



## SR-101 Signal Receiver

Fault Location and DSL Identification Receiver  
Technician Manual  
Version 1.0.6

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# 1 GENERAL DESCRIPTION

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The SR-101 Signal Receiver is a multipurpose signal receiver used to monitor signals on twisted pair telephone lines. The SR-101 is compatible with the DAP-125 differential amplified probe, DHC-124 differential hand-coil sensor, and other layup stick sensors used for aerial fault locating.

This manual applies to firmware versions 2.14 and higher.

## 1.1 FEATURES

The features of the SR-101 Signal Receiver include:

- Locating resistive faults in Aerial Cables or splice cases
- Monitoring for Simplex and TriPlex tones during Cable Transfers/Restoration
- Identifying DSL presence on cable pairs
- Six standard frequencies: 145Hz, 335Hz, 577Hz, 987Hz, 2KHz, and 4KHz.
- Ground, short, cross, and split fault location.
- Simple technician interface and operation.
- Rechargeable internal battery

## 1.2 COMPATIBILITY

The SR-101 along with the DHC-124 hand coil and DAP-125 probe are compatible with the ST-101 Cable Fault Locator Transmitter for locating pair shorts, crosses, splits, and ground faults.

## 1.3 HOW FAULT LOCATING WORKS

The SR-101 helps locate faults by receiving a signal applied to the faulted pair allowing the technician to trace the current flow. The current flowing in the pair causes a signal to be radiated. The receiver is highly sensitive and tuned to the same frequency as the signal source. The technician monitors the received signal strength to locate problems.

The SR-101 features a scrolling signal strength display and audible signal strength indication. The display clearly shows the changes in signal strength as the technician moves the probe along the cable path. The signal may increase and peak, dip, increase and remain higher, or decrease and remain lower depending on the type of fault, frequency used, and location of the signal source. The gain (sensitivity) of the receiver can be adjusted as needed for the best signal indication. The audible feature allows the technician to hear changes as the signal becomes stronger or weaker.

This manual describes the setup and the analysis of the display for the various faults to be located. It is important that the technician setup the system as described to obtain reliable results. In all cases, the system will need a complete circuit for the current to flow. This assures a current flow and greater radiated signal.

## 2 WHAT IS INCLUDED

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The SR-101 includes the following:

- SR-101 Signal Receiver
- DAP-125 Differential Amplifier Probe
- DHC-124 Differential Hand-coil Sensor
- Carrying case
- Charger
- USB Drive with manual

## 3 MAIN DISPLAY

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The SR-101 main display is shown in the following picture.



- The **PWR/CLR** on the lower left is used to exit any screen or to turn the unit off.
- A battery indication is in the top left corner. Always check this before use. If only one segment is indicated, charge the unit as soon as practical.
- The four functions are Check DSL, Probe, Locate, and Config. Press the Function key below the label to select a mode.

### 3.1 MODES

This is a brief description of each of the four modes on the main display. Each mode is described later in this manual.

#### 3.1.1 CheckDSL

The CheckDSL mode allows the technician to identify special circuits and scan DSL circuits if detected. This can be beneficial when special handling is required for cable pairs with these services.

### 3.1.2 Probe

The probe feature is used with a DAP-125 probe to identify cable pairs. The frequencies 577Hz or 987Hz are typically used for pair identification. Any standard tone source, such as the AALogic D-105 test set or the AALogic TriTone tone generator, maybe be used to send tone on the pair.

### 3.1.3 Locate

The locate function allows the technician to locate resistive faults on cable pairs using the differential hand-coil sensor, DHC-124, or another compatible probe. An appropriate tone generator, such as the AALogic ST-101, must be used to send tone on the pair after the fault has been identified using conventional test equipment.

### 3.1.4 Configure

The Configure mode allows the setting of the Display Contrast, Power Time-out, Display Backlight, and the Speaker Volume.

## 4 BEFORE FIRST USE

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### 4.1 BATTERY CHARGING

The SR-101 should be charged before the first use. Use only the supplied power supply with the SR-101. AALogic recommends charging a minimum of four hours before the first use. In normal operation, the SR-101 should be fully charged after two to three hours depending on the current level of charge.

### 4.2 DISPLAY SETUP – CONTRAST AND BACKLITE

Press the **F4 [Config]** key from the main screen and you may adjust the display for personal preferences. The Contrast and Backlite levels can both be adjusted. It may be easier to increase the Backlite to a comfortable level first and then adjust the Contrast.

### 4.3 TIMEOUT

The SR-101 can turn itself off when not in use to extend battery usage. This timeout can be set in 15 minute increments from OFF to 45 minutes.

### 4.4 CARRY CASE

The included carry case may be adjusted for a comfortable carry height. The case is designed to hang in a face up position when in use.

### 4.5 PROBE SELECTION

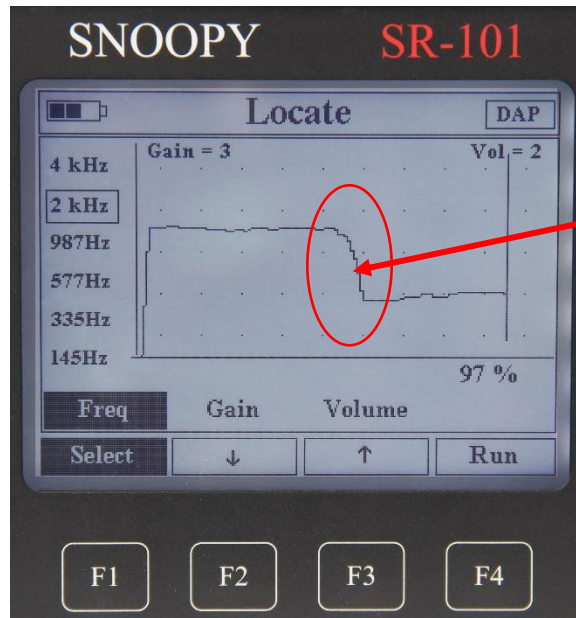
At least one probe is necessary when using the SR-101. Both the DAP-125 and DHC-124 are included. The DHC-124 is preferred when using the Locate mode. The DAP-125 is preferred in all other modes.

## 5 FAULT LOCATE MODE

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The Locate mode uses a high gain audio monitor to display signal levels. A time-based graph is displayed providing a history of signal strength. The graph is extremely useful when analyzing signal level changes as the sensor is moved over the cable.

The graph records from left to right and takes approximately 20 seconds to complete the initial pass. The graph then shifts left by one-half screen and continues recording signal levels.



Signal decrease when passing a low resistance fault such as a Short, Ground, or Cross.

### 5.1 FAULT LOCATE CONCEPT

Fault location is accomplished by measuring the current flow in a pair. Current flow requires a source voltage and a complete path from the Red clip to the Black clip. The ST-101, or other transmitter, provides the source voltage and the resistive fault completes the path back to the source. This means open faults, bridge tap, and other non-resistive faults are not located using the SR-101. A TDR, such as the D-105 test set, can be used for these faults.

### 5.2 FAULT TYPE IDENTIFICATION

Use a cable pair test set, such as the D-105, to identify the type fault to be located. Estimate the distance to the fault from the test location.

Short	Tip connected to Ring
Ground	Tip or Ring connected shield
Cross	Tip or Ring of one pair is connected to the Tip or Ring of another pair
Split	Tip or Ring of one pair is split with the Tip or Ring of another pair

#### 5.2.1 Shorts

For a short condition the transmitter should be connected to the faulted pair using Tip and Ring clips. The current would travel from the transmitter to the short on one clip and return on the other clip. The polarity of the leads does not matter.

***The signal will be minimal or non-existent on the side of the fault away from the transmitter.***

#### 5.2.2 Ground

For a ground condition the transmitter should be connected to the grounded Tip or Ring and sheath using the test clips. The current would travel from the transmitter to the short on one clip and return on the other clip. The polarity of the leads does not matter.

***The signal will be minimal or non-existent on the side of the fault away from the transmitter.***



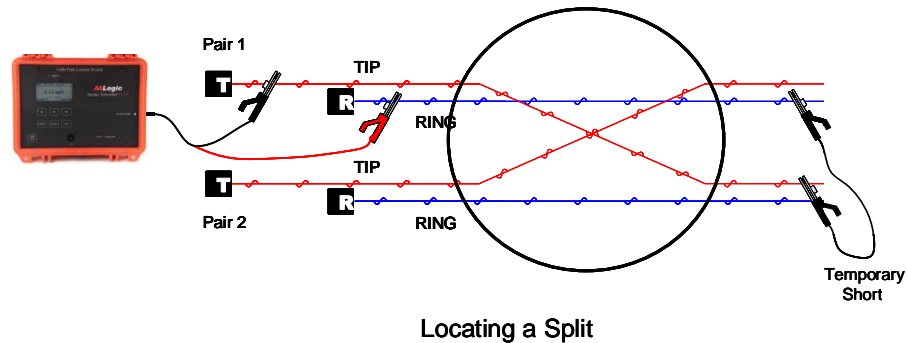
### 5.2.3 Crosses

A cross is located by connecting the clips to the two crossed wires. Connect one clip transmitter to the faulted wire (Tip or Ring) and the other clip to the cable sheath. The current will flow through the grounded wire and the sheath.

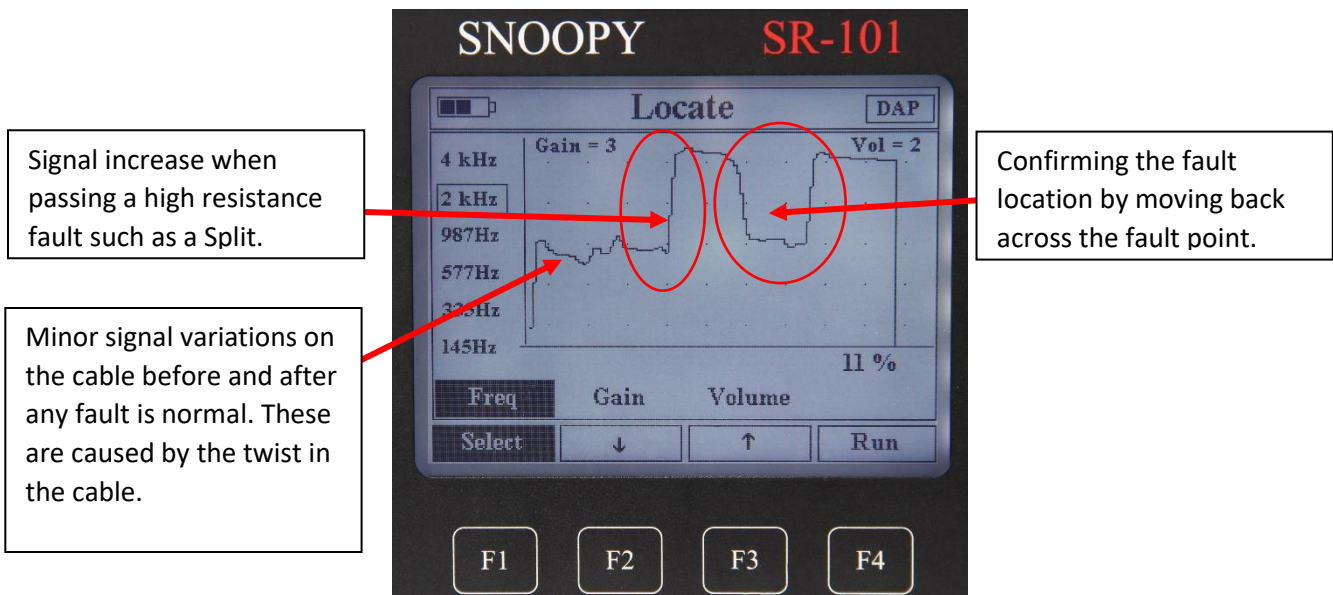
**The signal will be minimal or non-existent on the side of the fault away from the transmitter.**

### 5.2.4 Pair Split

The SR-101 relies on current flow in the pair to be able to receive the signal on the pair. A split pair does not have a complete circuit so one must be created.



During identification of the split, the technician must identify the two pairs involved in the split and if the tips or rings are split. The diagram shows a split and a temporary short placed at a point beyond the fault.



**A split location is detected by an increase in signal after the split. Moving the probe back over the fault location verifies the location.**

### 5.3 DHC-124 DIFFERENTIAL HAND-COIL SENSOR

The SR-101 includes a DHC-124 Differential Hand-coil Sensor for fault location. This sensor is designed to reduce outside electrical interference, and optimized to virtually eliminate tone beyond the cable fault. The DHC-124 is connected to the DAP connector on the right of the SR-101.

### 5.4 OTHER COIL SENSORS

A phone plug connector on the right side of the SR-101 allows using other compatible probes with the SR-101. Probes not manufactured by AALogic may not be compatible.

### 5.5 ST-101 TONE TRANSMITTER

A suitable tone transmitter is required and the SR-101 is compatible with other tone transmitters capable of sending compatible frequencies with sufficient power to be detected by the SR-101. The ST-101 is a high-powered signal transmitter capable of sending tone through a 100,000 ohm resistive fault to be detected by the SR-101 receiver.

The transmitter has adjustable frequency and power settings. Higher power settings should be used for higher resistance faults. The lower frequencies have a reduced chance of tone carry-over beyond the fault. Lower power settings are less likely to “dry” the fault during the locate process. The 4 kHz frequency will radiate further and is typically chosen when the fault resistance is high.

**It should be noted that various fault conditions and cable make-up determine the maximum locatable fault resistance. A short condition, the most difficult to find due to the pair twist, requires greater current to be detected from the outer sheath. Faults located in the center binder groups of cables are more difficult to locate than pairs near the sheath.**

### 5.6 LOCATING THE FAULT

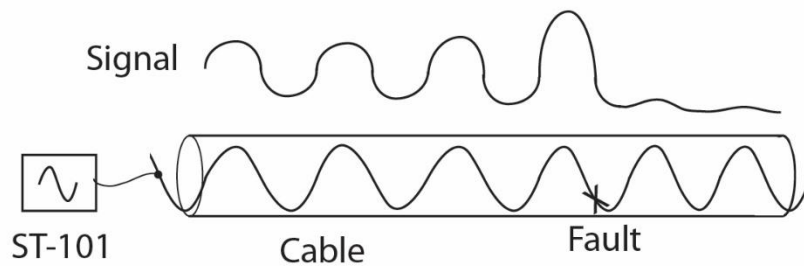
A signal transmitter, such as the ST-101, must be connected to the cable pair as discussed previously. The frequency and power settings should be selected to begin the locating procedure. The frequency and/or power may need to be adjusted to improve the signal reception. Refer to the transmitter documentation as needed.

1. Prepare the SR-101 by connecting the DHC-124 hand coil or another appropriate sensor to the SR-101.
2. Turn on the SR-101 and select Locate using the keys from the Home screen.
3. Select the frequency matching the transmitter frequency.
4. Place the sensor near the cable and adjust the Gain and Volume for an adequate signal indication on the SR-101 and from the speaker/earphone. The graph signal should be maintained between 20% and 80%.
5. Move the sensor along the cable while monitoring the screen graph and audible tone. Adjust the Gain and Volume as needed.

*Note: The cable pair and group are twisted inside the cable. This means the pair may be on the top, bottom, or middle as the probe is moved along the cable. It is normal for the signal indication to rise and fall before and after the fault. The fault location is determined by higher average signal peaks before the fault than after the fault for shorts, grounds, and crosses. The average peaks are higher after a split than before the split.*

*The average signal may also increase as a splice case is approached. This is due to the lack of sheath shielding at the case and the separation of the pair groups during splicing. The position of the pair in the*

*inbound cable may be different than the outbound cable due to the change in position of the pair in the two cables. Compare the maximum signal before the splice and after the splice to confirm a fault location.*



6. Verify the location when the appropriate indication is detected by comparing the average signal peaks before and after the identified location.
  - a. The signal should decrease significantly for shorts, crosses, and grounds.
  - b. The signal should increase when crossing the point where a pair splits. If moving from the split section to the un-split section, the signal will decrease.
  - c. Refer to the pictures above.

## 6 RECEIVING AUDIO TONE – DAP-125

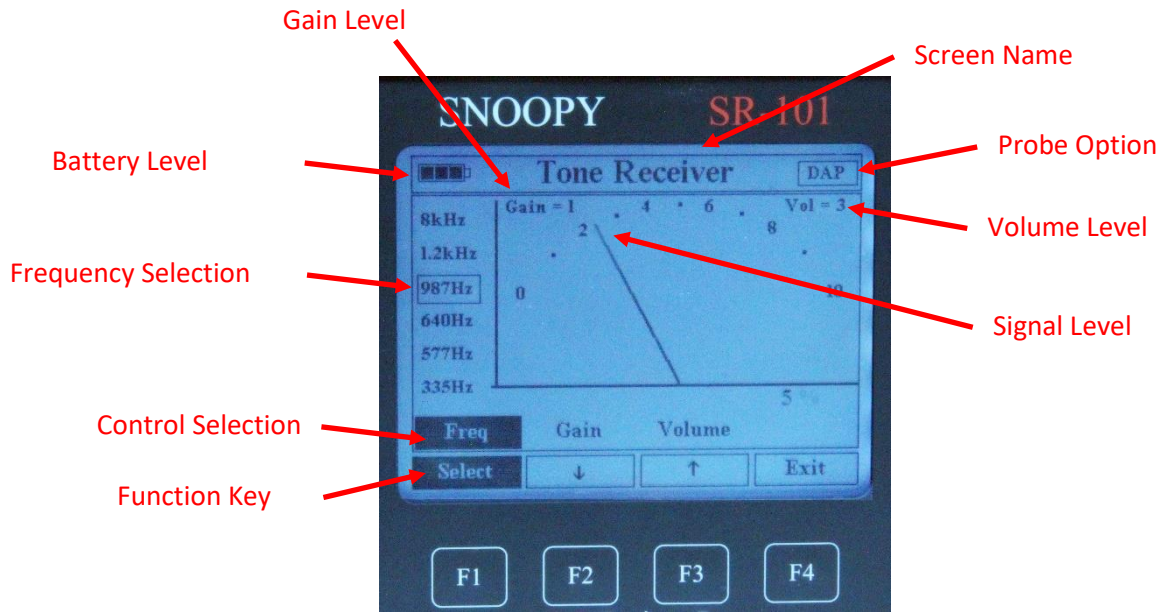
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The DAP-125 and SR-101 provide a means of non-intrusively detecting the type of service, DSL for example, on a pair without making an electrical connection. This configuration is also used to locate identification tone being sent on a cable pair from tone sources.

Tone sources compatible with the SR-101 include:

- AALogic TriTone Generator
- AALogic D-105 cable pair test set
- AALogic ATV-25 Cable analysis tester
- Third party generators capable of transmitting one of the SR-101 frequencies.

The Tone Receiver screen is divided into areas making it easy to monitor all settings and received signal levels. The following image identifies the information on the screen.



The **F1** key is used to select one of the control options. Function keys **F2** and **F3** decrease or increase the current option. The Gain and Volume values are in the top corners of the analog meter area. The **F4** or **PWR/CLR** keys can be used to exit to the Home screen.

The SR-101 receiver software and hardware can detect small differences in received tone amplitude that cannot be heard. The received signal strength is displayed on an analog scale of 0 to 10. The equivalent numeric value of 0% to 100% is displayed in the lower right corner of the meter area.

## 6.1 SIMPLEX TONE

Simplex tone has been used extensively to identify cable pairs for cable transfers and restoration. Simplex tone applies equal amplitude and phase tone on the Tip and Ring at the same time. The customer does not hear the tone because there is no signal difference between the Tip and Ring on balanced pairs. Simplex tone is sometimes referred to as “quiet tone” and is ideal when identifying cable pairs.

Simplex tone couples over to adjacent pairs. This helps identify pair groups, and then the specific pair, because the tone becomes louder when the probe is placed near the pair. Cable conditions can increase tone coupling making positive pair identification difficult.

## 6.2 TRIPLEX TONE

TriPlex tone, a special tone mode developed by AALogic. TriPlex is recommended when cable conditions, such as poor shielding, bonding, or cable faults produce excessive tone coupling. TriPlex can be heard by customers and is intended to be used for service restoration when the technician has difficulty identifying pairs.

### 6.2.1 Using TriPlex Tone

TriPlex tone has less coupling to adjacent pairs and requires a different technique. Start the search using Simplex tone to identify the group. Simplex tone can also be used to identify the most likely pairs. TriPlex is then used to isolate the correct pair. This technique reduces the time searching the cable. A conventional probe can also be used to locate TriPlex as long as the twist is not too tight or there is some separation between the Tip and Ring.

### 6.2.2 Confirming Identification with the DAP-125

The DAP-125 can usually be used to make a positive identification without the need to short the pair. Place one side of the tip against the Tip and then against the Ring and note the signal level on the D-105 or SR-101 receiver. A significant increase in signal level when the tip is placed between the Tip and Ring confirms both Tip and Ring have been found.

## 7 DETECTING DSL

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The SR-101 monitors a frequency or group of frequencies to determine signal level, and produces an audio sound in the speaker to indicate digital data transmission.

### 7.1 FREQUENCY SCAN

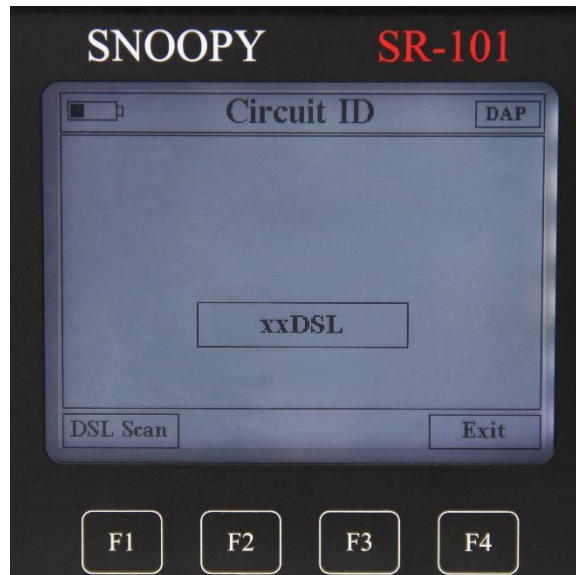
The DSL Frequency Mode scans the selected frequency range to indicate signal or noise level. The range is selectable and displayed at the bottom of the graph. The graph vertical column on the left is the relative dB level of the signal.

Cursor Mode can be selected and the scanning stops allowing the technician to select specific frequencies. The frequency and dB level are shown at the top of the LCD graph. The received signal can be heard from the speaker or a connected earphone.

### 7.2 CIRCUIT ID

The Circuit ID function scans a number of frequencies to determine the type of DSL signal on the pair if one is present. The types of DSL detected are HDSL, T1, ADSL, or VDSL. The indication xxDSL is displayed when an unknown DSL type is detected.

Audible tones are heard when a circuit is detected. Each circuit type has a different tone and can aid the technician to identify the circuit without referring to the SR-101 Display.



## 8 SPECIFICATIONS:

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Receiver Gain	≤ 90dB
DAP-125 Gain	40dB
DHC-124 Gain	12dB
Display	
Transflective	Sunlight Readable
Backlight	LED
Resolution	320x240
Power	
Li-ion	2000mAH
Charger	6Vdc@1.0A
Operate Time	8 to 16 hours
Charge Time	~2 Hrs
Temperature	
Charge	0 to 45c (32 to 113F)
Operate	-20 to 60c (-4 to 158F)
Storage	-20 to 60c (-4 to 158F)

### TYPICAL RESISTIVE FAULT LIMITS (K OHMS)

	Cable Diameter (inches)		
	1	2	3
<b>SHORT</b>	75K	50K	25K
<b>CROSS</b>	100K	75K	50K
<b>GROUND</b>	100K	75K	75K
<b>SPLIT</b>	> 1600 ohms, both pairs shorted		

**Fault Limits are shown as a general guideline and may vary due to cable makeup or fault position within the cable.**