



ST-101 Signal Transmitter

Fault Location Transmitter
User Manual
Version 2.0.0

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1 GENERAL DESCRIPTION

The ST-101 Signal Transmitter transmits signals on twisted pair telephone lines for locating resistive faults when used with a receiver such as the AALogic SR-101.

1.1 FEATURES

The features of the ST-101 Signal Transmitter include:

- Five frequencies: 145Hz, 335Hz, 987Hz, 2KHz, and 8KHz.
- Simple user interface and operation.
- Rechargeable internal battery
- Water resistant, lockable case

1.2 HOW FAULT LOCATING WORKS

The ST-101 helps locate faults by transmitting a signal on a resistive fault. The technician uses a signal receiver, the AALogic SR-101, to trace the signal on the cable. The current flowing through the fault causes the signal to be radiated from the cable. The highly sensitive receiver, tuned to the signal frequency, allows the technician to locate the fault by observing and/or listening to the changes in the signal strength. The signal significantly increases or decreases as the technician moves past the fault, depending on the type of fault.

The ST-101 offers a high voltage, low current signal that is compatible with receivers capable of monitoring one of the signal frequencies.

This manual describes the setup of the transmitter for the various aerial faults to be located. It is important that the technician setup the system as described to obtain reliable results. In all cases, a complete circuit, through the fault, is required.

The receiver operating instructions must also be used for effective location of faults.

2 WHAT IS INCLUDED

The ST-101 includes the following:

- ST-101 Signal Transmitter
- Test cord with clips
- Charger
- USB Drive with manual

3 FRONT PANEL

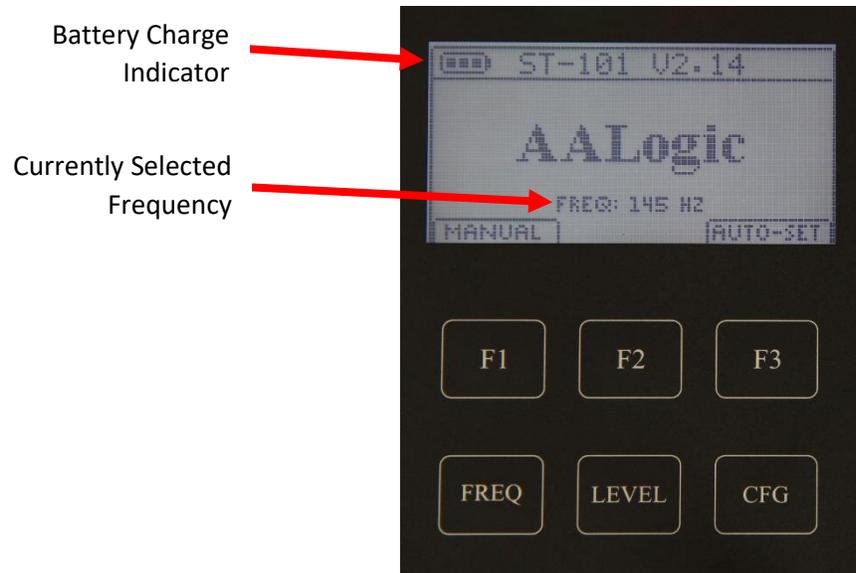
The ST-101 main display is shown in the following picture.



- The **PWR/CLR** on the lower left is used to Exit any screen or to turn the unit off.
- Keys **[F1]**, **[F2]**, and **[F3]** are screen dependent.
 - The **[F1] MANUAL** key starts sending a signal at the currently set frequency.
 - The **[F3] AUTO-SET** key initiates an automatic setup feature. The ST-101 will scan the pair and attempt to determine an optimum frequency and initial power level.
- The **FREQ** key allows for manual frequency selection.
- The **LEVEL** key allows for manual power level setting.
- The **CFG** key allows the user to set the **CONTRAST**, **BACKLIGHT**, and access the **HELP** options.
- The charger jack (12V) is used to charge the internal battery. Only use the supplied charger to charge the ST-101 to avoid damage to the unit.
- The CHGR lights above the display has a green light when the charger is connected. A red light is on when the battery is charging.
- The pair cord plugs in on the right side of the case as indicated on the front panel.

4 DISPLAY

The main screen is shown in the following picture.



From this screen, the **[F1]** key is labelled **MANUAL**. This begins the transmitting operation using the current frequency shown on the screen and automatically adjusts the power output level. The **[F2]** is not used from the Main screen. The **[F3]** key is labelled **AUTO-SET** and begins the transmitting operation and automatically adjusts the frequency and the power output.

The display is backlight and contrast adjustable by pressing the **CFG** key.

A battery charge indicator is in the top left corner. Always check this before use. If only one segment is shown, charge the unit as soon as practical.

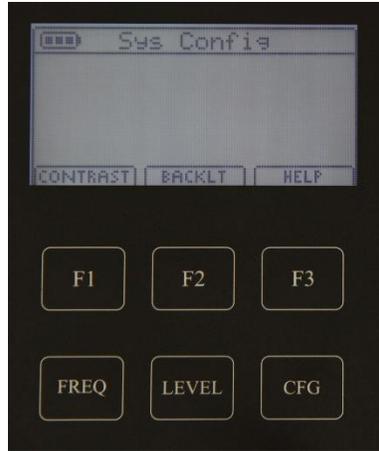
5 BEFORE FIRST USE

5.1 BATTERY CHARGING

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

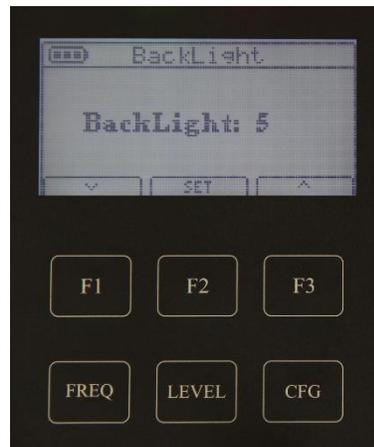
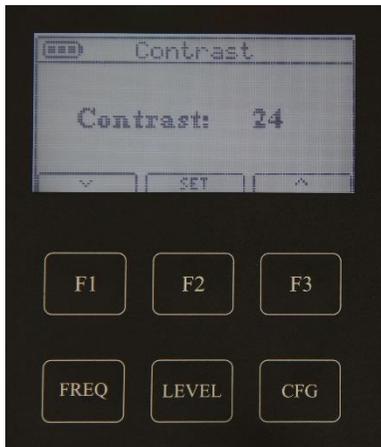
5.2 CONFIGURATION OPTIONS

This section describes the configuration options for the ST-101. Press the **[CFG]** key to display the config screen.



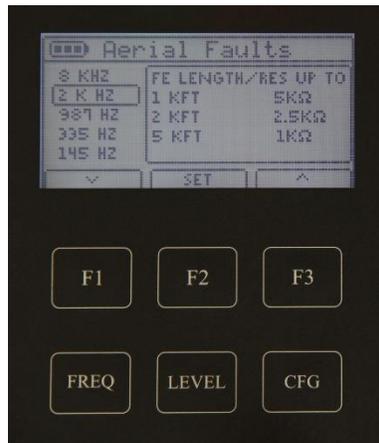
5.2.1 Display Setup – Contrast and Backlight

The contrast and backlight **LEVELS** can both be adjusted. It may be easier to increase the Backlight (**BACKLT**) to a comfortable level first and then adjust the contrast.



5.2.2 Help

The help table lists reference information regarding resistance expectations for various far-end lengths.



6 SETUP

The ST-101 is designed to simplify setup and operation. The directions provided with the receiver should be reviewed to ensure the best success in locating the fault.

6.1 SAFETY

All prescribed safety precautions and procedures must be observed while using the ST-101. Failure to do so can result in serious injury or death.

Caution should be used when foreign voltage is detected on a pair. The voltage may be a power source capable of injury to technicians and possible damage to equipment. Foreign voltage should be removed prior to locating for best results.

7 TYPES OF FAULTS

The following aerial resistive faults may be located:

- Short Tip connected to Ring
 - 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
- ✓ *Locating ground faults are more difficult due to multiple ground signal return paths. It is recommended to locate shorts or crosses whenever possible. Otherwise it may be helpful to remove shield ground at the transmitter location, then connect the transmitter leads to the faulted wire and shield.*
- ✓ *The cable length beyond the fault should be as short as possible.*

8 FAULT PRE-TESTING

The technician must identify the type of fault before attempting location. Test equipment, such as the AALogic D-105, ATV-25, or similar test sets may be used to identify various fault types according to local

practice. Once the faulted wires are identified, the transmitter can be connected. With multiple faults, it is recommended to use the fault with the lowest resistance.

The approximate location of the fault should also be estimated using the test equipment. The estimate and the cable documentation are useful in sectioning the cable for fault location. The physical location and the location provided by electrical measurements may not match the estimate.

9 SECTIONING

The CO and the premise should be isolated from the fault as close as practical on each side of the fault, following standard practice, prior to attempting fault location. This will improve the reliability of the fault indications and reduce the time needed to locate the fault.

10 CONNECTIONS

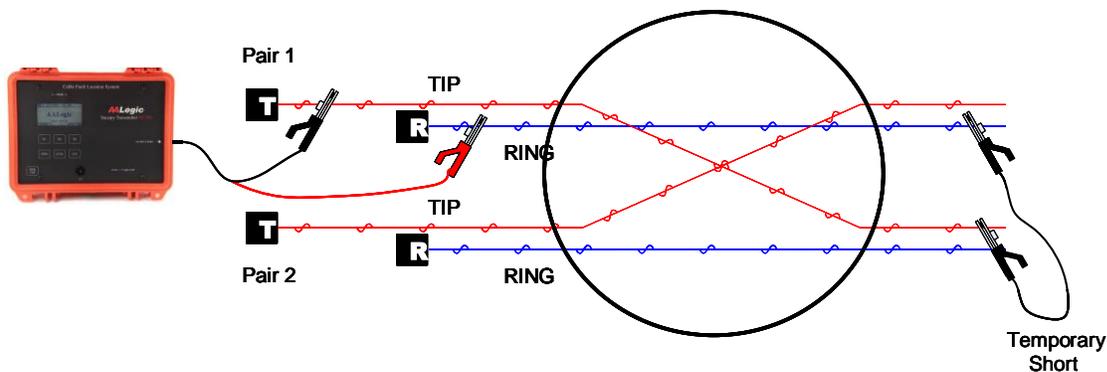
The ST-101 includes a cord with pair clips. This cord is plugged into the jack on the right side. Only the pair cord supplied with the ST-101 should be used.

Fault location depends on current flow. The black and red clips must be connected to each side of the fault as follows:

Fault	Description	Connections
Short	Tip connected to Ring	Black to one wire and Red to other wire.
Ground	Tip or Ring connected shield	Black to sheath and Red to grounded wire (See para. 7 above)
Cross	Tip or Ring of one pair is connected to the Tip or Ring of another pair	Black to one of the crossed wires and Red to the other crossed wire.
Split	Tip or Ring of one pair is split with the Tip or Ring of another pair	Black to one of the split wires and Red to the other wire of the same pair. See 10.1 below.

10.1 SPLIT FAULTS

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 below shows a split and how to place temporary short at the end of the section.



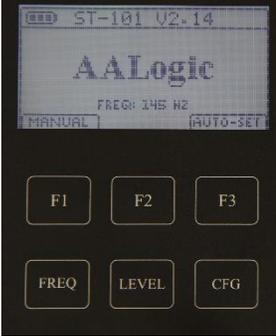
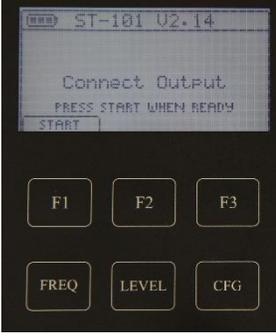
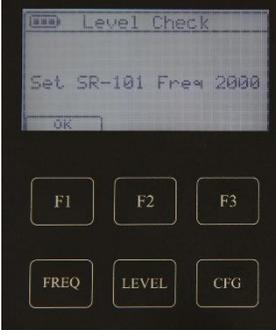
Locating a Split

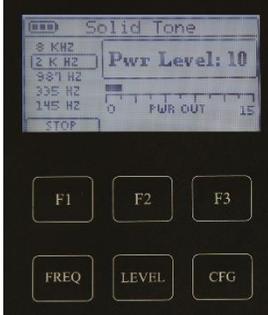
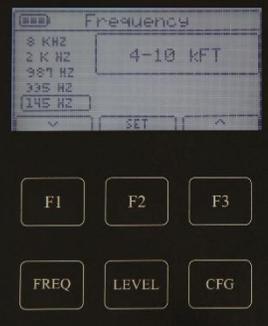
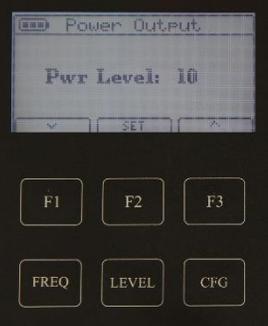
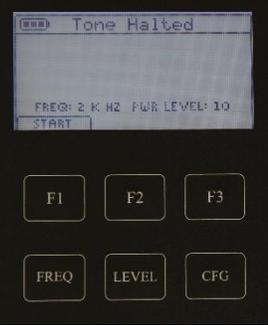
11 TRANSMITTING

The transmitter frequency and level can be set manually or using the Auto-Set function. The Auto-Set function is recommended as a starting point for all faults. The frequency and output level can be manually adjusted after the Auto-Set function is used.

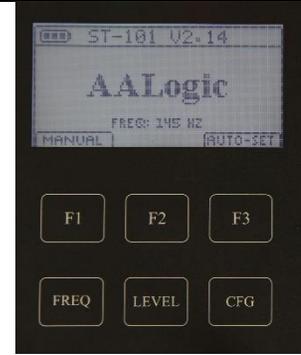
11.1 AUTO-SET MODE

The preferred and easiest way to start the ST-101 is using the **[F3] AUTO-SET** from the Main screen. The ST-101 will scan the connection and set the initial frequency and PWR LEVEL. The frequency and power level can then be adjusted if desired.

<p>1. From the Main screen, press [F3] AUTO-SET.</p>	
<p>2. The ST-101 prompts to connect the output. 3. Connect the clips as described in 10 above and press [F1] START. 4. The ST-101 determines the initial frequency and output level for the current connection.</p>	
<p>5. The ST-101 displays, "Set SR-101 Freq XXX". This is the initial frequency as determined by the ST-101. Set the SR-101, or other receiver, to this frequency and press [F1] OK.</p>	

<p>6. The ST-101 starts transmitting the signal at the frequency and power level determined by the scan. Follow the instructions for the receiver to ensure the signal is detected by monitoring the cable.</p>	
<p>7. The frequency can be changed by pressing the FREQ key. Always ensure the ST-101 and receiver are using the same frequency. Use [F1] or [F2] to highlight the frequency then press SET.</p>	
<p>8. Output level is adjusted by pressing the LEVEL key. Use [F1] or [F2] to decrease or increase the Pwr Level then press SET.</p>	
<p>9. Press [F1] STOP to temporarily stop transmitting but remain in the Transmit mode. Press [F1] START from the stop screen to resume transmitting.</p>	

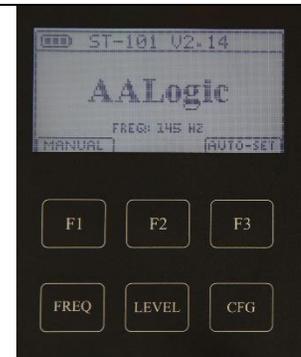
10. Press **CLR** to stop transmitting and return to the main screen.



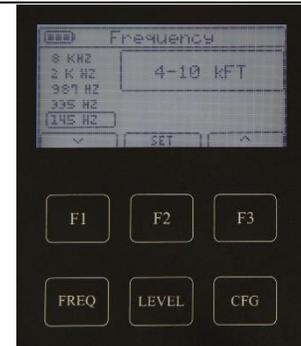
11.2 MANUAL MODE

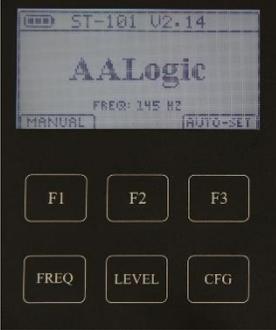
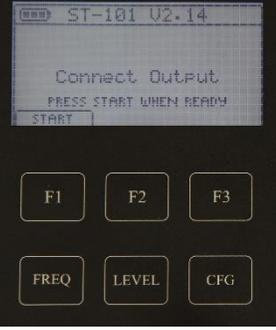
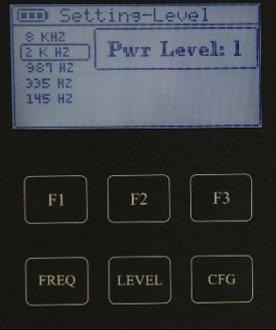
Use these instructions to transmit a signal at a pre-set frequency.

1. From the Main screen, press **FREQ**. If the desired frequency is displayed on the main screen, this step may be skipped.

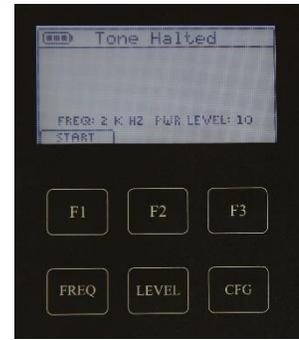


2. Use **[F1]** or **[F3]** to select and set the desired frequency then press **[F3]** **SET**. The transmitter returns to the main screen.

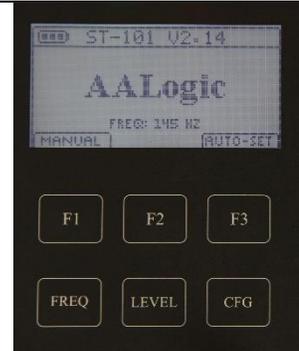


<p>3. Press [F1] MANUAL to begin.</p>	
<p>4. The ST-101 prompts to connect the output and press [F1] START.</p>	
<p>5. The ST-101 uses the selected frequency and gradually increases the power level to obtain a recommended initial PWR LEVEL. This level should be sufficient in most cases. The frequency and gain on the receiver must be adjusted using directions provided with the receiver.</p> <p><i>The power LEVEL can be adjusted by the user by pressing the LEVEL key from the Transmit screen. The level may be adjusted up or down, as needed, within the range of 1 to 10.</i></p>	
<p>6. The ST-101 starts transmitting the signal at the frequency and power level determined by the scan. Follow the instructions for the receiver to ensure the signal is detected by monitoring the cable.</p>	

7. Press **[F1] STOP** to temporarily stop transmitting but remain in the Transmit mode. Pressing **[F1] START** from the stop screen will resume transmitting.

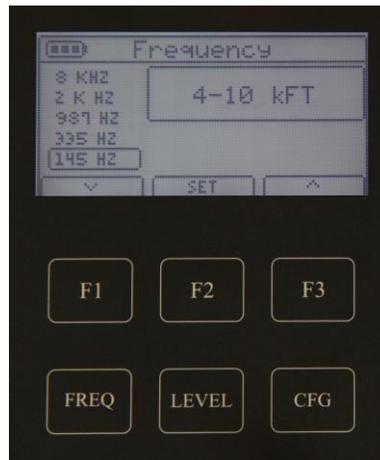


8. Press **CLR** to stop transmitting and return to the main screen.



12 MANUAL FREQUENCY SELECTION

Pressing the **FREQ** key from the main menu or while transmitting allows the user to select a specific frequency. The ST-101 displays the recommended distance for each frequency on the screen.



The table below shows the recommendations and notes.

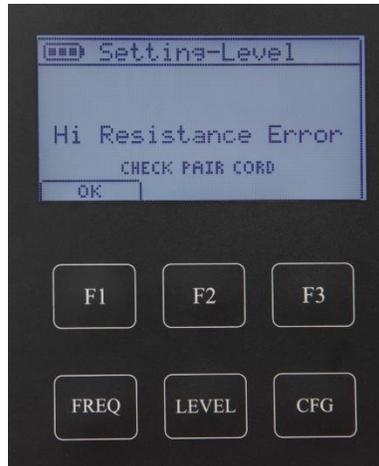
Section Length	Frequency	Note
1 - 3 kFt	2 KHz	Higher frequencies may result in more signal carry-by the fault.
2 - 5 kFt	987 Hz	Some pair identification probe/coils are compatible with this frequency.
3 - 6 kFt	335 Hz	
4 - 10 kFt	145 Hz	Additional fault isolation is recommended if the section is greater than 10 kFt. If the section is longer than 10 kFt, start with 145 Hz.

13 OUTPUT ERRORS

This section describes the transmitter operation when the clips have excessively high or low resistances connected to the pair clips.

13.1 LOW CURRENT – HIGH RESISTANCE OR OPEN

Low current occurs when the resistive fault is too high or the clips are connected to an Open. Check the clip connections when the ST-101 indicates **Hi Resistance Error**. In some cases, a higher frequency may be used and increase the current.

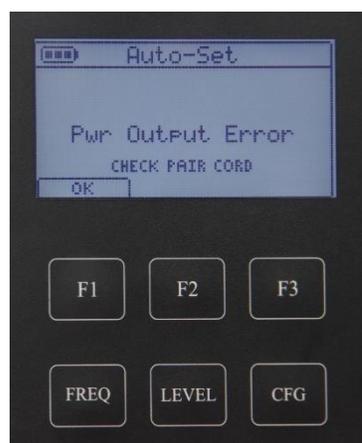


The following table shows the typical fault resistances that can be located.

Resistive Fault Range (Ω) (approximate)			
Fault Type	Cable Diameter		
	1"	2"	3"
Short	50K	30K	15K
Cross and T/R to Sheath	75K	50K	25K
Split	> 1600 ohms		

13.2 HIGH CURRENT – SHORT, CROSS, OR GROUND

When the current is too high, the ST-101 may stop scanning and display Pwr Output Error. Use the following table to resolve the error.



Procedure	Solution
Check the Clips	Ensure the clips and wire are not shorted.
Measure the fault with a test set	The cable pair maybe shorted at the connection point.
Decrease the frequency	High frequencies require more current on long sections.

13.3 AUTO-SET HIGH CURRENT ERROR

The AUTO-SET function may not be able to determine the correct frequency if the resistive fault is very low. In these cases, use the manual mode to setup the ST-101 as described in 11.2 above.

14 SPECIFICATIONS:

Display

Transflective	Sunlight Readable
Backlight	LED
Resolution	128 x 64

Power

Li-ion	6800mAH
Charger	12 Vdc / 2A
Operate Time	8 to 16 hours
Charge Time	~4 Hrs

Temperature

Charge	0 to 45c (32 to 113F)
Operate	-20 to 60c (-4 to 158F)
Storage	-20 to 60c (-4 to 158F)

Fault Limits

Resistive Fault Range (Ω) (approximate)			
Fault Type	Cable Diameter		
	1"	2"	3"
Short	50K	30K	15K
Cross and T/R to Sheath	75K	50K	25K
Split	> 1600 ohms		

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

All specifications subject to change without notice.

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