DAP125 Differential Amplified Probe

A Non-Intrusive Means for Identifying DSL Service

And

Transferring Cable Pairs Under Adverse Conditions

Contents

1 Overview

The DAP125 is a handheld probe designed to be attached to the D105 Test Set, or SR-101 Filtered Tone Receiver. It is capable of receiving various frequency audio tones used for pair identification, and can detect and identify presence of an active DSL circuit.

Unlike many tone probes available, the DAP125 has a dual sided probe tip that when placed between the Tip and Ring can sense signals on the customer cable pair. It is a non-intrusive device that does not require physical contact with the cable pair.

2 Locating Audible Tone

The process of locating tone with the DAP125 is similar to practices currently used where a sending device is placed at one end of the cable and a receiving device at the other. The DAP125 can be used with a D105 Test Set when placed in the receive mode, or SR-101 receiver. Full benefits of the DAP125 features can be realized when using ***TriPlex*** tone being sent by a second D105 Test Set or ***TriTone*** Generator.

2.1 Simplex Tone

Simplex tone has been in use for decades to identify pairs for cable transfers and restoration. The Simplex method places equal tone on the Tip and Ring, and since the customer only hears the difference between the Tip and Ring, it is sometimes referred to as “quiet tone”.

Because Simplex causes minimal customer interference it is the ideal tone to use when identifying cable pairs. Also, Simplex has a tendency to couple over to adjacent pairs, making it easier to locate a pair within a high count cable because the closer the tone probe gets to the pair the louder the tone. Unfortunately in many cases tone bleed-over is so severe that positive identification is somewhat a mystery.

2.2 TriPlex Tone

TriPlex, a special tone developed by AALogic, is recommended in situations where poor shielding and bonding produces excessive tone bleed-over. It should be noted that TriPlex is intended to be used where a cable is already out of service and the technician has difficulty determining the correct pair due to sever bleed-over conditions.

Since TriPlex reduces bleed-over, the method of locating a pair is much different than Simplex. In large bundles it is best to start the tone search with Simplex to identify the group, then switch to TriPlex to pinpoint the pair. A conventional probe will work in locating TriPlex as long as the twist is not too tight or there is some separation of the Tip and Ring.

In most cases when using the DAP125 positive identification can be made without the need to short the pair. Place one side of the paddle against the Tip, and then against the Ring and note the signal level on

the D105 or SR-101 receiver. Placing the probe between the Tip and Ring yields a significant signal level increase confirming both Tip and Ring have been found.

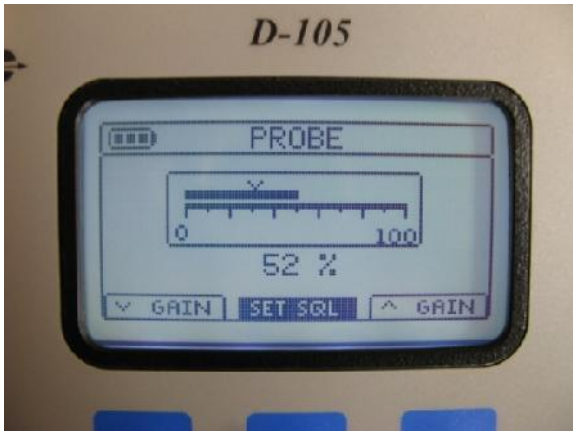
3 USING THE DAP125 TO LOCATE SIMPLEX TONE

Locating Simplex Tone on a cable with good sheath continuity is usually very easy. When sheath continuity is poor, or non-existent, several pairs can be bonded to the sheath at each end of the cable to reduce bleed-over of tones to adjacent pairs. For best results keep all leads including ground as short as possible, and use only **one side** of the probe tip to locate the pair.

3.1 Receiving Simplex Tone

The D105 probe software and hardware can discern small differences in tone amplitude, even when no difference can be heard. This method uses a "squelch" technique to mute the speaker until the signal level exceeds the squelched amplitude. When the signal level increases above the precision squelch point the speaker is turned on. This abrupt change makes minor tone level differences easily identified.

Probe Signal levels on the D105 are displayed on a scale of 0-100%. The "bar graph" is a visual indication of received signal level. Below the graph the equivalent numeric value is shown. The down arrow in the upper portion of the graph indicates the squelch point. For signals less than this point the speaker is turned OFF. Signals that exceed the squelch point cause the speaker to become unmuted. F1 and F3 function keys are used to decrease or increase the received signal level so that the indication resides within the graph window. The F2 function key sets the squelch to a value slightly above the current signal being received by the probe.



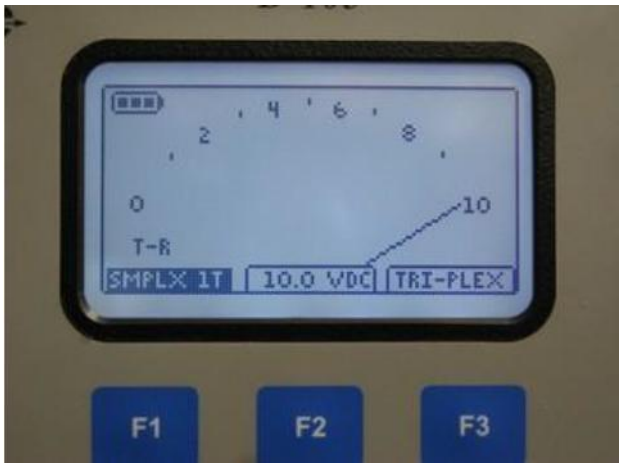
Tone level Above "V" can be heard

The squelch point is set by placing the probe flat against a pair where tone is being heard and pressing the F2 function key. Once set the technician can search through the remaining pairs for a stronger signal. Any slight difference will unmute the speaker. If the speaker does not unmute, try setting the squelch for a different pair. When signal differences are not adequate to break or unmute squelch the technician may be able to use the numeric display to distinguish the correct pair.

3.2 Sending Simplex Tone with the D105

The technician can choose between two different display modes while sending tone, “3T” and “1T”.

D105 Sending Tone measuring TR/TG/RG



D105 Sending Tone, TR measurement only

When the technician shorts the pair in the “3T” mode a momentary “BUZZ” is seen in the T-R window, and the tone pattern will change to provide the far end notification the pair has been shorted.

Additionally, during the time tone is being sent the D105 measures Tip and Ring tone levels. If the pair has a short the technician can merely ground each side to confirm pair identity.

If the cable is clear of TR faults the “1T” method can be used. This produces the same results as the “3T” method, but is much quicker because the test set isn’t required to measure for ground faults.

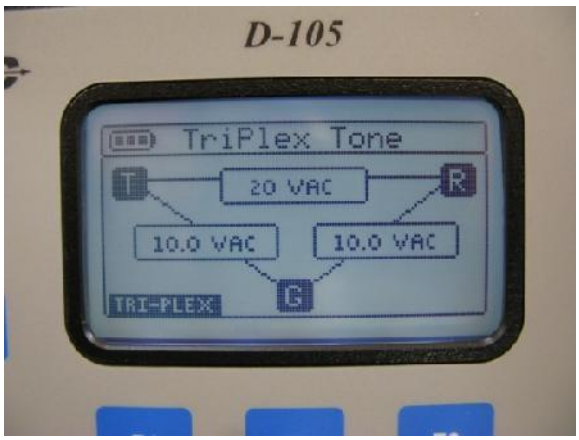
Both “3T” and “1T” mode changes the tone sequence cadence when shorted to indicate the correct pair.

4 The DAP125 with TriPlex Tone

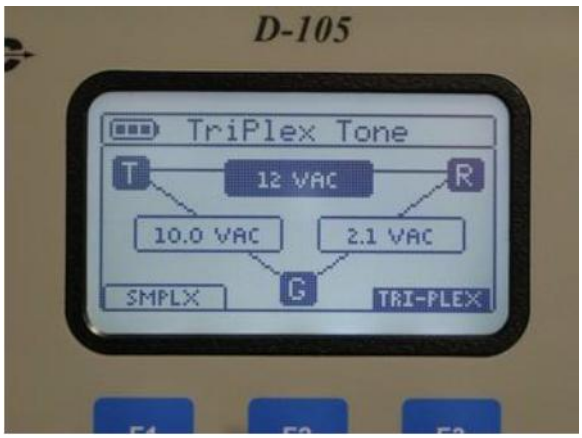
TriPlex tone is recommended in situations where there is significate bleed-over on adjacent pairs. Since there is very little tone bleed-over, it may be necessary to probe pairs individually rather than probing binders.

4.1 Receiving TriPlex Tone

The advantage of TriPlex becomes obvious when using the DAP125 differential probe. Placing the probe between the Tip and Ring of the correct pair will cause the received tone level to double. If the probe is placed between an adjacent pair with bleed-over the level will decrease, thus giving a substantial difference between the correct pair and any adjacent pair.



TriPlex doubles tone output level



TriPlex Transmit Tone, with Ring Ground

The picture above is a D105 sending TriPlex tone at the transmitting end of a cable pair. Notice the tone level is twice that of when sending Simplex.

When the technician at the receiving end shorts the pair a momentary "BUZZ" is seen in the T-R window. Also as tone is being sent voltage readings are taken by the transmitter between TR/TG/RG and displayed accordingly.

5 Filtered Probe

The D105 and SR-101includes an internal digital filter that is used with the DAP125. The default filter frequency is 577Hz. When used with the TriTone Generator the optional 987Hz filter can be selected.

6 DSL Detection

Since the customer receives service between the Tip and Ring, the DAP125 should be placed between the pair for optimum results. There are three methods for identifying DSL service on the cable pair, Circuit ID, Frequency Scan, and Snoop.

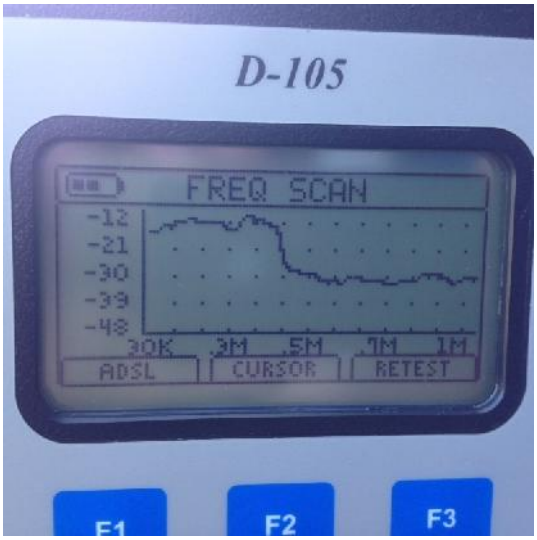
6.1 Circuit ID

The Circuit ID method rapidly scans a handful of frequencies for specifics that characterizes the type of DSL signal. The types of DSL displayed are HDSL, T1, ADSL, VDSL, xxDSL. If the program determines DSL is present, but can't determine the type, it will indicate ***xxDSL.***

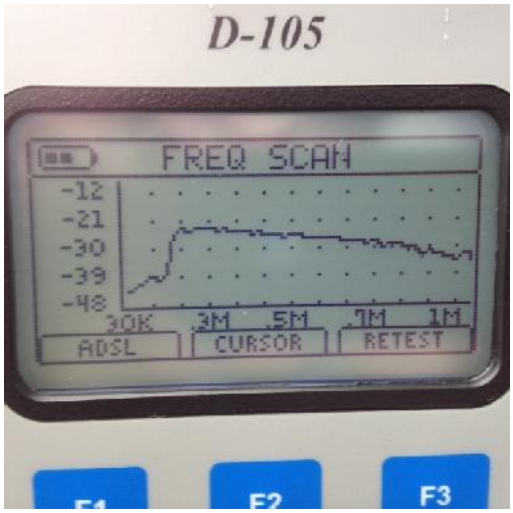
In addition to determining the circuit type an audible tone provides an indication of DSL presence.

6.2 Frequency Scan Images

The two pictures below show high level ***upstream*** and high level ***downstream*** data typical of asymmetrical DSL such as ADSL or VDSL.



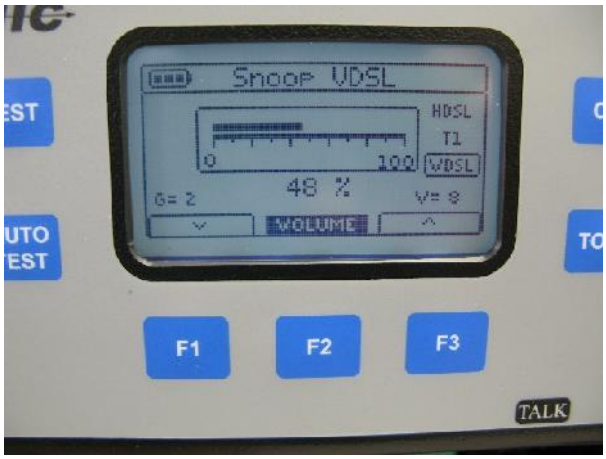
VDSL located close to subscriber



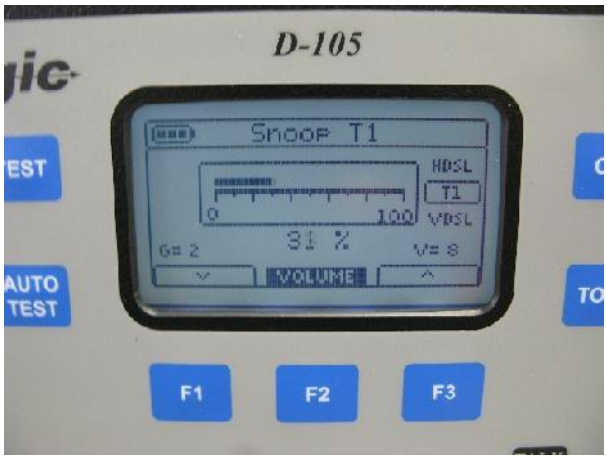
VDSL located close to CO

6.3 Snoop Mode

The Snoop Mode allows the user to monitor the audio produced at a specific frequency within the DSL service spectrum. The sound heard will resemble the hissing sound of a dial up modem before the connection has been completed, and the display represents the signal level.



Typical Receive Signal Level for VDSL



T1 Signal being Received

7 Specifications:

Frequency Response	500Hz to 5MHz
Interface	D105 Test Set / SR-101 Receiver
Cord Length	60” (5 Ft) (1.5m)
Weight	0.14 pounds (65 grams)
Size	
Diameter	0.67 in (17mm)
Length	7 in (17.8cm)
Power	Supplied by D105 or SR-101
	(4-7Vdc)
Temperature	
Operate	-40 to +60c (-40 to 140F)
Storage	-40 to +80c (-40 to 175F)