

Telephone Line Diagnostic Table Customer _____ Pg ___ of ___

Telephone / Line Number >						
On-Hook DCV (24 to 50VDC)						
Off-Hook DCV (5 to 15VDC)						
Loop Current ² DCma (23 to 35ma)						
On-Hook ACV ³ - T to R (<.5VAC)						
On-Hook ACV ³ - T to Grnd (<.5VAC)						
On-Hook ACV ³ - R to Grnd (<.5VAC)						
AC Ring Voltage (>75VACRMS)						
AC Ring Current ⁶ (8.5 to 45maAC)						
Open Loop <i>going</i> Off-Hook ⁴ (<20ms)						
CPC Open Loop Duration ⁴ (500ms)						
Circuit Loss ¹ -db (-5.5 to -8.5db)						
Using 1KC Tone (MW) phone number ¹ :						

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Instructions:

The only way to diagnose many problems on phone lines is to take voltage, current and circuit loss readings.

When you have a problem, by taking readings on all of the phone lines at a premise, and comparing the results to those at other premises with no problems, the cause of the problem should jump out at you. Always take readings at premises where you aren't having problems first, so you have a basis of comparison, and a comfort level with your readings. **Never use a tester for the first time at a premise with a problem!**

If you ask the telco to take these readings, they'll simply say "they're fine." They don't care. They don't have to. It's your customer and your problem.

Once you have the readings that point to the cause of the symptoms, going to battle with the phone company is a lot easier. Even with these reading, you may have to escalate the case of trouble, since the repair people at the phone company may not know what these readings mean.

NOTES:

1. When taking Circuit Loss readings for a "Can't Hear" / "Can't be Heard" problem you **must** use the 1KC (milliwatt) tone for the **local CO** these lines are working from. If the lines are from a CLEC or on portability, you **must** find the 1KC tone number located at the CO these lines originate from. Using another 1KC number will give you incorrect circuit loss readings and be meaningless. There is **always** an unknown amount of loss between COs.

If there are three or more phone lines at a premise and you have a **1KC Tone Generator**, you can do a "**Loop Around**" test, sending tone on one line, and receiving it on the others. Doing some math, you can get within about 10% of the actual circuit loss on the lines.

If there is more than 8.5db of loss on a line, the phone company has to bring it up over -8.5db (except at **true** Rural phone companies, where they can do anything they want to get you dial tone). Since "Can't Hear" problems start at around -7.5db, you'll have to change the line to a trunk (with a minimum -5.5db spec), or find a way to amplify the line yourself (pretty much impossible).

2. The phone company doesn't have to bring the Loop Current on a phone line down unless it's over 110maDC. Since problems start occurring above 35ma (sometimes over 27ma), you'll have to reduce the Loop Current yourself. If the current is below 23ma, it's the phone company's responsibility to get the current up over 23ma (except at **true** Rural phone companies).

3. The phone company doesn't have to bring the AC on a phone line down unless it's over 50VAC (for safety reasons). Since problems start occurring on telephone systems above .5VAC, you'll have to reduce the AC yourself.

4. Some phone lines give a brief open loop (0VDC) when the line first goes off-hook, or right after the last digit is dialed. This can cause a cut-off if the CPC (Open Loop Timer) in the phone system is set too low. The CPC signal is normally 550 to 850ms at 0 volts, so the CPC or Open Loop Disconnect timer on a phone system should be set to 500ms (or shorter than the measured CPC signal).

5. Echo problems that don't change are often caused by an impedance mismatch between the trunk and station equipment. Since there is no easy way to measure the impedance of the phone line or phone in the field, the only way to check is to change the impedance to see if the problem clears (using a 600 to 900 ohm **Echo Stopper** Impedance Matcher).

6. AC Ringing Current can be too low to make a ringer ring (less than 1 REN?), or too high which could burn up components on a trunk card (common on Nortel). A **Loop Current Regulator** also regulates AC ringing current. High AC ringing current can follow high loop current.