Telephone Ringing

In the last part of the exercise, you will evaluate the threshold voltage at which the analog telephone sets in the Telephony Training System ring.

EQUIPMENT REQUIRED

Refer to Appendix A of this manual to obtain the list of equipment required to perform this exercise.

PROCEDURE

Setting Up the Central Office

☐ 1. Make sure that the Reconfigurable Training Module, Model 9431, is connected to the TTS Power Supply, Model 9408.

Make sure that there is a network connection between the Reconfigurable Training Module and the host computer.

Install the Dual Analog Line Interface, Model 9475, into one of the analog/digital (A/D) slots of the Reconfigurable Training Module.

Connect two analog telephone sets to the Dual Analog Line Interface. Make sure that the tone dialing mode is selected on the analog telephone sets.

CAUTION!

High voltages are present on the standard telephone connectors of the Dual Analog Line Interface. Do not connect or disconnect the analog telephone sets when the Reconfigurable Training Module is turned on.

Connect the AC/DC power converter supplied with each analog telephone set to one of the AC power outlets on the TTS Power Supply. Connect the DC power output jack of each AC/DC power converter to the DC power input connector on either one of the analog telephone sets.

Note: *The analog telephone set requires an auxiliary DC power source for the digital display to be operative.*

☐ 2. Turn on the host computer.

Turn on the TTS Power Supply then the Reconfigurable Training Module.

☐ 3. On the host computer, start the Telephony Training System software, then download the CO program to the Reconfigurable Training Module. The CO program configures the Reconfigurable Training Module so that it operates as a central office.

Note: *If the host computer is unable to download the CO program to the Reconfigurable Training Module, it may not be using the proper IP address. Have your instructor or the LAN administrator check if the host computer uses the proper IP address to communicate with the Reconfigurable Training Module.*

AC Ringing Voltage and Telephone Ringing

☐ 4. On the host computer, zoom in on ANALOG LINE INTERFACE A, connect Oscilloscope Probe 1 to TP2 (AC ringing voltage), and start the Oscilloscope.

Note: *Probe 1 is associated with channel 1 of the Oscilloscope.*

☐ 5. Make the following settings on the Oscilloscope:

Channel 1
- Mode . . . . . Normal
- Sensitivity . . . . . 50 V/div
- Input Coupling . . . . . AC

Time Base . . . . . 10 ms/div

Trigger
- Source . . . . . Ch 1
- Level . . . . . 0 V
- Slope . . . . . Positive (+)

Display Refresh . . . . . Manual

☐ 6. Refresh the Oscilloscope display. The AC ringing voltage waveform should be displayed on the Oscilloscope screen.

What is the waveform of the AC ringing voltage?

AC ringing voltage showas sine wave with some difference.

☐ 7. Record the RMS value and frequency of the AC ringing voltage that are indicated on the Oscilloscope.

AC Ringing Voltage RMS Value: 85.3 V

AC Ringing Voltage Frequency: 20.1 Hz

☐ 8. On the host computer, connect Oscilloscope Probe 2 to TP1 (voltage across the telephone line connected to ANALOG LINE INTERFACE A).

Note: *Probe 2 is associated with channel 2 of the Oscilloscope.*

☐ 9. Make the following settings on the Oscilloscope:

Channel 2
- Mode . . . . . Normal
- Sensitivity . . . . . 50 V/div
- Input Coupling . . . . . AC

Time Base . . . . . 5 ms/div
Display Refresh . . . . . Continuous

Note: *If the UK ringing cadence is selected and/or the AC ringing voltage frequency is set to 50 Hz, set the time base to 2 ms/div.*

☐ 10. Lift off the handset of the telephone set connected to ANALOG LINE INTERFACE B and dial the number of the telephone set connected to ANALOG LINE INTERFACE A. This will make the telephone set connected to ANALOG LINE INTERFACE A ring. Let it ring a few times while observing the signal at TP1 on the Oscilloscope screen, and hang up.

Note: *In the rest of this manual, the telephone sets connected to ANALOG LINE INTERFACEs A and B will be referred to as telephone sets A and B, respectively.*

Note: *The rate at which the Oscilloscope display is refreshed depends on the speed of the host computer running the Telephony Training System software. Closing other applications that are running on the host computer releases system resources, and thereby, should improve the Oscilloscope display refresh rate.*

Describe what happens when a telephone set rings.

When a telepphone set rings,there is a signal of it and it changes with the ring. Its shape is also sine wave.

☐ 11. Repeat the previous step, but this time answer the call while the telephone set is ringing, then hang up both telephone sets.

Describe what happens when you answer a telephone call.

When we answer the call of telephone A through telephone B then the ring stops and due to that there are no sine of the ringing.

Telephone Ringing

Ringing Threshold Voltage of a Telephone Set

☐ 12. Make the following settings on the Oscilloscope:

Display Refresh . . . . . Manual

☐ 13. On the host computer, set the output voltage of the RING GENERATOR (AC ringing voltage) to 45 V.

Note: *The RING GENERATOR is located in the Signaling Circuit of the central office.*

☐ 14. Make the following settings on the Oscilloscope:

Channel-2 Sensitivity . . . . . 20 V/div
Display Refresh . . . . . Continuous

Observe that the value of the AC ringing voltage has decreased.

Lift off the handset of telephone set B and dial the number of telephone set A. This will make this telephone set ring. Do not answer the call.

On the host computer, increase the resistance of the telephone line connected to ANALOG LINE INTERFACE A by steps until telephone set A stops ringing. While doing this, observe the signal at TP1 (voltage across the telephone line connected to ANALOG LINE INTERFACE A).

Note that LINE MONITOR 1, which measures the voltage across the telephone line, is connected to the telephone side of the telephone line as shown in Figure 1-8. Thus, the signal observed at TP1 is the voltage across the Tip and Ring terminals of telephone set A. Resistors are used in ANALOG LINE INTERFACE A to simulate a telephone line of a certain length. The resistance of these resistors is variable to allow different line lengths to be simulated.

Briefly explain why telephone set A stops ringing when the telephone line resistance is increased to a certain value.

The telephone set A stops ringing because due to the increase of resistance in the telephone line, there passes a small amount of current through the telephone circuit.

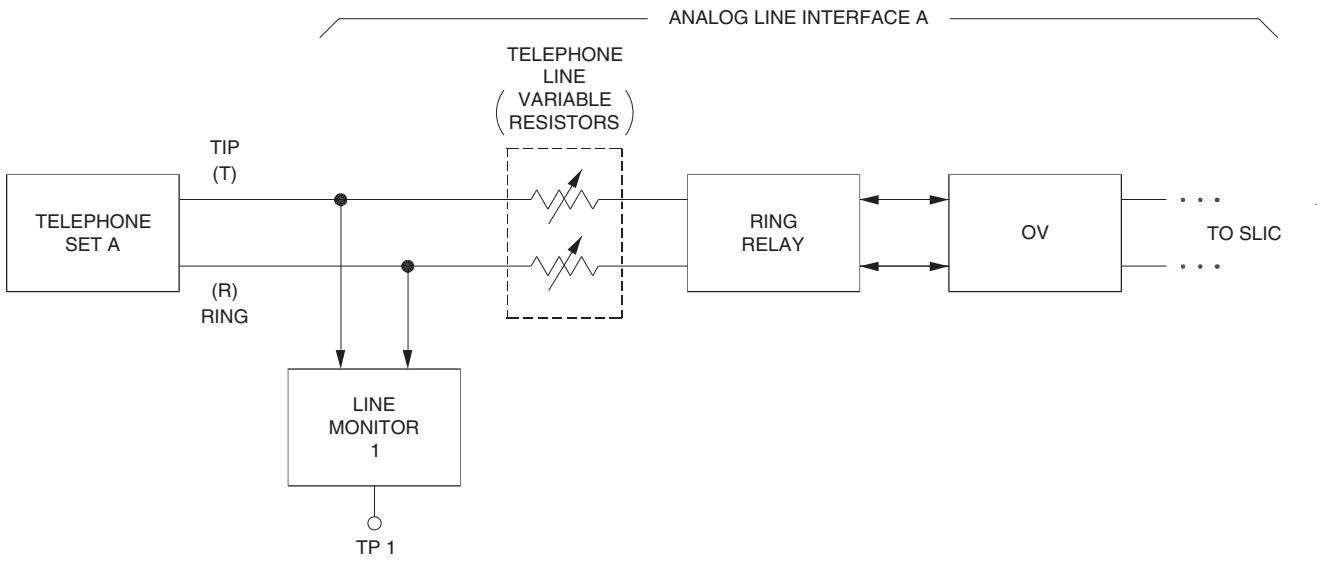

Figure 1-8. Line monitor 1 in ANALOG LINE INTERFACE A is connected to the telephone side of the telephone line.

☐ 15. Measure the amplitude of the AC ringing voltage (signal at TP1) displayed on the Oscilloscope. This value is approximately equal to the ringing threshold voltage of telephone set A.

Ringing Threshold Voltage: _____ V

Replace the handset of telephone set B on the cradle.

On the host computer, set the Oscilloscope display refresh to Manual.

☐ 16. On the host computer, close the Telephony Training System software.

Turn off the TTS Power Supply as well as the host computer (if it is no longer required).

Disconnect the AC/DC power converters from the TTS Power Supply and the analog telephone sets.

Disconnect the analog telephone sets from the Dual Analog Line Interface.

Remove the Dual Analog Line Interface from the Reconfigurable Training Module.