Using a Comrex POTS codec on a "Dry Pair"
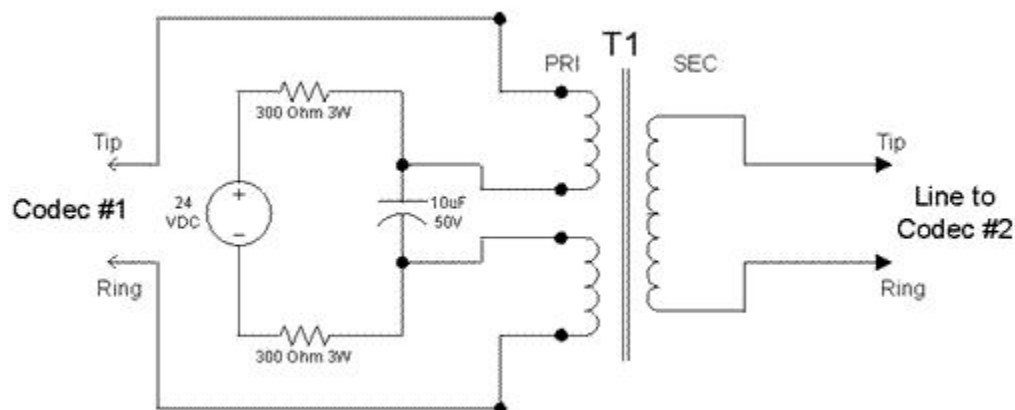
A "dry pair" is a simple pair of wires with no voltage, ringing signals… just two wires. We are occasionally asked if our POTS codecs - BlueBox, Matrix, Vector or HotLine - will work on a dry pair. It is hard to give a simple answer to that question. Here's why:

With the addition of some circuitry described later in this article, you should be able to use our POTS codecs on a pair of wires less than 18,000 feet (5500 meters), assuming that it is a twisted pair in good condition. The presence of loading coils (usually not found in a line of this length) or bridge ties (branch circuits that end in other locations) may restrict the modem performance. Examples of such circuits can be found within large sports facilities, or in a local alarm circuit provided by a telephone company.

For longer circuits, the answer is more complicated. If the line is an actual pair of wires, it may be usable unless attenuation and poor frequency response make modem operation impossible. If the circuit is not just simply wire, the first complication is that it must be bi-directional, as the modems must negotiate with each other. And since our POTS codecs have a 2-wire interface, the line must be bi-directional on two wires, not four. The second consideration is about noise level. In some countries, long analog lines with repeater amplifiers are still common. These circuits may be too noisy for modem operation. Some microwave links or carrier circuits may also be noisy. With all of these variables, you may not be able to predict whether your POTS codecs will work reliably.

If you would like to try to use a dry pair, you need to remember that although the line does not provide dial tone, ringing signals or DTMF ("Touch Tone") operation, you can manually place and receive a call as long as proper "battery" voltage is present on the line. The telephone companies usually provide an open-circuit voltage of 48 VDC or more. When a normal telephone line is seized by a phone or a modem, that voltage drops to 6 - 12 VDC when current is being drawn. For our purposes, a 24 VDC supply should be sufficient, but it must be current limited by a power resistor in the 600 ohm range, and run through audio chokes or a transformer to isolate the power supply from the audio on the line. Here is a diagram of a circuit we have used at Comrex:

Put Comrex On The Line.

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This circuit must be added to the line at each end. The transformer is a Magnetek TY-306P, which is available from Digi-Key as their part number 10620-ND for around $11.00. The power supply can be a battery, or a regulated 24 VDC supply. The loop current will be 20 - 30 mA with the values shown. You may use a higher or lower voltage supply, but the resistor values will have to be changed to limit the current.

To originate and answer the calls, you will have to operate the codec manually. The only trick is to coordinate the button-pushing.

- HotLine: #1 is originating the call. On that unit, press ENTER, DIAL, and EXTERNAL PHONE. Then press ENTER. You then have about 15 seconds to do the following on HotLine #2: Press ENTER, and ANSWER. If you have done it in time, the modems will negotiate, and the Ready lights will come on. When you are done, press HANG UP to terminate the "call."

- Vector: you initiate the call by pressing MENU, PLACE A CALL, EXT TELSET and OK on Vector #1. Within the next 15 seconds, press ANSWER CALL on Vector #2.

- Matrix: press ENTER on Codec #1, DIAL, and EXT PHONE. Then press ENTER. You then have about 15 seconds on the other Matrix to press ENTER on Codec #2 and 2) Answer.

An important consideration in the use of these codecs on a dry pair is that the calling process cannot be streamlined or automated. If you need a continuous connection, or if capable people are not available to push the buttons, dry pair operation of POTS codecs may not be possible.

We do have another suggestion. The above information assumes that you have two HotLines, Vectors or Matrixes available for use on the dry pair. A technically superior and more cost-effective method would be to use two Comrex Nexus or Envoy ISDN codecs in the Limited Distance Modem (LDM) mode as described in their manuals. The dry pair can be up to 18,000 feet in length. All you need are the wires, with no power supplies, transformers or special connections.

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