

## POTS vs ISDN (plus some hints for both)

---

### ISDN Advantages

- Best quality audio
- Consistent performance

### ISDN Disadvantages

- More complicated to setup
- ISDN service may not be available / more \$

### POTS Advantages

- Flexible, Easy-to-use
- Phone service costs less

### POTS Disadvantage

Performance dependent on line quality

POTS codecs can be great ... often their performance is comparable to ISDN. However there are some cautions to heed with this new technology. The performance of POTS codecs depends on the quality of the telephone line dialed. The Matrix and Vector POTS codecs deliver 15 kHz audio at 24 kb/s or higher, and drop to 5 kHz at 9600 baud. With the HotLine, audio bandwidth is 10 kHz at a connection rate of 33.6 kb/s, but scales down to 4.5 kHz at 12 kb/s. Outside influences on telephone lines (noise, crosstalk, etc.) can cause the modems in POTS codecs to fail during a broadcast, producing several seconds of muted audio while the modems reestablish the link. Also, there is coding delay inherent with these devices and a mix-minus feed is required from the studio to avoid the host being echoed back (This is also true of ISDN.) Finally, note that some POTS and ISDN codecs have roundtrip coding delays of a second or more. These will not be suitable for live interactive programs such as talk.

For program delivery at fixed studio locations, ISDN is still the best choice for program delivery, but for those spur-of-the-moment road trips, the POTS codec can be a very valuable asset.

### Check list for ISDN and some helpful hints

The following information MUST be entered into your ISDN Terminal Adapter in order for you to use the line. Get these details (which are unique for each line) from the phone company well in advance and preprogram your ISDN gear. Don't expect the installer to leave this information for you.

## Switch Type

This selection can be confusing. Three switch types are commonly used in North America: 5ESS, DMS-100 and National ISDN -1 (NI-1). If the telephone company tells you the switch is 5ESS or DMS-100, ask for the software type. If they say the switch uses National software, then use NI-1 as the switch type.

## Local Dialing Numbers - or LDNs

This is the 7-digit local number. You will usually be given two numbers, although there will be just one if there is only one "B" channel ordered or if the switch is a point-to-point switch.

## SPID numbers - or Service Profile ID

This incorporates the local number and often the area code with some prefix and/or suffix numbers. Incorrect SPIDs account for a large percentage of initial setup problems.

**Hint 1:** Select a long distance carrier when ordering ISDN. (You will not be automatically assigned one.)

**Hint 2:** Enter SPIDs and LDNs in the correct order... i.e. SPID #1 with LDN #1.

**Hint 3:** Keep ISDN line details handy for future trouble-shooting.

**Hint 4:** Make friends with your ISDN installer, and don't let him/her leave until you have completed a long distance call successfully.

## PBXs and POTS codecs

As a rule of thumb, use any means possible to avoid the using POTS codecs over in-house phone systems. POTS codecs contain high speed modems and digital PBX systems can present problems for modem communication. Many electronic phone systems have voltages and currents that are very different from those on a regular phone line. Some can even damage the modem in a POTS codec or a laptop computer. Just because there is a modular jack, don't assume that you can plug a modem into it.

This said, there are probably situations where a PBX is unavoidable. Most PBX systems have the capability of providing direct analog access, since fax machines and computer modems require this facility. In other words, ask to borrow an existing fax or modem line. (Many hotels now offer modem access in your room upon request.) Obviously, the best choice is to have a direct outside line, since it is possible that the analog interface in a given phone system will degrade the line.



## Some Creative Ideas ... in no certain order

Use a UPS on your AC feed at remotes - provides surge protection and gives you a battery backup.

Use an inexpensive computer-type ISDN terminal adapter, such as the Adtran Express 3000, to provide a high quality POTS port for a POTS codec.

Put an ISDN line at your transmitter site. Even if you don't keep a codec and TA there, you can set one up quickly if your regular STL fails.

ISDN and POTS codecs are completely two-way, so use IFB in the return feed to remotes. "IFB" stands for "Interruptible Fold Back," the techie term for adding intercom to the return audio feed. A push-button controlled relay can insert the studio operator's voice into the studio codec return audio, allowing communications with the remote site without the need of an extra phone line.

Consider carrying an inexpensive phone to check out PBXs - if you can get dial tone and dial out, your POTS codec should work. Or try an IBM "Modem Saver," which has status lights to tell you if a phone jack is safe. Or you may want to look at the Model 111 Konnexx Connector made by Unlimited Systems Corporation in San Diego (Phone: 619-622-1400. Fax: 619-550-7330). . It works with many PBXs and provides an RJ-11 2-wire connection through the 4-wire handset jack, transforming impedances and levels for modem operation.

## A Case History in TELCO Diplomacy

When WATR in Waterbury, CT bought a pair of HotLine POTS codecs, their Chief Engineer, Frank Jankowics, tested them out on arrival and found stable connect rates in and out of his local central office (CO) around 21.6 kb/s. This wasn't bad, but a similar loophrough at SFX in Hartford with the same equipment connected at 33.6 kb/s. Frank knew that the phone company wouldn't claim responsibility for providing a 33.6 connect rate, but he felt that with a bit of diplomacy and help from his telco contacts, he could do better at WATR.

Rather than calling the phone company to come "fix" his lines, he first talked with a phone company friend, a transmission specialist dealing in digital transmission (ISDN, etc.), who suggested if he was running through a SLIC, it may be causing problems. This was indeed the case with WATR and, after some persistence on Frank's part and some contacts through his transmission specialist friend, the phone company was able to find direct copper pairs between the CO and the station and shift his service off the SLIC.



The new line increased connect rates to 26.4 kb/s. But Frank felt there was still room for improvement. Suspecting that the phone company had reinserted loading coils into the new circuit, Frank placed a repair call. The repair technician used a standard device to “ring the line out” and found 3 loading coils. When the coils were removed, they were still at the 26.4 kb/s rate, but the repair technician was now enlisted in Frank’s project and offered to go through the other copper pairs available and find the best one.

After a few hours, the least noisy pair was found and loading coils removed from it. In addition, the technician found that the line was bridge tapped with an unterminated branch to a local factory and this was removed. Result: a consistent 33.6 kb/s connect rate with the HotLines!

In actual use, Frank usually sets a lower maximum rate to provide a safety margin against errors, but he says “it’s nice to know that it’s there.” He adds: “The important thing, since you don’t have control over the phone line at the remote site, is to get the best possible line between the station and the CO, and you’ve gotten rid of half the problem.”

## Check list for improved phone lines. Find out

- How far are you from the local CO?
- Does your line go through a SLIC?
- Are there loading coils on the line?
- Are there any bridged taps on the line?