

ISDN Primer

This information is intended for users of ISDN and other digital services for sound broadcasting who want to optimize performance and ensure the channels purchased are delivered on time and work correctly from start to finish.

The ordering process for Integrated Services Digital Networks (ISDN) can vary depending on the service type and local or long distance company involved. For example, although BRI provisioning requirements vary by equipment vendor, each equipment manufacturer specifies how to order BRI line for their configuration. For this reason, it is recommended that the user identify their specific requirements prior to selecting an equipment vendor.

To ensure a smooth ISDN provisioning process and help with future trouble resolution, it is useful to create a configuration template. The template will depict how the various pieces of equipment and the network work together. Additionally, it is important to test this configuration before it is deployed. Often, a major carrier will provide guidance in selecting this equipment and sustain an on-going program of testing equipment to ensure that it meets their published network interface specifications.

Installing ISDN

Although ISDN installation time varies by company, the average is from 15 to 30 business days. Prior to installation, the following information is critical and must be correct.

- **Service address**
- **Working telephone number at site**
- **Customer contact at site**
- **Credit information**

Most Local Exchange Carriers (LEC) use a standard set of provisioning codes that specify which set of features to install for a specific customer. However, these codes may vary from company to company. To ensure proper installation, customers must provide detailed order information that includes the type of facilities ordered, PIC, B-Channel characteristics (i.e., voice and data), and other factors. To resolve any installation problems that arise, it can be helpful to know the installer's name and pager number. The installer works on the actual circuit and is familiar with the line. If problems arise with the line during broadcast, the installer might fix the line more quickly than a service technician.

When placing the ISDN order with your selected carrier, obtain as much of the order information as possible, including switch type, circuit number, SPIDS and phone numbers. Some carriers will provide customers with a copy of the actual ISDN order form. Complete and submit this form with the appropriate order information to promote a smooth installation. In all cases, the first rule is to order early and check out any remote installations prior to the due date.

Ordering a BRI line is similar to ordering voice telephone service. Customers who order directly from the LEC must also select a long-distance or inter-exchange carrier, commonly known as an IXC. This selection is processed, converted to a code (PIC) that designates the carrier and is included in the line setup at the long-distance switching center.

Since an IXC can cover the entire United States and any international requirements, the most

practical approach is to select an IXC first and work with them to configure the equipment for a given application. The PIC selection does not affect the quality of the connection, only the ability to make the long distance call. Broadcasts are usually more reliable and of a higher quality when both ends of the circuit have the same long-distance carrier. Therefore, customers should specify the PIC for both ends of the circuit wherever possible.

If the PIC is not selected, not programmed or programmed incorrectly, the long-distance may be carried by the wrong company or will be unavailable. To force a call to a specific long-distance carrier, or to access an alternate carrier, customers can dial around their PIC by using carrier-specified codes (e.g., 10-288 for AT&T). Dialing the five-digit code enables customers to complete long-distance calls until the switch is reprogrammed. When selecting a long-distance service provider, choose one that enables access to any end point. Some providers, based on agreements with local companies, may only permit unidirectional calls at remote sites (i.e., only inbound calls or only outbound calls.)

Production Considerations

ISDN service brings with it several special considerations. Delay at ISDN remote sites can produce a slight delay (or worse) for live audio broadcasts. Typically, the delay results from the specific codec used, and varies by vendor and model. The nature of the coding can cause significant delay, producing an echo that affects production quality. On-time line installation often can identify and help to resolve any delay problems. However, to achieve the highest-quality professional sound, customers should consider sending a mix-minus from the studio (using an off-air monitor for the talent will not work). The mix-minus is everything the customer wants the talent to hear except themselves.

Most on-air consoles have a "Program 2" or "Audition" bus that can be used to create this mix-minus and send down the ISDN line to the remote. At the remote, the mix-minus from the studio can be put on one input of a mixer/console and the talent on another input (or inputs). This way the talent hears himself as he talks instead of through the delay of the ISDN. Since ISDN is two-way, it is easy to get the signal to the remote. The trick is to be set up with the correct mixes on both ends of the remote.

Redundancy

ISDN comes with some built-in restoration features such as the ability to get back on the air by simply redialing, thus minimizing lengthy outages. In order to avoid shorter outages, customers need to provide individual protection and redundancy. One way to avoid these shorter outages is to maintain clean power. However, if the service is critical to the customer's business needs, then the entire arrangement should be backed up, including the duplication of the local equipment that supplies the actual service application.

Codec

The codec (co/dec = codec / decoder) plays an important role in ISDN line performance. The codec on each end of the ISDN line must be capable of transmitting the same compression algorithms. Algorithms can be either an open standard or vendor-proprietary. The codecs that will be utilized should be tested and verified prior to moving forward with installation.

Most codecs have internal jumpers for in/out levels (bridge/terminating). Each manufacturer adopts its own method of using jumpers. If jumpers are not set for an application, customers can overdrive the front end of the codec. This results in audio dropouts on peaks, and in some cases, the termination of the ISDN call. Peak limiting prior to codec input is a good idea for sports remotes and other applications where audio levels change rapidly.

Testing

The most important rule when testing ISDN service is to test early and often. The best medium for testing radio broadcasting is program audio. Tone will work most of the time, but users should remember that ISDN does not perform like analog circuits. Due to the human-auditory based digital compression and the various algorithms available, program audio, rather than tones, will confirm a quality link.

Trouble reporting

Trouble reporting procedures and phone numbers will vary by company. Many companies have different numbers for business and non-business hours. Additionally, some companies have ISDN help desks that can resolve provisioning issues more quickly than the regular repair numbers. Be prepared when reporting trouble with the SPIDs, line number, order number and installation date. Work out a trouble resolution plan before deploying a major application.

In most cases, when a customer reports trouble, the local and/or long-distance company creates a trouble ticket. They test the line to determine where the trouble is occurring. When reporting problems, get the trouble ticket number to ensure that the company tracks the problem. The trouble ticket is also essential to obtain status on the resolution of the issue.

In summary, to ensure a smooth ISDN installation, remember the three P's: provisioning, peak levels and power. For optimal performance results: obtain detailed requirements and order information, select and thoroughly test the codecs and maintain clean power to attain peak ISDN performance.

ABC Satellite Services can be reached at (212) 456-5801