Remote Broadcast Setups and Strategies for the young Broadcast Engineer

Introduction

This article is a small insight to the approaches I take when planning a remote broadcast setup. This article is written with the young broadcast engineer in mind; someone who has a basic understanding of audio theory, signal flow, and broadcast equipment. The ideas and strategies in this article apply primarily to larger remote broadcast setups but can be applied to small remotes as well.

Pre-Planning

No matter the duration, location, or complexity of a remote broadcast, two basic questions must be answered; where's the power and how am I getting the audio back to the station? Without these questions being answered, there is no broadcast.

Power

Power is a quick but important topic. You may not always have a choice, but power your equipment with a 20 amp circuit when possible. A single 20 amp circuit may be all the power you need depending on how much equipment you have. If using power strips, make sure they can handle 20 amps. I prefer using 20 amp power conditioners over power strips because they protect against surges and spikes in voltage, plus they can be rack mounted. You never know how regulated the supplied power will be and the last thing you want to do is fry your equipment.

Avoid running power cables across doorways. It looks bad, it's a trip hazard, but most importantly the door can cut the cables insulation and expose the conductors, potentially electrifying the door. Also, never use a power plug or cable with the ground pin missing. In the event of an electrical short in your equipment, the ground pin is needed to route the extra voltage to ground. If the ground pin is missing from the plug, your equipment could become electrified. No broadcast is worth someone getting hurt or killed due to laziness.

When deploying your setup on-site, use power outlets closest to your setup location. You will have to carry less power cabling and it allows you to keep a watchful eye on the outlet itself. People like to unplug power cables at random to charge their cell phones, killing power to all of your equipment. Believe me, it happens. Help avoid this issue by deploying a power strip specifically for cell phone charging.

Station Feed / Backhaul Options

IP Audio Codecs are becoming the most common and simple way to execute a remote broadcast. Such devices include Comrex Access and Tie Line. These units utilize the internet to send audio to the station and back to the remote broadcast site. Most venues will have a fairly speedy hardline internet connection for you to use. Coordinate a site check with the IT administrator of the venue well in advance of the broadcast. There may be firewall or port restriction preventing you from connecting to the station. It's up to you and the IT administrator to identify and fix these issues as soon as possible.

For remote broadcasts where a hardline internet connection isn't available, you can use a wireless 4G card. If you use a wireless card, consider the following. During the site check the signal strength on the wireless card appears strong. You leave the site check thinking everything will work smooth the day of broadcast. But once hundreds or thousands of people show up to the venue, each of their wireless devices use up bandwidth on the wireless network. Will there be enough bandwidth left for you? You may consider having wireless cards for different networks but that can get costly and may not help you in the end. If you're setting up at car dealership or smaller venue bandwidth probably won't be an issue.

Larger bandwidth is always better as it allows you to use a lossless codec, but you may not always be provided with a fast connection. If you are provided with a slow connection, choose an audio codec created to work with that speed. At present, there are codecs to accommodate almost any connection speed you come across. On networks with poor performance and fluctuating bandwidth, some audio codec devices have built-in networking tools and options that allow you manage these issues. Such features allow you to allocate a specified amount of bandwidth to error correction as well as auto-relegation of codecs, all in order to provide a jitter free feed.

The second backhaul option is ISDN (Integrated Services Digital Network). ISDN is an aging technology but is still in use today. This service is stable and provides good audio quality, if the copper lines and c/o (central office) cards are in good condition. Most communication providers are no longer installing new ISDN lines. It's getting to where providers are not repairing existing lines. As IP Audio Codecs are proving to be more reliable, I would start to phase ISDN out of your broadcast plans. There are other means of getting audio to and from the station like Marti's and POT's lines but that should be an absolute last resort.

Production Requirements

After you figure out the power and backhaul situation, the next thought should be on-site production needs. Equipment requirements for single or multi day remote broadcast can be quite different and demands careful consideration. Identify your 'must haves' and 'wants'.

-How many mics will I need?

-Is there a need for audio editing on-site?

-Do the show producers need to import field audio?

-Will there be an interview camera that requires an audio feed?

-Will there be multiple cameras requiring separate audio feeds?

-Do I need a DI box and boom mic stand for an artist playing an acoustic set?

Talk with your program director, on-air talent, show producers, and digital department to see what their needs are. They may have a unique request you haven't thought of. Answering these questions usually dictate the size of audio console you will use.

Choosing the "Right" Equipment

Typically, a radio station isn't going to have a "broadcast console" for a remote broadcast. Odds are you'll be using an audio console that is meant for live audio applications. If you have the option of selecting the console of your choice, choose a console that has plenty of inputs and outputs. This will allow for maximum flexibility of signal routing. Audio requirements can change at a moment's notice and you need a console that can accommodate the change.

Depending on the complexity of the setup, a 12-channel / 2-aux audio console should work fine. Use a 16-channel / 4 aux console if you are running multiple broadcast areas. An example of this would be a main broadcast area and a separate guest interview area. The more individualized routing and level control you want for your devices, the larger console you will need. You can never have enough aux sends. Here are some inputs & outputs to consider when planning your setup.

Console Inputs: (Mic & Line Level)

-Microphones

-Station Feed / Backhaul Return

-Laptop & Sound Effect Audio Playback

-DAW Software

-1/8 cable for smart phones and pocket recorders

-DI Boxes for artist performances

Console Outputs (Mains, Aux, Sub groups)

-Station Feed / Backhaul Sends

-Headphones, Cue Speaker & Wireless IFB

-DAW Software

-Camera Feeds

-Field Recorder

TIP: Before finalizing your setup, think about this. Do you want a robust setup that requires a dedicated board op or a simple setup that anyone could run? This choice can be determined by the technical requirements of the remote broadcast and competency of your on air talent.

Microphones

In the past I have used Shure SM58's, EV RE20's, EV RE 27's, Rode Broadcasters, even Neumann TLM 103's for remote broadcasts microphones. What microphone you choose comes down to what's available to you and on-site variables. In dusty, damp, or windy environments I use dynamic microphones such as Shure SM58 or an EV RE20/27. Dynamic capsules can withstand a lot of abuse whereas condensers capsules cannot. Condenser microphone capsules are extremely sensitive to environmental variables due to their construction type. They may stop working if it's too humid or dusty, and they pick up wind easily. In a controlled environment, condenser microphones can be wonderful to use due to their sonic clarity and presents.

As for combating wind interference, you can use a wind screen. I personally don't care for the sonic quality of a microphone when using a wind screen, but you may have no choice. You can also roll off some low end to reduce the winds affects.

Microphone Processors & Dynamic Control

When I have the financial luxury and rack space, I like to use broadcast quality outboard microphone processors for remote broadcasts. These processors have built-in EQ, compression, and aural exciter controls. These controls give you the sonic flexibility that onboard console dynamic controls cannot, at least on less expensive consoles. I like to use Aphex Channel Strips or the more affordable DBX 286s. Both make for a stellar sounding broadcast. If outboard voice processors are not an option, and they're usually not, don't worry. There are affordable audio consoles that have a one size fits all compression knobs on each channel, as well as EQ. This isn't the best option but it's better than going without.

Regardless of the microphone and processors I'm using, I like to put a compressor on the consoles output buss feeding the input of the audio codec. Using a compressor on the "program bus" helps smooth combined levels and knock down peak transients that could distort the input of your codec. Distortion of a digital codec input WILL sound like trash on-air. When using compression, use it sparingly. Over compressing the audio can result in undesired sonic artifacts like pumping and breathing. Compress the local audio only to prevent peak transients and smooth over-all levels. Remember there will be more audio processing back at the station.

After you've determined the equipment requirements, draw the signal flow of your setup. Do this before you gather or mounting any gear. This will help you work out issues before you ever plug in a cable. I personally use Microsoft Visio to lay out my signal flow before I put any plan into action.

Racking & Ventilating the Equipment

After you have identified your equipment needs, it's time to put the equipment in to road cases. The less amount of road cases you have to transport the better, especially if you are flying. But the question you need to ask yourself is "does the equipment have proper ventilation to suite its broadcast environment?" In a remote broadcast environment you may be setting up on a hot asphalt parking lot or under a tent. In these situations you want maximum air flow over the equipment to prevent over-heating. Leave 1RU spacing between each piece of equipment (if space is available) to allow air flow in the rack. In addition to the 1 RU separation, install a single RU fan at the top of the rack to pull air across the equipment. If you don't mind putting a hole in your road case, use a hole saw to cut a hole in the top of the case for the fan exhaust. Be sure to install a grill to prevent debris or fingers from getting in the fan. If you have rear rack rails on your case, you can install a fan on the back to help draw the heat away from the rack.

Conclusion

There are plenty of areas where we could have expounded on topics such as maximum audio console utilization/ console signal routing, gain staging, voice processor setup, cabling, redundant station backhaul, & IP Codec & ISDN technology, on-site setup and deployment… the list goes on and on. I just wanted to give you some food for thought for when you're planning your next remote broadcast. I hope this helps you with your next setup.

Chris Ark, CBT

Grand Rapids, Michigan