

Masterlink-IP™

Audio over IP management system

Applications Guide

Leverage Technology to Improve Efficiency

Digital technology has long allows broadcasters to improve station operational efficiencies by simplifying operational tasks. The Masterlink-IP™ platform helps broadcasters harness the power of IP based networks for the transport of audio for a variety of critical operations. This technology breakthrough allows you to simply move audio for a fraction of the cost of a conventional implementation.

Application #1 — Confidence Monitoring

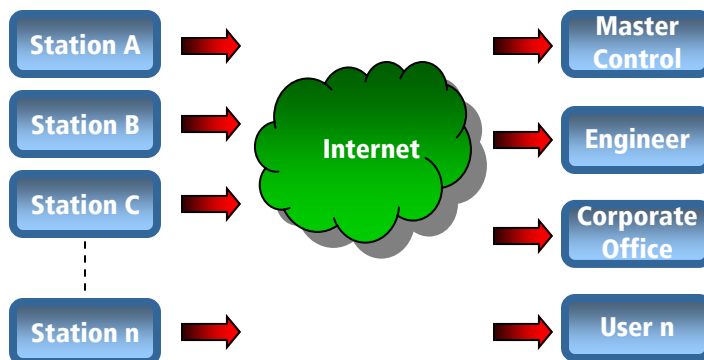
Many broadcasters operate multiple transmitter sites, some at a great distance from their monitoring facilities. These remote repeater or translator stations are usually fed off-air, by microwave, or by satellite. There is often no easy way to monitor the audio quality of these transmitters. Too often, engineers are dispatched to remote transmitter sites based on a listener complaint – only to find that the problem was not with the transmitter, but instead with the listener’s receiver.

Masterlink-IP™ solves this problem, easily and economically. A standard AM/FM radio is tuned to the transmitter’s frequency, the audio output of the radio is connected to the Instreamer 100, and the audio quality of that site can now be easily monitored by the Extreamer 900. Even when Internet connectivity is unavailable at the transmitter site, it is often commonly available in the city of license, where the monitoring radio and the Instreamer 900 can be readily located.



Thanks to the Extreamer 900 – and the powerful Masterlink-IP™ database software – virtually everyone who needs to monitor a station can easily do so, even if they do not have access to a computer. Simply connect the Extreamer 900 to the Internet, and start listening. Likewise, broadcast executives, regional managers, and advertising agency executives will find Masterlink-IP™ to be an easy way to quickly tune between a large number of station feeds (up to 979 stations) without having to use a cumbersome computer interface. Just use the simple remote control to select the desired station.

A powerful extension of this applications is to allow group operators to easily listen to distant markets. Simply connect the Masterlink-IP system to an audio feed and you can listen real time anywhere in the world. Now from a distance you can monitor your stations, those new HD Radio™ HD-2 channels, and even the competition from your home or office.



Masterlink-IP™

Application #2 — Emergency STL

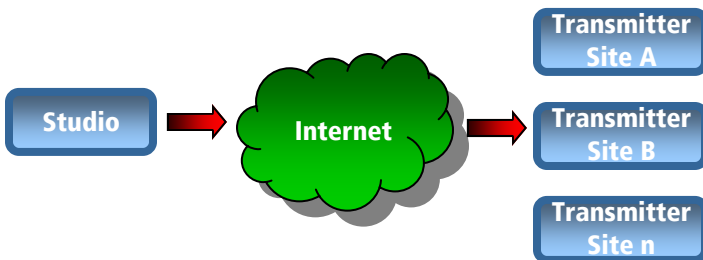
Few issues trouble engineers more than the loss of the studio-to-transmitter link. Even backup systems can fail – leaving a station off the air. With Masterlink-IP™, broadcasters have an economical method of providing a backup STL feed to any transmitter site that has access to the Internet (including satellite internet). Combined with the Masterlink-IP™ database software, broadcasters have an easy way to monitor their STL feeds from anywhere in the world.

In the event of a disaster, when most terrestrial communication links can fail, a satellite internet connection at the transmitter site can allow a broadcaster to switch the transmitter's audio input from the primary STL to the Exstreamer 900. With the optional Masterlink-IP™ "polling" feature, the channel of that transmitter's Exstreamer 900 can be tuned to any one of 979 channels – allowing for groups of stations to switch to regional disaster coverage, even if that coverage is coming from a station hundreds or thousands of miles away.



Application #3 — Localization

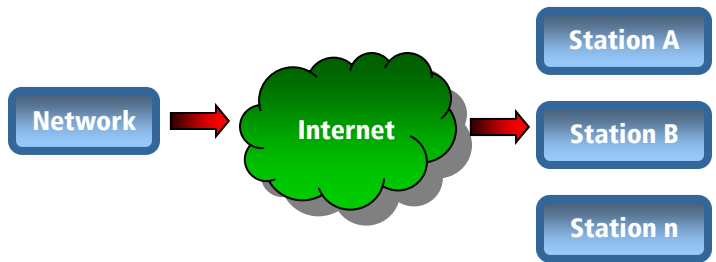
Many statewide networks simulcast their service on every station in their network. When networks need to occasionally break away from the to carry local or regional programming, Masterlink-IP™ provides an affordable method for providing localized program audio for a station that normally carries the network feed.



Application #4 — Network Backup

Although satellite connectivity between a network and its affiliates is usually quite reliable, failures can occur. The failure of the Galaxy 4 satellite in 1998 rendered the public radio satellite system inoperative for many hours. Likewise, outages caused by solar interference plague satellite reception every fall and spring. Masterlink-IP™ provides a low-cost method of distributing broadcast quality audio to affiliates during these periods. The Masterlink-IP™ database server makes it possible for a single Exstreamer 900

to tune to a large number of network feeds.



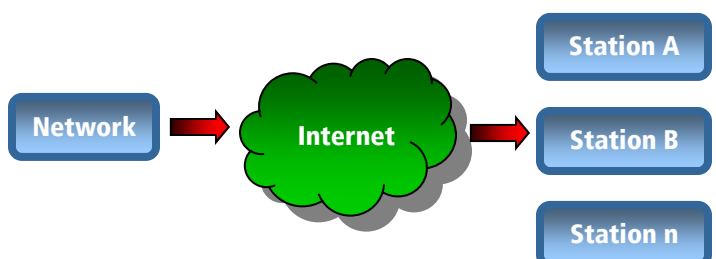
Application #5 — RPU Audio Transport

The remote broadcast remains one of the greatest challenges for a radio engineer. Even with satellite, UHF, ISDN, and dedicated circuits, one can never have enough low-cost, high-quality redundancy. Masterlink-IP™ can provide that backup with the Instreamer 100. As long as there is an Internet connection at the remote broadcast site, the Instreamer 100 can provide a hot-standby audio feed to the station. The Instreamer 100 can usually bust through the most rigorous firewalls to deliver remote audio back to the station where other technologies might fail. Additionally one could use the Masterlink-IP to bring remote audio from a remotely located RF based RPU receive such as a tower site or tall building back to the studio.



Application #6 — Squawk Channels

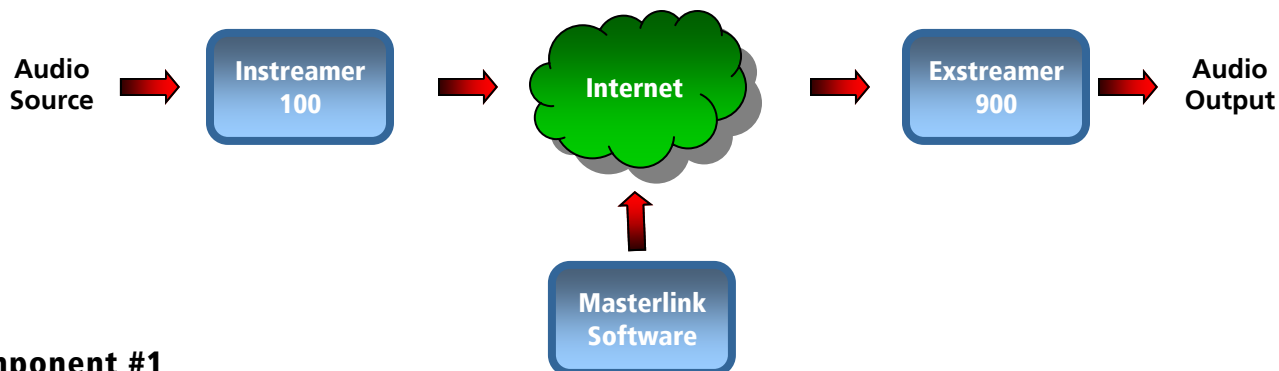
News and sports networks that broadcast a large amount of live programming often find it challenging to get timely information to affiliates regarding breaking coverage or station breaks. Some networks use costly satellite channels to deliver what is basically timing and cueing information to affiliates. Often these "T & C channels" are on the same satellite as the program audio, so if there was a failure of the satellite transponder, the network would have no way of quickly getting information to affiliates. Masterlink-IP™ provides a low-cost method of getting this information to affiliates and, combined with the database server, can allow a network with multiple program services (i.e., a sports network covering simultaneous sporting events) to operate a separate squawk channel for each event.



Masterlink-IP™

How does it work?

Masterlink-IP™ is a flexible audio-over-IP solution that can be used in many challenging broadcast applications. Masterlink-IP™ consists of three distinct components:



Component #1 Exstreamer 900

The Exstreamer 900 is a palm-sized Internet radio. It decodes mp3 streams and delivers stereo audio outputs through standard RCA phono jacks and a mini-headphone jack. It uses a standard Ethernet port that can easily be connected to a home or office Ethernet cable.

It is *very simple* to operate this unit. The user plugs the Ethernet cable into the unit, connects the audio output to an amplifier (or to a headset), and applies power. At that point, the user will hear a synthesized voice announce the IP address that it has secured. After about 5-7 seconds, audio from Channel 1 will begin to play. An easy to operate remote control allows user to change channels, adjust the volume, etc.



Exstreamer 900

Combined with the *Masterlink-IP™* database server, the Exstreamer 900 can be used to tune up to 979 different Internet radio stations. Each user can also preset the first 20 channels for each unit. This allows for easy access to frequently used channels. Channels 21 through 979 are standard for all Exstreamers in a client's system. However, one single *Masterlink-IP™* installation can support several different clients or departments.

With its small footprint, the Exstreamer 900 can easily be tossed into a suitcase or a brief case; it is an easy way to listen to a large number of Internet audio streams without having to use a traditional computer.

Component #2 Instreamer 100

The Instreamer 100 is an mp3 audio encoder and streamer. It has analog and digital audio inputs. This palm-sized device provides an inexpensive way to digitize any audio source. With a static IP address, the Instreamer 100 can serve up to six simultaneous streaming audio connections at data rates ranging from 32 kbps to 192 kbps, giving users the ability to tailor the settings based on available bandwidth. Alternately, the Instreamer 100 can be set for DHCP; in this configuration, users can plug this device into most ethernet connections to send encoded audio to a central audio server. This DHCP configuration is particularly useful in situations where the unit needs to be portable: it points to the same server regardless of where it connects to the internet. Listeners using the Exstreamer 900 will always hear the Instreamer 100 on the same channel. Connecting the Instreamer 100 to a central server also allows the audio stream to be widely distributed to large numbers of listeners.



Instreamer 100

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Component #3 Masterlink-IP™ Database Software

The power of the Masterlink-IP system is the database software which allows users to simply leverage the flexibility of IP based audio transport.

The software screen to the left is designed to control the Exstreamer 900 units for a client. Intuitive straight forward set up allows you to get going quickly from a web browser on a standard computer.

The software screen shown below allows one to provision Exstreamer 900 units to talk to a central database. At this point, when the user presses a number on the Exstreamer 900 remote control, a message is sent to the central database server, indicating the channel that was selected by that user. The server responds, sending mount point instructions based on the channel number that was selected. The Exstreamer 900 then

switches to that address – and then begins to play that stream. This database can support a large quantity (979) of streams to allow users a wide range of audio listening at a press of a button

The power of this centralized database gives users extraordinary control over their system – and provides great flexibility for future applications.

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