

Tele-Link

STUDIO TRANSMITTER LINK



For Transfer of *UN - COMPRESSED* Audio
via *SPREAD SPECTRUM*



Features:

- ◆ A Duplex, Unlicensed Wireless STL Link with Multiple T1 Capacity.
- ◆ Each Terminal Contains a Spread Spectrum Transceiver.
- ◆ Reliable High Performance Transmission Up to 40 Miles.
- ◆ Can provide Simultaneously (4) Uncompressed AES/EBU, or Balanced 22K Analog Stereo Channels.
- ◆ Can Serve as a Duplex STL Link for HD Radio.
- ◆ Can Relay Remote Pick-Up from Transmitter to Studio Sites.
- ◆ No Monthly Operation or FCC Charges.
- ◆ Contains All Standard Tele-Link Features Including Automatic Restart, Re-Connect, and Pager Alerts and Understandable Operation Screens, Insertion of Locally Provided Program Fill.
- ◆ No dependence on external ISP provider: you are your own provider.



ENERGY-ONIX

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Description

The **Tele-Link** is a field proven system which can transport high quality 22K bandwidth analog audio and AES/EBU digital from point to point. Initially the Tele-Link was designed to provide an economic solution for interconnecting two points that did not have “line of sight”, but which did have reliable, dedicated, wide band interconnections to the Internet. Unfortunately, Internet connections are not normally available at remote transmitter sites. However, where there does exist “line of sight” between studio and transmitter sites wireless STL systems can interconnect these two sites.

Unfortunately, existing STL microwave systems do not have the capacity to transfer HD Radio (I-BOC) AES/EBU Digital or uncompressed Audio. Uncompressed audio requires at least 1.4 mb of bandwidth which is inconsistent with conventional microwave performance. Uncompressed audio eliminates the generation of undesirable artifacts.

The installation of a spread-spectrum transceiver within the **Tele-Link** terminal and the utilization of high gain antennas and low loss transmission lines permit the establishment of an STL Link whose range can be reliably computed up to as much as 40 miles @ 2.4 GHz and 20 miles @ 5.8 GHz.

The “Spread-Spectrum” connection offers a bandwidth of 11 mb for the 2.4GHz terminals and 54 mb for the 5.8GHz terminals. This is much more than the required bandwidth for HD Radio and (8) uncompressed audio independent channels.

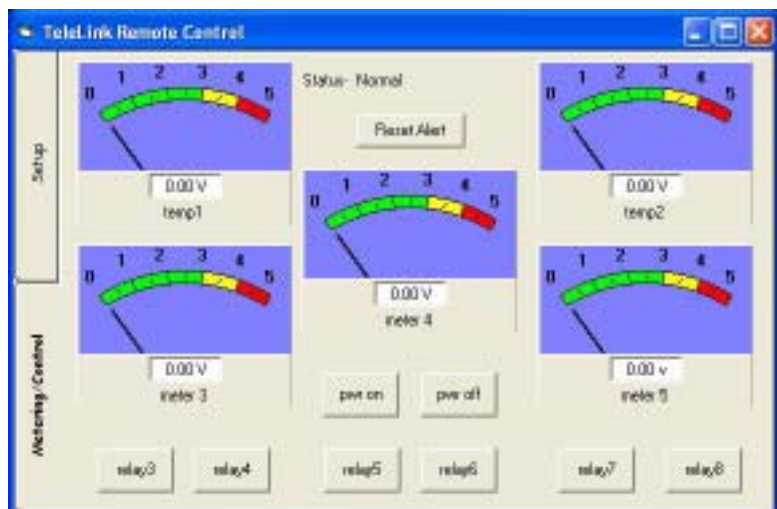
The **Tele-Link** moves audio, simultaneously in both directions. It can be configured to send and receive 8 mono or 4 stereo channels in each direction.

The **Tele-Link** utilizes several enhanced versions of industry standard compression and communication protocols. It utilizes a 16 bit enhanced “mpeg4” at compression rates of 32kbs, 48kbs, 64kbs and 96kbs. It also utilizes a 24 bit enhanced “mpeg4” at compression rates of 128kbs, 256kbs, 384kbs and a non-compressed rate which occupies a bandwidth of 1.4MB. Thus, the **Tele-Link** can select a non-compressed, or seven compression rates from 32kbs to 384kbs.

The **Tele-Link** communicates with other **Tele-Links** via the industry proven “TCP/IP” and “HTTP” protocols. This enables the **Tele-Link** to be used on virtually any broadband Internet/Intranet connection. (DSL, ISDN, Cable, T1, and Wireless).

The **Tele-Link** offers digital AES/EBU, SPDIF, balanced and unbalanced analog inputs and outputs. In the event of interruptions in the program feed, the **Tele-Link** will automatically reconnect. If not able to reconnect, it will play an internal audio fill that had been pre-recorded on the hard drive. It will also notify via pager, the station technical personnel. In the event of interruption of power beyond the time capacity of the local UPS, the **Tele-Link** will, when power is restored, automatically assume its pre power failure status.

The only requirement for acceptable interconnection is a stable 24/7 Ethernet (RJ45) or Internet connection with a dedicated bandwidth from 56kps to 1.5mbs depending on **Tele-Link** settings.



Remote Control

A *Remote Control* system is available as an option which provides in Real Time, the control of (8) relays and the transmission of (5) Analog meter readings. The relay closures are normally momentary but can be converted to a latch function with the addition of an auxiliary panel. The power output indication can be configured to incorporate a “too low” and “too high” overload which, when activated, will operate the “Pager Alert” as well as the transmitter control system. If desired, this alert will turn off the transmitter if fault persists for 30 minutes.



Tele-Link (2) Channel Operations Screen

The normal operating screen of the (2) channel Tele-Link is pictured to the left. Here it can be seen that there exists facilities on this screen to simultaneously monitor the audio levels that have been applied to the encoder as well as the audio outputs of the decoder.

The Tele-Link has automatic facilities to “start” the encoder and to restart the decoder, but it has the capability of manually stopping the audio being applied to the encoder as well as manually resetting the internet connections to the decoder.



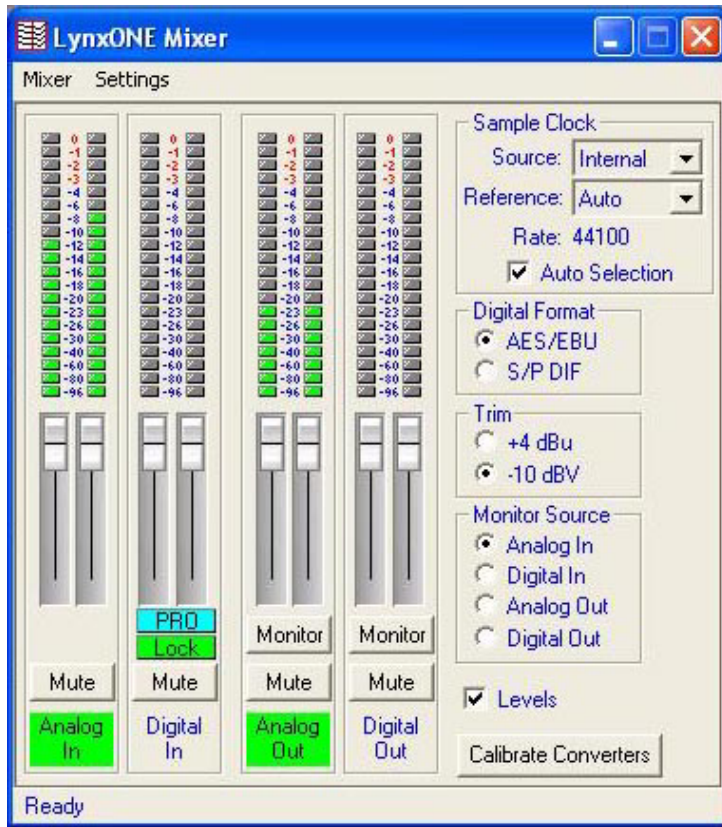
Tele-Link (8) Channel Operations Screen Encoder

The “Multiple Channel” option of the Tele-Link permits the encoding of (4) independent stereo channels simultaneously. Each channel can be independently started and stopped and can be independently programmed for any desired compression rate from 32kb to 384kb as well as uncompressed.



Tele-Link (8) Channel Operations Screen Decoder

The multiple channel decoder can select the desired program source by simply dialing up the static IP of the remote source and operating the reset switch.



LynxOne Mixer

Each **Tele-Link** terminal utilizes “LynxOne”, high performance digital/analog audio mixer cards. Each card has the capacity of handling (2) balanced analog or (1) digital AES/EBU signal.

The (4) channel terminal utilizes (2) “LynxOne” cards to encode (2) stereo channels. The (6) channel terminal has (3) “LynxOne” cards, while the (8) terminal Tele-Link utilizes (4) cards to encode (4) stereo channels.

Selection of this screen permits the user to analyze and control analog inputs to the encoder and decoder. This very versatile card can accept an AES/EBU input and have either a balanced analog or AES/EBU output. Conversely, it can accept a balanced analog input and have either an AES/EBU or balanced analog output.

Tele-Link Spread Spectrum Data

Frequency Range	2.4—2.497 GHz	5.720— 5.825 GHz
Transmitter Power	+20 dbm	+15 dbm
Antenna	2 ft. x 4 ft Parabolic (gain = 24 dbi)	2 ft. Dish (gain = 29 dbi)
Minimum Rec. Input Level	-92 dbm	-89 dbm
Assume Line of Sight		
Max. Cable Loss per Location	@ 2.4 GHz	@ 5.8 GHz
5 Mile Range	10 db	7.5 db
10 Mile Range	7 db	5.0 db
15 Mile Range	4 db	2.5 db
20 Mile Range	2 db	1.5 db
30 Mile Range	1.75 db	N/A
40 Mile Range	1.5 db	N/A
Bandwidth	11 mps	22 mps