

Professional FM-MPX IP Codecs

With Optional μ MPX and Satellite Tuner



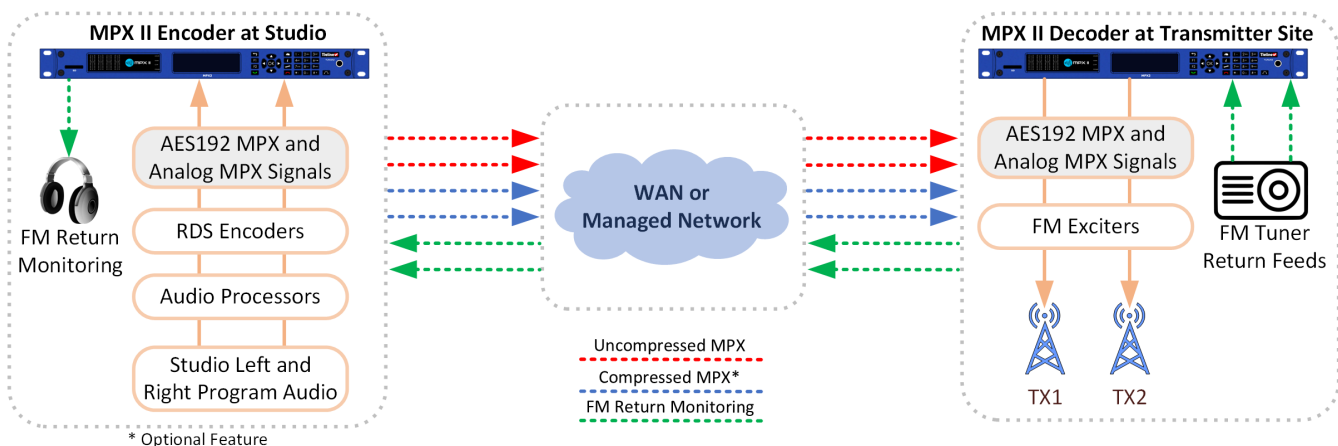
Tieline Delivers Flexible FM-MPX or μ MPX Transport Solutions...

Tieline's MPX I and MPX II codecs deliver composite FM multiplex (MPX) codec solutions for real-time network distribution of FM-MPX or MicroMPX (μ MPX*) signals to transmitter sites. The MPX I is ideal for transmitting a composite STL signal from a single station with return monitoring, whereas the Tieline MPX II can transport two discrete composite FM-MPX signals from the studio to transmitters with return monitoring.

Both the MPX I and MPX II support sending the full uncompressed FM signal, or compressed μ MPX to deliver high-quality multiplexed FM signals at lower bit-rates. They support analog MPX (BNC) or MPX over AES192 to deliver a wide range of flexible composite encoder and decoder configurations for many different applications. Order an optional satellite tuner card at purchase to support decoding DVB-S or DVB-S2 signals.

The Benefits of Tieline MPX Solutions

Sending transmission-ready FM composite signals from the studio allows broadcasters to maintain audio processing and RDS data insertion at the studio. This significantly reduces capital and operational costs by eliminating processing equipment from transmitter sites, which reduces on-site power consumption, wiring and space requirements, as well as site visits for service and support. Composite MPX over IP signals can be easily replicated and distributed using multicast and multi-unicast technologies and take advantage of rock solid redundancy features like redundant streaming, RIST and FEC.



Compressed μ MPX and uncompressed FM-MPX encoding and decoding with FM return monitoring

Applications

- Single or Dual MPX Composite Encode or Decode: Encode/Decode up to two point-to-point MPX/ μ MPX composite signals.
- MPX/ μ MPX Composite Encode or Decode with Encoder or Decoder FM Monitoring: Encode/Decode two point-to-point MPX/ μ MPX composite signals; at the encoder monitor the demodulated local MPX input or the return feed. At the decoder monitor the MPX output or the secondary MPX feed, which is either the local MPX input or the secondary stream.
- Non-MPX IP audio streaming to support IP connections with older infrastructure, as well as simultaneously connecting to analog or digital MPX infrastructure.

* Optional

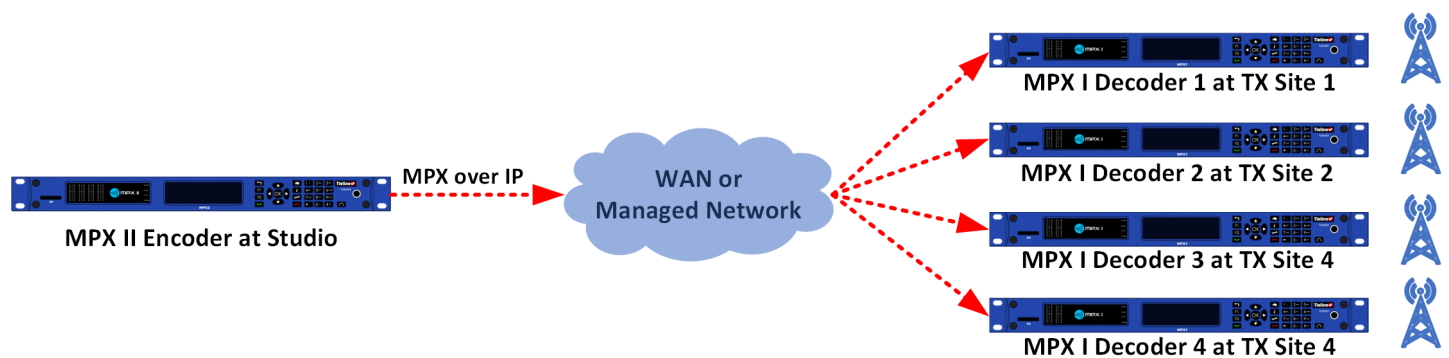


Key Features

- Transport uncompressed MPX or reduce bandwidth requirements by transmitting compressed μ MPX Composite signals to sites. Support for GPIOs in MPX or μ MPX modes.
- Monitor demodulated MPX at the encoder or decoder and configure return FM confidence monitoring as required.
- Use a single MPX I or MPX II codec to multicast uncompressed MPX or compressed μ MPX signals, or Multi-unicast μ MPX signals to reduce CAPEX and OPEX at the studio and TX sites
- Both the MPX I and MPX II can operate as an encoder or decoder.
- Support for both analog and digital MPX signals allows networks to support transmissions using analog transmitters as networks transition to newer all-digital setups over time.
- Redundant streaming with hitless packet switching, RIST and Forward Error Correction (FEC)
- Dual internal PSUs for redundancy.
- Full remote control using the HTML5 Toolbox Web-GUI, Cloud Codec Controller, plus comprehensive automated alarms and SNMP monitoring.

MPX Composite Distribution

Distribution of MPX composite signals from the studio or playout center eliminates expensive audio processing and RDS generation requirements at STL sites. Multipoint distribution via multicast or multi-unicast technologies reduces costs even further, by affordably replicating MPX composite streams using a single MPX I or MPX II encoder, similar to how baseband IP audio streams are replicated in audio codecs. Compressed μ MPX composite signals can be distributed over WANs like the internet at bitrates as low as 320kbps to reduce bandwidth requirements.



A single MPX I or MPX II encoder can distribute multiple MPX Composite signals to transmitter site MPX I decoders

Specifications

MPX I Rear Panel Input and Outputs

RJ-45 Analog/AES3 Inputs 1	1 Shared Stereo Analog Line Input or stereo AES3 Input
RJ-45 Analog/AES3 Outputs 1	1 Shared Stereo Analog Line Output or stereo AES3 Output
RJ-45 AES192 MPX Input/Output 1	1 Stereo AES192 Digital MPX Composite Input and Output
BNC Analog Input 1/Outputs 1-2	1 BNC Analog MPX composite Input and 2 BNC Analog MPX Outputs (1 A & B output)
DB-25 Serial Port	2 x Serial I/O Ports

MPX II Rear Panel Input and Outputs

RJ-45 Analog/AES3 Inputs 1 & 2	2 Shared Stereo Analog Line Inputs or 2 x stereo AES3 Inputs
RJ-45 Analog/AES3 Outputs 1 & 2	2 Shared Stereo Analog Line Outputs or 2 x stereo AES3 Outputs
RJ-45 AES192 MPX Inputs/Outputs 1 & 2	2 Stereo AES192 Digital MPX Composite Inputs and Outputs
BNC Analog Input 1 & 2/Outputs 1-4	2 BNC Analog MPX composite Inputs and 4 BNC Outputs (2 A & B outputs)
DB-25 Serial Port	4 x Serial I/O Ports

Common MPX I and MPX II Rear Panel Input and Outputs

Optional DVB Satellite card/module	DVB-S/S2 RF1 Input and RF2 Output via F connectors
Gigabit RJ-45 LAN1 and LAN2 Ports	Gbit Ethernet ports for Control/IP streaming over WANs
Gigabit RJ-45 LAN3 Port	Gbit Ethernet port for Control
Gigabit RJ-45 AoIP/LAN4 Port	Gbit Ethernet AoIP/LAN4 Port
BNC Sync Input/Output	2 configurable Input/Output BNC sync connectors
Female DB-25 Control Port In/Out	DB-25 Control Port I/O Supporting: 4 GPIOs in MPX I; 8 GPIOs in MPX II

Front Panel Inputs and Outputs

Front Panel Headphone Output	1 x 6.35mm (1/4") headphone Jack
Front Panel SD Card Slot	Full size SD card slot for firmware upgrades

Data and Control

Configure, Control, and Monitoring Serial (DB-25)	HTML5 Toolbox Web-GUI, Cloud Codec Controller (CCC) 2 x RS-232 in MPX I (2 sync with audio); 4 x RS-232 in MPX II (4 sync with audio) up to 115kbps with or without CTS/RTS flow control can be used as a proprietary data channel; supports hardware and software flow control
Hardware / Software Logic I/Os (SLIO)	Support for software logic I/Os

Monitoring and Alarms

Demodulated Audio Monitoring	Demodulate MPX for local monitoring, or stream external stereo signal at the decoder back to encoder for remote monitoring (using Opus).
Front Panel PPMs	Front Panel PPMs to monitor MPX levels or input/outputs: 4PPMs in MPX I; 8 PPMs in MPX II
Front Panel LEDs	Configurable Alarm and User LEDs with Connection and Power LEDs
Embedded HTML5 Web Server	HTML5 Toolbox Web-GUI used for configuration and control of all functions including alarms
Comprehensive Alarms	Configurable alarms including automated silence detection, PSU, connection, temperature, AES input, AES reference, loss of pilot
SNMP	Support for SNMP monitoring and traps via SNMP v1 and SNMPv2c

Encoding, Decoding, and IP Streaming

MPX Encoding/Decoding	<ul style="list-style-type: none">• 16-bit (2.3 Mbps) and 24-bit (4.6Mbps) Raw MPX;• μMPX 320, 340, 360, 384, 400, 448, 512, 576, 640, 704, 768, 800, 900 kbps;• Support for μMPX v1, 2, 3 and 4• Sampling frequency: 192kHz
MPX Buffer	0 to 10 seconds
MPEG-TS Encoding/Decoding	DVB-S and DVB-S2 supported via optional DVB module; 16, 24 and 32-bit PCM at 96kHz;
IP (non-MPX) Encoding Formats	Tieline Music, Tieline MusicPLUS, Opus, G.711, G.722, MPEG Layer 2, MPEG Layer-3 LC-AAC, HE-AAC, HE-AACv.2, AAC-LD, AAC-ELD, 16/24 bit aptX® Enhanced algorithm. MPEG audio technologies licensed by Fraunhofer IIS (http://www.iis.fraunhofer.de/audio)
Uncompressed IP	Linear PCM 12/16/20/24 bit 32kHz, 44.1kHz, 48kHz, 96kHz sampling
IP Sample Frequencies	8kHz, 16kHz, 32kHz, 44.1kHz, 48kHz, 96kHz
FEC	Selectable FEC 15% -100% with time delay
Protocols	RTP, DHCP, SNMPv2c, DNS, HTTP, IGMPv3, IPv4/IPv6, RTCP, SSL Security Certificate, RIST, RFC2733, RFC3190
Redundant Streaming	Primary plus automatic failover to 1 SmartStream MPX/ μ MPX redundant stream per stream with hitless packet switching at the decoder, RIST
Jitter Buffer Management	5 automated, or fixed/static jitter buffer settings for IP stream monitoring
Multi-unicasting	Support for IP or MicroMPX multi-unicast streams. MPX I supports a single multi-unicast, MPX II supports 1 or 2 multi-unicast streams. Up to 10 connections/endpoints in total supported.
Multicasting	Support for Multicast streams to unlimited endpoints over compatible IP networks

Satellite Tuner DVB-S – ETSI EN 300 421 (Optional)

Frequency	950 to 2150 MHz
Input Level	-65 to -25 dBm
Standard Modulation	QPSK
Symbol Rate	1~54 Msps
FEC	Enhanced FEC decoder

Specifications

Satellite Tuner DVB-S2/S2X – ETSI EN 302 307-1

Standard Modulation/Symbol Rate	QPSK: 1~60 Msps; 8PSK: 1~60 Msps; 16APSK: 1~58 Msps; 32APSK: 1~58 Msps; 64APSK: 1~34 Msps
Modulation Type	VCM, ACM
Roll-off	Roll-off factors from 0.05 to 0.35
FEC	Normal (64800 bits) FECFRAME supported
Transport Stream Processing	Single Transport Stream, Multiple Transport Stream
Data Forwarding	IP

AoIP Standards Specifications

AES67 Compliant	Compliant with Audio Engineering Society standards for AES67
ST 2110-30 Compliant	Class A, Ax, B, Bx Sender and Receiver Compliant
RAVENNA Compliant	Supports RAVENNA Stream Discovery and Advertisement
Livewire Compliant	Natively supports Livewire+ for AoIP Streaming
NMOS Compliant	NMOS IS-04 & IS-05 Discovery, Registration and Connection Management
Ember+	Supports Ember+ control protocol
Supported Audio Frames	125ms, 250ms, 333ms, 1ms, 4ms
Clock Modes Supported	Primary Leader, Follower, Follower Only

Advanced Networking

VLAN Tagging	IEEE 802.1Q, 802.1p
Quality of Service (QoS)	Support for DiffServ (DSCP)
Synchronization	IEEE1588-2008 (PTPv2)
Multicasting	IGMP v2 and v3
SAP	SAP v2 (Session Announcement Protocol) as defined in RFC 2974

General

Display	24-bit Color LCD Screen (480 x 128 pixels)
Keypad	26 button silicon keypad
Navigation	5 navigation and selection buttons
Size	1U x 19" Rackmount
Dimensions	19" x 1 3/4" x 11 13/16" [482mm (W) x 44.45mm (H) x 300mm (D)] excluding rear connectors
Weight (including Satellite Module)	4.08kg/8.99 pounds
AC Power	Dual AC 90-240V IEC power inlets; 2A 50-60 Hz
Inrush Current (cold start)	60A 230 VAC (per PSU) ; 30A/115VAC (per PSU)
Operating Temperature	0°C to 45°C (32°F to 113°F)
Humidity Operating Range	10% ≥ RH ≤ 90% (0 to 45°C/32°F to 113°F), non-condensing

MPX Transport Options

Wireless Point-to-Point IP STL



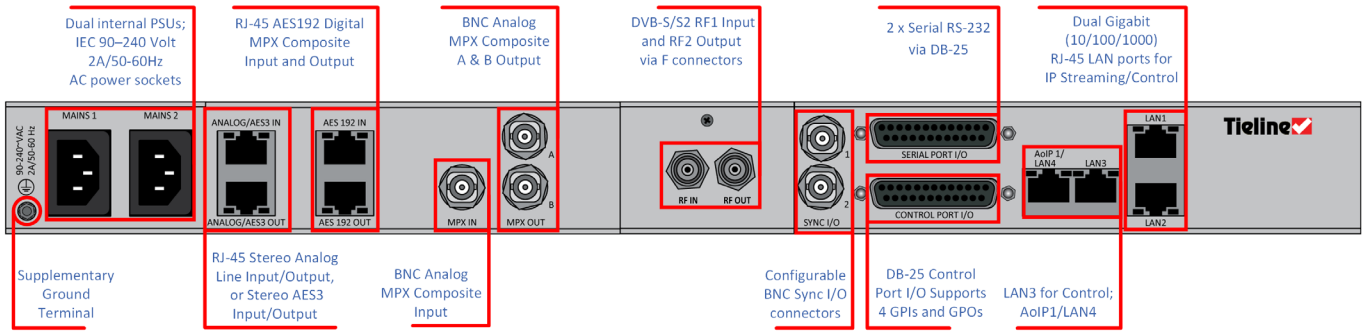
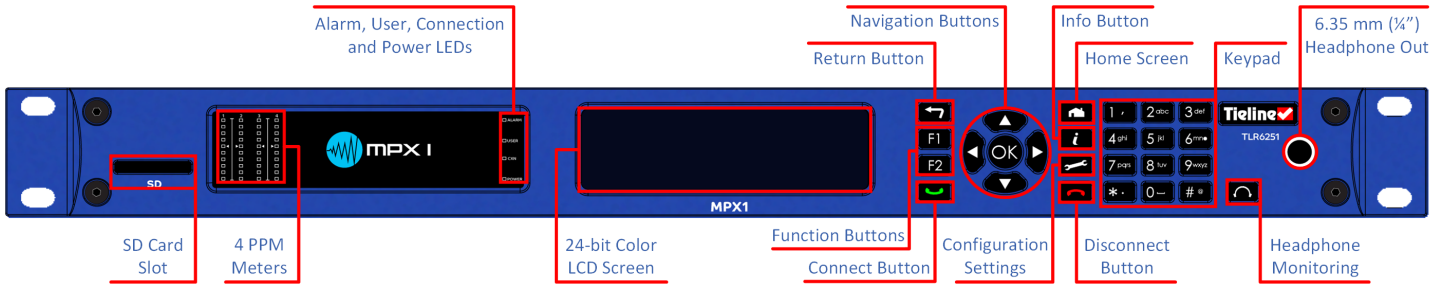
MPX STL over LAN/WAN



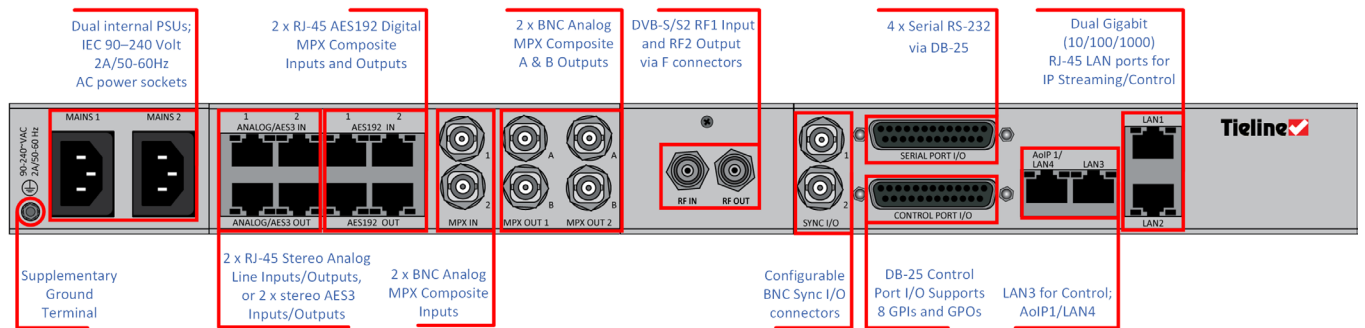
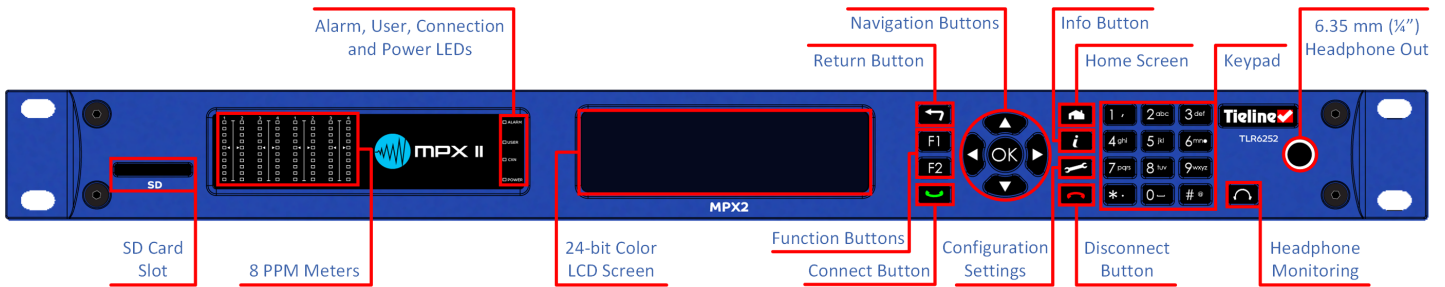
MPEG-TS over Satellite



MPX I Front and Rear Panel



MPX II Front and Rear Panel



Extensive dealer network with global telephone support in 2 strategic locations around the world

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