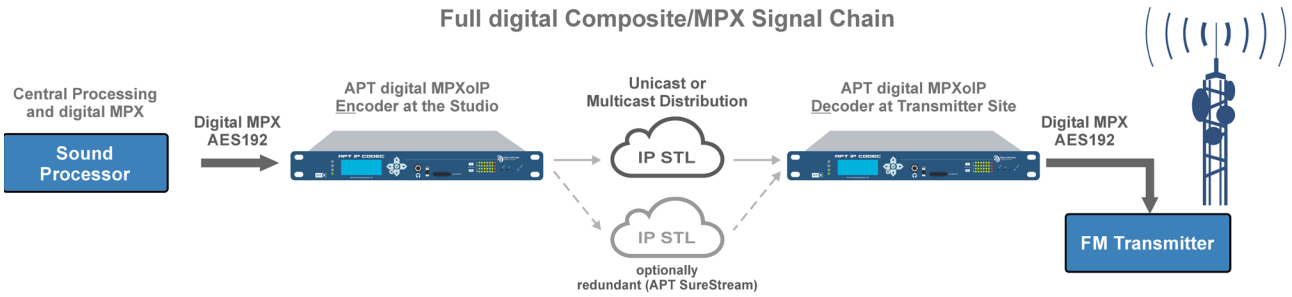
WORLDCAST SYSTEMS

APTmpX: Complete Digital MPX Transmission with RDS

Did Stereo FM give rise to the MPX signal, or was it the other way around? Either way, the multiplex (MPX) signal remains the essence of radio production, merging artistic and technical efforts into a single electrical signal.

Digitization revolutionized MPX processing with the AES192 format – the AES/EBU standard sampled at 192kHz. This allows the entire MPX spectrum, including RDS or RBDS data, to be transmitted digitally.
A key advantage of digital MPX transmission is centralizing signal processing in the studio. The sound processor, a costly but essential component, was often omitted at smaller transmission sites, leading to inconsistent audio quality. By keeping MPX processing in one location, broadcasters ensure a uniform and high-quality listening experience.



The digitalization of the MPX signal enables it's uncomplicated and robust distribution in IP networks. The signal fidelity of the digital MPX remains undiminished at every transmitter location.

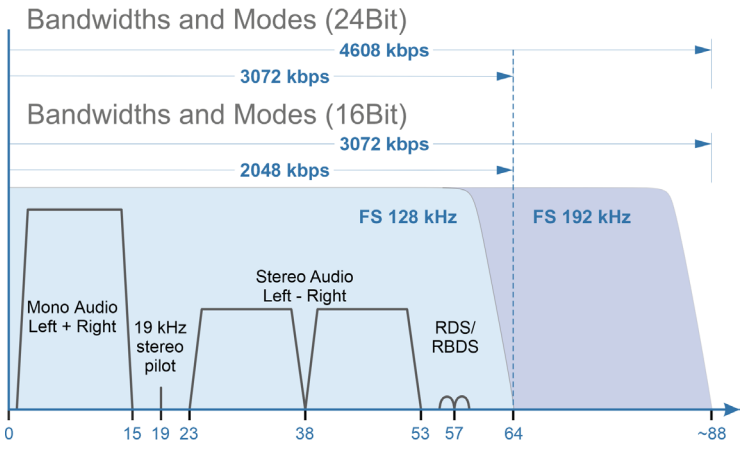
Really, at every location? What about the less essential locations that only have IP bandwidths suitable for baseband audio? Linear digital MPX in 24-bit resolution requires approximately 3.4Mbps for a single program and the RDS/RBDS signal. A high-quality audio signal (L/R) compressed with EaptX requires only about 420kbps (24Bit), including the embedded RDS/RDBS data. Further innovation was required for truly comprehensive MPX transmission.

APTmpX – Optimizing MPX Transmission

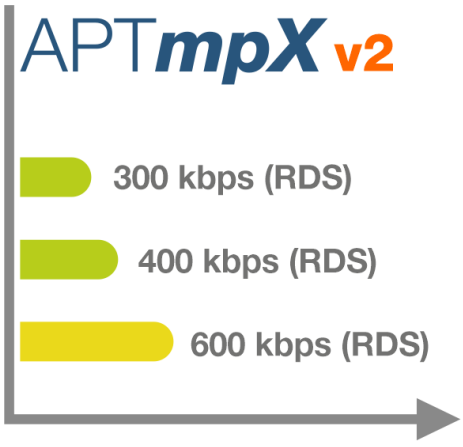
As established, the MPX signal encapsulates all aspects of radio program production. While digitization introduces minimal, negligible quality loss, compressing the MPX signal is far more critical. Any distortion in phase or level balance can audibly degrade signal fidelity, stereo imaging, and carrier frequency deviation.
To address these challenges, WorldCast Systems developed developed APTmpX, enabling a seamless transition from baseband IP audio to IP MPX transmission. The key driver was bandwidth reduction, but equally crucial were:

- Highest Signal Fidelity – preserving audio integrity and stereo imaging.
- Low Coding Delay – ensuring minimal latency (a core APT principle).
- Robust IP Transmission – simple, efficient packet structures like linear PCM over IP.
- Stable Bit Rates – essential for metered satellite links.
- Multiple Modes – offering flexibility between bit rate and signal fidelity.
- Complete Integrity – ensuring all signal components, including RDS/RBDS data, are accurately transmitted.

Another development goal was to design the APTmpX format as a lean, "lightweight " format that would allow integration with CPU categories commonly used in audio codecs.



Linear MPX components and bandwidth requirements



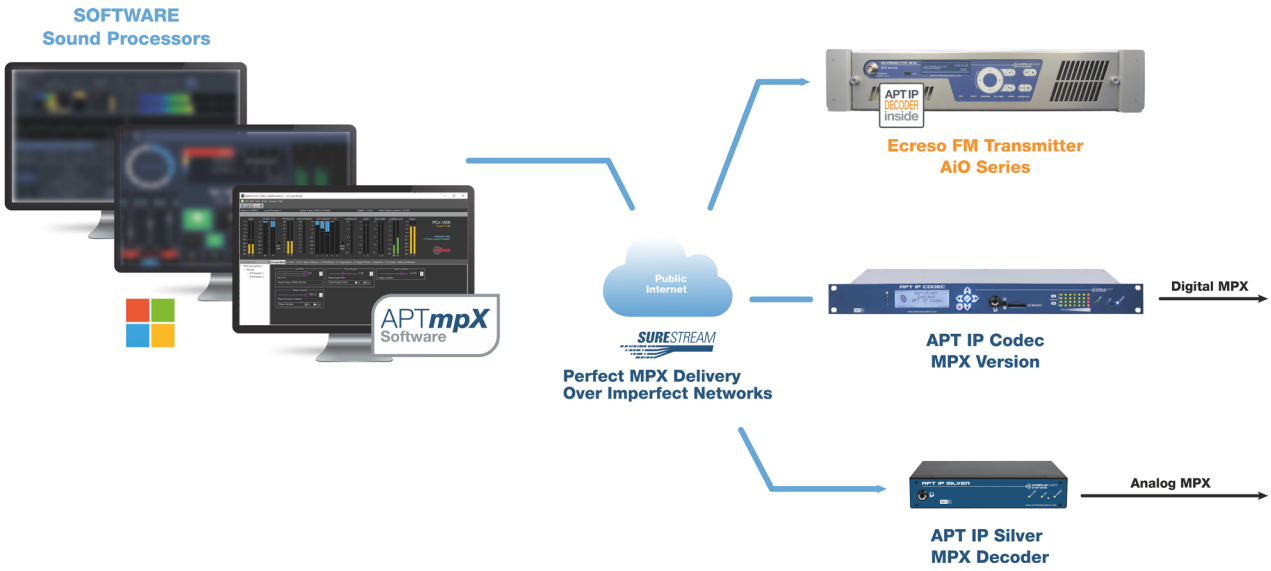
APTmpX (RDS) bandwidths

APTmpX and RDS Data

The second version of the APTmpX format now includes the 57 kHz subcarrier, seamlessly integrating RDS transmission with minimal data overhead at the nominal bit rate. Embedding RDS data directly into the multiplex signal at the source can eliminate the need for a separate RDS encoder at the transmitter site. APTmpX ensures a highly stable stereo pilot, resulting in a consistently stable subcarrier. RDS data blocks are transmitted with optimal efficiency, and APTmpX is ready to support additional RDS standards (RDS2) as demand evolves.

APTmpX Software

The APTmpX, as a Software Appliance, is an essential tool for modern broadcasters looking for a simple-to-implement, high-performance MPX solution at an accessible price. Designed for effortless installation on Windows platforms, it ingests MPX over AES67 and provides seamless integration into existing studio infrastructures.
With a studio software sound processor, broadcasters can rely on APTmpX to transport their MPX content to the transmitter site, offering flexibility for various configurations.
If required, the sound processor can embed the RDS data directly into the APTmpX output signal.



The APTmpX software is an application on a Windows installation that connects to a sound processor.