Program Audio Transport

Intraplex PT/PR-353 audio modules provide digital transport of up to 22.5 kHz CD quality stereo program audio. These modules are the ideal solution for applications requiring today's higher sampling rates to produce the best audio fidelity possible. They plug into Intraplex network access products, which combine the program audio with other audio, voice, and data traffic for transmission over T1, E1 and Ethernet access products.

Key Features

- **48, 44.1, or 32 ksps sample rate**
  Faster sample rates support digital audio broadcasting and high-quality audio transport applications with up to 22.5 kHz audio bandwidth. Operating at the same sample rates used in modern digital studios eliminates the unwanted artifacts generated from up and down sample rate conversions.

- **Linear uncompressed audio**
  Uncompressed audio ensures the best fidelity possible, free from the effects of encoding and decoding algorithms. Modulation compression schemes are avoided resulting in greater transmission robustness.

- **Both AES/EBU and analog inputs and outputs on each module**
  Simultaneous digital and analog outputs feed both the digital and analog systems. Having the analog I/O is especially handy for monitoring and testing.

- **Sample rate adaptation on AES/EBU input**
  Incoming AES/EBU audio sample rate is preserved throughout the system, eliminating sample rate converters. If desired, an internal rate converter can be switched on to rate convert the AES/EBU input, eliminating the need to employ an external sample rate converter.

- **External AES/EBU timing input**
  The digital output accepts an external AES/EBU reference or RS-422 clock signal to synchronize the output stream to facility timing, a require-ment for IBOC digital audio broadcasting.

- **Data channel built-in**
  Onboard data channel provides for PAD (program associated data). There's no need to consume additional channels or equipment for the PAD transport.

- **Reed Solomon error correction**
  Reed Solomon forward error correction provides superior audio performance even in the event bit errors occur in the network.

Specifications

Specifications and designs are subject to change without notice

General	
System Compatibility	Compatible with Intraplex T1, E1 and Ethernet access products
PT/PR-353 Series Modules	• PT-353: Digital or analog input, auto-detect • PR-353: Digital and analog output, simultaneous
No. of Audio Channels	1 or 2 per module, user selectable
Sample Rate and Audio Bandwidth	• 48 ksps for 22.5 kHz operation • 44.1 ksps for 20 kHz operation • 32 ksps for 15 kHz operation
Coding	16-bit linear coding
Data Rate and Time Slot Usage (2 channel)	• 22.5 kHz: 25 TS (1.600 Mbps)* • 20 kHz: 23 TS (1.472 Mbps) • 15 kHz: 17 TS (1.088 Mbps)
Processing Delay (digital audio through one pair of modules)	• Less than 6.0 ms at 32 and 44.1 ksps • Less than 5.0 ms at 48 ksps
Error Correction	Reed Solomon error correction, user selectable, results in no audible degradation at 10^{-3} bit error rate.
Data Channel	• RS-232 data transport 9.6 kbps • AES/EBU A&B channel status bits are transported
Line Error Tolerance	Error tolerance is part of the Enhanced apt-X coding, resulting in no audible degradation at 10^{-5} random bit error rate.
Input/Output Connectors (MA-508 and MA-509)	• Audio Inputs: XLR female on left, right, and digital • Audio Outputs: XLR male on left, right, and digital • External Clock, Data/Alarm, RJ-11 Note: MA-503, 504, 505, 510, and 511 may be used for analog audio or digital audio only applications.
Digital Audio Operation	
Audio Performance Characteristics	Frequency response, distortion, crosstalk, and dynamic range of the source are unaffected because a bit-identical copy of the source is delivered to the output (no sample rate conversion or DC offset removal)
Accepted Audio Sampling Rates	Accepts any AES/EBU rate between 32 and 48 ksps
Rate Conversion (PT) (user selectable)	Rate converts any AES/EBU input rate to 48, 44.1, or 32 ksps
Rate Adaptation	Input (PT) locks to incoming AES/EBU clock rate, which is preserved through the system to the output (PR)
External Sync (PR)	Accepts external AES/EBU reference signal or RS-422 clock to synchronize output to facility timing
Input/Output Impedance	Balanced, 110 Ω ±20%
Analog Audio Operation	
Audio Frequency Response (±0.5 dB, emphasis off)	• 48 ksps: 1 Hz–22 kHz • 44.1 ksps: 1 Hz–20.5 kHz • 32 ksps: 1 Hz–15 kHz
Audio Full Load Level	+9 to +24 dBu
Crosstalk	Greater than –80 dB
Total Distortion	(THD+N) Less than 0.003% at 1 kHz –1 dBFS input
Dynamic Range	Greater than 91 dB
Audio Pre-emphasis (user selectable)	Pre-emphasis and de-emphasis per ITU-T J.17
Input Impedance	Balanced, 600 Ω nominal or greater than 10K Ω
Output Impedance	Balanced, less than 52 Ω

*E1 operation only

Status and Diagnostics	
LED Indicators	Service On/Off, E1 Operation, Module Failure; (PT only) Input Source; (PR only) External Clock, Activity, Frame, Mute/Error
VU Meter	Five-segment LED audio level with overload indication
Test Access	Analog audio input and output, bantam test jacks
Test Tone Generator	1004 Hz test tone at –12 dBFS, which is equivalent to +8 dBm, input
Alarm	Card-level failure relay contacts via MA-508 and -509
Physical and Environmental	
Nominal Power Consumption	Less than 3.4 watts per module
Temperature	0 °C – 50 °C operating
Humidity	0% – 90% noncondensing