Intraplex® PT/PR-153

Program Audio Modules (48, 44.1, 32, 24, 16 KSPS)

Program Audio Transport

Intraplex PT/PR-153 audio modules provide digital transport of up to 22.5 kHz CD-quality stereo program audio using **Enhanced apt-X™** compression. These modules are the ideal solution for applications requiring today's higher sampling rates to produce the best audio fidelity possible.

The modules plug into Intraplex network access products, which combine the program audio with other audio, voice, and data traffic for transmission over T1 (1.5 Mbps), E1 (CEPT 2.0 Mbps), IP, and other high-speed digital links.

Key Features

- **48, 44.1, 32, 24, and 16 ksps sample rates**
  Faster sample rates support digital audio broadcasting and high-quality audio transport applications with up to 22.5 kHz audio bandwidth.
- **16-, 20-, and 24-bit sample sizes**
  User-selectable sample size lets you optimize both audio resolution and network bandwidth usage.
- **Both AES/EBU and analog inputs and outputs**
  Simultaneous digital and analog outputs feed both the digital and analog systems. Having the analog I/O is especially handy for monitoring and testing.
- **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 HD Radio (IBOC) digital audio broadcasting.
- **Built-in data channel**
  An onboard data channel provides for PAD, RDS, RBDS, or an independent auxiliary data channel. There's no need to consume additional bandwidth or buy additional equipment for data transport

Specifications

Specifications and designs are subject to change without notice

General	
PT/PR-153 Series Modules	• PT-153: Digital or analog input, auto-detect • PR-153: Digital and analog output, simultaneous
System Compatibility	Compatible with Intraplex T1, E1, ISDN, IP, and variable-rate access products
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 • 24 ksps for 12 kHz operation • 16 ksps for 7.5 kHz operation
Coding	Enhanced apt-X 4:1 compression
Data Rate and Time Slot Usage (2 channel)	• 22.5 kHz: 3 to 9 time slots • 20 kHz: 3 to 9 time slots • 15 kHz: 2 to 6 time slots • 7.5 kHz: 2 time slots
Processing Delay	• Less than 6.0 ms at 32 and 44.1 ksps • Less than 5.0 ms at 48 ksps
Data Channel	• RS-232 data transport 1.2, 2.4, 4.8, and 9.6 kbps, mode dependent • 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	
Accepted Audio Sampling Rates	Accepts any AES/EBU rate between 24 and 48 ksps
Rate Conversion (PT-153)	Rate converts any AES/EBU input rate to 48, 44.1, 32, 24, or 16 ksps
External Sync (PR-153)	Accepts external AES/EBU reference signal or RS-422 clock to synchronize output to facility timing
Input/Output Impedance	Balanced, 110 Ohms ±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 0.04% at 1 kHz –1 dBFS input
Dynamic Range	• Greater than 92 dB 16 bit • Greater than 105 dB 20 bit • Greater than 110 dB 24 bit
Audio Pre-emphasis (user selectable)	Pre-emphasis and de-emphasis per ITU-T J.17
Input Impedance	Balanced, 600 Ohm nominal or greater than 10 kOhm
Output Impedance	Balanced, less than 52 Ohm

Status and Diagnostics	
LED Indicators	Service On/Off, T1/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 5.5 watts per module
Temperature	0 to +50 °C operating
Humidity	0 to 90% noncondensing