## Description

The T9160 Integrated Power Amplifier Mainframe is designed to house, supply power to, and cool up to nine (9) Titan Series power amplifier cards. In addition, the mainframe provides digital audio network connections, utilizing CobraNet technology, to an IED audio network controller such as a 500 Series Announcement Control System or GLOBALCOM vACS. Local program or background music (BGM) inputs can connect to analog connections located on the back of the mainframe. Eight of the amplifier cards function as primary cards to drive connected loudspeaker circuits. The ninth card functions as a spare that is automatically switched in place of a failed card. Digital Signal Processing is provided on each of 16 channels and includes input level controls, paging routing, automatic ducking of background music, equalization (up to 9 parametric bands per amplifier channel), signal delay, and IED's patented technology for ambient analysis-based automatic level control. The mainframe contains integrated supervision that monitors each signal path and reports any failures to the IED fault reporting system. Each channel is monitored in multiple locations, including the line level output of the DSP, the amplifier output voltage, amplifier output current, and loudspeaker line ground fault detection.

Several models of Titan power amplifier card are available in single or dual channel configurations. Different models are capable of driving 70 Volt distributed and 100 Volt distributed loads. Each amplifier card is capable of supplying 400 Watts of continuous power. Single channel cards will provide 400 Watts into a single channel while the dual channel cards provide 200 Watts for each channel. A full mainframe is capable of driving up to 16 channels of 200 Watts or 3200 Watts total.

The mainframe requires 6 rack units (10.5") of vertical space in a 19" equipment rack/cabinet. All cooling is front to back, so no additional vertical space is required in the rack for cooling. Connections for local program or BGM inputs are provided on the back using plug-in lugless compression-type screw terminals. Loudspeaker connections are made using larger scale terminals of the same type. Power amp cards slide in from the front and are secured in the mainframe with tamper-resistant screws. Each card has an individual power switches on the front along with power and signal presence LEDs. Individual cards can be powered down and removed from the frame for service without disrupting all channels on the mainframe.

Optional collector units are available to support advanced features such as Ambient Analysis or enhanced supervision. The T9032NS Ambient Analysis Sensor Collector used to interface with up to 32 IED 540S ambient sensors. Each sensor reports the ambient noise level at its location and that information is used by the T9160 to automatically adjust the output level as the ambient noise level changes. The T9040NLR is a collector unit that includes a combination of logic inputs, relay outputs, and noise sensor inputs. When additional supervision points are required, the T9032MT Monitor/Test Collector can be used to add an additional 32 monitor/test points to be used by the system. These add-on options are linked via the Ethernet connection.

Audio signals enter the T9160 Mainframe using the local analog program/BGM connections or through the Ethernet connection using CobraNet® technology. The combination of the Titan Series T9160 Mainframe System, GLOBALCOM controller, 1000vACS, IED 500ACS with IED 510N Digital Audio Network card, and IED 524 or 528 digital microphone stations comprises a completely digital/network connected audio/paging system.
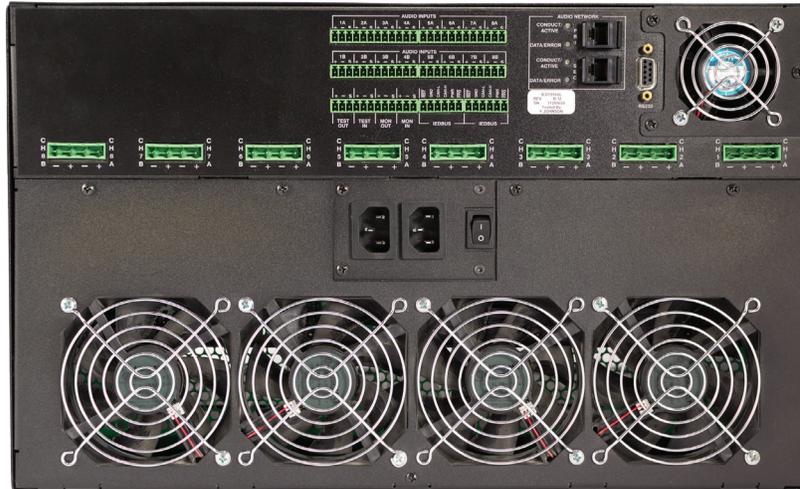
Specifications

Capacities

Maximum Number of Titan series Amplifier Cards....................... 9 Cards
8 Cards with speaker loads, 1 Card as backup
Maximum Number of Local Program/BGM Inputs.................... 16 Inputs
Maximum Number of Paging Zones Assignable to Frame .... 16 Zones
Maximum Number of Amplifier/Loudspeaker Outputs .... 16 Outputs

Connectors

Program/Background Music Inputs 16
plug-in lugless compression-type screw terminals
Speaker Connections 8
plug-in lugless compression-type screw terminal blocks (2 outputs per block)
Ethernet
  Network Audio and Control .... 2 - 100Base-T modular RJ-45
  For redundant networks
Test Signal Out, Test In, Monitor Out and Monitor In 4
plug-in lugless compression-type screw terminals
AC Power Cord
  T9160L for 120VAC Operation......................... (2) Belden/Volex 17250
  T9160H for 240VAC Operation .... (2) Belden/Volex 17850

Digital Signal Processing Functions

Level Controls .... 16 Program, 16 BGM, 16 Overall Channel Levels
Equalization Bands .... 9 Parametric per Channel (16)
Signal Delay Range .... 0 to 2 Seconds in 1 msec steps
Ambient Analysis .... Up to four 540S sensors per Channel
automatic or slaved modes
Built-in Testing
  Automated multi-frequency and 20kHz testing of all channels, ampli-
  fiers and speaker line current load plus ground fault detection of all
  speaker lines
Monitoring
  Capability to listen to any test point plus additional monitor-only
  points in the mainframe locally or via the network at another location.

Electrical

All of the following specifications apply with program input via the network (CobraNet®), or with direct inputs to the power amplifier.

Frequency Response...±0.2 dB, 20 Hz - 20 kHz
Total Harmonic Distortion. THD .... <0.01%, 20 Hz - 20 kHz
Signal-to-Noise Ratio, S/N .... >93 dB, 22 Hz - 22 kHz, weighted
Maximum Input .... +14 dBu
Maximum Output .... +14 dBu
Gain
  Via the network ....Unity
  Direct Input..25 dB, Max
  Background Music..25 dB, Max

Analog-to-Digital Converter, A/D..24 bit
Digital-to-Analog Converter, D/A..24 bit
Internal processing ....32-bit, floating point
Sample Rate.. 48 k
Latency.. <1 ms
Crosstalk .... < −75 dB, f = 2 kHz
Backup Amplifier Switching Time..< 4 Seconds

AC Power Requirements

No power amplifier cards, quiescent power ....75 W
8 power amplifier cards, quiescent power ....387 W
8 power amplifier cards ....875 W
  1/8 power output, typical for speech/voice announcements
8 power amplifier cards ....4115 W
  full power output, sine wave input

Mechanical

Size, overall
  Width, with ears .... (48.3 cm) 19"
  Height.. (17.8 cm) 10.5"
  Depth .... (43.2 cm) 17"
Mounting Depth (rack depth) .... (44.2 cm) 17.4"
  for proper fan operation add a minimum of 2" (5.1 cm) clearance
Weight
  T9160 with supplied rack ears...............................(16.10 kg) 35.5 lbs
  Extra rear rack ears..(0.68 kg) 1.5 lbs
  With 9 power amplifier cards ....(32.43 kg) 71.5 lbs
Cooling fans
  For amplifiers 4
  For digital electronics 1
Mounting Ear Location Options.............................. 3 (front, rear, bottom)

Environmental

Operating Temperature Range .... (+32 °F - +122 °F) 0 °C - +50 °C
  Applicable for typical voice paging and background music applications.
Storage Temperature Range .... (−40 °F - +158 °F) −40 °C - +70 °C

Power Amplifier Card Options

T6002 .... Dual-channel Line Driver Card
T6411 .... Single 400W, 100V Power Amplifier Card
T6412 .... Dual 200W, 100V Power Amplifier Card
T6471 .... Single 400W, 70.7V Power Amplifier Card
T6472 .... Dual 200W, 70.7V Power Amplifier Card