MODEL T9160

INTEGRATED POWER AMPLIFIER MAINFRAMES

The Models T9160 Integrated Power Amplifier Mainframes are designed to house, supply power to, and cool up to nine Titan Series power amplifier cards. In addition, the mainframes provides digital audio network connections, utilizing CobraNet technology, to an IED audio network controller such as the IED 500ACS Announcement Control System. Local program or background music (BGM) inputs connect via analog connections. The mainframe's nine power amplifier card slots are configured for eight main amplifier cards to drive loudspeaker circuits and one backup amplifier card to serve as a hot standby/backup amplifier. The mainframes can also automatically switch to the backup amplifier as necessary.

Digital Signal Processing on each of 16 incoming signals includes functions such as input level controls, paging routing, automatic ducking of BGM audio, equalization (up to 9 parametric bands per amplifier channel), signal delay, and IED's patented technology for ambient analysis based automatic level control. IED monitor/test functions are also included inside of the T9160 Mainframe System. The system provides the built-in amplifier test, loudspeaker line test, and ground fault detection, and these tests are all accomplished inside of the Mainframe with no external test circuit wiring required.

There are several models of Titan power amplifier card that may be put into the mainframe including single channel or dual channel configurations, and loudspeaker driving options of 4 Ohm, 8 Ohm, 70 Volt distributed and 100 Volt distributed. Each amplifier card is capable of supplying 400 Watts of continuous power to its designed load type, which means there will be either 200 or 400 Watts per channel depending on the amplifier card type. So, a full frame is capable of driving 16 channels of 200 Watts or 3200 Watts total.

The mainframe requires 6 rack units (RUs) of space or 10.5" of vertical space in a 19" equipment rack/cabinet. All cooling is back to front, so no additional vertical space is required in the rack for cooling. Local program or BGM inputs are provided on the back via plug-in lugless compression-type screw terminals. Also, the loudspeaker connections are made via larger scale terminals of the same type. The power amp cards slide in from the front and have individual power switches on the front along with power and signal presence LEDs. The Mainframes also are compatible with optional collector units such as the T9032NS Ambient Analysis Sensor Collector used to bring in IED 540S ambient sensor readings for the Ambient Analysis System computations. Another option is the T9032MT Monitor/Test Collector for additional monitor/test points. These add-on options are linked via the Ethernet connection.

Audio signals come into the T9160 Mainframe either via the local analog program/BGM connections or via the Ethernet connection utilizing the CobraNet technology. The combination of the Titan Series T9160 Mainframe System, IED 500ACS with IED 510N Digital Audio Network card, and IED 518 or 528 digital microphone stations comprises a completely digital/network connected audio/paging system.

Model T9160L is the part number for 120VAC power source, and Model T9160H is the part number for 240VAC power source.

IED®
Innovative Electronic Designs

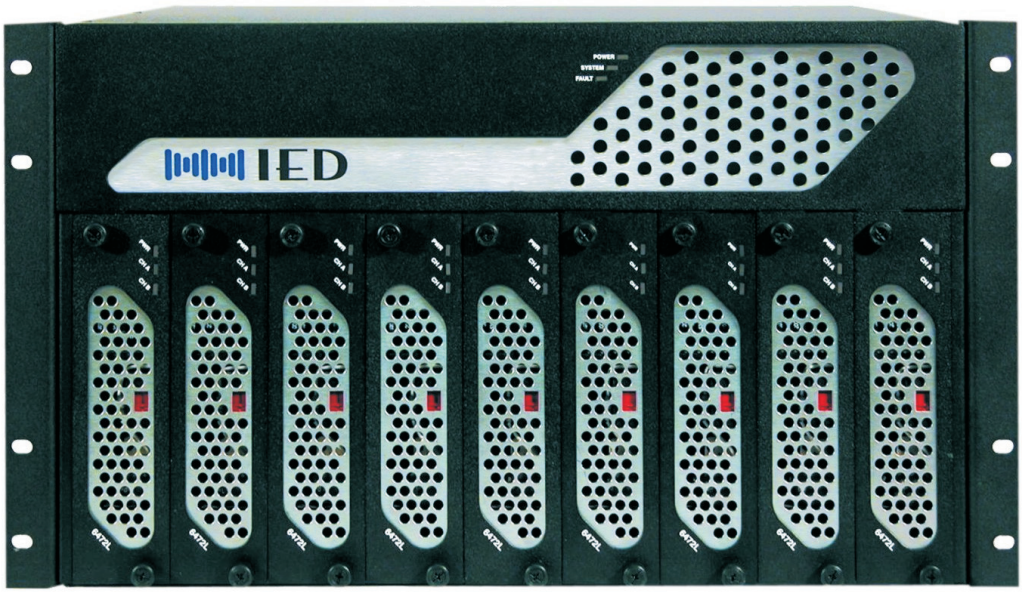

Figure 1 - Front View (with Amplifier Cards)

Figure 2 - Rear View

Innovative Electronic Designs, Inc. • 9701 Taylorsville Road • Louisville, Kentucky 40299 • USA
Phone: (502) 267-7436 • Fax: (502) 267-9070 • Internet: http://www.iedaudio.com

SPECIFICATIONS

CAPACITIES

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

CONNECTORS

1. Program/Background Music Inputs. 16
   plug-in lugless compression-type screw terminals
2. Speaker Connections 8
   plug-in lugless compression-type screw terminal blocks (2 outputs per block)
3. Ethernet
   Network Audio . . . . . 2 - 100Base-T modular-8 RJ-45
   For redundant networks
   Control . . . . . 1 - 100Base-T modular-8 RJ-45
4. Test Signal Out, Test In, Monitor Out and Monitor In 4
   plug-in lugless compression-type screw terminals
5. AC Power Cord
   T9160L for 120VAC Operation . . . . . (2) Belden/Volex 17250
   T9160H for 240VAC Operation . . . . . (2) Belden/Volex 17850

DIGITAL SIGNAL PROCESSING FUNCTIONS

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

IED®
Innovative Electronic Designs

ELECTRICAL

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

1. Frequency Response . . . . . ±0.2 dB
   20 Hz - 20 kHz
2. Total Harmonic Distortion. THD . . . . . <0.01%
   20 Hz - 20 kHz
3. Signal-to-Noise Ratio, S/N . . . . . >93 dB
   22 Hz - 22 kHz, weighted
4. Maximum Input. . . . . +14 dBu
5. Maximum Output. . . . . +14 dBu
6. Gain
   - Via the network . . . . . Unity
   - Direct Input. . . . . 25 dB, Max
   - Background Music. . . . . 25 dB, Max
7. Analog-to-Digital Converter, A/D. . . . . 24 bit
8. Digital-to-Analog Converter, D/A. . . . . 24 bit
9. Internal processing. . . . . 32-bit, floating point
10. Sample Rate. . . . . 48 k
11. Latency . . . . . <1 ms
12. Crosstalk . . . . . below –75 dB
    f = 2 kHz
13. Backup Amplifier Switching Time . . . . . < 4 Seconds

AC POWER REQUIREMENTS

1. No power amplifier cards, quiescent power . . . . . 83 W
2. 8 power amplifier cards, quiescent power . . . . . 403 W
3. 8 power amplifier cards . . . . . 883 W
   full power output, speech/voice announcement input
4. 8 power amplifier cards . . . . . 4115 W
   full power output, sine wave input

MECHANICAL

1. Size, overall
   - Width, with ears . . . . . (48.3 cm) 19”
   - Height . . . . . (17.8 cm) 10.5”
   - Depth . . . . . (43.2 cm) 17”
2. Mounting Depth (rack depth) . . . . . (44.2 cm) 17.4"
   for proper fan operation add a minimum of 2" (5.1 cm) clearance
3. 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
4. Cooling fans
   - For amplifiers 4
   - For digital electronics. 1
5. Mounting Ear Location Options 3
   front, rear, bottom

Innovative Electronic Designs, Inc. • 9701 Taylorsville Road • Louisville, Kentucky 40299 • USA
Phone: (502) 267-7436 • Fax: (502) 267-9070 • Internet: http://www.iedaudio.com

ENVIRONMENTAL

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

POWER AMPLIFIER CARD OPTIONS

1. T6472 Dual 200 Watt, 70 Volt Power Amplifier Card
2. T6482 Dual 200 Watt, 8 Ohm Power Amplifier Card
3. T6471 Single 400 Watt, 70 Volt Power Amplifier Card
4. T6481 Single 400 Watt, 8 Ohm Power Amplifier Card
5. T6441 Single 400 Watt, 4 Ohm Power Amplifier Card
6. T6411 Single 400 Watt, 100 Volt Power Amplifier Card

SUPPORT EQUIPMENT OPTIONS

Below are optional units that may be ordered to work with and extend the capabilities of this mainframe.

1. T9032NS Ambient Sensor Collector
2. T0516BGM Background Music Hub
3. T9032MT Monitor/Test Collector
   For additional external monitor/test points

This page left blank intentionally