

AUDIO BANDWIDTH TEST SYSTEMS

Designed to meet the rigorous requirements of EMC testing



Automotive • Aviation • Telecom

AETECHRON

The Audio Bandwidth EMC Experts

Standards Waveform Generator



**When used with AE Techron 7000-series amplifiers.*

- Includes a large library of Automotive and Aviation Standards' test routines
- Drag and drop interface makes it easy to modify existing tests or build new waveform sequences
- Loop entire tests or test sections; repeat loops with increments of up to four variables
- Form multi-test programs by quickly linking tests from the Standards Library
- Instantly halts testing if an amplifier fault occurs, saving time and preventing potential equipment damage*
- Can be used as a free-standing test system or connected to an Ethernet network and controlled remotely

The 3110 features a powerful yet simple-to-use interface and a large library of Automotive and Aviation tests. Tests are easy to link, build from scratch, or customize using time-saving controls like triggers and loops with changing variables. Plus, the 3110's intuitive, drag-and-drop interface makes it easy to modify existing tests or build new tests.

The 3110 produces standard signals and waveforms with or without a DC offset. Frequency, amplitude and DC offset can be fixed or swept, and

sweeps can be linear, logarithmic or exponential. It can create dropouts and surges with rise and fall times as fast as 3µs. Individual signal duration can be as short as 150µs or as long as 49 days. It can also produce ripple waveforms of up to 300 kHz.

Use the 3110 with AE Techron 7000-series amplifiers to create an intelligent, engineered, modular test system. During operation, the 3110 monitors the amplifier status and will automatically abort a test if a fault condition occurs, saving time and preventing potential equipment damage. In addition,

AE Techron amplifiers can be easily configured into series or parallel multi-amp systems for a wide range of voltage and current capabilities.

For automotive testing, continuous DC power ratings from 15A to 240A DC are possible. For aviation testing, systems can be created for 115 VAC / 230 VAC with surge voltages up to 380 VAC.

Together, AE Techron's 3110 Controller and 7000-series amplifiers create a complete solution for AF EMC testing.

LF Tests from the following Standards are included in the 3110 Standards Library

Airbus ABD0100.1.8.1 Issue C (2008-07)
 Airbus ABD0100.1.8 Issue E (2005-04)
 Airbus AMD-24 Issue C (2005-03)
 ANSI ASAE EP455
 Audi I EE-32 (2006-06)
 BMW GS 95003-2 (2010-01)
 BMW GS 95003-3 (2010-01)
 BMW GS 95024-2-1 (2010-01)
 BMW GS 95024-2-2 (2011-01)
 Boeing D6-16050-5 Issue C (2006-09)

Case New Holland ENS0310 (12-2-2010)
 Chrysler CS-11809 (2009-05-29)
 Chrysler CS-11979 (2010-04-13)
 Claas CN 05 0215 (2004-12)
 Cummins 14269 (06201-028)
 Cummins 14387 (102020-119)
 DAF BSL-003 (1998-12)
 DAF BSL-006 (2009-04)
 Daimler Chrysler DC-10842 (2003-12)
 Daimler Chrysler PF-9326 Change D
 DO160G (2012-12)
 Fiat 9-90110 Issue 13 (2007-03)
 Ford CS-209.1 (2-11-2010)
 GMW 3172 H (July 2010)

Honda 7794Z-SAAA-000 (28.12.2004)
 Hyundai ES 39110-00 (5-8-2012)
 Hyundai ES 95400-10 (2007-11-14)
 Hyundai ES 96100-02 (2006-11-16)
 Hyundai ES 96200-00 (2008-07-03)
 ISO 7637-2:2011 (E)
 ISO 16750-2:2012 (E)
 JASO D001-94 (1994)
 Mazda MES PW 67600 (1995-17)
 MIL 461F (2007-12)
 Mitsubishi ES-X82010 Rev Q (2007-01)
 Mitsubishi ES X82115 Rev C (2009-03)
 Nissan 28400 NDS 02, 03
 Nissan 28401 NDS 02 Rev.4 (2008-08)
 SAE J1113-2, -11
 SAE J2139 SEP2005

SAE J2628 JUL2007
 Toyota TSC3500G Rev 8 (May 2005)
 Toyota TSC3590G Rev 7 (June 2001)
 Toyota TSC7021G Rev.2 (2007-06)
 VW 80000 (2009-10)
 VW 80101 (2009-03)

Disclaimer:

Although AE Techron has made substantial effort to ensure the accuracy of the Standards' test files (SWG files), which are included with the 3110 unit, no warranty, expressed or implied, is made regarding accuracy, adequacy, completeness, legality, reliability or usefulness of the information provided. It is the responsibility of the user to ensure the accuracy and applicability of these test files for their intended purposes.

Amplifiers / Battery Simulation



7548 / 7794 / 7796 **Modular Power**

- 3.3 kW – 20 kW
- 115/200 VAC (L-N/L-L) or 230/400 VAC (L-N/L-L) modes
- Controlled-voltage and controlled-current modes
- Signal Integrity – <1 mV noise floor and <0.1% THD
- Rugged Design – Output protected from open circuit, shorting, back EMF; amplifier protected from over temperature, under/over voltage and over current
- Modular, Flexible, Expandable – can be used alone or combined in Series or Parallel systems for up to 800 Ap or 600 Vp

7548/7794/7796 power amplifiers offer great power and flexibility. The series consists of three different models. Each model can be used as a free-standing gain block or combined in multiples to achieve high voltage (460 Vrms at 25 Arms) or high current (up to 800 Ap or 400A at 13.5–28 VDC continuously).

The **7548** can be used to create very fast (up to 200 kHz), low noise (0.1% THD), DC-coupled, variable-frequency, three-phase power systems of 0–115 Vrms/200 Vrms or 0–230 Vrms/400 Vrms (L-N/L-L) ideal for the DC offset measurements required in RTCA/DO 160 Section 16.

The **7794** is designed to be a battery substitute for transient immunity testing and can produce up

to 60A continuous at 13.8 VDC. It is capable of producing the 80V surges required for DO-160G section 16.6.2.4 abnormal surge testing. It is also well suited for ISO 7637 pulse 2b and 4 testing.

The **7796**, when run in controlled-current mode, is a perfect choice to drive medium to large diameter Helmholtz coils and radiators like those specified in Ford EMC CS2009 (RI140, RI150).

Amplifiers / Conducted & Radiated Immunity Tests

7224 **Robust & Versatile**

- DC (0 Hz) to 300 kHz
- 75 V/μs rise time
- 0–30 VDC, 0–55 Vrms or 0–110 Vrms modes
- Signal Integrity – <1 mV noise floor and <0.1% THD
- Multi-functional – One amplifier can produce both test interference and EUT DC or AC mains power
- Can be combined in Series or Parallel systems for increased voltage or current
- Rugged Design – Output protected from open circuit, shorting, back EMF; amplifier protected from over temperature, under/over voltage and over current

The **7224** amplifier can produce both the 13.5-volt DC and the high-frequency (AC) conducted interference waveforms required for Ford EMC CS2009, (CI210, CI230, CI250, CI260) and can also be used for cranking, surge and drop-out tests in automotive standards like CS-11809, GMW3172-07, ISO 7637-2, and SAE J1113-2.

When used with T-Series coupling transformers, the 7224 is the ideal amplifier for the low-voltage conducted or radiated immunity tests needed for Aviation industry standards like DO 160 (Section 18 and 19), MIL STD 461/462 (CS101 and RS101),

Airbus and Boeing audio bandwidth electrical and magnetic tests.

The 7224, when run in controlled-current mode, is a perfect choice to drive small to medium Helmholtz coils and radiators like those specified in Ford EMC CS2009 (RI140, RI150).



7224 amplifier

Test Systems



4301 Telecom Test System

- For GR-1089 Section 10 and ATIS-0600315.2007 testing
- Slew rates up to 60 V/ μ sec
- Up to 240 ADC at +50 VDC or -50 VDC
- Can provide pulses of up to 800 amps at voltages of up to \pm 100V



3110 Standards Waveform Generator

- For ISO 16750-2, ISO 7637-2, SAE J1112-11 and Ford CS2009.1 testing
- 60A continuous at 13.8 VDC
- 150 kHz small signal bandwidth
- Ideal for ISO 7637 pulse 2b and 4 (voltage variations) testing

3110 Standards Waveform Generator

+ T-Series Coupling Transformers



+ 7224 Conducted & Radiated Immunity

- Ideal for DO-160 (sections 16, 18 and 19) conducted and induced susceptibility testing
- Up to 300 kHz frequency response
- Up to 100 Arms secondary current using T1000 transformer
- Up to 200W audio power using T2000 transformer
- Up to 3,700V using T3700 transformer



Transformers

- Performance – Meets or exceeds requirements for Aviation (DO 160, MILSTD461, Boeing, Airbus) and Automotive (Ford CS2009.1, SAE J1113-2) Standards
- Protection – Circuit Breaker/Fuse to protect from damage
- Modern Design – Modern toroidal design gives wider bandwidth, lower weight and a contemporary look
- Integrated Solution – Specifically designed to work in conjunction with AE Techron 7224 amplifiers

T1000

AF Magnetic Field Susceptibility Transformer

- Up to 100 Arms
- 350 Hz to 35 kHz
- Turns ratio 10:1 step-down
- Exceeds DO 160 Section 19, Boeing D6-16050-5 Section 7, Airbus ABD0100 1.2 requirements

The T1000 is a general-purpose, wide-bandwidth step-down transformer for various test requirements including RTCA/DO 160 Section 19 magnetic-field requirements.

T2000

LF Conducted Susceptibility Transformer

- Audio power up to 200 watts
- Secondary saturation, 60A
- Turns ratio, 2:1 step down
- 10 Hz to 250 kHz bandwidth
- Exceeds DO 160 Section 18 requirements

The T2000 Transformer is an isolation transformer used for various test requirements including RTCA/DO-160 Section 18 conducted susceptibility testing.

T3700

AF Electric Field Susceptibility Transformer

- Up to 3,700 volts output potential
- Turns ratio of 1:37 step up
- 35 Hz to 35 kHz bandwidth
- Withstand tested to 3,700 Vrms

The T3700 Transformer is a step-up transformer used for various tests requirements. SOA exceeds the requirements of RTCA/DO 160 Section 19 and Boeing D6-16050-5.



T-Series Coupling Transformers