



7224

900VA, Single-phase,
2U, Industrial Amplifier/
Battery Simulator

Performance Overview:

AC Power (up to 20 kHz):	900 watts RMS
Small Signal (8V p-p):	1 MHz
For High-Power Applications to:	150 kHz
DC Power:	16A at 13.5 VDC
40 mS Pulse (0.5Ω):	50 Ap
Slew Rate:	90 V/μs
Output Voltage:	±150 Vp
Output Impedance:	5.3 mΩ in series with 0.95 μH

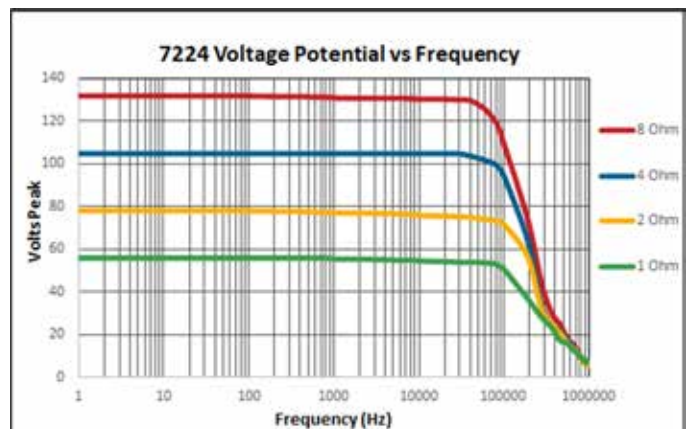
AE Techron's **7224** amplifier is a 900 VA, DC-enabled unit that provides exceptional versatility and value. It features a DC to 1 MHz small-signal bandwidth and improved long-term power performance at frequencies above 40 kHz. In continuous operation, a 7224 can provide rated output power for frequencies up to 40 kHz. If more current or power is needed, up to four amplifiers can be combined in series or parallel and operate as a single system.

The 7224 can be configured by the user for high-voltage/low-current, medium voltage and current, or low-voltage/high-current applications. It provides very low noise and very fast slew rates, and can safely drive a wide range of resistive, inductive loads.

The 7224 is typically used to simulate ripple, noise, drop-outs, surges and ground as required by a variety of EMC standards for DC powered electronics like FMC1278, DO-160, and MIL STD 461. It can also be used as a gradient amplifier for very small bore, high-gain MRI and NMR systems.

Features:

- Provides rated long-term power at frequencies up to 40 kHz.
- Stable when driving highly capacitive loads.
- Four-quadrant operation.
- User-selectable controlled-voltage or controlled-current modes of operation.
- System output of over 3,600 watts or over 200 amperes maximum is possible with multiple, interconnected amplifiers.
- Occupies only 2U height and weighs only 46 lbs.
- Protection circuitry protects the amplifier from input overloads, improper output connection (including shorted and improper loads), over-temperature, over-current, and supply voltages that are too high or low.
- Shipped ready to operate from 120-volt (±10%) single-phase AC mains; 220/240-volt model available on request.



Specifications

Performance

AC testing was done at 100 Hz. Continuous DC power levels are lower. See DC Specifications chart for test conditions.

Frequency Response, DC–300 kHz (1 watt): +1.0 to -1.5 dB

Slew Rate: 90 V/ μ Sec

Residual Noise,

10 Hz to 300 kHz: 950 μ V (0.95 mV)

10 Hz to 80 kHz: 300 μ V (0.3 mV)

Signal-to-Noise Ratio,

10 Hz - 30 kHz: -113 dB

10 Hz - 80 kHz: -106.6 dB

10 Hz - 500 kHz: -99.9 dB

Unit to Unit Phase Error: ± 0.1 degrees at 60 Hz

THD (DC - 30 kHz): <0.1%

Output Offset: < ± 400 μ V

DC Drift: < ± 200 μ V (after 20 minutes of operation)

Output Impedance: 4.4 mOhm in Series with 0.43 μ H (old 5.3 mOhm in Series with 0.95 μ H)

Phase Response (10 Hz - 10 kHz):

± 5 degrees plus 600 nsec (old 560 nsec) propagation delay

Input Characteristics

Balanced with ground: Three terminal barrier block connector, 20k ohm differential

Unbalanced: BNC connector, 10k ohm single ended

Gain (variable or fixed):

Voltage Mode: 20 volts/volt or 6 volts/volt (DIP switch)

Current Mode: 5 amperes/volt

Gain Linearity (over input signal, from 0.2V to 5V):

0.15% (old 0.02% DC; 0.05% AC)

Max Input Voltage: ± 10 V, balanced or unbalanced

Input Impedance: 20k ohm differential

Control, Status, I/O

Front Panel LED Displays indicate:

Ready, Standby, Fault, Over Temp, Over Voltage, Overload

Soft Touch Switches for: Run, Stop, Reset

Gain Control, when enabled:

Voltage gain adjustable from 20 to 0. Can be configured for a gain of 6 to 0.

On/Off Breaker

Back Panel Power Connection:

25 Amp IEC (with retention latch)

Signal Output:

Three-position terminal strip (OUTPUT/COMMON/CHASSIS GROUND); resistor between COMMON and CHASSIS GROUND terminals is a 2.7-ohm, 2W, 5%, metal-oxide resistor

Signal Input:

User-selectable BNC or Barrier Strip, Balanced or Unbalanced

DIP Switches: Refer to the *Configuration Settings* graphic for more information.

Interconnect Connectors: Two back-panel DB9 connectors.

Interlock Connector: DB25 connector located on back panel.

Communication Capabilities

Operation Monitor: Run/Standby

Voltage Monitor: 10V/V $\pm 1\%$

Current Monitor: 5A/V $\pm 1\%$

Temperature Monitor: 1V/100 Kelvin

Reporting: System Fault, Over Temp, Over Voltage, Over Load

Remote Control via Interconnect Connectors:

Force to Standby

Remote Control via Interlock Connector:

Force to Standby, Reset after a Fault

Physical Characteristics

Chassis: The amplifier is designed for stand-alone or rack-mounted operation. The Chassis is steel with a black powder coat finish. The unit occupies two EIA 19-inch-wide units.

Weight: 46 lbs (20.9 kg), Shipping 56 lbs (25.4 kg)

AC Power: Single phase, 120 VAC, 60 Hz, 20A service; (220-240 VAC, 50-60 Hz, 10A service model available)

Operating Temperature:

10°C to 50°C (50°F to 122°F), maximum output Power derated above 30°C (86°F).

Humidity: 70% or less, non-condensing

Cooling: Forced air cooling from front to back through removable filters.

Airflow: 180CFM

Dimensions (HxWxD): 3.5 in. x 19 in. x 22.75 in. (8.9 cm x 48.3 cm x 57.8 cm)

Protection

Over/Under Voltage:

$\pm 10\%$ from specified supply voltage amplifier is forced to Standby

Over Current:

Breaker protection on both main power and low voltage supplies

Over Temperature:

Separate output transistor, heat sink, and transformer temperature monitoring and protection

Please note that the handles are not to be used for carrying the amplifier and only lift the device using a two-person technique.

AC Specifications – High-Voltage Mode

Ohms	PEAK OUTPUT						RMS OUTPUT				
	40 mSec Pulse, 20% Duty Cycle		5 Minutes, 100% Duty Cycle		1 Hour, 100% Duty Cycle		5 Minutes, 100% Duty Cycle		1 Hour, 100% Duty Cycle		
	Volts	Amps	Volts	Amps	Volts	Amps	Volts	Amps	Volts	Amps	Watts
16	158	9.8	158	9.8	158	9.8	112	6.9	112	6.9	773
8	154	19	136	16	120**	15**	96	11.5	85**	10.6**	900**
4	124	31	108	25.7	61	14.5	76	18.2	43	10.3	443
2	98	49	*	*	*	*	*	*	*	*	*

AC Specifications – Mid-Level Mode

Ohms	PEAK OUTPUT						RMS OUTPUT				
	40 mSec Pulse, 20% Duty Cycle		5 Minutes, 100% Duty Cycle		1 Hour, 100% Duty Cycle		5 Minutes, 100% Duty Cycle		1 Hour, 100% Duty Cycle		
	Volts	Amps	Volts	Amps	Volts	Amps	Volts	Amps	Volts	Amps	Watts
4	72	18	69	16.4	69	16.4	49	12	49	11.6	568
2	61	30	57	26.2	57	26.2	40	19	40	18.5	740
1	47	47	43	39.6	21	21	30	28	15	14.8	222
0.5	26	52	*	*	*	*	*	*	*	*	*

AC Specifications – High-Current Mode

Ohms	PEAK OUTPUT						RMS OUTPUT				
	40 mSec Pulse, 20% Duty Cycle		5 Minutes, 100% Duty Cycle		1 Hour, 100% Duty Cycle		5 Minutes, 100% Duty Cycle		1 Hour, 100% Duty Cycle		
	Volts	Amps	Volts	Amps	Volts	Amps	Volts	Amps	Volts	Amps	Watts
1	29	29	29	29	29	29	21	21	20.5	20.5	420
0.75	27	36	26	34	26	34	18	24	18	24	432
0.5	24	48	22.7	45	22.7	45	16	32	16	32	512

Note: **Numbers provided are preliminary.** Testing performed into resistive loads as specified. Performance reported is typical into the specified load up to 40 kHz frequency levels. Performance may be affected when operating into highly reactive loads or above 20 kHz, reducing maximum voltage, current and power output. *Testing not performed. **Maximum 45 minutes of continuous operation.

DC Specifications – High-Current Mode

VDC	OUTPUT (Amperes)		
	100 mS Surge	10 Minute, 100% Duty Cycle	1 Hour, 100% Duty Cycle
13.5	50	20	16
24	45	26	20
48	40	12	12

THD + Noise*	
Filter	µV
10 to 500 kHz	697
10 to 80 kHz	418
10 to 30 kHz	331
10 to 22 kHz	315

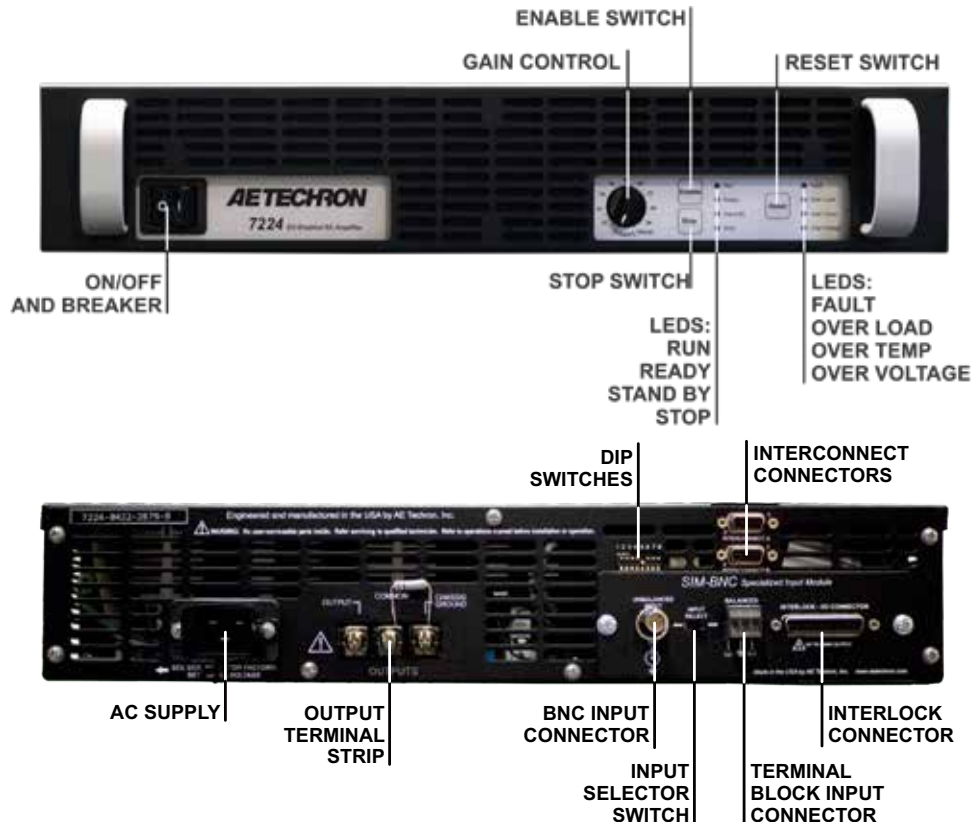
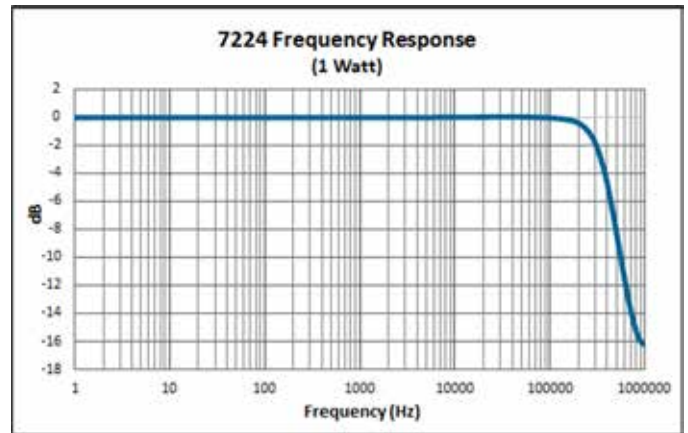
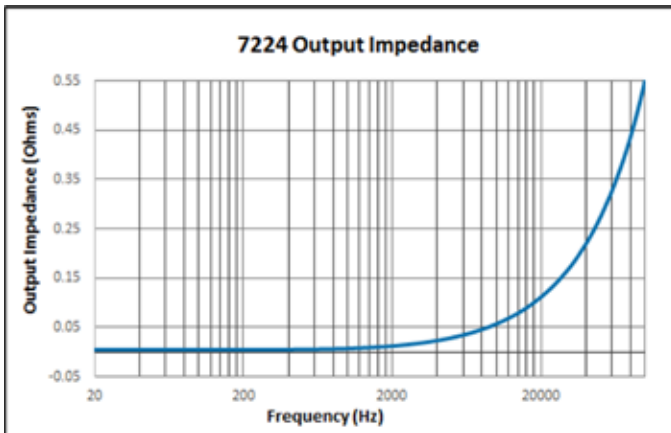
*THD + Noise with 1V input, 8-ohm load

CONFIGURATION SETTINGS



	DIP SWITCH SETTINGS	UP	DOWN	
Controlled-voltage or controlled-current operation	1 OPERATION (CV / CC)	CV	CC	Compensation network (for controlled-current operation)
Enable 50 kHz low-pass filter	2 COMPENSATION (CC1 / CC2)	CC1	CC2	
Enable electronic gain matching (for parallel multi-amp operation)	3 LOW PASS FILTER	OFF	ON	Gain selection (20 / 6)
Low (line-level) input or high input (up to 180V)	4 GAIN (20 / 6)	20	6	
	5 ELECTRONIC GAIN MATCHING	ON	OFF	Multi-amp configuration
	6 MASTER / FOLLOWER	MASTER	FOLLOWER	
	7 VOLTAGE INPUT (LOW / HIGH)	LOW	HIGH	DC enable or DC block
	8 DC / AC COUPLING	DC	AC	

RED = FACTORY DEFAULT



230V versions of this product bear the CE mark