

### **DAX-1/3**

**1 or 3kW AM/IBOC  
Transmitter**



The Harris DAX-1/1R and DAX-3 are part of a dynamic family of 1-6kW AM transmitters designed from the ground up to provide superior IBOC and analog performance. DAX's exceptional linearity and bandwidth will not only deliver the cleanest analog sound in this power range, but also the most accurate reproduction of digital radio signals. Accurate digital signal reproduction with low bit error rate is essential to maximizing digital coverage.

With DAX, Harris — the company that has pioneered every AM modulation standard in use today — introduces a brand new high-efficiency/high-performance modulation technique. Called Digital Adaptive Modulation, this new modulation technology uses a digitally generated AM waveform with DSP based adaptive correction to give the user a high performance transmitter in a cost effective platform. Digital Adaptive Modulation samples the modulated output and dynamically corrects for non-linearity. The result is the cleanest, purest analog or digital (DRM™ or HD Radio™) signal in this power level.

#### **Features And Benefits:**

- Ready for Digital – NOW – not a modified design.
- 50 kHz broadband modulator for exceptional linearity
- Lightweight, UPS-shippable main chassis
- Compact, rack-mount design (only 16 RU)
- Hot-spare redundancy at 1 kW (DAX-1R only)
- Extensive diagnostics and fault reporting
- Unsurpassed factory support – 24/7

#### **Options:**

- Adjustable Output Matching Network
- Spare Parts Kits
- Factory Training



## General

Type of Modulation:	Harris Digital Adaptive Modulation (Patent pending).
Transmitter Type:	Medium Wave, 100% solid state.
Power Output Range:	DAX-1: 5w-1.15 kW. DAX-3: 15w-3.4 kW. Five adjustable power levels are provided.
Frequency Range:	529 kHz to 1705 kHz. Supplied, tuned, and tested on one frequency as specified. Direct, digital, synthesized (DDS) in 1 kHz steps.
AC Mains Input:	Standard: Single phase 220-240VAC, 50/60 Hz.
Power Supply Variation:	+5% voltage, +3 Hz frequency for full performance. +10/-15% voltage transmitter operational.
Output Power Regulation:	Less than 1% for all power line voltage variations.
Transient Protection:	Meets ANSI/IEEE C62.41-1980 requirements; includes high energy MOVs.
Frequency Stability:	±2 PPM over frequency range and temperature range 0 to 50° C. Higher stability available with external 10 MHz reference. Optional internal precision frequency reference.
Audio Input:	-10 to +10 dBm, adjustable transformerless input; 600 and 10k terminators provided.
Dedicated Digital (IBOC/DRM) Input:	Magnitude: -10 to +10 dBm; Phase: 2V-20V P-P, remote switchable.
RF Output:	DAX-1: Type 'N'. DAX-3: 7/8" EIA flange, bullet provided.
RF Load:	50 ohms, fixed, unbalanced, resistive.
VSWR:	1.3:1 for full rated power, no tuning required.
Cabinet & Harmonic /Spurious Radiation:	Meets or exceeds FCC, IC, and other world standards.
Overall AC to RF Efficiency:	73% or better at rated power output (0 to 100% sinusoidal modulation). 77% typical.
Metering:	9 Parameters from front panel. Additional diagnostics and metering through serial interface.
Monitoring and Control:	Parallel and serial (VT100) interface.

## Audio Performance

Audio Frequency Response:	+0.2/-0.8 dB at 90% or 95% modulation, 30 Hz to 10 kHz. Reference: 1 kHz. No audio filter required.
Total Harmonic Distortion+Noise:	90% or 95% modulation, 30 Hz to 10 kHz, 1 kW (DAX-1), 3 kW (DAX-3): 0.7% or less; 0.15% typical. 10% of rated power: 1.25% or less.
Intermodulation Distortion:	1% or less 1:1, 60/7000 Hz; SMPTE at 95% modulation. 1.5% or less 4:1.
Transient Intermodulation Distortion:	0.6% or less at 85% modulation, 2.96/8.0 kHz, 4:1. 30 kHz bandwidth.

CCIF Intermodulation Distortion:	0.2% or less, 1:1 80/5000, 85% modulation.
Squarewave Overshoot:	1% or less, 400 Hz, 70% modulation. (No linear phase filter required, rise time limited to 50 (s or less).
Squarewave Tilt:	0.5% or less at 40 Hz, 70% modulation.
Carrier Shift:	Less than 1% at 95% modulation at 1 kHz.
Hum and Noise:	-60 dB or better below 100% modulation (unweighted).
Incidental Quadrature Modulation:	-38 dB at 1 kHz, 95% modulation; -45 dB typical.
Positive Peak Capability:	+145% or greater at 1 kW (DAX-1), 3 kW (DAX-3) audio program modulation, at ±5% mains voltage.
Duty Cycle:	Continuous 100% modulated sine wave at rated power.

## IBOC/DRM Compatibility

Audio Frequency Response:	+0.2/-1.2 dB, 30 Hz to 15 kHz, 90% or 95% modulation, ref 1 kHz.
Audio Total Harmonic Distortion (THD+N):	0.8% or less, 30 Hz to 15 kHz, 90% or 95% modulation.
Group Delay Variation:	±3 uS, 200 Hz-15 kHz, ref 1 kHz at 90% or 95% modulation.
J3E Linearity Test:	(Single Sideband suppressed carrier) -50 dB, 4/5 kHz equal amplitude tones. -50 dB, 4/5 kHz 5 kHz -1 dB relative to 4 kHz. -65 dB, 5/8 kHz 8 kHz -30 dB relative to 5 kHz.

## Service Conditions

Power Consumption:	DAX-1 (DAX-3): 1.3 kW (3.9 kW) or less typical at 1 kW (3 kW), 0% modulation; 2.0 kW (5.8 kW) or less typical at 1 kW (3 kW), 100% tone modulation.
Ambient Temperature:	0° C to 50° C; derate 2° C per 1,000 feet (305 meters) of altitude.
Humidity Range:	0 to 95% non-condensing.
Altitude:	Up to 13,000 feet (3962 meters).
Size:	(Rack Mount Chassis): 16 RU, 28"H x 19"W x 22.75"D (71 cm x 48 cm x 58 cm)
Size:	(Power Supply Transformer): 16" x 16" x 16" NEMA enclosure.
Weight:	(Rack Mount Chassis): DAX-1: 100 lbs (45 kg) DAX-3: 104 lbs. (47 kg).
Weight:	(Power Supply Transformer): DAX-1: 97 lbs (44 kg) DAX-3: 162 lbs. (74 kg).

## NOTES:

1. All measurements made into test load at rated power, unless otherwise indicated, with adaptive correction circuits enabled.
2. Noise may degrade if AC lines are unbalanced.
3. Audio performance measurements made with standard audio input, no special filters required to obtain these specifications.



Specifications are subject to change. For a complete listing of the most current specifications, please visit our website at [www.broadcast.harris.com](http://www.broadcast.harris.com).



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