



**AM Radio Solutions**

***DAX 1-6kW  
AM HD Radio  
Transmitter***



*The DAX 1-6kW line of transmitters continues the legacy of high-quality, solid design by Harris.*

This line of low power transmitters is designed from the ground up to provide enhanced audio and superior performance in both HD Radio™ and analog transmission. Built with exceptional linearity and bandwidth, the DAX 1-6kW line delivers the cleanest analog sound and the most accurate reproduction of the HD Radio signal in the low power ranges. This accurate reproduction is necessary to maximize digital coverage.





## Make these Harris DAX 1-6kW transmitter benefits yours:

### »» An unmatched high-performance modulation solution

The DAX uses Harris' new wide bandwidth and high-performance modulation technique called Digital Adaptive Modulation. Designed to provide the linearity demanded by digital transmission, Digital Adaptive Modulation uses a digitally generated AM waveform with DSP-based adaptive correction, giving users a high performance transmitter in a cost effective platform. This technology enables sampling of the transmitter output, and corrects for load-induced distortion. Reduced distortion and noise translates to cleaner sounding analog, and extended digital coverage.

### »» Exceptional transmitter reliability and serviceability

The DAX features a modular architecture and "hot-swappable" PA modules that enhance reliability as well as provide on-air serviceability. The DAX-5/6 occupies less than 24 x 34 inches of floor space, yet no compromises were made to provide easy access to all components and user connections. The DAX-1 and DAX-3 are rack mount transmitters (16RU), ideal for installations where space is premium.

### »» Intelligent user interface designed for low power transmission

The DAX is designed with extensive diagnostic, control and lower-stage metering capabilities. The software-driven dot matrix display allows for easy control and monitoring of the DAX and provides parameter metering, status, fault log retention and a set-up/configuration menu.

### »» A cost-effective and flexible migration path

The DAX provides a cost-effective solution for the HD Radio transition. With the DAX, users can broadcast a clean analog signal now and can easily make the transition to digital by simply adding a Harris DEXSTAR™ HD Radio exciter, which can be mounted right in the DAX cabinet or rack.

### »» A complete end-to-end solution

Only Harris can provide everything you need as you plan your transition to digital radio...from source through studio through STL HD through transmission. And our systems team is available to help you put together the system that makes the most sense for your operation—*now and in the future.*

## DAX 1-6KW

### 1 Main Controller

The Controller is the heart of DAX and Digital Adaptive Modulation. It contains the on-board synthesized exciter, and performs all the DSP-based supervisory and adaptive correction to the modulated envelope. It also performs power control, module turn on, fan control, and analog/IBOC audio input selection. In addition to the parallel user I/O, a serial interface is included, enabling extended and redundant off-site diagnostics and control.

### 2 User Interface Display

The lighted 1.5" x 2.75" Optrex dot-matrix display offers in-depth monitoring and diagnostic capability not possible with conventional analog meters. It constantly meters nine critical parameters, and can display a time-elapsed fault log. IBOC mode control, Power limit settings, and setup functions are also controlled from this display.

### 3 User Input/Output Board

All user signal connections are located at convenient eye-level for ease of installation and service, and are RFI filtered and transient protected.

### 4 Power Supplies

The high voltage power supply in DAX is a 300 VDC SCR-regulated linear supply. Electronic tap switching assures no compromised performance, even when operated at very low reduced power levels. The +48 VDC and +12VDC supplies are modular and easily replaceable. +5 VDC is derived through on-board linear regulation.

### 5 PA Modules

RF PA modules are based on the same conservatively designed FET-based wideband amplifiers in the Harris Destiny 3DX-50. Each hot-swappable module can support 1.1 kW of modulated (+145%) RF power. And all RF modules are fully interchangeable with other DAX family transmitters, independent of frequency. Each module is individually fused and thermally protected.

### ★ DEXSTAR Exciter (optional)

Dexstar generates the required IBOC magnitude and phase signals to drive the DAX transmitter directly through dedicated IBOC inputs, and provides the necessary diversity delay to the analog signal. The DEXSTAR can be integrated into the DAX transmitter cabinet, eliminating the need for separate extra deep rack space. DEXSTAR features an all-XLR Audio I/O, all BNC RF I/O, and an intuitive Harris graphical user interface. These enhancements allow for maximum performance and functionality.

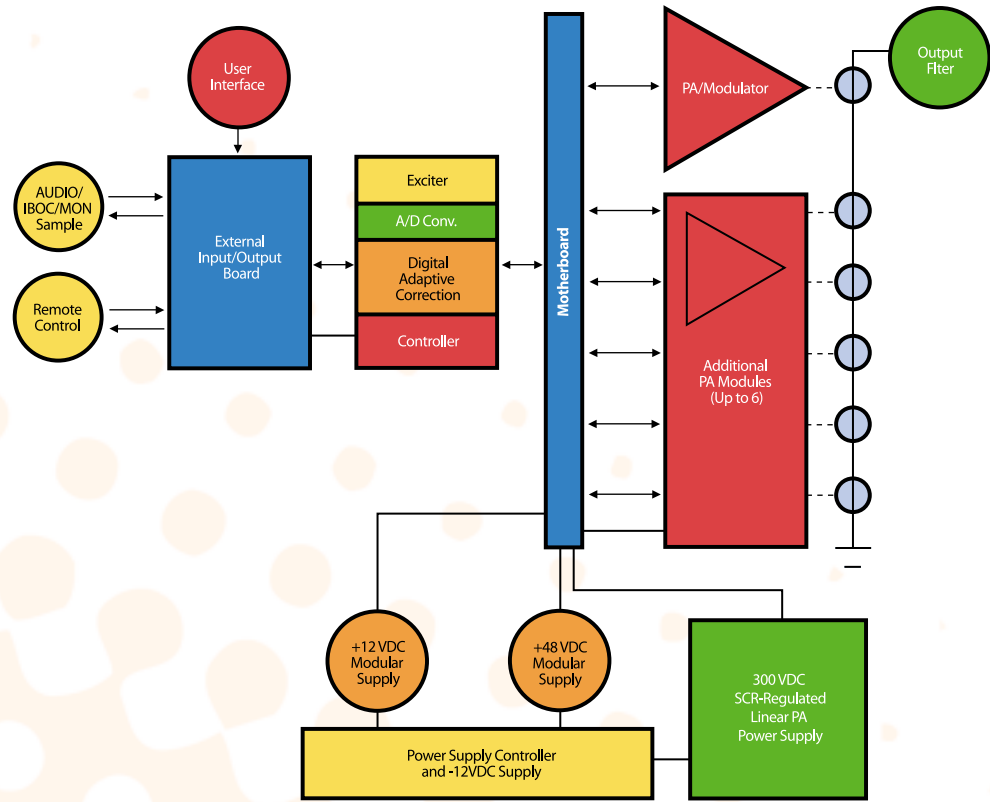
The DEXSTAR is available with the exclusive ePAL™ option. ePAL provides the required synchronization and sample rate conversion to the incoming STL signal, Dexstar audio bypass switching, and digital audio distribution.

The DEXSTAR-AM also features:

- Remote control of digital carrier on/off and day/night setups.
- A standard internal GPS receiver which provides stable and accurate time reference for all subassemblies
- Easy operation locally or remotely with Harris' exclusive Graphical User Interface (GUI)
- Extensive diagnostics with automatic fault-logging for troubleshooting

Another benefit of the DEXSTAR is the investment security that comes with Harris technology. Harris has delivered more DTV exciters than all of its competitors combined. Harris has also provided HD Radio equipment for major HD Radio field tests.





### Service and Support

Like all Harris radio products, DAX 1-6kW users receive Harris' industry leading service and parts support. The Harris service and support team can provide the information and product knowledge necessary to keep your stations on the air – 24/7.



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).



Broadcast Communications Division | 4393 Digital Way | Mason, OH USA 45040  
 phone: +1 513-459-3400 | email: [broadcast@harris.com](mailto:broadcast@harris.com) | [www.broadcast.harris.com](http://www.broadcast.harris.com)

Trademarks and tradenames are the property of their respective companies.

Copyright © 2003 Harris Corporation

Printed in USA on Recyclable Paper HMC 15184 HG ADV. 1164B 5/03

### ***DX 10 & 15***

***10kW and 15kW***

***Digital Solid State***

***AM Transmitters***

No matter how demanding your broadcast needs, the Harris DX 10 and DX 15 will keep you on the air. Hundreds of broadcasters have benefited from the superior performance and reliability provided by Harris-patented digital amplitude modulation. According to our customers, DX transmitters provide unsurpassed audio performance, improved coverage, simple operation, the lowest cost of operation, and the highest reliability of any medium wave transmitter.

#### ***Features/Benefits***

- ▶ **Digital:** Harris DX transmitters have Direct Digital Synthesis of the RF envelope using true digital modulation, not PDM.
- ▶ **Reliable:** Harris DX transmitters have set a new standard for RF amplifier reliability and ruggedness. The RF modules run exceptionally cool.
- ▶ **Simple:** Harris DX transmitters are simple to operate and maintain. Each system uses standard off-the-shelf components. Components are easily accessible and field repairable.
- ▶ **Efficient:** Harris DX transmitters are proven to yield typical efficiency of over 83%, resulting in the industry's lowest power cost.
- ▶ **Rugged:** Harris DX transmitters use a patented lightning protection system that virtually eliminates failures. Built-in surge protection is standard on all AC mains lines and internal power supplies.
- ▶ **Redundant:** Harris DX transmitters use redundant circuit designs in critical areas. Soft failure and FLEXPatch™ reassignment ensure uninterrupted broadcasting without significant degradation in performance. Broadband interchangeable RF amplifier modules simplify maintenance.
- ▶ **Future Compatibility:** Harris DX transmitters ensure future digital broadcast compatibility with high peak-to-average power capability, exceptional audio bandwidth, and virtually no audio-to-RF group delay variation. Harris DX transmitters have been used for IBOC field tests.



## DX 10 & DX 15 Specifications

### General

Type Of Modulation: Harris patented AM Digital Amplitude Modulation.  
Transmitter Type: Medium Wave, 100% solid state.  
Power Output Range: DX 10: 1 kW – 11 kW. DX 15: 2 kW - 15 kW. Transmitter capable of combined operation. Three adjustable pre-set power levels are provided.  
Frequency Range: 531 kHz – 1705 kHz. Supplied, tuned and tested to one frequency as specified.  
AC Mains Input: 197 – 281 VAC, 3 phase, 341-468 VAC, 3 phase, 4 wire.  
Power Supply Variation:  $\pm 10\%$  voltage, 48-63 Hz.  
Transient Protection: Meets IEC 587 requirements.  
Power Factor: 0.98% typical.  
Frequency Stability:  $\pm 10$  Hz, 0 to 50°C,  $\pm 2$  Hz at typical conditions.  
Audio Input: -10 to +10 dBm, adjustable transformerless input; 600, 150, and 50 ohm terminators provided.  
RF Output:  $1\frac{5}{8}$ " EIA flange.  
RF Load: 50 ohms, unbalanced.  
Cabinet & Harmonic/Spurious Radiation: Meets FCC, CCIR and IC requirements.  
Overall AC Efficiency: Typically 83% at 10 kW and 15 kW.

### Audio Performance

Audio Frequency Response: +0.2/-0.8 dB, 20 Hz to 10 kHz. Reference 1 kHz at 95% modulation.  
Total Harmonic Distortion: DX 10: 0.8% or less at 95% modulation, 30 Hz to 10 kHz, at 10 kW; 0.5% typical. DX 15: 1.0% or less at 95% modulation, 30 Hz to 10 kHz, at 15 kW, 0.3% typical.  
Intermodulation Distortion: DX 10: 0.8% or less, 1:1, 60/7000 Hz; 1.3% or less 4:1, 60/7000 Hz; SMPTE at 95% modulation. No audio filters required. DX 15: 1.0% or less, 1:1, 60/7000 Hz; 1.4% or less 4:1, 60/7000 Hz; SMPTE at 95% modulation. No audio filters required.  
Transient Intermodulation Distortion: DX 10: 0.3% or less at 95% modulation, 2.96/8.0 kHz, 4:1. No audio filters required. DX 15: 0.5% or less at 95% modulation, 2.96/8.0 kHz, 4:1. No audio filters required.

Squarewave Overshoot: 0.3% or less at 400 Hz, 85% modulation. Measured peak to peak. No audio filters required.  
Squarewave Tilt: 0.5% or less at 40 Hz, 80% modulation. No audio filters required.  
Carrier Shift: Less than 1%, referenced to 1 kHz, 100% modulation.  
Hum and Noise: -65 dB or better below 100% modulation (unweighted).  
IQM: -32 dB at 1 kHz, 95% modulation; -40 dB typical.  
Positive Peak Capability: DX 10: +145% at 10 kW; +125% at 11 kW (program modulation). DX 15: +135% at 15 kW, (program modulation).  
Duty Cycle: Continuous 100% modulated sine wave.

### Service Conditions

RF Monitor Provisions: Up to 10 volt RMS RF modulated output sample (constant sample level at High, Medium or Low power setting). Five volt RMS RF frequency monitor sample. Nominal over specified power range.  
Power Consumption: DX 10: 11.6 kW typical at 10 kW, 0% modulation; 17.4 kW typical at 10 kW, 100% tone modulation. DX 15: 17.4 kW typical at 15 kW, 0% modulation; 26.2 kW typical at 15 kW, 100% tone modulation.  
Ambient Temperature: -10°C to +50°C; derated 2°C per 1,000 feet (305 meters) of altitude.  
Temperature Rise (Inlet/Outlet Air): Approximately 6°C.  
Altitude: Up to 13,000 feet (3,962 meters).  
Humidity Range: 0 to 95%, non-condensing.  
Size: 72" (183 cm) W x 33" (84 cm) D x 78" (198 cm) H.  
Weight: DX 10: 1,535 lbs. (698 kg).  
DX 15: 1,700 lbs. (773 kg).

NOTES: 1. All measurements made into test load at rated power.  
2. Noise may degrade if AC lines are unbalanced.

Specifications subject to change without notice.



**HARRIS**

next level solutions

Broadcast Communications Division | 4393 Digital Way | Mason, OH USA 45040  
phone: 513-459-3400 | email: broadcast@harris.com | www.harris.com

Copyright © 2000 Harris Corporation  
ADV. 889A 03/00