

# Making Digital Radio Work.

## INTEGRAL DIGITAL

The NX50 transmitter was designed to provide digital transmission as a default requirement. That means digital is Integral to the overall NX50 design and isn't an add-on or an afterthought. Whether you initiate digital broadcasting immediately or start with analog transmission and move to digital at a later date, the NX50 will address all of your analog and digital transmission needs seamlessly.

### Designing the Industry's Best Digital Transmitter

Nautel invented the modern solid state transmitter 40 years ago. Everything our engineers have learned over those years and 5 generations of transmitter design has been applied to the NX50. To design the industry's best digital transmitter our engineers applied two guiding principles. First they designed a transmitter so linear that no precorrection would be needed. Then they pushed the limits of transmitter design by adding the best precorrection available. The result is an ultra linear digital broadcast transmitter that is ideal for digital broadcasting.

### Linear optimized

The NX50 transmitter achieves outstanding linearity by employing a unique nine phase Direct Digital Modulation technique that is encoded at an unprecedented 2.7 mega-samples per second.

### HD Radio

NX50 transmitters configured for HD Radio transmission include an integral IBOC Engine card which provides a hybrid AM+HD Radio signal. This solution is easy to configure, includes GPS synchronization and is compatible with Nautel's award winning HD Transport Suite to ensure reliable studio to transmitter links.

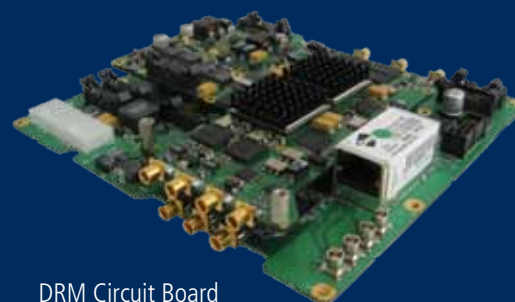


### AM Precorrection

The NX50 utilizes precorrection that corrects for all primary forms of distortion which typically affect both analog and digital AM broadcasting. The result is dramatically increased linearity and an extremely clean spectrum. Specific precorrection techniques include:

- Envelope equalization
- AM-AM correction
- AM-PM correction

All precorrection filters can be monitored from the front panel display.



DRM Circuit Board

### DRM

NX50 transmitters configured with DRM include a DRM exciter.

This integrated DRM approach reduces cost and simplifies implementation.

The Integral Digital DRM solution supports all current DRM modes and provides excellent program flexibility allowing broadcasters to offer both AM and DRM services on a time of day basis.



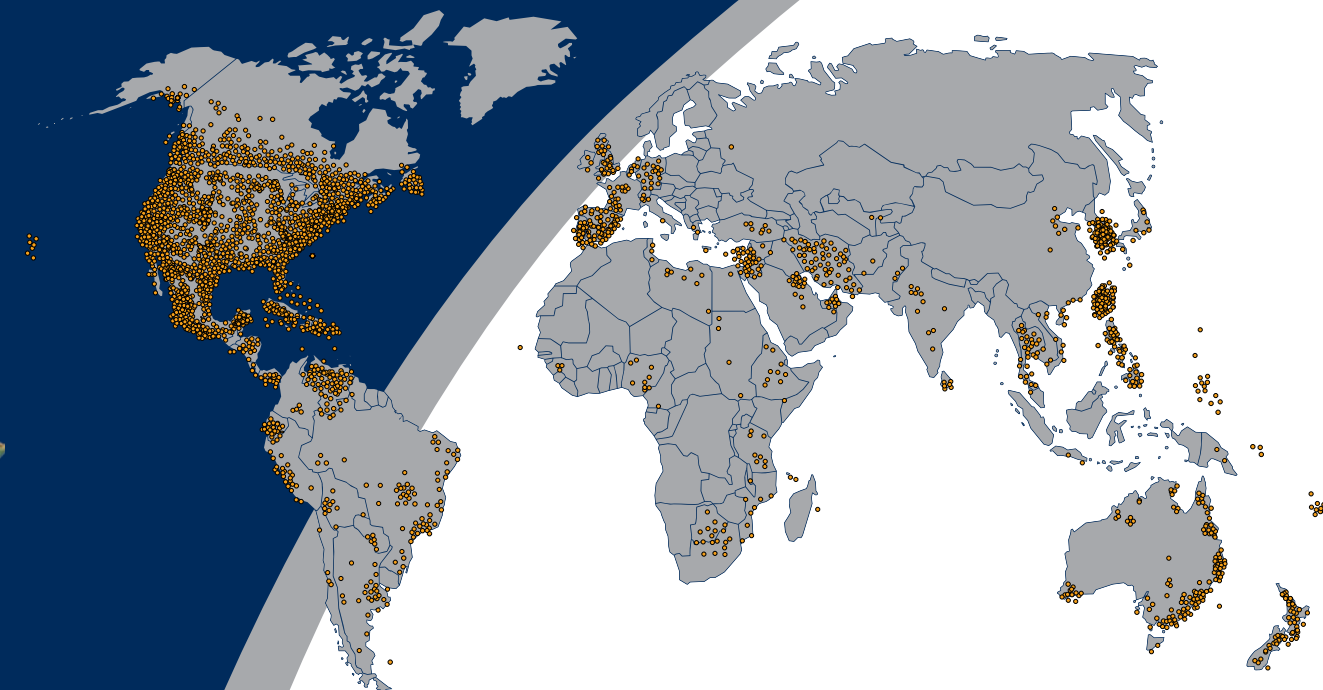
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### • Nautel installed AM transmitters



### WHY CHOOSE NAUTEL?

Nautel designers and engineers have the experience to support our products, old or new. Our customer service staff is available 24 hours a day, 7 days a week to answer your questions and provide experienced technical support. We provide extensive training and on-site support for all our products along with extended warranties and a ready supply of parts that can be shipped at a moment's notice.

Nautel products include extensive documentation, manuals and schematics to guide you through everything from installation to troubleshooting. We build value into every piece of equipment that leaves our facilities; in terms of technical features, innovation and cost effectiveness, Nautel is always one step ahead of the pack.



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**NX50**  
Digital/Analog AM



50kW AM  
Digital/Analog Transmitter

# NX50

## NEXT GENERATION CONTROL AND MONITORING

## SPACE AND POWER EFFICIENCY



The NX50 sets a new standard for digital performance, rugged design and operational ease in the industry's most compact enclosure. Add AM precorrection, 90% efficiency, available integrated HD Radio™ Exgine card or DRM exciter plus an intuitive touch screen interface and the result is the most advanced AM transmitter available today.

**NAUTEL INNOVATION**

- AM Precorrection, unmatched linearity
- Industry's top efficiency: 90%
- 2.7 mHz Direct Digital Modulation
- 17" intuitive touch screen interface
- 100% remote access to the user interface
- RF and audio spectrum analyzer
- Integral Digital: HD Radio, all DRM modes
- The new standard in compact AM design



### NX Advanced User Interface (AUI)

The NX50 features a 17 inch color LCD screen with a wide range of configurable displays. The AUI can be controlled by touch screen, or via a mouse and keyboard.

Some of the features of the AUI include:

- Real-time Impedance locus measurement
- Instrument grade spectrum analyzer
- IBOC modulation analyzer
- Module level monitoring and control
- Logging of all functions

Screens are easy to set up and read, and clearly display the parameters you need to see.

### 100% Remote Access

No matter where you are, you're only moments away from ensuring your NX50 transmitter is operating optimally. Pull up a web browser, enter your transmitter's IP address, and you're connected. The complete local NX50 display functionality is available via the internet. Users can access status, controls, alarms, logs and reports.

### Real-Time Impedance Measurement

The NX50 uses Nautel's patent-pending real-time impedance measurement technology which compares the transmitted voltage and current waveforms to measure the load impedance over the operational frequency range. Because this system can measure impedance without requiring artificial swept tones, the antenna system impedance locus can be measured without taking the station off-air. Impedance is measured at the combiner so no correction for harmonic filter phase is required. This capability allows the antenna system load impedance can be optimized and monitored while the transmitter is operating normally.

The NX50 also includes a built in directional coupler for spectrum measurement. Traditionally transmitters have utilized a voltage or current sensor. The directional coupler increases the accuracy of spectrum measurement into a real antenna load which is quite important when measuring adjacent channel emissions.

### Control Redundancy

The touch screen interface is implemented as a non-critical functional unit and may be completely removed from the system without affecting transmitter operation. The NX50 also supports SNMP and traditional direct wired contact closure capability for local or remote control.

### Class Leading Space Efficiency:

The NX50 is smaller than any other transmitter in its class. Yet even with such a compact footprint the NX50 offers easy and spacious access to all major serviceable components and modules.

### On-Air Serviceability

NX50 transmitters are ruggedly engineered to provide easy on-air service and maintenance. In the NX50, 20 amplifiers combine to deliver up to 37.5 kW of average power (carrier plus modulation). At all power and modulation levels, all modules contribute equally to the final output. If an amplifier fails, no stress is imposed on the remaining modules and spectral integrity is never compromised. Maintenance can be performed whenever it is convenient.

Generous ventilation is provided by redundant brushless DC ball bearing fans mounted in removable trays below the power modules. Airflow is unaffected by AC supply variations, further ensuring cool operation and long term reliability.

### Automatic Standby

The most critical part of a transmitter is the exciter section, which provides the RF carrier and modulation control signals to the power modules. A unique feature of Nautel transmitters is the complete duplication of these circuits. Should a failure occur in the RF drive or modulator drive, the transmitter automatically switches over to the built-in standby exciter. This dramatically enhances the already high operational reliability inherent in the modular solid-state design.

### Unattended Operation

The NX50 transmitter is built to stay on the air without human supervision. The NX50 was designed with a high VSWR threshold of 1.5:1 at rated power with 100% modulation. With more extreme VSWR values, power is automatically reduced to a safe level. A unique circuit also dynamically stabilizes power against AC line voltage variations. After an AC power loss, over voltage or RF overload, prior operating status is automatically restored. The NX 50 is ideally suited for unattended automatic or remote controlled operation.

### Powerful Building Blocks

The building block of the NX50 is an integrated RF amplifier/modulator with a carrier power capability of 2500W. These power modules plug into the front of the transmitter, making service easy.



Power Module

**90% EFFICIENCY**

The Class-D RF amplifier uses four transistors that can be replaced without soldering using only a screw driver. Due to advances in amplifier technology, this amplifier is so efficient (90%) that it is capable of operating at over 10kW continuously. This power capability results in very low transistor junction temperatures assuring reliable operation even in the highest ambient temperatures.

### Redundant Architecture

Redundancy features and protection systems help you maintain operation without a site engineer, reducing your operating costs even further.

The NX50 offers:

- Redundant Exciters
- Redundant Modulators
- Parallel/redundant fans
- Redundant low voltage power supplies
- Redundant amplifier control power supplies
- Failsafe manual and remote control

## NAUTEL NX50 QUICK SPECS

- 55 kW RF maximum output power**
- 90% efficiency at 50 kW typical**
- 140% positive peak modulation at 50 kW**
- 1.5:1 VSWR threshold at 50 kW, 100% modulation**
- Frequency Agile**

### 20 RF power modules each with:

- Digital optimized linear design
- Integrated RF amplifier/modulator
- Microcontroller for protection and monitoring
- Short circuit protection
- Hot pluggable

### Dual exciters

- AM precorrection
- 2.7 mega-samples/second Direct Digital Modulation
- Dynamic carrier control system included
- Integrated AM stereo
- Audio filtering with pre-emphasis and low pass
- Automatic changeover

### Integral Digital Broadcast Support options

- HD-Radio
- Two AES-EBU inputs supporting analog or digital I,Q inputs
- DRM 4.5/5/9/10/18/20 kHz and simulcast modes
- DRM SFN Support

### Control and Monitoring

- 17"/436mm LCD touch screen
- Web based remote access/control
- SNMP and contact closure remote
- Redundant back-up control interface
- Module level monitoring
- Power, current, voltage, RF spectrum, RF impedance, Modulation, heat sink, fan RPM

Voltage: 350-510 Vac 3 phase @ 50/60Hz or to customer specifications

### NX50 Dimensions

1.84 m H x 0.96 m W x 1.12 m D  
72.5" H x 37.75" W x 44" D  
Weight: 916kg/ 2015lbs