



NX Series

Digital/Analog MW



100kW-2,000kW Digital/Analog
Medium Wave Transmitters

NX Series

The new power in medium wave.



100kW- 2MW

NX300, 300kW MW Transmitter

With power outputs of 100 to 2000 kW, the NX Series sets a new standard for digital performance, rugged design and operational ease in the industry's most compact enclosure. Add AM adaptive precorrection, 90% efficiency, available integrated DRM exciter/content server or HD Radio Engine card plus an intuitive touch screen interface and the result is the most advanced medium wave transmitter available today.

NAUTEL INNOVATION

- Adaptive precorrection, a first for high power MW
- Industry's top efficiency: 90%
- Low cost Integral DRM option
- 2.7 mega samples/second Direct Digital Modulation
- Intuitive touch screen interface and remote web access
- The new standard in compact MW design
- Integral Digital: All DRM modes plus HD Radio transmission
- Largest single transmitter power output available

NEXT GENERATION CONTROL AND MONITORING

NX Graphical User Interface

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



Some of the features of the GUI include:

- Network analyzer for antenna cusp analysis.
- Spectrum analyzer for spectral mask compliance.
- Complete monitor and control of all functions to the module level.
- 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 NX Series transmitter is operating optimally. Pull up a web browser, enter your transmitter's IP address, and you're connected. 100% of the local NX Series display functionality is available on any web-interfaced PC

or handheld device via the internal NX Series web server. Users can access status, controls, alarms, logs and reports via the internet.

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. A back-up control interface provides control in case of front panel computer system failure. In addition to web based access the NX Series also supports SNMP and traditional direct wired contact closure capability for local or remote control.



100kW

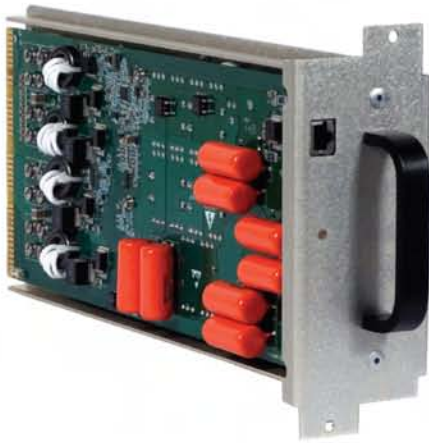
300kW

600kW

LEADERSHIP SPACE AND POWER EFFICIENCY

Powerful Building Blocks

The building block of the NX series 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.



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 (98%) 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.

Class Leading Space Efficiency:

The NX Series is one half to one third the size of comparable high power medium wave transmitters. Yet even with such a compact footprint the NX Series offers easy and spacious access to all major serviceable components and modules.

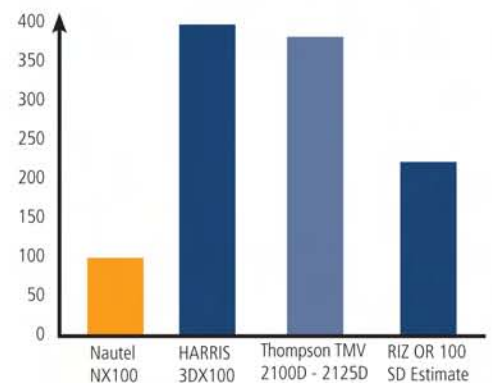
Outstanding Efficiency Lowers Ownership Cost

Exceptional efficiency and low maintenance overhead make this

transmitter extremely cost effective to own and operate. Overall efficiency is typically 90% or better. The high efficiency means less energy is wasted as heat, which reduces cooling and ventilation costs.

90%
EFFICIENCY

100kW transmitter volume comparison



800kW

1 MW



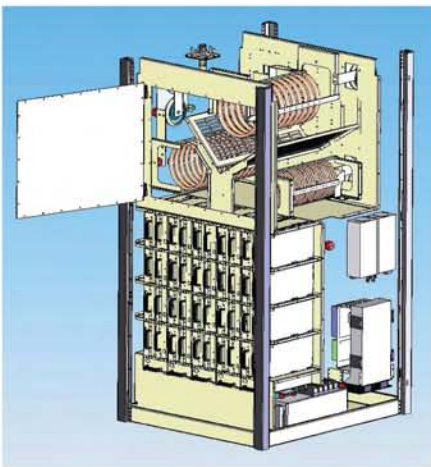
Robust Proven Design

Nautel MW transmitters are field proven with installations in harsh environments all over the world. Tens of millions of hours of real-world operational experience have gone into the design and construction of the NX Series. The result is unparalleled performance and reliability.

On-Air Serviceability

NX Series transmitters are ruggedly engineered to provide easy on-air service and maintenance. In the NX100 and in each 100kW power cabinet, 40 amplifiers combine to deliver up to 150 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 not compromised. Repair or replacement can be performed whenever it is convenient.

Ventilation is provided by redundant brushless DC-powered 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 coherent drive to the power modules. These low level circuits generate the RF carrier and modulation control signals. 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

NX series transmitters are built to stay on the air without human supervision. The NX Series was designed with a high VSWR threshold of 1.5:1 peak reflected watts 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 series is ideally suited for unattended automatic or remote controlled operation.

SAFETY without Compromise

The NX series transmitters cabinets are fitted with locked front and rear doors that require a key to open ensuring only authorized access to critical or dangerous circuitry. These standard features allow the transmitter to meet safety standard EN60215. In addition to this, an optional safety upgrade allows the system to greatly exceed EN60215 standards. This equipment consists of a mechanical key controlled access system that ensures

power is removed from the transmitter cabinets and the antenna is grounded before allowing access. In addition, a fail-safe, emergency shut down system is included that allows an unlimited number of series connected safety shut off switches to be added. Any loss of electrical continuity in this loop will automatically cause the main AC circuit breaker to open, removing all power from the transmitter cabinet(s).

Fast Frequency Change

All NX Series transmitters are designed for fast simple frequency change capability without the need of special tools or external test equipment.

Redundant Architecture

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

- Redundant Exciters
- Redundant Modulators
- 15 parallel/redundant fans per 100kW cabinet
- Redundant low voltage power supplies
- Redundant Amplifier control power supplies
- Failsafe manual and remote control

NAUTEL NX SERIES QUICK SPECS

100kW cabinet

110 kW RF maximum output power

90% efficiency at 100kW typical

One hour field tunable to any MW frequency

135% positive peak modulation at 100kW

1.5:1 VSWR threshold at 100kW, 100% modulation

40 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 and modulation encoders:

- Adaptive pre-correction
- 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

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

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: 380/400V 3 phase or to customer specifications

NX Series dimensions per 100kW cabinet

1.84 m H x 0.96 m W x 1.12 m D

72.5" H x 37.75" W x 44" D

*plus an external transformer cabinet



NX100, 100kW MW Transmitter

Making Digital Radio Work.

INTEGRAL DIGITAL

The NX Series transmitters are the first high power MW transmitters that assume digital transmission as a default requirement. That means digital is Integral to the overall NX Series 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 NX Series will address all of your analog and digital transmission needs. In fact the NX Series transmitters support all current forms of AM broadcasting without the need for external add on components.

Designing the Industry's Best Digital Transmitter

Nautel invented the modern solid state transmitter almost 40 years ago. Everything our engineers have learned over those years and 5 generations of transmitter design has been applied to the NX Series. 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 scalable across from 100kW to 2 MW.

Linear optimized

The NX Series transmitters achieve their outstanding linearity by employing a unique nine phase Direct Digital Modulation that is encoded at an unprecedented 2.7 mega-samples per second.

NX Series transmitters configured with DRM include an internal DRM exciter as well as a content server.

This integrated DRM approach reduces cost, simplifies implementation and provides integrated control from the transmitter front panel or web interfaces. 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.



Industry First Dynamic Pre-correction

The NX Series of AM transmitters are the first high power AM transmitters to be offered with dynamic pre-correction 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:

- Adaptive envelope equalization
- Adaptive AM-AM correction
- Adaptive AM-PM correction

All pre-correction filters can be monitored from the front panel display.



DRM Circuit Board

NX Series 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 Reliable HD Transport Suite for reliable studio to transmitter communications.



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- **Nautel installed medium wave 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.

Making Digital Radio Work.

Issue 1.0/Aug 20/2007

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