



M50



50 W Direct-to-Channel FM Exciter

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50 W Digital Exciter

M50 FM Digital Exciter



READY FOR DIGITAL. READY FOR ANYTHING.

The M50 is the most advanced FM exciter available with features to meet the needs of any application. The digital adaptive pre-correction capabilities and included Exgine card make the transition to HD Radio™ a worry-free experience. With a simple LAN connection, the M50's user-defined presets select the mode of operation for the host transmitter.

Direct-to-channel conversion of the audio ensures the highest fidelity FM signal free from any microphonics or spurious emissions. In addition to standard features like SCA generators and a RBDS/RDS coder, the M50 includes adjustments with the required resolution to facilitate single frequency network and N+1 applications.

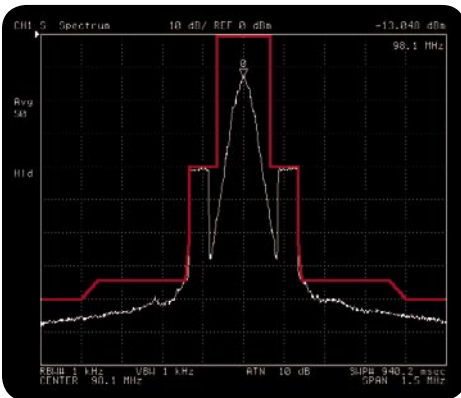
The M50 is complete with a 240 x 64 LCD display that provides comprehensive system monitoring capabilities. A time-stamped 128-event log complements the diagnostic flow diagram to provide all the information necessary to make long-term maintenance an easy task.

Making Digital Radio Work.



ADAPTIVE PRE-CORRECTION

The M50 links with a Nautel Virtuoso series transmitter to provide adaptive pre-correction by continuously sampling the final RF output and dynamically applying digital pre-correction. This optimizes performance independent of environmental changes and ensures the HD Radio signal is transmitted within spectral limits without requiring an external bandpass filter.



Adaptive Pre-correction Graph

ADVANCED DIGITAL SIGNAL

Advanced digital signal processing and field programmable gate array technologies provide superior signal reproduction, eliminating analog up conversion. This Direct-to-Channel conversion of audio eliminates problems related to aging, microphonics, and filtering.

OPERATING CONVENIENCE

An intuitive graphic user interface with soft key menu access provides comprehensive control and monitoring capabilities. In-depth diagnostics are facilitated via the 128-event time-stamped log and the "at-a-glance" diagnostic flow diagram. An on-board clock further simplifies operation, troubleshooting and system monitoring.

Six programmable presets for audio source, power and frequency configurations are selectable via local or remote control.

SEAMLESS INTEGRATION

The M50 integrates seamlessly with a Nautel Exporter for HD Radio transmission in either fully Digital or Hybrid modes. The high precision delay adjustment capability of the M50 gives the broadcaster the ability to ensure an undetectable blend between digital and analog transmission modes in any HD Radio combining configuration.

DIGITAL COMPOSITE SIGNAL

The M50's built-in DSP stereo generator interpolates AES/EBU digital data or L&R analog audio to produce a digital stereo composite signal. With the two built-in SCA Generators and an RBDS/RDS Coder, no external generators are required.

The exciter is frequency agile and requires no tuning for operation between 87.9 MHz and 108 MHz, making it suitable for N+1 applications.

For further information, please contact us at:

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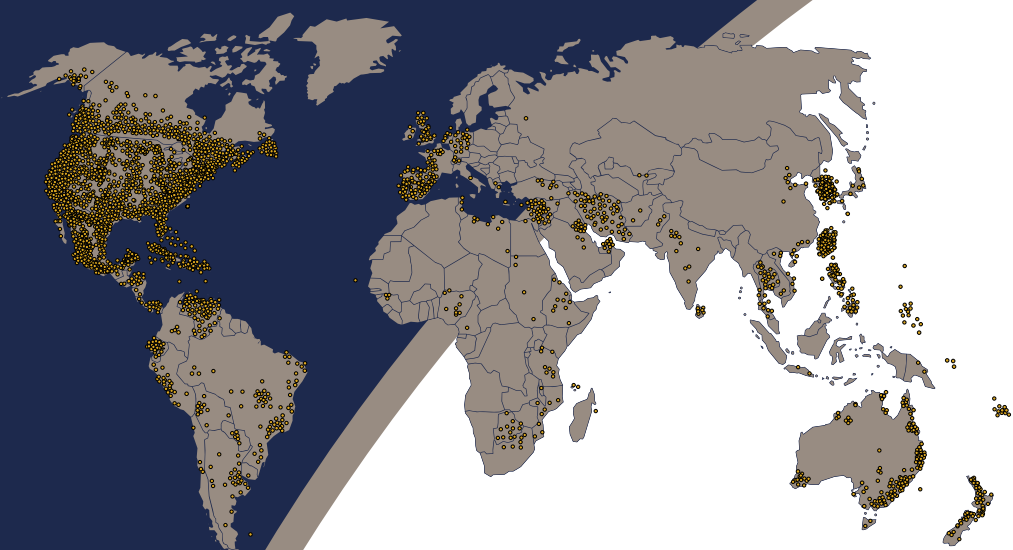
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• **Nautel installed transmitters**



QUICK SPECS

- Direct-to-Channel modulation gives superior signal reproduction and eliminates analog up conversion
- Frequency agile and requires no tuning for operation between 87.5 MHz and 108 MHz, making it ideal for N+1 applications
- Built-in programmable time delay on all inputs is ideal for synchronous applications and HD Radio™ blend synchronization.
- Built-in DSP stereo generator interpolates AES/EBU digital data or L&R analog audio to produce digital stereo composite signal
- Built-in SCA generators (2) and RBDS/RDS coder means no external generation is needed
- Universal AC supply with power factor correction accommodates supply voltages from 90 V to 264 V
- 240 x 64 LCD graphical user interface, advanced alarm system, 128-event log and on-board real-time clock make operation, troubleshooting and system monitoring easy
- Six programmable presets for audio source, power and frequency configurations selectable via local or remote control
- Fully compatible with HD Radio™ digital radio broadcasting
- Standard 19" EIA rack mountable
- Dimensions: 5.25" H x 19" W x 20" D
- Weight: 24.5 lbs



Making Digital Radio **Work.**

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Nautel Family Name

Maestro

Nautel Model Number

M50

GENERAL

RF Output Power

1 W to 55 W, adjustable by front panel controls

RF Frequency Range

87.5 MHz to 108 MHz
Digitally programmable in 10 kHz steps by front panel controls

Fine Frequency Range

±9,990 Hz
Digitally programmed in 10 Hz steps by front panel controls

RF Terminating Impedance

50 ohms unbalanced
BNC jack VSWR protected

RF Output Monitor

-30 dBc, BNC jack

RF Harmonics/Spurious Output

Meets and exceeds all FCC, DOC and ISC requirements and CCIR recommendations for a 55 W transmitter when used with optional low pass filter

Frequency Stability

±250 Hz
0°C to +50°C ambient temperature range

Modulation Type

Direct Digital Synthesis (DDS) using a 32 bit NCO numerically controlled oscillator

Display

Backlit 240 x 64 graphic display for control, meters, diagnostics and modulation indicator

Alarm log holds up to 128 entries in reverse chronological order

Modulation capability

150% (±75 kHz reference standard)

Asynchronous AM S/N Ratio

75 dB minimum below reference carrier with 100% amplitude modulation using 75 µS de-emphasis (no FM modulation present)

Synchronous AM S/N Ratio

60 dB below reference carrier with 100% amplitude modulation at 400 Hz with 75 µS de-emphasis

ELECTRICAL AND MECHANICAL

AC Input Power

Universal, PF >0.98, 90 V ac to 264 V ac, 47 Hz to 63 Hz, 180 W typical at 50 W output

AC Entry

Appliance inlet style, switched with 5 A breaker

Dimensions

19 inches W x 5.25 inches H x 20 inches D
(48.26 cm W x 13.34 cm H x 50.8 cm D)

Mounting

Standard 19" (48.3 cm) EIA rack mountable

Weight

24.5 lbs (11 kg)

OPERATING ENVIRONMENT

Ambient Temperature

0°C to +50°C, Derate 3°C per 500 m (2°C per 1000 ft above sea level)

Humidity Range

Up to 95% non-condensing

Altitude

Up to 13,000 ft (4,000 m)

Stereo Performance with Digital Audio Input:

Input Connector

Two total; One XLR female and one optical input receiver, selected with internal jumper

XLR Input Impedance

110 ohms, nominal

Input Level

0 dBf to -10 dBfs for 100% modulation, front panel adjustable

Data Format

AES/EBU (XLR), SPDIF (optical); 16 bits to 24 bits resolution

Data Rate

31 kHz to 108 kHz (32 kHz, 44.1 kHz, 48 kHz, 88.2 kHz, 96 kHz typical)

Pre-Emphasis

0 µS, 25 µS, 50 µS or 75 µS, front panel selectable

Pilot Carrier

19 kHz ± 0.01 Hz, programmable 6% to 12% injection level. Available on rear panel BNC as 1 Vp-p sine wave. Pilot phase may be referenced to GPS 1 PPS (BNC) and adjusted with 1° resolution

38 kHz Suppression

80 dB below ±75 Hz deviation reference

Stereo Separation

Better than 70 dB, 30 Hz to 15 kHz



Amplitude Response (L or R)

±0.2 dB, 30 Hz to 15 kHz referenced to 0 dB at 400 Hz

FM Signal-to-Noise Ratio (L or R)

80 dB below 100% modulation (reference 400 Hz, measured in 22 Hz to 22 kHz bandwidth with 75 µS de-emphasis and DIN 'A' weighting)

Stereo Total Harmonic Distortion (L or R)

0.025% or less, 30 Hz to 15 kHz, measured in 22 Hz to 22 kHz bandwidth with 75 µS de-emphasis

Stereo Crosstalk

60 dB below 100% (30 Hz to 15 kHz). Modulation reference: L+R to L-R and L-R to L+R

Intermodulation Distortion (L or R)

CCIF: 0.008% or less (14/15 kHz, 1:1)
SMPTE: 0.025% or less (60 Hz and 7,000 Hz, 1:1)

Transient Intermodulation Distortion (DIM) (L or R)

0.05% or less (2.96 kHz square wave / 14 kHz sine wave)

Stereo/Monaural Mode Control

Monaural mode selectable from front panel using left channel

Stereo Performance with Analog Stereo Input:

Input Connector

Two XLR female connectors (Left/Mono, Right)

Input Impedance

Balanced, no transformers, 600 ohms / 10,000 ohms selectable with internal jumper

Input Level

0 dBm to 12 dBm (2.1 Vp-p to 8.7 Vp-p) for ±75 kHz deviation at 400 kHz. 12 dBm to 24 dBm (8.7 Vp-p to 35 Vp-p) input range selectable with internal jumper

Input Quantization

Sampled at 93 kHz with 24-bit analog-to-digital converter

Pre-Emphasis

0 µS, 25 µS, 50 µS, or 75 µS, selectable from the front panel

Pilot Carrier

19 kHz ± 0.01 Hz, programmable 6% to 12% injection level. Available on rear panel as TTL or 1 Vp-p sine wave. Pilot phase may be referenced to GPS 1 PPS (BNC) and adjusted with 1° resolution

38 kHz Suppression

80 dB below ±75 Hz deviation reference

Stereo Separation

Better than 70 dB, 30 Hz to 15 kHz

Amplitude Response (L or R)

± 0.2 dB, 30 Hz to 15 kHz, referenced to 0 dB at 400 Hz

FM Signal-to-Noise Ratio (L or R)

80 dB below 100% modulation (reference 400 Hz, measured in 22 Hz to 22 kHz bandwidth with 75 µS de-emphasis and DIN 'A' weighting)

Stereo Total Harmonic Distortion (L or R)

0.025% or less, 30 Hz to 15 kHz, measured in 22 Hz to 22 kHz bandwidth with 75 µS de-emphasis

Stereo Crosstalk

50 dB below 100% (30 Hz to 15 kHz) Modulation reference: L+R to L-R and L-R to L+R

Intermodulation Distortion (L or R)

CCIF: 0.008% or less (14/15 kHz, 1:1)
SMPTE: 0.025% or less (60 Hz and 7,000 Hz, 1:1)

Transient Intermodulation Distortion (DIM) (L or R)

0.05% or less (2.96 kHz square wave / 14 kHz sine wave)

Stereo/Monaural Mode Control

Monaural mode selectable from front panel, using left channel

Monaural Performance with Digital or Analog Inputs:

FM Signal-to-Noise Ratio

90 dB below 100% modulation (reference 400 Hz at ±75 kHz deviation with 75 µS de-emphasis and DIN 'A' weighting in 22 Hz to 22 kHz passband)

Harmonic Distortion

0.005% or less at 400 Hz measured in a 22 Hz to 22 kHz bandwidth with 75 µS de-emphasis

CCIF Intermodulation Distortion

0.009% or less (15/14 kHz, 1:1)

SMPTE Intermodulation Distortion

0.015% or less (60 Hz and 7,000 Hz, 1:1)

Transient Intermodulation Distortion

0.015% or less (2.96 kHz square wave / 14 kHz sine wave)



Wideband Composite Operation:

Input Connector

One BNC connector. 50 ohms / 10,000 ohms selectable with internal jumper, balanced/unbalanced selectable with rear panel switch

Input Level

3.5 Vp-p nominal for ± 75 kHz deviation

Amplitude Response

0.01 dB, 20 Hz to 100 kHz

Phase Response

$\pm 0.1^\circ$ from linear phase, 20 Hz to 100 kHz

FM Signal-to-Noise Ratio

90 dB below 100% modulation (reference 400 Hz at ± 75 kHz deviation with 75 μ S de-emphasis and DIN 'A' weighting in 22 Hz to 22 kHz passband)

Total Harmonic Distortion

0.005% or less (reference 400 Hz at ± 75 kHz deviation with 75 μ S de-emphasis and DIN 'A' weighting in 22 Hz to 22 kHz passband)

Stereo Separation

50 dB, 20 Hz to 15 kHz

SCA (RBDS/RDS) Performance:

Input Connector

2 x BNC female

Input Impedance

10,000 ohms unbalanced

Input Level

2.8 Vp-p nominal for ± 7.5 kHz deviation

Amplitude Response

± 0.2 dB, 20 kHz to 100 kHz

Subcarrier Frequency Range

57 kHz to 92 kHz (25 kHz to 92 kHz monaural)

SCA Generator Performance:

Input Connector

DB9

Input Impedance

2 balanced, 600 ohms or 10,000 ohms jumper selectable

Input Level

2.8 Vp-p nominal for ± 75 kHz deviation

Input Level

0 dBm to 12 dBm (2.1 Vp-p to 8.7 Vp-p) for ± 75 kHz deviation at 400 Hz. 12 dBm to 24 dBm (8.7 Vp-p to 35 Vp-p) input range, selectable with internal jumper

Amplitude Response

± 0.05 dB, 20 Hz to 15 kHz

Pre-Emphasis

0 μ S, 50 μ S, 75 μ S, or 150 μ S, selectable from the front panel

S/N Ratio

60 dB or better

Frequency

20 kHz to 99 kHz, adjustable in 10 Hz steps from front panel

Injection Level

0% to 15%, front panel adjustable

RDS/RBDS Generator Performance:

Input Connector

DB9, RS 232 DCE

Frequency

57 kHz ± 0.03 Hz

Injection Level

0% to 15% front panel adjustable

Protocol

UCEP

Supported Commands

PI, PS, TP, TA, MS, PTY, DI, RF, AT

HD Radio Compatibility:

Exciter generates complete hybrid FM waveform with analog FM and IBOC components

Exciter accepts LVDS IQ stream and 10 MHz frequency reference from Nautel NE IBOC - HD Radio signal generator.. Forward compatible for exporter/exciter configuration .

Input Connectors

RJ45 (LVDS IQ), BNC (GPS 10 MHz)



Specifications subject to change without notice.

