



GENERAL

Transmitter Type

FM Broadcast, 100% solid state

Configuration

16 RF power modules with integrated IPA PA's
32 switching power supplies (2 per RF power module)

2 IPA power supplies

Integrated exciter

Standard Features

- Redundant IPA power supply
- Redundant low voltage power supplies
- Redundant fan power supply

Optional standby exciter

RF Output Power

Analog mode:

900 W to 33,000 W into a 1.2 VSWR

900 W to 30,000 W into a 1.5 VSWR

HD Radio™ Hybrid Mode (-20 dB):

24,000 W Max Power into a 1.2 VSWR

21,900 W Max Power into a 1.5 VSWR

HD Radio™ Hybrid Mode (-10 dB):

13,100 W Max Power into a 1.2 VSWR

12,000 W Max Power into a 1.5 VSWR

HD Radio™ Digital mode:

9000 W into a 1.2 VSWR

8400 W into a 1.5 VSWR

RF Output Connection

3-1/8 inch EIA, female (standard)

4-1/16 inch EIA female (optional)

RF Output Impedance

50 ohms unbalanced

Efficiency

Analog Mode:

61% typical at 30.0 kW

HD Radio™ Hybrid Mode (-20dB):

55% typical at 21.9 kW

HD Radio™ Hybrid Mode (-10dB):

40% typical at 12.0 kW

HD Radio™ Digital Mode:

33% typical at 8.4 kW

RF Load VSWR

1.5:1 with automatic power reduction into higher VSWR

Protected from open and short circuits at all phase angles

RF Frequency Range

87.5 MHz to 108 MHz

No tuning required

Turn Around Loss

Better than 20 dB

Spurious and Harmonic

Meets or exceeds all FCC/IC/CE requirements



PRELIMINARY SPECIFICATIONS SUBJECT
TO CHANGE WITHOUT NOTICE



AC INPUT

Voltage

180 V ac to 264 V ac, 3 phase, 50/60 Hz
312 V ac to 457 V ac, 3 phase, 50/60 Hz
180 V ac to 264 V ac, 1 phase, 50/60 Hz

Power Consumption

Analog mode:

49.2 kW at 30.0 kW RF output (49.7 kVA)

HD Radio™ Hybrid Mode (-20dB)

39.8 kW at 21.9 kW RF output (40.2 kVA)

HD Radio™ Hybrid Mode (-10dB):

30.0 kW at 12.0 kW RF output (30.3 kVA)

HD Radio™ Digital Mode:

25.5 kW at 8.4 kW RF output (25.7 kVA)

Power Factor

Unity Power Factor Corrected (typically 0.99)

Power Line Harmonics

IEEE 519-1992

AUDIO PERFORMANCE

Asynchronous AM S/N Ratio

Better than 60 dB below reference carrier with 100% amplitude modulation using 75 μ s de-emphasis (no FM modulation present)

Synchronous AM S/N Ratio

Better than 50 dB below reference carrier with 100% amplitude modulation using 75 μ s de-emphasis

ENVIRONMENTAL

Temperature Range

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

Humidity Range

0% to 95% non-condensing

Altitude

0 m to 3000 m (0 ft to 10,000 ft)

Cooling Air Requirements

3821 m³/hr (2250 cfm)

PHYSICAL

Dimensions

Open ventilation configuration:
184.2 cm H x 139.7 cm W x 81.3 cm D
(72.5" H x 55" W x 32" D)

Note: total depth 84.2 cm (33.1") with air filters fitted

Closed ventilation configuration - consult factory

Weight

567 kg (1250 lbs)



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INTEGRATED EXCITER

GENERAL

RF Output Power

95 W

RF Frequency Range

87.5 MHz to 108 MHz
Digitally programmable in 1 Hz steps

RF Terminating Impedance

50 ohms unbalanced
BNC jack VSWR protected

RF Output Monitor

-30 dBc, BNC jack

RF Harmonics/Spurious Output

Meets or exceeds all FCC/IC/CE requirements for a 95 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
Direct-to-channel RF generation at 635 MS/s with a 16-bit DAC

Modulation Capability

160% (4 dB) ± 75 kHz reference standard
 ± 300 kHz modulation capable upon request

Asynchronous AM S/N Ratio

75 dB minimum below reference carrier with 100% amplitude modulation using 75 μ s 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 μ s de-emphasis

STEREO PERFORMANCE WITH DIGITAL AUDIO INPUT

Input Connector

One XLR female, one DB15 male and one optical input

AES/EBU Input Impedance

110 ohms, nominal

Input Level

0 dBfs to -16 dBfs for 100% modulation

Data Format

AES/EBU (XLR, DB15), SPDIF (optical); 16 bits to 24 bits resolution

Data Rate

20 kHz to 192 kHz

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)

± 0.1 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 μ s 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 μ s 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 using left channel

STEREO PERFORMANCE WITH ANALOG STEREO INPUT

Input Connector

DB15 male

Input Impedance

Balanced, no transformers, 600 ohms

Input Level

-6 dBu to 12 dBu for 100% modulation

Input Quantization

Sampled at 77.5 kHz with 24-bit ADC

Pre-Emphasis

0 μ s, 25 μ s, 50 μ s or 75 μ s, user selectable

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

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INTEGRATED EXCITER

Stereo Separation

Better than 70 dB, 30 Hz to 15 kHz

Amplitude Response (L or R)

±0.1 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)

SMPT: 0.025% or less (60 Hz and 7 kHz, 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 using left channel

MONAURAL PERFORMANCE WITH DIGITAL OR ANALOG INPUTS

Amplitude Response (L or R)

±0.05 dB, 30 Hz to 15 kHz referenced to 0 dB at 400 Hz

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 22 Hz to 22 kHz bandwidth with 75 µs de-emphasis

WIDEBAND COMPOSITE OPERATION

Input Connector

Two BNC connectors, one balanced, one unbalanced

Input Impedance

10,000 ohms

Input Quantization

Sampled at 620 KS/s with 16 bit ADC

Input Level

3.5 Vpp nominal for 100% modulation

Amplitude Response

±0.05 dB, 20 Hz to 100 kHz

Phase Response

±0.1° 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 µs 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 µs 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

Two BNC female connectors

Input Impedance

10,000 ohms unbalanced

Input Level

1.24 Vrms nominal for ±7.5 kHz deviation

Amplitude Response (L or R)

±0.2 dB, 20 Hz to 100 kHz

Subcarrier Frequency Range

57 kHz to 93 kHz (25 kHz to 93 kHz monaural)

SCA GENERATOR PERFORMANCE

Input Connector

DB15 Male

Input Impedance

2 balanced, 600 ohms

Input Level

-6 dBu to 12 dBu for ±7.5 kHz deviation

Amplitude Response

±0.02 dB, 30 Hz to 7.5 kHz

Pre-Emphasis

0 µs, 50 µs, 75 µs or 150 µs

Signal-to-Noise Ratio

60 dB or better

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INTEGRATED EXCITER

Frequency

20 kHz to 99 kHz, adjustable in 1 Hz steps

Modulation

Narrow band FM with maximum deviation of ± 7.5 kHz

Injection Level

0% to 15%, user adjustable

RDS/RBDS GENERATOR PERFORMANCE

Input Connector

DB9, RS-232 (DCE, 75 to 115.2 kbps)

Frequency

57 kHz ± 0.03 Hz

Injection Level

0% to 15%, user adjustable

Programming

ASCII, UECF

Supported Commands

PI, PS, PTY, PTYN, TA, TP, MS, DI, RT, AF, ODA
(Free-format)

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 Excige and Exporter Plus

Excige

Excige card may be added to exciter during digital implementation

Input Connectors

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

Notes:

Specifications established at rated power unless otherwise noted.

All measurements into 50 ohm resistive load.

AC input voltage at nominal level.



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