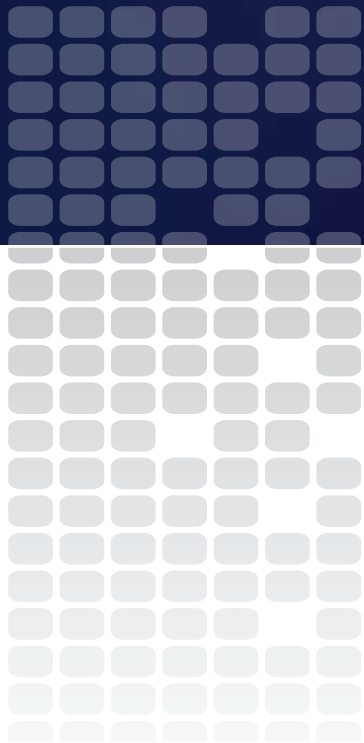


Platinum Z HD+

Tri-Mode HD Radio™ Transmitters



Platinum Z HD+

Platinum Z HD+ — The Industry Standard for FM/HD Radio™ Transmitters

Harris presents the Platinum Z HD+ family of transmitters for amplification of FM and HD Radio™ compliant signals. All Platinum Z transmitters deliver FM, FM+HD (at any ratio) or HD-only signals “on-the-fly,” without any adjustments. When operated in FM-only mode, the Platinum Z transmitters automatically rebias the power amplifiers back to class C for maximum output power and efficiency, and switch the power control back to the IPA stage for easy integration of a legacy, analog FM-only exciter. Harris has applied its expertise in linear and digital systems to create an extremely redundant and flexible architecture. Platinum Z HD+ transmitters offer unmatched reliability, performance, and proprietary digital technology that can significantly reduce your operating costs.

Exclusive Precorrection Technology

One of the biggest requirements for FM/HD Radio transmission is linear amplification. To achieve the linearity required for maximum power output and compliance with FCC and NRSC-5B RF mask requirements and to prevent signal interference, one technique has been to utilize a fixed precorrection to the RF drive to counteract non-linearities in the amplifiers. As implied, fixed precorrection does not adapt for any changes in the amplifiers or antenna system, which will cause increased intermodulation or distortion products that can result in interference. Drawing on Harris’ expertise in digital TV transmission, Platinum Z HD+ transmitters employ proprietary Real-Time Adaptive Correction (RTAC™) precorrection circuitry. RTAC prevents intermodulation and other distortion products from occurring in the first place. This produces a linear and mask-compliant signal, regardless of changes in the amplifier or load.

Platinum Z HD+ transmitters offer higher digital output power than competing designs. Thanks to the efficiency provided by RTAC precorrection, up to 15 percent of additional output power is available in common amplification mode. This added headroom can mean significant savings in initial transmitter sizing, allowing you to avoid an upsizing that may be required in a competitive model.

Unleash the Power of HD Radio

The key to your station’s success is the ability to deliver outstanding sound. With HD Radio, which creates a true digital pipeline, you can deliver data as well with its value-added services and revenue generating potential.

Platinum Z HD+ transmitters are equipped with the award-winning FlexStar® HDx-FM exciter. The FlexStar HDx-FM exciter has redefined FM analog and HD Radio performance. With dual RF outputs, this advanced exciter can drive both your HD Radio transmitter and the existing analog transmitter when using separate amplification. You can also add the FlexStar HDI-100 importer to your Platinum Z HD+ transmitter, and engage in multicasting or broadcasting more than one program stream on HD Radio.

Built-In Reliability that Keeps you on the Air

Based on the field-proven Harris® Platinum Z CD solid-state FM transmitter design, Z HD+ transmitters are built to keep you on the air. Standard features such as main/alternate IPA switching and inclusion of all hardware and software for main/alternate exciter switching help eliminate single points of failure. From the exciter, IPA and PA, to the power supplies and the microprocessor controller, the Platinum Z HD+ transmitter is a true “soft-failure” design. The broadband solid-state RF module used for both the IPA and the PA sections is exceptionally reliable. The module is designed to provide built-in redundancy when used in the IPA. And in the PA section, multiple RF modules operate in parallel to produce rated power, eliminating a single point of transmitter failure.

“Z-plane,” a patented Harris innovation, combines amplifiers from front to back in the cabinet or in the “Z” axis to ensure maximum utilization of space and reduce cabinet size. An automatically reconfigurable isolation combiner, “Z-plane” keeps you on the air at full power, even with an RF module removed.

Easy to Operate, Simple to Service

Today's radio broadcasters have fewer engineers, and Platinum Z HD+ transmitters accommodate this reality. The transmitters are very easy to control and monitor — locally and remotely. Platinum Z HD+ transmitters require less maintenance than previous-generation tube transmitters. Tuning, loading and matching requirements are eliminated, and tube replacements are a thing of the past. What's more, Platinum Z HD+ transmitters feature "hot-swappable" RF modules and operational system tests that allow much of the maintenance to be performed safely while you continue to broadcast.

Like all Harris transmitters, Platinum Z HD+ transmitters are backed by the best 9X5 factory service in the industry, 24-hour emergency technical assistance, around-the-clock parts support and legendary Harris training.

You can upgrade your analog Platinum Z today! Upgrade packages are available to convert existing Platinum Z FM and Z CD transmitters to Z HD+. And, you can continue to use your DIGIT® CD exciter as an analog-only mode backup exciter.

Make a Safe Investment

HD Radio is more than a financial investment. Technically speaking, it's a whole new ballgame. To make a safe investment in HD Radio, you can count on Harris. As broadcasting's DTV and DAB (Eureka 147) transmission leader, Harris has developed a solid core competency backed by years of experience in the areas essential to maximum HD Radio performance. Since the beginning, Harris has provided transmitters for every major HD Radio test, including multicasting.

Harris can provide everything you need as you plan your transition to digital radio — from source through studio through STL through transmission.

Key Features and Benefits



IPA/PA Modules

Platinum Z HD+ IPA/PA modules are identical, provide unmatched reliability and are "hot swappable" for on-air servicing. Proprietary "Z-plane" combining keeps the transmitter at full power, even if a PA module is removed.



FlexStar HDx Exciter

This advanced exciter generates both the HD and FM signals in a single, compact enclosure that mounts inside the transmitter. When used with the companion HDE-200 embedded exporter, all audio processing and digital stream generation can be moved to the studio for easy access management. Other important features of the FlexStar exciter include a front-panel spectral display for a quick check of sideband spectrum, built-in RBDS and SCA (2) generators, multiple audio inputs with automatic and manual switching, dual RF outputs with both primary and backup operating modes, and an intuitive, menu-driven graphical user interface for setup and extensive diagnostics.



User Interface

The Z HD+ transmitter provides straightforward operation, locally or remotely. Comprehensive information is at your fingertips via RS-232 connection and optional Xtraware® software or eCDi® Ethernet interface. The microprocessor-based controller also makes intelligent decisions based on operating conditions. A pull-out/tilt design provides even greater accessibility.

Platinum Z HD+

Main Controller

Microprocessor-based controller monitors more than 100 parameters and makes intelligent decisions based on operating information. Provides automatic power control, VSWR overload protection, VSWR foldback, RF power "soft-start," AC re-start and automatic switching to a backup exciter and reserve IPA. For troubleshooting, the controller logs the last 32 faults and times of occurrence. Features both serial (RS-232) and parallel control. Also includes a discrete logic Life Support Controller that allows continued operation at a safe 25% forward power level if the main microprocessor fails or is removed for service.

Diagnostics Display

Detailed information is accessible on a diagnostic panel. A large, four-line LCD display provides status information for more than 100 parameters and also provides fault alerts. A digital multimeter and LEDs provide additional information.

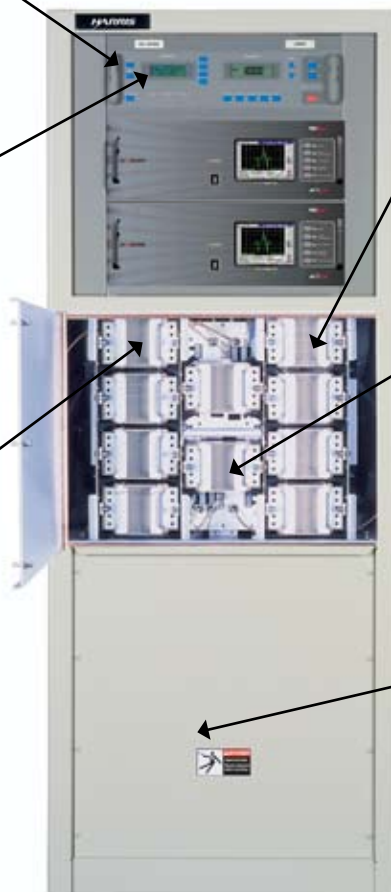
PA

In the PA section, multiple RF modules operate in parallel to produce rated power. Each module is conservatively rated to produce 850 W of power into a system VSWR of 1.5:1.

Z-Plane Combiner (NOT SHOWN)

Harris' patented Z-plane automatically reconfigurable isolation combiner keeps Z HD+ transmitters on the air at full (or nearly full) power even if a PA module is removed from service.

Z16HD+



Solid-State RF Modules

The IPA and PA sections use identical, interchangeable broadband RF modules. Each module comprises two MOSFET pairs (four devices). Each MOSFET pair is mounted on a heat spreader and attached to a heat-sink assembly. RF modules plug directly into the combiner. "Hot-swappable" modules can be safely removed or inserted during transmission without removing plugs or cables.

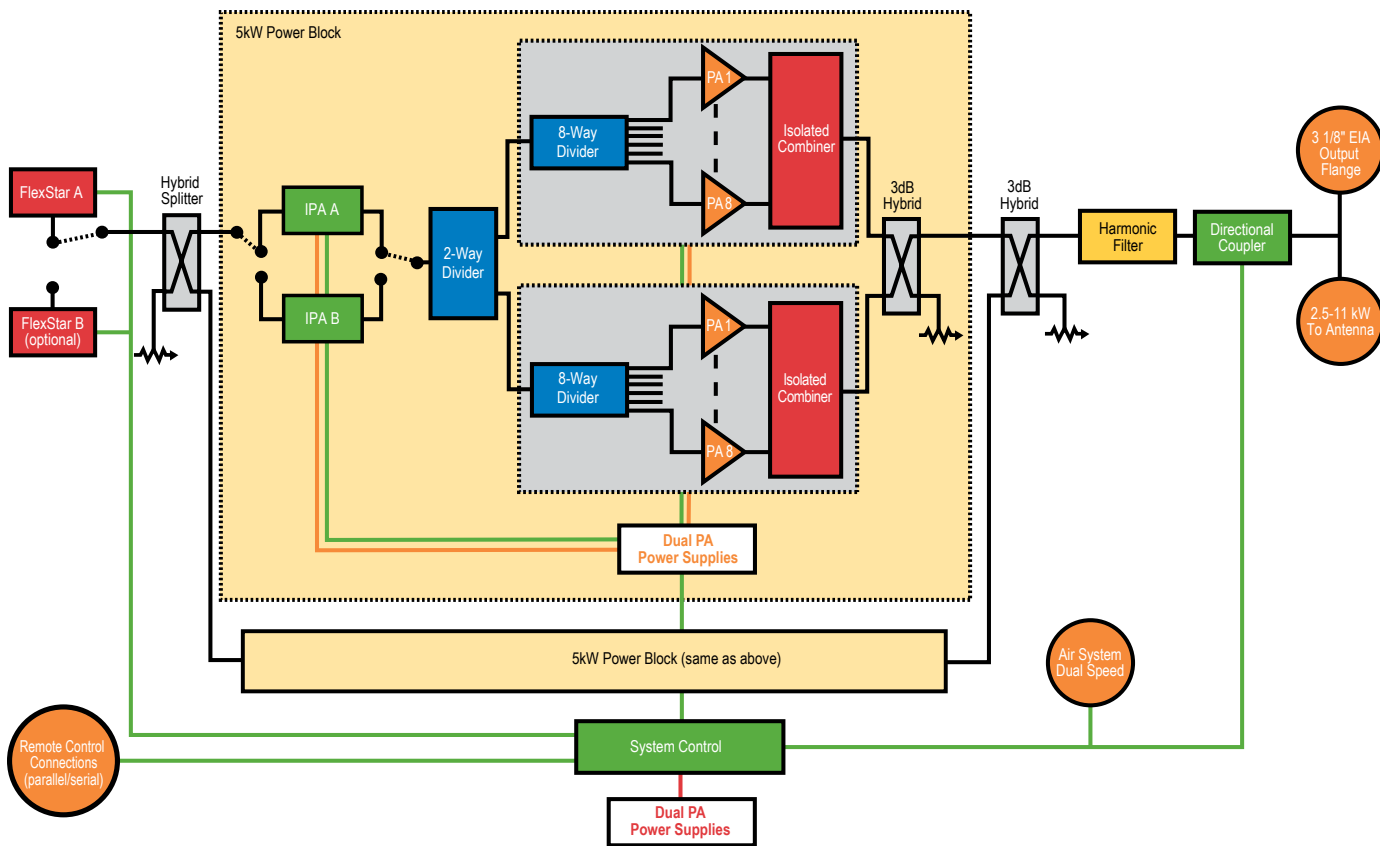
IPA

The solid-state module design ensures IPA redundancy. Although the IPA module has two MOSFET pairs, only one pair is used during transmission. If the operating MOSFET pair fails, the remaining MOSFET pair automatically replaces it. For even greater reliability, any PA module can be used as an IPA module with absolutely no modification.

Power Supplies

Redundant power supplies are standard in every Z HD+ transmitter with more than four solid-state modules and are optional in transmitters with fewer modules. The linear/non-switching design provides high conversion efficiency, increased line isolation to transients, multiple fused secondary rectifiers, and an excellent power factor with very-low line harmonics. Power supplies are housed on a roll-out mounting plate for complete accessibility. The transmitter's controller is powered by its own dual low-voltage power supply.

Z16HD+ Diagram



The Z HD+ is available for analog operation, and is designed for separate or common amplification systems from the Z4HD+ through ZD32HD+.

Z HD+ Transmitter Models	Common	Separate	FM Only
Z4HD+	1.65 kW	775 W	2.2 kW
Z6HD+	2.8 kW	1.35 kW	3.85 kW
Z8HD+	4.0 kW	1.75 kW	5.25 kW
Z12HD+	6.0 kW	2.6 kW	7.8 kW
Z16HD+	8.0 kW	3.5 kW	10.5 kW
ZD24HD+	12.0 kW	5.2 kW	15.6 kW
ZD32HD+	16.0 kW	7.0 kW	21.0 kW

Platinum Z HD+

Specifications

Specifications are subject to change without notice.

General (For FM and HD with FlexStar HDx)

FM Power Output Range	Z4HD+: 0.3 to 2.2 kW Z6HD+: 0.875 to 3.85 kW Z8HD+: 1.25 to 5.25 kW Z12HD+: 1.88 to 7.8 kW Z16HD+: 2.5 to 10.5 kW ZD24HD+: 3.76 to 15.6 kW ZD32HD+: 5 to 21 kW
FM+HD Power Output Range (HD signal injection ratio -20dB).	Z4HD+: 0.375 to 1.65 kW Z6HD+: 0.625 to 2.8 kW Z8HD+: 0.875 to 4.0 kW Z12HD+: 1.25 to 6.0 kW Z16HD+: 1.75 to 8.0 kW ZD24HD+: 2.50 to 12.0 kW ZD32HD+: 3.50 to 16.0 kW
HD Power Output Range	Z4HD+: 0.225 to .875 kW Z6HD+: 0.325 to 1.3 kW Z8HD+: 0.435 to 1.75 kW Z12HD+: 0.650 to 2.6 kW Z16HD+: 0.875 to 3.5 kW ZD24HD+ 1.30 to 5.2 kW ZD32HD+: 1.75 to 7.0 kW
RF Output Connector.	All Models: 3 1/8 in. EIA, 50 ohms 1 5/8 in. EIA step reducer supplied on request at no charge
Excitation	Harris FlexStar HDx digital FM/HD exciter
Frequency Range.	87.5 to 108 MHz programmable in 10 kHz steps
Frequency Stability	± 150 Hz, 32° to 122° F (0° to 50° C) using high-accuracy internal (59.535 MHz) TCXO; 10 MHz input for synchronization to external (GPS) reference; automatic switching to internal oscillator if external reference fails
Overall Efficiency.	HD mode greater than or equal to 26% AC to RF, FM+HD (common mode-20 dB ratio) mode greater than or equal to 37% AC to RF, FM (analog only) mode greater than or equal to 55% AC to RF; all figures are at model-specific nominal output power
Harmonic / Spurious Suppression	Internal harmonic filter meets or exceeds all FCC, IC, CE, CCIR and IEC215 requirements; meets or exceeds standard NRSC-5A emission limits in all modes
VSWR	For load VSWR exceeding 1.5:1, nominal, transmitter automatically reduces RF output as a function of load VSWR (proportional VSWR foldback); for an instantaneous VSWR of 3:1 or greater, an automatic carrier interruption occurs to extinguish possible arcing conditions in the output load
Modulation Types	FM digitally synthesized direct-to-channel, HD digital direct-to-channel; FM+HD digital direct-to-channel
Operating Modes	"On-the-fly" switching between FM only, HD only, FM+HD
FM Modulation Capability	Greater than ± 300 kHz
Asynchronous AM S/N Ratio	55 dB minimum below equivalent 100% amplitude modulation by 400 Hz using 75 µs de-emphasis (no FM modulation present)
Synchronous AM S/N Ratio	50 dB minimum below equivalent 100% amplitude modulation with 75 µs de-emphasis and 400 Hz high-pass filter (FM deviation +/- 75 kHz by a 1 kHz sine wave); measured at wideband input

AC Mains Requirement	197 to 250 V, 1-phase, 50 or 60 Hz, 2-wire (plus safety ground) 197 to 250 V, 3-phase, 50 or 60 Hz, 3-wire Closed Delta or WYE 380 to 415 V, 3-phase, 50 or 60 Hz, 4-wire WYE 437 to 506 V, 3-phase, 60 Hz, 3-wire Closed Delta or WYE Note: Z16 requires two cabinets in single phase configuration; ZD32 requires four cabinets in single phase configuration
RF Cabinet Size (W x D x H).	28.6 x 49.72 x 72 in.(72.6 x 126.3 x 183 cm) (with fan and air filter assembly attached)
Harmonic/Low Pass Filter	Internal
Remote Control Connections	Barrier strip inside upper left sidewall (facing rear of transmitter)
Additional Remote Control Connection	RS-232 on system controller supports eCDI or WebRemote
AC Entrances	Through top or bottom surface of cabinet
Fuse/Breaker.	Wall-mounted fused disconnect or breaker is customer-supplied item; an RK5 class fuse such as the Bussman FRN-R (250 V), FRS-R (600 V) or LittleFuse FLNR (250 V), FLSR (600 V) is recommended; if a circuit breaker is used, it should have a trip curve similar to that of the RK5 fuse trip curve
AC Power Factor	3-phase: 0.95; 1-phase: 0.8

Refer to individual transmitter ECM sheets for specific specifications regarding power consumption, heat loads, weights, etc.

Input/Output

External Frequency Control	Parallel I/O control of up to 8 frequencies; unlimited frequency selection via optional N+1 controller
AES-3 Audio Inputs	Two auto-switching AES-3 inputs, female XLR, 110 ohms balanced; -2.8 dBfs nominal; adjustable level from 0 to -15 dBfs in 0.1 dB steps for +/- 75 kHz deviation; input sample rate 32 to 96 kHz
Analog L/R Inputs	Female XLR, >10K ohms, balanced, resistive; default level is +10 dBu for +/-75 kHz deviation; level adjustable from -10 dBV to +10 dBV
Analog Composite Input	Two BNC inputs (1 balanced, 1 unbalanced); balanced impedance is 10K ohms or 50 ohms (selectable); unbalanced is 10K ohms; input level: 3.5 V pk-pk for +/-75 kHz deviation; adjustable 2 to 5 V pk-pk
SCA Audio Inputs	Two inputs combined on one 5-pin XLR female connector (mating male connector supplied); >10K ohms balanced, resistive; +10 dBV nominal for +/- 6 kHz of FM sub-carrier
External SCA Inputs.	Two BNC female, unbalanced; >10K ohm; 1.5 V P-P nominal for +/-7.5 kHz (10%) deviation of main carrier; adjustable from 1 to 4 V pk-pk
RBDS Data Input	Sub-D 9-pin female RS-232
External 10 MHz Clock Input.	BNC female, unbalanced, 50 ohms, -10 dBm to +10 dBm
External 1 PPS Clock Input	BNC female, unbalanced, 50 ohms, TTL level
User Remote Interface.	D 25-pin female
N+1 Interface	Sub-D 25-pin female
RF Sample Out	BNC jack, -66 dBc, post harmonic filter
19 kHz Pilot Sync Output.	BNC female, unbalanced, 50 ohms resistive, sine wave, AC coupled, 4.5 V pk-pk nominal, unterminated

Exciter Communication Ports . . .	Two Sub-D 9-pin female; RS-232 protocol, for RBDS or VT-100 data
Exciter Ethernet Ports	Two RJ-45 on main processor board; two RJ-45 on Engine board (HD version only); all Ethernet ports 10/100; supports static or dynamic IP address
Exciter USB Port	Front-panel USB type-A connector; USB 1.1/2.0-compliant; supports configuration save/restore and software updates via flash drive

Amplitude Response	+/- 0.005 dB 20 Hz to 53 kHz; +/-0.03 dB, 53 kHz to 100 kHz
Total Harmonic Distortion	0.002%*/.01% THD over stereo sub band (10 Hz to 53 kHz) with 75 μ s de-emphasis
Intermodulation Distortion.	CCIF: 0.005% (14/15 kHz, ratio 1:1); SMPTE: 0.005% (60/7000 Hz, Ratio 1:1)
Transient Intermodulation Distortion (DIM)	0.005% (2.96 kHz square wave/14 kHz sine wave modulation)
Slew Rate	11.8 V/ μ s — symmetrical
Phase Response Variation	\pm 0.05° from linear phase, 10 Hz to 100 kHz
Group Delay Variation	\pm 5 ns, 10 Hz to 53 kHz, \pm 30 ns, 53 kHz to 100 kHz

Stereo Generator Performance (AES-3 or Analog Inputs)

Modes	Stereo, mono L+R, mono L, and mono R; remote controllable
Pre-emphasis	Selectable 0, 25, 50, or 75 μ s
Stereo Pilot Tone	19 kHz \pm 0.03 Hz; injection adjustable 0% to 12% in 0.05% steps; nominal: 9%. 38 kHz, 57 kHz, 76 kHz, 95 kHz suppression: 80 dB below +/-75 kHz deviation
Stereo Separation	80 dB*/60 dB, 10 Hz to 15 kHz
Dynamic Stereo Separation	80 dB*/60 dB, 10 Hz to 15 kHz*
Stereo Amplitude Response	\pm 0.1 dB, 10 Hz to 15 kHz referenced to selected pre-emphasis curve
Stereo Signal to Noise Ratio (L or R)	85 dB below 100% modulation at 400 Hz; measured in a 10 Hz to 22 kHz bandwidth with 75 μ s de-emphasis and DIN "A" weighting
Stereo Total Harmonic Distortion	0.005%*/0.02%, any modulating frequency 10 Hz to 15 kHz, in bandwidth 10 Hz to 22 kHz; with 75 μ s de-emphasis
Stereo Intermodulation Distortion (L or R)	CCIF: 0.005%*/0.02% Note 1; (14/15 kHz 1:1), SMPTE: 0.02% (60 and 7000 Hz 1:1)
Transient Intermodulation Distortion (DIM)	0.008%*/0.02%; (2.96 kHz square wave/14 kHz sine wave modulation)
Linear Crosstalk	90 dB below 100% modulation reference (AES-3 Input); L+R to L-R or L-R to L+R due to amplitude and phase matching of L and R channels (10 Hz to 15 kHz)
Non-Linear Crosstalk.	80 dB below 100% modulation reference; L+R to L-R or L-R to L+R due to distortion products
Audio Overshoot	Less than 0.16 dB

Mono Performance (AES-3 or Analog Input)

Pre-emphasis	Selectable 0, 25, 50 or 75 μ s
FM Mono Signal-to-Noise Ratio	94 dB below 100% modulation at 400 Hz; measured in a 10 Hz to 22 kHz bandwidth with 75 μ s de-emphasis and DIN "A" weighting
Amplitude Response	\pm 0.05 dB, referenced to selected pre-emphasis curve (no low-pass filter)
Mono Total Harmonic Distortion	0.002%*/0.01% THD, 10 Hz to 22 kHz bandwidth
Mono Intermodulation Distortion	CCIF: 0.005% (14/15 kHz 1:1); SMPTE: 0.005% (60/7000Hz 1:1)
Mono Transient Intermodulation Distortion (DIM)	0.005% (2.96 kHz square wave/14 kHz sine wave)

Wideband Analog Input Performance

FM Signal-to-Noise Ratio	94 dB below \pm 75 kHz deviation at 400 Hz; measured in a 10 Hz to 100 kHz bandwidth with 75 μ s de-emphasis; DIN "A" weighting
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External SCA, RBDS Performance

SCA Format	Externally generated, analog FM subcarriers in the range 53-99 kHz
SCA Sub-band Amplitude Response	+/-0.5dB, 40 kHz to 100 kHz; high-pass filtered
SCA Channel FM Signal-to-Noise Ratio	80 dB below +6 kHz subcarrier deviation at 400 Hz with 150 μ s de-emphasis
Harmonic Distortion	less than 0.2% in audio pass-band of SCA generator
Intermodulation Distortion.	SMPTE (60 and 7000 Hz, 1:1): 0.2% or less, no pre/de-emphasis, SCA generator low-pass filter bypassed
Crosstalk, SCA to Stereo	80 dB below 100% modulation, L or R channel with 75 μ s de-emphasis
Crosstalk, Stereo to SCA	80 dB below 100% modulation (referenced to +/-6 kHz deviation and 150 μ s de-emphasis)
Crosstalk, SCA to SCA.	80 dB below 100% modulation (referenced to +6 kHz deviation and 150 μ s de-emphasis per channel)

Dual Internal SCA Performance

Pre-emphasis: Selectable.	150 μ s, 75 μ s, none
Amplitude Response	\pm 0.5 dB, 10 Hz to 7.5 kHz; selectable 4.3 kHz or 7.5 kHz low-pass filter
Subcarrier Frequency	57 kHz to 99 kHz in 1 kHz steps
Signal-to-Noise Ratio	80 dB with de-emphasis (150 μ s), 65 dB without de-emphasis at +/-6 kHz deviation
Total Harmonic Distortion	0.1% 10 Hz to 5 kHz
SCA Deviation Capability.	+/-1 kHz to +/-12 kHz; +/-6 kHz default
Injection Level.	2 to 20%, adjustable in 0.1% increments
Spurious & Harmonic Performance	2nd harmonic: better than 40 dB below subcarrier; 3rd harmonic: better than 45 dB below sub-carrier; all other components: 50 Hz to 100 kHz: better than 80 dB below subcarrier

RBDS Generator Performance

Subcarrier Frequency	57 kHz, \pm 0.09 Hz
Injection Level.	2 to 20% in 0.1% increments

HD Radio Performance

Compliant with iBiquity and NRSC 5A standards

NOTE: Specifications marked with asterisk (*) were measured using laboratory digital demodulation techniques for product performance verification. All other specifications were measured to the performance limits of currently available production test equipment. All specifications referenced to any single output frequency (87 to 108 MHz), nominal rated output power, and 50 ohms, isolated, non-reactive load. Some analog performance specifications may degrade when using alternate exciters.

HD Radio™ is a trademark of iBiquity Digital Corp.

ONE Company for Workflow Solutions Throughout the Media Chain

Harris is the ONE company delivering interoperable workflow solutions across the entire media delivery chain — providing today's broadcaster with a single, integrated approach to capitalize on the benefits of IT and mobile applications. By providing unparalleled interoperability across our product portfolio, Harris is able to offer customers integrated solutions that improve workflows, save money, enable new revenue streams and provide a migration path to emerging media business models. To meet the evolving needs of broadcast, distribution, government agencies and entertainment businesses, Harris is the ONE answer for change.

Service And Support

At Harris, we are committed to customer service excellence. It is our goal to provide the highest level of support by applying a simple rule: We take ownership of helping our customers succeed. Our support teams consist of innovative technical experts who support all situations regarding product performance, integration and operational processing. We are adept at providing proven solutions, making workflows better and ensuring reliability of the product and system. At Harris, our experienced and dedicated teams stand ready to help you meet your goals for premium product performance, 100% up-time and reduced maintenance investment.

Warranty

Because we want to assure you that Harris stands beside its products and system solutions, our products carry a standard set of warranty services, which are competitive with — and in some cases outperform — others in the industry.

Service Packages

We offer value-add services that allow you to customize the level of services you need in meeting mission-critical performance levels. Our service package options offer many ways to upgrade your standard warranty by choosing the All-Inclusive OnePak, or by selecting individual services from our extensive portfolio. Our service and support advisors can assist in the selection of the individual services that best suit your requirements.

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For more information, please visit www.broadcast.harris.com/radio.

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