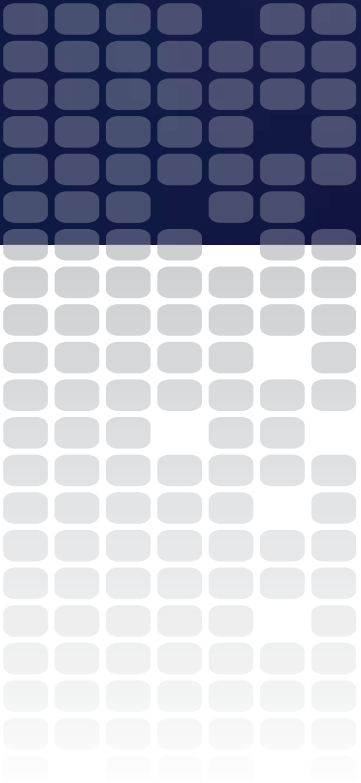


HPX[™]

High-Power Tube Transmitter
for Analog FM and HD Radio[™]



Introducing Harris® HPX™ — the next generation in high-power tube transmission for FM analog and HD Radio™ broadcasting. This amazing transmitter offers power and efficiency at an extremely attractive price point.

Powerful, Simple and Rugged

Depending on mode and power level, the Harris HPX transmitter achieves market-leading power levels up to 42 kW analog FM, utilizing either the 4CX20,000 or 4CX25,000 series rugged Radial Beam Power Tetrode tube. Additionally, systems can be combined into a dual unit for redundancy and power levels up to 84 kW analog FM. Unlike high-power solid-state transmitters, the HPX series can safely operate at higher power levels with elevated VSWR.

Outstanding Value

In terms of dollars-per-watt, the HPX tube-based transmitter outperforms all solid-state transmitters in the same class. Operators realize a savings of nearly 25 percent in cost of ownership over the lifetime of the transmitter. This includes regular tube replacement.

Superior HD Radio Operation and Performance

Combined with the Harris FlexStar® HDX-100 exciter and advanced Real-Time Adaptive Correction (RTAC™) feature, the HPX transmitter provides superior analog and HD Radio performance, exceeding NRSC-5B mask compliance even at the highest power levels. Up to 31.5 kW FM+HD at -20dBc injection and 17 kW at -10dBc injection are available. For a complete HD Radio system, add the new FlexStar HDE-200 embedded exporter and the HDI-100 advanced services program importer.

Maximum Efficiency

The HPX provides the highest operating efficiency of any transmitter available in its class by utilizing tube-based ¼ wave, bandwidth-optimized cavity, grounded cathode design, a 3-phase linear high-voltage power supply, switching power supplies for screen, grid and low voltage control circuits, and a single high-efficiency 3-phase blower. The HPX can maintain peak efficiency over a wide range of power levels and operating modes.

Compact Footprint — Simple Installation

The HPX is the most compact high-power transmitter in its class. The matching power amplifier (PA) and power supply cabinets measure only 32 in. (W) x 35 in. (D) x 78 in. (H). The small footprint and the internal low-pass harmonic filter simplify installation and lower shipping costs, while reducing cost and space requirements in the facility. The high-voltage power supply cabinet and PA cabinet can be separated with the optional (standard 40-foot length) cable set. Other custom lengths are available upon request.

Unparalleled Control and Diagnostics

The HPX incorporates the most advanced transmitter control system available. The basic controller option provides critical life support, control, automatic exciter switching and fault diagnostic functions without reliance on a microprocessor. The enhanced transmitter control unit option combines the basic controller functionality with a microprocessor and ¼ VGA touch-screen graphical user interface (GUI) for increased control and diagnostics, including TCP/IP connectivity, Web remote control/monitoring and SNMP communications. A single controller is capable of operating two transmitters and the combiner in dual combined or redundant backup modes. A simple parallel user interface connects to today's most popular remote transmitter control systems.

Reliability and Serviceability

The solid-state driver stage uses the field-proven Platinum Z™/ZX® IPA modules and ZX series switching power supplies in a dual redundant configuration. Modules are front-panel accessible and hot-swappable to allow ease of service, provide reliability and simplify spares inventory. Maintenance technicians can easily and safely service the PA cavity because of the ability to bypass the PA stage using FlexPatch™, and put the IPA or even the exciter directly to air with the blower and all high voltage shut down.

Common Components and Architecture

From the highest power FM+HD systems to the lowest power FM-only systems, the entire HPX transmitter line uses virtually all the same major components, including the PA cavity. This consolidation of components makes parts sparing simple and straightforward.

Future-Proof, Smooth Upgradeability

The HPX transmitter features the world-class FlexStar HDx-FM exciter, which can be field-upgraded to HD by adding an Exgine card; Z/ZX IPA components that switch modes "on-the-fly"; a universal transmitter control unit; and additional common components across the full line. With only minor component changes required, upgrading the HPX is a simple, smooth and inexpensive process, whether you are upgrading to higher power or upgrading from analog to HD Radio or both. Harris can provide everything you need as you plan your transition to digital radio — from source through studio through STL through transmission. And a Harris systems team is available to help you put together a package that makes the most sense for your operation — now and in the future.

FEATURES

System

- High-power FM/FM+HD tube-based transmitter with nominal nameplate (FM) power output rating based on three models of 20 kW, 30 kW and 40 kW

Mechanical

- Solid, welded steel exterior cabinets; aluminum inner skins and chassis
- Hinged rear doors for normal access, easily removed for maintenance or installation activities
- Major access panels are securely latched with a supplied hex head tool for quick, safe access
- Top or bottom entry locations for all cabling

Cooling

- Direct drive 3-phase blower in main PA cabinet
- High-efficiency flushing fans

RF Drive

- Requires only 30 W (analog) exciter
- Fully integrated RF and control interface with FlexStar, DigitCD™ and MicroMax™ exciters
- IPA stage uses the field-proven Platinum Z/ZX PA modules
 - Higher power models employ two modules providing redundancy
 - Lower power system can employ optional main/backup IPA
- IPA modules are replaceable from the front of the transmitter

Power Amplifier Stage

- Common tube socket for all models; 4CX20,000C
- ¼ wave grounded cathode design offers stability and efficiency
- Ability to bypass PA stage using Flexpatch to put exciter and/or IPA directly to air, with blower shut down. No user safety issues while servicing PA cavity

Controller

- Basic transmitter controller provides critical life support, control, automatic exciter switching and diagnostic functions on MIMIC panel without reliance on a microprocessor
- Enhanced transmitter controller option combines the basic controller functionality and life support with a microprocessor and ¼ VGA GUI for advanced control and diagnostics including TCP/IP connectivity, Wwb remote control and monitoring and SNMP communications
- Single controller capable of operating two transmitters and combiner in dual-combined mode
- Four large front-panel analog meters: Forward/Reflected power, PA volts, PA amps and multimeter for other operating parameters

Power Supplies

- High-voltage, 3-phase linear supply with primary/secondary MOV protection; half tap on transformer and multiple voltage taps; some model upgrades may be accomplished with only change in HV transformer
- Rugged, reliable mains transformer provides worry-free performance, easy to tap for specific installation requirements
- Low-voltage control and IPA use switching supplies from field-proven ZX products, reducing spare parts costs

Power Amplifier Cabinet

HV Power Supply Cabinet



1 Customer Control Interface Compartment

2 Dual Main/Alt Exciters

3 Transmitter Control Unit

4 Screen and Bias Supply Compartment

5 IPA PS Compartment

6 IPA Compartment
1 or 2 "Z" Modules

7 Regulated Filament Supply Compartment

8 Primary Circuit Breakers

9 Primary Power Compartment

10 High Voltage Compartment

11 Analog Meter Panel

FlexStar Exciter



1 Front-Panel USB Port

2 RTAC Monitoring

3 User Control

Transmitter Control Unit



1 Basic MIMIC Panel
or

2 Optional Enhanced GUI

3 System Status/
Fault Indicators

4 Auto/Manual Main/Alt
Exciter Control

5 APC Control

6 Remote/Local Control

7 Power Control

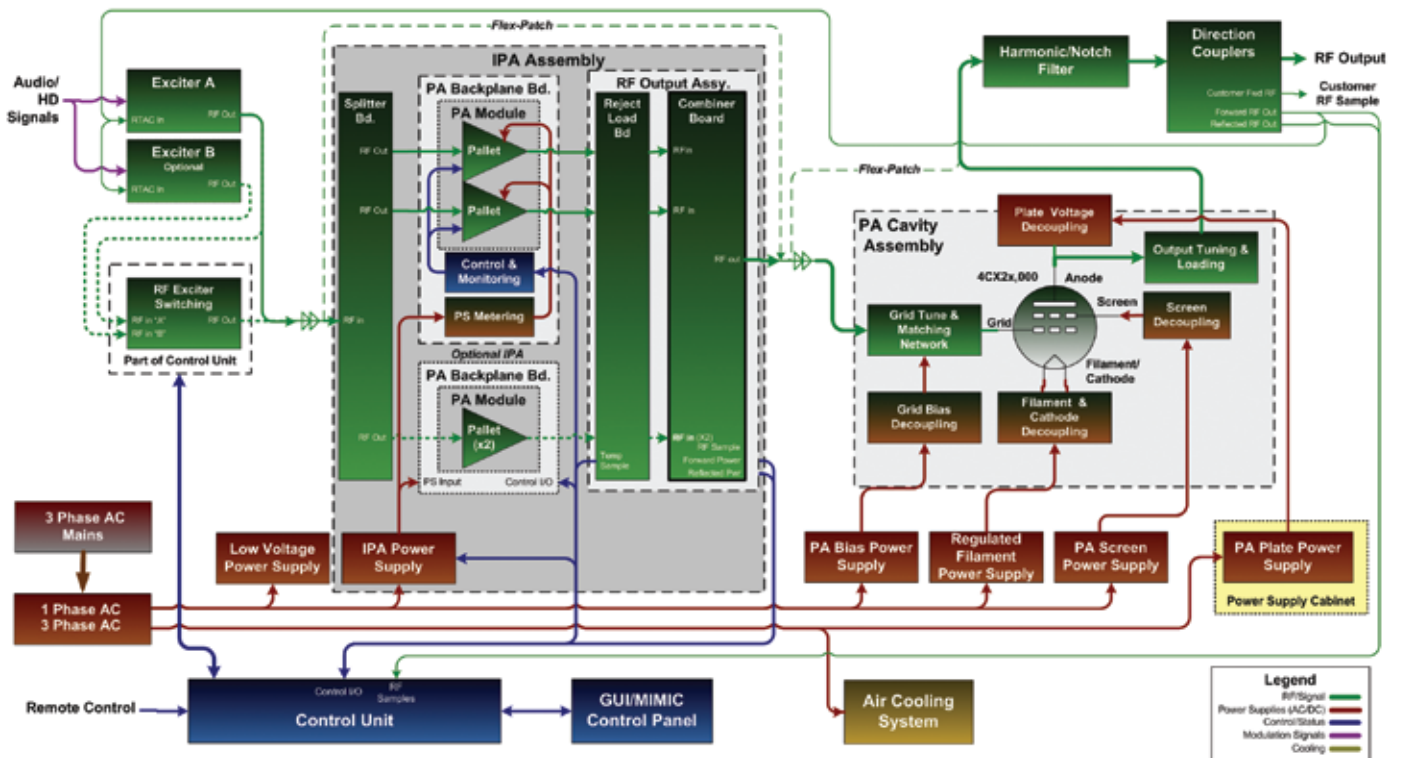
8 Plate On/Off

9 Filament On/Off



- 1 Transmitter Control Unit
- 2 IPA Supplies
- 3 Low Voltage Supplies
- 4 IPA Compartment 1 or 2 "Z" Modules
- 5 Transmitter Interface Logic
- 6 PA Tuning and Loading, Grid Tuning and Loading
- 7 Ancillary Circuit Breakers — Screen and Bias, Filaments Flushing Fans, PA Blower, Exciters

HPX Transmitter Block Diagram



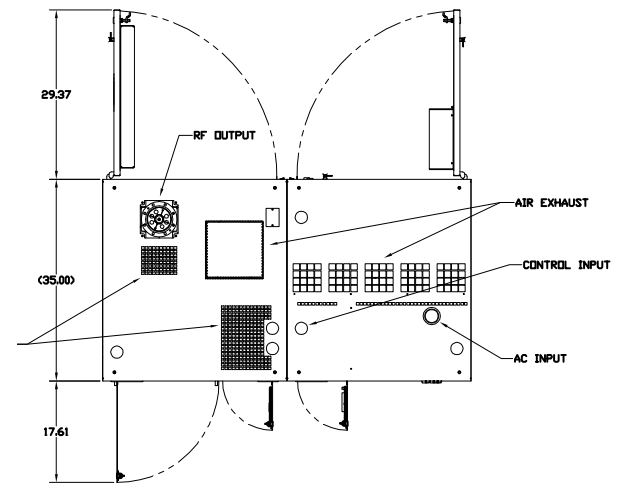
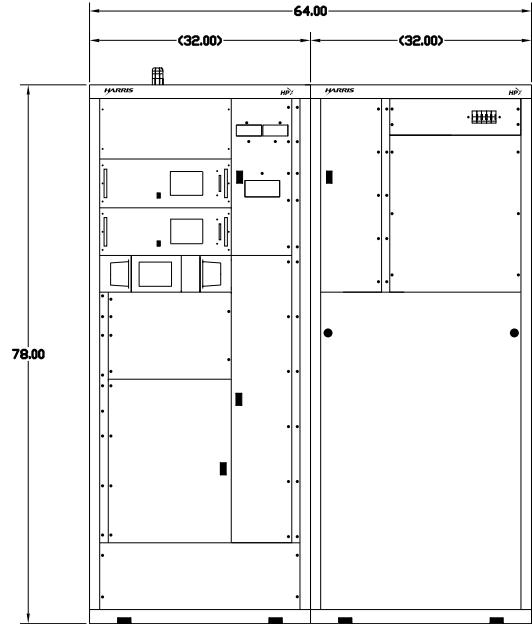
Specifications

Specifications are subject to change without notice.

Frequency Range	87.5 to 107.9 MHz		
Maximum Power Output	HPX20	HPX30	HPX40
FM Mode	21 kW	31.5 kW	42 kW
FM+HD -20 dBc	21 kW	26.5 kW	31.5 kW
FM+HD -10 dBc	15 kW	16 kW	>17 kW*
HD Mode -20 dBc	8.4 kW	9.4 kW	9.6 kW
HD Mode -10 dBc	6.1 kW	6.8 kW	7.0 kW
Minimum Overall			
AC to RF Efficiency	HPX20	HPX30	HPX40
FM Mode	66%	68%	70%
Typical Overall			
AC to RF Efficiency	HPX20	HPX30	HPX40
FM Mode	68%	70%	72%
FM+HD -20 dBc	58%	61%	62%
FM+HD -10 dBc	40%	41%	42%
Output Impedance	50 ohms		
Output Connector	3-1/8 in. EIA or 4-1/16 in. male flange (Myat compatible)		
Maximum VSWR	1.5:1 for 100% power output with proportional fold-back		
Input Voltage	50-60 Hz, 197 to 250 V AC, 3 phase, 3-wire closed Delta or WYE — 250 amperes max or 360-415 V AC 4-wire WYE — 125 amperes max		
Input Voltage Variation	± 5% for full specification, +10%, -15% for continued operation		
Power Factor	0.95		
Maximum Altitude	10,000 ft (3,048 m) high-altitude/high-power cooling kit required above 7,500 ft (2,286 m) MSL		
Ambient Temperature			
Analog FM Mode	32° to 122° F (0° to 50° C); derate 3.6° F (2° C) for each 1,000 ft (304.8 m) elevation		
Humidity	95% non-condensing		
RF Harmonics/			
Spurious Emissions	Meet or exceed FCC, NRSC, ITU and IC requirements		
Asynchronous AM			
S/N Ratio	55 dB below equivalent 100% AM modulation		
Synchronous AM			
S/N Ratio	52 dB below equivalent 100% AM modulation		
Other Audio Specifications	Determined by exciter		
Dimensions (W x D x H)	Two cabinets, each 32 x 35 x 78 in. (81 x 88.9 x 198.1 cm) Main PA cabinet contains 13RU of 19 in. rack space for dual exciters and ancillary equipment		
Standards Compliance	NRSC-5B or most current HD Radio standard FCC, CE, Industry Canada RoHS-compliant design and manufacturing Safety EN60215		

* Maximum power currently 17 kW at -10 dBc with existing Crest Factor Reduction techniques. Improvements in efficiency and PAPR control within the FlexStar exciter indicate that an increase of 1-1.5 dB (23 kW Max) available output power at -10 dBc is anticipated.

HPX Transmitter Outline Drawings



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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