



*FM Radio Solutions*

*Z CD  
Analog FM  
Transmitters*

*The industry-standard 2-20kW  
solid-state FM broadcast  
transmitters with a solid path  
to your digital future*

*next level solutions*





## Make these Harris Z CD transmitter benefits yours:

### » Investment security with the leading FM transmitter

Z CD transmitters have the largest installed base of any solid-state FM transmitters in their class with more than 2,000 on air worldwide. There are many reasons these transmitters are so popular — from their redundant, low-maintenance architecture and CD-quality performance to proprietary features that ensure top flexibility and a cost-effective migration path to digital.

### » Solid-state reliability and functionality at tube transmitter prices

If you've assumed that you'll have to pay more for the benefits of solid-state, think again. Z CD transmitters make solid-state technology available for the price of vacuum tube transmitters. You no longer have to sacrifice the extraordinary reliability, on-air serviceability and other benefits of solid-state for a lower initial purchase price.

### » Truly competitive 16-bit CD quality sound-year in and year out

The ultimate task of any transmitter is to deliver signal quality that stands out on the dial. And Z CD transmitters, with Harris' industry-standard DIGIT CD® FM exciter, do this better than any other FM transmitter. And because DIGIT CD provides sustainable performance, your transmitter will sound as good years after installation as it does on the day it is installed — without tweaking.

### » A cost-effective migration path to your future

Z CD transmitters give you a cost-effective migration path to an all digital air chain. For example, DIGIT CD is available with field-changeable analog or digital input modules enabling you to accept an AES/EBU audio input. And Z CD transmitters when you are ready to initiate IBOC DAB service.

### » A complete end-to-end solution

Only Harris can provide everything you need as you plan your transition to digital radio — from source through studio through STL through transmission. And our systems team is available to help you put together the system that makes the most sense for your operation — *now* and in the *future*.



# Z CD - the world's most popular FM transmitter

Harris proudly presents its Z CD family of 2 - 20kW FM transmitters. When these transmitters were introduced in 1996, they were hailed for accomplishing something that no other transmitters in their class ever had-making solid-state technology and Harris' industry-standard DIGIT CD® digital FM exciter available at the price of far less reliable tube transmitters with analog exciters.

Z CD transmitters have lived up to their promise. Today they are the world's most popular transmitters in their class, with more than 2,000 on the air worldwide. Why? Because their competitive purchase price and an irresistible combination of benefits make Z CD the undisputed FM value leader.



## Built-in reliability keeps you on the air

Z CD transmitters are designed to keep you on the air. Standard features and options can eliminate single points of failure — from IPA, PA, and power supplies to the exciter — for a true “soft-failure” design.

Unmatched reliability starts with Z CD components. The broadband solid-state RF module used for both the IPA and the PA sections is exceptionally reliable, and this is only the beginning. The RF 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, replacing the single PA tube that has traditionally been the most common single point of transmitter failure.

A patented Harris innovation, the “Z-plane” isolation combiner, keeps you on the air at full power even with an RF module removed, giving you full on-air performance and reliability.



## Digital performance and cd-quality sound

With DIGIT CD® as their standard exciter, Z CD transmitters generate the loudest and cleanest analog FM signal on the dial. Consider features like proprietary circuitry that reduces synchronous AM — no matter where it originates in the air-chain! And, you'll see why DIGIT CD measurably outperforms every other FM stereo exciter on the market.

DIGIT CD is future-proof. Field-changeable analog or digital input modules let you upgrade to an all-digital air-chain in a matter of minutes when you are ready. And, while performance with the analog input will surpass the best analog exciter, the digital input will take you to the next level — true CD sound day-in and day-out, without tweaking.

In fact, the digital input module includes two unique built-in features—a DSP stereo generator that provides incredible stereo performance with a signal-to-noise ratio of 83db, and a Digital Composite Limiter with “look-ahead” circuitry to predict and eliminate overmodulation peaks before they occur.

DIGIT CD is frequency agile and enables channels to be selected in 50Hz increments with no requirements for tuning. This capability, combined with Z CD's broadband RF modules, makes Z CD transmitters ideal for N+1 operation. In fact, a Z CD can provide ready backup support for any number of FM transmitters in the same market.



## Easy operation, unprecedented serviceability

It's no secret that today's radio broadcasters have far fewer engineers, and Z CD transmitters accommodate this reality. These transmitters are very easy to control and monitor-locally and remotely. Harris offers as an option Xtraware™ Z Monitoring software which can query the transmitter via an RS 232 port.

Z CD transmitters require up to 90% 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, Z CD transmitters with “hot-swappable” RF modules allow a great deal of maintenance to be performed safely while you continue to broadcast.

Like other Harris transmitters, Z CD transmitters are backed by the best factory service in the industry-24-hour technical assistance, around-the-clock parts support and our legendary training.

We invite you to take a closer look at Z CD-transmitters that are so outstanding that they will redefine your expectations.



## Key Features and Benefits

### IPA/PA Modules:



#### **Legendary reliability**

Harris Z CD IPA/PA modules provide unmatched reliability and a hot-swappable design for on-air servicing. Proprietary "Z-plane" combining keeps the transmitter at full power even if a PA module is removed. IPA and PA modules are identical and completely interchangeable.

### DIGIT CD:



#### **Standout CD sound — forever!**

#### **Absolutely no tweaking required**

DIGIT CD will deliver the best possible sound with no tweaking — ever! Field-changeable input modules let you easily upgrade from analog to digital in minutes, and a broadband design eliminates tuning and makes N+1 operation truly practical.

### User Interface:



#### **Straight forward operation, locally or remotely**

Z CD transmitters put comprehensive information at your fingertips, locally or remotely via RS-232 connection. The microprocessor-based controller also makes intelligent decisions based on operating conditions. A pull-out/tilt design provides even greater accessibility. Harris also offers Xtraware™ Z Monitoring software which allows transmitter parameters to be read remotely on a PC via an interconnection to the RS 232 port.

## Z CD: A family of industry-leading FM transmitters

### 1 Main Controller

This microprocessor-based controller monitors more than 100 parameters and makes intelligent decisions based on operating information. It provides automatic power control, VWSR overload protection, VSWR foldback, RF power "soft-start", AC re-start and automatic switching to a back-up exciter and reserve IPA. To aid in troubleshooting, the controller logs the last 32 faults and times of occurrence. An RS-232 port provides direct connection to standard remote control systems.

### 2 DIGIT CD® Exciter

Harris' industry leading DIGIT CD® FM exciter digitally generates the FM signal, eliminating such age-old problems as poor low-frequency separation, PLL unlock, and subsonic transients that compromise audio quality and reliability in analog exciters. Drift-free circuits maintain CD-quality performance year-in and year-out without tweaking. Field-changeable analog or digital input modules provide a simple migration path to an all-digital air-chain. As a frequency-agile exciter that allows channels to be selected in 50Hz increments with no tuning, DIGIT CD is ideal for N+1 applications.

### 3 Optional DIGIT CD® Exciter

Every Z CD transmitter is available with an optional DIGIT CD® exciter with automatic switching.

### 4 'Z-Plane' Combiner

Harris' patented Z-plane isolation combiner keeps Z CD transmitters on the air at full (or nearly full) power even if a PA module is removed from service. (not shown)

### 5 Solid-State RF Modules

The IPA and PA sections use identical broadband RF modules. Each module is comprised of 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.

### 6 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.

### 7 PA

In the PA section, multiple RF modules operate in parallel to produce rated power. Each module is conservatively rated to produce 850W of power into a system VSWR of 1.5:11.

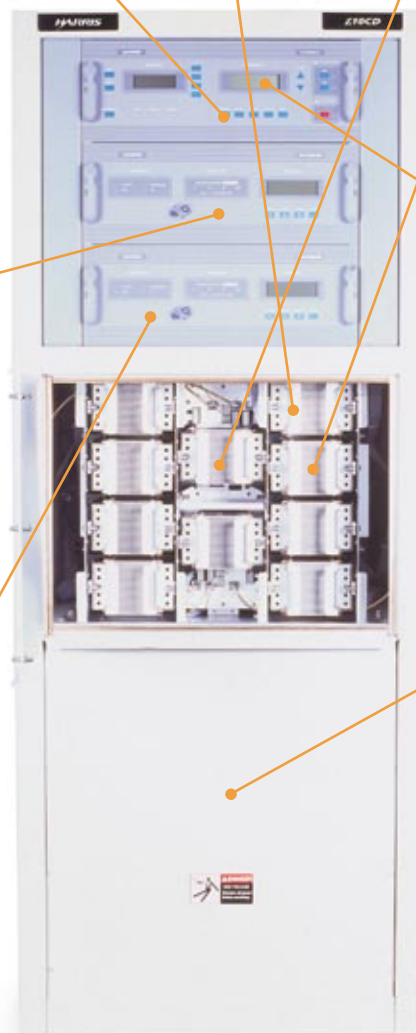
### 8 Diagnostics Display

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.

### 9 Power Supplies

Redundant power supplies are standard in every Z CD transmitter over 3.5kW and optional in 2kW models. One main power supply is provided for every four solid-state modules. The non-switching design provides high conversion efficiency 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 power supply.

Z10CD



**Power Output Range**

- Z2CD: 2kW nominal; 500W – 2.2kW
- Z3.5CD: 3.5kW nominal; 875W – 4.125kW
- Z5CD: 5kW nominal; 1.25 – 5.5kW
- Z7.5CD: 7.5kW nominal; 1.88 – 8.25kW
- Z10CD: 10kW nominal; 2.5 – 11kW
- ZD20CD: 20kW nominal; 5 – 22kW

**Output Connector**

- Z2CD through Z10CD: 1 5/8" or 3 1/8" EIA flange (female) specify
- ZD20CD: 3 1/8" EIA flange (female)

**Excitation**

- Harris DIGIT CD digital FM exciter

**Frequency Range**

- 87 – 108MHz, digitally programmable in 50Hz increments

**Frequency Stability**

- +/-150Hz, 0°C - 50°C ambient temperature range (using internal frequency reference)

**External Frequency Control**

- Capable of locking to an external 10MHz reference for use in FM synchronous applications (requires optional DIGIT CD Sync Board)
- Sync Input Requirement: 2.8V p-p or TTL level; Connector: BNC (female)

**Harmonic/Spurious Output**

- Meets or exceeds FCC, IC and CCIR requirements

**Modulation Type**

- Direct Digital Synthesis using a 32-bit Numerically Controlled Oscillator (NCO)

**Modulation Capability**

- 208% (+/-175kHz reference)

**PLL/AFC Overload Characteristics**

- Immune to carrier dropouts caused by high energy, low frequency modulation (program audio is not applied to VCO)

**Modulation Indication**

- Digitally generated peak reading, 0.25% accuracy (at 150% modulation setting), color-coded LED display with baseband overmodulation indicator

**Asynchronous AM S/N Ratio**

- 55dB minimum below equivalent 100% amplitude modulation by 400Hz using 75µs de-emphasis (no FM modulation present)

**Synchronous AM S/N Ratio**

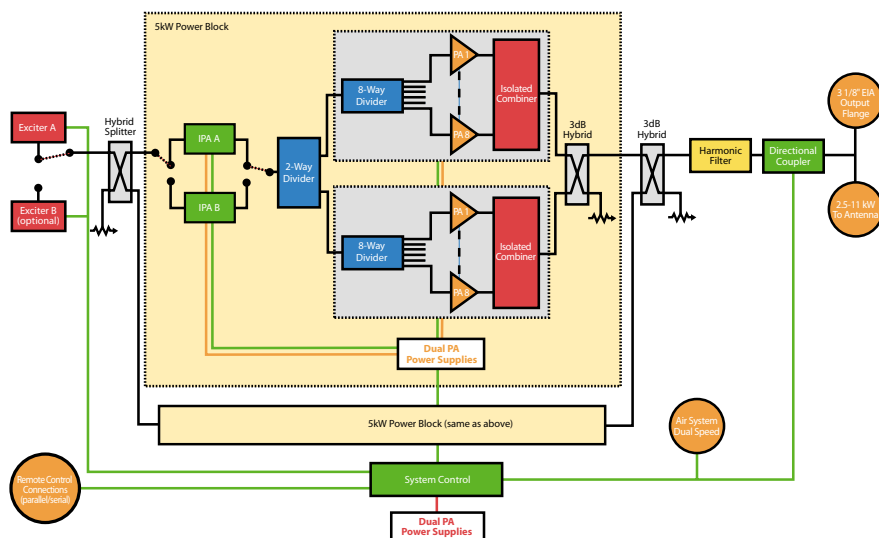
- 53dB minimum below equivalent 100% amplitude modulation with 75µs de-emphasis and 400Hz highpass filter (FM deviation +/- 75kHz by a 1kHz sine wave)

**AC Mains**

- 190 – 250VAC, 3 phase, 50/60Hz, 3 wire
- 360 – 415VAC, 3 phase, 50/60Hz, 4 wire
- 190 – 250 VAC, single phase, 50/60Hz

**Power Consumption (nominal)**

- Z2CD: 4.0kW at 2.2kW output power
- Z3.5CD: 6.1kW at 3.75kW output power
- Z5CD: 7.9kW at 5kW output power
- Z7.5CD: 11.7kW at 7.5kW output power
- Z10CD: 15.3kW at 10kW output power
- ZD20CD: 31kW at 20kW output power

**Z10CD Diagram****Power Factor (displacement)**

- 3-phase: >=0.95; 1 phase: >=0.8

**Altitude**

- To 3,049m (10,000 ft.) above mean sea level

**Ambient Temperature Range**

- 0 - 50°C; upper limit derated 2°C per 304.9m (1,000 ft.)

**Relative Humidity**

- To 95% (non-condensing)

**Dimensions**

- Z2CD, Z3.5CD, Z5CD: 28 1/2" (72.4cm) wide by 36" (91.4cm) deep by 72" (182.9cm) high. Blower assembly adds 13 3/16" (33.5cm) to depth
- Z7.5CD, Z10CD: 3 phase: 28 1/2" (72.4cm) wide by 36" (91.4cm) deep by 72" (182.9cm) high. 1 phase: 57" (144.8cm) wide by 36" (91.4cm) deep by 72" (182.9cm) high. Blower assembly adds 13 3/16" (33.5cm) to depth
- ZD20CD: 3 phase: 57" (144.8cm) wide by 36" (91.4cm) deep by 72" (182.9cm) high. 1 phase: 114" (289.6cm) wide by 36" (91.4cm) deep by 72" (182.9cm) high. Blower assembly adds 13 3/16" (33.5cm) to depth. External 2x10kW combining equipment: Dependent on selected combining technique. Separate drawing with mechanical detail provided for each type.

**Weight**

	3 phase	1 phase
• Z2CD:	1,130 lbs. (514kg)	1,225 lbs. (557kg)
• Z3.5CD:	1,280 lbs. (581kg)	1,375 lbs. (624kg)
• Z5CD:	1,300 lbs. (590kg)	1,395 lbs. (633kg)
• Z7.5CD:	1,710 lbs. (776kg)	2,260 lbs. (1,027kg)
• Z10CD:	1,750 lbs. (795kg)	2,300 lbs. (1,045kg)
• ZD20CD:	3,500 lbs. (1,590kg)	4,600 lbs. (2,090kg)

Specifications are subject to change. For a complete listing of the most current specifications, please visit our Website at [www.broadcast.harris.com](http://www.broadcast.harris.com).



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