

DM8C-R

Digital ATSC Exciter



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Digital Exciter System

Complete ATSC Capabilities

The DM8C-R digital television exciter is the most advanced ATSC exciter available today. Building on the field-proven hardware platform of Axcera's digital exciter family, the DM8C-R offers terrestrial broadcasters the most flexible solution available. The DM8C-R supports ATSC fixed (A/53), ATSC Mobile DTV (A/153) and Distributed Transmission System (DTS) (A/110B) slave mode. Because it operates using 100% digital signal processing, the DM8C-R can evolve as broadcast requirements change, helping to protect your investment for many years to come. The DM8C-R is also a perfect candidate to retrofit existing transmitters, regardless of transmitter manufacturer, making any transmitter DTS and ATSC Mobile DTV compatible.

The DM8C-R utilizes a patented VSB modulation technique, which makes it possible to generate a virtually perfect 8-VSB RF signal. Since the DM8C-R is a completely reprogrammable digital television exciter, it can be easily upgraded in the field with new software versions. Upgrades can be completed locally or remotely via a web interface over a secure network connection. Critical parameters can also be conveniently set and queried directly on the LCD screen or via a remote or local interface to a personal computer. The DSP circuitry also handles frequency offsets allowing any number of user selectable offsets.

The DM8C-R utilizes Direct Digital Synthesis (DDS) technology to replace a traditional analog upconverter and allow operation on any channel in the VHF and UHF bands. This provides outstanding IMD performance, extremely low phase noise and exceptional SNR, all of which maximize broadcast signal reception.

The DM8C-R modulator can be locked to an external 10 MHz reference for synchronization or precise frequency offset control. Non-volatile operation is achieved through flash-RAM (random access memory), which stores all digital settings for the entire exciter-modulator system. In the event of a power loss, the system will return to the previously selected settings when power is restored, saving time by eliminating the need to re-enter operating parameters.

Adaptive Equalization

Advanced Correction Technology

Standard with all DM8C-R exciters, our One-Touch Correction (OTC) provides digital precorrection that tracks and corrects for distortions, both linear and non-linear, in the complete transmitter system at the touch of a button. All correction operations are performed in the high-speed processor, which provides a full system optimization in about two minutes.

The DM8C-R also offers the ability to upgrade to the Axcera Adaptive Correction Technology (AXACT)[™] option. With AXACT, correction operations run continuously at timed intervals which can be set by the user through the remote interface or the front panel.

To obtain the necessary data, the exciter samples the transmitter system output, both before and after the mask filter. The DM8C-R processes the data and the necessary digital precorrection is applied to the modulator output signal, resulting in consistent transmitter system performance, independent of environmental changes.

The DM8C-R also performs over fifteen safety tests upon each adaptive correction run to confirm that the new correction values are appropriate before applying them to the on-air signal. This ensures that the signal will not be negatively affected by a failure of an RF component in the sample path, such as an RF coupler, connector, relay or cable.

DTVision[™] Signal Analysis

All In One System Testing

Available on all DM8C-R exciters is Axcera's exclusive DTVision digital signal analysis and test system. Designed to eliminate the need for expensive DTV test equipment, this system samples the transmitter output and measures critical transmitter performance parameters. This information is available on the exciter's front panel LCD display in text form, and also on the Web GUI which is available locally or remotely on an external PC. Graphical displays of the DTVision parameters are also available locally or remotely via an Axcera software application installed on any Windows PC. The DM8C-R may be monitored from any remote location that has Internet access.

Available performance parameters include digital SNR, error vector magnitude (EVM), eye diagram, graphs of adaptive equalizer performance, RF spectrum, constellation diagram, and more.

Dual Processors

On-Air Reliability

Every DM8C-R employs dual processors to ensure on-air reliability. An extremely reliable FPGA-based processor is dedicated to running the modulator hardware, which generates the ATSC signal, user interface and controls. This processor uses a highly reliable Linux operating system for the mission critical 8-VSB signal generation.

A second processor is dedicated to providing the adaptive equalization, diagnostics, and graphics such as DTVision, using the very stable and reliable Linux operating system. This high performance computer handles the processor intensive functions, performing all adaptive correction, and processing and displaying the data for the optional DTVision signal analysis measurement; all without negatively affecting the critical on-air signal path. In the unlikely event of a failure of this computer, the DM8C-R remains on the air with a fully corrected ATSC signal. The Linux computer may even be rebooted with no interruption of the on-air signal, and the DM8C-R is capable of a cold start without the Linux computer. The net result is an extremely high level of on-air reliability.

The DM8C-R also allows simple field upgrades to new operating modes, such as DTx slave, ATSC Mobile DTV, or other yet to be adopted ATSC enhancements, as they become available.

Distributed Transmission (DTx) Slave Mode

Improved Coverage, Lower Power Consumption

Continuing Axcera's leadership position in Distributed Transmission Technology, any DM8C-R can be easily field configured for slave mode operation, allowing DTx single frequency operation. DTx can allow a broadcaster to target population centers with much smaller transmitters than would be required for a typical single transmitter architecture. With a well designed system, DTx results in improved coverage throughout the licensed contour, lower overall power consumption, and inherent system redundancy.

ATSC Mobile DTV (A/153) Capable

Seamless Migration to ATSC Mobile DTV Service

As a leader in Mobile TV Transmission Technology, Axcera has designed every DM8C-R to support ATSC Mobile DTV service with a simple software upgrade and no change in hardware. The DM8C-R can be deployed in three modes by a change in software; Standard ATSC (A/53), Distributed Transmission (A/110B) and ATSC Mobile DTV (A/153).

Specifications

Frequency Range	
Low-Band VHF	54 to 88 MHz
High-Band VHF	174 to 216 MHz
UHF	470 to 806 MHz
Transport Stream Inputs (two available)	
Connector	75Ω, isolated BNC
Input 1	ATSC-compliant SMPTE-310M, 19.39Mbps
Cable Equalization	Automatic
Input 2	DVB-ASI, 213Mbps, 75Ω, BNC
Cable Equalization	Automatic
10 MHz Reference Input	
Connector	50Ω, BNC
Input Signal	-10 to +10 dBm
1PPS Timing Input	
Connector	50Ω, BNC
Input Signal	TTL
RF Output	
Connector	50Ω, BNC
Power Level	-10 to +10 dBm, average
Downconverter RF Sample	
Input Connector (Pre & Post)	50Ω, SMA
Dynamic Range	-10 to -5 dBm
Management	
10/100 Ethernet	RJ45, 10/100 Mbps

Performance

Output Power	-10 to +10 dBm, average
Regulation of Output Power	1% or less
Frequency Stability	±50 Hz (max variation over 30 days) ±2 Hz (with Precise Frequency option)
Pilot Frequency Offsets	Continuously adjustable in <0.1 Hz steps
Pilot Frequency Independent of SMPTE-310M Input	
Response Variation	±0.1 dB, typical
Group Delay	2 ns, typical
Phase Noise	-110 dBc/Hz typical, 20 kHz offset
Signal to Noise Ratio	>40 dB, typical
Shoulder Level	>60 dB

General

ATSC Standards	A/53; A/110; A/153
Operational Temp. Range	0° to 50°C, derate 2°C/1000ft.
Operational Humidity Range	0% to 95%, non-condensing
Maximum Altitude	10,000 feet AMSL
Size (H x W x D)	3.5" x 19" x 24"
Weight	20 lbs
Input Power	117/230 VAC ± 10%, single phase, 50/60 Hz
Power Consumption	225W, typical

Options

AXACT Adaptive Correction
DTVision Signal Analysis
Gigabit Ethernet Input
GPS Receiver

Manufacturing & Support

The DM8C-R is completely designed, built and factory tested by Axcera under strict ISO 9001:2008 control. This ensures the highest quality manufacturing practices and provides parts and service availability in a very timely fashion, keeping you on the air.

Axcera is serious about our commitment to "Total Customer Happiness." When you choose our products and systems, you will also receive our relentless commitment to your overall satisfaction. Our extensive RF capabilities and experience enable us to provide design and integration services and ongoing customer service and support that are unparalleled in the broadcast industry.

Axcera offers complete RF coverage analysis, system design and integration, installation, project management and support services directly and through our global network of integration and support partners. Our knowledgeable account managers and systems engineers will work with you to ensure that you are provided with a solution that is optimal for your needs. Our world class integration, installation and support team is well recognized in the industry for its exceptional customization capabilities and installation craftsmanship.

Our industry-leading Customer Support Group is a team of experienced field service technicians available 24/7. Our team is also available to travel to your site to quickly resolve any service issues. They are also available for routine maintenance, equipment installation, proof of performance testing and product training.

Our professional support is available by phone 1-800-215-2614 or +1 724-873-8100 or email: service@axcera.com.

At Axcera we look forward to the opportunity to demonstrate our commitment to your total happiness with our products and services.



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