

HARRIS®



Apex M2X™

Multimedia Exciter for Global Digital and Analog Standards

Apex M2X™

Performance

The Harris® Apex M2X™ multimedia exciter brings TV transmission to the next level with a digital signal of flawless integrity as well as complete technical and regulatory compliance for Harris solid-state and tube digital and analog transmitters. The low-maintenance Apex M2X multimedia exciter delivers consistency and quality year after year for both analog and digital operations.

Real-Time Adaptive Correction (RTAC™) incorporated in the Apex M2X maximizes RF performance and coverage. RTAC continuously monitors transmitter output and filter characteristics while automatically adapting for system nonlinearities.

Flexibility—for Today and Tomorrow

The Apex M2X supports a wide range of global digital standards: ATSC, ATSC Mobile DTV, DVB-T/T2, ISDB-Tb, FLO-TV, DAB/DMB, CMMB, CTTB and analog TV standards, including NTSC and PAL.

For analog operations, the Apex M2X exciter handles the range of analog inputs and can easily be upgraded to digital with a software upgrade.

With its expansion capacity, the M2X can readily adapt to changing digital standards and evolving air chain technologies—ensuring your system operates with the latest technologies. This flexibility ensures the sustainable utility and value of your investment, saving you the expense of replacement equipment.



RTAC Explained

With RTAC advanced digital precorrection, the Apex M2X is able to fully use the transmitter power amplifier while maintaining spectral mask compliance of the digital signal.

Precorrection can be implemented various ways, which are listed below in order of sophistication:

- Analog fixed precorrection
- Digital fixed precorrection
- Digital adaptive precorrection
- Digital, memoryful, adaptive precorrection (RTAC)

There are two types of precorrection used by the the Apex M2X: linear and nonlinear.

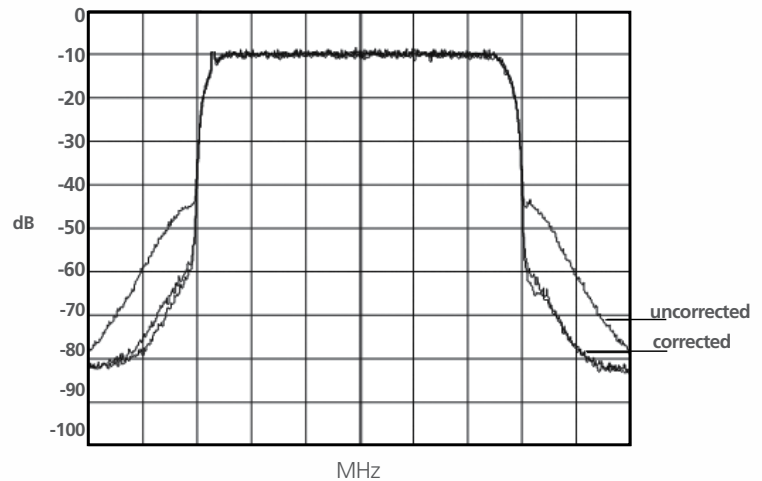
Linear Precorrection

Linear precorrection corrects for the non-ideal amplitude response and time response of the transmission system, including the power amplifier and any bandpass filters. Linear precorrection helps optimize the modulation performance of the transmitted digital signal so less equalization is required at the receiver.

Nonlinear Precorrection

Nonlinear precorrection corrects for the two major types of nonlinearity (AM to AM and AM to PM) in the RF power amplifier that cause unwanted spectral components and poor RF mask compliance. With AM to AM nonlinearity, the RF power amplifier output amplitude does not exactly track the input amplitude. This nonlinearity occurs typically near the peak output power of the amplifier where saturation effects cause the output response to flatten as the input continues to increase and the amplifier output goes to zero.

With AM to PM nonlinearity, the RF power amplifier output phase does not track the input phase. The amplifier acts like a phase modulator as the power output varies to follow the input signal, producing undesirable sidebands.



Fixed vs. Adaptive

Fixed precorrection can improve the system linearity for one specific operating point, but has to be manually readjusted for changes in power output, antenna load impedance, temperature or operating point.

Adaptive digital precorrection uses an RF sample taken at the output of the RF amplifier and automatically adjusts the shape of the precorrection, continuously optimizing the linearization of the system. The bandwidth limitation, especially in tube type amplifiers (IOT) and the stored energy in tuned circuits introduce "memory effects."

Digital, Adaptive, Memoryful Precorrection

Digital, adaptive, memoryful precorrection can correct for these memory effects and for simple AM to AM and AM to PM distortions. Even wideband solid-state RF amplifiers have memory effects that change the shape of the nonlinearities with digital modulation data states. RTAC is the only system with simultaneous, linear and nonlinear, adaptive, memoryful precorrection, providing total correction to all types of RF amplifiers.

Why Apex M2X?

Secure Investment

Harris is the industry-leading provider of DTV and digital radio transmission solutions, and understands the technological challenges of transitioning to digital and delivering mobile content. With Apex M2X—and all Harris broadcast products—your investment is backed by our years of experience in technologies critical to maximum digital transmission performance.

Multimedia

Be prepared for ever-changing global digital standard with the Apex M2X, designed to tackle a wide range of global standards.

Cost-Efficient Precorrection

RTAC precorrection enables transmitters to provide linear amplification with seamless content delivery at higher power levels. RTAC technology also increases efficiency, conserving energy and power costs, while well exceeding the RF mask requirements to prevent signal interference.

Compliance Monitoring Integration

Built on a legacy of integrated compliance monitoring, the Apex M2X features integrated monitoring tools for coded orthogonal frequency division multiplexing (COFDM) digital standards, as well as standard 8VSB monitoring. These tools provide solid measurement of digital parameters, ensuring the transmitter is in compliance within your network. These basic measurements help reduce equipment costs and provide assurance your system is operating properly.

Built-In Graphical User Interface

The graphical user interface (GUI) in the Apex M2X works with any Windows® PC running a standard Web browser and enables easy setup and in-depth monitoring.

Migration Flexibility

If you need a new transmitter but are not ready for digital, purchase a digital-ready transmitter and an Apex M2X analog exciter. When it's time to transition, the Apex M2X is the only system that provides a seamless upgrade to digital with the power of RTAC.

End-to-End Solution

Harris provides everything you need to transition to digital and mobile TV—from ad sales and billing, to HD studio equipment, servers and branding, to STL and transmission. Consult with a Harris applications team for help configuring the best system for your operation, now and into the future.



Extensive GUI set up and control

World-Class Value, Competitive Edge

The Apex M2X helps broadcasters around the world unlock the full potential of digital and mobile TV signals and succeed in increasingly competitive markets.

- Real-Time Adaptive Correction (RTAC)
- Digital adaptive group delay equalization
- Optimized correction for tube and solid-state transmitters
- Frequency agility – Band I, III, IV, V (L-Band option available)
- Built-in GPS option for single frequency network (SFN) support
- Built-in UPS option to support vital frequency-critical components for SFN operation
- Expansion ports for adaptability
- Space-saving, 2RU design
- Easy-to-use operator interface via standard Web browser and external PC
- SNMP information available to higher-level agent
- Dual video or transport stream inputs with auto switching
- Seamless integration with new Harris transmitter control systems
- Standard support for legacy or third-party transmitters
- Easy to service
- High-efficiency, auto-ranging power supply

Seamless Shift to Mobile

From world-tested transmission platforms to content management, encoding and transport systems, Harris provides the industry-leading solutions for emerging mobile TV applications. Harris transmitters power many of the world's leading mobile TV networks with all leading standards: DVB-H, DVB-T/T2, ATSC Mobile DTV, DMB, ISDB-Tb and FLO-TV.

The Apex M2X supports mobile networks with multi-standard flexibility, enabling broadcasters to seamlessly adapt to changing industry needs. Put DVB-T/T2 on air now and adapt using hierarchical modulation or fully switch to DVB-H. Apex M2X supports standard ATSC and can be easily upgraded to include mobile once standards are adopted. Because most mobile networks require coordinated transmitters for continuous coverage, the Apex M2X was designed to support single-frequency networks (SFN). Operation is easy with optional built-in GPS receivers and UPS backup for frequency stability and an integrated remote monitoring and control network.

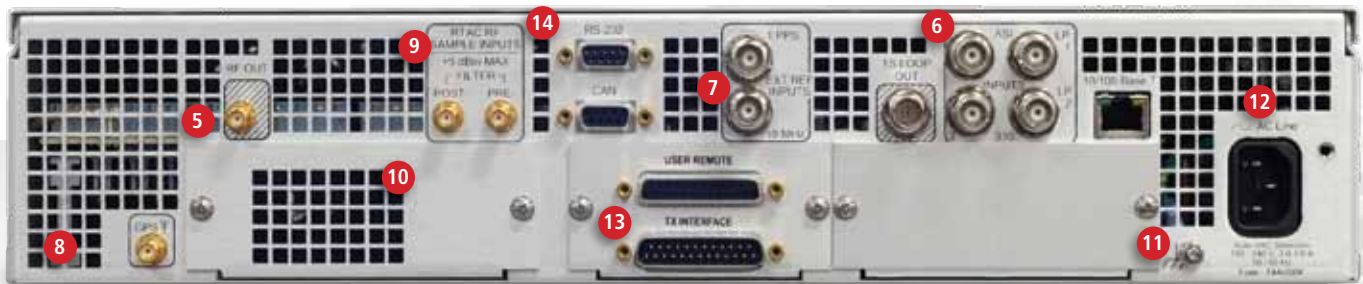


Apex M2X™



Front Panel

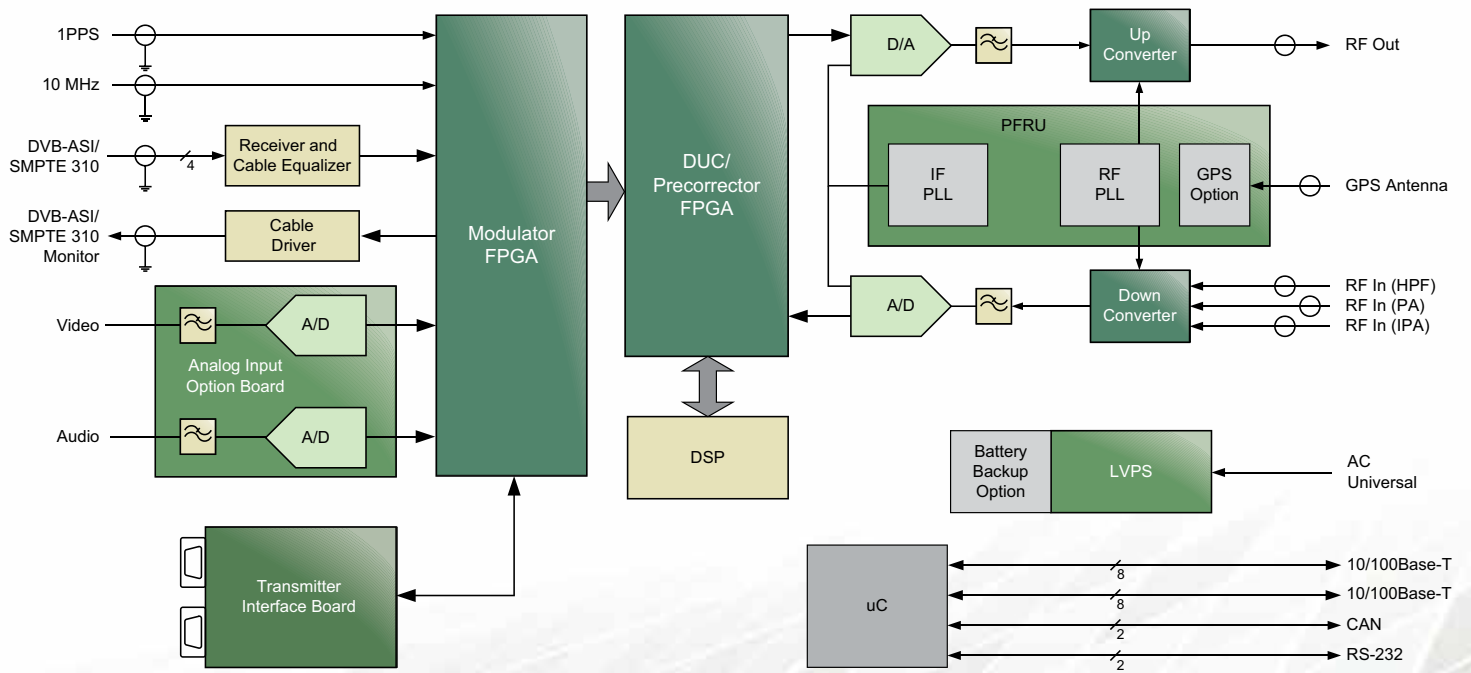
- 1 User Control**
Touch control and straightforward indicators for quick status and control or RTAC.
- 2 Status Monitoring**
Key operating parameters displayed for quick assessment. Additional indicators of rear-panel digital inputs provide assurance of backup source readiness.
- 3 Ethernet Ports**
Ethernet port for quick system updates or setup. All parameters are available through the standard graphical user interface.
- 4 Sample Outputs**
RF sample outputs and for 10 MHz and the 1 PPS signals for convenient connection to test equipment as needed.



Back Panel

- 5 RF Output**
Main high-level output provides 100 to 150 mW of power depending on the mode of operation.
- 6 Dual Switching Inputs**
Dual ASI (with high and low priority) or SMPTE 310 inputs for seamless backup switching and an isolated monitor output for confidence monitoring.
- 7 External Reference Input**
Support for single frequency networks (SFN), for both 10 MHz and 1 PPS inputs.
- 8 GPS Receiver**
Optional integrated GPS receiver provides accurate reference for seamless SFN operation and reduces installation costs and space.
- 9 RTAC RF Samples**
RTAC monitors the output of the transmitter and any filters or multi-station combiners, delivering maximum clarity and coverage—optimizing station performance.
- 10 Expansion Slot**
Expansion slot to accommodate ASI over IP input module, satellite receiver and other future input options.
- 11 Dual Analog Inputs**
Optional dual analog inputs support a range of standards, including NTSC and PAL systems, with built-in NICAM stereo operation and support for external BTSC generators.
- 12 Ethernet Connectivity**
RJ-45 connector for system 10/100Base-T Ethernet connectivity to the Apex M2X, facilitating diagnostics, monitoring and system updates.
- 13 Parallel Remote Control**
Dedicated DB-type connectors provide standard interfacing for transmitter control systems.
- 14 Serial Connectivity**
Multiple communications ports provide standard connectivity, including CAN and RS-232.

Universal Exciter Platform



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 broadcast.harris.com/TVTransmission.

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