
BE
BE
Solutions for
Tomorrow's Radio

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BROADCAST ELECTRONICS NEWS RELEASE

BE Showing Upgraded FXi Digital Exciter for Sync FM

Calibrated BE FXi digital FM exciters offer unprecedented accuracy for syncing audio

Quincy, IL, USA (*September 30, 2004*) – Broadcast Electronics is showing at the NAB Radio Show a software upgrade to its **FXi digital FM exciter** that makes it possible to calibrate audio levels within a fraction of a decibel – an important development for synchronous FM.

"Calibrating audio levels to this level of accuracy has never been done before," said Richard Hinkle, Director of RF Engineering for Broadcast Electronics. Affected by the change are broadcasters needing to fill-in licensed coverage areas with a booster or broadcasters seeking continuous program coverage along highways or within areas under-served by existing FM transmission sites.

For these broadcasters, the FXi 60/250 exciter upgrade makes it possible to adjust two or more exciters' AES/EBU audio inputs within 1/10th of a decibel, resulting in unprecedented reception and audio performance through booster or multiple-site networks broadcasting on the same frequency. Having the capability to set multiple sites to the same modulation level within 0.1dB allows optimum audio quality performance; 0.2dB differences between sites produce audible distortions in single-frequency FM networks, according to Hinkle. BE's FXi exciter is the only product available with audio frequency and modulation synchronization in addition to pilot and carrier syncing. Other approaches offer

pilot and carrier synchronization, but fail to completely synchronize the audio signals, which can result in degraded audio performance in the areas where the transmitted signals overlap. Without the ability to synchronize audio waveforms in lockstep, many stations have been precluded from using synchronous FM technology because of unacceptable distortion artifacts in overlap zones.

The FXi update completes BE's **Sync FM** solution, which, in addition to the FXi exciter, includes a pilot phase-locking accessory as well as off-the-shelf third-party components. BE's Sync FM solution is now being used to synchronize Antenna FM's three-site, single-frequency network in Athens, Greece. The solution also is being used to conduct landmark testing of a main and booster IBOC system operating in hybrid mode at KCSN(FM) in Los Angeles, California. The upgraded FXi 60/250 digital FM exciter, named one of the top six products of the year during the TechCon 2004 conference held in the United Kingdom in mid-July, will be on display at booth 702 during the NAB Radio Show.

About Broadcast Electronics (www.bdcast.com)

Broadcast Electronics (BE) is the premier provider of mission-critical solutions for over-the-air and Internet radio. BE products encompass program generation, audio and data management, inter-facility transport, and analog and digital transmission. For more than four decades, BE pioneering developments have set industry standards for innovation and reliability, while providing broadcasters with new options for operational productivity and income generation. BE is headquartered in Quincy, Illinois, and is represented worldwide by a network of local representatives.

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BROADCAST ELECTRONICS NEWS RELEASE

BE Debuts 50kW AM Transmitter at NAB Show

Patent-pending 4M modulation scheme and switch-mode power supplies yield ultra-efficient, ultra-light transmitter

Quincy, IL – (*September 29, 2004*). Broadcast Electronics will unveil its 50kW AM transmitter at next week's NAB Radio Show in San Diego.

BE's new 4MX 50 AM™ transmitter is based on a patent-pending Fourier Modulation (4M) technique designed by Broadcast Electronics. It features duty cycle modulated RF to produce optimum efficiency over the entire 250 watt to 55kW power range, eliminating the need for an additional low power transmitter during nighttime operation.

"This is a huge departure from the usual modulation techniques, and it all started with a 'what-if' question: What if we modulated RF devices directly and independently, so we didn't need a modulator stage or to turn PA modules on and off?" commented Richard Hinkle, Broadcast Electronics' Director of RF Engineering, who led the development team.

The result is a product with improved efficiency in a lightweight, ultra-small package one-third the size of competitive products, according to Hinkle.

The new 4MX 50 AM transmitter features:

- 89% overall efficiency; power factor greater than 0.99
- Wide range of operating power, from 55kW down to 250W, to meet all broadcast needs, day or night.
- One-third the size and a fourth the weight of comparable high-powered transmitters due to the use of offline switching power supplies instead of bulky transformers used in most transmitter designs.
- DSP exciter with adaptive audio correction for superior audio performance. The exciter adaptively corrects for any distortion products to provide the best audio quality.
- Mega redundancy. All 32 power amplifiers, each with their own power supply, are hot-pluggable and can be removed and replaced while the transmitter remains on the air. Dual low voltage power supplies allow full operation with no loss of power or service even if one should go off line.
- Advanced diagnostics, including impedance sweeps of the antenna system and spectrum analysis of the output signal to verify spectral performance of a standard AM or HD Radio™ system. Draws a Smith Chart plot, plus can create a spectrum plot for IBOC implementation.
- Flexible HD Radio implementation. Will take I and Q directly from BE's ASi 10 HD signal generator, plus provides for a plug-in Exgine card for implementation of the next generation HD Radio configuration with the coding and processing at the studio.
- Provides for the flexibility of changing modes on the fly between AM and AM + HD locally via the GUI interface or remotely via closures.
- Accommodates analog mono audio input as well as AES audio, either wired or optical.
- Can be set up to automatically detect loss of audio and automatically switch to the backup source. Either audio input can be set as primary or backup with programmable loss time before switching.
- The 4MX 50 also can accommodate audio via IP if the need arises, allowing further flexibility and capability in delivering audio to the transmitter.
- 15" XGA graphical user interface for operation and diagnostics, accessible from the front panel or over a network via IP.
- The power supplies in the 4MX 50 are power factor corrected to 0.99 or better and accommodate AC input voltages in the 240 or 415 volt ranges 50/60 Hz.

BE will show the new transmitter at booth 702 during the NAB Radio Show, October 6 through 8.

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BROADCAST ELECTRONICS NEWS RELEASE

FOR IMMEDIATE RELEASE July 6, 2004

BE to Host HD Radio Seminar in San Diego, October 6

HD Radio Generation from the Studio among the Hot Topics to be Covered

Quincy, IL – HD Radio™ generation from the studio and the latest delivery methods will be among the topics to be discussed during Broadcast Electronics' upcoming **HD Radio Seminar in San Diego, October 6**.

The seminar, which coincides with the **NAB Radio Show** in San Diego, is the latest of more than 35 BE-sponsored national seminars started two years ago to focus on the developing technology of HD Radio. "As the rollout of HD Radio continues, it's important to keep broadcasters abreast of new developments. These seminars create an opportunity for people around the country to interface with leading manufacturers of equipment as well as users of HD Radio systems," said John Abdnour, BE's National Accounts Manager/RF Systems.

In addition to HD Radio developments, the BE seminar will cover transmission technologies, installation and integration, antenna technologies and field reports.

The seminar is free to all broadcasters and will be held at the Embassy Suites Hotel – Downtown, 601 Pacific Highway, from 1 p.m. to 3 p.m. on October 6. Reservations can be made by emailing HDR@bdcast.com. Exhibit hall guest

passes also are available for the NAB Radio Show by contacting Broadcast Electronics.

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BROADCAST ELECTRONICS NEWS RELEASE

FOR IMMEDIATE RELEASE August 18, 2004

BE Appoints HD Radio Product Manager

Ted Lantz to head up new HD Radio product initiatives

Quincy, IL – *August 18, 2004.* Broadcast Electronics has appointed Ted Lantz as the product manager of its HD Radio™ product line.

Ted served in various capacities for Broadcast Electronics over a 12-year period, including applications developer for the company's digital audio line. "We are very fortunate to have Ted's experience at this crucial time in HD Radio expansion, when we are making important advancements into datacasting and other digital applications," said John Pedlow, the President of Broadcast Electronics, which recently expanded its HD Radio line to include a data management system.

"Broadcasters today are under a tremendous amount of pressure to cut operating expenses and at the same time, prepare for new opportunities. I see my job as making sure they have everything they need to realize both," said Ted, who started his new role with Broadcast Electronics in August as manager of the company's line of HD Radio transmitters and new data management suite, the Radio Data Dimensions System (RDDS).

Ted's strong background in digital content management complements the company's HD Radio RF team, including BE Vice President of RF Systems Tim Bealor and BE RF Director of Engineering Richard Hinkle, who holds several patents as the innovator of key transmission technologies now in use by stations today. "Ted has a reputation for understanding the nuances of broadcasting products and how to apply that to the everyday needs of the customer," commented Bealor.

Ted is located in Quincy, Illinois, and can be reached at 217-224-9600 or via email at tlantz@bdcast.com.

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BROADCAST ELECTRONICS NEWS RELEASE

FOR IMMEDIATE RELEASE September 14, 2004

BE Names Vice President Strategic Marketing

Neil Glassman to lead new communications and strategic development initiatives

Quincy, IL — *September 13, 2004*. Broadcast Electronics announced today that veteran broadcast industry marketer Neil Glassman will join the company as vice president for strategic marketing, effective immediately.

As a key member of the executive team, Neil will be responsible for directing product positioning and branding, as well as developing and implementing short- and long-range strategies and tactics to increase BE market share worldwide. In addition, he will oversee worldwide marketing, advertising, media relations, online presence and trade shows.

"We are delighted to welcome Neil onboard at a pivotal time and in a critical new executive position," said BE President John Pedlow. "We look to Neil's insights into markets and customers to help us more quickly assess and adjust our direction in response to changes in the environment, particularly as they relate to HD Radio."

Neil will draw on his two decades of proven management, sales and marketing experience in the broadcast equipment, audio electronics and telecommunications industries in his new post. As managing director of Cowan Communications, he has been consulting on marketing communications for BE for the past year. Before that, he launched the US-based division of French digital audio networking company Digigram S.A in 1997, successfully changing the image of Digigram from a respected technology developer to an industry leader. Previously, he was a consultant for Cleveland-based Telos Systems and Omnia Audio. Neil was Sales and Marketing Manager for Bradley Broadcast for six years before that.

Glassman can be reached at nglassman@bdcast.com

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NAB Radio 2004

BROADCAST ELECTRONICS:

Total Radio. Guaranteed.

A radio station is more than the sum of its parts. Improved integration among the mission-critical, high-value equipment in your facilities results in greater reliability, lower maintenance and increased productivity.

Broadcast Electronics introduces **Total Radio™**, our solution for comprehensive radio program and data integration. With Total Radio, your analog broadcast, HD Radio™ and Internet streaming requirements are fulfilled with fewer, more powerful operational components. Content and data management is seamless. Equipment from any manufacturer benefits from Total Radio, with the greatest advantages achieved using BE technology.

Total Radio was developed for the realities of radio, including tight budgets. Contact BE today for more details.

BROADCAST ELECTRONICS:

Total Radio. Guaranteed.

Your plant consists of four equipment clusters:

1. Program generation and audio management
2. Data management
3. Program and data transport
4. Transmission

For program generation and audio management, the latest version of BE's AudioVAULT℠ provides individualized user interfaces, is optimized for operational efficiency and is designed for elegant management of Program Associated Data (PAD). AudioVAULT is ready now for HD Radio secondary audio services, such as Tomorrow Radio.

Surprising affordable, the flexible and reliable AudioVAULT can be found in markets of all sizes. Its modular core enables you to purchase a system configured precisely to your unique studio environment.

Data management must accommodate the disparate requirements of Radio Data Services (RDS) for analog FM, Advanced Application Services (AAS) for HD Radio and Internet streaming clients. BE's **Radio Data Dimensions (RDDS™)** simplifies the use of PAD to feed your branding and program information using RDS. RDDS supports HD Radio AAS, including expanded messaging, traffic bulletins and maps, and alerting, in addition to the Secondary Program Service (SPS) audio for Tomorrow Radio.

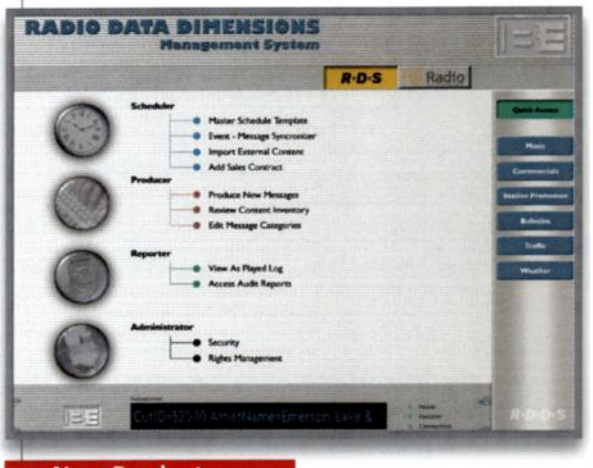
From a single web-browser based application, RDDS allows you to expand your listener offerings in an ever more competitive broadcast environment. One system can even manage multiple stations.

Upgraded Version

AudioVAULT Version 9

Radio Automation and Audio Content Management

- AV FlexScreen customizable user interfaces
- Preset GUI secured by user
- Enhanced quick-start pallets
- Second generation CD ripper
- True IP networking
- Internet streaming integration
- RDS and HD Radio data integration
- Microsoft Windows XP Support



New Product

Radio Data Dimensions

RDS and HD Radio Data Management Suite

- Controls today's RDS and tomorrow's HD Radio data opportunities
- Increases income and listener loyalty
- Simplifies administration
  - Station branding
  - Title and artist information
  - Expanded advertiser information
  - Day-part program identification
  - Sponsorship and promotional messages
  - Amber alerts, emergency bulletins
  - Traffic, weather and news

The XPi 10 studio HD Radio signal generator addresses the additional demands on your "bit-budget" that are a consequence of HD Radio's revenue-creating opportunities. By generating the more compact HD Radio signal at the studio, rather than at the transmitter, the XPi 10 reduces STL bandwidth requirements and thus can reduce the amount of equipment replaced during migration to HD Radio. The system also includes a plug-in circuit card for the **FXi Digital FM Exciter** located at the transmitter.

Many current and anticipated HD Radio deployments have the HD Radio signal generator, such as the BE **FSi 10**, located at the transmitter. Due to the advanced design of the FXi Digital FM Exciter and the foresight of BE, existing transmitter-based FXi/FSi combinations can be updated to the functional equivalent of an XPi/FXi system.

Existing wireless and terrestrial studio-to-transmitter links (STL) will remain an appropriate program and data transport choice for many. Collocation and other factors, however, demand more efficient solutions with greater bandwidth. **Big Pipe™**, with its scalable, bidirectional capabilities up to a whopping 45 Mb/s, interchanges uncompressed analog and digital audio, HD Radio data, Ethernet, serial data and telephony via a wireless or wireline path. Big Pipe is designed for both STL and studio facility interconnect applications.

The BP Series high capacity, point-to-point microwave radios support up to 45 Mbps full-duplex bandwidth operating in the 5.3 GHz UNII band, reaching up to seven miles, or the 5.8 GHz ISM band, reaching up to 40 miles. Alternately, Network Interface Units connect Big Pipe via wireline networks.

Upgraded Version

XPi 10

Studio HD Radio Signal Generator

- Reduces STL bandwidth
- Eases your move to HD Radio by repurposing existing gear
- Takes advantage of revenue-producing HD Radio services
- Speeds implementation of Tomorrow Radio

New Product

Big Pipe

Wide Bandwidth Studio-Transmitter Link

- Scalable, flexible, bidirectional capabilities up to 45 Mb/s
- Interchange
  - Analog and digital audio
  - HD Radio data
  - Ethernet
  - Serial data
  - Video
  - Telephony
- Available for wireless and wireline interconnects
- Also for studio facility interconnects

BROADCAST ELECTRONICS:

Total Radio. Guaranteed.

BE continues to lead the industry in **FM and AM transmission technology.** Designed for the demands of both analog and digital transmission, the **4MX 50 AM transmitter** is based on a patent-pending modulation design developed by BE that packs unparalleled efficiency and features into a small footprint with a price to match. It boasts 89% overall efficiency in a typical system. Additionally, you can also operate the 4MX 50 at power levels as low as 250 W to meet all your power level needs, day and night. While the 4MX 50 is as little as one-third the size and one-quarter the weight of competing models, it exceeds expectations for reliability and service accessibility.

Every transmitter currently sold by BE is HD Radio capable, so you can buy confidently, without the risks of rapid obsolescence or unpredictable expenses. Our **Total Radio Guarantee** puts it in writing: When you buy a BE transmitter, we will provide a firm quotation of your BE HD Radio equipment for up to three years from the date of your purchase.

Sync FM provides precision synchronization of FM transmitters, of interest to broadcasters needing to fill-in licensed coverage areas with a booster or those seeking continuous program coverage presently under-served by existing FM transmission sites. BE's technology provides unprecedented reception and audio performance for boosters or multiple-site network broadcasting on the same frequency.

Using two calibrated BE FXi digital FM exciters, Sync FM not only syncs the the frequency and the phase of both the pilot and the carrier, it calibrates the audio amplitude at the AES/EBU inputs in order to synchronize both audio waveforms in lockstep and reduce interference typical of competing signals in an overlap zone.

New Product

4MX 50 AM Transmitter

Revolutionary Design Packs 50 kW Into Small Chassis

- Patent-pending modulation design
- Exceeds all iBiquity specifications for HD Radio operation
- 15" XGA graphical user interface for operation and diagnostics, also available via IP
- Power factor greater 0.99 or better
- Efficiency 88% or better

New Product

Sync FM

Booster Technology for More Complete Signal Coverage

- Patent-pending technology made possible by the FXi Digital FM Exciter
- Carriers and pilot are synched using GPS
- FXi software enables synching of input audio
- The entire system is digital
- Improves reception in zone where signals overlap

Total GUARANTEED Radio

Program Generation & Audio Management | Data Generation & Management | Transport | Transmission

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BROADCAST ELECTRONICS NEWS RELEASE

System Integration Next Step in Digital Surround Sound

System integrator BE participates in SRS Circle Surround testing and demonstrations of surround sound at NAB Radio Show

Quincy, IL – (*October 1, 2004*). With several formats now on the table for HD Radio™ surround sound, the industry is turning to systems integrator Broadcast Electronics to integrate this new technology into the broadcast facility.

During the NAB Radio Show, BE will play a systems integrator role in the surround sound demonstrations of the Fraunhofer format at the Telos Systems booth and another surround sound format showing for the first time in public at the Orban booth. Both exhibits will run 5.1 surround sound formatted by their respective technologies into a Broadcast Electronics FXi digital FM exciter and Broadcast Electronics FSi 10 HD Radio signal generator.

Over the summer, BE also participated in testing of the Fraunhofer format in Germany. In September, at its Quincy sound lab, BE conducted system testing of SRS Labs' Circle Surround, a 6.1 surround sound format recently approved by iBiquity Digital for HD Radio compatibility. "We're at a point where integration is playing a much larger part, and of course broadcasters are going to look to the systems integrators building HD Radio stations to fill that role. That's why we contacted BE for initial testing," said Mike Canevaro, Director of Sales for SRS Labs (www.srslabs.com).

BE engineers are looking into equipment compatibility with the wide variety of surround sound technologies on the table, whether it be multiple stream or matrix audio techniques. "We are mainly interested in system compatibility at this point, so that when the industry does decide on a format, we're not locking them out of the choice they make," commented Richard Hinkle, BE's Director of RF Engineering. No systems integration issues have been detected for three of the four major contenders offering formats for HD Radio surround sound. The fourth contender, Neural Audio, is in partnership with Harris.

Broadcast Electronics is a major systems integrator and manufacturer of HD Radio products, and does not have an endorsement interest in any of the HD Radio surround sound formats.

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BROADCAST ELECTRONICS NEWS RELEASE

FOR IMMEDIATE RELEASE September 21, 2004

Mexico Tests AM IBOC

Broadcast Electronics participates in key tests to set standards

Quincy, IL, USA – *September 21, 2004.* Broadcast Electronics is participating in tests of the HD Radio™ AM system in Mexico.

The tests are being conducted in cooperation with the Cámara de la Industria de Radio y Televisión (CIRT) and Grupo Radio Centro, Mexico's leading radio broadcaster with 11 stations in Mexico City. This follows five months of exhaustive testing of a BE-equipped HD Radio FM system on the group's XHFAJ-FM, which was concluded in early 2004.

A Broadcast Electronics ASi 10 HD Radio signal generator was installed on the 100 kW transmitter of XEN-690 in Mexico City on August 31. Several months of field testing will be conducted on the AM system, and the results of both the AM

and FM tests will be given to the Secretaría de Comunicaciones (SCT), the government agency which oversees broadcasting in Mexico, for the purpose of selecting a national digital radio standard. The SCT is expected to choose an AM and FM digital standard in 2005.

"Hundreds of thousands of measurement points and nine hours of video and audio have been recorded for the FM, and I expect the AM will go through similar rigorous testing," commented John Schneider, Broadcast Electronics' Sales Manager for Latin America and the Caribbean.

Broadcast Electronics, he added, is committed to the pursuit of digital standards to improve the quality of broadcasts in Mexico. AM and FM channel spacing is narrower in Mexico than in the United States, which presents unique challenges to IBOC implementation. Improved sound quality will be the focus of testing, according to Ing. Eduardo Stevens, Director of Engineering for Grupo Radio Centro, which owns several BE transmitters and has a working relationship with Broadcast Electronics that dates back more than 15 years.

The AM system will be demonstrated to industry leaders at the CIRT's national fall convention in Mexico City, which will be held October 6 - 8. Attendees will receive a full report on the FM field test results at that time.

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PHOTO: Technicians who installed the HD Radio AM system at XEN-690 in Mexico City on August 31, left to right: Ing. Hector Martinez, transmitter plant supervisor, Grupo Radio Centro; Gil Housewright, service technician, Broadcast Electronics; Ing. Federico Ortíz López , Grupo Radio Centro; Ing. Javier Cercado Quezada, Grupo Radio Centro; Ing. Eduardo Stevens, Director of Engineering, Grupo Radio Centro; and John Schneider, Latin America Sales Manager, Broadcast Electronics.

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BROADCAST ELECTRONICS NEWS RELEASE

FOR IMMEDIATE RELEASE August 11, 2004

KCSN Begins Testing IBOC Booster

BE FMi transmission system used in landmark testing of main and booster HD Radio system

Quincy, IL – *August 11, 2004*. KCSN(FM) began testing an HD Radio™ booster this week to fill in its 1 mV/m contour in West Los Angeles.

The California State University station, located in Northridge, Calif., received experimental authorization from the FCC to conduct landmark testing of a main and booster HD Radio system operating in hybrid mode. Broadcast Electronics' FMi 73 HD Radio transmitters, FXi 60 exciters, and FSi 10 signal generators are being used for the test.

FCC authorization followed KCSN(FM)'s eligibility for a Corporation for Public Broadcasting (CPB) grant as part of a "seed market campaign" establishing HD Radio in 13 major markets. The station agreed to convert to HD Radio only if it could convert both the main and a proposed booster site that would fill in part of its licensed coverage area heretofore unreachable because of the Santa Monica mountain range blocking its main signal.

"We were reluctant to go HD Radio on just the main because we fully anticipate a third of our market coming from this new booster site. Converting to HD Radio on

just the one may have made the aural experience less than it should be," explained Mike Worrall, Chief Engineer for KCSN(FM), a classical/eclectic station.

"Mike contacted us and asked if it could be done. We had conducted similar testing in Europe, so we were confident we could help," said Ellis Terry, West Region Sales Manager for Broadcast Electronics.

Broadcast Electronics supplied an FMi 73 HD Radio transmitter with FXi 60 digital FM exciter and FSi 10 HD Radio signal generator for the main antenna site in Northridge and another identical BE transmission system for the booster site in West Los Angeles.

Both transmission systems are set up in a low-level combine configuration, with 480 watts analog output power for the main and 320 watts analog output power for the booster. Both transmission systems are synchronizing analog and digital broadcasts on 88.5 MHz.

BE FXi exciters at each site are phase locked to the GPS reference of 10MHz. Pilot frequencies from each are locked to one pulse-per-second for continuity of stereo service. In addition, a new FXi exciter software module has made it possible to calibrate the audio amplitude at the AES input in order to synchronize both audio waveforms in lockstep and reduce interference in the overlap zone.

Uncompressed digital STLs are used to simultaneously feed audio to both transmission systems.

Field testing of KCSN(FM)'s analog and digital, as well as booster and main, signal areas will be conducted throughout the month of August.

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BROADCAST ELECTRONICS NEWS RELEASE

Seven Detroit Stations Convert to BE HD Radio in July

Rush orders triple the number of BE HD Radio stations there

Quincy, IL – It was Christmas in July for stations in and around the Detroit, Michigan, area.

Broadcast Electronics packaged up and sent HD Radio™ transmitter systems to seven Detroit stations for installation during the month of July, bringing the number of stations using Broadcast Electronics HD Radio systems there to a total of 10.

Clear Channel, Crawford Broadcasting, and Infinity Broadcasting bought BE FXi digital FM exciters, FSi10 HD Radio signal generators and HD Radio FMi transmitters for their respective Detroit stations WJLB(FM), WKQI(FM), WMXD(FM), WMUZ(FM), WOMC(FM), and WVMV(FM). Infinity also purchased BE's ASi10 HD Radio signal generator for WXYT(AM), to be used in front of an existing 50kW AM transmitter.

Five of the seven conversion packages were shipped by Broadcast Electronics within 10 days after order.

Broadcast Electronics also sent along top HD Radio field engineer Gil Housewright and BE senior design engineer Jerry Westberg to ensure the successful installation of HD Radio in the Detroit market.

"With Detroit being an important market for automakers, BE's staff worked diligently to reach out to its customers, quickly doubling the number of Detroit stations converting. BE is clearly working in the best interest of the broadcast industry to implement HD Radio technology quickly and cost effectively," commented Scott Stull, Executive Director of Broadcast Business Development for iBiquity Digital Corporation.

Detroit stations previously equipped with BE HD Radio systems include Clear Channel's WDTW(FM), Eastern Michigan University's WEMU(FM) and Greater Media's WMGC(FM).

Two other Greater Media stations in greater Detroit, WRIF(FM) and WCSX(FM), have BE HD Radio systems on order pending changes to a transmission site.

Broadcast Electronics supplied the Detroit FMs with FMi transmitters ranging in power from 280 watts to 7kW, accommodating the lower power requirements of separate antenna configurations, as well as the higher power requirements of common amplification of the analog and HD Radio signals.

About Broadcast Electronics (www.bdcast.com)

Broadcast Electronics (BE) is the premier provider of mission-critical solutions for over-the-air and Internet radio. BE products encompass program generation, audio and data management, inter-facility transport, and analog and digital transmission. For more than four decades, BE pioneering developments have set industry standards for innovation and reliability, while providing broadcasters with new options for operational productivity and income generation. BE is headquartered in Quincy, Illinois, and is represented worldwide by a network of local representatives.

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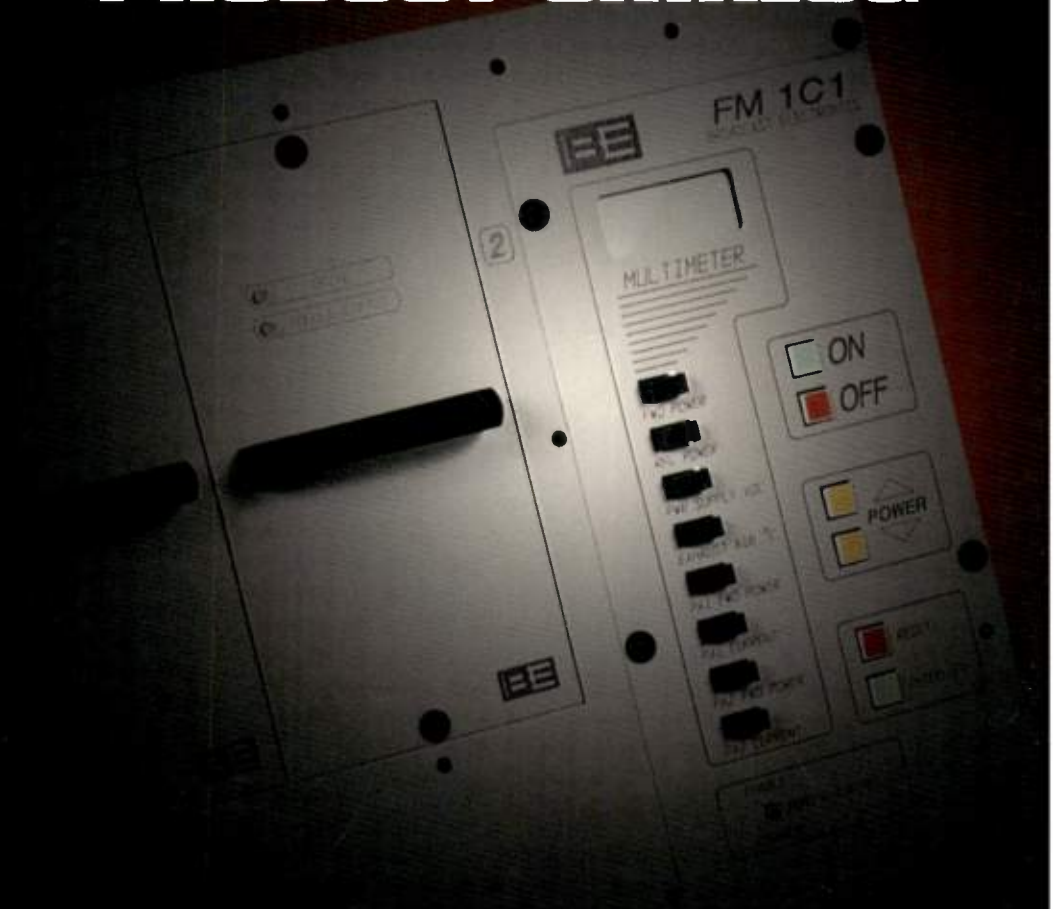
SOLID STATE FM
PRODUCT CATALOG



Solutions for
Tomorrow's Radio

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BROADCAST ELECTRONICS... SOLUTIONS FOR TOMORROW'S RADIO

Broadcast Electronics Solid State FM

As the only major manufacturer devoted exclusively to engineering better radio, it's no wonder that Broadcast Electronics has led the industry in the introduction of AM and FM transmitters and advanced technologies.

Broadcast Electronics' Solid State FM transmitters set the standard for audio quality, cost-efficiency, reliability and long life. The family of Solid State FM broadcast transmitters range from the 50W FX-50 to the 10,000W FM-10S. As a division of the RF Product Line, these transmitters are just a part of Broadcast Electronics' total solutions for tomorrow's radio.

Broadcast Electronics' Advantages

FX-50 Exciter Technology—Highest audio performance at any price.

Full RF Redundancy—Multiple front panel plug-in power amplifiers.

Full PA Power Supply Redundancy—Multiple front panel plug-in power supplies.

Low-Noise Super-Cooling System—Significantly extends transistor life.

High Power Exciters—Eliminate the need for Intermediate Power Amplifiers.

Conservative Power Rating—Broadcast Electronics' transmitters operate at rated power into 1.5-to-1 VSWR.

Frequency-Agile, N+1 Compatible—Tune to any frequency in the FM band.

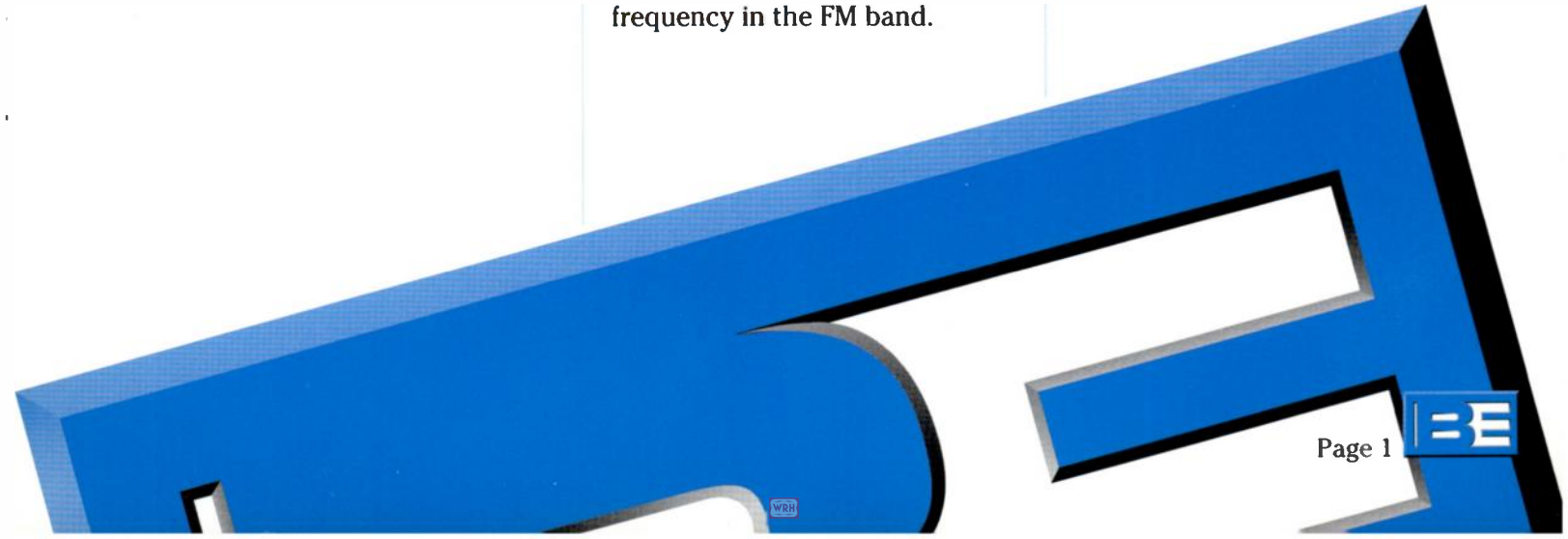
Power-Agile—All Broadcast Electronics' FM transmitters operate normally over a wide input power range - 196-252 VAC, 50-60 Hz.

True Proportional VSWR Foldback—Allows operation into 3-to-1 VSWR.

Rack Mountable Transmitters—Power levels from 50W to 3kW fit standard 19-inch racks.

Compliant with IEC 215 Safety Standard.

Reliable—RF module MTBF (mean time before failure) demonstrated to be greater than 600,000 hours, best in the industry.

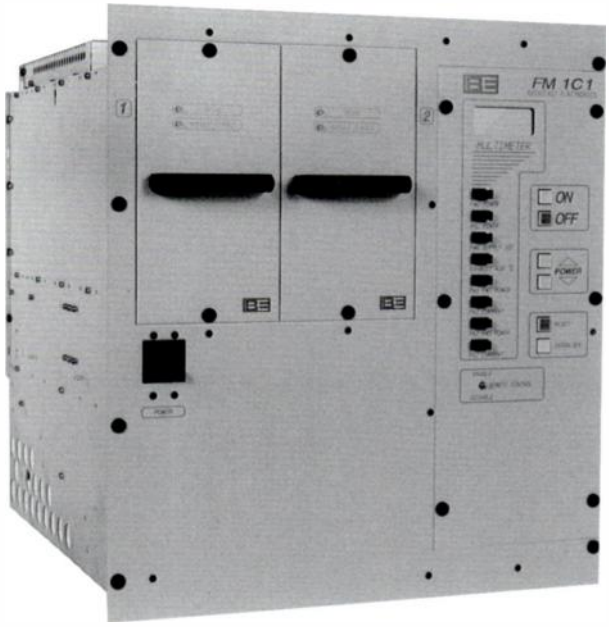


BROADCAST ELECTRONICS'

FM-100C

FM-250C

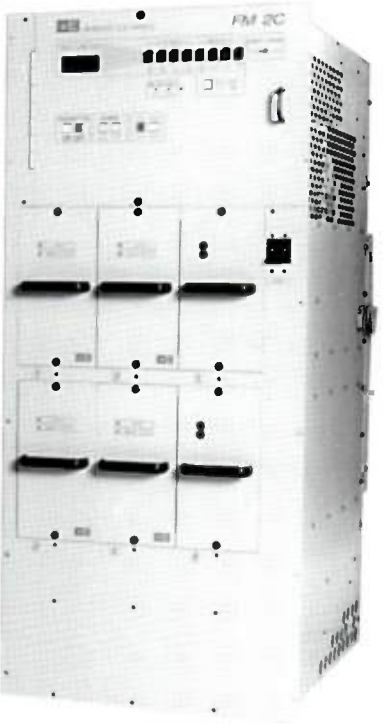
FM-1C1



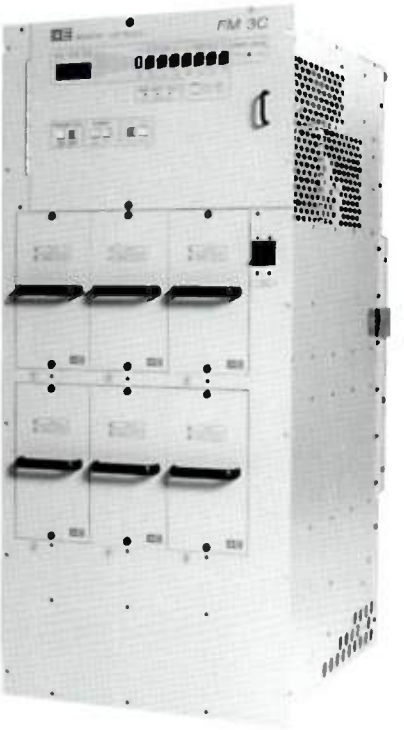
FM-500C1

SOLID STATE FM FAMILY

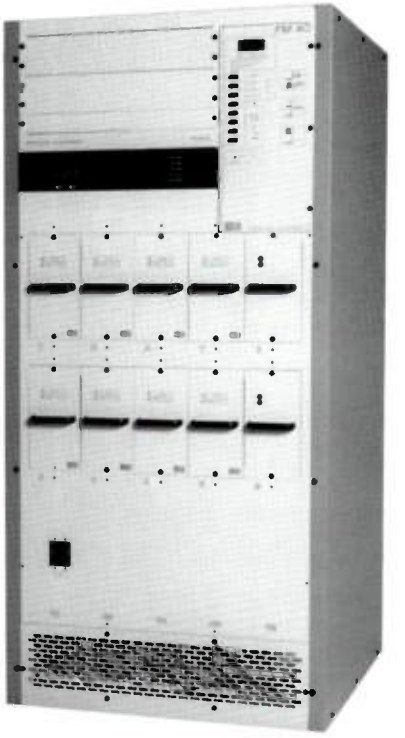
FM-2C



FM-3C



FM-4C



FM-5C

FM-10S

BROADCAST ELECTRONICS' FX-50 EXCITER/50 WATT TRANSMITTER & PREDATOR

Broadcast Electronics' FX-50 Exciter

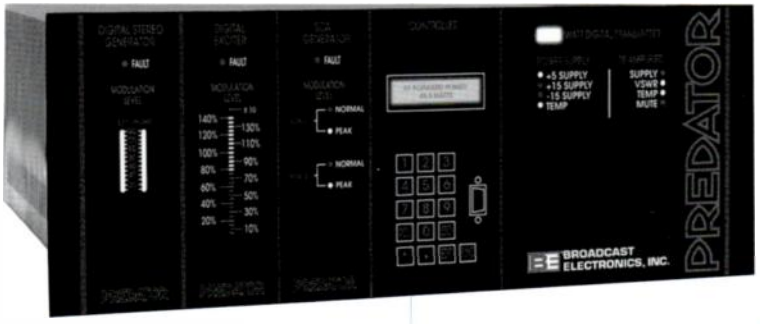
All Broadcast Electronics' FM transmitters contain the renowned Broadcast Electronics' FX-50 Exciter, the acknowledged broadcast standard for FM audio performance. The FX-50's performance can bring existing FM transmitters up to digital quality standards, and has the lowest distortion of any available exciter. This breakthrough remains unsurpassed by more costly and complex digital exciters.

FM-50 Watt Transmitter

Besides its unique status as the industry standard FM exciter, the FX-50 with the addition of an internal low pass filter can also serve as a reliable 50 watt stand-alone FM transmitter. Either as an exciter or as a 50 watt transmitter, its superior performance specifications make the FX-50 totally transparent to your broadcast signal.

Predator Digital Transmitter/Exciter

Broadcast Electronics' engineers were the first to develop the right kind of digital technology for a low power transmitter/exciter—modular, expandable, convertible, digital quality, and priced thousands less. All at power levels designed to fit any need - 50 or 250 watts. The Predator accepts AES/EBU, left and right, or composite inputs, can be upgraded in the field and is equipped with a full remote control interface.



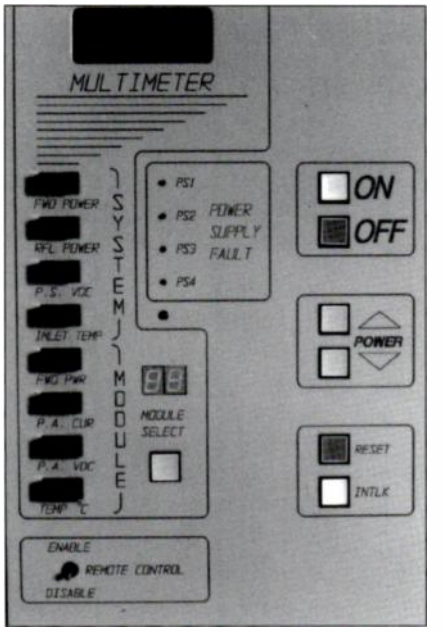
BROADCAST ELECTRONICS' SOLID STATE FM TECHNOLOGY

True Proportional Variable Standing Wave Ratio (VSWR) Foldback

Broadcast Electronics was the first company to offer proportional VSWR foldback in FM transmitters. In cases of gradual changes in load conditions, such as ice building up on the antenna, BE's unique design protects the power amplifier by automatically reducing output power to a safe operating level. A "soft start" circuit then gradually increases power to allow the transmitter to resume a safe optimum operating level under high VSWR conditions.

Advanced Transmitter Controller

Broadcast Electronics' transmitter controllers provide exceptional front-panel transmitter adjustment capabilities and extensive metering of individual modules: forward power, reflected power, PA current and heat sink temperature. The same system also displays these parameters for the entire transmitter. All measurements can be selected and viewed from a remote location. BE's FM transmitters utilize switch mode power supplies, making possible adjustment of transmitter power over a wide output range.

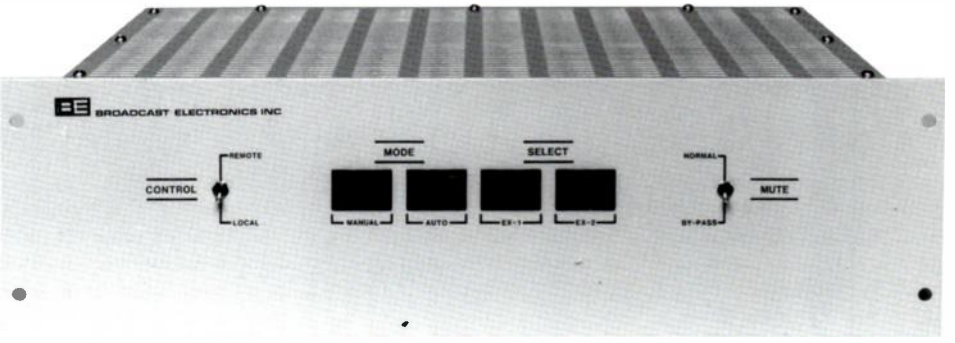


Automatic Power Control

The integrated automatic power control system (APC) in all Broadcast Electronics' solid state transmitters maintains constant RF output power within 2.0% of the operator setting, regardless of fluctuations in incoming AC line voltage, RF drive level or antenna impedance. In addition, the sophisticated proportional feedback system corrects power variations without overshoot.

ACCESSORIES

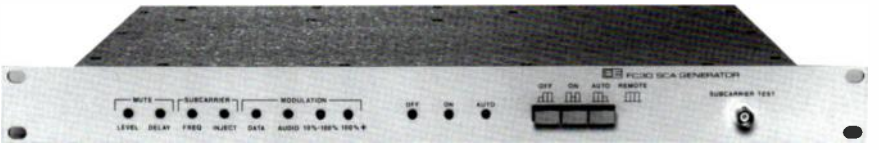
FW-30 Automatic Exciter Switcher



The FW-30 delivers total transmitter system redundancy, continuously monitors the status of the on-air FM exciter and switches to hot-standby unit if failure is detected.

Lynx Stereo Generator

This state-of-the-art stereo generator with encoding features makes it easy to use in conventional analog applications, as well as with the newest digital transmission systems. For superior performance specifications and excellent long-term stability, all encoding is executed entirely in the digital domain by a dedicated DSP chip.



FC-30 SCA Generator

The FC-30 delivers low FM noise and high operational stability. Distortion is minimized by the use of its modulated oscillator and an output low pass filter instead of a distortion-producing bandpass filter. Other quality enhancing features include: DC-coupled data input, internal data/audio low pass filter, extensive RFI filtering, LED peak modulation indicator, and convenient front panel test jack. In addition, the FC-30's controlled subcarrier decay muting eliminates squelch noise in SCA receivers.

BROADCAST ELECTRONICS TRANSMITTER SYSTEMS SPECIFICATIONS

Solid State FM Exciters - ALL MODELS

General

Frequency Range: 87.5 to 108 MHz, tuned to specific operating frequency. Exciter programmable in 10 kHz steps.
RF Output Impedance: 50 ohms
VSWR Rated power into 1.5:1 maximum, without output matching (capable of operating into higher VSWR with automatic power reduction). Open and short circuit protected at all phase angles.
Frequency Stability: +/-300 Hz, 0 to 50 degrees C.
Type of Modulation: Direct frequency modulation of carrier frequency.
Modulation Capability: Greater than +/-350 kHz.
Modulation Indication: Peak reading, color coded, LED display with baseband overmodulation indicator.
RF Harmonics: Suppression meets all FCC/DOC requirements and CCIR recommendations.
AC Input Power: 97V to 133V and 194-266 Vac, 50/60 Hz, single phase. All power supplies and cooling are single phase.
Ambient Temperature Range: 0 degrees C to +50 degrees C.

Monaural Operation

Audio Input Impedance: 600 ohms balanced, resistive, adaptable to other impedances, 60 dB common mode suppression.
Audio Input Level: +10 dBm nominal for +/- 75 kHz deviation @ 400 Hz adaptable to other levels.
Total Harmonic Distortion + Noise: .01% or less at 400 Hz.
SMPTE Intermodulation Distortion: .01% or less, 60 Hz/7 kHz, 4:1 ratio.
CCIF Intermodulation Distortion: .01% or less, 15 kHz/14 kHz, 1:1 ratio.
Transient Intermodulation Distortion: .01% or less sine wave/ square wave.

Wideband Composite Operation

Composite Inputs: 3 total, (1) unbalanced and (1) balanced plus front panel test. All connectors BNC.
Composite Input Impedance: 10 K ohm or 50 ohm, nominal, resistive selectable.
Composite Input Level: 3.5V p-p nominal, for +/- 75 kHz deviation.
Composite Transient Intermodulation Distortion: .01% or less sine wave/ square wave.
Composite Amplitude Response: +/- 0.1 dB, 30 Hz to 53 kHz.
Composite Phase Response: +/- .25 degrees from linear phase, 30 Hz to 53 kHz.
Composite Group Delay: 125 nanoseconds.

Stereo Operation

Audio Input Impedance: 600 ohms balanced, resistive, floating (adaptable to other impedances).
Audio Input Level: +10 dBm, +/- 1 dBm, for 100% modulation @ 400 Hz.
Audio Input Filters: 15 kHz LPF with delay equalization for minimum overshoot.
Frequency Response: +/- 0.5 dB, 30-15,000 Hz, 75 µS pre-emphasis (flat, 25 or 50 µS pre-emphasis selectable).
Total Harmonic Distortion: 0.05% or less @ 400 Hz.
SMPTE Intermodulation Distortion: 0.05%, 60 Hz/7 kHz; 4:1 ratio.
CCIF Intermodulation Distortion: 0.05% or less, 15 kHz/14 kHz; 1:1 ratio.
Transient Intermodulation Distortion: 0.05% (square wave/sine wave).
FM Signal to Noise: -82 dB or better below left or right channel, 100% modulation @ 400 Hz, 75 µS de-emphasis.
Stereo Separation: 50 dB or better; 30-15,000 Hz (sine wave).
Dynamic Stereo Separation: 40 dB or better; 30-15,000 Hz (normal program content).
Linear Crosstalk: Main to Sub/Sub to Main due to amplitude and phase matching of left and right channels, 30-15,000 Hz, 45 dB minimum below 100% modulation.

SCA Operation

Subcarrier Frequency: 67 kHz (39 to 95 kHz to order).
Subcarrier Harmonic Content: Less than 0.3%.
Subcarrier Envelope Decay: Greater than 100 msec from 90% to 10% subcarrier levels.
Modulation Capability: +/- 20% of subcarrier frequency.
Audio Input Impedance: 600 ohm balanced, resistive.
Data Input Impedance: 75 ohm unbalanced, resistive, DC coupled.
Input Levels: (Audio) adjustable +10 dBm to -10 dBm for +/- 6 kHz deviation @ 400 Hz. (Data) adjustable 1.0 to 4.0 V p-p for +/- 6 kHz deviation (DC coupled).
Frequency Response: (Audio) +/- 0.5 dB, 10-10,000 Hz, exclusive of audio low pass filter. (Data) +/- 0.5 dB, DC-10,000 Hz.
Total Harmonic Distortion: Less than 0.5% throughout AF pass band.
SMPTE Intermodulation Distortion: Less than 0.5%, 60 Hz/7 kHz; 1:1 ratio (audio pre-emphasis and LPF bypassed).
Crosstalk, SCA to Stereo: -60 dB or better below 100% modulation of left or right. 75 µS de-emphasis.
Crosstalk, Stereo to SCA: -50 dB or better below +/- 6 kHz deviation of SCA using 150 µS de-emphasis and FS-30 stereo generator.

FM-100C

General

Power Output: 10 watts to 125 watts.
Output Connector: Type "N" female.
Pre-Emphasis: FCC 75 µS, CCIR 50 µS (where specified), 25 µS (Dolby) or flat response, selectable.
Asynchronous AM S/N Ratio: 70 dB below 100 watt reference carrier with 100% AM modulation @ 400 Hz, 75 µS de-emphasis. (No FM modulation present).
Synchronous AM S/N Ratio: 55 dB below 100 watt reference carrier with 100% AM modulation @ 400 Hz, 75 µS de-emphasis. (FM modulation +/- 75 kHz @ 400 Hz @ 100 watts output power).
Overall Efficiency: 25% or better.
Altitude: 7500 ft. @ 50 Hz (2286 M), 10,000 ft. @ 60 Hz (3048 M).
Size: 19.00"W x 7.00"H x 19.00"D (48.26 x 17.78 x 48.26 cm).
Net Weight: 40 lbs. (18.1 kg), packed 46 lbs. (20.9 kg).

Monaural Operation

Audio Frequency Response: +/- 0.5 dB, 30 Hz to 15 kHz, selectable flat, 25, 50, 75 microsecond pre-emphasis.
FM S/N Ratio: 90 dB below +/- 75 kHz deviation @ 400 Hz measured in a 20 Hz to 30 kHz bandwidth with 75 µS de-emphasis.

Wideband Composite Operation

Composite FM S/N Ratio: 90 dB below +/- 75 kHz deviation @ 400 Hz. Measured in a 20 Hz to 200 kHz bandwidth with 75 µS de-emphasis.
Composite Harmonic Distortion + Noise: 0.005% or less @ 400 Hz.
Composite SMPTE Intermodulation Distortion: 0.005% or less, 60 Hz/7 kHz, 1:1 ratio.
Composite CCIF Intermodulation Distortion: 0.01% or less, 15 kHz/14 kHz, 1:1 ratio.

FM-250C

General

Power Output: 25 watts to 250 watts.
Output Connector: Type "N" female.
Pre-Emphasis: FCC 75 µS, CCIR 50 µS, or flat response, selectable.
Asynchronous AM S/N Ratio: 70 dB below 250 watt reference carrier with 100% AM modulation @ 400 Hz, 75 µS de-emphasis (No FM modulation present).
Synchronous AM S/N Ratio: 55 dB below 250 watt reference carrier with 100% AM modulation @ 400 Hz, 75 µS de-emphasis (FM modulation +/- 75 kHz @ 400 Hz @ 100 watts output power).
Overall Efficiency: 40% or better.
Altitude: 7500 ft. @ 50 Hz (2286 M), 10,000 ft. @ 60 Hz (3048 M).
Size: 19.00"W x 7.00"H x 19.00"D (48.26 x 17.78 x 48.26 cm).
Net Weight: 53 lbs. (24.0kg), packed 59 lbs. (26.8 kg).

Monaural Operation

Audio Frequency Response: +/- 0.5 dB, 30 Hz to 15 kHz, selectable flat, 50, 75 microsecond pre-emphasis.
FM S/N Ratio: 85 dB below +/- 75 kHz deviation @ 400 Hz measured in a 20 Hz to 30 kHz bandwidth with 75 µS de-emphasis.

Wideband Composite Operation

Composite FM S/N Ratio: 85 dB below +/- 75 kHz deviation @ 400 Hz measured in a 20 Hz to 200 kHz bandwidth with 75 µS de-emphasis.
Composite Harmonic Distortion + Noise: 0.01% or less @ 400 Hz.
Composite SMPTE Intermodulation Distortion: 0.01% or less, 60 Hz/7 kHz, 1:1 ratio.
Composite CCIF Intermodulation Distortion: 0.01% or less, 15 kHz/14 kHz, 1:1 ratio.

FX-50 Solid State Exciter/FM-50

General

Power Output: 3 to 50 watts continuously variable (BNC connector) open and short circuit protected.
Asynchronous AM S/N Ratio: 80 dB minimum below equivalent reference carrier with 100% amplitude modulation @ 400 Hz and 75 µS de-emphasis (no FM modulation present).
Synchronous AM S/N Ratio: 60 dB minimum below equivalent 50 watts reference carrier with 100% AM modulation @1 kHz, no de-emphasis (FM modulation +/- 75 kHz and 1 kHz).
Multimeter: 5 function LCD diagnostic aid +/- 3% accurate.
Test Metering: Internal high-input impedance multimeter with probe for point-to-point DC measurements.
Front Panel Test Connections: Composite input and composite output.
Audio/Control Connections: 14-terminal barrier strip and 5 GNC connectors.
Altitude: 15,000 feet (4,572 M) AMSL.
Size: 17.70"W x 5.25"H x 19.00"D (44.96 x 13.33 x 48.26 cm).
Net Weight: 38 lbs. (17.2 kg), packed 46 lbs. (20.7 kg).

Wideband Composite Operation

Composite FM S/N Ratio: 90dB (93 dB typical) below +/- 75 kHz deviation at 400 Hz, measured in a 20 Hz to 200 kHz bandwidth with 75 µS de-emphasis, 94 dB (96 dB typical) with DIN "A" weighting.
Composite Harmonic Distortion: 0.003% or less.
Composite Intermodulation Distortion: 0.005% or less (0.003% typical).
Composite Amplitude Response: +/- 0.025 dB, 30 Hz to 53 kHz.
Composite Phase Response: +/- 0.1 degree from linear phase, 30 Hz to 53 kHz.
Composite Group Delay Variation: +/- 5 nanoseconds, 30 Hz to 100 kHz.
Stereophonic Separation: 60 dB, 30 Hz to 5 kHz, 52 dB, 5 to 15 kHz (measured using BE FS-30 Stereo Generator).
SCA Inputs: 3 total, unbalanced BNC connectors.
SCA Input Impedance: 100 K ohm nominal, resistive.
SCA Input Level: 3.5 V p-p nominal for +/- 7.5 kHz deviation.
SCA Amplitude Response: +/- 0.2 dB, 40 to 100 kHz.

Monaural Operation

Audio Frequency Response: +/- 0.5 dB, 30 Hz to 15 kHz; selectable flat, 25, 50, or 75 µS pre-emphasis.
Total Harmonic Distortion + Noise: 0.005% (0.003% typical).
Intermodulation Distortion: 0.005% or less (0.003% typical) 60 Hz to 7 kHz, 4:1 ratio.
FM S/N Ratio: 90 db (93 db typical) below +/- 75 kHz deviation @ 400Hz, measured in a 20Hz to 15 kHz bandwith with 75 µS de-emphasis, 94 db (96 db typical) with DIN "A" weighting.

PREDATOR SPECIFICATIONS

GENERAL

Power Output: 50 watt module: 5 to 50 watts, continuously variable. Type "N" female connector.
250 watt module: 25 to 250 watts, continuously variable. Type "N" female connector.
RF Output Impedance: 50 ohms.
RF Harmonic and Spurious Suppression: Meets or exceeds all FCC, DOC, and CCIR standards (low pass filter included for transmitter).
Frequency Stability: ±300 Hz, +32°F to +122°F (0°C to +50°C). ±100 Hz optional. Can be locked to an external 10 MHz reference source such as GPS (global positioning system).
Modulation Type: FM, generated digitally using a 32-bit numerically controlled oscillator.
Modulation Capability: ±399 kHz maximum.
Asynchronous AM S/N Ratio: 80dB below an equivalent reference carrier with 100% amplitude modulation @ 400 Hz and 75 µS de-emphasis (no FM modulation present).
Synchronous AM S/N Ratio: 60dB below an equivalent reference carrier with 100% amplitude modulation @ 1 kHz (FM modulation: ±75 kHz @ 400 Hz).
Pre-emphasis: Analog Interface Module: FCC 75µS, CCIR 50µS, Dolby 25µS, or flat response, selectable.
Digital Stereo Generator Module: FCC 75µS, CCIR 50µS, or flat response, selectable.
Overall Efficiency: Greater than 20%.
AC Input Power Requirements: 100 to 240 VAC, 50/60 Hz, single phase.
Ambient Operating Temperature Range: +32°F to +122°F (0°C to +50°C).
Humidity: 95% Maximum, Non-condensing.
Altitude: 50 Hz: 0 to 7500 ft. (2286 m) above sea level.
60 Hz: 0 to 10,000 ft. (3048 m) above sea level.
Dimensions (H X W X D): 7" X 19" X 16" (17.78cm X 48.3cm X 40.64cm).
Weight: 26 lbs. (11.8 kg) unpacked.

WIDEBAND COMPOSITE OPERATION

Analog Interface Module

Composite Input: Balanced BNC connector.
Composite Input Impedance: 10 k ohm or 50 ohm, nominal, resistive, selectable.
Composite Input Level: 3.5 Vp-p nominal, for ±75 kHz deviation.
Composite FM Signal-to-Noise Ratio: 93dB (96dB typical) below ±75 kHz deviation @ 400 Hz measured within a 20 Hz to 80 kHz bandwidth with 75µS de-emphasis and DIN "A" weighting.
Composite Harmonic Distortion plus Noise: 0.005% or less @ 400 Hz.
Composite SMPTE Intermodulation Distortion: 0.005% or less, 60 Hz/7 kHz 1:1 ratio.
Composite CCIF Intermodulation Distortion: 0.005% or less, 15 kHz/14 kHz 1:1 ratio.
Composite Amplitude Response: ±0.025 dB, 30 Hz to 53 kHz.
Composite Phase Response: ±0.1° from linear phase, 30 Hz to 100 kHz.
Composite Group Delay Variation: ±40 nanoseconds, 30 Hz to 100 kHz.
Stereo Separation: 65dB or better from 30 Hz to 15 kHz (sine wave).

STEREO PERFORMANCE

Digital Stereo Generator Module

Digital Audio Input: Format: AES/EBU.
Connectors: Two (2) total, one (1) XLR and one (1) Toshiba optical.
Impedance: 110 ohms, resistive.
Level: -2 dBfs nominal for 100% modulation.
Data Rate: Any in range of 32 to 56 kHz (32, 44.1, or 48 kHz typical output rates for AES/EBU devices).
Frequency Response: ±0.5 dB, 20 Hz to 15 kHz, 75µS pre-emphasis (Flat or 50µS pre-emphasis selectable).
Total Harmonic Distortion: 0.03% or less from 30 Hz to 15 kHz.
Intermodulation Distortion: 0.03%, 60 Hz/7 kHz 4:1 ratio.
Stereo Separation: 70dB or better from 20 Hz to 15 kHz(Sine Wave).
Linear Crosstalk: Main to Sub (L+R to L-R), 20 Hz to 15 kHz, 70dB minimum below 100% modulation.
Sub to Main, 20 Hz to 15 kHz, 50dB minimum below 100% modulation.
FM Noise: 85dB or better below 100% modulation @ 400 Hz measured within a 20 Hz to 22 kHz bandwidth with 75µS de-emphasis and DIN "A" weighting.
Pilot Stability: ±0.3 Hz, +32°F to +122°F (0°C to +50°C).
Dynamic Stereo Separation: 60dB or better from 20 Hz to 15 kHz (normal program content).
38 kHz Suppression: 80dB minimum below 100% modulation.
57 kHz, 76 kHz, and 95 kHz Suppression: 80dB minimum below 100% modulation.
Spurious and Sideband Suppression (beyond 95 kHz): 75dB minimum below 100% modulation.
Modes of Operation: Stereo, Mono L+R, Mono L, and Mono R. Remote control accessible.

MONAURAL OPERATION

Analog Interface Module

Audio Input Impedance: 10 k ohm or 600 ohm selectable, balanced, resistive, 60dB common mode suppression.
Audio Input Level: +10 dBm nominal for ±75 kHz deviation @ 400 Hz, adaptable to other levels.
Audio Frequency Response: ±0.5 dB, 30 Hz to 15 kHz, selectable flat, 25µS, 50µS, or 75µS pre-emphasis.
Harmonic Distortion plus Noise: 0.03% or less @ 400 Hz.
SMPTE Intermodulation Distortion: 0.03% or less, 60 Hz to 7 kHz 4:1 ratio.
CCIF Intermodulation Distortion: 0.03% or less, 15 kHz/14 kHz 1:1 ratio.
FM Signal-to-Noise Ratio: 93dB (96dB typical) below ±75 kHz deviation @ 400 Hz measured in a 20 Hz to 80 kHz bandwidth with 75µS de-emphasis and DIN "A" weighting.

SCA (RBDS/RDS) OPERATION

Analog Interface or Digital Stereo Generator Modules

Input: 3 total, BNC connectors. Two (2) SCA Inputs, one (1) RBDS/RDS Input. SCA Input 2 configurable for SCA or wideband audio input.
Input Impedance: 10 k ohm, unbalanced.
Input Level: 3.5 Vp-p nominal for 10% deviation.
SCA Amplitude Response: ±0.2 dB, 40 to 100 kHz.

SOLID STATE FM TRANSMITTERS - ALL MODELS

General

Frequency Range: 87.5 to 108 MHz, tuned to specific operating frequency. Exciter programmable in 10 kHz steps.
Frequency Stability: +/- 300 Hz, 0 to 50 degrees C.
Modulation Capability: Greater than +/- 350 kHz.
Modulation Indication: Peak reading, color coded, LED display with baseband overmodulation indicator.
Pre-Emphasis: FCC 75 µS, CCIR 50 µS (where specified), 25 µS (Dolby), or flat response, selectable.
IMD Protection: The output filtering supplied with the transmitter will be adequate to provide spurious and harmonic suppression as defined below. The combining system will provide 20 dB or more mixing Turn Around Loss to interfering signals. Band pass or notch filters required at sites used by multiple stations will be vendor supplied on an as needed basis.
RF Harmonics: Suppression meets all FCC/DOC requirements and CCIR recommendations.
Altitude: 7500 ft. at 50 Hz (2286 M), 10,000 ft. at 60 Hz (3048 M).
Ambient Temperature Range: 0 degrees C to +50 degrees C.
Meets IEC 215 Safety Standard

Monaural Operation

Total Harmonic Distortion + Noise: 0.02% or less at 400 Hz.
SMPTE Intermodulation Distortion: 0.02% or less, 60 Hz/7 kHz, 4:1 ratio.
CCIF Intermodulation Distortion: 0.02% or less, 15 kHz/14 kHz, 1:1 ratio.
Transient Intermodulation Distortion: 0.02% or less sine wave/ square wave.

Wideband Composite Operation

Composite Harmonic Distortion + Noise: 0.02% or less at 400 Hz.
Composite SMPTE Intermodulation Distortion:
0.02% or less, 60 Hz/7 kHz, 1:1 ratio.
Composite CCIF Intermodulation Distortion:
0.02% or less, 15k Hz/14 kHz, 1:1 ratio.
Composite Transient Intermodulation Distortion:
0.02% or less, sine wave/square wave.
Composite Slew Rate: 9 V/microseconds (symmetrical).

For Additional Performance Specifications See Appropriate Transmitter Section.

FM-500C1

General

Power Output: 125 watts to 500 watts.
Output Connector: "N" type.
VSWR: Rated power into 1.5:1 maximum, without output matching (capable of operating into higher VSWR with automatic power reduction). Open and short circuit protected at all phase angles.
Exciter: Solid State, 50 watt output, Model FX-50; incorporating a digitally programmed synthesizer. (10 kHz increments).
Asynchronous AM S/N Ratio: 68 dB below reference carrier with 100% AM modulation at 1000 Hz, 75 µS de-emphasis (no FM modulation present).
Synchronous AM S/N Ratio: 58 dB below 1 kW reference carrier with 100% AM modulation at 1000 Hz, 75 µS de-emphasis with FM modulation +/- 75 kHz at 1000 Hz.
AC Input Power: 195/252 VAC, 50/60 Hz, single phase. All power supplies and cooling will be single phase.
Overall Efficiency: 40% or better, typically 45%.

Monaural Operation

FM S/N Ratio: 88 dB below +/- 75 kHz deviation at 400 Hz measured in a 20 Hz to 30 kHz bandwidth with 75 µS de-emphasis.

Wideband Composite Operation

Composite Amplitude Response: +/- 0.25 dB, 30 Hz to 100 kHz.

FM-1C1

General

Power Output: 250 watts to 1000 watts.
Output Connector: "N" type.
VSWR: Rated power into 1.5:1 maximum, without output matching (capable of operating into higher VSWR with automatic power reduction). Open and short circuit protected at all phase angles.
Exciter: Solid State, 50 watt output, Model FX-50; incorporating a digitally programmed synthesizer. (10 kHz increments).
Asynchronous AM S/N Ratio: 68 dB below reference carrier with 100% AM modulation at 1000 Hz, 75 µS de-emphasis (no FM modulation present).
Synchronous AM S/N Ratio: 58 dB below 1 kW reference carrier with 100% AM modulation at 1000 Hz, 75 µS de-emphasis with FM modulation +/- 75 kHz at 1000 Hz.
AC Input Power: 195/252 VAC, 50/60 Hz, single phase. All power supplies and cooling will be single phase.
Overall Efficiency: 47% or better, typically 52%.

Monaural Operation

FM S/N Ratio: 88 dB below +/- 75 kHz deviation at 400 Hz measured in a 20 Hz to 30 kHz bandwidth with 75 µS de-emphasis.

Wideband Composite Operation

Composite Amplitude Response: +/- 0.25 dB, 30 Hz to 100 kHz.

FM-2C

General

Power Output: 500 watts to 2000 watts.
Output Connector: 1 5/8" EIA flange.
VSWR: Rated power into 1.5:1 maximum. Capable of operating into higher VSWR with automatic power reduction. Open and short circuit protected at all phase angles.
Exciter: Solid State, 125 watt output, Model FM-100C; incorporating a digitally programmed synthesizer. (10 kHz increments).
Asynchronous AM S/N Ratio: 55 dB below reference carrier with 100% AM modulation at 400 Hz, 75 µS de-emphasis (no FM modulation present).
Synchronous AM S/N Ratio: 50 dB below 2 kW reference carrier with 100% AM modulation at 400 Hz, 75 µS de-emphasis with FM modulation +/- 75 kHz at 400 Hz.
AC Input Power: 195/252 VAC, 50/60 Hz, single phase.
Overall Efficiency: 46% at 230 VAC, 2000 watts into 50 ohms, 48% typical.

Monaural Operation

FM S/N Ratio: 85 dB below +/- 75 kHz deviation at 400 Hz measured in a 20 Hz to 30 kHz bandwidth with 75 µS de-emphasis.

Wideband Composite Operation

Composite Amplitude Response: +/- 0.05 dB, 30 Hz to 100 kHz.

Size: 42.00"H x 28.50"D x 19.00"W
(FM-100C: 7.00"H x 18.25"D x 19.00"W).
Weight: 252 lbs. (96.2 kg) unpacked; including exciter.

FM-3C

General

Power Output: 750 watts to 3000 watts.
Output Connector: 1 5/8" EIA flange.
VSWR: Rated power into 1.5:1 maximum. Capable of operating into higher VSWR with automatic power reduction. Open and short circuit protected at all phase angles.
Exciter: Solid State, 125 watt output, Model FM-100C, incorporating a digitally programmed synthesizer (10 kHz increments).
Asynchronous AM S/N Ratio: 55 db below reference carrier with 100% AM modulation @ 400 Hz, 75 µS de-emphasis (no FM modulation present).
Synchronous AM S/N Ratio: 50 dB below 3 kW reference carrier with 100% AM modulation @ 400 Hz, 75 µS de-emphasis (FM modulation + 75 kHz @ 400 Hz @ 2.5 kW output power).
AC Input Power: 195/252 VAC, 50/60 Hz, single phase.
Overall Efficiency: 50% minimum at 230 VAC, 3000 watts into 50 ohms, 53% typical.

Monaural Operation

FM S/N Ratio: 85 dB below +/- 75 kHz deviation @ 400 Hz measured in a 20 Hz to 30 kHz bandwidth with 75 µS de-emphasis.

Wideband Composite Operation

Composite Amplitude Response: + 0.05 dB, 30 Hz to 100 kHz.

Size: 42.00"H x 28.50"D x 19.00"W
(FM-100C: 7.00"H x 18.25"D x 19.00"W).
Weight: 300 lbs. (136kg) unpacked; including exciter.

FM-4C

General

Power Output: 2000 watts to 4000 watts.
Output Connector: 1 5/8" EIA flange.
VSWR: Rated power into 1.35:1 maximum. Capable of operating into higher VSWR with automatic power reduction. Open and short circuit protected at all phase angles.
Exciter: Solid State, 250 watt output, Model FM-250C, incorporating a digitally programmed synthesizer. (10 kHz increments).
Asynchronous AM S/N Ratio: 55 dB below reference carrier with 100% AM modulation at 400 Hz, 75 µS de-emphasis (no FM modulation present).
Synchronous AM S/N Ratio: 50 dB below 4 kW reference carrier with 100% AM modulation at 400 Hz, 75 µS de-emphasis with FM modulation +/- 75 kHz at 400 Hz at 5 kW output power.
AC Input Power: 195/252 VAC, 50/60 Hz, single phase. Three phase input power optional.
Overall Efficiency: 50% or better (52% typical) at 230 VAC. 50 ohms at 4000 watts.

Monaural Operation

FM S/N Ratio: 85 dB below +/- 75 kHz deviation at 400 Hz measured in a 20 Hz to 30 kHz bandwidth with 75 µS de-emphasis.

Wideband Composite Operation

Composite Amplitude Response: +/- 0.1 dB, 30 Hz to 53 kHz.

Size: 30.64"W x 30"D x 64"H (77.83 x 162.56 x 76.2 cm).
Weight: 525 lbs. (238 kg) unpacked; including exciter.

FM-5C

General

Power Output: 2500 watts to 5000 watts.
Output Connector: 1 5/8" EIA flange.
VSWR: Rated power into 1.35:1 maximum. Capable of operating into higher VSWR with automatic power reduction. Open and short circuit protected at all phase angles.
Exciter: Solid State, 250 watt output, Model FM-250C; incorporating a digitally programmed synthesizer. (10 kHz increments).
Asynchronous AM S/N Ratio: 55 dB below reference carrier with 100% AM modulation at 400 Hz, 75 µS de-emphasis (no FM modulation present).
Synchronous AM S/N Ratio: 50 dB below 5 kW reference carrier with 100% AM modulation at 400 Hz, 75 µS de-emphasis with FM modulation +/- 75 kHz at 400 Hz at 5 kW output power.
AC Input Power: 195/252 VAC, 50/60 Hz, single phase. Three phase input power optional.
Overall Efficiency: 50% or better (52% typical) at 230 VAC. 50 ohms at 5000 watts.

Monaural Operation

FM S/N Ratio: 85 dB below +/- 75 kHz deviation at 400 Hz measured in a 20 Hz to 30 kHz bandwidth with 75 µS de-emphasis.

Wideband Composite Operation

Composite Amplitude Response: +/- 0.1 dB, 30 Hz to 53 kHz.

Size: 30.64"W x 30"D x 64"H (77.83 x 162.56 x 76.2 cm).
Weight: 575 lbs. (261 kg) unpacked; including exciter.

GENERAL

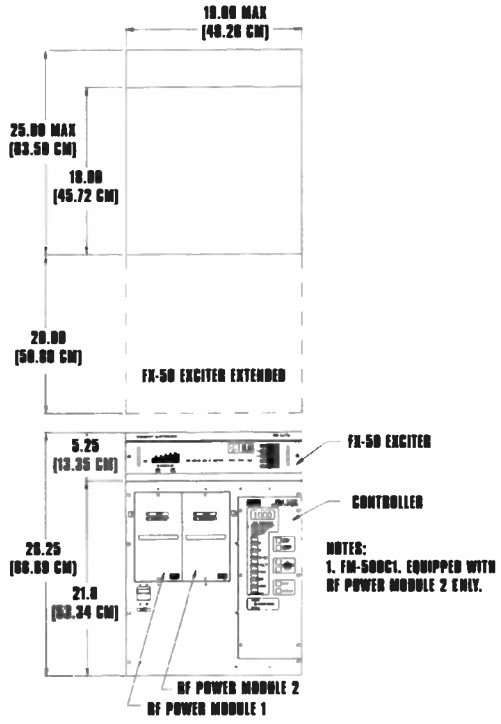
Power Output: 5,000 watts to 10,000 watts.
Frequency Range: 87.5 to 108 MHz, tuned to specific operating frequency. Exciter programmable in 10 kHz steps.
RF Output Impedance: 50 ohms.
Output Connector: 1 5/8 EIA flange, optional 3 1/8 EIA flange.
VSWR: Rated power into 1.5:1 maximum. Capable of operating into higher VSWR with automatic power reduction. Open and short circuit protected at all phase angles.
Frequency Stability: +/- 300 Hz, 0 to 50 degrees C.
Type of Modulation: Direct frequency modulation of carrier frequency.
Modulation Capability: Greater than+/- 350 kHz.
Asynchronous AM S/N Ratio: 55 dB below equivalent 10 kW reference carrier with 100% AM modulation at 400 Hz, 75µS de-emphasis (no FM modulation present).
Synchronous AM S/N Ratio: 50 dB below equivalent 10 kW reference carrier with 100% AM modulation at 400 Hz, 75 µS de-emphasis with FM modulation+/- 75 kHz at 400 Hz.
IMD Protection: 20 dB or better turn-around-loss or mixing loss to interfering signals.
RF Harmonics: Suppression meets all FCC/IC/CE requirements and CCIR recommendations.
AC Input Power: 195-252 VAC, 50/60 Hz, three phase. Single phase input power optional.
Power Factor: 0.95 or better at 230 VAC. 10 kW output power into 50 ohm load.
Overall Efficiency: 58% or better at 230 VAC, 10,000 watts into 50 ohms, 63% typical.
Surge Protection: Tested with IEEE C62.41-1991 recommended waveforms for location category B3 and IEC 801-4 standard waveforms for severity level 4.
Altitude: 10,000 ft. at 60 Hz (3048 M), 7500 ft. at 50 Hz (2286 M).
Ambient Temperature Range: 0 degrees C to +50 degrees C.
Safety Protection: Meets IEC 215 safety requirements.
Additional Standards: Meets applicable CE standards.

WIDEBAND COMPOSITE OPERATION

Composite Inputs: 3 total, (1) unbalanced and (1) balanced plus front panel test. All connectors BNC.
Composite Input Impedance: 10K ohm or 50 ohm, nominal, resistive selectable.
Composite Input Level: 3.5 V p-p nominal, for +/- 75 kHz deviation.
Composite FM S/N Ratio: 85 dB below +/- 75 kHz deviation at 400 Hz. Measured in a 20 Hz to 30 kHz bandwidth with 75µS de-emphasis.
Composite Harmonic Distortion: + Noise: 0.02% or less at 400 Hz.
Composite SMPTE Intermodulation Distortion: 0.02% or less, 60 Hz/7 kHz 1:1 ratio.
Composite CCIF Intermodulation Distortion: 0.02% or less, 15 kHz/14 kHz 1:1 ratio.
Composite Transient Intermodulation Distortion: 0.02% or less sine wave/square wave.
Composite Amplitude Response: +/- 0.1 dB, 30 Hz to 53 kHz.
Composite Phase Response: +/- 0.25 degrees from linear phase, 30 Hz to 53 kHz.
Composite Group Delay: 125 nanoseconds.
Composite Slew Rate: 9 V/microsecond (symmetrical).
Size: 44.5"W x 70"H x 26.5"D (113cm x 178cm x 68cm)
Weight: 713 lbs. (323 kg)

BROADCAST ELECTRONICS FLOOR PLANS

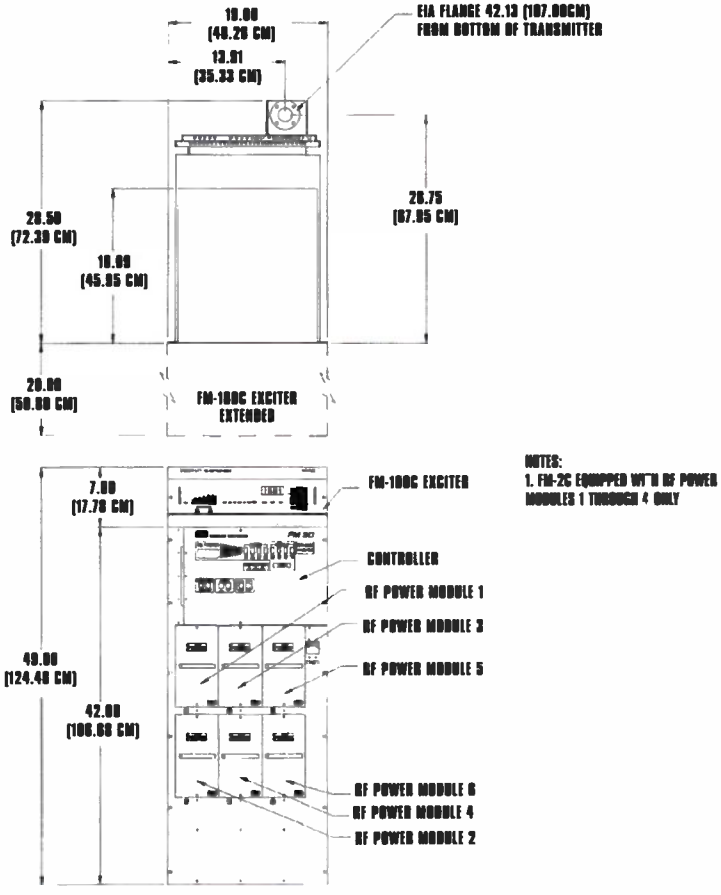
FM-500C1 & FM-1C1



FM-500C1 / FM-1C1 NOTES:

1. COOLING AIR REQUIREMENT-700CFM (19.8M3/MIN) FILTER REQUIRED-407-0162.
2. GROUND STRAP ENTRY IN LOWER LEFT CORNER AT REAR OF CABINET.
3. RF OUTPUT CONNECTION-TYPE N CONNECTOR.
4. HEAT DISSIPATION: FM 1KW-1.5KW (5120 BTU/H) AT A 1KW RF OUTPUT, 50 OHM RESISTIVE LOAD.
   FM 500W-800W (2730 BTU/H) AT A 500 WATT RF OUTPUT, 50 OHM RESISTIVE LOAD.
5. WEIGHT: FM-1C1-TRANSMITTER= 103LBS (46.7KGS)
   EXCITER= 38LBS (17.2KGS).
   FM-500C1-TRANSMITTER= 75LBS (34.0KGS)
   EXCITER= 38 LBS (17.2KGS).
6. AC POWER INPUT: FM-1C1-196 TO 252VAC 50/60HZ SINGLE PHASE, 11 AMPERES MAXIMUM.
   FM-500C1-196 TO 252VAC 50/60HZ SINGLE PHASE, 6 AMPERES MAXIMUM. FUSE DISCONNECT SWITCH RECOMMENDED. FOR PROPER SIZING OF FUSES, REFER TO FOLLOWING TEXT, NATIONAL ELECTRIC CODES, AND LOCAL CODES.
7. PRIMARY AC FUSED DISCONNECT:
   FM-1C1: FUSE SIZE-20 AMP, WIRE SIZE- #12 COPPER AWG.
   FM-500C1: 220V OPERATION- FUSE SIZE- 15 AMP, WIRE SIZE- #14 COPPER AWG.
8. RACK REQUIREMENTS - 19" RACK UNIVERSAL MOUNTING. .281 DIAMETER HOLES OR 10-32 TAPPED HOLES, 15 VERTICAL RACK UNITS.
9. AIR EXHAUST SIZE- 320 SQ. IN. (2065 SQ. CM).

FM-2C / FM-3C



FM-2C / FM-3C NOTES:

1. COOLING AIR REQUIREMENT-1400 CFM (39.7M3/MIN) FILTER REQUIRED-407-0062
2. GROUND STRAP ENTRY IN LOWER LEFT CORNER AT REAR OF CABINET
3. RF OUTPUT CONNECTION-1-5/8 INCH EIA 50 OHM FEMALE FIELD FLANGE.
4. HEAT DISSIPATION: FM-3C (10,250 BTU/H) AT A 3KW RF OUTPUT, 50 OHM RESISTIVE LOAD.
   FM-2C-2.2KW (7525 BTU/H) AT A 2KW RF OUTPUT, 50 OHM RESISTIVE LOAD.
5. WEIGHT: FM-3C-TRANSMITTER= 260LBS (117.9KGS)
   EXCITER=38 LBS (17.2 KGS).
   FM-2C-TRANSMITTER=212LBS (96.2KGS)
   EXCITER=38 LBS (17.2 KGS).
6. AC POWER INPUT: FM-3C-196 TO 252VAC 50/60HZ SINGLE PHASE, 35 AMPERES (MAXIMUM CONDITION).
   FM-2C-196 TO 252VAC 50/60HZ SINGLE PHASE, 25 AMPERES (MAXIMUM CONDITION). FUSE DISCONNECT SWITCH RECOMMENDED. FOR PROPER SIZING OF FUSES, REFER TO FOLLOWING TEXT, NATIONAL ELECTRIC CODES, AND LOCAL CODES.
7. PRIMARY AC FUSED DISCONNECT:
   FM-3C: FUSE SIZE-60 AMP, WIRE SIZE-#4 COPPER AWG, TYPE THHN.
   FM-2C: FUSE SIZE-40 AMP, WIRE SIZE-#8 COPPER AWG, TYPE THHN.
8. RACK REQUIREMENTS-19" RACK UNIVERSAL MOUNTING. .281 DIAMETER HOLES OR 10-32 TAPPED HOLES, 28 VERTICAL RACK UNITS.
9. AIR EXHAUST SIZE-500 SQ. IN. (3226 SQ. CM).

FM-4C & FM-5C

FM-4C / FM-5C NOTES:

1. AIR INLET AT REAR OF CABINET- 2200 CFM (62.3M3/MIN) FILTER REQUIRED.
2. GROUND STRAP ENTRY IN LOWER LEFT CORNER AT REAR OF CABINET.
3. RF OUTPUT CONNECTION - 1-5/8 INCH EIA 50 OHM FEMALE FIELD FLANGE.
4. AIR OUTLET AT TOP, FRONT AND REAR OF CABINET.
5. ACCESS FOR AC POWER THROUGH CABINET TOP OR BOTTOM ACCESS HOLES.
6. ACCESS FOR REMOTE CONTROL, MODULATION MONITOR, AND AUDIO CONNECTIONS THROUGH TOP OF CABINET.
7. HEAT DISSIPATION: FM-5C- 5.5 KW (18,805 BTU/H) AT A 5KW RF OUTPUT, 50 OHM RESISTIVE LOAD. FM-4C- 4.5 KW (15,390 BTU/H) AT A 4KW RF OUTPUT, 50 OHM RESISTIVE LOAD.

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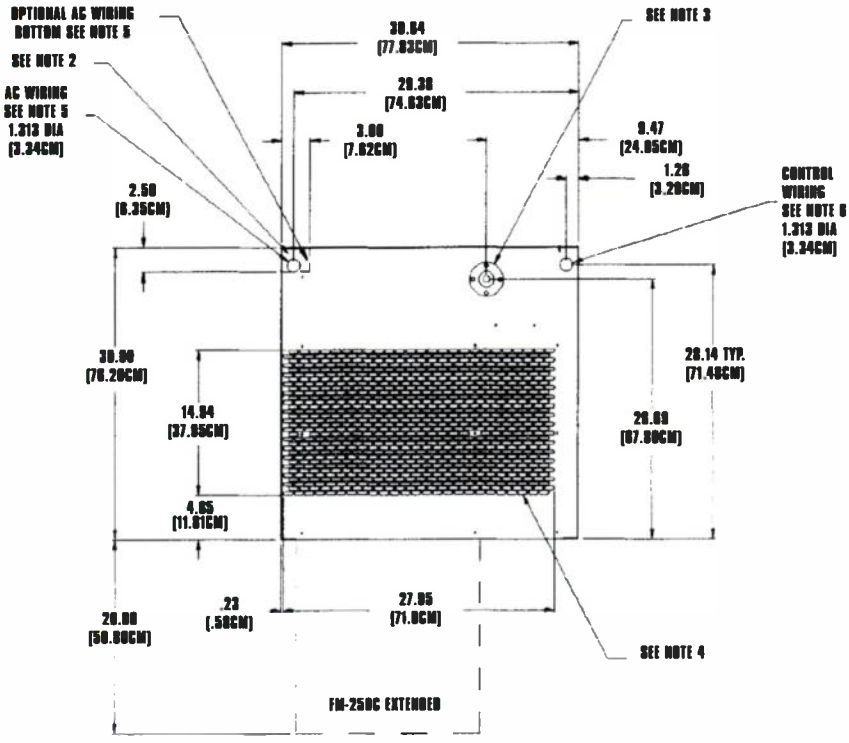
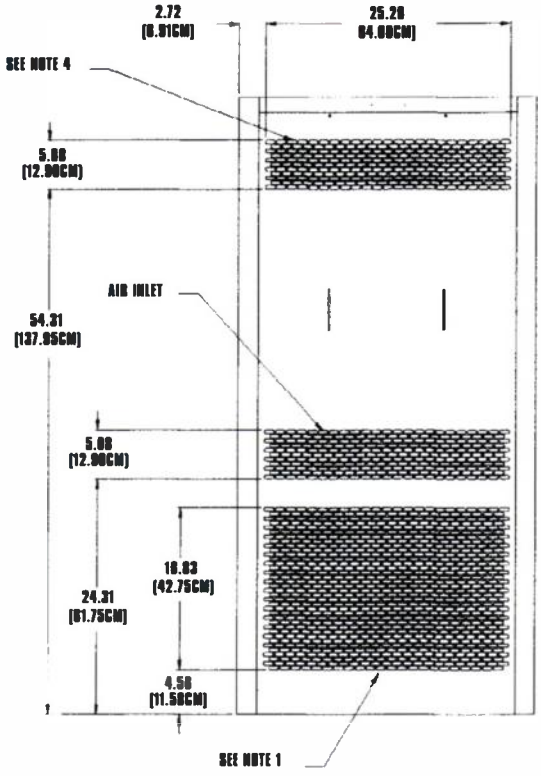
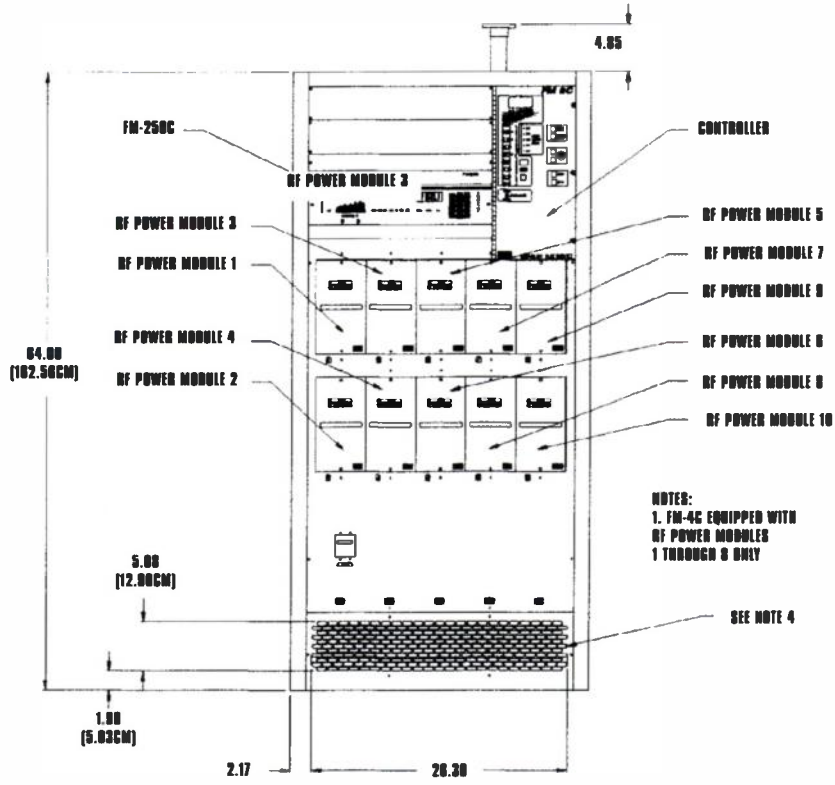


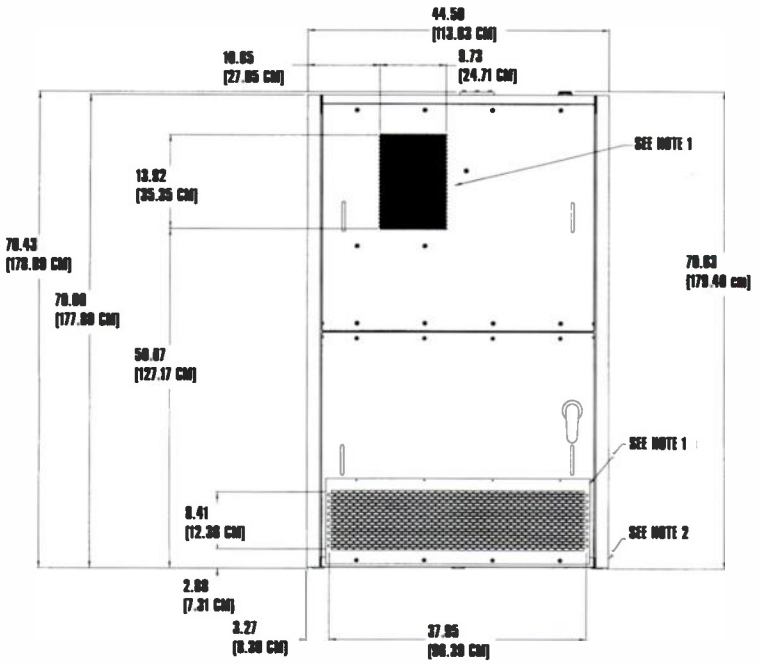


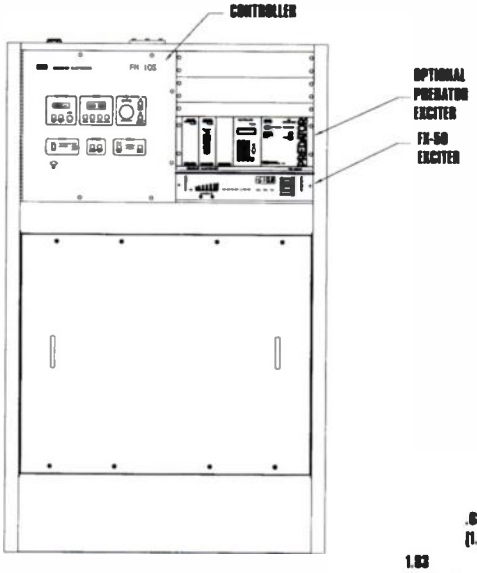


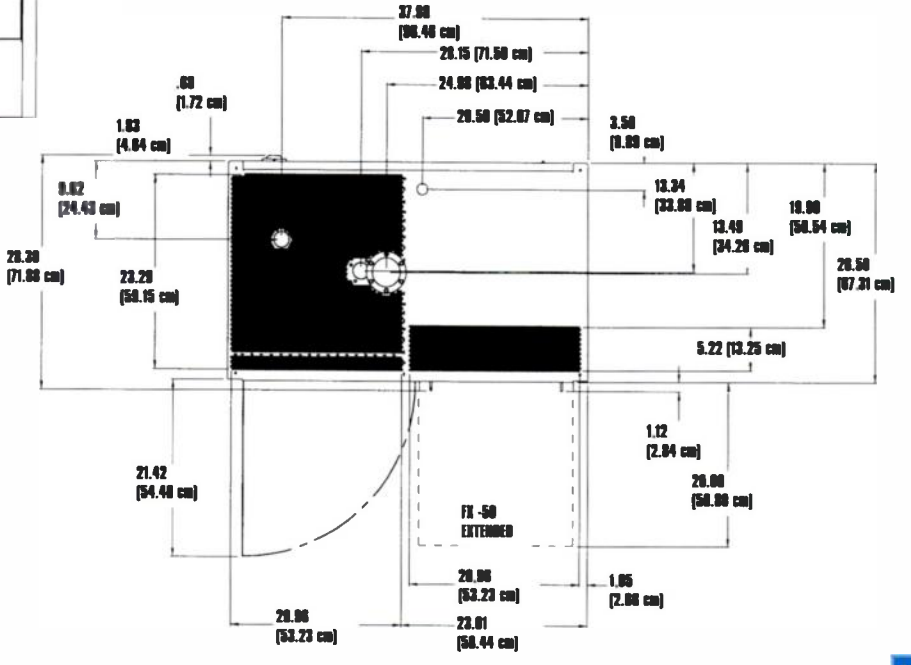
FM-4C / FM-5C NOTES: CONT'D...

8. AC POWER INPUT: FM-5C-196 TO 252VAC 50/60HZ SINGLE PHASE, 60 AMPERES (MAXIMUM CONDITION). FM-5C-196 TO 252VAC OR 339 TO 437VAC THREE PHASE, 35 AMPERES (MAXIMUM CONDITION). FM-4C-196 TO 252VAC 50/60HZ SINGLE PHASE, 50 AMPERES (MAXIMUM CONDITION). FM-4C-196 TO 252VAC OR 339 TO 437VAC THREE PHASE, 30 AMPERES (MAXIMUM CONDITION). FUSE DISCONNECT SWITCH RECOMMENDED, FOR PROPER SIZING OF FUSES, REFER TO FOLLOWING TEXT, NATIONAL ELECTRIC CODES, AND LOCAL CODES.
9. PRIMARY AC FUSED DISCONNECT:
   FM-5C: SINGLE PHASE: FUSE SIZE-80 AMP, WIRE SIZE- #3 COPPER AWG, TYPE THHN.
   FM-5C: THREE PHASE: FUSE SIZE-50 AMP, WIRE SIZE- #6 COPPER AWG, TYPE THHN.
   FM-4C: SINGLE PHASE: FUSE SIZE-70 AMP, WIRE SIZE- #4 COPPER AWG, TYPE THHN.
   FM-4C: THREE PHASE: FUSE SIZE-50 AMP, WIRE SIZE- #6 COPPER AWG, TYPE THHN.
10. WEIGHT: FM-5C TRANSMITTER: 575 LBS. (261 KGS).
    FM-4C TRANSMITTER: 525 LBS. (238KGS).

FM-10S







FM-10S NOTES:

1. AIR INLET AT REAR OF CABINET 2400 CFM (68.0 3M 3/MIN) FILTER REQUIRED.
2. GROUND STRAP ENTRY IN LOWER RIGHT CORNER AT REAR OF CABINET.
3. RF OUTPUT CONNECTION- 3-1/8 INCH EIA 50 DHM FEMALE FIELD FLANGE (3-1/8 INCH TO 1-5/8 INCH EIA FLANGE ADAPTER OPTIONAL)
4. AIR OUTLET AT TOP OF CABINET.
5. ACCESS FOR AC POWER THROUGH CABINET TOP ACCESS HOLE.
6. ACCESS FOR REMOTE CONTROL, MODULATION MONITOR, AND AUDIO CONNECTIONS THROUGH TOP OF CABINET.
7. HEAT DISSIPATION: 7 KW (23,910 BTU/H) NOMINAL AT A 10 KW RF OUTPUT, 50 DHM RESISTIVE LOAD. 11 KW (37,570 BTU/H) AT A 10 KW RF OUTPUT INTO A 1.5:1 VSWR LOAD.
8. WEIGHT: 713 LBS (324 KG) UNPACKED WITH OPTIONAL EXCITER, IPA, AND POWDER UNITS.
9. AC POWER CONSUMPTION: 17 KW NOMINAL AT A 10 KW RF OUTPUT INTO A 50 DHM RESISTIVE LOAD WITH A 230 VAC INPUT. 21 KW AT A 10KW RF OUTPUT INTO A 1.5:1 VSWR LOAD WITH A 230 VAC INPUT.
10. AC POWER INPUT: 196 TO 252VAC 50/60HZ SINGLE PHASE, 111 AMPERES (MAXIMUM CONDITION). FUSE DISCONNECT SWITCH RECOMMENDED. FOR PROPER SIZING OF FUSES, REFER TO FOLLOWING TEXT, NATIONAL ELECTRONICS CODES, AND LOCAL CODES.
11. PRIMARY AC FUSE DISCONNECT: SINGLE PHASE: FUSE SIZE-150AMP, WIRE SIZE-2/0 COPPER AWG. TYPE THHN THREE PHASE: FUSE SIZE-100 AMP, WIRE SIZE-#1 COPPER AWG. TYPE THHN
12. POWER FACTOR - BETTER THAN .95 @ 230VAC WITH A 10KW RF OUTPUT INTO A 50 OHM LOAD.

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FM-5T

Solutions for Tomorrow's Radio

5 kW High Power FM Transmitter

Broadcast Electronics' FM-5T not only upholds the standards set by the FM-30T, but also utilizes the FM-250C high power exciter which can be used as a 250W transmitter. In addition, this 5kW high power transmitter incorporates an advanced controller, offering operators access to more information than any other transmitter on the market. The T-Series FM transmitters are available only from Broadcast Electronics, the leader in solutions for tomorrow's radio.

Features

- The patented folded half-wave cavity eliminates troublesome and unreliable DC plate blocking capacitors and all sliding RF contacts.
- True proportional VSWR foldback protects the transmitter under all antenna load conditions.
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- Now available with optional Predator digital exciter.
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- Extensive metering of PA parameters eases tuning and adjustment which allows for more efficient operation as proper operating parameters can be monitored and maintained.
- Complete remote control interface built-in allows for convenient use of all current remote control systems.
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FM-5T

Solutions for Tomorrow's Radio

5 kW High Power FM Transmitter

Performance Specifications

GENERAL

Power Output: 5 kW (2.5 kW to 5.5 kW).
Frequency Range: 87.5 to 108 MHz, tuned to specific operating frequency. Exciter programmable in 10 kHz steps.
RF Output Impedance: 50 ohms (others on special request).
Output Connector: 1-5/8" EIA flange.
VSWR: 1.8:1 maximum. (Capable of operating into higher VSWR with automatic power reduction).
Frequency Stability: ±300 Hz, 0 to 50 degrees C.
Type of Modulation: Direct frequency modulation of carrier frequency.
Modulation Capability: Greater than ±350 kHz.
Modulation Indication: Peak reading, color coded, LED display with baseband overmodulation indicator.
Exciter: Solid state, 250 watt output, Model FM-250C, incorporating a digitally programmed synthesizer (10 kHz increments).
Pre-Emphasis: FCC 75uS, CCIR 50uS (where specified), 25uS (Dolby) or flat response, selectable.
Asynchronous AM S/N Ratio: 55 dB below equivalent reference carrier with 100% AM modulation @ 400 Hz, 75uS de-emphasis (no FM modulation present).
Synchronous AM S/N Ratio: 40 dB below equivalent 5 kW reference carrier with 100% AM modulation @ 1 kHz, no de-emphasis (FM modulation ±75 kHz @ 1 kHz).
Tube Complement: (1) 4CX3500A.
RF Harmonics: Suppression meets all FCC/DOC requirements and CCIR recommendations.

ELECTRICAL/MECHANICAL

AC Input Power: 208/240 V Delta or WYE, 50/60 Hz, three phase. (Taps for 196 to 252 V. Other voltages and line frequencies are available upon request).
Primary Power Consumption: Typically 8.3 kW (at .92 pf) @ 5 kW RF output.
Overall Efficiency: Typically 60% (AC line input to RF output).
Altitude: 7500 ft. (2286 M) @ 50 Hz; 10,000 ft. (3048 M) @ 60 Hz.
Ambient Temperature Range: -10 to +50 degrees C.
Size: 34.5"W x 70"H x 37.25"D (87.83 x 177.8 x 94.61 cm).
Weight & Cubage: 1000 lbs. (455 kg) unpacked; 1200 lbs. (545 Kg) packed. 60 cu. ft. (2 cu. meters).

MONAURAL OPERATION

Audio Input Impedance: 600 ohms balanced, resistive, adaptable to other impedances, 60 dB common mode suppression.
Audio Input Level: +10 dBm nominal for ±75 kHz deviation @ 400 Hz.
Audio Frequency Response: ±0.5 dB, 30 Hz to 15 kHz, selectable flat, 25, 50, 75 microsecond pre-emphasis.
Total Harmonic Distortion + Noise: 0.02% or less at 400 Hz.
SMPTE Intermodulation Distortion: 0.05% or less, 60 Hz/7 kHz, 4:1 ratio.
CCIF Intermodulation Distortion: 0.02% or less, 15 kHz/14 kHz, 1:1 ratio.
Transient Intermodulation Distortion: 0.02% or less, sine wave/square wave.
FM S/N Ratio: 85 dB below ±75 kHz deviation @ 400 Hz, measured in a 20 Hz to 30 kHz bandwidth with 75uS de-emphasis.

WIDEBAND COMPOSITE OPERATION

Composite Inputs: 3 total, (1) unbalanced and (1) balanced plus front panel test. All connectors BNC.
Balanced Composite Input Impedance: 10K ohm or 50 ohm, nominal, resistive, selectable.
Unbalanced Composite Input Impedance: 10K ohm, nominal, resistive.
Composite Input Level: 3.5V p-p nominal, for ±75 kHz deviation.
FM S/N Ratio: 85 dB below ±75 kHz deviation @ 400 Hz. Measured in a 20 Hz to 30 kHz bandwidth with 75uS de-emphasis.
Composite Total Harmonic Distortion + Noise: 0.02% or less @ 400 Hz.
Composite SMPTE Intermodulation Distortion: 0.05% or less, 60 Hz/7 kHz, 1:1 ratio.
Composite CCIF Intermodulation Distortion: 0.02% or less, 15 kHz/14 kHz, 1:1 ratio.
Composite Transient Intermodulation Distortion: 0.02% or less, sine wave/square wave.
Composite Amplitude Response: ±0.05 dB, 30 Hz to 53 kHz.
Composite Phase Response: ±0.25 degrees from linear phase, 30 Hz to 53 kHz.
Composite Group Delay Variation: ±10 nanoseconds, 30 Hz, 100 MHz.
Composite Slew Rate: 9 V/microsecond (symmetrical).
Subcarrier Inputs: (3) total, unbalanced, BNC connectors.
Subcarrier Input Impedance: 100K ohm, nominal, resistive.
Subcarrier Input Level: 3.5 V p-p, nominal, for ±7.5 kHz deviation.
Subcarrier Amplitude Response: ±0.2 dB, 40 kHz to 100 kHz.

STEREO OPERATION

Modulation Type: Digitally synthesized stereo, digitally synthesized pilot. No pilot phase adjustment required.
Audio Input Impedance: 600 ohms balanced, resistive, floating (adaptable to other impedances).
Audio Input Level: +10 dBm, ±1 dB, for 100% modulation @ 400 Hz (adaptable to other impedances).
Audio Input Filters: 15 kHz LPF with delay equalization for minimum overshoot.
Frequency Response: ±0.5 dB, 30 to 15,000 Hz, 75uS pre-emphasis (flat, 25 or 50uS pre-emphasis selectable).
Total Harmonic Distortion + Noise: 0.05% or less @ 400 Hz.
SMPTE Intermodulation Distortion: 0.05% or less, 60 Hz/7 kHz, 4:1 ratio.
CCIF Intermodulation Distortion: 0.05% or less, 15 kHz/14 kHz, 1:1 ratio.
Transient Intermodulation Distortion: 0.05% or less, sine wave/square wave.
FM S/N Ratio: 82 dB below ±75 kHz deviation @ 400 Hz, measured in a 20 Hz to 30 kHz bandwidth with 75uS de-emphasis.
Stereo Separation: 50 dB or better, 30-15,000 Hz (sine wave).
Dynamic Stereo Separation: 50 dB or better, 30-15,000 Hz (normal program content).
Linear Crosstalk: Main to Sub/Sub to Main due to amplitude and phase matching of left and right channels. 30-15,000 Hz, 45 dB minimum below 100% modulation.
Non-Linear Crosstalk: Main to Sub/Sub to Main due to distortion products. 70 dB minimum below 100% modulation.
38 kHz Subcarrier Suppression: 80 dB minimum below 100% modulation.
Pilot Stability: ±0.5 Hz, 0 to 50 degrees C.
Modes: Stereo, Mono L+R, Mono (L) and Mono (R) remote controlled. (See FS-30 data sheet for full details.)

FM-5T system performance is specified using model FM-250 Exciter and FS-30 Stereo Generator, where applicable, measured at rated transmitter power of 5 kW into a 50 ohm resistive load.

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FM-10T

Solutions for Tomorrow's Radio

10 kW High Power FM Transmitter

Broadcast Electronics' FM-10T not only upholds the standards set by the FM-30T, but also utilizes the FM-250C high power exciter which can be used as a 250W transmitter. In addition, this 10kW high power transmitter incorporates an advanced controller, offering operators access to more information than any other transmitter on the market. The T-Series FM transmitters are available only from Broadcast Electronics, the leader in solutions for tomorrow's radio.

Features

- The patented folded half-wave cavity eliminates troublesome and unreliable DC plate blocking capacitors and all sliding RF contacts.
- True proportional VSWR foldback protects the transmitter under all antenna load conditions.
- Advanced transmitter controller design monitors virtually all operating parameters of the transmitter and facilitates remote monitoring and full connectivity.
- Equipped with FX-50 Exciter technology, which is the standard for FM audio performance.
- High power exciter with low pass filter provides built-in emergency backup.
- Now available with optional Predator digital exciter.
- High volume low pressure air flow improves heat transfer while reducing ambient noise.
- Extensive metering of PA parameters eases tuning and adjustment, allowing for more efficient operation as proper operating parameters can be monitored and maintained.
- Complete built-in remote control interface results in convenient use of all current remote control systems.
- The elimination of the IPA stage improves overall reliability of the transmitter.
- RTDS (Remote Transmitter Diagnostic System) option available.

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FM-10T

Solutions for Tomorrow's Radio

10 kW High Power FM Transmitter

Performance Specifications

GENERAL

Power Output: 10 kW (4.5 kW to 11.0 kW)
PA Efficiency: 80% typical.
Frequency Range: 87.5 to 108 MHz, tuned to specific operating frequency. Exciter programmable in 10 kHz steps.
RF Output Impedance: 50 ohms (others on special request).
Output Connector: 1 5/8 inch EIA coupling or flange standard. 3 1/8 inch EIA flange optional.
VSWR: 1.8:1 maximum (will operate into higher VSWR with automatic power reduction).
Frequency Stability: +/- 300 Hz, 0 to 50 degrees C.
Type of Modulation: Direct frequency modulation of carrier frequency.
Modulation Capability: Greater than +/- 350 kHz.
Modulation Indication: Peak reading, color coded, LED display with baseband overmodulation indicator.
Exciter: Solid state, 250 watt output, model FM-250C; incorporating a digitally programmed synthesizer (10 kHz increments).
Pre-Emphasis: FCC 75µS, CCIR 50µS (where specified), 25µS (Dolby), or flat response, selectable.
Asynchronous AM S/N Ratio: 55 dB below equivalent reference carrier with 100% AM modulation at 400 Hz, 75µS de-emphasis (without FM modulation present).
Synchronous AM S/N Ratio: 45 dB below equivalent 10 kW reference carrier with 100% AM modulation at 1 kHz, no de-emphasis (FM modulation +/- 75 kHz at 1 kHz).
Tube: (1) 4CX7500A.
RF Harmonics Suppression: Meets all FCC/DOC requirements and CCIR recommendations.

ELECTRICAL/MECHANICAL

AC Input Power: 208/240 V Delta or WYE, 50/60 Hz, three phase (taps for 196 to 252 V. Other voltages and line frequencies are available upon request).
Primary Power Consumption: Typically 15.8 kW (at 0.94 pf) at 10 kW RF output.
Overall Efficiency: Typically 63% (AC line input to RF output).
Size: (Transmitter) 33.7" W x 37.2" D x 69.8" H (85.6 W x 94.6 D x 177.3 H cm); (Power Supply) 22.7" W x 37.2" D x 69.6" H (57.6 W x 94.6 D x 177.3 H cm).
Weight & Cubage: (Transmitter) 800 lbs. (363 kg); 53 cu. ft. (1.5 cu. meters); (HV Power Supply) 1000 lbs. (453.6 kg); 36 cu. ft. (1.01 cu. meters)
Altitude: 10,000 ft. at 60 Hz (3048 M), 7500 ft. at 50 Hz (2286 M).
Ambient Temperature Range: -10 degrees C to +50 degrees C.

MONAURAL OPERATION

Audio Input Impedance: 600 ohms balanced, resistive, adaptable to other impedances, 60 dB common mode suppression.
Audio Input Level: +10 dBm nominal for +/- 75 kHz deviation at 400 Hz.
Audio Frequency Response: +/- 0.5 dB, 30 Hz to 15 kHz, selectable flat, 25, 50, 75 microsecond pre-emphasis.
Total Harmonic Distortion + Noise: 0.02% or less at 400 Hz.
SMPTE Intermodulation Distortion: 0.05% or less, 60 Hz/7 kHz 4:1 ratio.
CCIF Intermodulation Distortion: 0.02% or less, 15 kHz/14 kHz 1:1 ratio.
Transient Intermodulation Distortion: 0.02% or less, sine wave/square wave.
FM S/N Ratio: 85dB below +/- 75 kHz deviation at 400 Hz, measured in a 20 Hz to 30 kHz bandwidth with 75µS de-emphasis

WIDEBAND COMPOSITE OPERATION

Composite Inputs: 3 total, (1) unbalanced and (1) balanced plus front panel test. All connectors BNC.
Balanced Composite Input Impedance: 10K ohm or 50 ohm, nominal, resistive, selectable.
Unbalanced Composite Input Impedance: 10K ohm, nominal, resistive.
Composite Input Level: 3.5 V p-p nominal, for +/- 75 kHz deviation.
Composite Total Harmonic Distortion + Noise: 0.02% or less at 400 Hz.
Composite SMPTE Intermodulation Distortion: 0.05% or less, 60Hz/7 kHz 1:1 ratio.
Composite CCIF Intermodulation Distortion: 0.02% or less, 15 kHz/14 kHz 1:1 ratio.
Composite Transient Intermodulation Distortion: 0.02% or less, sine wave/square wave.
Composite Amplitude Response: +/- 0.05dB, 30 Hz to 53 kHz.
Composite Phase Response: +/-0.25 degrees from linear phase, 30 Hz to 53 kHz.
Composite Group Delay Variation: +10 nanoseconds, 30 Hz to 100 kHz.
Composite Slew Rate: 9 V/microsecond (symmetrical).
Subcarrier Inputs: (3) total, unbalanced, BNC connectors.
Subcarrier Input Impedance: 100K ohm, nominal, resistive.
Subcarrier Input Level: 3.5 V p-p, nominal, for +/- 7.5 kHz deviation.
Subcarrier Amplitude Response: +/- 0.2dB, 40 kHz to 100 kHz.

STEREO OPERATION

Modulation Type: Digitally synthesized stereo, digitally synthesized pilot. No pilot phase adjustment required.
Audio Input Impedance: 600 ohms balanced, resistive, floating (adaptable to other impedances).
Audio Input Level: +10 dBm, +/- 1 dB, for 100% modulation at 400 Hz (adaptable to other input levels).
Audio Input Filters: 15 kHz LPF with delay equalization for minimum overshoot.
Frequency Response: +/- 0.5 dB, 30-15,000 Hz, 75µS pre-emphasis (flat, 25 or 50µS pre-emphasis selectable).
Total Harmonic Distortion + Noise: 0.05% or less at 400 Hz.
SMPTE Intermodulation Distortion: 0.08% or less, 60 Hz/7 kHz 4:1 ratio.
CCIF Intermodulation Distortion: 0.05% or less, 15 kHz/14 kHz 1:1 ratio.
Transient Intermodulation Distortion: 0.05% or less, sine wave/square wave.
FM S/N Ratio: 82dB below +/- 75 kHz deviation at 400 Hz, measured in a 20 Hz to 30 kHz bandwidth with 75µS de-emphasis.
Stereo Separation: 50 dB or better, 30-15,000 Hz (sine wave).
Dynamic Stereo Separation: 50 dB or better, 30-15,000 Hz (normal program content).
Linear Crosstalk: Main to Sub/Sub to Main due to amplitude and phase matching of left and right channels, 30-15,000 Hz, 45 dB minimum below 100% modulation.
Non-Linear Crosstalk: Main to Sub/Sub to Main due to distortion products. 70 dB minimum below 100% modulation.
38 kHz Subcarrier Suppression: 80 dB, minimum, below 100% modulation.
Pilot Stability: +/- 0.5 Hz, 0 to 50 degrees C.
Modes: Stereo, Mono L+R, Mono (L) and Mono (R) remote controlled. (See FS-30 data sheet for full details)

SCA OPERATION

Modulation: Direct FM.
Subcarrier Frequency: 67 kHz (39 to 95 kHz to order).
Subcarrier Frequency Stability: +/- 0.5% (330 Hz at 67 kHz), 0 to 50 degrees C.
Subcarrier Harmonic Content: Less than 0.3%
Subcarrier Envelope Decay: Greater than 100 msec. from 90% to 10% subcarrier levels.
Modulation Capability: +/-20% of subcarrier frequency.
Audio Input Impedance: 600 ohm balanced, resistive.
Data Input Impedance: 75 ohm unbalanced, resistive, DC coupled.
Input Levels: (Audio) adjustable +10 dBm to -10 dBm for +/- 6 kHz deviation at 400 Hz; (Data) adjustable 1.0 to 4.0 V p-p for +/- 6 kHz deviation (DC coupled).
Pre-Emphasis: (Audio) 150 microseconds standard (75µS with internal jumper); (Data) no pre-emphasis.
Frequency Response: (Audio) +/- 0.5 dB, 10-10,000 Hz, exclusive of audio low pass filter; (Data) +/- 0.5 dB, DC - 10,000 Hz.
Audio Low Pass Filter: Sixth order, -3 dB at 4.3 kHz, standard (resistor changes for other values).
Data Low Pass Filter: Same as AF filter or may be bypassed.
Total Harmonic Distortion: Less than 0.5% throughout AF pass band.
SMPTE Intermodulation Distortion: Less than 0.5%, 60 Hz/7 kHz 1:1 ratio (audio pre-emphasis and LPF bypassed).
Crosstalk, SCA to Stereo: -60 dB or better below 100% modulation of left or right. 75µS de-emphasis.
Crosstalk, Stereo to SCA: -50 dB or better below +/- 6 kHz deviation of SCA using 150 µS de-emphasis and FS-30 stereo generator.
Crosstalk, SCA to SCA: -50 dB or better below +/- 6 kHz deviation of either SCA using 150 µS de-emphasis.
FM Noise: 62 dB below +/- 6 kHz deviation at 400 Hz (150µS de-emphasis).
Auto Muting Level: Adjustable from 10 to 30 dB below program level.
Auto Muting Delay: Adjustable, 0.5 to 10.0 seconds.
FM-10T System Performance is specified using model FM-250C, FS-30 Stereo Generator, and FC-30 SCA Generator, where applicable, measured at rated transmitter power of 10 kW into a 50 ohm resistive load.

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FM-30T

Solutions for Tomorrow's Radio

30 kW High Power Transmitter

The Broadcast Electronics' 30kW high power transmitter sets the standards for audio quality, cost-efficiency, reliability, and long life. The FM-30T represents a new generation of high power tube transmitters and is backed by BE's committment to quality. The T-Series FM transmitters represent just one of our many solutions to your radio needs.

Features

- The patented folded half-wave cavity eliminates troublesome and unreliable DC plate blocking capacitors and all sliding RF contacts.
- True proportional (VSWR) foldback protects the transmitter under all antenna load conditions.
- Advanced transmitter controller design monitors virtually all operating parameters of the transmitter and facilitates remote monitoring and full connectivity.
- Equipped with the FX-50 Exciter which has easily become the standard for FM audio performance.
- High volume low pressure air flow improves heat transfer while reducing ambient noise.
- Extensive metering of PA parameters eases tuning and adjustment which allows for more efficient operation as proper operating parameters can be monitored and maintained.
- Complete remote control interface built-in allows for convenient use of all current remote control systems.
- The latest MOSFET technology is used in IPAs.

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FM-30T

Solutions for Tomorrow's Radio

30 kW High Power Transmitter

Performance Specifications

GENERAL

Power Output: 30 kW (7.5 kW to 30.0 kW)
Frequency Range: 87.5 to 108 MHz, tuned to specific operating frequency. Exciter programmable in 10 kHz steps.
RF Output Impedance: 50 ohms (others on special request).
Output Connector: 3 1/8 inch EIA flange.
VSWR: 1.8:1 maximum. (Will operate into higher VSWR with automatic power reduction.)
Frequency Stability: +/- 300 Hz, 0 to 50 degrees C.
Type of Modulation: Direct frequency modulation of carrier frequency.
Modulation Capability: Greater than +/- 350 kHz.
Modulation Indication: Peak reading, color coded, LED display with baseband overmodulation indicator.
Exciter: Solid state, 50 watt output, model FX-50; incorporating a digitally programmed synthesizer. (10 kHz increments)
Pre-Emphasis: FCC 75uS, CCIR 50uS (where specified), 25uS (Dolby), or flat response, selectable.
Asynchronous AM S/N Ratio: 55 dB below equivalent reference carrier with 100% AM modulation at 400 Hz, 75uS de-emphasis. (without FM modulation)
Synchronous AM S/N Ratio: 50 dB below equivalent 30 kW reference carrier with 100% AM modulation at 1 kHz, no de-emphasis. (FM modulation +/- 75 kHz at 1 kHz.)
Tube: (1) 8990/4CX20,000A
RF Harmonics Suppression: Meets all FCC/DOC requirements and CCIR recommendations.

ELECTRICAL/MECHANICAL

AC Input Power: 208/240 V Delta or WYE, 60 Hz, three phase. (Taps for 196 to 252 V. Other voltages and line frequencies are available upon request).
Primary Power Consumption: Typically 44 kW (at .94 pf) at 30 kW RF output.
Overall Efficiency: Typically 68% (AC line input to RF output).
Size: (Transmitter) 56.5" W x 31.5" D x 70" H (143.5 W x 80 D x 177.8 H cm) (Power Supply) 34.5" W x 31/5" D x 70" H (87.6 W x 80 D x 177.8 H cm).
Weight & Cubage: (Transmitter) 1500 lbs. (682 Kg); packed 1750 lbs. (795 Kg) 72 cu. ft. (2 cu. meters) (HV Power Supply) 1750 lbs. (794 Kg); packed 1800 lbs. (816 Kg) 44 cu. ft. (1.25 cu. meters).
Altitude: 10,000 ft. at 60 Hz (3048 M), 7500 ft. at 50 Hz (2286 M).
Ambient Temperature Range: -10 degrees C to +50 degrees C.
Sound Level: 61 dB (A-weighted), 48 dB (SIL), (Ref. 0 dB = .0002 microbar) at one meter front center.
NOTE: All monaural, wideband composite, and stereo performance is measured using the Belar Electronics model FMM-2 FM Modulation Monitor and the FMS-2 FM Stereo Monitor, as applicable.

MONAURAL OPERATION

Audio Input Impedance: 600 ohms balanced, resistive, adaptable to other impedances, 60 dB common mode suppression.
Audio Input Level: +10 dBm nominal for +/- 75 kHz deviation at 400 Hz.
Audio Frequency Response: +/- 0.5 dB, 30 Hz to 15 kHz, selectable flat, 25, 50, 75 microsecond pre-emphasis.
Total Harmonic Distortion + Noise: 0.02% or less at 400 Hz.
SMPTE Intermodulation Distortion: 0.02% or less, 60 Hz/7 kHz 4:1 ratio.
CCIF Intermodulation Distortion: 0.02% or less, 15 kHz/14 kHz 1:1 ratio.
Transient Intermodulation Distortion: 0.02% or less, sine wave/square wave.
FM S/N Ratio: 80dB below +/- 75 kHz deviation at 400 Hz, measured in a 20 Hz to 30 kHz bandwidth with 75uS de-emphasis.

WIDEBAND COMPOSITE OPERATION

Composite Inputs: 3 total, (1) unbalanced and (1) balanced plus front panel test. All connectors BNC. Balanced Composite Input Impedance: 10K ohm or 50 ohm, nominal, resistive, selectable.
Unbalanced Composite Input Impedance: 10K ohm, nominal, resistive.
Composite Input Level: 3.5 V p-p nominal, for +/- 75 kHz deviation.
Composite Total Harmonic Distortion + Noise: 0.02% or less at 400 Hz.
Composite SMPTE Intermodulation Distortion: 0.02% or less, 60Hz/7 kHz 1:1 ratio.
Composite CCIF Intermodulation Distortion: 0.02% or less, 15 kHz/14 kHz 1:1 ratio.
Composite Transient Intermodulation Distortion: 0.02% or less, sine wave/square wave.
Composite Amplitude Response: +/- 0.05dB, 30 Hz to 53 kHz.
Composite Phase Response: +/-0.25 degrees from linear phase, 30 Hz to 53 kHz.
Composite Group Delay Variation: +10 nanoseconds, 30Hz to 100kHz.
Composite Slew Rate: 9 V/microsecond (symmetrical).
Subcarrier Inputs: (3) total, unbalanced, BNC connectors.
Subcarrier Input Impedance: 100K ohm, nominal, resistive.
Subcarrier Input Level: 3.5 V p-p, nominal, for +/- 7.5 kHz deviation.
Subcarrier Amplitude Response: +/- 0.2dB, 40 kHz to 100 kHz.

STEREO OPERATION

Modulation Type: Digitally synthesized stereo, digitally synthesized pilot. No pilot phase adjustment required.
Audio Input Impedance: 600 ohms balanced, resistive, floating. (Adaptable to other impedances.)
Audio Input Level: +10 dBm, +/- 1 dB, for 100% modulation at 400 Hz. (Adaptable to other input levels.)
Audio Input Filters: 15 kHz LPF with delay equalization for minimum overshoot.
Frequency Response: +/- 0.5 dB, 30-15,000 Hz, 75uS pre-emphasis (flat, 25 or 50uS pre-emphasis selectable).
Total Harmonic Distortion + Noise: 0.05% or less at 400 Hz.
SMPTE Intermodulation Distortion: 0.05% or less, 60 Hz/7 kHz 4:1 ratio.
CCIF Intermodulation Distortion: 0.05% or less, 15 kHz/14 kHz 1:1 ratio.
Transient Intermodulation Distortion: 0.05% or less, sine wave/square wave.
FM S/N Ratio: 82dB below +/- 75 kHz deviation at 400 Hz, measured in a 20 Hz to 30 kHz bandwidth with 75uS de-emphasis.
Stereo Separation: 50 dB or better; 30-15,000 Hz (sine wave).
Dynamic Stereo Separation: 50 dB or better; 30-15,000 Hz (normal program content).
Linear Crosstalk: Main to Sub/Sub to Main due to amplitude and phase matching of left and right channels, 30-15,000 Hz, 45 dB minimum below 100% modulation.
Non-Linear Crosstalk: Main to Sub/Sub to Main due to distortion products. 70 dB minimum below 100% modulation. 38 kHz Subcarrier Suppression: 80 dB, minimum, below 100% modulation.
Pilot Stability: +/- 0.5 Hz, 0 to 50 degrees C.
Modes: Stereo, Mono L+R, Mono (L) and Mono (R) remote controlled.

FM-30T system performance is specified using model FX-50 Exciter and FS-30 Stereo Generator where applicable, measured at rated transmitter power of 30 kW into a 50 ohm resistive load.

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FM-35T

Solutions for Tomorrow's Radio

35 kW High Power FM Transmitter

The FM-35T is the largest transmitter offered in the Broadcast Electronics' high power series. The FM-35T represents a new generation of high power tube transmitters and is backed by BE's committment to quality. The T-Series FM transmitters represents just one of our many solutions to your radio needs.

Features

- The patented folded half-wave cavity eliminates troublesome and unreliable DC plate blocking capacitors and all sliding RF contacts.
- True proportional (VSWR) foldback protects the transmitter under all antenna load conditions.
- Advanced transmitter controller design monitors virtually all operating parameters of the transmitter and facilitates remote monitoring and full connectivity.
- Equipped with the FX-50 Exciter which has easily become the standard for FM audio performance.
- High volume low pressure air flow improves heat transfer while reducing ambient noise.
- Extensive metering of PA parameters eases tuning and adjustment which allows for more efficient operation as proper operating parameters can be monitored and maintained.
- Complete remote control interface built-in allows for convenient use of all current remote control systems.
- The latest MOSFET technology is used in IPAs.

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FM-35T

Solutions for Tomorrow's Radio

35 kW High Power FM Transmitter

Performance Specifications

GENERAL

Power Output: 35 kW (10.0 kW to 38.5 kW).
Frequency Range: 87.5 to 108 MHz, tuned to specific operating frequency. Exciter programmable in 10 kHz steps.
RF Output Impedance: 50 ohms (others on special request).
Output Connector: 3-1/8" EIA flange.
VSWR: 1.8:1 maximum. (Capable of operating into higher VSWR with automatic power reduction).
Frequency Stability: ±300 Hz, 0 to 50 degrees C.
Type of Modulation: Direct frequency modulation of carrier frequency.
Modulation Capability: Greater than ±350 kHz.
Modulation Indication: Peak reading, color coded, LED display with baseband overmodulation indicator.
Exciter: Solid state, 50 watt output, Model FX-50, incorporating a digitally programmed synthesizer (10 kHz increments).
Pre-Emphasis: FCC 75uS, CCIR 50uS (where specified), 25uS (Dolby) or flat response, selectable.
Asynchronous AM S/N Ratio: 55 dB below equivalent reference carrier with 100% AM modulation @ 400 Hz, 75uS de-emphasis (no FM modulation present).
Synchronous AM S/N Ratio: 50 dB below equivalent 35 kW reference carrier with 100% AM modulation @ 1 kHz, no de-emphasis (FM modulation ±75 kHz @ 1 kHz).
Tube Complement: (1) 4CX20, 000C.
RF Harmonics: Suppression meets all FCC/DOC requirements and CCIR recommendations.
Power Supply Rectifiers: Silicon.

ELECTRICAL/MECHANICAL

AC Input Power: 208/240 V Delta or WYE, 60 Hz, three phase. (Taps for 196 to 252 V. Other voltages and line frequencies are available upon request).
Primary Power Consumption: Typically 51 kW (at .94 pf) @ 35 kW RF output.
Overall Efficiency: Typically 68% (AC line input to RF output).
Altitude: 10,000 ft. (3048 M) @ 60 Hz.
Ambient Temperature Range: -10 to +50 degrees C.
Size: (Transmitter) 56.5"W x 70"H x 31.5"D (143.5 x 177.8 x 80 cm). (Power Supply) 34.5"W x 70"H x 31.5"D (87.6 x 177.8 x 80 cm).
Weight & Cubage: (Transmitter) 1500 lbs. (682 kg) unpacked; 1750 lbs. (795 Kg) packed. 72 cu. ft. (2 cu. meters). (HV Power Supply) 1750 lbs. (794 kg) unpacked; 1800 lbs. (816 Kg) packed. 44 cu. ft. (1.25 cu. meters). Altitude: 10,000 ft. @ 60 Hz (3048M), 7500 ft. @ 50 Hz (2286M).
Ambient Temperature Range: -10 degrees C to +50 degrees C.
Sound Level: 61 dB (A-weighted), 48 dB (SIL), (Ref. 0 dB=.0002 microbar) at one meter front center.

MONAURAL OPERATION

Audio Input Impedance: 600 ohms balanced, resistive, adaptable to other impedances, 60 dB common mode suppression.
Audio Input Level: +10 dBm nominal for ±75 kHz deviation @ 400 Hz.
Audio Frequency Response: ±0.5 dB, 30 Hz to 15 kHz, selectable flat, 25, 50, 75 microsecond pre-emphasis.
Total Harmonic Distortion + Noise: 0.02% or less at 400 Hz.
SMPTE Intermodulation Distortion: 0.02% or less, 60 Hz/7 kHz, 4:1 ratio.
CCIF Intermodulation Distortion: 0.02% or less, 15 kHz/14 kHz, 1:1 ratio.
Transient Intermodulation Distortion: 0.02% or less, sine wave/square wave.
FM S/N Ratio: 85 dB below ±75 kHz deviation @ 400 Hz, measured in a 20 Hz to 30 kHz bandwidth with 75uS de-emphasis.

WIDEBAND COMPOSITE OPERATION

Composite Inputs: 3 total, (1) unbalanced and (1) balanced plus front panel test. All connectors BNC.
Balanced Composite Input Impedance: 10K ohm or 50 ohm, nominal, resistive, selectable.
Unbalanced Composite Input Impedance: 10K ohm, nominal, resistive.
Composite Input Level: 3.5V p-p nominal, for ±75 kHz deviation.
FM S/N Ratio: 85 dB below ±75 kHz deviation @ 400 Hz. Measured in a 20 Hz to 30 kHz bandwidth with 75uS de-emphasis.
Composite Total Harmonic Distortion + Noise: 0.02% or less @ 400 Hz.
Composite SMPTE Intermodulation Distortion: 0.02% or less, 60 Hz/7 kHz, 1:1 ratio.
Composite CCIF Intermodulation Distortion: 0.02% or less, 15 kHz/14 kHz, 1:1 ratio.
Composite Transient Intermodulation Distortion: 0.02% or less, sine wave/square wave.
Composite Amplitude Response: ±0.05 dB, 30 Hz to 53 kHz.
Composite Phase Response: ±0.25 degrees from linear phase, 30 Hz to 53 kHz.
Composite Group Delay Variation: ±10 nanoseconds, 30 Hz to 100 kHz.
Composite Slew Rate: 9 V/microsecond (symmetrical).
Subcarrier Inputs: (3) total, unbalanced, BNC connectors.
Subcarrier Input Impedance: 100K ohm, nominal, resistive.
Subcarrier Input Level: 3.5 V p-p, nominal, for ±7.5 kHz deviation.
Subcarrier Amplitude Response: ±0.2 dB, 40 kHz to 100 kHz.

STEREO OPERATION

Modulation Type: Digitally synthesized stereo, digitally synthesized pilot. No pilot phase adjustment required.
Audio Input Impedance: 600 ohms balanced, resistive, floating (adaptable to other impedances).
Audio Input Level: +10 dBm, ±1 dB, for 100% modulation @ 400 Hz (adaptable to other input levels).
Audio Input Filters: 15 kHz LPF with delay equalization for minimum overshoot.
Frequency Response: ±0.5 dB, 30 to 15,000 Hz, 75uS pre-emphasis (flat, 25 or 50uS pre-emphasis selectable).
Total Harmonic Distortion + Noise: 0.05% or less @ 400 Hz.
SMPTE Intermodulation Distortion: 0.05% or less, 60 Hz/7 kHz, 4:1 ratio.
CCIF Intermodulation Distortion: 0.05% or less, 15 kHz/14 kHz, 1:1 ratio.
Transient Intermodulation Distortion: 0.05% or less, sine wave/square wave.
FM S/N Ratio: 82 dB below ±75 kHz deviation @ 400 Hz, measured in a 20 Hz to 30 kHz bandwidth with 75uS de-emphasis.
Stereo Separation: 50 dB or better, 30-15,000 Hz (sine wave).
Dynamic Stereo Separation: 50 dB or better, 30-15,000 Hz (normal program content).
Linear Crosstalk: Main to Sub/Sub to Main due to amplitude and phase matching of left and right channels. 30-15,000 Hz, 45 dB minimum below 100% modulation.
Non-Linear Crosstalk: Main to Sub/Sub to Main due to distortion products. 70 dB minimum below 100% modulation.
38 kHz Subcarrier Suppression: 80 dB minimum below 100% modulation.
Pilot Stability: ±0.5 Hz, 0 to 50 degrees C.
Modes: Stereo, Mono L+R, Mono (L) and Mono (R) remote controlled. (See FS-30 data sheet for full details.)

FM-35B system performance is specified using model FX-50 Exciter and FS-30 Stereo Generator, and where applicable, measured at rated transmitter power of 35 kW into a 50 ohm resistive load.

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FM-10S

10 kW Solid State FM Transmitter

A solid combination of performance, reliability, ease of service and price define the new FM-10S 10kW solid state FM transmitter from Broadcast Electronics.

Engineered to the same exacting standards as our complete line of solid state FMs, the FM-10S performs like no other in the industry. An extensive redundancy and protection system has been added that will keep your signal on the air even in the most extreme conditions. An optional standby exciter, IPA and power supply can give you full power standby without having to buy another transmitter.

The FM-10S' large, removable panel provides immediate access to every major assembly for fast and easy repair. In fact, the FM-10S has a lower Mean Time to Repair than any other transmitter in its class.

(shown with industry standard FX-50 and optional standby exciter)

Features

- All RF modules, main and optional standby IPA's. are removable from the front of the unit.
- 95% of full power can be maintained into a normal load with one module removed.
- Redundant power supplies are used to keep the transmitter on the air even under failed power supply conditions.
- Optional standby power supply provides full power operation with one supply removed.
- Full module operating parameters are monitored and displayed on the front panel.
- Developed with a high efficiency cooling system that extends transistor life.
- True proportional (VSWR) foldback to keep the transmitter on the air even in the worst conditions.
- Modules can be removed and replaced without perceptible carrier interruption.
- Amplifier pallets can be replaced in the field without retuning.
- Frequency agile, N+1 compatible to provide an automatic back-up for up to 10 signals anywhere in the band.
- Optional integral standby exciter and IPA provides automatic change over of both.
- Available with optional Predator digital exciter.

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FM-10S

10 kW Solid State FM Transmitter

Performance Specifications

GENERAL

Power Output: 5,000 watts to 10,000 watts.
Frequency Range: 87.5 to 108 MHz, tuned to specific operating frequency. Exciter programmable in 10 kHz steps.
RF Output Impedance: 50 ohms.
Output Connector: 3 1/8" EIA flange, 1 5/8" EIA flange optional.
VSWR: Rated power into 1.3:1 maximum. Capable of operating into higher VSWR with automatic power reduction. Open and short circuit protected at all phase angles.
Frequency Stability: +/- 300 Hz, 0 to 50 degrees C.
Type of Modulation: Direct frequency modulation of carrier frequency.
Modulation Capability: Greater than+/- 350 kHz.
Asynchronous AM S/N Ratio: 55 dB below equivalent 10 kW reference carrier with 100% AM modulation at 400 Hz, 75µS de-emphasis (no FM modulation present).
Synchronous AM S/N Ratio: 50 dB below equivalent 10 kW reference carrier with 100% AM modulation at 400 Hz, 75 µS de-emphasis with FM modulation+/- 75 kHz at 400 Hz.
IMD Protection: 20 dB or better turn-around-loss or mixing loss to interfering signals.
RF Harmonics: Suppression meets all FCC/IC/CE requirements and CCIR recommendations.
AC Input Power: 196-252 VAC, DELTA (or 340-435 VAC 4 WIRE WYE), 50/60 Hz, three phase. Single phase input power optional.
Power Factor: 0.98 at 230 VAC. 10 kW output power into 50 ohm load.
Overall Efficiency: 58% or better at 230 VAC, 10,000 watts into 50 ohms, 61% typical.
Surge Protection: Tested with IEEE C62.41-1991 recommended waveforms for location category B3 and IEC 801-4 standard waveforms for severity level 4.
Altitude: 10,000 ft. at 60 Hz (3048 M), 7500 ft. at 50 Hz (2286 M).
Ambient Temperature Range: 0 degrees C to +50 degrees C.
Safety Protection: Meets IEC 215 safety requirements.
Additional Standards: Meets applicable CE standards.

WIDEBAND COMPOSITE OPERATION

Composite Inputs: 3 total, (1) unbalanced and (1) balanced plus front panel test. All connectors BNC.
Composite Input Impedance: 10K ohm or 50 ohm, nominal, resistive selectable.
Composite Input Level: 3.5 V p-p nominal, for +/- 75 kHz deviation.
Composite FM S/N Ratio: 85 dB below +/- 75 kHz deviation at 400 Hz. Measured in a 20 Hz to 30 kHz bandwidth with 75µS de-emphasis.
Composite Harmonic Distortion + Noise: 0.02% or less at 400 Hz.
Composite SMPTE Intermodulation Distortion: 0.02% or less, 60 Hz/7 kHz 1:1 ratio.
Composite CCIF Intermodulation Distortion: 0.02% or less, 15 kHz/14 kHz 1:1 ratio.
Composite Transient Intermodulation Distortion: 0.02% or less sine wave/square wave.
Composite Amplitude Response: +/- 0.1 dB, 30 Hz to 53 kHz.
Composite Phase Response: +/- 0.25 degrees from linear phase, 30 Hz to 53 kHz.
Composite Group Delay: 125 nanoseconds.
Composite Slew Rate: 9 V/microsecond (symmetrical).
Size: 44.5"W x 70"H x 26.5"D (113cm x 178cm x 68cm)
Weight: 660 lbs. (300 kg) standard unpacked
713 lbs. (323 kg) with standby exciter, IPA and power supply options.

Frequently Asked Questions

MODEL FM-10S

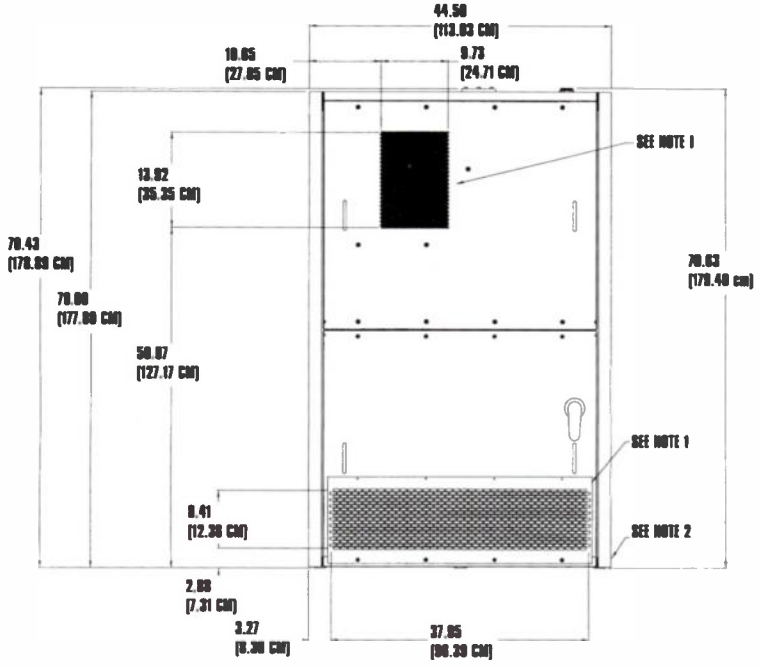
Power Range:	5kW to 10kW
AC Voltage Requirements:	196 to 252 VAC, 50/60 Hz, 3 phase, Closed Delta or WYE (3 or 4 wire) 340 to 435 VAC, 50/60 Hz, 3 phase, 4 wire, WYE only
Disconnect Size:	100 Amp fused disconnect recommended
Actual amperage draw at:	10kW - 50A, average, actual determined by line voltage, carrier frequency, etc.
AC wire size:	1 AWG copper, THHN or equivalent
Power Consumption:	17.3kW at 10kW RF output
Cooling Air requirements:	2700 CFM
Air Outlet (PA exhaust) size:	Top of Cabinet (27" x 45")
Heat dissipation:	7.3kW (24,915 BTU/hr) at 10kW RF output
To determine Air Conditioner size for closed system:	one BTU/hr = 0.293 watt one watt = 3.413 BTU/hr 12,000 BTU/hr = 1 ton of A/C eg, at 7.3kW dissipated, a 2.1 ton A/C unit would be needed (7,300 x 3.413 = 24,915/12,000 = 2.1)
Output connection size:	3 1/8" EIA female (1 5/8" optional)
Weight:	660 lbs. standard unpacked

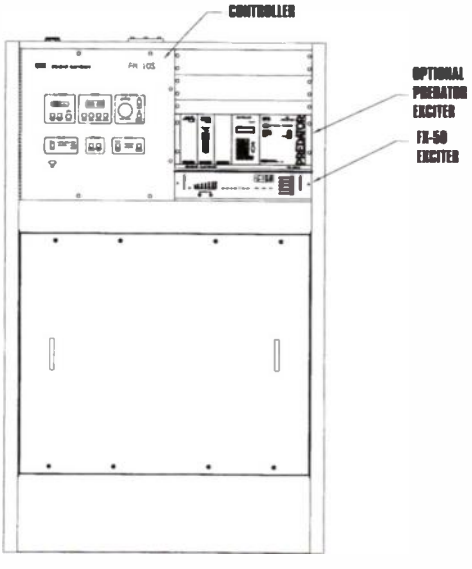
MODEL FM-10S (Single Phase)

Power Range:	5kW to 10kW
AC Voltage Requirements:	196 to 252VAC, 50/60 Hz, single phase
Disconnect Size:	150 Amp fused disconnect recommended
Actual amperage draw at:	10kW - 85A, average, actual determined by line voltage, carrier frequency, etc.
AC wire size:	2/0 copper, THHN or equivalent
Power Consumption:	17.3kW at 10kW RF output
Cooling Air requirements:	2700 CFM
Air Outlet (PA exhaust) size:	Top of Cabinet (27" x 45")
Heat dissipation:	7.3kW (24,915 BTU/hr) at 10kW RF output
To determine Air Conditioner size for closed system:	one BTU/hr = 0.293 watt one watt = 3.413 BTU/hr 12,000 BTU/hr = 1 ton of A/C eg, at 7.3kW dissipated, a 2.1 ton A/C unit would be needed (7,300 x 3.413 = 24,915/12,000 = 2.1)
Output connection size:	3 1/8" EIA female (1 5/8" optional)
Weight:	660 lbs. standard unpacked

FM-10S

10 kW Solid State FM Transmitter

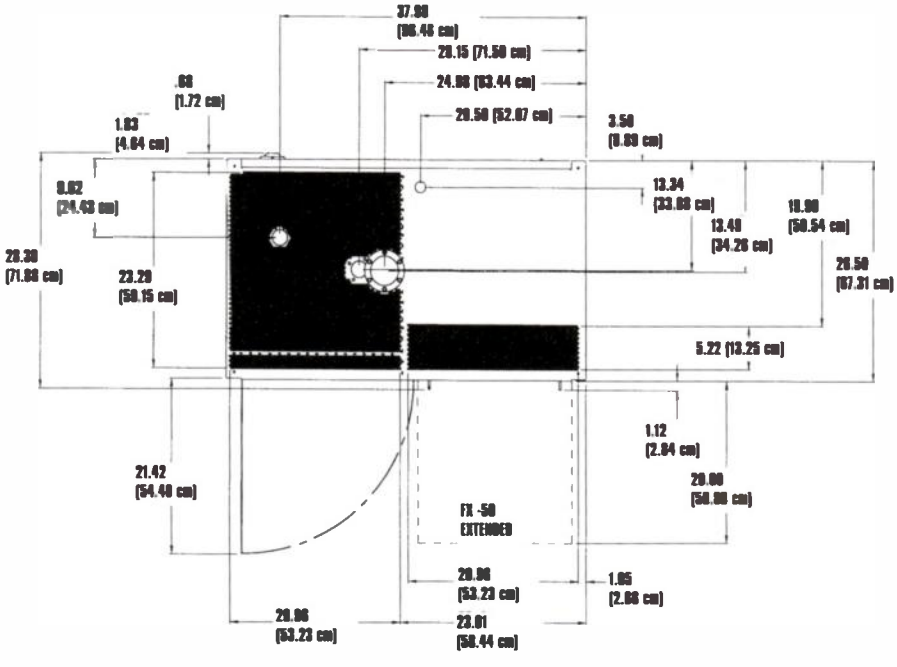




FM-10S

FM-10S NOTES:

1. Air inlet at rear of cabinet 2400 cfm (68.0 3m 3/min) filter required.
2. Ground strap entry in lower right corner at rear of cabinet.
3. RF Output Connection- 3-1/8 inch eia 50 dhm female field flange (3-1/8 inch to 1-5/8 inch eia flange adapter optional)
4. Air outlet at top of cabinet.
5. Access for ac power through cabinet top access hole.
6. Access for remote control, modulation monitor, and audio connections through top of cabinet.
7. Heat dissipation: 7 kw (23,910 btu/h) nominal at a 10 kw rf output, 50 dhm resistive load. 11 kw (37,570 btu/h) at a 10 kw rf output into a 1.5:1 vswr load.
8. Weight: 713 lbs (324 kg) unpacked with optional exciter, ipa, and powder units.
9. AC power consumption: 17 kw nominal at a 10 kw rf output into a 50 dhm resistive load with a 230 vac input. 21 kw at a 10kw rf output into a 1.5:1 vswr load with a 230 vac input.
10. AC power input: 196 to 252vac 50/60hz single phase, 111 amperes (maximum condition). fuse disconnect switch recommended. for proper sizing of fuses, refer to following text, national electronics codes, and local codes.
11. Primary ac fuse disconnect: single phase: fuse size-150amp, wire size-2/0 copper awg. type thhn three phase: fuse size-100 amp, wire size-#1 copper awg. type thhn
12. Power factor - better than .95 @ 230vac with a 10kw rf output into a 50 Ohm load.



FM-10S

10 kW Solid State FM Transmitter

Broadcast Electronics FX-50 Exciter

All Broadcast Electronics FM transmitters contain the renowned Broadcast Electronics' FX-50 Exciter technology, the acknowledged broadcast standard for FM audio performance. The FX-50's performance can bring existing FM transmitters up to digital quality standards, and has the lowest distortion of any available exciter. This breakthrough remains unsurpassed by more costly and complex digital exciters.

FM-50 Watt Transmitter

Besides its unique status as the industry standard FM exciter, the FX-50 with the addition of an internal low pass filter can also serve as a reliable 50 watt stand-alone FM transmitter. Either as an exciter or as a 50 watt transmitter, its superior performance specifications make the FX-50 totally transparent to your broadcast signal.

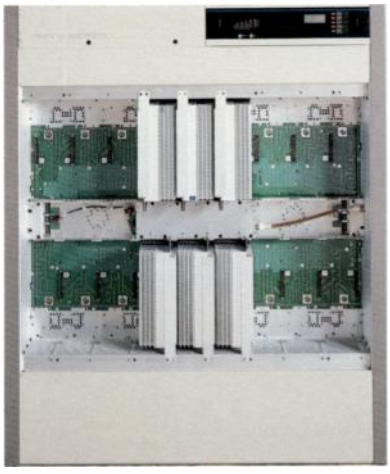
Predator Digital Transmitter/Exciter

Broadcast Electronics' engineers were the first to develop the right kind of digital technology for a low power transmitter/ exciter-modular, expandable, convertible, digital quality, and priced thousands less. All at power levels designed to fit any need - 50 or 250 watts. The Predator accepts AES/EBU, left and right, or composite inputs, can be upgraded in the field and is equipped with a full remote control interface.

Automatic Power Control

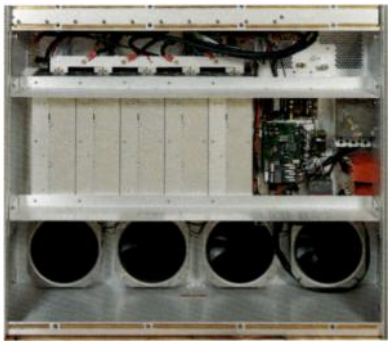
The integrated automatic power control system (APC) in all Broadcast Electronics' solid state transmitters maintains constant RF output power within 2.0% of the operator setting, regardless of fluctuations in incoming AC line voltage, RF drive level or antenna impedance. In addition, the sophisticated proportional feedback system allows the transmitter to stay on line into loads of as poor as 3 to 1 VSWR.

Front View



The easily removed front panel allows immediate access to all PA and IPA modules from the front of the transmitter. PA modules can be removed while the transmitter is still on the air without damage to the module and without perceptible carrier interruption. All PA and IPA modules are identical and may be moved into any spot in the transmitter. The FM-10S will continue to make 95% of full power with one of the modules failed and can remain on the air with as few as four PA modules operational. Optional redundant IPA's insure normal operation in case of an IPA failure. Standby or main IPA can be selected from the front panel or remotely.

Rear View



The FM-10S is the only transmitter in its class that offers true power supply redundancy. The FM-10S comes standard with four modular PA power supplies and a fifth unit is optional. These power supplies are ganged together to provide for full power operation with one of the supplies off line in the optional configuration. The FM-10S can stay on the air with as many as three supplies off line in the optional configuration.

Cooling for the FM-10S is provided by four ball bearing blowers. These high capacity air movers insure proper cooling for all sections of the transmitter. No major area of the transmitter uses air that has been pre-heated by another section of the unit. Every section intakes air that is at room temperature. The multiple fans provide for proper cooling at temperatures and altitudes far beyond those of most other solid state transmitters of this power level.

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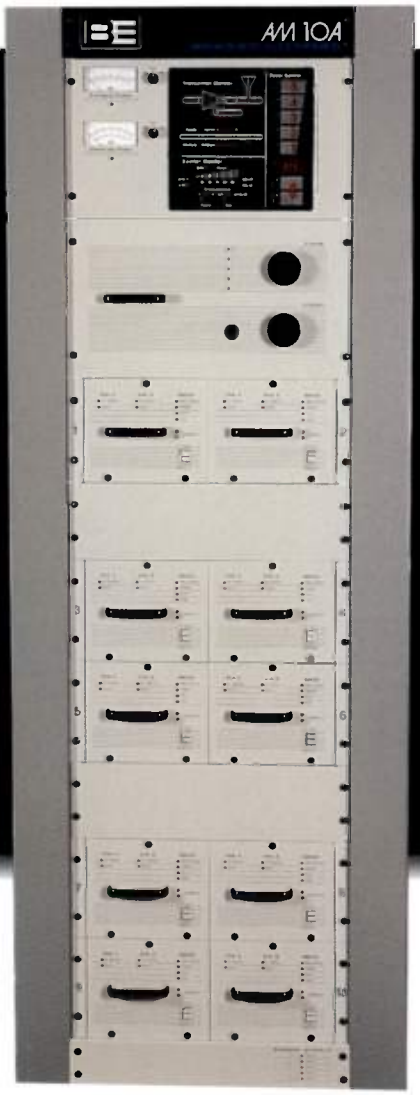
AM-10A

Solutions for Tomorrow's Radio

10 kW Solid State AM Stereo Transmitter

The 10 kW Solid State AM transmitter from Broadcast Electronics is based on the original AM-10 but has been designed in a single rack to take up less space in the transmitter room. Less occupied space means reduced overhead expenses. And the AM-10A is one of the least expensive 10 kW AM transmitters on the market. The AM-10A Solid State AM transmitter represents just one of the many solutions to your radio needs.



Features

- Exclusive, patented class E power modules achieve unequaled power economy and operating efficiencies.
- Operates at five user-defined power levels, low enough to handle any nighttime power requirement.
- Performs at the highest audio quality - even at the station's lowest output power.
- Multiple front-panel plug-in power amplifiers.
- Unique redundant power supply design enhances transmitter reliability.
- Only Solid State 10 kW AM transmitter in a single rack.
- Low-noise super cooling system extends transistor life up to eight times.
- Built-in output network eliminates the need for external impedance matching.
- Built-in C-QUAM stereo delivers the highest quality stereo performance, eliminating the need for additional equipment.

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AM-10A

Solutions for Tomorrow's Radio

10 kW Solid State AM Stereo Transmitter

Performance Specifications

General: The AM-10A transmitter complies with Broadcast Electronics safety standards and meets IEC 215 safety requirements. The AM-10A also meets or exceeds FCC and DOC technical requirements.
Transmitter Configuration: The AM-10A is comprised of the following assemblies: One Exciter Control Unit (ECU), Five Power Blocks, One Output Network, Five Power Supply Panels, One AC Distribution Panel, and Five Fan Assemblies.
PA Configuration: Ten plug-in power modules for easy front panel removal, rated at 1100 watts RF power output. Each power module is comprised of two power amplifier boards and one modulator board. The power amplifiers use high efficiency Class E (patented) switching amplifiers in push pull mode. The modulator uses a high efficiency forward Pulse Width Modulation (PWM) switchmode converter.
Power Output: 10 kW nominal. 50 watts to 10,800 watts capability. Five (5) Preset Power levels available by local or remote control. Power Controls 1 & 2 adjustable between 50 and 5000 watts. Power Control 3 is switchable between either 50 to 5000 watts or 3500 to 10,800 watts. Power Controls 4 & 5 adjustable between 3500 and 10,800 watts.
RF Output Load Impedance: 50 ohms, unbalanced. Matching network to optimize nominal VSWR of 1.4:1 at any phase angle at carrier frequency.
Output Connector: 1-5/8" female EIA flange.
Load VSWR: Nominal 1.4:1 at full carrier power. Will operate into higher VSWR with automatic power reduction, open and short circuit protected.
Harmonic And Spurious Suppression: Meets or exceeds FCC, DOC, and CCIR requirements, when preceded by external NRSC-1 compatible audio low pass filter(s).
Carrier Frequency Range: 522 kHz to 1705 kHz. Supplied on one frequency (synthesized), as ordered. Accommodates 9 kHz or 10 kHz channel spacing.
Carrier Frequency Stability: +/-3 ppm, 0 to 50 degrees, centigrade.
Carrier Shift: Less than 1% at 95% negative modulation at 1 kHz.
Type of Modulation: Pulse Width Modulation of L+R envelope with integrated standard C-QUAM® AM stereo. An RF input connector (BNC) is also provided for an external stereo exciter.
Modes: Stereo, Mono L+R, Mono L, Mono R by local or remote control.
Modulation Capability: 145% peak positive capability at 10,800 watts. 130% into 1.4:1 VSWR.
Modulation Input Indication: Peak reading, color coded, LED bar graph display with an autorange feature for monitoring positive or negative input levels of four different audio channels (L/R or L+R/L-R) in the transmitter.
Audio Input Level: +10 dBm, +/-1 dB, L=R (or mono) to produce 100% L+R envelope modulation. Other input levels accommodated by internal resistor selection.
Audio Input Impedance: 600 ohms. Inputs are balanced, transformerless, and resistive with passive RFI filtering. Other impedances can be accommodated.
Audio Frequency Response (Mono): +/-0.5 dB, from 20 Hz to 10 kHz at 90% negative modulation (high frequency boost in) +0.1 dB, -3 dB from 20 Hz to 10 kHz at 90% negative modulation, standard configuration.
Audio Harmonic Distortion (Mono):
Less than 0.8%, 20 Hz to 10 kHz, at 10 kW;
Less than 1.5%, 20 Hz to 10 kHz, at 5 kW;
Less than 2.0%, 20 Hz to 10 kHz, at 2.5 kW;
Less than 3.0%, 20 Hz to 10 kHz, at 1 kW.
All mono audio harmonic distortion specifications are referenced to an audio input level which generates 90% modulation at 1 kHz (9 dBm).
Audio Harmonic Distortion (Stereo): Less than 1.5% at 50% single channel modulation, 50 Hz to 10 kHz, at rated power.
Audio Intermodulation Distortion (Mono): 1.2% or less 1:1 ratio; 1.7% or less 4:1 ratio, 60/7000 Hz SMPTE standards at 85% modulation, at rated power.
CCIF Intermodulation Distortion (Mono): 1.0% or less 1:1 ratio, 4 kHz/5 kHz at 85% modulation, at rated power.
Transient Intermodulation Distortion (Mono): 1.0% or less 4:1 ratio, 2.96 kHz square wave/ 8.00 kHz sinewave at 85% modulation, at rated power.
Incidental Phase Modulation (Stereo): Less than 2 degrees (0.035 radians) average, or 30 dB (typical 40dB) below equivalent 100% L-R C-QUAM® modulation 50 Hz to 10 kHz, at rated power. Measured with an audio input level which generates 95% negative L+R envelope modulation at 1 kHz (9.5 dBm).
Stereo Separation: -30 dB or better, 50 Hz to 10 kHz, at 50% single channel modulation into a 50 ohm resistive load, at rated power.
Squarewave Overshoot (Mono): Less than 0.1% at 400 Hz, 90% modulation (linear phase mode).
Squarewave Overshoot (Stereo): Less than 1.0% at 400 Hz, 50% single channel modulation (linear phase mode).
Squarewave Tilt: Less than 1% at 40 Hz, less than 1.5% at 20 Hz, 90% negative modulation.
Noise (Mono): Better than 65 dB below a reference level equivalent to 100% negative modulation in a 22 Hz to 30 kHz bandwidth, unweighted.
Noise (Stereo): Better than 55 dB below a reference level equivalent to 100% negative modulation of either Left or Right channel in a 22 Hz to 30 kHz bandwidth, unweighted.
AC Input Voltage: 196 - 252 VAC, 50/60 Hz, three phase WYE or DELTA standard. Capability for: 339 - 437 VAC, 50/60 Hz, three phase 4 wire WYE or 196 - 252 VAC, 50/60 Hz single phase. The transmitter has built-in MOV's for surge suppression per IEEE C62.41-1991 Level B3 standard.
Output Power Regulation: Less than 1% change in output power with variation of AC line input voltage from 196 to 252 VAC.
AC Power Consumption: 13.3 kW, no modulation of 10 kW carrier. 20 kW, 100% sinusoidal modulation of 10 kW carrier.
Overall Efficiency: 75% or better, 100% sinusoidal modulation of 10 kW carrier (AC line input to RF output).
Cooling: Low velocity air (1200 CFM), with disposable filters. Filters can be changed with transmitter running.
Metering: Output Forward Power (High Scale 0-12,000 watts, Low Scale 0-3000 watts); Output Reflected Power (High 0-1200 watts, Low Scale 0-300 watts); AC Line Input Voltage (150-300 volts).
RF Monitoring Provisions: 2 volts RMS nominal RF output sample into 50 ohms input of the modulation monitor, adjustable from the transmitter front panel for each of the five power levels.
Remote Interface: Built-in simple interface for most remote control and monitoring systems.
Remote Control:
Transmitter OFF
Power Level Control 1, 2, 3, 4, 5
Power Raise and Lower
Mode Control (Stereo, Mono L+R, L, R), (Stereo, Mono L+R, L, R)
Antenna Interlocks (A, B, C)
External Transmitter Mute
Remote Failsafe
External Interlock
Alarm Reset

Remote Monitoring:
Transmitter OFF Status
Power Level Status 1, 2, 3, 4, 5
Mode Status (Stereo, Mono L+R, L, R)
Forward and Reflected Power Outputs (0-2.5 or 0-5.0 volts, jumper selectable)
Remote Enabled Status
Antenna Conflict
Maintenance
Lightning
1.2:1 VSWR
Reflected Power High (>400 watts)AM-10A
Reflected Power Emergency (>2700 watts)
Foldback (Output Power)
Exciter Fault
Overtemperature
Power Module Fault
Power Supply Fault
Alarm Status
Operating Temperature: 0 to 50 degrees, centigrade.
Operating Humidity: 0 to 95% (non-condensing).
Operating Altitude (AMSL): 10,000 feet (3,048 meters) at 60 Hz or 7,500 feet (2,286 meters) at 50 Hz.
Size: 27.3 in. wide x 37.0 in. deep x 73.5 in. high. (69.3 cm wide x 94.0 cm deep x 186.7 cm high.)
Weight: 635 lbs; 289 kg.
Cubage: 42.5 cu. ft. (1.2 cu. m.) domestic packed.

All specifications measured with Broadcast Electronics Model AS-10 modulation monitor while transmitting at 10 kW into a 50 ohm resistive load. Audio performance may be degraded should the transmitter be operated into a bandwidth restricted antenna system.

C-QUAM is the registered trademark of Motorola, Inc.

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AM-500A

Solutions for Tomorrow's Radio

500W Solid State AM Transmitter

The AM-500A from Broadcast Electronics is designed to save you money. Sure it's small but it's also less expensive than any other major manufacturer's 500W model. The AM-500A fits easily into your existing equipment rack without tying up needed floor space. It's even less expensive to ship. What's more, the AM-500A's unique power control design can meet your nighttime power requirements without expensive splitters or the need for a separate low-power transmitter. And because of this unique engineering feature, there's less audio degradation when it's time to reduce power.

Features

- Exclusive, patented class E power module achieves unequaled power economy and operating efficiencies
- Operates at five user-defined power levels, as low as 5 watts
- Performs at the highest audio quality - even at the station's lowest output power
- Front-panel plug-in power amplifier
- UPS-shippable
- Super cooling system extends transistor life up to eight times
- Optional output network eliminates the need for external impedance matching
- Built-in C-QUAM stereo delivers the highest quality stereo performance, eliminating the need for additional equipment
- Mounts in standard 19" EIA equipment rack

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AM-500A

Solutions for Tomorrow's Radio

500W Solid State AM Transmitter

Performance Specifications

GENERAL

The AM-500A transmitter complies with Broadcast Electronics safety standards and meets IEC 215 safety requirements. The AM-500A also meets or exceeds FCC and Industry Canada technical requirements.

Transmitter Configuration: The AM-500A is comprised of two main assemblies: Exciter Control Unit (ECU) and the Output Network box. The output network box includes the RF module, power supply and AC distribution wiring. These units can be mounted in a standard 19" rack, not supplied.

PA Configuration: One plug-in power module for easy front panel removal rated at 550 watts RF power output. The power module is comprised of two power amplifier boards and one modulator board. The power amplifiers use high efficiency Class E (patented) switching amplifiers in push pull mode. The modulator uses a high efficiency forward Pulse Width Modulation (PWM) switchmode converter.

Power Output: 500W nominal. 5 watts to 550 watts capability. Five (5) Preset Power levels available by local or remote control. Power Controls 1& 2 adjustable between 5 and 250 watts. Power Control 3 is switchable between either 5 or 500 watts or 150 to 550 watts. Power Controls 4 & 5 adjustable between 150 and 500 watts.

RF Output Load Impedance: 50 ohms, unbalanced. Optional matching network to optimize nominal VSWR of 1.35:1 at any phase angle at carrier frequency.

Load VSWR: Nominal 1.3:1 at full carrier power. Will operate into higher VSWR with automatic power reduction, open and short circuit protected.

Harmonic and Spurious Suppression: Meets or exceeds FCC, Industry Canada, and CCIR requirements, when preceded by external NRSC-1 compatible audio low pass filter(s).

Carrier Frequency Range: 522 kHz to 1705 kHz. Supplied on one frequency (synthesized), as ordered. Accommodates 9 kHz or 10 kHz channel spacing (9 kHz requires an optional crystal).

Carrier Frequency Stability: +/- 3 ppm, 0 to 50 degrees, centigrade.

Carrier Shift: Less than 1% at 95% negative modulation at 1 kHz.

Type of Modulation: Pulse Width Modulation of L+R envelope with integrated standard C-QUAM® AM stereo. An RF input connector (BNC) is also provided for an external stereo exciter.

Modes: Stereo, Mono L+R, Mono L, Mono R by local or remote control.

Modulation Capability: 145% peak positive capability at 550 watts. 130% into 1.3:1 VSWR.

Modulation Input Indication: Peak reading, color coded, LED bar graph display with an autorange feature for monitoring positive or negative input levels of four different audio channels (L/R or L+R/L-R) in the transmitter.

Audio Input Level: +10 dBm, +/-1 dB, L=R (or mono) to produce 100% L+R envelope modulation. Other input levels accommodated by internal resistor selection.

Audio Input Impedance: 600 ohms. Inputs are balanced, transformerless, and resistive with passive RFI filtering. Other impedances can be accommodated.

Audio Frequency Response (Mono): +/-1.0 dB, from 20 Hz to 10 kHz, at 90% negative modulation (high frequency boost installed). +0.1 dB, -3 dB from 20 Hz to 10 kHz at 90% negative modulation referenced at 1 kHz (9dBm), linear phase mode.

Audio Harmonic Distortion (Mono): Less than 1.2%, 20 Hz to 10 kHz, at 500 W. All mono audio harmonic distortion specifications are referenced to an audio input level which generates 90% modulation at 1 kHz (9 dBm).

Audio Harmonic Distortion (Stereo): Less than 2.0% at 50% single channel modulation, 50 Hz to 10 kHz, at rated power.

Audio Intermodulation Distortion (Mono): 1.2% or less 1:1 ratio; 1.7% or less 4:1 ratio, 60/7000 Hz SMPTE standards at 85% modulation, at rated power.

CCIF Intermodulation Distortion (Mono): 1.0% or less 1:1 ratio, 4 kHz/5 kHz at 85% modulation, at rated power.

Transient Intermodulation Distortion (Mono): 1.0% or less 4:1 ratio, 2.96 kHz squarewave/8.00 kHz sinewave at 85% modulation, at rated power.

Incidental Phase Modulation: Less than 2 degrees (0.035 radians) average, or 30 (typical 40 dB) dB below equivalent 100% L-R C-QUAM® modulation 50 Hz to 10 kHz, at rated power. Measured with an audio input level which generates 95% negative L+R envelope modulation at 1 kHz (9.5 dBm).

Stereo Separation: -25 dB or better, 50 Hz to 10 kHz at 50% single channel modulation into a 50 ohm resistive load, at rated power.

Squarewave Overshoot (mono): 0.1% or less at 400 Hz, 90% modulation, without HF boost circuit (linear phase mode).

Squarewave Overshoot (Stereo): 1.0% or less at 400 Hz, 50% single channel modulation, without HF boost circuit (linear phase mode).

Squarewave Tilt: Less than 1% at 40 Hz, less than 1.5% at 20 Hz, 90% negative modulation.

Noise (Mono): Better than 65 dB below a reference level equivalent to 100% negative modulation in a 22 Hz to 30 kHz bandwidth, unweighted.

Noise (Stereo): Better than 55 dB below a reference level equivalent to 100% negative modulation of either Left or Right channel in a 22 Hz to 30 kHz bandwidth, unweighted.

AC Input Voltage: 196-252 VAC, 50/60 Hz, single phase. The transmitter has built-in MOV's for surge suppression. Meets IEEE C62.41-1991 Level B3 standard.

Output Power Regulation: Less than 1% change in output power with variation of AC line input voltage from 196 to 252 VAC.

AC Power Consumption: 830 watt, no modulation of 500W carrier. 1.25 kW, 100% sinusoidal modulation of 500 watt carrier.

Overall Efficiency: 60% or better, 100% sinusoidal modulation of 500W carrier (AC line input to RF output).

Metering: Output Forward Power (High Scale 0-600 watts, Low Scale 0-150 watts); Output Reflected Power (High 0-60 watts, Low Scale 0-12 watts); AC Line input Voltage (150-300 volts).

RF Monitoring Provisions: 2 volts RMS nominal RF output sample into 50 ohms input of the modulation monitor, adjustable from the transmitter back panel for each of the five power levels.

Remote Interface: Built-in simple interface for most remote control monitoring systems.

Remote Control: Transmitter OFF; Power Level Control 1, 2, 3, 4, 5: Power Raise and Lower; Mode Control (Stereo, Mono L+R, L, R); Antenna Interlocks (A, B, C); External Transmitter Mute; Remote Failsafe; External Interlock; Alarm Reset.

Remote Monitoring: Transmitter OFF Status; Power Level Status 1, 2, 3, 4, 5; Mode Status (Stereo, Mono L+R, L, R); Forward and Reflected Power Outputs; (0-2.5 or 0-5.0 volts, jumper selectable); Remote Enabled Status; Antenna Conflict; Maintenance; Lightning; 1.2:1 VSWR; Reflected Power High (>20 watts); Reflected Power Emergency (>100 watts); Foldback (Output Power); Overtemperature; Exciter Fault; Power Module Fault; Power Supply Fault; Alarm Status.

Operating Temperature: 0 to 50 degrees, centigrade.

Operating Humidity: 0 to 95% (non-condensing).

Operating Altitude (AMSL): 10,000 feet (3,048 meters) at 60 Hz or 7,500 feet (2,286 meters) at 50 Hz.

Size & Weight:

Output Network: 14"H x 19"W x 29"D - 76 lbs.
ECU: 10.5"H x 19"W x 17"D - 14.6 lbs.
Matching Network (optional): 8.75"H x 19"W x 20"D - 25 lbs.

C-QUAM is the registered trademark of Motorola, Inc.

Frequently Asked Questions

Power Range: AC Voltage	5 Watts to 500 Watts
Requirements:	196 to 252VAC 50/60 Hz
Configuration:	Single Phase, 3 wire
Disconnect Size:	20 Amp fused disconnect recommended
Actual amperage draw at:	1 Phase, 500 Watts, 9.5 Amps, average, actual determined by line voltage, carrier frequency, etc.
AC wire size:	14 copper, THHN or equivalent
Power Consumption:	830 Watts at 500kW RF output (no modulation). 1.25kW at 500 Watts RF output at 100% tone modulation
Cooling Air requirements:	1) Chassis 1 100 CFM
Heat dissipation:	750 Watts (2330 BTU/Hr) at 500 Watts RF output
To determine Air Conditioner size for closed system:	one BTU/hr=0.293 watt one watt=3.413 BTU/hr 12,000 BTU/hr=1 ton of A/C eg, at .60kW dissipated, a .17 ton A/C unit would be needed (600 x 3.413 = 2,047/12,000 = .17)
Output connection size:	Type N Female
Rack Requirements:	19" Rack Universal Mounting rail spacing (.281 diameter holes or 10-32 taps) with 12 vertical rack units (21.00") Depth 27" minimum
Weight:	85 lbs

NOTE: AC currents stated assumes line voltage of 196 VAC for operation at full modulation (125% peak).

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AM-1A

Solutions for Tomorrow's Radio

1 kW Solid State AM Transmitter

The AM-1A from Broadcast Electronics is designed to save you money. Sure it's small but it's also less expensive than any other major manufacturer's 1 kW model. The AM-1A fits easily into your existing equipment rack without tying up needed floor space. It's even less expensive to ship. What's more, the AM-1A's unique power control design can meet your nighttime power requirements without expensive splitters or the need for a separate low-power transmitter. And because of this unique engineering feature, there's less audio degradation when it's time to reduce power.

Features

- Exclusive, patented class E power modules achieve unequaled power economy and operating efficiencies
- Operates at five user-defined power levels, as low as 5 watts
- Performs at the highest audio quality - even at the station's lowest output power
- Front-panel plug-in power amplifier
- UPS-shippable
- Super cooling system extends transistor life up to eight times
- Optional output network eliminates the need for external impedance matching
- Built-in C-QUAM stereo delivers the highest quality stereo performance, eliminating the need for additional equipment
- Mounts in standard 19" EIA equipment rack

Need Solutions?
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AM-1A

Solutions for Tomorrow's Radio

1 kW Solid State AM Transmitter

Performance Specifications

GENERAL

The AM-1A transmitter complies with Broadcast Electronics safety standards and meets IEC 215 safety requirements. The AM-1A also meets or exceeds FCC and DOC technical requirements.

Transmitter Configuration: The AM-1A is comprised of two main assemblies: Exciter Control Unit (ECU) and the Output Network box. The output network box includes the RF module, power supply and AC distribution wiring. These units can be mounted in a standard 19" rack, not supplied.

PA Configuration: One plug-in power module for easy front panel removal rated at 1100 watts RF power output. The power module is comprised of two power amplifier boards and one modulator board. The power amplifiers use high efficiency Class E (patented) switching amplifiers in push pull mode. The modulator uses a high efficiency forward Pulse Width Modulation (PWM) switchmode converter.

Power Output: 1 kW nominal. 5 watts to 1100 watts capability. Five (5) Preset Power levels available by local or remote control. Power Controls 1& 2 adjustable between 5 and 500 watts. Power Control 3 is switchable between either 5 or 500 watts or 300 to 1100 watts. Power Controls 4 & 5 adjustable between 300 and 1100 watts.

RF Output Load Impedance: 50 ohms, unbalanced. Optional matching network to optimize nominal VSWR of 1.35:1 at any phase angle at carrier frequency.

Output Connector: Type N.

Load VSWR: Nominal 1.3:1 at full carrier power. Will operate into higher VSWR with automatic power reduction, open and short circuit protected.

Harmonic and Spurious Suppression: Meets or exceeds FCC, DOC, and CCIR requirements, when preceded by external NRSC-1 compatible audio low pass filter(s).

Carrier Frequency Range: 522 kHz to 1705 kHz. Supplied on one frequency (synthesized), as ordered. Accommodates 9 kHz or 10 kHz channel spacing (9 kHz requires an optional crystal).

Carrier Frequency Stability: +/- 3 ppm, 0 to 50 degrees, centigrade.

Carrier Shift: Less than 1% at 95% negative modulation at 1 kHz.

Type of Modulation: Pulse Width Modulation of L+R envelope with integrated standard C-QUAM® AM stereo. An RF input connector (BNC) is also provided for an external stereo exciter.

Modes: Stereo, Mono L+R, Mono L, Mono R by local or remote control.

Modulation Capability: 145% peak positive capability at 1100 watts. 130% into 1.5:1 VSWR.

Modulation Input Indication: Peak reading, color coded, LED bar graph display with an autorange feature for monitoring positive or negative input levels of four different audio channels (L/R or L+R/L-R) in the transmitter.

Audio Input Level: +10 dBm, +/-1 dB, L=R (or mono) to produce 100% L+R envelope modulation. Other input levels accommodated by internal resistor selection.

Audio Input Impedance: 600 ohms. Inputs are balanced, transformerless, and resistive with passive RFI filtering. Other impedances can be accommodated.

Audio Frequency Response (Mono): +/-0.5 dB, from 20 Hz to 10 kHz, at 90% negative modulation (high frequency boost installed). +0.1 dB, -3 dB from 20 Hz to 10 kHz at 90% negative modulation referenced at 1 kHz (9dBm), linear phase mode.

Audio Harmonic Distortion (Mono): Less than 0.8%, 20 Hz to 10 kHz, at 1 kW: Less than 1.5%, 20 Hz to 10 kHz, at 500 W; Less than 2.0%, 20 Hz to 10 kHz, at 250 W; Less than 3.0%, 20 Hz to 10 kHz at 100 W. All mono audio harmonic distortion specifications are referenced to an audio input level which generates 90% modulation at 1 kHz (9 dBm).

Audio Harmonic Distortion (Stereo): Less than 1.5% at 50% single channel modulation, 50 Hz to 10 kHz, at rated power.

Audio Intermodulation Distortion (Mono): 1.2% or less 1:1 ratio; 1.7% or less 4:1 ratio, 60/7000 Hz SMPTE standards at 85% modulation, at rated power.

CCIF Intermodulation Distortion (Mono): 1.0% or less 1:1 ratio, 4 kHz/5 kHz at 85% modulation, at rated power.

Transient Intermodulation Distortion (Mono): 1.0% or less 4:1 ratio, 2.96 kHz squarewave/8.00 kHz sinewave at 85% modulation, at rated power.

Incidental Phase Modulation: Less than 2 degrees (0.035 radians) average, or 30 (typical 40 dB) dB below equivalent 100% L-R C-QUAM® modulation 50 Hz to 10 kHz, at rated power. Measured with an audio input level which generates 95% negative L+R envelope modulation at 1 kHz (9.5 dBm).

Stereo Separation: -30 dB or better, 50 Hz to 10 kHz at 50% single channel modulation into a 50 ohm resistive load, at rated power.

Squarewave Overshoot (mono): 0.1% or less at 400 Hz, 90% modulation, without HF boost circuit (linear phase mode).

Squarewave Overshoot (Stereo): 1.0% or less at 400 Hz, 50% single channel modulation, without HF boost circuit (linear phase mode).

Squarewave Tilt: Less than 1% at 40 Hz, less than 1.5% at 20 Hz, 90% negative modulation.

Noise (Mono): Better than 65 dB below a reference level equivalent to 100% negative modulation in a 22 Hz to 30 kHz bandwidth, unweighted.

Noise (Stereo): Better than 55 dB below a reference level equivalent to 100% negative modulation of either Left or Right channel in a 22 Hz to 30 kHz bandwidth, unweighted.

AC Input Voltage: 196-252 VAC, 50/60 Hz, single phase. The transmitter has built-in MOV's for surge suppression. Meets IEEE C62.41-1991 Level B3 standard.

Output Power Regulation: Less than 1% change in output power with variation of AC line input voltage from 196 to 252 VAC.

AC Power Consumption: 1.37 kW, no modulation of 1 kW carrier. 2.05 kW, 100% sinusoidal modulation of 1 kW carrier.

Overall Efficiency: 73% or better, 100% sinusoidal modulation of 1 kW carrier (AC line input to RF output).

Cooling: 250 cfm min.

Metering: Output Forward Power (High Scale 0-1200 watts, Low Scale 0-300 watts); Output Reflected Power (High 0-120 watts, Low Scale 0-30 watts); AC Line input Voltage (150-300 volts).

RF Monitoring Provisions: 2 volts RMS nominal RF output sample into 50 ohms input of the modulation monitor, adjustable from the transmitter front panel for each of the five power levels.

Remote Interface: Built-in simple interface for most remote control monitoring systems.

Remote Control: Transmitter OFF; Power Level Control 1, 2, 3, 4, 5: Power Raise and Lower; Mode Control (Stereo, Mono L+R, L, R); Antenna Interlocks (A, B, C); External Transmitter Mute; Remote Failsafe; External Interlock; Alarm Reset.

Remote Monitoring: Transmitter OFF Status; Power Level Status 1, 2, 3, 4, 5; Mode Status (Stereo, Mono L+R, L, R); Forward and Reflected Power Outputs; (0-2.5 or 0-5.0 volts, jumper selectable); Remote Enabled Status; Antenna Conflict; Maintenance; Lightning; 1.2:1 VSWR; Reflected Power High (>40 watts); Reflected Power Emergency (>270 watts); Foldback (Output Power); Overtemperature; Exciter Fault; Power Module Fault; Power Supply Fault; Alarm Status.

Operating Temperature: 0 to 50 degrees, centigrade.

Operating Humidity: 0 to 95% (non-condensing).

Operating Altitude (AMSL): 10,000 feet (3,048 meters) at 60 Hz or 7,500 feet (2,286 meters) at 50 Hz.

Size & Weight:

Output Network: 14"H x 19"W x 29"D - 76 lbs.
ECU: 10.5"H x 19"W x 17"D - 14.6 lbs.
Matching Network (optional): 8.75"H x 19"W x 20"D - 25 lbs.

All specifications measured with Broadcast Electronics Model AS-10 modulation monitor while transmitting at 1 kW into a 50 ohm resistive load. Audio performance may be degraded should the transmitter be operated into a bandwidth restricted antenna system.

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AM-2.5E

Leaders Look to BE

2.5 kW Solid State AM Transmitter

The 2.5kW solid state AM transmitter from Broadcast Electronics is based on the original AM-2.5, but has been improved to deliver many more hours of trouble-free operation. To increase the life of the power transistors, the AM-2.5E operates at a lower temperature above ambient than its predecessors. The AM-2.5E solid state AM transmitter represents just one of the many solutions available from Broadcast Electronics.

Features

- Exclusive, patented class E power modules achieve unequaled power economy and operating efficiencies
- Operates at five user-defined power levels, low enough to handle any nighttime power requirement
- Performs at the highest audio quality — even at the station's lowest output power
- Multiple front panel plug-in power amplifiers
- Low-noise super cooling system extends transistor life up to eight times
- Built-in output network eliminates the need for external impedance matching
- Built-in C-QUAM stereo delivers the highest quality stereo performance, eliminating the need for additional equipment
- Under/over voltage protection
- Power factor correction
- Meets CE Electro-Magnetic Compatibility (EMC) and Low Voltage Directives (LVD)

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AM-2.5E

Leaders Look to BE

2.5 kW Solid State AM Transmitter

Performance Specifications

General: The AM-2.5E transmitter complies with Broadcast Electronics safety standards and meets ENG0215 safety requirements. The AM-2.5E also meets or exceeds FCC and DOC technical requirements.

Transmitter Configuration: The AM-2.5E is comprised of the following ssemblies: One Exciter Control Unit (ECU), One Power Block, One Output Network, One Power Supply Panel, One AC Distribution Panel, and Two Fan Assemblies.

PA Configuration: Two plug-in power modules for easy front panel removal, rated at 1375 watts RF power output. Each power module is comprised of two power amplifier boards and one modulator board. The power amplifiers use high efficiency Class E (patented) switching amplifiers in push/pull mode. The modulator uses a high efficiency forward Pulse Width Modulation (PWM) switchmode converter.

Power Output: 2.5kW nominal. 12.5 watts to 2750 watts capability. Five (5) preset power levels available by local or remote control. Power controls 1 & 2 adjustable between 12.5 and 1250 watts. Power control 3 is switchable between either 12.5 to 1250 watts or 750 to 2750 watts. Power controls 4 & 5 adjustable between 750 and 2750 watts.

RF Output Load Impedance: 50 ohms, unbalanced. Matching network to optimize nominal VSWR of 1.5:1 at any phase angle at carrier frequency.

Output Connector: Female 7/16" DIN.

Load VSWR: Nominal 1.5:1 at full carrier power. Will operate into higher VSWR with automatic power reduction, open and short circuit protected.

Harmonic and Spurious Suppression: Meets or exceeds FCC, DOC, and CCIR requirements, when preceded by external NRSC-1 compatible audio low pass filter(s).

Carrier Frequency Range: 522kHz to 1705kHz. Supplied on one frequency (synthesized), as ordered. Accommodates 9kHz or 10kHz channel spacing.

Carrier Frequency Stability: ±3ppm, 0 to 50°, centigrade.

Carrier Shift: Less than 1% at 95% negative modulation at 1kHz.

Type of Modulation: Pulse width modulation of L+R envelope with optional integrated C-QUAM AM stereo. An RF input connector (BNC) is also provided for an external RF or stereo exciter.

Modes: Stereo, Mono L+R, Mono L, Mono R by local or remote control.

Modulation Capability: 145% peak positive capability at 2750 watts. 130% into 1.5:1 VSWR.

Modulation Input Indication: Peak reading, color coded, LED bar graph display with an autorange feature for monitoring positive or negative input levels of four different channels (L/R or L+R/L-R) in the transmitter.

Audio Input Level: +10dBm, ±1dB, L=R (or mono) to produce 100% L+R envelope modulation. Other input levels accommodated by internal resistor selection.

Audio Input Impedance: 600 ohms. Inputs are balanced, transformerless, and resistive with passive RFI filtering. Other impedances can be accommodated.

Audio Frequency Response (Mono): ±0.5dB, from 20Hz to 10kHz at 90% negative modulation (high frequency boost in) +0.1dB, -3dB from 20Hz to 10kHz at 90% negative modulation, standard configuration.

Audio Harmonic Distortion (Mono):
Less than 0.8%, 20Hz to 10kHz, at 2.5kW;
Less than 1.5%, 20Hz to 10kHz, at 1.25kW;
Less than 2.0%, 20Hz to 10kHz, at .625kW;
Less than 3.0%, 20Hz to 10kHz, at 250W.
All mono audio harmonic distortion specifications are referenced to an audio input level which generates 90% modulation at 1kHz (9dBm).

Audio Harmonic Distortion (Stereo): Less than 1.5% at 50% single channel modulation, 50Hz to 10kHz, at rated power.

Audio Intermodulation Distortion (Mono): 1.2% or less 1:1 ratio; 1.7% or less 4:1 ratio, 60/7000 Hz SMPTE standards at 85% modulation, at rated power.

CCIF Intermodulation Distortion (Mono): 1.0% or less 1:1 ratio, 4kHz/5kHz at 85% modulation, at rated power.

Transient Intermodulation Distortion (Mono): 1.0% or less 4:1 ratio, 2.96 kHz square wave/8.00 kHz sinewave at 85% modulation, at rated power.

Incidental Phase Modulation (Stereo): Less than 2° (0.035 radians) average, or 30dB (typical 40dB) below equivalent 100% L-R C-QUAM modulation 50Hz to 10kHz, at rated power. Measured with an audio input level which generates 95% negative L+R envelope modulation at 1kHz (9.5dBm).

Stereo Separation: -30dB or better, 50Hz to 10kHz, at 50% single channel modulation into a 50 ohm resistive load, at rated power.

Squarewave Overshoot (Mono): Less than 0.1% at 400Hz, 90% modulation (linear phase mode).

Squarewave Overshoot (Stereo): Less than 1.0% at 400Hz, 50% single channel modulation (linear phase mode).

Squarewave Tilt: Less than 1% at 40Hz, less than 1.5% at 20Hz, 90% negative modulation.

Noise (Mono): Better than 65dB below a reference level equivalent to 100% negative modulation in a 22Hz to 30kHz bandwidth, unweighted.

Noise (Stereo): Better than 55dB below a reference level equivalent to 100% negative modulation of either Left or Right channel in a 22Hz to 30kHz bandwidth, unweighted.

AC Input Voltage: 196-252 VAC, 50/60Hz, single phase.

Output Power Regulation: Less than 1% change in output power with variation of AC line input voltage from 196 to 252 VAC.

AC Power Consumption: 3.3kW, no modulation of 2.5kW carrier. 5kW, 100% sinusoidal modulation of 2.5kW carrier.

Overall Efficiency: 75% or better, 100% sinusoidal modulation of 2.5kW carrier (AC line input to RF output).

Cooling: Low velocity air (500 CFM), with cleanable filters. Filters can be changed with transmitter running.

Metering: Output Forward Power (high scale 0 to 3000 watts, low scale 0 to 750 watts); output reflected power (high 0 to 300 watts, low scale 0 to 75 watts); AC line input voltage (150 to 300 volts).

RF Monitoring Provisions: 2 volts RMS nominal RF output sample into 50 ohms input of the modulation monitor adjustable from the transmitter front panel for each of the five power levels.

Remote Interface: Built-in simple interface for most remote control and monitoring systems.

Remote Control:
Transmitter OFF
Power Level Control 1, 2, 3, 4, 5
Power Raise and Lower
Mode Control (Stereo, Mono L+R, L, R)
Antenna Interlocks (A, B, C)
External Transmitter Mute
Remote Failsafe
External Interlock
Alarm Reset

Remote Monitoring:
Transmitter OFF Status
Power Level Status 1, 2, 3, 4, 5
Mode Status (Stereo, Mono L+R, L, R)
Forward and Reflected Power Outputs, (0-2.5 or 0-5.0 volts, jumper selectable)
Remote Enabled Status
Antenna Conflict
Maintenance
Lightning
1.2:1 VSWR
Reflected Power High (>100 watts)
Reflected Power Emergency (>675 watts)
Foldback (Output Power)
Exciter Fault
Overtemperature
Power Module Fault
Power Supply Fault
Alarm Status

Operating Temperature: 0 to 50° C.

Operating Humidity: 0 to 95% (non-condensing)

Operating Altitude (AMSL): 10,000 feet (3,048 meters) at 60Hz or 7,500 feet (2,286 meters) at 50Hz.

Size: 24.82 in. wide x 31.55 in. deep x 71.32 in. high. (63.0 cm wide x 80.1 cm deep x 181.2 cm high)

Weight: 410 lbs; 186 kg.

Cubage: 42.8 cu. Ft. (1.2 cu. M) domestic packed.

All specifications measured with Broadcast Electronics' Model AS-10 modulation monitor while transmitting at 5kW into a 50 ohm resistive load. Audio performance may be degraded should the transmitter be operated into a bandwidth restricted antenna system.

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AM-5E

Leaders Look to BE

5 kW Solid State AM Transmitter

The 5kW solid state AM transmitter from Broadcast Electronics is based on the original AM-5, but has been improved to deliver many more hours of trouble-free operation. To increase the life of the power transistors, the AM-5E operates at a lower temperature above ambient than its predecessors. The AM-5E solid state AM transmitter represents just one of the many solutions available from Broadcast Electronics.

Features

- Exclusive, patented class E power modules achieve unequaled power economy and operating efficiencies
- Operates at five user-defined power levels, low enough to handle any nighttime power requirement
- Performs at the highest audio quality — even at the station's lowest output power
- Multiple front panel plug-in power amplifiers
- Unique redundant power supply design enhances transmitter reliability
- Low-noise super cooling system extends transistor life up to eight times
- Built-in output network eliminates the need for external impedance matching
- Built-in C-QUAM stereo delivers the highest quality stereo performance, eliminating the need for additional equipment
- Under/over voltage protection
- Power factor correction
- Meets CE Electro-Magnetic Compatibility (EMC) and Low Voltage Directives (LVD)

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AM-5E

Leaders Look to BE

5 kW Solid State AM Transmitter

Performance Specifications

General: The AM-5E transmitter complies with Broadcast Electronics safety standards and meets ENG0215 safety requirements. The AM-5E also meets or exceeds FCC and DOC technical requirements.

Transmitter Configuration: The AM-5E is comprised of the following assemblies: One Exciter Control Unit (ECU), Two Power Blocks, One Output Network, Two Power Supply Panels, One AC Distribution Panel, and Two Fan Assemblies.

PA Configuration: Four plug-in power modules for easy front panel removal, rated at 1375 watts RF power output. Each power module is comprised of two power amplifier boards and one modulator board. The power amplifiers use high efficiency Class E (patented) switching amplifiers in push/pull mode. The modulator uses a high efficiency forward Pulse Width Modulation (PWM) switchmode converter.

Power Output: 5kW nominal. 25 watts to 5500 watts capability. Five (5) preset power levels available by local or remote control. Power controls 1 & 2 adjustable between 25 and 2500 watts. Power control 3 is switchable between either 25 to 2500 watts or 1500 to 5500 watts. Power controls 4 & 5 adjustable between 1500 and 5500 watts.

RF Output Load Impedance: 50 ohms, unbalanced. Matching network to optimize nominal VSWR of 1.5:1 at any phase angle at carrier frequency.

Output Connector: Female 7/16" DIN.

Load VSWR: Nominal 1.5:1 at full carrier power. Will operate into higher VSWR with automatic power reduction, open and short circuit protected.

Harmonic and Spurious Suppression: Meets or exceeds FCC, DOC, and CCIR requirements, when preceded by external NRSC-1 compatible audio low pass filter(s).

Carrier Frequency Range: 522kHz to 1705kHz. Supplied on one frequency (synthesized), as ordered. Accommodates 9kHz or 10kHz channel spacing.

Carrier Frequency Stability: ±3ppm, 0 to 50°, centigrade.

Carrier Shift: Less than 1% at 95% negative modulation at 1kHz.

Type of Modulation: Pulse width modulation of L+R envelope with optional integrated C-QUAM AM stereo. An RF input connector (BNC) is also provided for an external RF or stereo exciter.

Modes: Stereo, Mono L+R, Mono L, Mono R by local or remote control.

Modulation Capability: 145% peak positive capability at 5500 watts. 130% into 1.5:1 VSWR.

Modulation Input Indication: Peak reading, color coded, LED bar graph display with an autorange feature for monitoring positive or negative input levels of four different channels (L/R or L+R/L-R) in the transmitter.

Audio Input Level: +10dBm, ±1dB, L=R (or mono) to produce 100% L+R envelope modulation. Other input levels accommodated by internal resistor selection.

Audio Input Impedance: 600 ohms. Inputs are balanced, transformerless, and resistive with passive RFI filtering. Other impedances can be accommodated.

Audio Frequency Response (Mono): ±0.5dB, from 20Hz to 10kHz at 90% negative modulation (high frequency boost in) +0.1dB, -3dB from 20Hz to 10kHz at 90% negative modulation, standard configuration.

Audio Harmonic Distortion (Mono):
Less than 0.8%, 20Hz to 10kHz, at 5kW;
Less than 1.5%, 20Hz to 10kHz, at 2.5kW;
Less than 2.0%, 20Hz to 10kHz, at 1.25kW;
Less than 3.0%, 20Hz to 10kHz, at 500W.
All mono audio harmonic distortion specifications are referenced to an audio input level which generates 90% modulation at 1kHz (9dBm).

Audio Harmonic Distortion (Stereo): Less than 1.5% at 50% single channel modulation, 50Hz to 10kHz, at rated power.

Audio Intermodulation Distortion (Mono): 1.2% or less 1:1 ratio; 1.7% or less 4:1 ratio, 60/7000 Hz SMPTE standards at 85% modulation, at rated power.

CCIF Intermodulation Distortion (Mono): 1.0% or less 1:1 ratio, 4kHz/5kHz at 85% modulation, at rated power.

Transient Intermodulation Distortion (Mono): 1.0% or less 4:1 ratio, 2.96 kHz square wave/8.00 kHz sinewave at 85% modulation, at rated power.

Incidental Phase Modulation (Stereo): Less than 2° (0.035 radians) average, or 30dB (typical 40dB) below equivalent 100% L-R C-QUAM modulation 50Hz to 10kHz, at rated power. Measured with an audio input level which generates 95% negative L+R envelope modulation at 1kHz (9.5dBm).

Stereo Separation: -30dB or better, 50Hz to 10kHz, at 50% single channel modulation into a 50 ohm resistive load, at rated power.

Squarewave Overshoot (Mono): Less than 0.1% at 400Hz, 90% modulation (linear phase mode).

Squarewave Overshoot (Stereo): Less than 1.0% at 400Hz, 50% single channel modulation (linear phase mode).

Squarewave Tilt: Less than 1% at 40Hz, less than 1.5% at 20Hz, 90% negative modulation.

Noise (Mono): Better than 65dB below a reference level equivalent to 100% negative modulation in a 22Hz to 30kHz bandwidth, unweighted.

Noise (Stereo): Better than 55dB below a reference level equivalent to 100% negative modulation of either Left or Right channel in a 22Hz to 30kHz bandwidth, unweighted.

AC Input Voltage: 196-252 VAC, 50/60Hz, single phase.

Output Power Regulation: Less than 1% change in output power with variation of AC line input voltage from 196 to 252 VAC.

AC Power Consumption: 6.7kW, no modulation of 5kW carrier. 10kW, 100% sinusoidal modulation of 5kW carrier.

Overall Efficiency: 75% or better, 100% sinusoidal modulation of 5kW carrier (AC line input to RF output).

Cooling: Low velocity air (500 CFM), with cleanable filters. Filters can be changed with transmitter running.

Metering: Output Forward Power (high scale 0 to 6000 watts, low scale 0 to 1500 watts); output reflected power (high 0 to 600 watts, low scale 0 to 150 watts); AC line input voltage (150 to 300 volts).

RF Monitoring Provisions: 2 volts RMS nominal RF output sample into 50 ohms input of the modulation monitor adjustable from the transmitter front panel for each of the five power levels.

Remote Interface: Built-in simple interface for most remote control and monitoring systems.

Remote Control:
Transmitter OFF
Power Level Control 1, 2, 3, 4, 5
Power Raise and Lower
Mode Control (Stereo, Mono L+R, L, R)
Antenna Interlocks (A, B, C)
External Transmitter Mute
Remote Failsafe
External Interlock
Alarm Reset

Remote Monitoring:
Transmitter OFF Status
Power Level Status 1, 2, 3, 4, 5
Mode Status (Stereo, Mono L+R, L, R)
Forward and Reflected Power Outputs, (0-2.5 or 0-5.0 volts, jumper selectable)
Remote Enabled Status
Antenna Conflict
Maintenance
Lightning
1.2:1 VSWR
Reflected Power High (>200 watts)
Reflected Power Emergency (>1350 watts)
Foldback (Output Power)
Exciter Fault
Overtemperature
Power Module Fault
Power Supply Fault
Alarm Status

Operating Temperature: 0 to 50° C.

Operating Humidity: 0 to 95% (non-condensing)

Operating Altitude (AMSL): 10,000 feet (3,048 meters) at 60Hz or 7,500 feet (2,286 meters) at 50Hz.

Size: 24.82 in. wide x 31.55 in. deep x 71.32 in. high. (63.0 cm wide x 80.1 cm deep x 181.2 cm high)

Weight: 525 lbs; 238 kg.

Cubage: 42.8 cu. Ft. (1.2 cu. M) domestic packed.

All specifications measured with Broadcast Electronics' Model AS-10 modulation monitor while transmitting at 5kW into a 50 ohm resistive load. Audio performance may be degraded should the transmitter be operated into a bandwidth restricted antenna system.

C-QUAM is a registered trademark of Motorola, Inc.

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AM-6A

Solutions for Tomorrow's Radio

6 kW Solid State AM Stereo Transmitter

The 6kW Solid State AM transmitter from Broadcast Electronics is based on the original AM-5, but has been improved to deliver more power, better efficiency and many more hours of trouble free operation. To increase the life of the power transistors, the AM-6A operates at a lower temperature above ambient than its predecessors.
The AM-6A Solid State AM transmitter represents just one of the many solutions to your radio needs available from Broadcast Electronics.

Features

- Exclusive, patented class E power modules achieve unequaled power economy and operating efficiencies.
- Operates at five user-defined power levels, low enough to handle any nighttime power requirement.
- Performs at the highest audio quality - even at the station's lowest output power.
- Multiple front-panel plug-in power amplifiers.
- Unique redundant power supply design enhances transmitter reliability.
- Low-noise super cooling system extends transistor life up to eight times.
- Built-in output network eliminates the need for external impedance matching.
- Built-in C-QUAM stereo delivers the highest quality stereo performance, eliminating the need for additional equipment.

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AM-6A

Solutions for Tomorrow's Radio

6 kW Solid State AM Stereo Transmitter

Performance Specifications

General: The AM-6A transmitter complies with Broadcast Electronics safety standards and meets IEC 215 safety requirements. The AM-6A also meets or exceeds FCC and DOC technical requirements.
Transmitter Configuration: The AM-6A is comprised of the following assemblies: One Exciter Control Unit (ECU), Three Power Blocks, One Output Network, Three Power Supply Panels, One AC Distribution Panel, and Three Fan Assemblies.
PA Configuration: Six plug-in power modules for easy front panel removal, rated at 1100 watts RF power output. Each power module is comprised of two power amplifier boards and one modulator board. The power amplifiers use high efficiency Class E (patented) switching amplifiers in push pull mode. The modulator uses a high efficiency forward Pulse Width Modulation (PWM) switchmode converter.
Power Output: 6 kW nominal. 25 watts to 6600 watts capability. Five (5) Preset Power levels available by local or remote control. Power Controls 1 & 2 adjustable between 25 and 3000 watts. Power Control 3 is switchable between either 25 to 3000 watts or 2000 to 6600 watts. Power Controls 4 & 5 adjustable between 2000 and 6600 watts.
RF Output Load Impedance: 50 ohms, unbalanced. Matching network to optimize nominal VSWR of 1.5:1 at any phase angle at carrier frequency.
Output Connector: 1/2" or 7/8" coax clamp.
Load VSWR: Nominal 1.5:1 at full carrier power. Will operate into higher VSWR with automatic power reduction, open and short circuit protected.
Harmonic And Spurious Suppression: Meets or exceeds FCC, DOC, and CCIR requirements, when preceded by external NRSC-1 compatible audio low pass filter(s).
Carrier Frequency Range: 522 kHz to 1705 kHz. Supplied on one frequency (synthesized), as ordered. Accommodates 9 kHz or 10 kHz channel spacing.
Carrier Frequency Stability: +/-3 ppm, 0 to 50 degrees, centigrade.
Carrier Shift: Less than 1% at 95% negative modulation at 1 kHz.
Type of Modulation: Pulse Width Modulation of L+R envelope with integrated standard C-QUAM™ AM stereo. An RF input connector (BNC) is also provided for an external stereo exciter.
Modes: Stereo, Mono L+R, Mono L, Mono R by local or remote control.
Modulation Capability: 145% peak positive capability at 6600 watts. 130% into 1.5:1 VSWR.
Modulation Input Indication: Peak reading, color coded, LED bar graph display with an autorange feature for monitoring positive or negative input levels of four different audio channels (L/R or L+R/L-R) in the transmitter.
Audio Input Level: +10 dBm, +/-1 dB, L=R (or mono) to produce 100% L+R envelope modulation. Other input levels accommodated by internal resistor selection.
Audio Input Impedance: 600 ohms. Inputs are balanced, transformerless, and resistive with passive RFI filtering. Other impedances can be accommodated.
Audio Frequency Response (Mono): +/-0.5 dB, from 20 Hz to 10 kHz at 90% negative modulation (high frequency boost in) +0.1 dB, -3 dB from 20 Hz to 10 kHz at 90% negative modulation, standard configuration.

Audio Harmonic Distortion (Mono):
Less than 0.8%, 20 Hz to 10 kHz, at 6 kW;
Less than 1.5%, 20 Hz to 10 kHz, at 3 kW;
Less than 2.0%, 20 Hz to 10 kHz, at 1.5 kW;
Less than 3.0%, 20 Hz to 10 kHz, at 600 W.
All mono audio harmonic distortion specifications are referenced to an audio input level which generates 90% modulation at 1 kHz (9 dBm).
Audio Harmonic Distortion (Stereo): Less than 1.5% at 50% single channel modulation, 50 Hz to 10 kHz, at rated power.
Audio Intermodulation Distortion (Mono): 1.2% or less 1:1 ratio; 1.7% or less 4:1 ratio, 60/7000 Hz SMPTE standards at 85% modulation, at rated power.
CCIF Intermodulation Distortion (Mono): 1.0% or less 1:1 ratio, 4 kHz/5 kHz at 85% modulation, at rated power.
Transient Intermodulation Distortion (Mono): 1.0% or less 4:1 ratio, 2.96 kHz square wave/8.00 kHz sinewave at 85% modulation, at rated power.
Incidental Phase Modulation (Stereo): Less than 2 degrees (0.035 radians) average, or 30 dB (typical 40dB) below equivalent 100% L-R C-QUAM™ modulation 50 Hz to 10 kHz, at rated power. Measured with an audio input level which generates 95% negative L+R envelope modulation at 1 kHz (9.5 dBm).
Stereo Separation: -30 dB or better, 50 Hz to 10 kHz, at 50% single channel modulation into a 50 ohm resistive load, at rated power.
Squarewave Overshoot (Mono): Less than 0.1% at 400 Hz, 90% modulation (linear phase mode).
Squarewave Overshoot (Stereo): Less than 1.0% at 400 Hz, 50% single channel modulation (linear phase mode).
Squarewave Tilt: Less than 1% at 40 Hz, less than 1.5% at 20 Hz, 90% negative modulation.
Noise (Mono): Better than 65 dB below a reference level equivalent to 100% negative modulation in a 22 Hz to 30 kHz bandwidth, unweighted.
Noise (Stereo): Better than 55 dB below a reference level equivalent to 100% negative modulation of either Left or Right channel in a 22 Hz to 30 kHz bandwidth, unweighted.
AC Input Voltage: 196 - 252 VAC, 50/60 Hz, single phase standard. Capability for: 339 - 437 VAC, 50/60 Hz, three phase 4 wire WYE or 196 - 252 VAC, 50/60 Hz WYE or DELTA three phase. The transmitter has built-in MOV's for surge suppression per IEEE C62.41-1991 Level B3 standard.
Output Power Regulation: Less than 1% change in output power with variation of AC line input voltage from 196 to 252 VAC.
AC Power Consumption: 8 kW, no modulation of 6 kW carrier. 12 kW, 100% sinusoidal modulation of 6 kW carrier.
Overall Efficiency: 75% or better, 100% sinusoidal modulation of 6 kW carrier (AC line input to RF output).
Cooling: Low velocity air (720 CFM), with cleanable filters. Filters can be changed with transmitter running.
Metering: Output Forward Power (High Scale 0-7000 watts, Low Scale 0-1750 watts); Output Reflected Power (High 0-600 watts, Low Scale 0-150 watts); AC Line Input Voltage (150-300 volts).
RF Monitoring Provisions: 2 volts RMS nominal RF output sample into 50 ohms input of the modulation monitor, adjustable from the transmitter front panel for each of the five power levels.

Remote Interface: Built-in simple interface for most remote control and monitoring systems.
Remote Control:
Transmitter OFF
Power Level Control 1, 2, 3, 4, 5
Power Raise and Lower
Mode Control (Stereo, Mono L+R, L, R),
(Stereo, Mono L+R, L, R)
Antenna Interlocks (A, B, C)
External Transmitter Mute
Remote Failsafe
External Interlock
Alarm Reset

Remote Monitoring:
Transmitter OFF Status
Power Level Status 1, 2, 3, 4, 5
Mode Status (Stereo, Mono L+R, L, R)
Forward and Reflected Power Outputs,
(0-2.5 or 0-5.0 volts, jumper selectable)
Remote Enabled Status
Antenna Conflict
Maintenance
Lightning
1.2:1 VSWR
Reflected Power High, (>240 watts)AM-6A
Reflected Power Emergency (>1620 watts)
Foldback (Output Power)
Exciter Fault
Overtemperature
Power Module Fault
Power Supply Fault
Alarm Status
Operating Temperature: 0 to 50 degrees, centigrade.
Operating Humidity: 0 to 95% (non-condensing).
Operating Altitude (AMSL): 10,000 feet (3,048 meters) at 60 Hz or 7,500 feet (2,286 meters) at 50 Hz.
Size: 27.3 in. wide x 37.0 in. deep x 73.5 in. high. (69.3 cm wide x 94.0 cm deep x 186.7 cm high.)
Weight: 442 lbs; 201 kg.
Cubage: 42.5 cu. ft. (1.2 cu. m.) domestic packed.

All specifications measured with Broadcast Electronics Model AS-10 modulation monitor while transmitting at 6 kW into a 50 ohm resistive load. Audio performance may be degraded should the transmitter be operated into a bandwidth restricted antenna system.

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FM-500C1

Solutions for Tomorrow's Radio

500 W Solid State FM Stereo Transmitter

The Broadcast Electronics' 500 Watt Solid State FM transmitter has set the standards for audio quality, cost-efficiency, reliability and long life. The FM-500C1 employs the FX-50 exciter which delivers unmatched audio performance. The FM-500C1 Solid State FM transmitter represents just one of the many solutions to your radio needs.

Features

- Contains the renowned FX-50 Exciter which is the broadcast standard for FM audio performance.
- True proportional (VSWR) foldback to keep the transmitter on the air even in the worst conditions.
- Advanced transmitter controller provides exceptional front panel transmitter control capabilities and extensive metering of P.A. module.
- Developed with a low noise super cooling system that significantly extends transistor life.
- Now available with optional Predator digital exciter.
- Frequency agile, N+1 compatible so you can have an automatic back-up for any signal in the band.
- Rack mountable - fits the standard 19-inch racks.
- Compact size allows low cost shipping. This transmitter is UPS-able.
- Accessories are available: automatic exciter switcher, digital stereo generator or SCA generator.
- Standby plug-in P.A. power supply available in separate rack mount chassis.

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FM-500C1

Solutions for Tomorrow's Radio

500 W Solid State FM Stereo Transmitter

Performance Specifications

GENERAL

Power Output: 125 watts to 500 watts
Frequency Range: 87.5 to 108 MHz, tuned to specific operating frequency. Exciter programmable in 10 kHz steps.
RF Output Impedance: 50 ohms
Output Connector: "N" type
VSWR: Rated power into 1.5:1 maximum, without output matching (capable of operating into higher VSWR with automatic power reduction). Open and short circuit protected at all phase angles.
Frequency Stability: ±300 Hz, 0 to 50 degrees C.
Type of Modulation: Direct frequency modulation of carrier frequency.
Modulation Capability: Greater than ±350 kHz.
Modulation Indication: Peak reading, color coded, LED display with baseband overmodulation indicator.
Exciter: Solid state, 50 watt output, Model FX50; incorporating a digitally programmed synthesizer. (10 kHz increments). Predator digital exciter optional.
PreEmphasis: FCC 75µS, CCIR 50µS (where specified), 25µS (Dolby), or flat response, selectable.
Asynchronous AM S/N Ratio: 68 dB below reference carrier with 100% AM modulation at 1000 Hz, 75µS deemphasis. (No FM modulation present.)
Synchronous AM S/N Ratio: 58 dB below 1 kW reference carrier at 100% AM modulation at 1000 Hz, 75 µS deemphasis with FM modulation ±75 kHz at 1000 Hz.
IMD Protection: The output filtering supplied with the transmitter will be adequate to provide spurious and harmonic suppression as required below. Band pass or notch filters required at sites used by multiple stations will be vendor supplied on an as needed basis. It is desirable that the combining system(s) provide 20dB or more mixing Turn Around Loss to interfering signals.
RF Harmonics: Suppression meets all FCC/DOC requirements and CCIR recommendations.
AC Input Power: 195/252 Vac, 50/60 Hz, single phase. All power supplies and cooling will be single phase.
Overall Efficiency: 40% or better, typically 45%.
Altitude: 7500 ft. at 50Hz (2286 M), 10,000 ft. at 60Hz (3048 M).
Ambient Temperature Range: 0 degrees C to +50 degrees C.
Size: 19" W x 24" D x 21" H (48.3 x 61.0 x 53.3 cm).
Weight: 73 lbs (33 kg); 140 lbs (64 kg) packed.

MONAURAL OPERATION

Audio Input Impedance: 600 ohms balanced, resistive, adaptable to other impedances, 60 dB common mode suppression.
Audio Input Level: +10 dBm nominal for ±75 kHz deviation at 400 Hz.
Audio Frequency Response: ±0.5 dB, 30 Hz to 15 kHz, selectable flat, 25, 50, 75 microsecond preemphasis.
Total Harmonic Distortion + Noise: 0.02% or less at 400 Hz.
SMPTE Intermodulation Distortion: 0.02% or less, 60 Hz/7 kHz, 4:1 ratio.
CCIF Intermodulation Distortion: 0.02% or less, 15 kHz/14 kHz, 1:1 ratio.
Transient Intermodulation Distortion: 0.02% or less sine wave/square wave.
FM S/N Ratio: 88dB below ±75 kHz deviation at 400 Hz measured in a 20 Hz to 30 kHz bandwidth with 75µS deemphasis.

WIDEBAND COMPOSITE OPERATION

Composite Inputs: 3 total, (1) unbalanced and (1) balanced plus front panel test. All connectors BNC.
Composite Input Impedance: 10K ohm or 50 ohm, nominal, resistive selectable.
Composite Input Level: 3.5 V pp nominal, for ±75 kHz deviation.
Composite FM S/N Ratio: 85dB below ±75 kHz deviation at 400 Hz. Measured in a 20 Hz to 30 kHz bandwidth with 75µS deemphasis.
Composite Harmonic Distortion + Noise: 0.02% or less at 400 Hz.
Composite SMPTE Intermodulation Distortion: 0.02% or less, 60Hz/7 kHz 1:1 ratio.
Composite CCIF Intermodulation Distortion: 0.02% or less, 15 kHz/14 kHz 1:1 ratio.
Composite Transient Intermodulation Distortion: 0.02% or less sine wave/square wave.
Composite Amplitude Response: ±0.25dB, 30 Hz to 100 kHz.
Composite Phase Response: ±0.25 degrees from linear phase, 30 Hz to 53 kHz.
Composite Group Delay: 125 nanoseconds.
Composite Slew Rate: 9 V/microsecond (symmetrical).

STEREO OPERATION

Audio Input Impedance: 600 ohms balanced, resistive, floating. (Adaptable to other impedances.)
Audio Input Level: +10 dBm, ±1 dBm, for 100% modulation at 400 Hz.
Audio Input Filters: 15 kHz LPF with delay equalization for minimum overshoot.
Frequency Response: ±0.5 dB, 30-15,000 Hz, 75µS preemphasis (flat, 25 or 50µS preemphasis selectable).
Total Harmonic Distortion: 0.05% or less at 400 Hz.
SMPTE Intermodulation Distortion: 0.05%, 60 Hz/7 kHz; 4:1 ratio.
CCIF Intermodulation Distortion: 0.05% or less, 15 kHz/14 kHz 1:1 ratio.
Transient Intermodulation Distortion: 0.05% (square wave/sine wave).
FM Signal to Noise: -82dB or better below 100% modulation at 400 Hz, 75 µS deemphasis.
Stereo Separation: 50 dB or better; 30-15,000 Hz (sine wave).
Dynamic Stereo Separation: 40 dB or better; 30-15,000 Hz (normal program content).
Linear Crosstalk: Main to Sub/Sub to Main due to amplitude and phase matching of left and right channels, 30-15,000 Hz, 45 dB minimum below 100% modulation.
NonLinear Crosstalk: Main to Sub/Sub to Main due to distortion products. 70 dB minimum below 100% modulation.
38 kHz Suppression: 80 dB minimum below 100% modulation.
Pilot Stability: ±0.5 Hz, 0 to 50 degrees C.
Modes: Stereo, Mono L+R, Mono (L) and Mono (R) remote controlled. (See FS30 data sheet for full details.)

SCA OPERATION

Modulation: Direct FM.
Subcarrier Frequency: 67 kHz (39 to 95 kHz to order).
Subcarrier Frequency Stability: ±0.5% (330 Hz at 67 kHz), 0 to 50 degrees C.
Subcarrier Harmonic Content: Less than 0.3%.
Subcarrier Envelope Decay: Greater than 100 msec from 90% to 10% subcarrier levels.
Modulation Capability: ±20% of subcarrier frequency.
Audio Input Impedance: 600 ohm balanced, resistive.
Data Input Impedance: 75 ohm unbalanced, resistive, DC coupled.
Input Levels: (Audio) adjustable +10 dBm to -10 dBm for ±6 kHz deviation at 400 Hz. (Data) adjustable 1.0 to 4.0 V p-p for ±6 kHz deviation (DC coupled).
Preemphasis: (Audio) 150 microseconds standard (75 µS with internal jumper) (Data) no preemphasis.
Frequency Response: (Audio) ±0.5 dB, 10-10,000 Hz, exclusive of audio low pass filter. (Data) ±0.5 dB, DC-10,000 Hz.
Audio Low Pass Filter: Sixth order, -3 dB at 4.3 kHz, standard (resistor changes for other values).
Data Low Pass Filter: Same as AF filter or may be bypassed.
Total Harmonic Distortion: Less than 0.5% throughout AF pass band.
SMPTE Intermodulation Distortion: Less than 0.5%, 60 Hz/7 kHz; 1:1 ratio (audio preemphasis and LPF bypassed).
Crosstalk, SCA to Stereo: -60 dB or better below 100% modulation of left or right. 75 µS deemphasis.
Crosstalk, Stereo to SCA: -50 dB or better below ±6 kHz deviation of SCA using 150 µS deemphasis and FS30 stereo generator.

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FM-1C1

Solutions for Tomorrow's Radio

1 kW Solid State FM Transmitter

The Broadcast Electronics' 1 kilowatt Solid State FM transmitter has set the standards for audio quality, cost-efficiency, reliability and long life. The FM-1C1 offers proportional VSWR foldback which protects the transmitter by automatically reducing output power to a safe operating level. The Solid State FM transmitters represent just one of the many solutions to your radio needs.

Features

- Contains the renowned FX-50 Exciter which is the broadcast standard for FM audio performance.
- Full RF redundancy - multiple front panel plug-in power amplifiers.
- True proportional (VSWR) foldback to keep the transmitter on the air even in the worst conditions.
- Advanced transmitter controller provides exceptional front panel transmitter control capabilities and extensive metering of individual modules.
- Conservative power rating.
- Developed with a low noise super cooling system that significantly extends transistor life.
- Frequency agile, N+1 compatible so you can have an automatic back-up for any signal in the band.
- Rack mountable - fits the standard 19-inch racks.
- Compact size allows low cost shipping. This transmitter is UPS-able.
- Accessories are available: automatic exciter switcher, digital stereo generator or SCA generator.

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FM-1C1

Solutions for Tomorrow's Radio

1 kW Solid State FM Transmitter

Performance Specifications

GENERAL

Power Output: 250 watts to 1,000 watts.
Frequency Range: 87.5 to 108 MHz, tuned to specific operating frequency. Exciter programmable in 10 kHz steps.
RF Output Impedance: 50 ohms.
Output Connector: "N" type.
VSWR: Rated power into 1.5:1 VSWR maximum, without output matching. Capable of operating into higher VSWR with automatic power reduction. Open and short circuit protected at all phase angles.
Frequency Stability: ±300 Hz, 0 to 50 degrees C.
Type of Modulation: Direct frequency modulation of carrier frequency.
Modulation Capability: Greater than ±350 Hz.
Modulation Indication: Peak reading, color coded, LED display with baseband overmodulation indicator.
Exciter: Solid state, 50 watt output, Model FX-50, incorporating a digitally programmed synthesizer (10 kHz increments).
Pre-Emphasis: FCC 75uS, CCIR 50uS (where specified), 25uS (Dolby), or flat response, selectable.
Asynchronous AM S/N Ratio: 68 dB below reference carrier with 100% AM modulation @ 1000 Hz, 75uS de-emphasis (no FM modulation present).
Synchronous AM S/N Ratio: 58 dB below 1 kW reference carrier at 100% AM modulation @ 1000 Hz, 75uS de-emphasis with FM modulation ±75 kHz @ 1000 Hz.
IMD Protection: The output filtering supplied with the transmitter will be adequate to provide spurious and harmonic suppression as required below. Band pass or notch filters required at sites used by multiple stations will be vendor supplied on an as needed basis. It is desirable that the combining system(s) provide 20dB or more mixing Turn Around Loss to interfering signals.
RF Harmonics: Suppression meets all FCC/DOC requirements and CCIR recommendations.
AC Input Power: 195/252 VAC, 50/60 Hz, single phase. All power supplies and cooling will be single phase.
Overall Efficiency: 47% or better, typically 50%.
Altitude: 7500 ft. (2286 M) @ 50 Hz; 10,000 ft. (3048 M) @ 60 Hz.
Ambient Temperature Range: 0 to +50 degrees C.

MONAURAL OPERATION

Audio Input Impedance: 600 ohms balanced, resistive, adaptable to other impedances, 60 dB common mode suppression.
Audio Input Level: +10 dBm nominal for ±75 kHz deviation @ 400 Hz.
Audio Frequency Response: ±0.5 dB, 30 Hz to 15 kHz, selectable flat, 25, 50, 75 microsecond pre-emphasis.
Total Harmonic Distortion + Noise: 0.02% or less at 400 Hz.
SMPTE Intermodulation Distortion: 0.02% or less, 60 Hz/7 kHz, 4:1 ratio.
CCIF Intermodulation Distortion: 0.02% or less, 15 kHz/14 kHz, 1:1 ratio.
Transient Intermodulation Distortion: 0.02% or less, sine wave/square wave.
FM S/N Ratio: 88 dB below ±75 kHz deviation @ 400 Hz, measured in a 20 Hz to 30 kHz bandwidth with 75uS de-emphasis.

WIDEBAND COMPOSITE OPERATION

Composite Inputs: 3 total, (1) unbalanced and (1) balanced plus front panel test. All connectors BNC.
Composite Input Impedance: 10K ohm or 50 ohm, nominal, resistive, selectable.
Composite Input Level: 3.5V p-p nominal, for ±75 kHz deviation.
Composite FM S/N Ratio: 88 dB below ±75 kHz deviation @ 400 Hz. Measured in a 20 Hz to 30 kHz bandwidth with 75uS de-emphasis.
Composite Total Harmonic Distortion + Noise: 0.02% or less @ 400 Hz.
Composite SMPTE Intermodulation Distortion: 0.02% or less, 60 Hz/7 kHz, 1:1 ratio.
Composite CCIF Intermodulation Distortion: 0.02% or less, 15 kHz/14 kHz, 1:1 ratio.
Composite Transient Intermodulation Distortion: 0.02% or less, sine wave/square wave.
Composite Amplitude Response: ±0.25 dB, 30 Hz to 100 kHz.
Composite Phase Response: ±0.25 degrees from linear phase, 30 Hz to 53 kHz.
Composite Group Delay: 125 nanoseconds.
Composite Slew Rate: 9 V/microsecond (symmetrical).

STEREO OPERATION

Audio Input Impedance: 600 ohms balanced, resistive, floating (adaptable to other impedances).
Audio Input Level: +10 dBm, ±1 dBm, for 100% modulation @ 400 Hz.
Audio Input Filters: 15 kHz LPF with delay equalization for minimum overshoot.
Frequency Response: ±0.5 dB, 30 to 15,000 Hz, 75uS pre-emphasis (flat, 25 or 50uS pre-emphasis selectable).
Total Harmonic Distortion: 0.05% or less @ 400 Hz.
SMPTE Intermodulation Distortion: 0.05%, 60 Hz/7 kHz, 4:1 ratio.
CCIF Intermodulation Distortion: 0.05% or less, 15 kHz/14 kHz, 1:1 ratio.
Transient Intermodulation Distortion: 0.05% (square wave/sine wave)
FM Signal to Noise: -82 dB or better below 100% modulation @ 400 Hz, 75uS de-emphasis.
Stereo Separation: 50 dB or better. 30-15,000 Hz (sine wave).
Dynamic Stereo Separation: 40 dB or better, 30-15,000 Hz (normal program content).
Linear Crosstalk: Main to Sub/Sub to Main due to amplitude and phase matching of left and right channels. 30-15,000 Hz, 45 dB minimum below 100% modulation.
Non-Linear Crosstalk: Main to Sub/Sub to Main due to distortion products. 70 dB minimum below 100% modulation.
38 kHz Suppression: 80 dB minimum below 100% modulation.
Pilot Stability: ±0.5 Hz, 0 to 50 degrees C.
Modes: Stereo, Mono L+R, Mono (L) and Mono (R) remote controlled. (See FS-30 data sheet for full details).

SCA OPERATION

Modulation: Direct FM.
Subcarrier Frequency: 67 kHz (39 to 95 kHz to order).
Subcarrier Frequency Stability: ±0.5% (330 Hz @ 67 kHz). 0 to 50 degrees C.
Subcarrier Harmonic Content: Less than 0.3%.
Subcarrier Envelope Decay: Greater than 100 msec from 90% to 10% subcarrier levels.
Modulation Capability: ±20% of subcarrier frequency.
Audio Input Impedance: 600 ohm balanced, resistive.
Data Input Impedance: 75 ohm unbalanced, resistive, DC coupled.
Input Levels: (Audio) adjustable +10 dBm to -10 dBm for ±6 kHz deviation @ 400 Hz. (Data) adjustable 1.0 to 4.0 V p-p for ±6 kHz deviation (DC coupled).
Pre-Emphasis: (Audio) 150 microseconds standard (75uS with internal jumper). (Data) no pre-emphasis.
Frequency Response: (Audio) ±0.5 dB, 10-10,000 Hz, exclusive of audio low pass filter. (Data) ±0.5 dB, DC-10,000 Hz.
Audio Low Pass Filter: Sixth order, -3 dB @ 4.3 kHz, standard (resistor changes for other values).
Data Low Pass Filter: Same as AF filter or may be bypassed.
Total Harmonic Distortion: Less than 0.5% throughout AF passband.
SMPTE Intermodulation Distortion: Less than 0.5%, 60 Hz/7 kHz, 1:1 ratio (audio pre-emphasis and LPF bypassed).
Crosstalk, SCA to Stereo: -60 dB or better below 100% modulation of left or right. 75uS de-emphasis.
Crosstalk, Stereo to SCA: -50 dB or better below ±6 kHz deviation of SCA using 150uS de-emphasis and FS-30 stereo generator.

PHYSICAL DIMENSIONS

Size: 19" W x 24" D x 21" H (48.3 x 61 x 53.3 cm).
Weight: 103 lbs (45 kg) 170 lbs (77 kg) packed.

Note: Size and weight do not indicate FX50 information.

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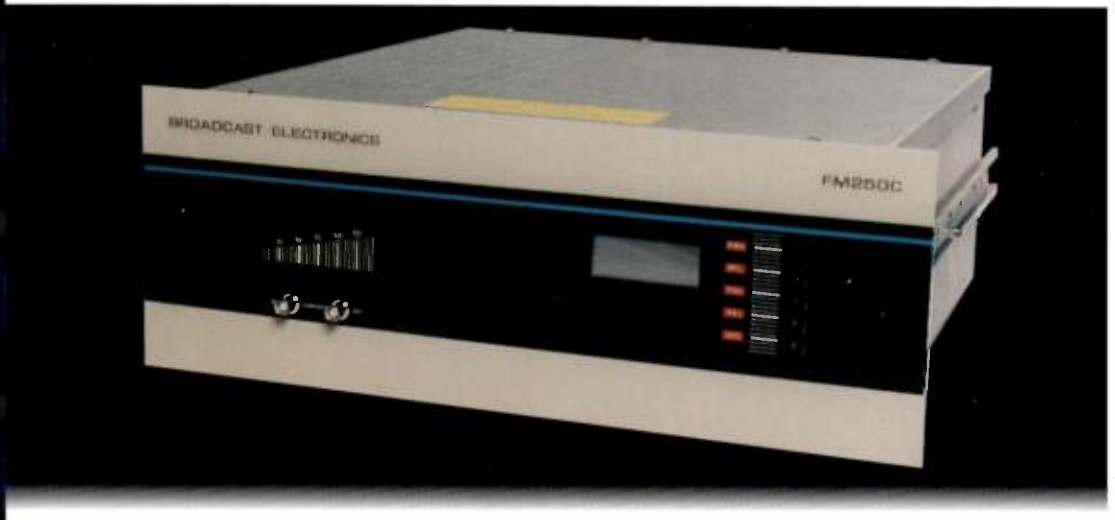
FM-250C

Solutions for Tomorrow's Radio

250 watt Exciter/Transmitter

The Broadcast Electronics' FM-250C's performance can bring existing FM transmitters up to digital quality standards, and has the lowest distortion of any available exciter. As the acknowledged standard for FM audio performance, the FM-250C's breakthrough technology remains unsurpassed by more costly and complex digital exciters. With the superb specifications available in this product, the FM-250C is totally transparent to your broadcast signal.



Features

- The FM-250C can serve as a reliable 250 watt stand-alone FM transmitter.
- Computer-optimized phase locked loop greatly improves low frequency response.
- Contains a 250 watt MOSFET as the output device.
- THD and IMD less than .01% typical for true digital capability.
- Optional N+1 board allows selection of up to 10 different frequencies in local or remote locations.
- With a signal to noise ratio that is typically 88 dB, the FM-250C can handle all of the nuances and power of digital audio.
- Frequency range of 87-109 MHz - digitally programmable in 10 kHz increments.
- Performance specifications feature a dynamic range that rivals CD players with harmonic and intermodulation distortion values so low they are virtually unmeasurable.

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FM-250C

Solutions for Tomorrow's Radio

250 watt Exciter/Transmitter

Performance Specifications

GENERAL

Power Output: 25 to 250 W continuously variable (BNC connector) open and short circuit protected.
R.F. Output Impedance: 50 ohms
R.F. Harmonic and Spurious Suppression: Meets all FCC and DOC requirements and CCIR recommendations for a 250-watt transmitter with standard low pass filter.
Frequency Range: 87 MHz to 109 MHz digitally programmable in 10 kHz increments.
Frequency Stability: ±300Hz, +32°F to +122°F (0°C to +50°C).
Modulation Type: Direct FM at the carrier frequency.
Modulation Capability: ±350 kHz.
Modulation Indication: Peak reading, color coded, LED display with baseband overmodulation indicator.
Asynchronous AM S/N Ratio: 70dB minimum below equivalent reference carrier with 100% amplitude modulation at 400Hz and 75µS de-emphasis (no FM modulation present).
Synchronous AM S/N Ratio: 55dB minimum below equivalent 50W reference carrier with 100% AM modulation at 1kHz, no de-emphasis (FM modulation +/- 75kHz and 1kHz).
Multimeter: 5 function LCD diagnostic aid +/- 3% accurate.
Test Metering: Internal high-input impedance multimeter with probe for point-to-point DC measurements.
Remote Metering: Buffered Forward and Reflected power outputs.
Exciter Status Display: Front panel status annunciators for +20V, -20V, +5V, Lock, RF, VSWR, and temp. Additional status LEDs are located on AFC/PII assembly for Mod Osc Chain, Ref Osc Chain, +5V, +15V and -15V.
Front Panel Test Connections: Composite input and composite output.
Audio/Control Connections: 14 position barrier strip and (5) BNC connectors. Control connections are AFC interlock (normally open/normally closed relay contacts), AFC indication (open collector and closure), +20V or remote power control (switch selectable), RF mute, Temperature overload (+18V at 15ma), buffered FWD and RFL meter samples, and two ground connections. All inputs/outputs RFI suppressed.
RF Mute Control: +3V to +40V DC or GND closure, switch selectable. Ima maximum.
AC Input Power: 97 to 133 VAC or 194 to 266 VAC, 50/60 Hz, 650 W maximum.
Ambient Temperature Range: ±32°F to +122°F (0°C to +50°C).
Altitude: 15,000 feet (4,572 m) AMSL.
Dimensions: 20.375"D x 7"H x 19.00"W (51.75 x 13.33 x 48.26 cm).
Net Weight: 53lbs. (24 kg), packed 63lbs. (27 kg).
Finish: Black backlit center overlay with technical white upper and lower extrusions.
Construction: Modular sub-assemblies with pin-plug interconnection.

WIDEBAND COMPOSITE OPERATION

Composite Inputs: 3 total, (1) unbalanced, (1) balanced, plus (1) front panel test provision (BNC connectors).
Composite Input Impedance:
Unbalanced: 10 k ohm, nominal, resistive.
Balanced: 10 k ohm or 50 ohm, programmable, jumper selected.
Composite Input Level: 3.5V p-p nominal, for ±75 kHz deviation.
Composite FM S/N Ratio: 85dB below +/- 75kHz deviation at 400Hz, measured in a 20Hz to 200kHz bandwidth with 75µS de-emphasis.
Composite Harmonic Distortion: 0.003% or less.
Composite Intermodulation Distortion: 0.01% or less.
Composite CCIF IMD: 0.01% or less. Twin tone, 15 kHz/14 kHz, 1:1 pair).
Composite Transient IMD: 0.01% or less (square wave/sine wave).
Composite Amplitude Response: +/- 0.1dB, 30Hz to 53kHz.
Composite Phase Response: +/- 0.25 degree from linear phase, 30Hz to 53kHz.
Composite Group Delay Variation: +/- 5 nanoseconds, 30Hz to 100kHz.
Subcarrier Inputs: 3 total, unbalanced, BNC connectors.
Subcarrier Input Impedance: 100 k ohm nominal, resistive.
Subcarrier Input Level: 3.5 V p-p nominal for ±7.5 kHz deviation (10% injection).
Subcarrier Amplitude Response: ±0.2 dB, 40 kHz to 100 kHz, -3 dB at 7,500 Hz.
Stereophonic Separation: 60dB, 30Hz to 5kHz, 52dB, 5 to 15kHz (measured using BE FS30 Stereo Generator).
SCA Inputs: 3 total, unbalanced BNC connectors.
SCA Input Impedance: 100 k ohm nominal, resistive.
SCA Input Level: 3.5V p-p nominal for+/- 7.5kHz deviation.
SCA Amplitude Response: +/- 0.2dB, 40 to 100kHz.

STEREO OPERATION

Modulation Type: Digitally synthesized stereo, digitally synthesized pilot. No pilot phase adjustment required.
Audio Input Impedance: 600 ohms, balanced, resistive, transformerless, floating (adaptable to other impedances).
Audio Input Level: +10 dBm, ±1 dB for 100% modulation at 400 Hz (adaptable to other input levels).
Audio Input Filters: 15 kHz active L.P.F., 45 dB rejection at 19 kHz, delay compensated for minimum overshoot without clippers or other non-linear devices.
Audio Overshoot: 2 dB maximum.
Audio Frequency Response: ±0.5 dB, 30 Hz to 15,000 Hz, 75µS pre-emphasis (flat, 25µS, 50µS pre-emphasis selectable).
Total Harmonic Distortion Plus Noise (THD+N): 0.03% or less at ±75 kHz deviation, 400 Hz, using 75µS de-emphasis.
Intermodulation Distortion: 0.05% or less, 60 Hz/7 kHz, 4:1 ratio.
CCIF Intermodulation Distortion: 0.05% or less. Left or right channel modulated 100%, twin tone, 15 kHz/14 kHz, 1:1 pair).
Stereo Separation: 50 dB; 30 Hz to 15,000 Hz 60dB; 30 Hz to 5000 Hz.
Dynamic Stereo Separation: 40 dB or better, 30-15,000 Hz (normal program content).
Linear Crosstalk: Main to Sub/Sub to Main due to distortion products. 45 dB minimum below 100% modulation.
Non-Linear Crosstalk: Main to Sub/Sub to Main due to distortion products. 70 dB minimum below 100% modulation.
38 kHz Suppression: 80 dB minimum below 100% modulation.
57, 76, and 95 kHz Suppression: 80 dB minimum below 100% modulation.
Spurious and Sideband Suppression: 80 dB minimum below 100% modulation to 95 kHz, 75 dB minimum beyond 95 kHz.
FM Signal to Noise Ratio: -80 dB minimum below left or right channel, 100% modulation, 400 Hz, with 75µS de-emphasis.
Pilot Stability: ±0.5 Hz, 0 to 50 degrees C.
Operational Modes: Stereo, Mono L+R, Mono L, Mono R, remote controllable.

SUBCARRIER OPERATION

NOTE: Subcarrier operation is specified using BE Model FC-30 FM Subcarrier Generator.
Modulation: Direct coupled FM at subcarrier frequency.
Frequency of Operation: 67 kHz (39 to 95 kHz to order). Front panel adjustable.
Frequency Stability: ±0.5% of subcarrier frequency (±335 Hz at 67 kHz).
Subcarrier Harmonic Content: Less than 0.3%.
Modulation Capability: ±20% of subcarrier frequency (±13.4 kHz at 67 kHz).
Modulation Indicator: Color coded peak reading LEDs.
Frequency Response:
Audio: ±0.5 dB 10-10,000 Hz exclusive of audio L.P.F. selectable flat, 150µS or 75µS pre-emphasis.
Data: ±0.5 dB DC to 10,000 Hz, no pre-emphasis.
Input Impedance:
Audio: 600 ohms, balanced, resistive, transformerless, terminal strip connection. Adaptable to other impedances.
Data: 75 ohms, unbalanced, resistive, DC coupled, BNC connector. Adaptable to other impedances.
Input Level:
Audio: Adjustable, +10 dBm to -10 dBm for ±6 kHz deviation at 400 Hz.
Data: Adjustable, 1.0 to 4.0 V p-p for ±6 kHz deviation DC coupled.
Input Filters:
Audio: Sixth order, -3 dB at 4.3 kHz standard (adaptable to other cutoff frequencies), defeatable.
Data: Same as audio or may be bypassed.
Audio Overshoot: 2 dB maximum.
Total Harmonic Distortion Plus Noise (THD+N): 0.5% or less throughout the audio passband, ±6 kHz deviation.
Intermodulation Distortion: 0.5% or less, 60 Hz/7 kHz, 1:1 ratio (audio LPF and pre-emphasis bypassed).
FM Signal to Noise Ratio: -62 dB minimum below ±6 kHz deviation at 400 Hz (150µS de-emphasis).
Crosstalk, Stereo to Subcarrier: -50 dB or better below ±6 kHz subcarrier deviation using 150µS de-emphasis and FS-30 stereo generator.
Crosstalk, Subcarrier to Stereo: -60 dB or better below 100% modulation, left or right. 75µS de-emphasis.
Crosstalk, Subcarrier to Subcarrier: -50 dB demodulated with 150µS de-emphasis.
Automatic Mute Level: Adjustable from 10 to 30 dB below program level.
Automatic Mute Delay: Adjustable, 0.5 to 10 seconds.
Subcarrier Envelope Decay: Greater than 100 mSec from 90% to 10% subcarrier levels. (Prevents receiver squelch noise.)
Subcarrier Injection Level: Continuously adjustable from 1% to 30% of total composite modulation.

MONAURAL OPERATION

Audio Input Impedance: 600 ohms balanced, resistive, adaptable to other impedances, 60 dB common mode suppression.
Audio Input Level: +10 dBm nominal for ±75 kHz deviation@400Hz, adaptable to other levels.
Audio Common Mode Rejection Ratio: Greater than 60 dB.
Audio Frequency Response: +/- 0.5dB, 30Hz to 15kHz; selectable flat, 25, 50, or 75µS pre-emphasis.
Total Harmonic Distortion Plus Noise (THD+N): 0.01% or less at ±75 kHz deviation and 50W RF power output, 400 Hz, using 75µS de-emphasis.
Total Harmonic Distortion + Noise (THD + N): 0.01%.
Intermodulation Distortion: 0.005% or less (0.01% typical) 60Hz to 7kHz, 4:1 ratio.
CCIF Intermodulation Distortion: 0.01% or less (all products greater than -86 dB below 100% modulation. Twin tone, 15 kHz/15 kHz 1:1 pairs).
Transient Intermodulation Distortion: 0.01% or less (square wave/sine wave).
FM S/N Ratio: 85dB below ±75 kHz deviation @ 400Hz. Measured within a 20 Hz to 200kHz bandwidth with 75µS de-emphasis.

FRONT AND REAR PANEL DESCRIPTIONS

Front Panel Descriptions

True Peak Reading LED Modulation Display: Consists of 29 segments from 5% to 145% in 5% increments.
Composite Test Input: BNC connector.
Composite Test Output: BNC connector.
Status Panel: Backlit annunciators fo +20V, -20V, +5V, Lock, RF, VSWR, Temp.
Contents: Five momentary, electronically interlocked switches which control the input to be monitored on the three segment LCD meter with minus sign. Functions are: Forward power, Reflected power, PA voltage, PA current, and AFC voltage.
LED Indication of Measured Units: Watts, Volts, or Amps.

Rear Panel Description

RF Output: BNC connector.
AC Input: Fused AC line filter and voltage selector.
Subcarrier Input Connectors: Three unbalanced BNC connectors.
Composite Input Connectors: One unbalanced and one balanced. BNC connectors.
Balanced Monaural Input: Terminal connections.
Exciter Interconnection Terminal Strip: Control connections are AFC interlock, (normally open/normally closed relay) AFC indication (open collector gnd closure), +20V or Remote Power Control (switch selectable), Temperature Overload (+18V at 15ma), FWD AND RFL Meter Samples, and two ground connections. Also ± and gnd connections for balanced monaural input.

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FM-100C

Solutions for Tomorrow's Radio

125 watt Exciter/Transmitter

The Broadcast Electronics' FM-100C's performance can bring existing FM transmitters up to digital quality standards, and has the lowest distortion of any available exciter. As the acknowledged standard for FM audio performance, the FM-100C's breakthrough technology remains unsurpassed by more costly and complex digital exciters. With the superb specifications available in this product, the FM-100C is totally transparent to your broadcast signal.

Features

- The FM-100C can serve as a reliable 125 watt stand-alone FM transmitter.
- Computer-optimized phase locked loop greatly improves low frequency response.
- Contains a 250 watt MOSFET as the output device.
- THD and IMD less than .003% typical for true digital capability.
- Optional N+1 board allows selection of up to 10 different frequencies in local or remote locations.
- With a signal to noise ratio greater than 90 dB, the FM-100C can handle all of the nuances and power of digital audio.
- Frequency range of 87-109 MHz - digitally programmable in 10 kHz increments.
- Performance specifications feature a dynamic range that rivals CD players with harmonic and intermodulation distortion values so low they are virtually unmeasurable.

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FM-100C

Solutions for Tomorrow's Radio

125 watt Exciter/Transmitter

Performance Specifications

GENERAL

Power Output: 10 to 125 W continuously variable (BNC connector) open and short circuit protected.
R.F. Output Impedance: 50 ohms
R.F. Harmonic and Spurious Suppression: Meets all FCC and DOC requirements and CCIR recommendations for a 125-watt transmitter with standard low pass filter.
Frequency Range: 87 MHz to 109 MHz digitally programmable in 10 kHz increments.
Frequency Stability: ±300Hz, +32°F to +122°F (0°C to +50°C).
Modulation Type: Direct FM at the carrier frequency.
Modulation Capability: ±350 kHz.
Modulation Indication: Peak reading, color coded, LED display with baseband overmodulation indicator.
Asynchronous AM S/N Ratio: 70dB minimum below equivalent reference carrier with 100% amplitude modulation at 400Hz and 75µS de-emphasis (no FM modulation present).
Synchronous AM S/N Ratio: 55dB minimum below equivalent 50W reference carrier with 100% AM modulation at 1kHz, no de-emphasis (FM modulation +/- 75kHz and 1kHz).
Multimeter: 5 function LCD diagnostic aid +/- 3% accurate.
Test Metering: Internal high-input impedance multimeter with probe for point-to-point DC measurements.
Remote Metering: Buffered Forward and Reflected power outputs.
Exciter Status Display: Front panel status annunciators for +20V, -20V, +5V, Lock, RF, VSWR, and temp. Additional status LEDs are located on AFC/PII assembly for Mod Osc Chain, Ref Osc Chain, +5V, +15V and -15V.
Front Panel Test Connections: Composite input and composite output.
Audio/Control Connections: 14 position barrier strip and (5) BNC connectors. Control connections are AFC Interlock (normally open/normally closed relay contacts), AFC indication (open collector and closure), +20V or remote power control (switch selectable), RF mute, Temperature overload (+18V at 15ma), buffered FWD and RFL meter samples, and two ground connections. All inputs/outputs RFI suppressed.
RF Mute Control: +3V to +40V DC or GND closure, switch selectable. Ima maximum.
AC Input Power: 97 to 133 VAC or 194 to 266 VAC, 50/60 Hz, 400 W maximum.
Ambient Temperature Range: ±32°F to +122°F (0°C to +50°C).
Altitude: 15,000 feet (4,572 m) AMSL.
Dimensions: 20.375"D x 7"H x 19"W (51.75 x 13.33 x 48.26 cm).
Net Weight: 42lbs. (19 kg), packed 50lbs. (22.7 kg).
Finish: Black backlit center overlay with technical white upper and lower extrusions.
Construction: Modular sub-assemblies with pin-plug interconnection.

WIDEBAND COMPOSITE OPERATION

Composite Inputs: 3 total, (1) unbalanced, (1) balanced, plus (1) front panel test provision (BNC connectors).
Composite Input Impedance: Unbalanced: 10 k ohm, nominal, resistive.Balanced: 10 k ohm or 50 ohm, programmable, jumper selected.
Composite Input Level: 3.5V p-p nominal, for ±75 kHz deviation.
Composite FM S/N Ratio: 90dB below +/- 75kHz deviation at 400Hz, measured in a 20Hz to 200kHz bandwidth with 75µS de-emphasis, 94dB with DIN "A" weighting.
Composite Harmonic Distortion: 0.005% or less.
Composite Intermodulation Distortion: 0.005% or less.
Composite CCIF IMD: 0.005% or less. Twin tone, 15 kHz/14 kHz, 1:1 pair).
Composite Transient IMD: 0.01% or less (square wave/sine wave).
Composite Amplitude Response: +/- 0.1dB, 30Hz to 53kHz.
Composite Phase Response: +/- 0.25 degree from linear phase, 30Hz to 53kHz.
Composite Group Delay Variation: +/- 5 nanoseconds, 30Hz to 100kHz.
Subcarrier Inputs: 3 total, unbalanced, BNC connectors.
Subcarrier Input Impedance: 100 k ohm nominal, resistive.
Subcarrier Input Level: 3.5 V p-p nominal for ±7.5 kHz deviation (10% injection).
Subcarrier Amplitude Response: ±0.2 dB, 40 kHz to 100 kHz, -3 dB at 7,500 Hz.
Stereophonic Separation: 60dB, 30Hz to 5kHz, 52dB, 5 to 15kHz (measured using BE FS30 Stereo Generator).
SCA Inputs: 3 total, unbalanced BNC connectors.
SCA Input Impedance: 100 k ohm nominal, resistive.
SCA Input Level: 3.5V p-p nominal for+/- 7.5kHz deviation.
SCA Amplitude Response: +/- 0.2dB, 40 to 100kHz.

STEREO OPERATION

Modulation Type: Digitally synthesized stereo, digitally synthesized pilot. No pilot phase adjustment required.
Audio Input Impedance: 600 ohms, balanced, resistive, transformerless, floating (adaptable to other impedances).
Audio Input Level: +10 dBm, ±1 dB for 100% modulation at 400 Hz (adaptable to other input levels).
Audio Input Filters: 15 kHz active L.P.F., 45 dB rejection at 19 kHz, delay compensated for minimum overshoot without clippers or other non-linear devices.
Audio Overshoot: 2 dB maximum.
Audio Frequency Response: ±0.5 dB, 30 Hz to 15,000 Hz, 75µS pre-emphasis (flat, 25µS, 50µS pre-emphasis selectable).
Total Harmonic Distortion Plus Noise (THD+N): 0.05% or less at ±75 kHz deviation, 400 Hz, using 75µS de-emphasis.
Intermodulation Distortion: 0.05% or less, 60 Hz/7 kHz, 4:1 ratio.
CCIF Intermodulation Distortion: 0.05% or less. Left or right channel modulated 100%, twin tone, 15 kHz/14 kHz, 1:1 pair).
Stereo Separation: 50 dB; 30 Hz to 15,000 Hz 60dB; 30 Hz to 5000 Hz.
Dynamic Stereo Separation: 40 dB or better, 30-15,000 Hz (normal program content).
Linear Crosstalk: Main to Sub/Sub to Main due to distortion products. 45 dB minimum below 100% modulation.
Non-Linear Crosstalk: Main to Sub/Sub to Main due to distortion products. 70 dB minimum below 100% modulation.
38 kHz Suppression: 80 dB minimum below 100% modulation.
57, 76, and 95 kHz Suppression: 80 dB minimum below 100% modulation.
Spurious and Sideband Suppression: 80 dB minimum below 100% modulation to 95 kHz, 75 dB minimum beyond 95 kHz.
FM Signal to Noise Ratio: -80 dB minimum below left or right channel, 100% modulation, 400 Hz, with 75µS de-emphasis.
Pilot Stability: ±0.5 Hz, 0 to 50 degrees C.
Operational Modes: Stereo, Mono L+R, Mono L, Mono R, remote controllable.

SUBCARRIER OPERATION

NOTE: Subcarrier operation is specified using BE Model FC-30 FM Subcarrier Generator.
Modulation: Direct coupled FM at subcarrier frequency.
Frequency of Operation: 67 kHz (39 to 95 kHz to order). Front panel adjustable.
Frequency Stability: ±0.5% of subcarrier frequency (±335 Hz at 67 kHz).
Subcarrier Harmonic Content: Less than 0.3%.
Modulation Capability: ±20% of subcarrier frequency (±13.4 kHz at 67 kHz).
Modulation Indicator: Color coded peak reading LEDs.
Frequency Response:
Audio: ±0.5 dB 10-10,000 Hz exclusive of audio L.P.F. selectable flat, 150µS or 75µS pre-emphasis.
Data: ±0.5 dB DC to 10,000 Hz, no pre-emphasis.
Input Impedance:
Audio: 600 ohms, balanced, resistive, transformerless, terminal strip connection. Adaptable to other impedances.
Data: 75 ohms, unbalanced, resistive, DC coupled, BNC connector. Adaptable to other impedances.
Input Level:
Audio: Adjustable, +10 dBm to -10 dBm for ±6 kHz deviation at 400 Hz.
Data: Adjustable, 1.0 to 4.0 V p-p for ±6 kHz deviation DC coupled.
Input Filters:
Audio: Sixth order, -3 dB at 4.3 kHz standard (adaptable to other cutoff frequencies), defeatable.
Data: Same as audio or may be bypassed.
Audio Overshoot: 2 dB maximum.
Total Harmonic Distortion Plus Noise (THD+N): 0.5% or less throughout the audio passband, ±6 kHz deviation.
Intermodulation Distortion: 0.5% or less, 60 Hz/7 kHz, 1:1 ratio (audio LPF and pre-emphasis bypassed).
FM Signal to Noise Ratio: -62 dB minimum below ±6 kHz deviation at 400 Hz (150µS de-emphasis).
Crosstalk, Stereo to Subcarrier: -50 dB or better below ±6 kHz subcarrier deviation using 150µS de-emphasis and FS-30 stereo generator.
Crosstalk, Subcarrier to Stereo: -60 dB or better below 100% modulation, left or right. 75µS de-emphasis.
Crosstalk, Subcarrier to Subcarrier: -50 dB demodulated with 150µS de-emphasis.
Automatic Mute Level: Adjustable from 10 to 30 dB below program level.
Automatic Mute Delay: Adjustable, 0.5 to 10 seconds.
Subcarrier Envelope Decay: Greater than 100 mSec from 90% to 10% subcarrier levels. (Prevents receiver squelch noise.)
Subcarrier Injection Level: Continuously adjustable from 1% to 30% of total composite modulation.

MONAURAL OPERATION

Audio Input Impedance: 600 ohms balanced, resistive, adaptable to other impedances, 60 dB common mode suppression.
Audio Input Level: +10 dBm nominal for ±75 kHz deviation@400Hz, adaptable to other levels.
Audio Common Mode Rejection Ratio: Greater than 60 dB.
Audio Frequency Response: +/- 0.5dB, 30Hz to 15kHz; selectable flat, 25, 50, or 75µS pre-emphasis.
Total Harmonic Distortion Plus Noise (THD+N): 0.01% or less at ±75 kHz deviation and 50W RF power output, 400 Hz, using 75µS de-emphasis.
Total Harmonic Distortion + Noise (THD + N): 0.01%.
Intermodulation Distortion: 0.01% or less 60Hz to 7kHz, 4:1 ratio.
CCIF Intermodulation Distortion: 0.01% or less. Twin tone, 15 kHz/15 kHz 1:1 pairs).
Transient Intermodulation Distortion: 0.01% or less (square wave/sine wave).
FM S/N Ratio: 85dB below ±75 kHz deviation @ 400Hz. Measured within a 20 Hz to 200kHz bandwidth with 75µS de-emphasis.

FRONT AND REAR PANEL DESCRIPTIONS

Front Panel Descriptions

True Peak Reading LED Modulation Display: Consists of 29 segments from 5% to 145% in 5% increments.
Composite Test Input: BNC connector.
Composite Test Output: BNC connector.
Status Panel: Backlit annunciators fo +20V, -20V, +5V, Lock, RF, VSWR, Temp.
Contents: Five momentary, electronically interlocked switches which control the input to be monitored on the three segment LCD meter with minus sign. Functions are: Forward power, Reflected power, PA voltage, PA current, and AFC voltage.
LED Indication of Measured Units: Watts, Volts, or Amps.

Rear Panel Description

RF Output: BNC connector.
AC Input: Fused AC line filter and voltage selector.
Subcarrier Input Connectors: Three unbalanced BNC connectors.
Composite Input Connectors: One unbalanced and one balanced. BNC connectors.
Balanced Monaural Input: Terminal connections.
Exciter Interconnection Terminal Strip: Control connections are AFC interlock, (normally open/normally closed relay) AFC indication (open collector gnd closure), +20V or Remote Power Control (switch selectable), Temperature Overload (+18V at 15ma), FWD AND RFL Meter Samples, and two ground connections. Also ± and gnd connections for balanced monaural input.

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SOLID STATE AM
PRODUCT CATALOG

Solutions for Tomorrow's Radio

TABLE OF CONTENTS

BROADCAST ELECTRONICS... SOLUTIONS FOR TOMORROW'S RADIO

Broadcast Electronics Solid State AM

As the only major manufacturer devoted exclusively to engineering better radio, it's no wonder that Broadcast Electronics has led the industry in the introduction of AM and FM transmitters and advanced technologies.

Broadcast Electronics' Solid State AM Stereo transmitters set the standard for audio performance, reliability, and efficiency. Their family of AM Solid State Broadcast Transmitters range from 500 watts to 10kW. As part of the RF Product Line, these superior transmitters are just part of Broadcast Electronics total solution for tomorrow's radio.

Broadcast Electronics Advantages

Exclusive, Patented Class "E" Power Modules—New RF technology achieves unequaled power economy and operating efficiencies.

Built-in C-QUAM Stereo—This integrated system delivers the highest quality stereo performance, eliminating the need for additional equipment.

Power-Agility—All Broadcast Electronics AM Transmitters operate at five user-defined power levels.

Full Modulation Capability at Low Power—Only Broadcast Electronics AM Transmitters perform at the highest audio quality—even at your station's lowest output power.

Full RF Redundancy—Multiple front-panel plug-in power amplifiers.

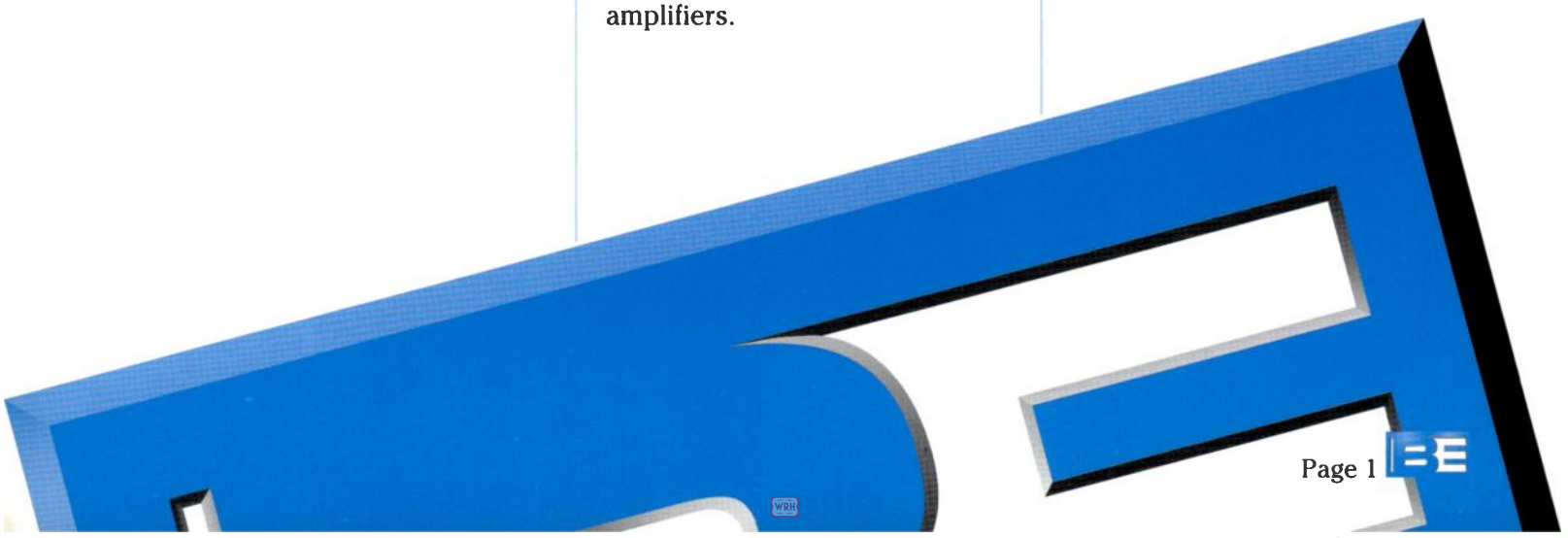
Redundant Power Supplies—Unique redundant power supply design enhances transmitter reliability.

Built-in Output Network—No additional equipment required for antenna tuning.

High-Efficiency Star Combiner Network—This advanced technology provides uninterrupted operation during module maintenance, eliminating dummy modules requirements.

Low-Noise Super-Cooling System—Extends transistor life up to eight times.

Compliant with IEC 215 Safety Standard.



BROADCAST ELECTRONICS

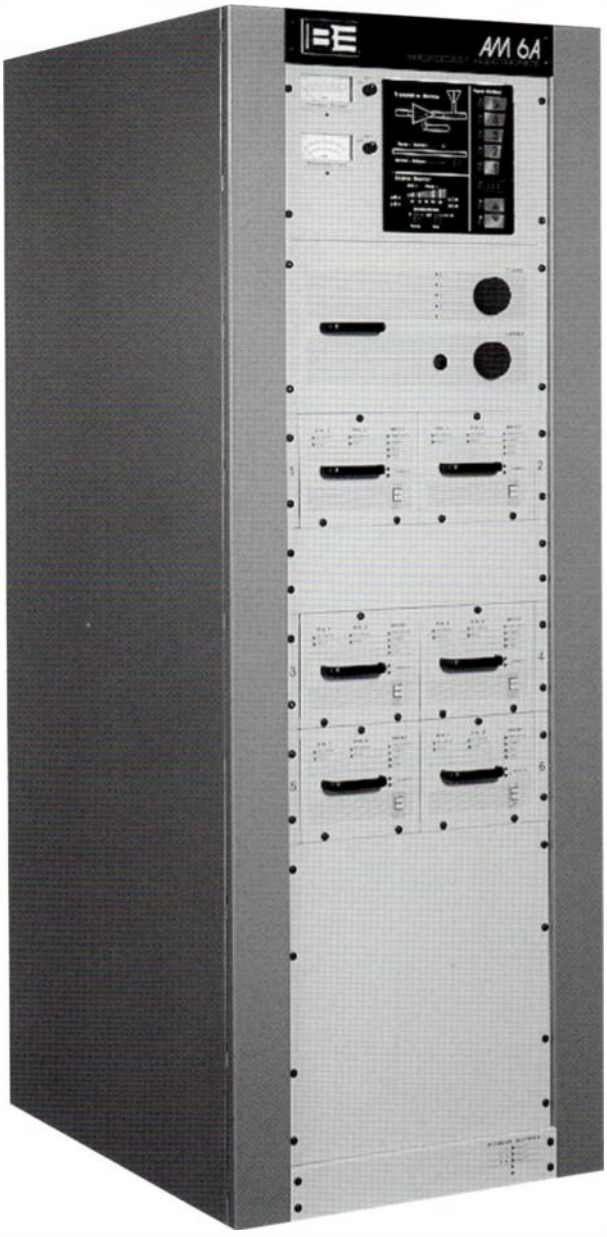
AM-500A

AM-2.5

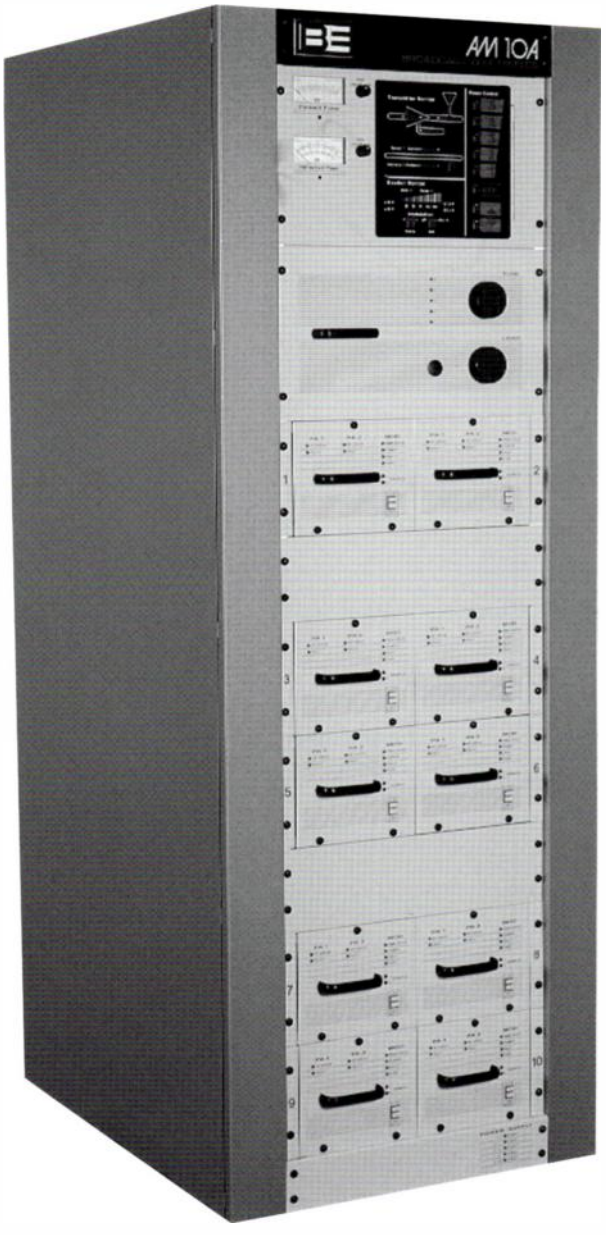
AM-1A

SOLID STATE AM FAMILY

AM-6A



AM-10A



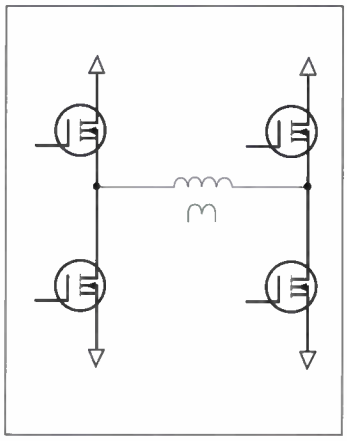
BROADCAST ELECTRONICS' SOLID STATE AM TECHNOLOGY

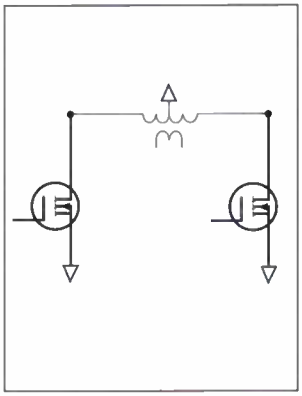
BE Integrated AM Stereo Transmitter Design

From audio and AC input to RF output, Broadcast Electronics AM transmitters are designed as C-QUAM(R) AM Stereo transmitters. This design unity results in the ability to operate at extremely low power without significant degradation in audio performance, while their performance as monaural AM transmitters is outstanding. Broadcast Electronics AM Stereo Transmitters are capable of modulating extremely low audio frequencies, as well as ignoring sideband VSWR, without damage.

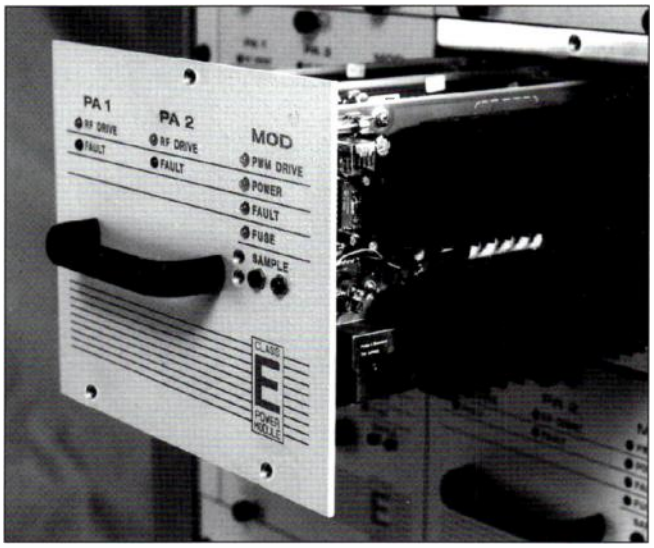
Patented Class E Power Amplification

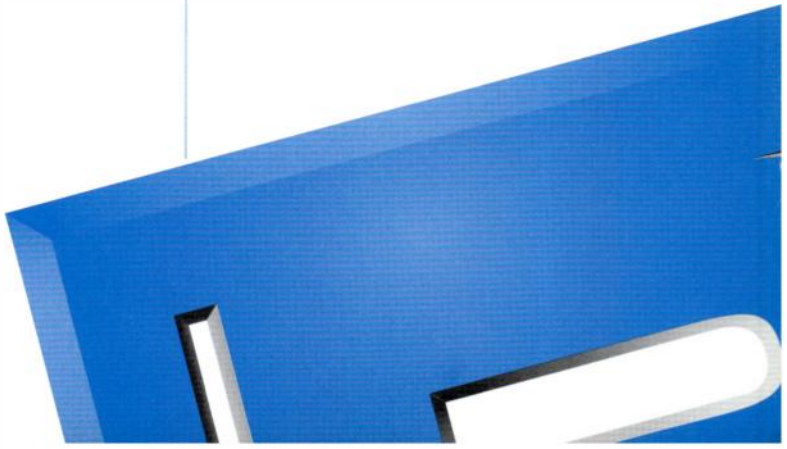
The RF power amplifier design (Class D) used by other major solid state transmitter manufacturers arranges transistors in an "H" formation. As the load VSWR changes, precise phase relationship between the "E" and "I" waveforms varies. This creates inefficiencies and heat, resulting in premature failure. In addition, this design is also highly susceptible to lightning damage.





However, the Patented Class E amplifier technology, licensed exclusively to Broadcast Electronics for broadcast use, represents state-of-the-art technology. This power amplifier design utilizes only two transistors, resulting in significantly more stable "E" and "I" waveforms under high VSWR conditions. Therefore, the Class E design improves audio performance into "real" loads, and reduces lightning susceptibility.





True Proportional Variable Standing Wave Ratio (VSWR) Foldback

In cases of gradual changes in load conditions, such as ice build-up on the antenna, the Broadcast Electronics' design protects the power amplifier by automatically reducing output power to a safe operating level. A "soft start" circuit then gradually increases power, allowing the transmitter to resume a safe optimum operating level under high VSWR conditions.

Automatic Power Control

The automatic power control system (APC) used in all Broadcast Electronics AM transmitters maintains constant RF output power within 2.0% of the operator setting, regardless of fluctuations in incoming AC line voltage.

ACCESSORY

AS-10 AM Stereo Moduation Monitor

Broadcast Electronics offers an accessory that is available with the Solid State AM line of transmitters - AS-10 AM Stereo Moduation Monitor. This latest generation C-QUAM moduation monitor is the perfect companion for BE's Stereo AM transmitters. Some of the capabilities include:

- RF automatic gain control for optimum C-QUAM decoder performance.
- Minimal overshoot for accurate modulation level measurement.
- Digital pilot detection for excellent long-term stability.
- Built-in selectable NRSC filters for audio outputs.

BROADCAST ELECTRONICS TRANSMITTER SYSTEMS SPECIFICATIONS

Solid State AM Transmitters - ALL

Harmonic and Spurious Suppression: Meets or exceeds FCC, DOC, and CCIR requirements, when preceded by external NRSC-1 compatible audio low pass filter(s).
Carrier Frequency Range: 522kHz to 1705kHz. Supplied on one frequency (synthesized), as ordered. Accommodates 9kHz or 10kHz channel spacing (9kHz requires an optional crystal).
Carrier Frequency Stability: +/-3 ppm, 0 to 50 degrees, centigrade.
Carrier Shift: Less than 1% at 95% negative modulation at 1kHz.
Type of Modulation: Pulse Width Modulation of L+R envelope with integrated standard C-QUAM AM stereo. An RF input connector (BNC) is also provided for an external stereo exciter.
Modes: Stereo, Mono L+R, Mono L, Mono R by local or remote control.
Modulation Input Indication: Peak reading, color coded, LED bar graph display with an autorange feature for monitoring positive or negative input levels of four different audio channels (L/R or L+R/L-R) in the transmitter.
Audio Input Level: +10dBm, +/-dB, L=R (or mono) to produce 100% L+R envelope modulation. Other input levels accommodated by internal resistor selection.
Audio Input Impedance: 600 ohms. Inputs are balanced, transformerless, and resistive with passive RFI filtering. Other impedances can be accommodated.
Audio Harmonic Distortion: (Stereo) Less than 1.5% (typically <1%), at 50% single channel modulation, 50Hz to 10kHz, at rated power.
Audio Intermodulation Distortion: (Mono) 1.2% or less (typically .8%), 1:1 ratio; 1.7% or less, typically 1%, 4:1 ratio, 60/7000Hz SMPTE standards at 85% modulation, at rated power.
CCIF Intermodulation Distortion: (Mono) 1% or less (typically .6%), 1:1 ratio, 4kHz/5kHz at 85% modulation, at rated power.
Transient Intermodulation Distortion: (Mono) 1% or less (typically .7%), 4:1 ratio, 2.96kHz square wave/8kHz sinewave at 85% modulation, at rated power.
Squarewave Overshoot: (Mono) Less than 0.1% (typically 0%), at 400Hz, 90% modulation without HF boost circuit (linear phase mode).
Squarewave Overshoot: (Stereo) Less than 1% (typically 0%), at 400Hz, 50% single channel modulation without HF boost circuit (linear phase mode).
Output Power Regulation: Less than 1% (typically 0%), change in output power with variation of AC line input voltage from 196 to 252 VAC.
RF Monitoring Provisions: 2 volts RMS nominal RF output sample into 50 ohms input of the modulation monitor, adjustable from the transmitter front panel for each of the five power levels.
Remote Interface: Built-in simple interface for most remote control and monitoring systems.
Remote Control: Transmitter OFF; Power Level Control 1, 2, 3, 4, 5; Power Raise and Lower; Mode Control (Stereo, Mono L+R, L, R); Antenna Interlocks (A,B,C); External Transmitter Mute; Remote Failsafe; External Interlock; Alarm Reset.
Operating Temperature: 0 to 50 degrees, centigrade.
Operating Humidity: 0 to 95% (non-condensing).
Operating Altitude: (AMSL) 10,000 feet (3,048 meters) at 60Hz of 7,500 feet (2,286 meters) at 50Hz.
Safety STD: - meets IEC 215.

AM-1A Transmitter

Transmitter Configuration: The AM-1 is comprised of the following assemblies: Exciter Control Unit (ECU), Power Blocks, Output Network, Power Supply Panels, and AC Distribution Panel.
PA Configuration: One plug-in power module for easy front panel removal, rated at 1100 watts RF power output. The power module is comprised of two power amplifier boards and one modulator board. The power amplifiers use high efficiency Class E (patented) switching amplifiers in push pull mode. The modulator uses a high efficiency forward Pulse Width Modulation (PWM) switchmode converter.
Power Output: 1KW nominal. 5 watts to 1100 watts capability. Five (5) Preset Power levels available by local or remote control. Power Controls 1 & 2 adjustable between 5 and 500 watts. Power Control 3 is switchable between either 5 to 500 watts or 300 to 1100 watts. Power Control 4 & 5 adjustable between 300 and 1100 watts.
RF Output Load Impedance: 50 ohms, unbalanced. Matching network to optimize nominal VSWR of 1.5:1 at any phase angle at carrier frequency.
Output Connector: N connector.
Load VSWR: Nominal 1.3:1 at full carrier power. Will operate into higher VSWR with automatic power reduction, open and short circuit protected.
Modulation Capability: 145% peak positive capability at 1100 watts. 130% into 1.3:1 VSWR.
Audio Frequency Response (Mono): +/-0.5dB, from 20Hz to 10kHz at 90% negative modulation (linear phase mode). +0.1dB, -3dB from 20Hz to 10kHz at 90% negative modulation, standard configuration.
Audio Harmonic Distortion (Mono): Less than 0.8% (typically .6%), 20Hz to 10kHz, at 1 KW; Less than 1.5%, 20Hz to 10kHz, at 500 W; Less than 2%, 20Hz to 10kHz, at 250 W; Less than 3%, 20Hz to 10kHz, at 100W. All mono audio harmonic distortion specifications are referenced to an audio input level which generates 90% modulation at 1kHz (9 dBm).
Stereo Separation: -30dB or better (typically -40dB), 50Hz to 10kHz, at 50% single channel modulation into a 50 ohm resistive load, at rated power.
Squarewave Tilt: Less than1% at 40Hz, less than 1.5% at 20Hz, 90% negative modulation.
Noise (Mono): Better than65dB below a reference level equivalent to 100% negative modulation in a 22Hz to 30kHz bandwidth, unweighted.
Noise (Stereo): Better than55dB below a reference level equivalent to 100% negative modulation of either Left or Right channel in a 22Hz to 30kHz bandwidth, unweighted.
AC Power Consumption: 1.37 KW (typically 1.3KW), no modulation of 1 KW carrier. 2.05 KW (typically 2KW), 100% sinusoidal modulation of 1 KW carrier.
Overall Efficiency: 73% or better (typically 75%), 100% sinusoidal modulation of 1 KW carrier (AC line input to RF output).
Metering: Output Forward Power (High Scale 0-1200 watts, Low Scale 0-300 watts); Output Reflected Power (High 0-120 watts, Low Scale 0-30 watts); AC Line Input Voltage (150-300 volts).
Remote Monitoring: Transmitter OFF Status; Power Level Status 1, 2, 3, 4, 5; Mode Status (Stereo, Mono L+R, L, R); Forward and Reflected Power Outputs (0-2.5 or 0-5 volts, jumper selectable); Remote Enabled Status; Antenna Conflict; Maintenance; Lightning; 1.2:1 VSWR; Reflected Power High (>40 watts); Reflected Power Emergency (>270 watts); Foldback (Output Power); Overtemperature; Exciter Fault; Power Module Fault; Power Supply Fault; Alarm Status.

AudioVAULT

Features

- Enterprise-wide WAN/ LAN technology
- Multi-site management tools
- Localization features
- Reliable redundancy server
- Play lists can be administered locally or remotely.
- Intuitive user interfaces.
- A.I. application
- In-depth on-site training and off-site classroom instruction.
- Strong documentation and help files.
- Complete automation, satellite or live-assist.
- On-screen voice-track editor.
- Drag-and-drop program log building and editing.
- Edit a program log while its on-the-air.
- Integrates with existing billing software.
- Audio and text management tools.
- Live assist and station automation tools.
- Import schedules from virtually any traffic and music scheduling program.
- Supports rapid voicetracking.
- Complete on-air copy management solution.
- Necessary PC and Network hardware.
- Optional newsroom automation system.
- Optional digital audio multi-track editing software.
- Optional auto-redundancy.
- Optional production editing software
- Optional live call-in talk show management software
- Optional disk editor
- Optional Internet audio processor

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AudioVAULT

AudioVAULT is the Industry Standard

The decision to implement a digital audio storage and studio system in your facility demonstrates both vision and wisdom. Your investment in a digital audio storage and studio system will return significant benefits to your entire business operation.

Broadcast Electronics' AudioVAULT is the world's leading digital audio storage and studio system for today's radio stations. Only AudioVAULT offers the complete range of software and hardware tools that today's radio operations require. Using the industry's most technologically advanced set of networked servers and software, AudioVAULT is easily configurable for virtually any kind of format, including live assist, satellite, or complete automation. Unlike other solutions, AudioVAULT's hardware and software are designed for today's radio environments, which require a powerful digital audio storage and studio system that is highly customizable, robust in features, easy to use, and seamlessly integrates into today's networking technologies (Internet, Streaming audio, MP3 distribution, etc...) In addition, AudioVAULT provides complete on-site and formal classroom training along with 24/7 support.

Solid Local and Remote Work-group Software Solutions

The AudioVAULT system treats digital audio storage and studio system management as a complete local and remote workgroup solution where audio programming, program content creation /collection, and system management exists in a dynamic, reliable environment. Only the AudioVAULT product line is designed to leverage these strengths and to provide unique solutions to our customers.

Broadcast Electronics' customers are able to maximize their investment in their existing network infrastructure.

WAN/ LAN Enterprise-Wide Productivity

AudioVAULT saves you time, effort, and money by providing a cost effective scalable environment for seamless management over several studios from one remote location. AudioVAULT's powerful studio management software tools enable program directors to easily route and share audio content securely between several digital studio systems at one time. In addition, AudioVAULT empowers talent to cut voice tracks from remote locations and have them routed directly to the AudioVAULT server where they can be inserted digitally into a program for broadcast. AudioVAULT reaches beyond WAN/ LAN technology by providing notification tools which alert members of the program generation team if content is late, missing, or off-the-air, no matter where they are! AudioVAULT repeatedly alerts station members by pager or email so your broadcast goes uninterrupted and is always on the air. The core philosophy behind AudioVAULT is to provide an easily customized solution that offers cost savings and flexibility to meet YOUR unique requirements.

Internet Ready

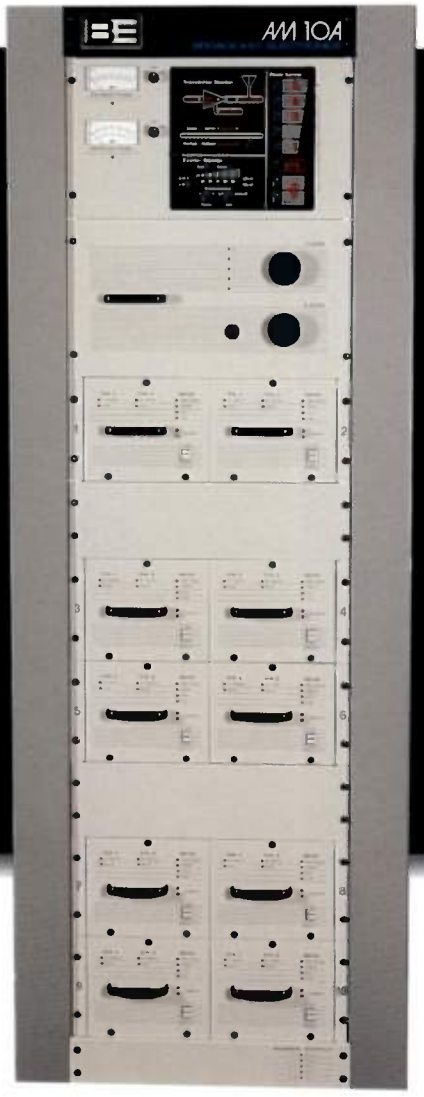
AudioVAULT thrusts today's radio station into the Internet age with streaming audio management tools, Internet audio processing technology, and dynamic radio station web site content generation applications. AudioVAULT's Internet solutions position your station to capitalize on the latest innovations so you can ride the eCommerce wave!

AM-10A

Solutions for Tomorrow's Radio

10 kW Solid State AM Stereo Transmitter

The 10 kW Solid State AM transmitter from Broadcast Electronics is based on the original AM-10 but has been designed in a single rack to take up less space in the transmitter room. Less occupied space means reduced overhead expenses. And the AM-10A is one of the least expensive 10 kW AM transmitters on the market. The AM-10A Solid State AM transmitter represents just one of the many solutions to your radio needs.



Features

- Exclusive, patented class E power modules achieve unequaled power economy and operating efficiencies.
- Operates at five user-defined power levels, low enough to handle any nighttime power requirement.
- Performs at the highest audio quality - even at the station's lowest output power.
- Multiple front-panel plug-in power amplifiers.
- Unique redundant power supply design enhances transmitter reliability.
- Only Solid State 10 kW AM transmitter in a single rack.
- Low-noise super cooling system extends transistor life up to eight times.
- Built-in output network eliminates the need for external impedance matching.
- Built-in C-QUAM stereo delivers the highest quality stereo performance, eliminating the need for additional equipment.

Need Solutions?
www.bdcast.com

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AM-10A

Solutions for Tomorrow's Radio

10 kW Solid State AM Stereo Transmitter

Performance Specifications

General: The AM-10A transmitter complies with Broadcast Electronics safety standards and meets IEC 215 safety requirements. The AM-10A also meets or exceeds FCC and DOC technical requirements.
Transmitter Configuration: The AM-10A is comprised of the following assemblies: One Exciter Control Unit (ECU), Five Power Blocks, One Output Network, Five Power Supply Panels, One AC Distribution Panel, and Five Fan Assemblies.
PA Configuration: Ten plug-in power modules for easy front panel removal, rated at 1100 watts RF power output. Each power module is comprised of two power amplifier boards and one modulator board. The power amplifiers use high efficiency Class E (patented) switching amplifiers in push pull mode. The modulator uses a high efficiency forward Pulse Width Modulation (PWM) switchmode converter.
Power Output: 10 kW nominal. 50 watts to 10,800 watts capability. Five (5) Preset Power levels available by local or remote control. Power Controls 1 & 2 adjustable between 50 and 5000 watts. Power Control 3 is switchable between either 50 to 5000 watts or 3500 to 10,800 watts. Power Controls 4 & 5 adjustable between 3500 and 10,800 watts.
RF Output Load Impedance: 50 ohms, unbalanced. Matching network to optimize nominal VSWR of 1.4:1 at any phase angle at carrier frequency.
Output Connector: 1-5/8" female EIA flange.
Load VSWR: Nominal 1.4:1 at full carrier power. Will operate into higher VSWR with automatic power reduction, open and short circuit protected.
Harmonic And Spurious Suppression: Meets or exceeds FCC, DOC, and CCIR requirements, when preceded by external NRSC-1 compatible audio low pass filter(s).
Carrier Frequency Range: 522 kHz to 1705 kHz. Supplied on one frequency (synthesized), as ordered. Accommodates 9 kHz or 10 kHz channel spacing.
Carrier Frequency Stability: +/-3 ppm, 0 to 50 degrees, centigrade.
Carrier Shift: Less than 1% at 95% negative modulation at 1 kHz.
Type of Modulation: Pulse Width Modulation of L+R envelope with integrated standard C-QUAM® AM stereo. An RF input connector (BNC) is also provided for an external stereo exciter.
Modes: Stereo, Mono L+R, Mono L, Mono R by local or remote control.
Modulation Capability: 145% peak positive capability at 10,800 watts. 130% into 1.4:1 VSWR.
Modulation Input Indication: Peak reading, color coded, LED bar graph display with an autorange feature for monitoring positive or negative input levels of four different audio channels (L/R or L+R/L-R) in the transmitter.
Audio Input Level: +10 dBm, +/-1 dB, L=R (or mono) to produce 100% L+R envelope modulation. Other input levels accommodated by internal resistor selection.
Audio Input Impedance: 600 ohms. Inputs are balanced, transformerless, and resistive with passive RFI filtering. Other impedances can be accommodated.
Audio Frequency Response (Mono): +/-0.5 dB, from 20 Hz to 10 kHz at 90% negative modulation (high frequency boost in) +0.1 dB, -3 dB from 20 Hz to 10 kHz at 90% negative modulation, standard configuration.
Audio Harmonic Distortion (Mono):
Less than 0.8%, 20 Hz to 10 kHz, at 10 kW;
Less than 1.5%, 20 Hz to 10 kHz, at 5 kW;
Less than 2.0%, 20 Hz to 10 kHz, at 2.5 kW;
Less than 3.0%, 20 Hz to 10 kHz, at 1 kW.
All mono audio harmonic distortion specifications are referenced to an audio input level which generates 90% modulation at 1 kHz (9 dBm).
Audio Harmonic Distortion (Stereo): Less than 1.5% at 50% single channel modulation, 50 Hz to 10 kHz, at rated power.
Audio Intermodulation Distortion (Mono): 1.2% or less 1:1 ratio; 1.7% or less 4:1 ratio, 60/7000 Hz SMPTE standards at 85% modulation, at rated power.
CCIF Intermodulation Distortion (Mono): 1.0% or less 1:1 ratio, 4 kHz/5 kHz at 85% modulation, at rated power.
Transient Intermodulation Distortion (Mono): 1.0% or less 4:1 ratio, 2.96 kHz square wave/ 8.00 kHz sinewave at 85% modulation, at rated power.
Incidental Phase Modulation (Stereo): Less than 2 degrees (0.035 radians) average, or 30 dB (typical 40dB) below equivalent 100% L-R C-QUAM® modulation 50 Hz to 10 kHz, at rated power. Measured with an audio input level which generates 95% negative L+R envelope modulation at 1 kHz (9.5 dBm).
Stereo Separation: -30 dB or better, 50 Hz to 10 kHz, at 50% single channel modulation into a 50 ohm resistive load, at rated power.
Squarewave Overshoot (Mono): Less than 0.1% at 400 Hz, 90% modulation (linear phase mode).
Squarewave Overshoot (Stereo): Less than 1.0% at 400 Hz, 50% single channel modulation (linear phase mode).
Squarewave Tilt: Less than 1% at 40 Hz, less than 1.5% at 20 Hz, 90% negative modulation.
Noise (Mono): Better than 65 dB below a reference level equivalent to 100% negative modulation in a 22 Hz to 30 kHz bandwidth, unweighted.
Noise (Stereo): Better than 55 dB below a reference level equivalent to 100% negative modulation of either Left or Right channel in a 22 Hz to 30 kHz bandwidth, unweighted.
AC Input Voltage: 196 - 252 VAC, 50/60 Hz, three phase WYE or DELTA standard. Capability for: 339 - 437 VAC, 50/60 Hz, three phase 4 wire WYE or 196 - 252 VAC, 50/60 Hz single phase. The transmitter has built-in MOV's for surge suppression per IEEE C62.41-1991 Level B3 standard.
Output Power Regulation: Less than 1% change in output power with variation of AC line input voltage from 196 to 252 VAC.
AC Power Consumption: 13.3 kW, no modulation of 10 kW carrier. 20 kW, 100% sinusoidal modulation of 10 kW carrier.
Overall Efficiency: 75% or better, 100% sinusoidal modulation of 10 kW carrier (AC line input to RF output).
Cooling: Low velocity air (1200 CFM), with disposable filters. Filters can be changed with transmitter running.
Metering: Output Forward Power (High Scale 0-12,000 watts, Low Scale 0-3000 watts); Output Reflected Power (High 0-1200 watts, Low Scale 0-300 watts); AC Line Input Voltage (150-300 volts).
RF Monitoring Provisions: 2 volts RMS nominal RF output sample into 50 ohms input of the modulation monitor, adjustable from the transmitter front panel for each of the five power levels.
Remote Interface: Built-in simple interface for most remote control and monitoring systems.
Remote Control:
Transmitter OFF
Power Level Control 1, 2, 3, 4, 5
Power Raise and Lower
Mode Control (Stereo, Mono L+R, L, R), (Stereo, Mono L+R, L, R)
Antenna Interlocks (A, B, C)
External Transmitter Mute
Remote Failsafe
External Interlock
Alarm Reset

Remote Monitoring:
Transmitter OFF Status
Power Level Status 1, 2, 3, 4, 5
Mode Status (Stereo, Mono L+R, L, R)
Forward and Reflected Power Outputs (0-2.5 or 0-5.0 volts, jumper selectable)
Remote Enabled Status
Antenna Conflict
Maintenance
Lightning
1.2:1 VSWR
Reflected Power High (>400 watts)AM-10A
Reflected Power Emergency (>2700 watts)
Foldback (Output Power)
Exciter Fault
Overtemperature
Power Module Fault
Power Supply Fault
Alarm Status
Operating Temperature: 0 to 50 degrees, centigrade.
Operating Humidity: 0 to 95% (non-condensing).
Operating Altitude (AMSL): 10,000 feet (3,048 meters) at 60 Hz or 7,500 feet (2,286 meters) at 50 Hz.
Size: 27.3 in. wide x 37.0 in. deep x 73.5 in. high. (69.3 cm wide x 94.0 cm deep x 186.7 cm high.)
Weight: 635 lbs; 289 kg.
Cubage: 42.5 cu. ft. (1.2 cu. m.) domestic packed.

All specifications measured with Broadcast Electronics Model AS-10 modulation monitor while transmitting at 10 kW into a 50 ohm resistive load. Audio performance may be degraded should the transmitter be operated into a bandwidth restricted antenna system.

C-QUAM is the registered trademark of Motorola, Inc.

BROADCAST ELECTRONICS, INC. 4100 N. 24th Street • Quincy, IL 62301 • Phone: (217)224-9600 • Fax: (217)224-9607 • e-mail: bdcast@bdcast.com

AM-6A

Solutions for Tomorrow's Radio

6 kW Solid State AM Stereo Transmitter

The 6kW Solid State AM transmitter from Broadcast Electronics is based on the original AM-5, but has been improved to deliver more power, better efficiency and many more hours of trouble free operation. To increase the life of the power transistors, the AM-6A operates at a lower temperature above ambient than its predecessors.
The AM-6A Solid State AM transmitter represents just one of the many solutions to your radio needs available from Broadcast Electronics.

Features

- Exclusive, patented class E power modules achieve unequaled power economy and operating efficiencies.
- Operates at five user-defined power levels, low enough to handle any nighttime power requirement.
- Performs at the highest audio quality - even at the station's lowest output power.
- Multiple front-panel plug-in power amplifiers.
- Unique redundant power supply design enhances transmitter reliability.
- Low-noise super cooling system extends transistor life up to eight times.
- Built-in output network eliminates the need for external impedance matching.
- Built-in C-QUAM stereo delivers the highest quality stereo performance, eliminating the need for additional equipment.

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AM-6A

Solutions for Tomorrow's Radio

6 kW Solid State AM Stereo Transmitter

Performance Specifications

General: The AM-6A transmitter complies with Broadcast Electronics safety standards and meets IEC 215 safety requirements. The AM-6A also meets or exceeds FCC and DOC technical requirements.
Transmitter Configuration: The AM-6A is comprised of the following assemblies: One Exciter Control Unit (ECU), Three Power Blocks, One Output Network, Three Power Supply Panels, One AC Distribution Panel, and Three Fan Assemblies.
PA Configuration: Six plug-in power modules for easy front panel removal, rated at 1100 watts RF power output. Each power module is comprised of two power amplifier boards and one modulator board. The power amplifiers use high efficiency Class E (patented) switching amplifiers in push pull mode. The modulator uses a high efficiency forward Pulse Width Modulation (PWM) switchmode converter.
Power Output: 6 kW nominal. 25 watts to 6600 watts capability. Five (5) Preset Power levels available by local or remote control. Power Controls 1 & 2 adjustable between 25 and 3000 watts. Power Control 3 is switchable between either 25 to 3000 watts or 2000 to 6600 watts. Power Controls 4 & 5 adjustable between 2000 and 6600 watts.
RF Output Load Impedance: 50 ohms, unbalanced. Matching network to optimize nominal VSWR of 1.5:1 at any phase angle at carrier frequency.
Output Connector: 1/2" or 7/8" coax clamp.
Load VSWR: Nominal 1.5:1 at full carrier power. Will operate into higher VSWR with automatic power reduction, open and short circuit protected.
Harmonic And Spurious Suppression: Meets or exceeds FCC, DOC, and CCIR requirements, when preceded by external NRSC-1 compatible audio low pass filter(s).
Carrier Frequency Range: 522 kHz to 1705 kHz. Supplied on one frequency (synthesized), as ordered. Accommodates 9 kHz or 10 kHz channel spacing.
Carrier Frequency Stability: +/-3 ppm, 0 to 50 degrees, centigrade.
Carrier Shift: Less than 1% at 95% negative modulation at 1 kHz.
Type of Modulation: Pulse Width Modulation of L+R envelope with integrated standard C-QUAM™ AM stereo. An RF input connector (BNC) is also provided for an external stereo exciter.
Modes: Stereo, Mono L+R, Mono L, Mono R by local or remote control.
Modulation Capability: 145% peak positive capability at 6600 watts. 130% into 1.5:1 VSWR.
Modulation Input Indication: Peak reading, color coded, LED bar graph display with an autorange feature for monitoring positive or negative input levels of four different audio channels (L/R or L+R/L-R) in the transmitter.
Audio Input Level: +10 dBm, +/-1 dB, L=R (or mono) to produce 100% L+R envelope modulation. Other input levels accommodated by internal resistor selection.
Audio Input Impedance: 600 ohms. Inputs are balanced, transformerless, and resistive with passive RFI filtering. Other impedances can be accommodated.
Audio Frequency Response (Mono): +/-0.5 dB, from 20 Hz to 10 kHz at 90% negative modulation (high frequency boost in) +0.1 dB, -3 dB from 20 Hz to 10 kHz at 90% negative modulation, standard configuration.

Audio Harmonic Distortion (Mono):
Less than 0.8%, 20 Hz to 10 kHz, at 6 kW;
Less than 1.5%, 20 Hz to 10 kHz, at 3 kW;
Less than 2.0%, 20 Hz to 10 kHz, at 1.5 kW;
Less than 3.0%, 20 Hz to 10 kHz, at 600 W.
All mono audio harmonic distortion specifications are referenced to an audio input level which generates 90% modulation at 1 kHz (9 dBm).
Audio Harmonic Distortion (Stereo): Less than 1.5% at 50% single channel modulation, 50 Hz to 10 kHz, at rated power.
Audio Intermodulation Distortion (Mono): 1.2% or less 1:1 ratio; 1.7% or less 4:1 ratio, 60/7000 Hz SMPTE standards at 85% modulation, at rated power.
CCIF Intermodulation Distortion (Mono): 1.0% or less 1:1 ratio, 4 kHz/5 kHz at 85% modulation, at rated power.
Transient Intermodulation Distortion (Mono): 1.0% or less 4:1 ratio, 2.96 kHz square wave/8.00 kHz sinewave at 85% modulation, at rated power.
Incidental Phase Modulation (Stereo): Less than 2 degrees (0.035 radians) average, or 30 dB (typical 40dB) below equivalent 100% L-R C-QUAM™ modulation 50 Hz to 10 kHz, at rated power. Measured with an audio input level which generates 95% negative L+R envelope modulation at 1 kHz (9.5 dBm).
Stereo Separation: -30 dB or better, 50 Hz to 10 kHz, at 50% single channel modulation into a 50 ohm resistive load, at rated power.
Squarewave Overshoot (Mono): Less than 0.1% at 400 Hz, 90% modulation (linear phase mode).
Squarewave Overshoot (Stereo): Less than 1.0% at 400 Hz, 50% single channel modulation (linear phase mode).
Squarewave Tilt: Less than 1% at 40 Hz, less than 1.5% at 20 Hz, 90% negative modulation.
Noise (Mono): Better than 65 dB below a reference level equivalent to 100% negative modulation in a 22 Hz to 30 kHz bandwidth, unweighted.
Noise (Stereo): Better than 55 dB below a reference level equivalent to 100% negative modulation of either Left or Right channel in a 22 Hz to 30 kHz bandwidth, unweighted.
AC Input Voltage: 196 - 252 VAC, 50/60 Hz, single phase standard. Capability for: 339 - 437 VAC, 50/60 Hz, three phase 4 wire WYE or 196 - 252 VAC, 50/60 Hz WYE or DELTA three phase. The transmitter has built-in MOV's for surge suppression per IEEE C62.41-1991 Level B3 standard.
Output Power Regulation: Less than 1% change in output power with variation of AC line input voltage from 196 to 252 VAC.
AC Power Consumption: 8 kW, no modulation of 6 kW carrier. 12 kW, 100% sinusoidal modulation of 6 kW carrier.
Overall Efficiency: 75% or better, 100% sinusoidal modulation of 6 kW carrier (AC line input to RF output).
Cooling: Low velocity air (720 CFM), with cleanable filters. Filters can be changed with transmitter running.
Metering: Output Forward Power (High Scale 0-7000 watts, Low Scale 0-1750 watts); Output Reflected Power (High 0-600 watts, Low Scale 0-150 watts); AC Line Input Voltage (150-300 volts).
RF Monitoring Provisions: 2 volts RMS nominal RF output sample into 50 ohms input of the modulation monitor, adjustable from the transmitter front panel for each of the five power levels.

Remote Interface: Built-in simple interface for most remote control and monitoring systems.
Remote Control:
Transmitter OFF
Power Level Control 1, 2, 3, 4, 5
Power Raise and Lower
Mode Control (Stereo, Mono L+R, L, R),
(Stereo, Mono L+R, L, R)
Antenna Interlocks (A, B, C)
External Transmitter Mute
Remote Failsafe
External Interlock
Alarm Reset

Remote Monitoring:
Transmitter OFF Status
Power Level Status 1, 2, 3, 4, 5
Mode Status (Stereo, Mono L+R, L, R)
Forward and Reflected Power Outputs,
(0-2.5 or 0-5.0 volts, jumper selectable)
Remote Enabled Status
Antenna Conflict
Maintenance
Lightning
1.2:1 VSWR
Reflected Power High, (>240 watts)AM-6A
Reflected Power Emergency (>1620 watts)
Foldback (Output Power)
Exciter Fault
Overtemperature
Power Module Fault
Power Supply Fault
Alarm Status
Operating Temperature: 0 to 50 degrees, centigrade.
Operating Humidity: 0 to 95% (non-condensing).
Operating Altitude (AMSL): 10,000 feet (3,048 meters) at 60 Hz or 7,500 feet (2,286 meters) at 50 Hz.
Size: 27.3 in. wide x 37.0 in. deep x 73.5 in. high. (69.3 cm wide x 94.0 cm deep x 186.7 cm high.)
Weight: 442 lbs; 201 kg.
Cubage: 42.5 cu. ft. (1.2 cu. m.) domestic packed.

All specifications measured with Broadcast Electronics Model AS-10 modulation monitor while transmitting at 6 kW into a 50 ohm resistive load. Audio performance may be degraded should the transmitter be operated into a bandwidth restricted antenna system.

C-QUAM is the registered trademark of Motorola, Inc.

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AM-5E

Leaders Look to BE

5 kW Solid State AM Transmitter

The 5kW solid state AM transmitter from Broadcast Electronics is based on the original AM-5, but has been improved to deliver many more hours of trouble-free operation. To increase the life of the power transistors, the AM-5E operates at a lower temperature above ambient than its predecessors. The AM-5E solid state AM transmitter represents just one of the many solutions available from Broadcast Electronics.

Features

- Exclusive, patented class E power modules achieve unequaled power economy and operating efficiencies
- Operates at five user-defined power levels, low enough to handle any nighttime power requirement
- Performs at the highest audio quality — even at the station's lowest output power
- Multiple front panel plug-in power amplifiers
- Unique redundant power supply design enhances transmitter reliability
- Low-noise super cooling system extends transistor life up to eight times
- Built-in output network eliminates the need for external impedance matching
- Built-in C-QUAM stereo delivers the highest quality stereo performance, eliminating the need for additional equipment
- Under/over voltage protection
- Power factor correction
- Meets CE Electro-Magnetic Compatibility (EMC) and Low Voltage Directives (LVD)

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AM-5E

Leaders Look to BE

5 kW Solid State AM Transmitter

Performance Specifications

General: The AM-5E transmitter complies with Broadcast Electronics safety standards and meets ENG0215 safety requirements. The AM-5E also meets or exceeds FCC and DOC technical requirements.

Transmitter Configuration: The AM-5E is comprised of the following assemblies: One Exciter Control Unit (ECU), Two Power Blocks, One Output Network, Two Power Supply Panels, One AC Distribution Panel, and Two Fan Assemblies.

PA Configuration: Four plug-in power modules for easy front panel removal, rated at 1375 watts RF power output. Each power module is comprised of two power amplifier boards and one modulator board. The power amplifiers use high efficiency Class E (patented) switching amplifiers in push/pull mode. The modulator uses a high efficiency forward Pulse Width Modulation (PWM) switchmode converter.

Power Output: 5kW nominal. 25 watts to 5500 watts capability. Five (5) preset power levels available by local or remote control. Power controls 1 & 2 adjustable between 25 and 2500 watts. Power control 3 is switchable between either 25 to 2500 watts or 1500 to 5500 watts. Power controls 4 & 5 adjustable between 1500 and 5500 watts.

RF Output Load Impedance: 50 ohms, unbalanced. Matching network to optimize nominal VSWR of 1.5:1 at any phase angle at carrier frequency.

Output Connector: Female 7/16" DIN.

Load VSWR: Nominal 1.5:1 at full carrier power. Will operate into higher VSWR with automatic power reduction, open and short circuit protected.

Harmonic and Spurious Suppression: Meets or exceeds FCC, DOC, and CCIR requirements, when preceded by external NRSC-1 compatible audio low pass filter(s).

Carrier Frequency Range: 522kHz to 1705kHz. Supplied on one frequency (synthesized), as ordered. Accommodates 9kHz or 10kHz channel spacing.

Carrier Frequency Stability: ±3ppm, 0 to 50°, centigrade.

Carrier Shift: Less than 1% at 95% negative modulation at 1kHz.

Type of Modulation: Pulse width modulation of L+R envelope with optional integrated C-QUAM AM stereo. An RF input connector (BNC) is also provided for an external RF or stereo exciter.

Modes: Stereo, Mono L+R, Mono L, Mono R by local or remote control.

Modulation Capability: 145% peak positive capability at 5500 watts. 130% into 1.5:1 VSWR.

Modulation Input Indication: Peak reading, color coded, LED bar graph display with an autorange feature for monitoring positive or negative input levels of four different channels (L/R or L+R/L-R) in the transmitter.

Audio Input Level: +10dBm, ±1dB, L=R (or mono) to produce 100% L+R envelope modulation. Other input levels accommodated by internal resistor selection.

Audio Input Impedance: 600 ohms. Inputs are balanced, transformerless, and resistive with passive RFI filtering. Other impedances can be accommodated.

Audio Frequency Response (Mono): ±0.5dB, from 20Hz to 10kHz at 90% negative modulation (high frequency boost in) +0.1dB, -3dB from 20Hz to 10kHz at 90% negative modulation, standard configuration.

Audio Harmonic Distortion (Mono):
Less than 0.8%, 20Hz to 10kHz, at 5kW;
Less than 1.5%, 20Hz to 10kHz, at 2.5kW;
Less than 2.0%, 20Hz to 10kHz, at 1.25kW;
Less than 3.0%, 20Hz to 10kHz, at 500W.
All mono audio harmonic distortion specifications are referenced to an audio input level which generates 90% modulation at 1kHz (9dBm).

Audio Harmonic Distortion (Stereo): Less than 1.5% at 50% single channel modulation, 50Hz to 10kHz, at rated power.

Audio Intermodulation Distortion (Mono): 1.2% or less 1:1 ratio; 1.7% or less 4:1 ratio, 60/7000 Hz SMPTE standards at 85% modulation, at rated power.

CCIF Intermodulation Distortion (Mono): 1.0% or less 1:1 ratio, 4kHz/5kHz at 85% modulation, at rated power.

Transient Intermodulation Distortion (Mono): 1.0% or less 4:1 ratio, 2.96 kHz square wave/8.00 kHz sinewave at 85% modulation, at rated power.

Incidental Phase Modulation (Stereo): Less than 2° (0.035 radians) average, or 30dB (typical 40dB) below equivalent 100% L-R C-QUAM modulation 50Hz to 10kHz, at rated power. Measured with an audio input level which generates 95% negative L+R envelope modulation at 1kHz (9.5dBm).

Stereo Separation: -30dB or better, 50Hz to 10kHz, at 50% single channel modulation into a 50 ohm resistive load, at rated power.

Squarewave Overshoot (Mono): Less than 0.1% at 400Hz, 90% modulation (linear phase mode).

Squarewave Overshoot (Stereo): Less than 1.0% at 400Hz, 50% single channel modulation (linear phase mode).

Squarewave Tilt: Less than 1% at 40Hz, less than 1.5% at 20Hz, 90% negative modulation.

Noise (Mono): Better than 65dB below a reference level equivalent to 100% negative modulation in a 22Hz to 30kHz bandwidth, unweighted.

Noise (Stereo): Better than 55dB below a reference level equivalent to 100% negative modulation of either Left or Right channel in a 22Hz to 30kHz bandwidth, unweighted.

AC Input Voltage: 196-252 VAC, 50/60Hz, single phase.

Output Power Regulation: Less than 1% change in output power with variation of AC line input voltage from 196 to 252 VAC.

AC Power Consumption: 6.7kW, no modulation of 5kW carrier. 10kW, 100% sinusoidal modulation of 5kW carrier.

Overall Efficiency: 75% or better, 100% sinusoidal modulation of 5kW carrier (AC line input to RF output).

Cooling: Low velocity air (500 CFM), with cleanable filters. Filters can be changed with transmitter running.

Metering: Output Forward Power (high scale 0 to 6000 watts, low scale 0 to 1500 watts); output reflected power (high 0 to 600 watts, low scale 0 to 150 watts); AC line input voltage (150 to 300 volts).

RF Monitoring Provisions: 2 volts RMS nominal RF output sample into 50 ohms input of the modulation monitor adjustable from the transmitter front panel for each of the five power levels.

Remote Interface: Built-in simple interface for most remote control and monitoring systems.

Remote Control:
Transmitter OFF
Power Level Control 1, 2, 3, 4, 5
Power Raise and Lower
Mode Control (Stereo, Mono L+R, L, R)
Antenna Interlocks (A, B, C)
External Transmitter Mute
Remote Failsafe
External Interlock
Alarm Reset

Remote Monitoring:
Transmitter OFF Status
Power Level Status 1, 2, 3, 4, 5
Mode Status (Stereo, Mono L+R, L, R)
Forward and Reflected Power Outputs, (0-2.5 or 0-5.0 volts, jumper selectable)
Remote Enabled Status
Antenna Conflict
Maintenance
Lightning
1.2:1 VSWR
Reflected Power High (>200 watts)
Reflected Power Emergency (>1350 watts)
Foldback (Output Power)
Exciter Fault
Overtemperature
Power Module Fault
Power Supply Fault
Alarm Status

Operating Temperature: 0 to 50° C.

Operating Humidity: 0 to 95% (non-condensing)

Operating Altitude (AMSL): 10,000 feet (3,048 meters) at 60Hz or 7,500 feet (2,286 meters) at 50Hz.

Size: 24.82 in. wide x 31.55 in. deep x 71.32 in. high. (63.0 cm wide x 80.1 cm deep x 181.2 cm high)

Weight: 525 lbs; 238 kg.

Cubage: 42.8 cu. Ft. (1.2 cu. M) domestic packed.

All specifications measured with Broadcast Electronics' Model AS-10 modulation monitor while transmitting at 5kW into a 50 ohm resistive load. Audio performance may be degraded should the transmitter be operated into a bandwidth restricted antenna system.

C-QUAM is a registered trademark of Motorola, Inc.

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AM-2.5E

Leaders Look to BE

2.5 kW Solid State AM Transmitter

The 2.5kW solid state AM transmitter from Broadcast Electronics is based on the original AM-2.5, but has been improved to deliver many more hours of trouble-free operation. To increase the life of the power transistors, the AM-2.5E operates at a lower temperature above ambient than its predecessors. The AM-2.5E solid state AM transmitter represents just one of the many solutions available from Broadcast Electronics.

Features

- Exclusive, patented class E power modules achieve unequaled power economy and operating efficiencies
- Operates at five user-defined power levels, low enough to handle any nighttime power requirement
- Performs at the highest audio quality — even at the station's lowest output power
- Multiple front panel plug-in power amplifiers
- Low-noise super cooling system extends transistor life up to eight times
- Built-in output network eliminates the need for external impedance matching
- Built-in C-QUAM stereo delivers the highest quality stereo performance, eliminating the need for additional equipment
- Under/over voltage protection
- Power factor correction
- Meets CE Electro-Magnetic Compatibility (EMC) and Low Voltage Directives (LVD)

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AM-2.5E

Leaders Look to BE

2.5 kW Solid State AM Transmitter

Performance Specifications

General: The AM-2.5E transmitter complies with Broadcast Electronics safety standards and meets ENG0215 safety requirements. The AM-2.5E also meets or exceeds FCC and DOC technical requirements.

Transmitter Configuration: The AM-2.5E is comprised of the following ssemblies: One Exciter Control Unit (ECU), One Power Block, One Output Network, One Power Supply Panel, One AC Distribution Panel, and Two Fan Assemblies.

PA Configuration: Two plug-in power modules for easy front panel removal, rated at 1375 watts RF power output. Each power module is comprised of two power amplifier boards and one modulator board. The power amplifiers use high efficiency Class E (patented) switching amplifiers in push/pull mode. The modulator uses a high efficiency forward Pulse Width Modulation (PWM) switchmode converter.

Power Output: 2.5kW nominal. 12.5 watts to 2750 watts capability. Five (5) preset power levels available by local or remote control. Power controls 1 & 2 adjustable between 12.5 and 1250 watts. Power control 3 is switchable between either 12.5 to 1250 watts or 750 to 2750 watts. Power controls 4 & 5 adjustable between 750 and 2750 watts.

RF Output Load Impedance: 50 ohms, unbalanced. Matching network to optimize nominal VSWR of 1.5:1 at any phase angle at carrier frequency.

Output Connector: Female 7/16" DIN.

Load VSWR: Nominal 1.5:1 at full carrier power. Will operate into higher VSWR with automatic power reduction, open and short circuit protected.

Harmonic and Spurious Suppression: Meets or exceeds FCC, DOC, and CCIR requirements, when preceded by external NRSC-1 compatible audio low pass filter(s).

Carrier Frequency Range: 522kHz to 1705kHz. Supplied on one frequency (synthesized), as ordered. Accommodates 9kHz or 10kHz channel spacing.

Carrier Frequency Stability: ±3ppm, 0 to 50°, centigrade.

Carrier Shift: Less than 1% at 95% negative modulation at 1kHz.

Type of Modulation: Pulse width modulation of L+R envelope with optional integrated C-QUAM AM stereo. An RF input connector (BNC) is also provided for an external RF or stereo exciter.

Modes: Stereo, Mono L+R, Mono L, Mono R by local or remote control.

Modulation Capability: 145% peak positive capability at 2750 watts. 130% into 1.5:1 VSWR.

Modulation Input Indication: Peak reading, color coded, LED bar graph display with an autorange feature for monitoring positive or negative input levels of four different channels (L/R or L+R/L-R) in the transmitter.

Audio Input Level: +10dBm, ±1dB, L=R (or mono) to produce 100% L+R envelope modulation. Other input levels accommodated by internal resistor selection.

Audio Input Impedance: 600 ohms. Inputs are balanced, transformerless, and resistive with passive RFI filtering. Other impedances can be accommodated.

Audio Frequency Response (Mono): ±0.5dB, from 20Hz to 10kHz at 90% negative modulation (high frequency boost in) +0.1dB, -3dB from 20Hz to 10kHz at 90% negative modulation, standard configuration.

Audio Harmonic Distortion (Mono):
Less than 0.8%, 20Hz to 10kHz, at 2.5kW;
Less than 1.5%, 20Hz to 10kHz, at 1.25kW;
Less than 2.0%, 20Hz to 10kHz, at .625kW;
Less than 3.0%, 20Hz to 10kHz, at 250W.
All mono audio harmonic distortion specifications are referenced to an audio input level which generates 90% modulation at 1kHz (9dBm).

Audio Harmonic Distortion (Stereo): Less than 1.5% at 50% single channel modulation, 50Hz to 10kHz, at rated power.

Audio Intermodulation Distortion (Mono): 1.2% or less 1:1 ratio; 1.7% or less 4:1 ratio, 60/7000 Hz SMPTE standards at 85% modulation, at rated power.

CCIF Intermodulation Distortion (Mono): 1.0% or less 1:1 ratio, 4kHz/5kHz at 85% modulation, at rated power.

Transient Intermodulation Distortion (Mono): 1.0% or less 4:1 ratio, 2.96 kHz square wave/8.00 kHz sinewave at 85% modulation, at rated power.

Incidental Phase Modulation (Stereo): Less than 2° (0.035 radians) average, or 30dB (typical 40dB) below equivalent 100% L-R C-QUAM modulation 50Hz to 10kHz, at rated power. Measured with an audio input level which generates 95% negative L+R envelope modulation at 1kHz (9.5dBm).

Stereo Separation: -30dB or better, 50Hz to 10kHz, at 50% single channel modulation into a 50 ohm resistive load, at rated power.

Squarewave Overshoot (Mono): Less than 0.1% at 400Hz, 90% modulation (linear phase mode).

Squarewave Overshoot (Stereo): Less than 1.0% at 400Hz, 50% single channel modulation (linear phase mode).

Squarewave Tilt: Less than 1% at 40Hz, less than 1.5% at 20Hz, 90% negative modulation.

Noise (Mono): Better than 65dB below a reference level equivalent to 100% negative modulation in a 22Hz to 30kHz bandwidth, unweighted.

Noise (Stereo): Better than 55dB below a reference level equivalent to 100% negative modulation of either Left or Right channel in a 22Hz to 30kHz bandwidth, unweighted.

AC Input Voltage: 196-252 VAC, 50/60Hz, single phase.

Output Power Regulation: Less than 1% change in output power with variation of AC line input voltage from 196 to 252 VAC.

AC Power Consumption: 3.3kW, no modulation of 2.5kW carrier. 5kW, 100% sinusoidal modulation of 2.5kW carrier.

Overall Efficiency: 75% or better, 100% sinusoidal modulation of 2.5kW carrier (AC line input to RF output).

Cooling: Low velocity air (500 CFM), with cleanable filters. Filters can be changed with transmitter running.

Metering: Output Forward Power (high scale 0 to 3000 watts, low scale 0 to 750 watts); output reflected power (high 0 to 300 watts, low scale 0 to 75 watts); AC line input voltage (150 to 300 volts).

RF Monitoring Provisions: 2 volts RMS nominal RF output sample into 50 ohms input of the modulation monitor adjustable from the transmitter front panel for each of the five power levels.

Remote Interface: Built-in simple interface for most remote control and monitoring systems.

Remote Control:
Transmitter OFF
Power Level Control 1, 2, 3, 4, 5
Power Raise and Lower
Mode Control (Stereo, Mono L+R, L, R)
Antenna Interlocks (A, B, C)
External Transmitter Mute
Remote Failsafe
External Interlock
Alarm Reset

Remote Monitoring:
Transmitter OFF Status
Power Level Status 1, 2, 3, 4, 5
Mode Status (Stereo, Mono L+R, L, R)
Forward and Reflected Power Outputs, (0-2.5 or 0-5.0 volts, jumper selectable)
Remote Enabled Status
Antenna Conflict
Maintenance
Lightning
1.2:1 VSWR
Reflected Power High (>100 watts)
Reflected Power Emergency (>675 watts)
Foldback (Output Power)
Exciter Fault
Overtemperature
Power Module Fault
Power Supply Fault
Alarm Status

Operating Temperature: 0 to 50° C.

Operating Humidity: 0 to 95% (non-condensing)

Operating Altitude (AMSL): 10,000 feet (3,048 meters) at 60Hz or 7,500 feet (2,286 meters) at 50Hz.

Size: 24.82 in. wide x 31.55 in. deep x 71.32 in. high. (63.0 cm wide x 80.1 cm deep x 181.2 cm high)

Weight: 410 lbs; 186 kg.

Cubage: 42.8 cu. Ft. (1.2 cu. M) domestic packed.

All specifications measured with Broadcast Electronics' Model AS-10 modulation monitor while transmitting at 5kW into a 50 ohm resistive load. Audio performance may be degraded should the transmitter be operated into a bandwidth restricted antenna system.

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AM-1A

Solutions for Tomorrow's Radio

1 kW Solid State AM Transmitter

The AM-1A from Broadcast Electronics is designed to save you money. Sure it's small but it's also less expensive than any other major manufacturer's 1 kW model. The AM-1A fits easily into your existing equipment rack without tying up needed floor space. It's even less expensive to ship. What's more, the AM-1A's unique power control design can meet your nighttime power requirements without expensive splitters or the need for a separate low-power transmitter. And because of this unique engineering feature, there's less audio degradation when it's time to reduce power.

Features

- Exclusive, patented class E power modules achieve unequaled power economy and operating efficiencies
- Operates at five user-defined power levels, as low as 5 watts
- Performs at the highest audio quality - even at the station's lowest output power
- Front-panel plug-in power amplifier
- UPS-shippable
- Super cooling system extends transistor life up to eight times
- Optional output network eliminates the need for external impedance matching
- Built-in C-QUAM stereo delivers the highest quality stereo performance, eliminating the need for additional equipment
- Mounts in standard 19" EIA equipment rack

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AM-1A

Solutions for Tomorrow's Radio

1 kW Solid State AM Transmitter

Performance Specifications

GENERAL

The AM-1A transmitter complies with Broadcast Electronics safety standards and meets IEC 215 safety requirements. The AM-1A also meets or exceeds FCC and DOC technical requirements.

Transmitter Configuration: The AM-1A is comprised of two main assemblies: Exciter Control Unit (ECU) and the Output Network box. The output network box includes the RF module, power supply and AC distribution wiring. These units can be mounted in a standard 19" rack, not supplied.

PA Configuration: One plug-in power module for easy front panel removal rated at 1100 watts RF power output. The power module is comprised of two power amplifier boards and one modulator board. The power amplifiers use high efficiency Class E (patented) switching amplifiers in push pull mode. The modulator uses a high efficiency forward Pulse Width Modulation (PWM) switchmode converter.

Power Output: 1 kW nominal. 5 watts to 1100 watts capability. Five (5) Preset Power levels available by local or remote control. Power Controls 1& 2 adjustable between 5 and 500 watts. Power Control 3 is switchable between either 5 or 500 watts or 300 to 1100 watts. Power Controls 4 & 5 adjustable between 300 and 1100 watts.

RF Output Load Impedance: 50 ohms, unbalanced. Optional matching network to optimize nominal VSWR of 1.35:1 at any phase angle at carrier frequency.

Output Connector: Type N.

Load VSWR: Nominal 1.3:1 at full carrier power. Will operate into higher VSWR with automatic power reduction, open and short circuit protected.

Harmonic and Spurious Suppression: Meets or exceeds FCC, DOC, and CCIR requirements, when preceded by external NRSC-1 compatible audio low pass filter(s).

Carrier Frequency Range: 522 kHz to 1705 kHz. Supplied on one frequency (synthesized), as ordered. Accommodates 9 kHz or 10 kHz channel spacing (9 kHz requires an optional crystal).

Carrier Frequency Stability: +/- 3 ppm, 0 to 50 degrees, centigrade.

Carrier Shift: Less than 1% at 95% negative modulation at 1 kHz.

Type of Modulation: Pulse Width Modulation of L+R envelope with integrated standard C-QUAM® AM stereo. An RF input connector (BNC) is also provided for an external stereo exciter.

Modes: Stereo, Mono L+R, Mono L, Mono R by local or remote control.

Modulation Capability: 145% peak positive capability at 1100 watts. 130% into 1.5:1 VSWR.

Modulation Input Indication: Peak reading, color coded, LED bar graph display with an autorange feature for monitoring positive or negative input levels of four different audio channels (L/R or L+R/L-R) in the transmitter.

Audio Input Level: +10 dBm, +/-1 dB, L=R (or mono) to produce 100% L+R envelope modulation. Other input levels accommodated by internal resistor selection.

Audio Input Impedance: 600 ohms. Inputs are balanced, transformerless, and resistive with passive RFI filtering. Other impedances can be accommodated.

Audio Frequency Response (Mono): +/-0.5 dB, from 20 Hz to 10 kHz, at 90% negative modulation (high frequency boost installed). +0.1 dB, -3 dB from 20 Hz to 10 kHz at 90% negative modulation referenced at 1 kHz (9dBm), linear phase mode.

Audio Harmonic Distortion (Mono): Less than 0.8%, 20 Hz to 10 kHz, at 1 kW: Less than 1.5%, 20 Hz to 10 kHz, at 500 W; Less than 2.0%, 20 Hz to 10 kHz, at 250 W; Less than 3.0%, 20 Hz to 10 kHz at 100 W. All mono audio harmonic distortion specifications are referenced to an audio input level which generates 90% modulation at 1 kHz (9 dBm).

Audio Harmonic Distortion (Stereo): Less than 1.5% at 50% single channel modulation, 50 Hz to 10 kHz, at rated power.

Audio Intermodulation Distortion (Mono): 1.2% or less 1:1 ratio; 1.7% or less 4:1 ratio, 60/7000 Hz SMPTE standards at 85% modulation, at rated power.

CCIF Intermodulation Distortion (Mono): 1.0% or less 1:1 ratio, 4 kHz/5 kHz at 85% modulation, at rated power.

Transient Intermodulation Distortion (Mono): 1.0% or less 4:1 ratio, 2.96 kHz squarewave/8.00 kHz sinewave at 85% modulation, at rated power.

Incidental Phase Modulation: Less than 2 degrees (0.035 radians) average, or 30 (typical 40 dB) dB below equivalent 100% L-R C-QUAM® modulation 50 Hz to 10 kHz, at rated power. Measured with an audio input level which generates 95% negative L+R envelope modulation at 1 kHz (9.5 dBm).

Stereo Separation: -30 dB or better, 50 Hz to 10 kHz at 50% single channel modulation into a 50 ohm resistive load, at rated power.

Squarewave Overshoot (mono): 0.1% or less at 400 Hz, 90% modulation, without HF boost circuit (linear phase mode).

Squarewave Overshoot (Stereo): 1.0% or less at 400 Hz, 50% single channel modulation, without HF boost circuit (linear phase mode).

Squarewave Tilt: Less than 1% at 40 Hz, less than 1.5% at 20 Hz, 90% negative modulation.

Noise (Mono): Better than 65 dB below a reference level equivalent to 100% negative modulation in a 22 Hz to 30 kHz bandwidth, unweighted.

Noise (Stereo): Better than 55 dB below a reference level equivalent to 100% negative modulation of either Left or Right channel in a 22 Hz to 30 kHz bandwidth, unweighted.

AC Input Voltage: 196-252 VAC, 50/60 Hz, single phase. The transmitter has built-in MOV's for surge suppression. Meets IEEE C62.41-1991 Level B3 standard.

Output Power Regulation: Less than 1% change in output power with variation of AC line input voltage from 196 to 252 VAC.

AC Power Consumption: 1.37 kW, no modulation of 1 kW carrier. 2.05 kW, 100% sinusoidal modulation of 1 kW carrier.

Overall Efficiency: 73% or better, 100% sinusoidal modulation of 1 kW carrier (AC line input to RF output).

Cooling: 250 cfm min.

Metering: Output Forward Power (High Scale 0-1200 watts, Low Scale 0-300 watts); Output Reflected Power (High 0-120 watts, Low Scale 0-30 watts); AC Line input Voltage (150-300 volts).

RF Monitoring Provisions: 2 volts RMS nominal RF output sample into 50 ohms input of the modulation monitor, adjustable from the transmitter front panel for each of the five power levels.

Remote Interface: Built-in simple interface for most remote control monitoring systems.

Remote Control: Transmitter OFF; Power Level Control 1, 2, 3, 4, 5: Power Raise and Lower; Mode Control (Stereo, Mono L+R, L, R); Antenna Interlocks (A, B, C); External Transmitter Mute; Remote Failsafe; External Interlock; Alarm Reset.

Remote Monitoring: Transmitter OFF Status; Power Level Status 1, 2, 3, 4, 5; Mode Status (Stereo, Mono L+R, L, R); Forward and Reflected Power Outputs; (0-2.5 or 0-5.0 volts, jumper selectable); Remote Enabled Status; Antenna Conflict; Maintenance; Lightning; 1.2:1 VSWR; Reflected Power High (>40 watts); Reflected Power Emergency (>270 watts); Foldback (Output Power); Overtemperature; Exciter Fault; Power Module Fault; Power Supply Fault; Alarm Status.

Operating Temperature: 0 to 50 degrees, centigrade.

Operating Humidity: 0 to 95% (non-condensing).

Operating Altitude (AMSL): 10,000 feet (3,048 meters) at 60 Hz or 7,500 feet (2,286 meters) at 50 Hz.

Size & Weight:

Output Network: 14"H x 19"W x 29"D - 76 lbs.
ECU: 10.5"H x 19"W x 17"D - 14.6 lbs.
Matching Network (optional): 8.75"H x 19"W x 20"D - 25 lbs.

All specifications measured with Broadcast Electronics Model AS-10 modulation monitor while transmitting at 1 kW into a 50 ohm resistive load. Audio performance may be degraded should the transmitter be operated into a bandwidth restricted antenna system.

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BROADCAST ELECTRONICS, INC. 4100 N. 24th Street • Quincy, IL 62301 • Phone: (217)224-9600 • Fax: (217)224-9607 • e-mail: bdcast@bdcast.com

AM-500A

Solutions for Tomorrow's Radio

500W Solid State AM Transmitter

The AM-500A from Broadcast Electronics is designed to save you money. Sure it's small but it's also less expensive than any other major manufacturer's 500W model. The AM-500A fits easily into your existing equipment rack without tying up needed floor space. It's even less expensive to ship. What's more, the AM-500A's unique power control design can meet your nighttime power requirements without expensive splitters or the need for a separate low-power transmitter. And because of this unique engineering feature, there's less audio degradation when it's time to reduce power.

Features

- Exclusive, patented class E power module achieves unequaled power economy and operating efficiencies
- Operates at five user-defined power levels, as low as 5 watts
- Performs at the highest audio quality - even at the station's lowest output power
- Front-panel plug-in power amplifier
- UPS-shippable
- Super cooling system extends transistor life up to eight times
- Optional output network eliminates the need for external impedance matching
- Built-in C-QUAM stereo delivers the highest quality stereo performance, eliminating the need for additional equipment
- Mounts in standard 19" EIA equipment rack

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AM-500A

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500W Solid State AM Transmitter

Performance Specifications

GENERAL
The AM-500A transmitter complies with Broadcast Electronics safety standards and meets IEC 215 safety requirements. The AM-500A also meets or exceeds FCC and Industry Canada technical requirements.

Transmitter Configuration: The AM-500A is comprised of two main assemblies: Exciter Control Unit (ECU) and the Output Network box. The output network box includes the RF module, power supply and AC distribution wiring. These units can be mounted in a standard 19" rack, not supplied.

PA Configuration: One plug-in power module for easy front panel removal rated at 550 watts RF power output. The power module is comprised of two power amplifier boards and one modulator board. The power amplifiers use high efficiency Class E (patented) switching amplifiers in push pull mode. The modulator uses a high efficiency forward Pulse Width Modulation (PWM) switchmode converter.

Power Output: 500W nominal. 5 watts to 550 watts capability. Five (5) Preset Power levels available by local or remote control. Power Controls 1& 2 adjustable between 5 and 250 watts. Power Control 3 is switchable between either 5 or 500 watts or 150 to 550 watts. Power Controls 4 & 5 adjustable between 150 and 500 watts.

RF Output Load Impedance: 50 ohms, unbalanced. Optional matching network to optimize nominal VSWR of 1.35:1 at any phase angle at carrier frequency.

Load VSWR: Nominal 1.3:1 at full carrier power. Will operate into higher VSWR with automatic power reduction, open and short circuit protected.

Harmonic and Spurious Suppression: Meets or exceeds FCC, Industry Canada, and CCIR requirements, when preceded by external NRSC-1 compatible audio low pass filter(s).

Carrier Frequency Range: 522 kHz to 1705 kHz. Supplied on one frequency (synthesized), as ordered. Accommodates 9 kHz or 10 kHz channel spacing (9 kHz requires an optional crystal).

Carrier Frequency Stability: +/- 3 ppm, 0 to 50 degrees, centigrade.

Carrier Shift: Less than 1% at 95% negative modulation at 1 kHz.

Type of Modulation: Pulse Width Modulation of L+R envelope with integrated standard C-QUAM® AM stereo. An RF input connector (BNC) is also provided for an external stereo exciter.

Modes: Stereo, Mono L+R, Mono L, Mono R by local or remote control.

Modulation Capability: 145% peak positive capability at 550 watts. 130% into 1.3:1 VSWR.

Modulation Input Indication: Peak reading, color coded, LED bar graph display with an autorange feature for monitoring positive or negative input levels of four different audio channels (L/R or L+R/L-R) in the transmitter.

Audio Input Level: +10 dBm, +/-1 dB, L=R (or mono) to produce 100% L+R envelope modulation. Other input levels accommodated by internal resistor selection.

Audio Input Impedance: 600 ohms. Inputs are balanced, transformerless, and resistive with passive RFI filtering. Other impedances can be accommodated.

Audio Frequency Response (Mono): +/-1.0 dB, from 20 Hz to 10 kHz, at 90% negative modulation (high frequency boost installed). +0.1 dB, -3 dB from 20 Hz to 10 kHz at 90% negative modulation referenced at 1 kHz (9dBm), linear phase mode.

Audio Harmonic Distortion (Mono): Less than 1.2%, 20 Hz to 10 kHz, at 500 W. All mono audio harmonic distortion specifications are referenced to an audio input level which generates 90% modulation at 1 kHz (9 dBm).

Audio Harmonic Distortion (Stereo): Less than 2.0% at 50% single channel modulation, 50 Hz to 10 kHz, at rated power.

Audio Intermodulation Distortion (Mono): 1.2% or less 1:1 ratio; 1.7% or less 4:1 ratio, 60/7000 Hz SMPTE standards at 85% modulation, at rated power.

CCIF Intermodulation Distortion (Mono): 1.0% or less 1:1 ratio, 4 kHz/5 kHz at 85% modulation, at rated power.

Transient Intermodulation Distortion (Mono): 1.0% or less 4:1 ratio, 2.96 kHz squarewave/8.00 kHz sinewave at 85% modulation, at rated power.

Incidental Phase Modulation: Less than 2 degrees (0.035 radians) average, or 30 (typical 40 dB) dB below equivalent 100% L-R C-QUAM® modulation 50 Hz to 10 kHz, at rated power. Measured with an audio input level which generates 95% negative L+R envelope modulation at 1 kHz (9.5 dBm).

Stereo Separation: -25 dB or better, 50 Hz to 10 kHz at 50% single channel modulation into a 50 ohm resistive load, at rated power.

Squarewave Overshoot (mono): 0.1% or less at 400 Hz, 90% modulation, without HF boost circuit (linear phase mode).

Squarewave Overshoot (Stereo): 1.0% or less at 400 Hz, 50% single channel modulation, without HF boost circuit (linear phase mode).

Squarewave Tilt: Less than 1% at 40 Hz, less than 1.5% at 20 Hz, 90% negative modulation.

Noise (Mono): Better than 65 dB below a reference level equivalent to 100% negative modulation in a 22 Hz to 30 kHz bandwidth, unweighted.

Noise (Stereo): Better than 55 dB below a reference level equivalent to 100% negative modulation of either Left or Right channel in a 22 Hz to 30 kHz bandwidth, unweighted.

AC Input Voltage: 196-252 VAC, 50/60 Hz, single phase. The transmitter has built-in MOV's for surge suppression. Meets IEEE C62.41-1991 Level B3 standard.

Output Power Regulation: Less than 1% change in output power with variation of AC line input voltage from 196 to 252 VAC.

AC Power Consumption: 830 watt, no modulation of 500W carrier. 1.25 kW, 100% sinusoidal modulation of 500 watt carrier.

Overall Efficiency: 60% or better, 100% sinusoidal modulation of 500W carrier (AC line input to RF output).

Metering: Output Forward Power (High Scale 0-600 watts, Low Scale 0-150 watts); Output Reflected Power (High 0-60 watts, Low Scale 0-12 watts); AC Line input Voltage (150-300 volts).

RF Monitoring Provisions: 2 volts RMS nominal RF output sample into 50 ohms input of the modulation monitor, adjustable from the transmitter back panel for each of the five power levels.

Remote Interface: Built-in simple interface for most remote control monitoring systems.

Remote Control: Transmitter OFF; Power Level Control 1, 2, 3, 4, 5: Power Raise and Lower; Mode Control (Stereo, Mono L+R, L, R); Antenna Interlocks (A, B, C); External Transmitter Mute; Remote Failsafe; External Interlock; Alarm Reset.

Remote Monitoring: Transmitter OFF Status; Power Level Status 1, 2, 3, 4, 5; Mode Status (Stereo, Mono L+R, L, R); Forward and Reflected Power Outputs; (0-2.5 or 0-5.0 volts, jumper selectable); Remote Enabled Status; Antenna Conflict; Maintenance; Lightning; 1.2:1 VSWR; Reflected Power High (>20 watts); Reflected Power Emergency (>100 watts); Foldback (Output Power); Overtemperature; Exciter Fault; Power Module Fault; Power Supply Fault; Alarm Status.

Operating Temperature: 0 to 50 degrees, centigrade.

Operating Humidity: 0 to 95% (non-condensing).

Operating Altitude (AMSL): 10,000 feet (3,048 meters) at 60 Hz or 7,500 feet (2,286 meters) at 50 Hz.

Size & Weight:
Output Network: 14"H x 19"W x 29"D - 76 lbs.
ECU: 10.5"H x 19"W x 17"D - 14.6 lbs.
Matching Network (optional): 8.75"H x 19"W x 20"D - 25 lbs.

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Frequently Asked Questions

Power Range: AC Voltage	5 Watts to 500 Watts
Requirements:	196 to 252VAC 50/60 Hz
Configuration:	Single Phase, 3 wire
Disconnect Size:	20 Amp fused disconnect recommended
Actual amperage draw at:	1 Phase, 500 Watts, 9.5 Amps, average, actual determined by line voltage, carrier frequency, etc.
AC wire size:	14 copper, THHN or equivalent
Power Consumption:	830 Watts at 500kW RF output (no modulation). 1.25kW at 500 Watts RF output at 100% tone modulation
Cooling Air requirements:	1) Chassis 1 100 CFM
Heat dissipation:	750 Watts (2330 BTU/Hr) at 500 Watts RF output
To determine Air Conditioner size for closed system:	one BTU/hr=0.293 watt one watt=3.413 BTU/hr 12,000 BTU/hr=1 ton of A/C eg, at .60kW dissipated, a .17 ton A/C unit would be needed (600 x 3.413 = 2,047/12,000 = .17)
Output connection size:	Type N Female
Rack Requirements:	19" Rack Universal Mounting rail spacing (.281 diameter holes or 10-32 taps) with 12 vertical rack units (21.00") Depth 27" minimum
Weight:	85 lbs

NOTE: AC currents stated assumes line voltage of 196 VAC for operation at full modulation (125% peak).

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AM-6A Transmitter

Transmitter Configuration: The AM-6A is comprised of the following assemblies: One Exciter Control Unit (ECU), Three Power Blocks, One Output Network, Three Power Supply Panels, and One AC Distribution Panel.
PA Configuration: Six plug-in power modules for easy front panel removal, rated at 1100 watts RF power output. Each power module is comprised of two power amplifier boards and one modulator board. The power amplifiers use high efficiency class E (patented) switching amplifiers in push pull mode. The modulator uses a high efficiency forward Pulse Width Modulation (PWM) switchmode converter.
Power Output: 6KW nominal. 25 watts to 6600 watts capability. Five (5) Preset Power levels available by local or remote control. Power Controls 1 & 2 adjustable between 25 and 3000 watts. Power Control 3 is switchable between either 25 to 3000 watts or 2000 to 6600 watts. Power Control 4 & 5 adjustable between 3000 and 6600 watts.
Operation With Four Power Modules: The transmitter will operate at reduced power output (20-35% typical) with three power modules plugged-in, relative to the selected power with six operating modules.
RF Output Load Impedance: 50 ohms, unbalanced. Matching network to optimize nominal VSWR of 1.5:1 at any phase angle at carrier frequency.
Output Connector: Clamp and Lug type, to accommodate 7/8" or 1/2" transmission line.
Load VSWR: Nominal 1.5:1 at full carrier power. Will operate into higher VSWR with automatic power reduction, open and short circuit protected.
Modulation Capability: 145% peak positive capability at 6600 watts. 130% into 1.5:1 VSWR.
Audio Frequency Response: (Mono) +/-0.5dB, from 20Hz to 10kHz at 90% negative modulation (linear phase mode). +0.1dB, -3dB from 20Hz to 10kHz at 90% negative modulation, standard configuration.
Audio Harmonic Distortion: (Mono) Less than 0.8% (typically .6%), 20Hz to 10kHz, at 6 KW; Less than 1.5%, 20Hz to 10kHz, at 2.3 KW; Less than 2%, 20Hz to 10kHz, at 1.5 KW; Less than 3%, 20Hz to 10kHz, at 600W. All mono audio harmonic distortion specifications are referenced to an audio input level which generates 90% modulation at 1kHz (9 dBm).
Stereo Separation: -30dB or better (typically -40dB), 50Hz to 10kHz, at 50% single channel modulation into a 50 ohm resistive load, at rated power.
Squarewave Tilt: Less than1% at 40Hz, less than 1.5% at 20Hz, 90% negative modulation.
Noise [Mono]: Better than65dB below a reference level equivalent to 100% negative modulation in a 22Hz to 30kHz bandwidth, unweighted.
Noise [Stereo]: Better than55dB below a reference level equivalent to 100% negative modulation of either Left or Right channel in a 22Hz to 30kHz bandwidth, unweighted.
AC Power Consumption: 8 KW (typically 7.8 KW), no modulation of 6 KW carrier. 12.6 KW (typically 11.7 KW), 100% sinusoidal modulation of 6 KW carrier.
Overall Efficiency: 75% or better (typically 77%), 100% sinusoidal modulation of 5 KW carrier (AC line input to RF output).
Metering Output Forward Power: (High Scale 0-7000 watts, Low Scale 0-1750 watts); Output Reflected Power (High 0-600 watts, Low Scale 0-150 watts); AC Line Input Voltage (150-300 volts).
Remote Monitoring: Transmitter OFF Status; Power Level Status 1, 2, 3, 4, 5; Mode Status (Stereo, Mono L+R, L, R); Forward and Reflected Power Outputs (0-2.5 or 0-5 volts, jumper selectable); Remote Enabled Status; Antenna Conflict; Maintenance; Lightning; 1.2:1 VSWR; Reflected Power High (>200 watts); Reflected Power Emergency (>1350 watts); Foldback (Output Power); Overtemperature; Exciter Fault; Power Module Fault; Power Supply Fault; Alarm Status.

AM-10A Transmitter

Transmitter Configuration: The AM-10A is comprised of the following assemblies: One Exciter Control Unit (ECU), One Driver Panel, Five Power Blocks, One Output Network, Five Power Supply Panels, One AC Distribution Panel, One Breaker Panel, and Five Fan Assemblies.
PA Configuration: Ten plug-in power modules for easy front panel removal, rated at 1100 watts RF power output. Each power module is comprised of two power amplifier boards and one modulator board. The power amplifiers use high efficiency class E (patented) switching amplifiers in push pull mode. The modulator uses a high efficiency forward Pulse Width Modulation (PWM) switchmode converter.
Power Output: 10KW nominal. 50 watts to 10,800 watts capability. Five (5) Preset Power levels available by local or remote control. Power Controls 1 & 2 adjustable between 50 and 1250 watts. Power Control 3 is switchable between either 50 to 5000 watts or 3500 to 10,800 watts. Power Control 4 & 5 adjustable between 3500 and 10,800 watts.
Operation With Eight Power Modules: The transmitter will operate at reduced power output (20-35% typical) with five power modules plugged-in, relative to the selected power with ten operating modules.
RF Output Load Impedance: 50 ohms, unbalanced. Matching network to optimize nominal VSWR of 1.4:1 at any phase angle at carrier frequency.
Output Connector: 1 5/8" female EIA flange.
Load VSWR: Nominal 1.4:1 at full carrier power. Will operate into higher VSWR with automatic power reduction, open and short circuit protected.
Modulation Capability: 145% peak positive capability at 10,800 watts. 130% into 1.4:1 VSWR.
Audio Frequency Response: (Mono) +/-0.5dB, from 20Hz to 10kHz at 90% negative modulation (linear phase mode). +0.1dB, -3dB from 20Hz to 10kHz at 90% negative modulation, standard configuration.
Audio Harmonic Distortion: (Mono) Less than 0.8% (typically .6%), 20Hz to 10kHz, at 10 KW; Less than 1.5%, 20Hz to 10kHz, at 5 KW; Less than 2%, 20Hz to 10kHz, at 2.5 KW; Less than 3%, 20Hz to 10kHz, at 1 KW. All mono audio harmonic distortion specifications are referenced to an audio input level which generates 90% modulation at 1kHz (9 dBm).
Stereo Separation: -30dB or better (typically -40dB), 50Hz to 10kHz, at 50% single channel modulation into a 50 ohm resistive load, at rated power.
Squarewave Tilt: Less than1% at 40Hz, less than 1.5% at 20Hz, 90% negative modulation.
Noise: (Mono) Better than65dB below a reference level equivalent to 100% negative modulation in a 22Hz to 30kHz bandwidth, unweighted.
Noise: (Stereo) Better than55dB below a reference level equivalent to 100% negative modulation of either Left or Right channel in a 22Hz to 30kHz bandwidth, unweighted.
AC Power Consumption: 13.3 KW (typically 13KW), no modulation of 10 KW carrier. 20 KW (typically 19.5 KW), 100% sinusoidal modulation of 10 KW carrier.
Overall Efficiency: 75% or better (typically 77%), 100% sinusoidal modulation of 10 KW carrier (AC line input to RF output).
Metering: Output Forward Power (High Scale 0-12,000 watts, Low Scale 0-3000 watts); Output Reflected Power (High 0-1200 watts, Low Scale 0-300 watts); AC Line Input Voltage (150-300 volts).
Remote Monitoring Transmitter: OFF Status; Power Level Status 1, 2, 3, 4, 5; Mode Status (Stereo, Mono L+R, L, R); Forward and Reflected Power Outputs (0-2.5 or 0-5 volts, jumper selectable); Antenna Conflict; Maintenance; Lightning; 1.2:1 VSWR; Reflected Power High (>400 watts) AM-10; Reflected Power Emergency (>2700 watts); Foldback (Output Power); Overtemperature; Exciter Fault; Power Module Fault; Power Supply Fault; Alarm Status.

AM-500 Transmitter

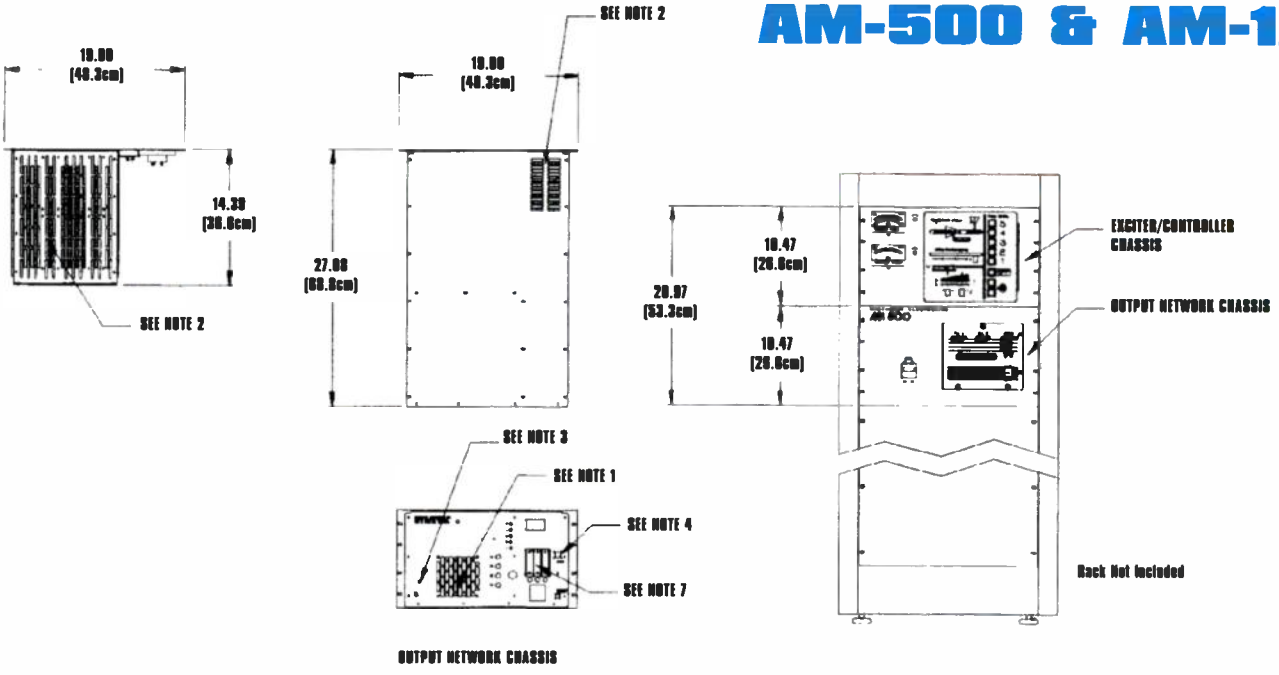
Transmitter Configuration: The AM-500 is comprised of two main assemblies: the Exciter Control Unit (ECU) and the Output Network Box. The Output Network Box includes the RF module, power supply and AC distribution wiring.
PA Configuration: One plug-in power module for easy front panel removal, rated at 500 watts RF power output. The power amplifiers use high efficiency Class E (patented) switching amplifiers in push pull mode. The modulator uses a high efficiency forward Pulse Width Modulation (PWM) switchmode converter.
Power Output: 500 watts. 5 to 500 watts capability. Five (5) Preset Power levels available by local or remote control. Power Controls 1 & 2 adjustable between 5 and 250 watts. Power Control 3 is switchable between either 5 to 500 watts or 150 to 500 watts. Power Control 4 & 5 adjustable between 150 and 500 watts.
RF Output Load Impedance: 50 ohms, unbalanced.
Load VSWR: Nominal 1.3:1 at full carrier power. Will operate into higher VSWR with automatic power reduction, open and short circuit protected.
Modulation Capability: 145% peak positive capability at 500 watts. 130% into 1.3:1 VSWR.
Audio Frequency Response (Mono): +/-1dB, from 20Hz to 10kHz at 90% negative modulation (high frequency boost installed). +0.1dB, -3dB from 20Hz to 10kHz at 90% negative modulation, standard configuration. 90% negative modulation referenced at 1kHz (9dBm).
Audio Harmonic Distortion (Mono): Less than 1% (.8% typical), 20Hz to 10kHz, at 500 W. All mono audio harmonic distortion specifications are referenced to an audio input level which generates 90% modulation at 1kHz (9dBm).
Stereo Separation: -25dB or better (-35dB typical), 50Hz to 10kHz, at 50% single channel modulation into a 50 ohm resistive load, at rated power.
Squarewave Tilt: Less than1.5% at 40Hz, less than 2% at 20Hz, 90% negative modulation.
Noise (Mono): Better than65dB below a reference level equivalent to 100% negative modulation of either Left or Right channel in a 22Hz to 30kHz bandwidth, unweighted.
Noise (Stereo): Better than55dB below a reference level equivalent to 100% negative modulation of either Left or Right channel in a 22Hz to 30kHz bandwidth, unweighted.
AC Power Consumption: 830 W maximum, no modulation of 500 W carrier. 1.25 KW, 100% sinusoidal modulation of 500 W carrier.
Overall Efficiency: 60% or better, 100% sinusoidal modulation of 500W carrier (AC line input to RF output).
Metering: Output Forward Power (High Scale 0-600 watts, Low Scale 0-150 watts); Output Reflected Power (High 0-60 watts, Low Scale 0-12 watts); AC Line Input Voltage (150-300 volts). RF Monitoring Provisions; 2 volts RMS nominal RF output sample inot 50 ohms input of the modulation monitor, adjustable from the back panel of the output network for each of the five power levels.
Remote Monitoring: Transmitter OFF Status; Power Level Status 1, 2, 3, 4, 5; Mode Status (Stereo, Mono L+R, L, R); Forward and Reflected Power Outputs (0-2.5 or 0-5 volts, jumper selectable); Remote Enabled Status; Antenna Conflict; Maintenance; Lightning; 1.2:1 VSWR; Reflected Power High (>20 watts); Reflected Power Emergency (>100 watts); Foldback (Output Power); Overtemperature; Exciter Fault; Power Module Fault; Power Supply Fault; Alarm Status.
Physical Dimensions:
ECU Chasis 19"W x 14.4"D x 10.5"H (48.3W x 36.6D x 26.7H cm.).
Output Network Chassis 19"W x 27.1" D x 10.5"H (48.3W x 68.8D x 26.7H cm).
Weight: 85lbs (38.5 kg), unpacked.
Cubage: 6.2 cu. ft. (0.18 cu. meters).

AM-2.5 Transmitter

Transmitter Configuration: The AM-2.5 is comprised of the following assemblies: One Exciter Control Unit (ECU), Two Power Blocks, One Output Network, Two Power Supply Panels, and One AC Distribution Panel.
PA Configuration: Four plug-in power modules for easy front panel removal, rated at 700 watts RF power output. Each power module is comprised of two power amplifier boards and one modulator board. The power amplifiers use high efficiency Class E (patented) switching amplifiers in push pull mode. The modulator uses a high efficiency forward Pulse Width Modulation (PWM) switchmode converter.
Power Output: 2.5KW nominal. 12.5 watts to 2800 watts capability. Five (5) Preset Power levels available by local or remote control. Power Controls 1 & 2 adjustable between 12.5 and 1250 watts. Power Control 3 is switchable between either 12.5 to 1250 watts or 800 to 2800 watts. Power Control 4 & 5 adjustable between 800 and 2800 watts.
Operation With Two Power Modules: The transmitter will operate at reduced power output (20-35% typical) with two power modules plugged-in, relative to the selected power with four operating modules.
RF Output Load Impedance: 50 ohms, unbalanced. Matching network to optimize nominal VSWR of 1.5:1 at any phase angle at carrier frequency.
Output Connector: Clamp and Lug type, to accommodate 7/8" or 1/2" transmission line.
Load VSWR: Nominal 1.5:1 at full carrier power. Will operate into higher VSWR with automatic power reduction, open and short circuit protected.
Modulation Capability: 145% peak positive capability at 2800 watts. 130% into 1.5:1 VSWR.
Audio Frequency Response (Mono): +/-0.5dB, from 20Hz to 10kHz at 90% negative modulation (linear phase mode). +0.1dB, -3dB from 20Hz to 10kHz at 90% negative modulation, standard configuration.
Audio Harmonic Distortion (Mono): Less than 0.8%, 20Hz to 10kHz, at 2.5 KW; Less than 1.5%, 20Hz to 10kHz, at 1.25 KW; Less than 2%, 20Hz to 10kHz, at 625 W; Less than 3%, 20Hz to 10kHz, at 250W. All mono audio harmonic distortion specifications are referenced to an audio input level which generates 90% modulation at 1kHz (9 dBm).
Stereo Separation: -30dB or better (-40dB typical), 50Hz to 10kHz, at 50% single channel modulation into a 50 ohm resistive load, at rated power.
Squarewave Tilt: Less than1% at 40Hz, less than 1.5% at 20Hz, 90% negative modulation.
Noise (Mono): Better than67dB below a reference level equivalent to 100% negative modulation in a 22Hz to 30kHz bandwidth, unweighted.
Noise (Stereo): Better than57dB below a reference level equivalent to 100% negative modulation of either Left or Right channel in a 22Hz to 30kHz bandwidth, unweighted.
AC Input Voltage: 196 - 252 VAC, 50/60Hz, single phase. The transmitter has built-in MOV's for surge suppression per IEEE C62.41-1991 Level B3 standard.
AC Power Consumption: 3.3 KW, no modulation of 2.5 KW carrier. 5 KW, 100% sinusoidal modulation of 2.5 KW carrier.
Overall Efficiency: 75% or better, 100% sinusoidal modulation of 2.5 KW carrier (AC line input to RF output).
Metering: Output Forward Power (High Scale 0-3000 watts, Low Scale 0-750 watts); Output Reflected Power (High 0-300 watts, Low Scale 0-60 watts); AC Line Input Voltage (150-300 volts).
Remote Monitoring: Transmitter OFF Status; Power Level Status 1, 2, 3, 4, 5; Mode Status (Stereo, Mono L+R, L, R); Forward and Reflected Power Outputs (0-2.5 or 0-5 volts, jumper selectable); Remote Enabled Status; Antenna Conflict; Maintenance; Lightning; 1.2:1 VSWR; Reflected Power High (>100 watts); Reflected Power Emergency (>640 watts); Foldback (Output Power); Overtemperature; Exciter Fault; Power Module Fault; Power Supply Fault; Alarm Status.
Weight: 440lbs (200 kg); packed 565lbs (257 kg).
Cubage: 42.8 cu. ft. (domestic packed); 57.4 cu. ft. (international packed).

BROADCAST ELECTRONICS FLOOR PLANS

AM-500 & AM-1A



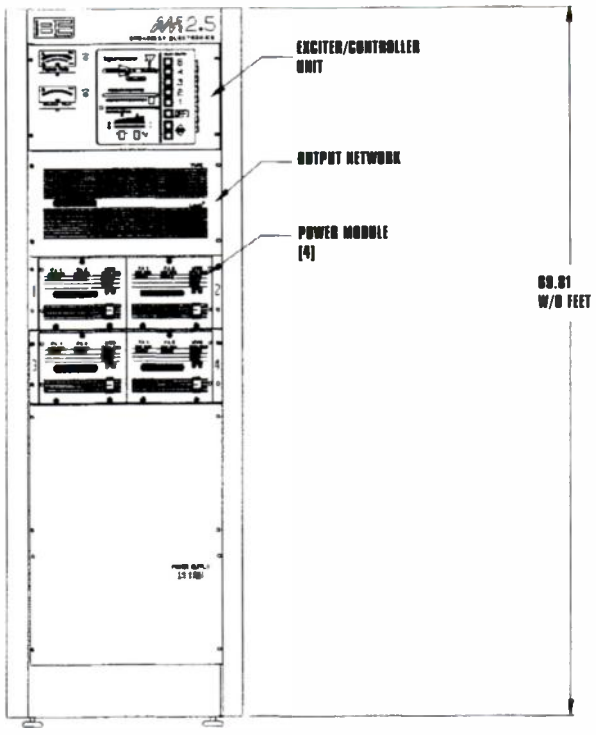
AM-500 NOTES:

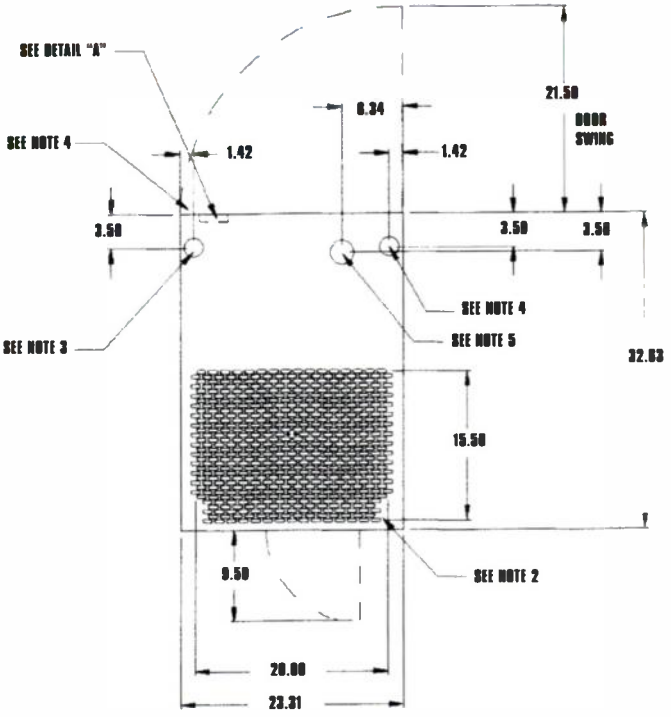
1. AIR INLET AT REAR OF OUTPUT NETWORK CHASSIS, 100 cfm (2.83m³/MIN.)
2. AIR OUTLET:
   A. EXCITER/CONTROLLER CHASSIS, 9.5" X 14", (24.1cm X 35.6cm)
   B. OUTPUT NETWORK CHASSIS, 3.0" X 5.5", (7.6cm X 14.0cm)
3. GROUND LUG.
4. OUTPUT RF CONNECTION IS TYPE "N".
5. HEAT DISSIPATION: 600 WATTS MAXIMUM (2000 BTU/HR.) FOR 500W RF OUTPUT @125% AUDIO TONE MODULATION.
6. WEIGHT: 85 LBS (38.5 KGS) UNPACKED.
7. AC POWER INPUT: 196-252 VAC SINGLE PHASE AT 9.5 AMPS MAXIMUM, 50/60 HZ. FUSED DISCONNECT SWITCH RECOMMENDED FOR PROPER SIZING OF FUSES, REFER TO INSTRUCTION MANUAL AND NATIONAL ELECTRICAL CODE OR LOCAL CODES.
8. PRIMARY FUSE DISCONNECT:
   FUSE SIZE: 20A
   WIRE SIZE: #14 COPPER THHN OR EQUAL

AM-1A NOTES:

1. AIR INLET AT REAR OF CABINET, 500 cfm (14.16 m³/MIN.) FILTER REQUIRED - P/N 407-0062.
2. AIR OUTLET AT TOP OF CABINET, 15.5" X 20.0", (40m X .50m)
3. ACCESS FOR AC POWER THROUGH CABINET TOP OR CABINET BOTTOM ACCESS HOLES.
4. ACCESS FOR REMOTE CONTROL AND AUDIO CONNECTIONS THROUGH TOP OF CABINET.
5. OUTPUT RF CONNECTION IS 7/8" OR 1/2" SEMI-RIGID FOAM COAXIAL CABLE. SEE CONNECTION INSTRUCTIONS ON REAR PANEL OF OUTPUT NETWORK.
6. HEAT DISSIPATION: 850 WATTS MAXIMUM (2,900 BTU/HR.) FOR 1.1KW RF OUTPUT @ 125% AUDIO TONE MODULATION.
7. AC POWER INPUT: 196-252 VAC SINGLE PHASE AT 40 AMPS MAXIMUM, 50/60 HZ. FUSED DISCONNECT SWITCH RECOMMENDED FOR PROPER SIZING OF FUSES REFER TO INSTRUCTION MANUAL AND NATIONAL ELECTRICAL CODE OR LOCAL CODES.

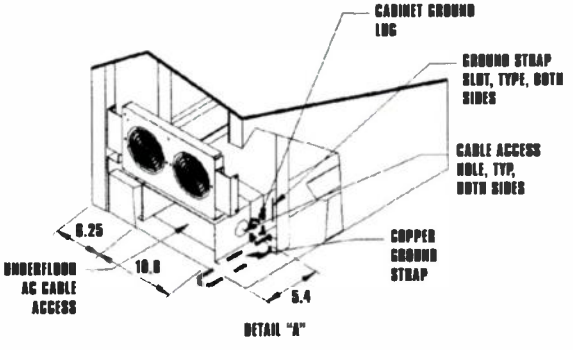
AM-2.5



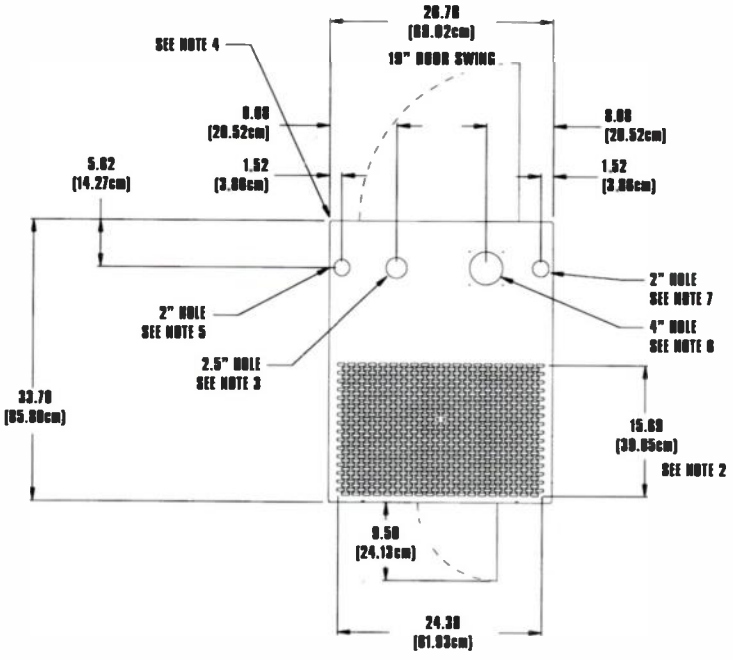


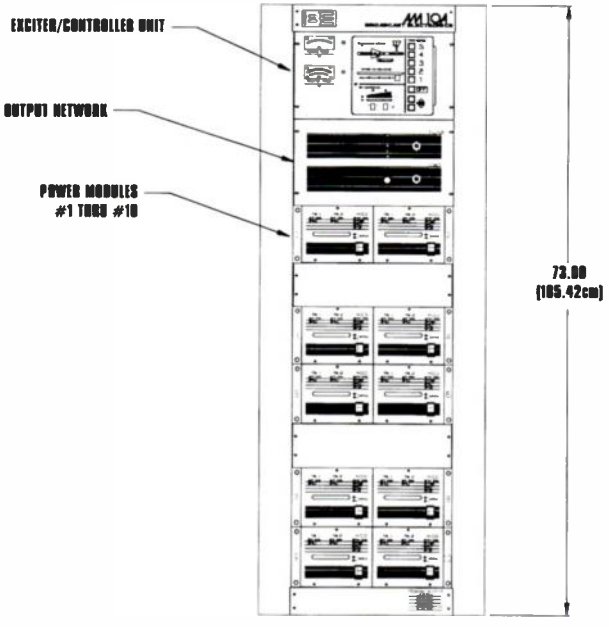
AM-2.5 NOTES:

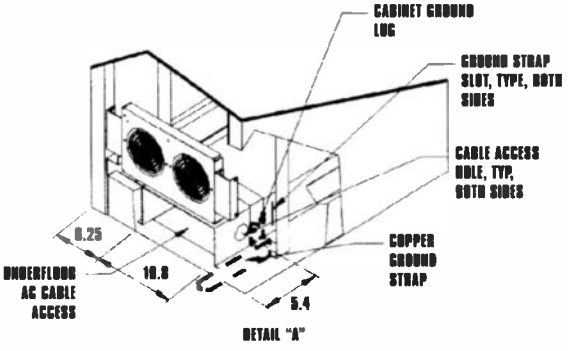
1. AIR INLET AT REAR OF CABINET, 500 cfm (14.16 m³/MIN.) FILTER REQUIRED -P/N 407-0062.
2. AIR OUTLET AT TOP OF CABINET, 15.5" X 20.0", (40m X .50m)
3. ACCESS FOR AC POWER THROUGH CABINET TOP OR CABINET BOTTOM ACCESS HOLES.
4. ACCESS FOR REMOTE CONTROL AND AUDIO CONNECTIONS THROUGH TOP OF CABINET.
5. OUTPUT RF CONNECTION IS 7/8" OR 1/2" SEMI-RIGID FOAM COAXIAL CABLE. SEE CONNECTION INSTRUCTIONS ON REAR PANEL OF OUTPUT NETWORK.
6. HEAT DISSIPATION: 1800 WATTS MAXIMUM (6,000 BTU/HR.) FOR 2.8KW RF OUTPUT @ 125% AUDIO TONE MODULATION.
7. AC POWER INPUT: 196-252 VAC SINGLE PHASE AT 40 AMPS MAXIMUM, 50/60 HZ. FUSED DISCONNECT SWITCH RECOMMENDED FOR PROPER SIZING OF FUSES REFER TO INSTRUCTION MANUAL AND NATIONAL ELECTRICAL CODE OR LOCAL CODES.
8. PRIMARY AC FUSED DISCONNECT:
   FUSE SIZE: 75A
   WIRE SIZE: #3 COPPER THHN OR EQUAL.



AM-10A & AM-6A







AM-10A NOTES:

1. AIR INLET AT REAR OF CABINETS, 1200 cfm (34.0 m^3/MIN.)
2. AIR OUTLET AT TOP OF CABINETS, 15.69" x 24.38" (39.85 cm x 61.93 cm)
3. ACCESS FOR AC POWER THROUGH CABINET TOP ACCESS HOLES.
4. GROUND STRAP ENTRY POINT IN LOWER LEFT CORNER AT REAR OF OUTPUT NETWORK CABINET. (SEE DETAIL "A")
5. ACCESS FOR REMOTE CONTROL AND AUDIO CONNECTIONS THROUGH TOP OF CONTROL CABINET.
6. OUTPUT RF CONNECTION IS 1-5/8" FEMALE EIA FLANGE. SEE CONNECTION INSTRUCTIONS ON REAR PANEL OF OUTPUT NETWORK.
7. ACCESS FOR MODULATION MONITOR RF SAMPLE.
8. HEAT DISSIPATION: 6000 WATTS MAXIMUM (20,525 BTU/HR.) FOR 10.8 KW RF OUTPUT @ 125% AUDIO TONE MODULATION.
9. WEIGHT: 635 LBS (288 KGS) UNPACKED.
10. PACKED CUBAGE:
    DOMESTIC 38.2 FT^3 (1.08 m^3)
    INTERNATIONAL 60.3 FT^3 (1.71 m^3)
11. AC POWER CONSUMPTION: 23 KW AT 125% SINUSOIDAL MODULATION OF 10.8 KW CARRIER.
12. AC POWER INPUT: 196-252 OR 339-437 VAC THREE PHASE AT 100 AMPS MAXIMUM; 196-252 VAC SINGLE PHASE AT 150 AMPS MAXIMUM; 50/60 Hz, FUSED DISCONNECT SWITCH RECOMMENDED. FOR PROPER SIZING OF FUSES, REFER TO INSTRUCTION MANUAL AND NATIONAL ELECTRICAL CODE OR LOCAL CODES.
13. PRIMARY AC FUSED SERVICE DISCONNECT:
    THREE-PHASE
    FUSE SIZE: 150A
    WIRE SIZE: 2/0 COPPER
    THHN OR EQUAL
    SINGLE PHASE
    FUSE SIZE: 225A
    WIRE SIZE: 250 MCM COPPER
    THHN OR EQUAL

AM-6A NOTES:

1. AIR INLET AT REAR OF CABINET, 700 cfm (19.8 m^3/MIN.) FILTER REQUIRED - P/N 407-0062.
2. AIR OUTLET AT TOP OF CABINET, 15.5" X 20.0", (40m X .50m)
3. ACCESS FOR AC POWER THROUGH CABINET TOP OR CABINET BOTTOM ACCESS HOLES.
4. ACCESS FOR REMOTE CONTROL AND AUDIO CONNECTIONS THROUGH TOP OF CABINET.
5. OUTPUT RF CONNECTION IS 7/8" SEMI-RIGID FOAM COAXIAL CABLE. SEE CONNECTION INSTRUCTIONS ON REAR PANEL OF OUTPUT NETWORK.
6. HEAT DISSIPATION: 3500 WATTS MAXIMUM (12,000 BTU/HR.) FOR 5.6KW RF OUTPUT @ 125% AUDIO TONE MODULATION.
7. AC POWER INPUT: 196-252 VAC SINGLE PHASE AT 85 AMPS MAXIMUM, 50/60 HZ 196-252 VAC OR 339-437 VAC THREE PHASE 50/60 HZ AT 40 AMPS MAXIMUM FUSED DISCONNECT SWITCH RECOMMENDED FOR PROPER SIZING OF FUSES REFER TO INSTRUCTION MANUAL AND NATIONAL ELECTRICAL CODE OR LOCAL CODES.
8. PRIMARY AC FUSED DISCONNECT:
    FUSE SIZE: 125A
    WIRE SIZE: #1 COPPER THHN OR EQUAL.
    THREE PHASE
    FUSE SIZE: 75A
    WIRE SIZE: #4 COPPER THHN OR EQUAL.

BROADCAST ELECTRONICS— SOLUTIONS FOR TOMORROW'S RADIO

Operating in today's radio industry calls for cost effective solutions for your equipment requirements.

For years, Broadcast Electronics has been leading the broadcast industry in technology, product development, and service. In fact, no other company today provides such a full range of radio broadcasting solutions.

The RF PRODUCTS LINE carries a wide range of AM and FM radio transmission systems, accessories, studio products, and remote equipment.

Included in this division is the MARTI line of industry leading remote pickup systems, telephone codecs, studio-transmitter links, FM exciters, accessories, and other wireless remote communication systems.

The STUDIO SYSTEMS division produces AudioVAULT®, the best selling digital audio storage and control system for radio. Additionally, a complete line of studio furniture, the AudioPOINT routing switch, and the MixTrak and AirTrak consoles are included in this division.

Broadcast Electronics' PROGRAMMING division is the leading U.S. provider of music formats, syndicated dayparts, libraries, and consulting services, offering comprehensive resources and programming solutions for radio.

For more information on any of our products, contact your Broadcast Electronics representative, call us direct at (217) 224-9600, or visit our homepage at www.bdcast.com.

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Solutions for Tomorrow's Radio

PREDATOR

Solutions for Tomorrow's Radio

Exciter/Transmitter

Years of design and testing have brought about a new and better breed of animal... introducing the Predator digital exciter. This superior exciter is available only from Broadcast Electronics, the leader in solutions for today's radio.

Features

- Completely modular
- Expandable to grow with your operation
- Available in 50, 150, or 250 watts
- Can also serve as a low-power transmitter
- Maintains your audio's CD quality sound
- Accepts AES/EBU, left and right, or composite inputs
- Field upgradable

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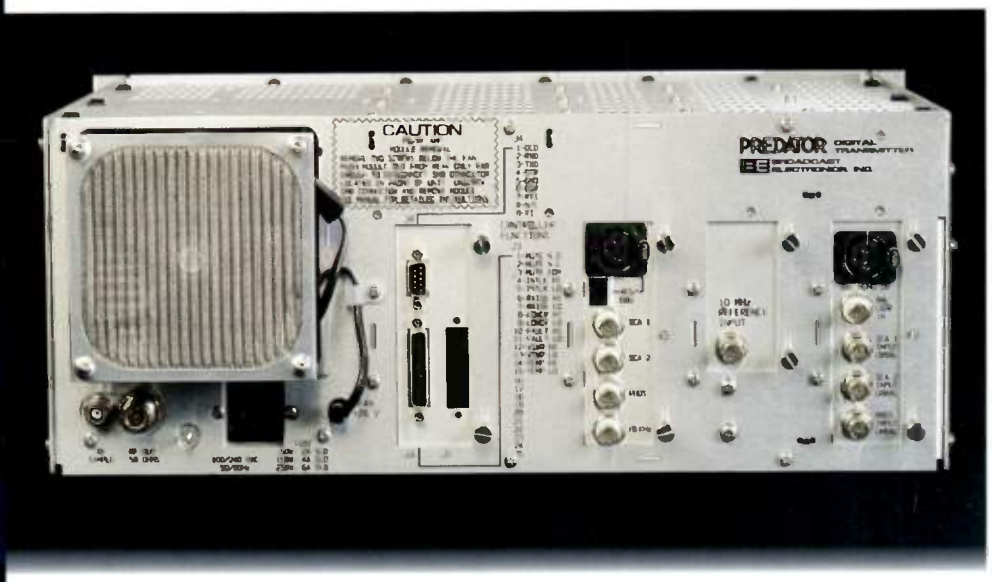

A Breed of Its Own

After years of design and testing, Broadcast Electronics engineers were the first to incorporate all the important components and technology in a digital exciter—modularity, expandability, convertibility, digital quality, and a price tag thousands less than other exciters. This new technology lets you take a more aggressive approach to radio...for more aggressive results.

Separated From the Pack

With the Predator comes revolutionary features in radio technology and design. First of all, both the Digital Stereo Generator Module and Analog Input Module can simultaneously reside in the Predator. For example, an STL with digital output can be connected to the Digital Stereo Generator Module, and a back-up composite STL can be connected to the Analog Interface Module. The Predator automatically reverts to analog input if no valid digital input is present.

Undoubtedly, the Predator has unparalleled diagnostics. Front panel LCD display of all the critical levels can be viewed remotely via modem. The Predator even has standard discrete logic level controls to interface to your transmitter.

The Predator's multi-stage filtering, unlike other exciters on the market, eliminates much of the spectrum noise. Simply put, not only will your signal sound different, but it will truly sound better. By incorporating all the latest technology available, the Predator is the most advanced digital exciter on the market.

Modularity

Broadcast Electronics' Predator is completely modular, as you can configure it to fit your station's needs. All modules plug in from the front panel, so there's no need to stock a completely new product as a standby. Instead, just inventory modules as you need, and you'll save time and money. And best of all, the Predator can be serviced in-field.

Expandability

With constant technical advances in digital, nothing stays the same for long. However, the Predator is designed to meet your present and future needs, allowing you to conveniently and inexpensively execute expansion plans and new product upgrades, and on your timeframe. In addition, the Predator has everything you need for a high quality transmitter—all in one simple package.

Convertibility

Not only is the Predator a superior digital exciter, but it can also serve as a low power transmitter.
All Predators are equipped with a low pass filter standard. Should your transmitter fail, you can use the Predator as a back-up until your problems are resolved. The Predator is the only 250 watt digital transmitter on the market, and is also available in 50 or 150 watts.

FOR MORE INFORMATION

For more information on the Predator digital exciter, call us direct at 1-217-224-9600, contact your Broadcast Electronics representative, or visit us on the web at www.bdcast.com.

PREDATOR

Exciter/Transmitter

Solutions for Tomorrow's Radio

Performance Specifications

GENERAL

Power Output:
50 Watt Module: 5 to 50 Watts, continuously variable. Type "N" female connector.
250 Watt Module: 25 to 250 Watts, continuously variable. Type "N" female connector.

RF Output Impedance: 50 ohms.

RF Harmonic and Spurious Suppression: Meets or exceeds all FCC, DOC, and CCIR standards (low pass filter included for transmitter).

VSWR: Rated power into 1.5:1 maximum without output matching. Capable of operating into higher VSWR with automatic power reduction. Open and short circuit protected at all phase angles.

Frequency Range: 87.5 MHz to 108 MHz digitally programmable in 100 kHz increments.

Frequency Stability: ±300 Hz, +32˚F to +122˚F (0˚C to +50˚C). ±100 Hz optional. Can be locked to an external 10 MHz reference source such as GPS (global positioning system).

Modulation Type: FM, generated digitally using a 32-bit numerically controlled oscillator.

Modulation Capability: ±399 kHz maximum.

Modulation Indication: Digital peak reading, color-coded, LED display with baseband over-modulation indicator. Accuracy to 0.25%.

Asynchronous AM S/N Ratio: 80 dB below an equivalent reference carrier with 100% amplitude modulation @ 400 Hz and 75 (S de-emphasis (no FM modulation present).

Synchronous AM S/N Ratio: 60 dB below an equivalent reference carrier with 100% amplitude modulation @ 1 kHz (FM modulation: ±75 kHz @ 400 Hz).

Pre-emphasis:
Analog Interface Module: FCC 75 µS, CCIR 50 µS, Dolby 25 µS, or flat response, selectable.
Digital Stereo Generator Module: FCC 75 µS, CCIR 50 µS, or flat response, selectable.

Overall Efficiency: Greater than 20%.

AC Input Power Requirements:
100 to 240 VAC, 50/60 Hz, single phase.

Ambient Operating Temperature Range:
+32˚F to +122˚F (0˚C to +50˚C).

Humidity: 95% Maximum, Non-condensing.

Altitude:
50 Hz: 0 to 7500 ft. (2286 m) Above Sea Level.
60 Hz: 0 to 10,000 ft. (3048 m) Above Sea Level.

Dimensions (H X W X D):
7" X 19" X 16" (17.78cm X 48.3cm X 40.64cm).

Weight: 26 lbs. (11.8 kg) unpacked.

WIDEBAND COMPOSITE OPERATION

Analog Interface Module

Composite Input: Balanced BNC connector.

Composite Input Impedance: 10 k ohm or 50 ohm, nominal, resistive, selectable.

Composite Input Level: 3.5 Vp-p nominal, for ±75 kHz deviation.

Composite FM Signal-to-Noise Ratio: 93 dB (96 dB typical) below ±75 kHz deviation @ 400 Hz measured within a 20 Hz to 80 kHz bandwidth with 75 µS de-emphasis and DIN "A" weighting.

Composite Harmonic Distortion plus Noise: 0.005% or less @ 400 Hz.

Composite SMPTE Intermodulation Distortion: 0.005% or less, 60 Hz/7 kHz 1:1 ratio.

Composite CCIF Intermodulation Distortion: 0.005% or less, 15 kHz/14 kHz 1:1 ratio.

Composite Amplitude Response: ±0.025 dB, 30 Hz to 53 kHz.

Composite Phase Response: ±0.1˚ from linear phase, 30 Hz to 100 kHz.

Composite Group Delay Variation: ±40 nanoseconds, 30 Hz to 100 kHz.

Stereo Separation: 65 dB or better from 30 Hz to 15 kHz (sine wave).

STEREO PERFORMANCE

Digital Stereo Generator Module

Digital Audio Input:
Format: AES/EBU
Connectors: Two (2) total, one (1) XLR and one (1) Toshiba optical.
Impedance: 110 ohms, resistive.
Level: -2 dBfs nominal for 100% modulation.
Data Rate: Any in range of 32 to 56 kHz (32, 44.1, or 48 kHz typical output rates for AES/EBU devices).

Frequency Response: ±0.5 dB, 20 Hz to 15 kHz, 75µS pre-emphasis (Flat or 50 µS pre-emphasis selectable).

Total Harmonic Distortion: 0.03% or less from 30 Hz to 15 kHz.

Intermodulation Distortion: 0.03%, 60 Hz/7 kHz 4:1 ratio.

Stereo Separation: 70 dB or better from 20 Hz to 15 kHz (Sine Wave).

Linear Crosstalk:
Main to Sub (L+R to L-R), 20 Hz to 15 kHz, 70 dB minimum below 100% modulation.
Sub to Main, 20 Hz to 15 kHz, 50 dB minimum below 100% modulation.

FM Noise: 85 dB or better below 100% modulation @ 400 Hz measured within a 20 Hz to 22 kHz bandwidth with 75 µS de-emphasis and DIN "A" weighting.

Pilot Stability: ±0.3 Hz, +32˚F to +122˚F (0˚C to +50˚C).

Dynamic Stereo Separation: 60 dB or better from 20 Hz to 15 kHz (normal program content).

38 kHz Suppression: 80 dB minimum below 100% modulation.

57 kHz, 76 kHz, and 95 kHz Suppression: 80 dB minimum below 100% modulation.

Spurious and Sideband Suppression (beyond 95 kHz):
75 dB minimum below 100% modulation.

Modes of Operation: Stereo, Mono L+R, Mono L, and Mono R. Remote control accessible.

MONAURAL OPERATION

Analog Interface Module

Audio Input Impedance: 10 k ohm or 600 ohm selectable, balanced, resistive, 60 dB common mode suppression.

Audio Input Level: +10 dBm nominal for ±75 kHz deviation @ 400 Hz, adaptable to other levels.

Audio Frequency Response: ±0.5 dB, 30 Hz to 15 kHz, selectable flat, 25 µS, 50 µS, or 75 µS pre-emphasis.

Harmonic Distortion plus Noise: 0.03% or less @ 400 Hz.

SMPTE Intermodulation Distortion: 0.03% or less, 60 Hz to 7 kHz 4:1 ratio.

CCIF Intermodulation Distortion: 0.03% or less, 15 kHz/14 kHz 1:1 ratio.

FM Signal-to-Noise Ratio: 93 dB (96 dB typical) below ±75 kHz deviation @ 400 Hz measured in a 20 Hz to 80 kHz bandwidth with 75 µS de-emphasis and DIN "A" weighting.

SCA (RBDS/RDS) OPERATION

Analog Interface or Digital Stereo Generator Modules

Input: 3 total, BNC connectors. Two (2) SCA Inputs, one (1) RBDS/RDS Input. SCA Input 2 configurable for SCA or wideband audio input.

Input Impedance: 10 k ohm, unbalanced.

Input Level: 3.5 Vp-p nominal for 10% deviation.

SCA Amplitude Response: ±0.2 dB, 40 to 100 kHz.

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FX-50

Solutions for Tomorrow's Radio

50 watt Exciter/Transmitter

The Broadcast Electronics' FX-50's performance can bring existing FM transmitters up to digital quality standards, and has the lowest distortion of any available exciter. As the acknowledged standard for FM audio performance, the FX-50's breakthrough technology remains unsurpassed by more costly and complex digital exciters. With the superb specifications available in this product, the FX-50 is totally transparent to your broadcast signal.

Features

- Optional: with the addition of an internal low pass filter, the FX-50 can serve as a reliable 50 watt stand-alone FM transmitter (FM-50).
- Computer-optimized phase locked loop greatly improves low frequency response.
- Contains a 50 watt MOSFET output power to drive the largest of transmitters.
- THD and IMD less than .003% typical for true digital capability.
- With a signal to noise ratio that is typically 93 dB, the FM-50 can handle all of the nuances and power of digital audio.
- Frequency range of 87-109 MHz - digitally programmable in 10 kHz increments.
- Performance specifications feature a dynamic range that rivals CD players with harmonic and intermodulation distortion values so low they are virtually unmeasurable.

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e-mail: bdcast@bdcast.com

FX-50

Solutions for Tomorrow's Radio

50 watt Exciter/Transmitter

Performance Specifications

GENERAL

Power Output: 3 to 50 W continuously variable (BNC connector) open and short circuit protected.
R.F. Output Impedance: 50 ohms
R.F. Harmonic and Spurious Suppression: Meets all FCC and DOC requirements and CCIR recommendations for a 50-watt transmitter with optional low pass filter.
Frequency Range: 87 MHz to 109 MHz digitally programmable in 10 kHz increments.
Frequency Stability: ±300Hz, +32°F to +122°F (0°C to +50°C).
Modulation Type: Direct FM at the carrier frequency.
Modulation Capability: ±350 kHz.
Modulation Indication: Peak reading, color coded, LED display with baseband overmodulation indicator.
Asynchronous AM S/N Ratio: 80dB minimum below equivalent reference carrier with 100% amplitude modulation at 400Hz and 75µS de-emphasis (no FM modulation present).
Synchronous AM S/N Ratio: 60dB minimum below equivalent 50W reference carrier with 100% AM modulation at 1kHz, no de-emphasis (FM modulation +/- 75kHz and 1kHz).
Multimeter: 5 function LCD diagnostic aid +/- 3% accurate.
Test Metering: Internal high-input impedance multimeter with probe for point-to-point DC measurements.
Remote Metering: Buffered Forward and Reflected power outputs.
Exciter Status Display: Front panel status annunciators for +20V, -20V, +5V, Lock, RF, VSWR, and temp. Additional status LEDs are located on AFC/PII assembly for Mod Osc Chain, Ref Osc Chain, +5V, +15V and -15V.
Front Panel Test Connections: Composite input and composite output.
Audio/Control Connections: 14 position barrier strip and (5) BNC connectors. Control connections are AFC Interlock (normally open/normally closed relay contacts), AFC indication (open collector and closure), +20V or remote power control (switch selectable), RF mute, Temperature overload (+18V at 15ma), buffered FWD and RFL meter samples, and two ground connections. All inputs/outputs RFI suppressed.
RF Mute Control: +3V to +40V DC or GND closure, switch selectable. Ima maximum.
AC Input Power: 97 to 133 VAC or 194 to 266 VAC, 50/60 Hz, 230 W maximum.
Ambient Temperature Range: ±32°F to +122°F (0°C to +50°C).
Altitude: 15,000 feet (4,572 m) AMSL.
Dimensions: 17.70"W x 5.25"H x 19.00"D (44.96 x 13.33 x 48.26 cm).
Net Weight: 38lbs. (17.1 kg), packed 46lbs. (20.7 kg).
Finish: Black backlit center overlay with technical white upper and lower extrusions.
Construction: Modular sub-assemblies with pin-plug interconnection.

WIDEBAND COMPOSITE OPERATION

Composite Inputs: 3 total, (1) unbalanced, (1) balanced, plus (1) front panel test provision (BNC connectors).
Composite Input Impedance:
Unbalanced: 10 k ohm, nominal, resistive.
Balanced: 10 k ohm or 50 ohm, programmable, jumper selected.
Composite Input Level: 3.5V p-p nominal, for ±75 kHz deviation.
Composite FM S/N Ratio: 90dB (94dB typical) below +/- 75kHz deviation at 400Hz, measured in a 20Hz to 200kHz bandwidth with 75µS de-emphasis, 94dB (96dB typical) with DIN "A" weighting.
Composite Harmonic Distortion: 0.003% or less.
Composite Intermodulation Distortion: 0.005% or less (0.003% typical).
Composite CCIF IMD: 0.005% or less (all products greater than -86 dB below 100% modulation. Twin tone, 15 kHz/14 kHz, 1:1 pair).
Composite Transient IMD: 0.01% or less (square wave/sine wave).
Composite Amplitude Response: +/- 0.025dB, 30Hz to 53kHz.
Composite Phase Response: +/- 0.1degree from linear phase, 30Hz to 53kHz.
Composite Group Delay Variation: +/- 5 nanoseconds, 30Hz to 100kHz.
Subcarrier Inputs: 3 total, unbalanced, BNC connectors.
Subcarrier Input Impedance: 100 k ohm nominal, resistive.
Subcarrier Input Level: 3.5 V p-p nominal for ±7.5 kHz deviation (10% injection).
Subcarrier Amplitude Response: ±0.2 dB, 40 kHz to 100 kHz, -3 dB at 7,500 Hz.
Stereophonic Separation: 60dB, 30Hz to 5kHz, 52dB, 5 to 15kHz (measured using BE FS30 Stereo Generator).
SCA Inputs: 3 total, unbalanced BNC connectors.
SCA Input Impedance: 100 k ohm nominal, resistive.
SCA Input Level: 3.5V p-p nominal for+/- 7.5kHz deviation.
SCA Amplitude Response: +/- 0.2dB, 40 to 100kHz.

STEREO OPERATION

Modulation Type: Digitally synthesized stereo, digitally synthesized pilot. No pilot phase adjustment required.
Audio Input Impedance: 600 ohms, balanced, resistive, transformerless, floating (adaptable to other impedances).
Audio Input Level: +10 dBm, ±1 dB for 100% modulation at 400 Hz (adaptable to other input levels).
Audio Input Filters: 15 kHz active L.P.F., 45 dB rejection at 19 kHz, delay compensated for minimum overshoot without clippers or other non-linear devices.
Audio Overshoot: 2 dB maximum.
Audio Frequency Response: ±0.5 dB, 30 Hz to 15,000 Hz, 75µS pre-emphasis (flat, 25µS, 50µS pre-emphasis selectable).
Total Harmonic Distortion Plus Noise (THD+N): 0.03% or less at ±75 kHz deviation, 400 Hz, using 75µS de-emphasis.
Intermodulation Distortion: 0.03% or less, 60 Hz/7 kHz, 4:1 ratio.
CCIF Intermodulation Distortion: 0.01% or less (all products greater than -80 dB below 100% modulation. Left or right channel modulated 100%, twin tone, 15 kHz/14 kHz, 1:1 pair).
Stereo Separation: 52 dB; 30 Hz to 15,000 Hz 60dB; 30 Hz to 5000 Hz.
Dynamic Stereo Separation: 50 dB or better, 30-15,000 Hz (normal program content).
Linear Crosstalk: Main to Sub/Sub to Main due to distortion products. 45 dB minimum below 100% modulation.
Non-Linear Crosstalk: Main to Sub/Sub to Main due to distortion products. 70 dB minimum below 100% modulation.
38 kHz Suppression: 80 dB minimum below 100% modulation.
57, 76, and 95 kHz Suppression: 80 dB minimum below 100% modulation.
Spurious and Sideband Suppression: 80 dB minimum below 100% modulation to 95 kHz, 75 dB minimum beyond 95 kHz.
FM Signal to Noise Ratio: -82 dB minimum below left or right channel, 100% modulation, 400 Hz, with 75µS de-emphasis.
Pilot Stability: ±0.5 Hz, 0 to 50 degrees C.
Operational Modes: Stereo, Mono L+R, Mono L, Mono R, remote controllable.

SUBCARRIER OPERATION

NOTE: Subcarrier operation is specified using BE Model FC-30 FM Subcarrier Generator.
Modulation: Direct coupled FM at subcarrier frequency.
Frequency of Operation: 67 kHz (39 to 95 kHz to order). Front panel adjustable.
Frequency Stability: ±0.5% of subcarrier frequency (±335 Hz at 67 kHz).
Subcarrier Harmonic Content: Less than 0.3%.
Modulation Capability: ±20% of subcarrier frequency (±13.4 kHz at 67 kHz).
Modulation Indicator: Color coded peak reading LEDs.
Frequency Response:
Audio: ±0.5 dB 10-10,000 Hz exclusive of audio L.P.F. selectable flat, 150µS or 75µS pre-emphasis.
Data: ±0.5 dB DC to 10,000 Hz, no pre-emphasis.
Input Impedance:
Audio: 600 ohms, balanced, resistive, transformerless, terminal strip connection. Adaptable to other impedances.
Data: 75 ohms, unbalanced, resistive, DC coupled, BNC connector. Adaptable to other impedances.
Input Level:
Audio: Adjustable, +10 dBm to -10 dBm for ±6 kHz deviation at 400 Hz.
Data: Adjustable, 1.0 to 4.0 V p-p for ±6 kHz deviation DC coupled.
Input Filters:
Audio: Sixth order, -3 dB at 4.3 kHz standard (adaptable to other cutoff frequencies), defeatable.
Data: Same as audio or may be bypassed.
Audio Overshoot: 2 dB maximum.
Total Harmonic Distortion Plus Noise (THD+N): 0.5% or less throughout the audio passband, ±6 kHz deviation.
Intermodulation Distortion: 0.5% or less, 60 Hz/7 kHz, 1:1 ratio (audio LPF and pre-emphasis bypassed).
FM Signal to Noise Ratio: -62 dB minimum below ±6 kHz deviation at 400 Hz (150µS de-emphasis).
Crosstalk, Stereo to Subcarrier: -50 dB or better below ±6 kHz subcarrier deviation using 150µS de-emphasis and FS-30 stereo generator.
Crosstalk, Subcarrier to Stereo: -60 dB or better below 100% modulation, left or right. 75µS de-emphasis.
Crosstalk, Subcarrier to Subcarrier: -50 dB demodulated with 150µS de-emphasis.
Automatic Mute Level: Adjustable from 10 to 30 dB below program level.
Automatic Mute Delay: Adjustable, 0.5 to 10 seconds.
Subcarrier Envelope Decay: Greater than 100 mSec from 90% to 10% subcarrier levels. (Prevents receiver squelch noise.)
Subcarrier Injection Level: Continuously adjustable from 1% to 30% of total composite modulation.

MONAURAL OPERATION

Audio Input Impedance: 600 ohms balanced, resistive, adaptable to other impedances, 60 dB common mode suppression.
Audio Input Level: +10 dBm nominal for ±75 kHz deviation@400Hz, adaptable to other levels.
Audio Common Mode Rejection Ratio: Greater than 60 dB.
Audio Frequency Response: +/- 0.5dB, 30Hz to 15kHz; selectable flat, 25, 50, or 75µS pre-emphasis.
Total Harmonic Distortion Plus Noise (THD+N): 0.005% or less (0.003% typical) at ±75 kHz deviation and 50W RF power output, 400 Hz, using 75µS de-emphasis.
Total Harmonic Distortion: + Noise (THD + N); 0.005% (0.003% typical).
Intermodulation Distortion: 0.005% or less (0.003% typical) 60Hz to 7kHz, 4:1 ratio.
CCIF Intermodulation Distortion: 0.005% or less (all products greater than -86 dB below 100% modulation. Twin tone, 15 kHz/15 kHz 1:1 pairs).
Transient Intermodulation Distortion: 0.01% or less (square wave/sine wave).
F.M. S/N Ratio: 90dB below ±75 kHz deviation @ 400Hz (93 dB typical). Measured within a 20 Hz to 200kHz bandwidth with 75µS de-emphasis. 94 dB (96 dB typical) with A weighting.

FRONT AND REAR PANEL DESCRIPTIONS

Front Panel Descriptions

True Peak Reading LED Modulation Display: Consists of 29 segments from 5% to 145% in 5% increments.
Composite Test Input: BNC connector.
Composite Test Output: BNC connector.
Status Panel: Backlit annunciators fo +20V, -20V, +5V, Lock, RF, VSWR, Temp.
Contents: Five momentary, electronically interlocked switches which control the input to be monitored on the three segment LCD meter with minus sign. Functions are: Forward power, Reflected power, PA voltage, PA current, and AFC voltage.
LED Indication of Measured Units: Watts, Volts, or Amps.

Rear Panel Description

RF Output: BNC connector.
AC Input: Fused AC line filter and voltage selector.
Subcarrier Input Connectors: Three unbalanced BNC connectors.
Composite Input Connectors: One unbalanced and one balanced. BNC connectors.
Balanced Monaural Input: Terminal connections.
Exciter Interconnection Terminal Strip: Control connections are AFC interlock, (normally open/normally closed relay) AFC indication (open collector gnd closure), +20V or Remote Power Control (switch selectable), Temperature Overload (+18V at 15ma), FWD AND RFL Meter Samples, and two ground connections. Also ± and gnd connections for balanced monaural input.

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FM-10S

10 kW Solid State FM Transmitter

A solid combination of performance, reliability, ease of service and price define the new FM-10S 10kW solid state FM transmitter from Broadcast Electronics.

Engineered to the same exacting standards as our complete line of solid state FMs, the FM-10S performs like no other in the industry. An extensive redundancy and protection system has been added that will keep your signal on the air even in the most extreme conditions. An optional standby exciter, IPA and power supply can give you full power standby without having to buy another transmitter.

The FM-10S' large, removable panel provides immediate access to every major assembly for fast and easy repair. In fact, the FM-10S has a lower Mean Time to Repair than any other transmitter in its class.

(shown with industry standard FX-50 and optional standby exciter)

Features

- All RF modules, main and optional standby IPA's, are removable from the front of the unit.
- 95% of full power can be maintained into a normal load with one module removed.
- Redundant power supplies are used to keep the transmitter on the air even under failed power supply conditions.
- Optional standby power supply provides full power operation with one supply removed.
- Full module operating parameters are monitored and displayed on the front panel.
- Developed with a high efficiency cooling system that extends transistor life.
- True proportional (VSWR) foldback to keep the transmitter on the air even in the worst conditions.
- Modules can be removed and replaced without perceptible carrier interruption.
- Amplifier pallets can be replaced in the field without retuning.
- Frequency agile, N+1 compatible to provide an automatic back-up for up to 10 signals anywhere in the band.
- Optional integral standby exciter and IPA provides automatic change over of both.
- Available with optional Predator digital exciter.

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FM-10S

10 kW Solid State FM Transmitter

Performance Specifications

GENERAL

Power Output: 5,000 watts to 10,000 watts.
Frequency Range: 87.5 to 108 MHz, tuned to specific operating frequency. Exciter programmable in 10 kHz steps.
RF Output Impedance: 50 ohms.
Output Connector: 3 1/8" EIA flange, 1 5/8" EIA flange optional.
VSWR: Rated power into 1.3:1 maximum. Capable of operating into higher VSWR with automatic power reduction. Open and short circuit protected at all phase angles.
Frequency Stability: +/- 300 Hz, 0 to 50 degrees C.
Type of Modulation: Direct frequency modulation of carrier frequency.
Modulation Capability: Greater than+/- 350 kHz.
Asynchronous AM S/N Ratio: 55 dB below equivalent 10 kW reference carrier with 100% AM modulation at 400 Hz, 75µS de-emphasis (no FM modulation present).
Synchronous AM S/N Ratio: 50 dB below equivalent 10 kW reference carrier with 100% AM modulation at 400 Hz,
75 µS de-emphasis with FM modulation+/- 75 kHz at 400 Hz.
IMD Protection: 20 dB or better turn-around-loss or mixing loss to interfering signals.
RF Harmonics: Suppression meets all FCC/IC/CE requirements and CCIR recommendations.
AC Input Power: 196-252 VAC, DELTA (or 340-435 VAC 4 WIRE WYE), 50/60 Hz, three phase. Single phase input power optional.
Power Factor: 0.98 at 230 VAC. 10 kW output power into 50 ohm load.
Overall Efficiency: 58% or better at 230 VAC, 10,000 watts into 50 ohms, 61% typical.
Surge Protection: Tested with IEEE C62.41-1991 recommended waveforms for location category B3 and IEC 801-4 standard waveforms for severity level 4.
Attitude: 10,000 ft. at 60 Hz (3048 M), 7500 ft. at 50 Hz (2286 M).
Ambient Temperature Range: 0 degrees C to +50 degrees C.
Safety Protection: Meets IEC 215 safety requirements.
Additional Standards: Meets applicable CE standards.

WIDEBAND COMPOSITE OPERATION

Composite Inputs: 3 total, (1) unbalanced and (1) balanced plus front panel test. All connectors BNC.
Composite Input Impedance: 10K ohm or 50 ohm, nominal, resistive selectable.
Composite Input Level: 3.5 V p-p nominal, for +/- 75 kHz deviation.
Composite FM S/N Ratio: 85 dB below +/- 75 kHz deviation at 400 Hz. Measured in a 20 Hz to 30 kHz bandwidth with 75µS de-emphasis.
Composite Harmonic Distortion + Noise: 0.02% or less at 400 Hz.
Composite SMPTE Intermodulation Distortion: 0.02% or less, 60 Hz/7 kHz 1:1 ratio.
Composite CCIF Intermodulation Distortion: 0.02% or less, 15 kHz/14 kHz 1:1 ratio.
Composite Transient Intermodulation Distortion: 0.02% or less sine wave/square wave.
Composite Amplitude Response: +/- 0.1 dB, 30 Hz to 53 kHz.
Composite Phase Response: +/- 0.25 degrees from linear phase, 30 Hz to 53 kHz.
Composite Group Delay: 125 nanoseconds.
Composite Slew Rate: 9 V/microsecond (symmetrical).
Size: 44.5"W x 70"H x 26.5"D (113cm x 178cm x 68cm)
Weight: 660 lbs. (300 kg) standard unpacked
713 lbs. (323 kg) with standby exciter, IPA and power supply options.

Frequently Asked Questions

MODEL FM-10S

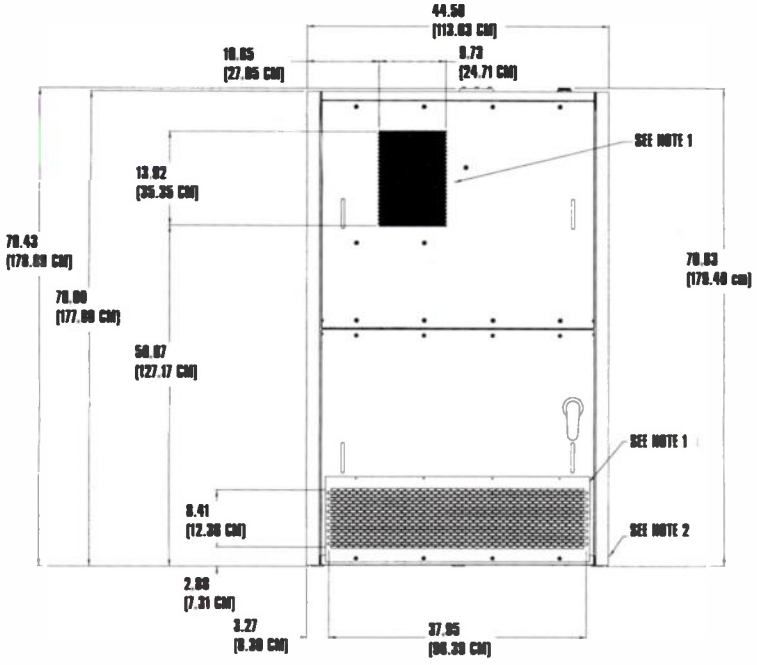
Power Range:	5kW to 10kW
AC Voltage Requirements:	196 to 252 VAC, 50/60 Hz, 3 phase, Closed Delta or WYE (3 or 4 wire) 340 to 435 VAC, 50/60 Hz, 3 phase, 4 wire, WYE only
Disconnect Size:	100 Amp fused disconnect recommended
Actual amperage draw at:	10kW - 50A, average, actual determined by line voltage, carrier frequency, etc.
AC wire size:	1 AWG copper, THHN or equivalent
Power Consumption:	17.3kW at 10kW RF output
Cooling Air requirements:	2700 CFM
Air Outlet (PA exhaust) size:	Top of Cabinet (27" x 45")
Heat dissipation:	7.3kW (24,915 BTU/hr) at 10kW RF output
To determine Air Conditioner size for closed system:	one BTU/hr = 0.293 watt one watt = 3.413 BTU/hr 12,000 BTU/hr = 1 ton of A/C eg, at 7.3kW dissipated, a 2.1 ton A/C unit would be needed (7,300 x 3.413 = 24,915/12,000 = 2.1)
Output connection size:	3 1/8" EIA female (1 5/8" optional)
Weight:	660 lbs. standard unpacked

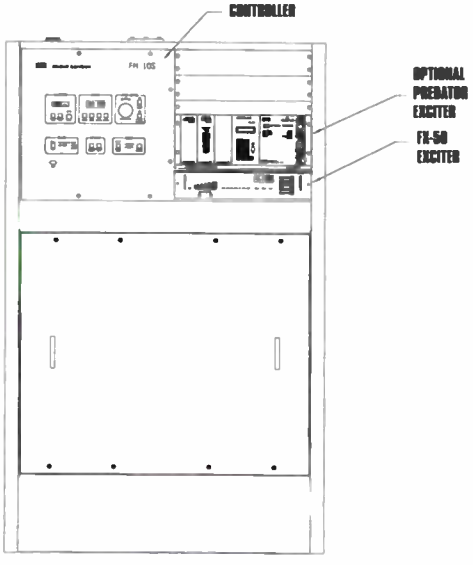
MODEL FM-10S [Single Phase]

Power Range:	5kW to 10kW
AC Voltage Requirements:	196 to 252VAC, 50/60 Hz, single phase
Disconnect Size:	150 Amp fused disconnect recommended
Actual amperage draw at:	10kW - 85A, average, actual determined by line voltage, carrier frequency, etc.
AC wire size:	2/0 copper, THHN or equivalent
Power Consumption:	17.3kW at 10kW RF output
Cooling Air requirements:	2700 CFM
Air Outlet (PA exhaust) size:	Top of Cabinet (27" x 45")
Heat dissipation:	7.3kW (24,915 BTU/hr) at 10kW RF output
To determine Air Conditioner size for closed system:	one BTU/hr = 0.293 watt one watt = 3.413 BTU/hr 12,000 BTU/hr = 1 ton of A/C eg, at 7.3kW dissipated, a 2.1 ton A/C unit would be needed (7,300 x 3.413 = 24,915/12,000 = 2.1)
Output connection size:	3 1/8" EIA female (1 5/8" optional)
Weight:	660 lbs. standard unpacked

FM-10S

10 kW Solid State FM Transmitter

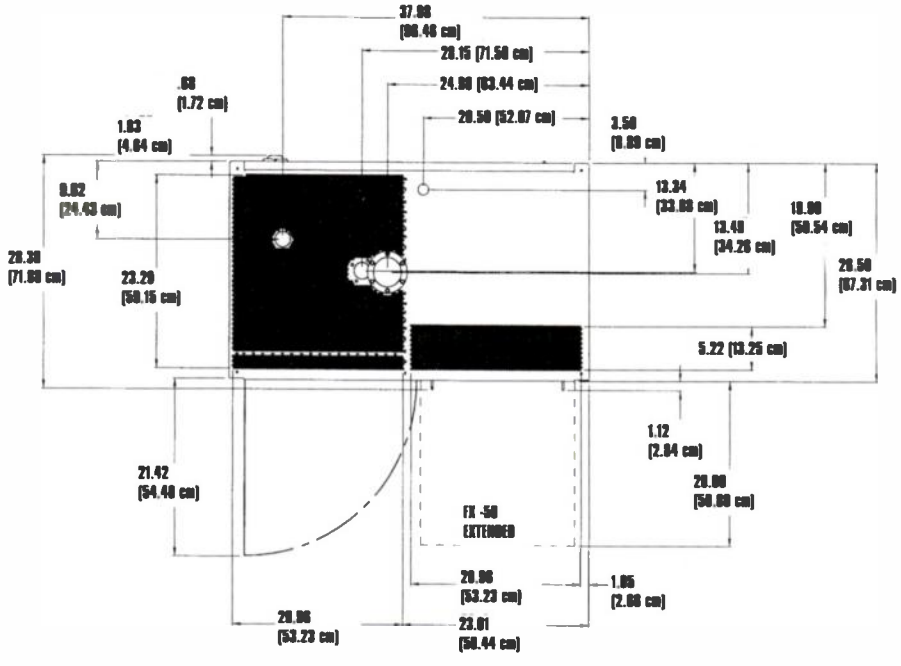




FM-10S

FM-10S NOTES:

1. Air inlet at rear of cabinet 2400 cfm (68.0 3m 3/min) filter required.
2. Ground strap entry in lower right corner at rear of cabinet.
3. RF Output Connection- 3-1/8 inch eia 50 dhm female field flange (3-1/8 inch to 1-5/8 inch eia flange adapter optional)
4. Air outlet at top of cabinet.
5. Access for ac power through cabinet top access hole.
6. Access for remote control, modulation monitor, and audio connections through top of cabinet.
7. Heat dissipation: 7 kw (23,910 btu/h) nominal at a 10 kw rf output, 50 dhm resistive load. 11 kw (37,570 btu/h) at a 10 kw rf output into a 1.5:1 vswr load.
8. Weight: 713 lbs (324 kg) unpacked with optional exciter, ipa, and powder units.
9. AC power consumption: 17 kw nominal at a 10 kw rf output into a 50 dhm resistive load with a 230 vac input. 21 kw at a 10kw rf output into a 1.5:1 vswr load with a 230 vac input.
10. AC power input: 196 to 252vac 50/60hz single phase, 111 amperes (maximum condition). fuse disconnect switch recommended. for proper sizing of fuses, refer to following text, national electronics codes, and local codes.
11. Primary ac fuse disconnect: single phase: fuse size-150amp, wire size-2/0 copper awg. type thhn three phase: fuse size-100 amp, wire size-#1 copper awg. type thhn
12. Power factor - better than .95 @ 230vac with a 10kw rf output into a 50 Ohm load.



FM-10S

10 kW Solid State FM Transmitter

Broadcast Electronics FX-50 Exciter

All Broadcast Electronics FM transmitters contain the renowned Broadcast Electronics' FX-50 Exciter technology, the acknowledged broadcast standard for FM audio performance. The FX-50's performance can bring existing FM transmitters up to digital quality standards, and has the lowest distortion of any available exciter. This breakthrough remains unsurpassed by more costly and complex digital exciters.

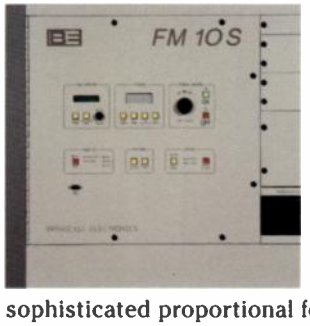
FM-50 Watt Transmitter

Besides its unique status as the industry standard FM exciter, the FX-50 with the addition of an internal low pass filter can also serve as a reliable 50 watt stand-alone FM transmitter. Either as an exciter or as a 50 watt transmitter, its superior performance specifications make the FX-50 totally transparent to your broadcast signal.

Predator Digital Transmitter/Exciter

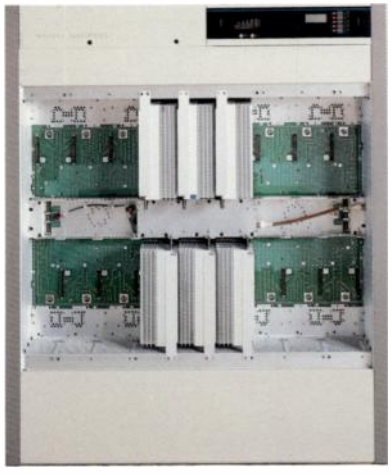
Broadcast Electronics' engineers were the first to develop the right kind of digital technology for a low power transmitter/ exciter-modular, expandable, convertible, digital quality, and priced thousands less. All at power levels designed to fit any need - 50 or 250 watts. The Predator accepts AES/EBU, left and right, or composite inputs, can be upgraded in the field and is equipped with a full remote control interface.

Automatic Power Control



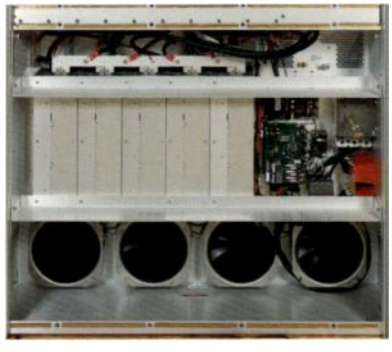
The integrated automatic power control system (APC) in all Broadcast Electronics' solid state transmitters maintains constant RF output power within 2.0% of the operator setting, regardless of fluctuations in incoming AC line voltage, RF drive level or antenna impedance. In addition, the sophisticated proportional feedback system allows the transmitter to stay on line into loads of as poor as 3 to 1 VSWR.

Front View



The easily removed front panel allows immediate access to all PA and IPA modules from the front of the transmitter. PA modules can be removed while the transmitter is still on the air without damage to the module and without perceptible carrier interruption. All PA and IPA modules are identical and may be moved into any spot in the transmitter. The FM-10S will continue to make 95% of full power with one of the modules failed and can remain on the air with as few as four PA modules operational. Optional redundant IPA's insure normal operation in case of an IPA failure. Standby or main IPA can be selected from the front panel or remotely.

Rear View



The FM-10S is the only transmitter in its class that offers true power supply redundancy. The FM-10S comes standard with four modular PA power supplies and a fifth unit is optional. These power supplies are ganged together to provide for full power operation with one of the supplies off line in the optional configuration. The FM-10S can stay on the air with as many as three supplies off line in the optional configuration.

Cooling for the FM-10S is provided by four ball bearing blowers. These high capacity air movers insure proper cooling for all sections of the transmitter. No major area of the transmitter uses air that has been pre-heated by another section of the unit. Every section intakes air that is at room temperature. The multiple fans provide for proper cooling at temperatures and altitudes far beyond those of most other solid state transmitters of this power level.

BROADCAST ELECTRONICS, INC.

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4MX 50 AM Transmitter

50 kW AM Transmitter

Something new in AM technology
Expanding our AM transmitter offerings is the next logical step in Broadcast Electronics' commitment to deliver **Total Radio™** solutions to the industry. We started development with our decades of engineering expertise, along with a "wish list" of performance and operational goals from broadcasters worldwide. The result is the **4MX 50 AM™**, an entirely new chapter in AM transmission technology.

Designed for the demands of both analog and digital transmission, the 4MX 50 is based on a patent-pending modulation design developed by BE that packs unparalleled efficiency and features into a small footprint with a price to match.

Our next-generation **4M Modulation™** is a Fourier modulation design incorporating zero-voltage switching and modulated RF duty cycle enabling the 4MX 50 to boast a typical efficiency of 89%. You can also operate the 4MX 50 at power levels as low as 250 W to meet all your power level needs, day and night.

Great things come in small packages
While the 4MX 50 is as little as one-third the size and one-quarter the weight of competing models, it exceeds expectations for reliability and service accessibility.

The unique design directly connects efficient switching power supplies to the power amplifier, entirely skipping the modulator stage.

All 32 power amplifiers have their own power supply, producing unparalleled redundancy, thus ensuring the transmitter is on air at maximum power—even with multiple failed modules. The power amplifiers are hot-pluggable and can be removed and replaced while the transmitter remains in operation.

The exciter in the 4MX 50 is DSP-based and provides enhanced audio performance by adaptively correcting for any distortion. In addition to superior audio quality for your listeners, the 4MX 50 offers unprecedented diagnostics, such as the ability to view an impedance sweep of the antenna system, as well as a spectrum analysis of the output signal to verify spectral performance of analog AM and HD Radio™ systems.

Flexible, friendly control
Full transmitter control and diagnostic capabilities are available locally via a 15-inch, 1024 x 768 XGA front-panel display. The user interface provides intuitive soft-button operation for easy viewing of all pertinent transmitter status and advanced diagnostic information, as well as transmitter operational control. Password and multi-layered access protection are provided.

All status, control and diagnostic parameters can be accessed remotely via IP, from virtually anywhere on a secure network connection. Pertinent control and diagnostics are also available through standard, discrete inputs and outputs.

Analog, digital or both
Fully HD Radio and DRM compatible as delivered from the factory, the 4MX 50 accommodates both current and future versions of HD Radio. As you have come to expect from BE, the 4MX 50 provides the flexibility of changing transmission between analog-AM mode and analog-AM-plus-HD-Radio mode on the fly either locally or remotely.

When it comes to implementing HD Radio, no AM transmitter provides more system design options than the 4MX 50. **BE's ASi 10 HD Radio Signal Generator** can feed I and Q directly to the transmitter. A plug-in Exgine module is all that is needed to configure the 4MX 50 for systems with HD Radio coding and processing in the studio using the **XPi 10™ Studio HD Radio Signal Generator**.

Attention to small details
The 4MX 50 accommodates wired or optical mono AES digital audio, as well as having analog audio inputs. The transmitter can automatically detect loss of primary audio and switch to a backup source with a user-programmed delay prior to switchover. An IP audio feed is also available, allowing significant options in audio delivery to your transmitter.

Lightning protection is provided on both the AC input and RF output to ensure robust operation for years. The power supplies in the 4MX 50 are power factor corrected to 0.99 or better.

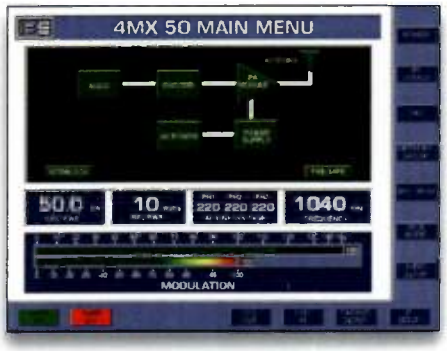
KEY PRODUCT FEATURES

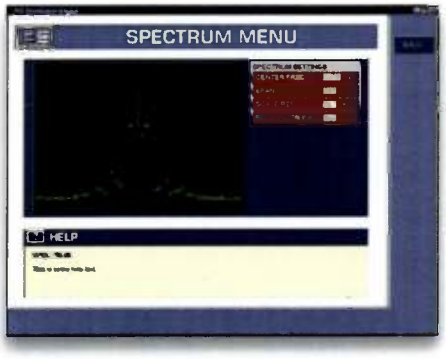
- Patent-pending 4M Modulation design
- 89% typical efficiency
- As little as one-third the footprint and one-quarter the weight of competing models
- Designed for analog AM, HD Radio and DRM
- Built-in redundancy
- Hot-pluggable power amplifier modules
- 15" XGA graphical user interface for diagnostics and operation
- Diagnostics, status and control available via IP
- Power capability as low as 250 watts
- Power factor greater than 0.99

WRH

SPECS: 4MX 50 AM Transmitter 50 kW AM Transmitter

Parameter	Specification
General	
RF Power Output	55 kW maximum
Range	250 W to 55 kW
Accuracy	±2 %
Resolution	Three significant digits
Connection	3 1/8" EIA flange
Efficiency	88 % or better at 50 kW; 89 % Typical
Output Impedance	50 Ω nominal
VSWR	1.2:1 or better at rated power
Frequency	
Range	531 to 1610 kHz
Stability	2.5 ppm 0° to +50° C; internal oscillator, external GPS for increased stability
Modulation	
Type	Patent Pending Digital Fourier Modulation
Capability	145 % peak modulation @ 55 kW
Spurious and Harmonic	80 dB; meets or exceeds FCC, IC and other world standards
AC Input	
Voltage	192–265 VAC, 50/60 Hz; 3Phase Wye or Closed Delta 332–460 VAC, 50/60 Hz; 3Phase 4 Wire Wye
Power Consumption	
240VAC/415VAC	56.8 kW @ 0% modulation, 50 kW output 59.7 kW @ normal program modulation, 50 kW output
Cooling Air Requirements	3000 CFM
Power Factor	0.99 or better
Environmental	
Temperature Range	0° to +50° C
Humidity	0 to 95 %, non-condensing
Altitude	10,000 (3,048 m)
Physical	
Size	45" W x 35" D x 87" H
Weight	650 lbs unpacked
Audio	
Input Connector	
Analog	3 position terminal block
AES	3 position terminal block
Input Level	
Analog	-10 dBm to +10 dBm electronically adjustable
AES	0 dBFS to -20 dBFS, electronically adjustable
Input Impedance	
Analog	600 Ω, balanced
AES	110 Ω, balanced
Frequency Response	+0.1/-0.25 dB, 20 Hz to 10 kHz
Total Harmonic Distortion + Noise	0.5 %, 20 Hz to 10 kHz
Intermodulation Distortion	0.5 % or less, 1:1 ratio
Transient Intermodulation Distortion	0.5 % or less, 4:1 ratio
Incidental Phase Modulation	40 dB, 1 kHz
Square Wave Overshoot	0.1 % or less at 400 Hz
Square Wave Tilt	0.5 % or less at 40 Hz
Signal to Noise	-70 dB or better
IBOC	
	Exceeds all regulatory requirements for AM HD Radio operation





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Attention to small details
The 4MX 50 accommodates wired or optical mono AES digital audio, as well as having analog audio inputs. The transmitter can automatically detect loss of primary audio and switch to a backup source with a user-programmed delay prior to switchover. An IP audio feed is also available, allowing significant options in audio delivery to your transmitter.

Lightning protection is provided on both the AC input and RF output to ensure robust operation for years. The power supplies in the 4MX 50 are power factor corrected to 0.99 or better.

KEY PRODUCT FEATURES

- Patent-pending 4M Modulation design
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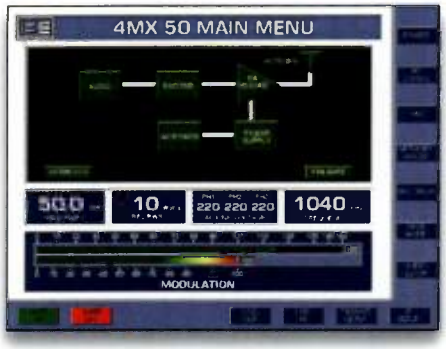
WRH

SPECS: 4MX 50 AM Transmitter 50 kW AM Transmitter

Parameter	Specification
General	
RF Power Output	55 kW maximum
Range	250 W to 55 kW
Accuracy	±2 %
Resolution	Three significant digits
Connection	3 1/8" EIA flange
Efficiency	88 % or better at 50 kW; 89 % Typical
Output Impedance	50 Ω nominal
VSWR	1.2:1 or better at rated power
Frequency	
Range	531 to 1610 kHz
Stability	2.5 ppm 0° to +50° C; internal oscillator, external GPS for increased stability
Modulation	
Type	Patent Pending Digital Fourier Modulation
Capability	145 % peak modulation @55 kW
Spurious and Harmonic	80 dB; meets or exceeds FCC, IC and other world standards
AC Input	
Voltage	192–265 VAC; 50/60 Hz; 3Phase Wye or Closed Delta 332–460 VAC; 50/60 Hz; 3Phase 4 Wire Wye
Power Consumption	
240VAC/415VAC	56.8 kW @0% modulation, 50 kW output 59.7 kW @normal program modulation, 50 kW output
Cooling Air Requirements	3000 CFM
Power Factor	0.99 or better
Environmental	
Temperature Range	0° to +50° C
Humidity	0 to 95 %; non-condensing
Altitude	10,000 (3,048 m)
Physical	
Size	45" W x 35" D x 87" H
Weight	650 lbs unpacked
Audio	
Input Connector	
Analog	3 position terminal block
AES	3 position terminal block
Input Level	
Analog	-10 dBm to +10 dBm electronically adjustable
AES	0 dBFS to -20 dBFS, electronically adjustable
Input Impedance	
Analog	600 Ω, balanced
AES	110 Ω, balanced
Frequency Response	+0.1/-0.25 dB, 20 Hz to 10 kHz
Total Harmonic Distortion + Noise	0.5 %, 20 Hz to 10 kHz
Intermodulation Distortion	0.5 % or less, 1:1 ratio
Transient Intermodulation Distortion	0.5 % or less, 4:1 ratio
Incidental Phase Modulation	40 dB; 1 kHz
Square Wave Overshoot	0.1 % or less at 400 Hz
Square Wave Tilt	0.5 % or less at 40 Hz
Signal to Noise	-70 dB or better
IBOC	
	Exceeds all regulatory requirements for AM HD Radio operation



Broadcast Electronics, Inc. • 4100 North 24th Street, P.O. Box 3606, Quincy, Illinois 62305-3606 U.S.A.
Telephone: (217) 224-9600 • Fax: (217) 224-9607 • E-Mail: bdcast@bdcast.com • www.bdcast.com

FXi 60/250

Model FXi 60 shown here

Features

- Direct-to-channel (DTC) modulation – no analog up-conversion
- All inputs all the time – AES (wire or optical), L&R analog, composite and mono all standard
- HD Radio upgradeable – operational modes include FM only, HD Radio + FM, or HD Radio only
- 640 x 480 GUI interface provides ease of use and quick viewing of pertinent system information
- Universal input power supply with built-in power factor correction and high/low line detection

The FXi 60 from Broadcast Electronics is the first direct to channel FM exciter. The FXi 60 eliminates the need for analog up-conversion and the resultant noise and filtering requirements. The spurious emissions and noise associated with previous digital exciters are in the past. This technological break through offers more input flexibility than any other exciter available. The FXi 60 and its higher power version, the FXi 250, can accept AES/EBU wired or optical, left and right analog, balanced and unbalanced composite or mono inputs all as standard. The FXi 60 and FXi 250 have two internal SCA generators as standard equipment, as well as a basic internal RDS code. The FXis can also accept externally generated SCAs or RDS. HD Radio installations can also be accommodated with the use of an optional plug-in HD Radio interface board. This board allows the FXi exciters to be used as HD Radio only, HD Radio + FM or FM only. This flexibility will allow implementation of HD Radio now, or whenever it is appropriate. There is no need to wait any longer to see what new developments will be made; the FXi series exciters are all you will need.

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FXi 60/250

FXi 60/250 Specifications

GENERAL

RF power Output:
60W: 5-60W
250W: 25-250W
Output Impedance: 50 ohms nominal
VSWR: Rated power (60 or 250W) into 1.5:1 VSWR. Open and short circuit protected at all phase angles.
Frequency Range: 87.5 MHz to 108 MHz; 100kHz increments, 10kHz when specified
Frequency Stability:
Internal TCXO: ±300Hz, -10C to +50C
External Output: ± accuracy of reference source
Audio Inputs: AES (wire & optical), L&R analog, composite, SCA/RBDS/RDS external generator input, SCA audio inputs (2); two internal SCA generators, internal RBDS/RDS generator
Modulation Type: Direct-to-channel digitally generated FM (no analog up-conversion); FM only, HD Radio only, or HD Radio + FM.
Modulation Capability: Up to 300kHz
Asynchronous AM S/N Ratio: 80dB below rated power reference carrier with 100% AM modulation at 400Hz, 75 µsec de-emphasis with no FM modulation present
Synchronous AM S/N Ratio: 60dB below rated power reference carrier with 100% AM modulation at 400Hz, 75µsec de-emphasis with FM modulation ±75kHz at 400Hz
Spurious and Harmonic: 85dB or better; low pass filter standard
AC Input: 90 to 264VAC; 47-63Hz
Power Factor: 0.98 or better
Surge Protection: Tested with IEEE C62.41-1991 recommended waveforms for location category B3 and IEC 801-4 standard waveforms for severity level 4
Regulatory: FCC; DOC, CE; CCIR; IEC 215 Safety

ENVIRONMENTAL

Temperature Range: -10° C to +50° C
Altitude: 10,000 ft. (3048M)
Humidity: 95% maximum; non-condensing

STEREO PERFORMANCE

Operational Modes: Stereo, mono (L+R), L only, R only
Input Level:
AES: -2dBfs for 100% modulation; 16-24 bits (32, 44.1, 48 or 96kHz typical rates for AES/EBU devices)
L&R: +10dBm for 100% modulation into 600 ohms
Impedance:
AES: 110 ohms balanced
L&R: 600 ohms or 10k selectable; balanced
Connector:
AES: Wire – XLR, Optical – Toshiba (TosLink)
L&R: XLR
Amplitude Response: ±0.5dB, 20Hz to 15kHz
THD+Noise: 0.03% or better
IMD Distortion: 0.03% or better
S/N Ratio: 85dB or better below 100% modulation @ 400Hz
Stereo Separation: 70dB, 20Hz to 15kHz
Linear Crosstalk: 70dB below 100% modulation; 20Hz to 15kHz; main to sub and sub to main
Pilot Stability: ±0.3Hz, 0° C to 50° C
Audio Overshoot: 2dB max
38, 57, 76, and 95kHz Suppression: 80dB below 100% modulation

COMPOSITE PERFORMANCE

Input Level: 3.5V p-p for 100% modulation into 10k ohms
Impedance:
Balanced: 10k ohms or 50 ohms selectable
Unbalanced: 10k ohms
Connector:
Balanced: BNC
Unbalanced: BNC
Amplitude Response: ±0.01dB; 20Hz to 53kHz; 0.1dB; 53kHz to 99kHz
Phase Response: ±0.1° from linear phase; 53kHz to 100kHz
THD + Noise: 0.005% or less
IMD Distortion: 0.005% or less
FM S/N Ratio: 90dB below 100% modulation @ 400Hz

MONO PERFORMANCE

Operational Modes: Mono (L+R), L only, R only
Input Level: 3.5V p-p for 100% modulation into 600 ohms
Impedance: 600 ohms or 10k ohms selectable
Connector: XLR
Amplitude Response: ±0.5dB; 20Hz to 15kHz
THD + Noise: 0.05% or less; 20Hz to 15kHz
IMD Distortion: 0.05% or less, 20Hz to 15kHz
FM S/N Ratio: 90dB below 100% modulation @ 400Hz

SCA 1&2 PERFORMANCE (INTERNAL)

Input Level: +10dB for 10% modulation into 600 ohms
Impedance: 600 ohms or 10k ohms selectable
Connector: D-Sub 9-position female
Amplitude Response: ±0.5dB; 20Hz to 7kHz
S/N Ratio: 60dB or better
Frequency: 20kHz to 99kHz; software programmable
Deviation: 2.5 to 10kHz; software programmable
Injection Level: 2 to 15%; software programmable

RBDS/RDS PERFORMANCE (INTERNAL)

Frequency: 57kHz
Injection Level: 2 to 15%; software programmable

SCA/RBDS/RDS (EXTERNAL)

Input Level: 3.5V p-p for 10% deviation
Impedance: 10k ohms unbalanced
Connector: BNC
Amplitude Response: ±0.5dB; 20Hz to 100kHz
19kHz Output: 19kHz synchronization clock for external RBDS/RDS operation 2.5V p-p into 50 ohms

PHYSICAL

Height: 7 inches
Width: 19" EIA rack mountable
Depth: No rear rails required – fits into 24" deep rack
Airflow: Intake and exhaust through back of unit
Weight: 38 lbs. unpacked

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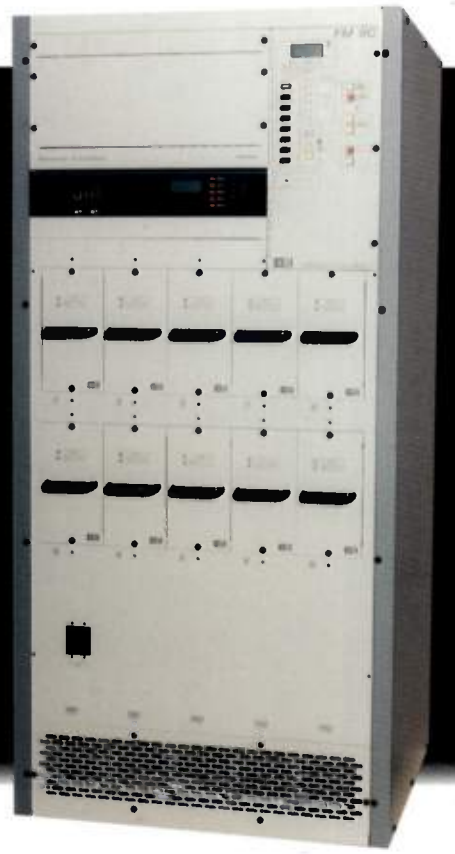
FM-5C

Solutions for Tomorrow's Radio

5 kW Solid State FM Transmitter

The Broadcast Electronics' 5 kilowatt Solid State FM transmitter has set the standards for audio quality, cost-efficiency, reliability and long life. The FM-5C offers proportional VSWR foldback which protects the power amplifier by automatically reducing output power to a safe operating level. The Solid State FM transmitters represent just one of our many solutions to your radio needs.



Features

- Contains the renowned FX-50 Exciter technology which is the broadcast standard for FM audio performance.
- Full RF redundancy - multiple front panel plug-in power amplifiers.
- Redundant P.A. power supplies are front plug-in units.
- True proportional (VSWR) foldback to keep the transmitter on the air even in the worst conditions.
- Advanced transmitter controller provides exceptional front panel transmitter control capabilities and extensive metering of individual modules.
- Conservative power rating.
- Now available with optional Predator digital exciter.
- Integrated automatic power control system maintains constant RF output power.
- Developed with a low noise super cooling system that significantly extends transistor life.
- Frequency agile, N+1 compatible so you can have an automatic back-up for any signal in the band.
- Accessories are available: automatic exciter switcher, digital stereo generator or SCA generator.

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FM-5C

Solutions for Tomorrow's Radio

5 kW Solid State FM Transmitter

Performance Specifications

GENERAL

Power Output: 2,500 watts to 5,000 watts.
Frequency Range: 87.5 to 108 MHz, tuned to specific operating frequency. Exciter programmable in 10 kHz steps.
RF Output Impedance: 50 ohms.
Output Connector: 1-5/8" EIA flange.
VSWR: Rated power into 1.35:1 maximum. Capable of operating into higher VSWR with automatic power reduction. Open and short circuit protected at all phase angles at 50°C.
Frequency Stability: ±300 Hz, 0 to 50°C.
Type of Modulation: Direct frequency modulation of carrier frequency.
Modulation Capability: Greater than ±350 Hz.
Modulation Indication: Peak reading, color coded, LED display with baseband overmodulation indicator.
Exciter: Solid state, 250 watt output, Model FM-250C, incorporating a digitally programmed synthesizer (10 kHz increments).
Pre-Emphasis: FCC 75µS, CCIR 50µS (where specified), 25µS [Dolby] or flat response, selectable.
Asynchronous AM S/N Ratio: 55 dB below reference carrier with 100% AM modulation @ 400 Hz, 75µS de-emphasis (no FM modulation present).
Synchronous AM S/N Ratio: 50 dB below 5 kW reference carrier with 100% AM modulation @ 400 Hz, 75µS de-emphasis (FM modulation ±75 kHz @ 400 Hz @ 5 kW output power).
RF Harmonics: Suppression meets all FCC/DOC requirements and CCIR recommendations.
IMD Protection: 20 dB or better turn-around-loss or mixing loss to interfering signals.
AC Input Power: 195-252 VAC, 50/60 Hz, single phase. Three phase input power optional.
AC Power Consumption: 10kW typical at a 5kW RF power output, 50 ohm resistive load.
Power Factor: 0.99 or better at 230 VAC, 5 kW output power into 50 ohm load.
Overall Efficiency: 50% or better at 230 VAC. 50 ohms at 5000 watts. 55% typical.
Surge Protection: Tested with IEEE C62.41-1991 recommended waveforms for location category B3 and IEC 801-4 standard waveforms for severity level 4.
Maximum Altitude: 10,000 ft. (3048 M) @ 60 Hz. 7500 ft. (2286 M) @ 50 Hz.
Ambient Temperature Range: 0 to +50°C.
Size: 30.64"W x 64"H x 30"D (77.83 x 162.56 x 76.2 cm).
Weight: 575 lbs. (261 kg) unpacked.
Safety Protection: Meets IEC 215 safety requirements.

MONAURAL OPERATION

Audio Input Impedance: 600 ohms balanced, resistive, adaptable to other impedances, 60 dB common mode suppression.
Audio Input Level: +10 dBm nominal for ±75 kHz deviation @ 400 Hz.
Audio Frequency Response: ±0.5 dB, 30 Hz to 15 kHz, selectable flat, 25, 50, 75 microsecond pre-emphasis.
Total Harmonic Distortion + Noise: 0.02% or less at 400 Hz.
SMPTE Intermodulation Distortion: 0.02% or less, 60 Hz/7 kHz, 4:1 ratio.
CCIF Intermodulation Distortion: 0.02% or less, 15 kHz/14 kHz, 1:1 ratio.
Transient Intermodulation Distortion: 0.02% or less sine wave/square wave.
FM S/N Ratio: 85 dB below ±75 kHz deviation @ 400 Hz measured in a 20 Hz to 30 kHz bandwidth with 75µS de-emphasis.

WIDEBAND COMPOSITE OPERATION

Composite Inputs: 3 total, (1) unbalanced and (1) balanced plus front panel test. All connectors BNC.
Composite Input Impedance: 10K ohm or 50 ohm, nominal, resistive selectable.
Composite Input Level: 3.5V p-p nominal, for ±75 kHz deviation.
Composite FM S/N Ratio: 85 dB below ±75 kHz deviation @ 400 Hz. Measured in a 20 Hz to 30 kHz bandwidth with 75µS de-emphasis.
Composite Harmonic Distortion + Noise: 0.02% or less @ 400 Hz.
Composite SMPTE Intermodulation Distortion: 0.02% or less, 60 Hz/7 kHz, 1:1 ratio.
Composite CCIF Intermodulation Distortion: 0.02% or less, 15 kHz/14 kHz, 1:1 ratio.
Composite Transient Intermodulation Distortion: 0.02% or less, sine wave/square wave.
Composite Amplitude Response: ±0.1 dB, 30 Hz to 53 kHz.
Composite Phase Response: ±0.25 degrees from linear phase, 30 Hz to 53 kHz.
Composite Group Delay: 125 nanoseconds.
Composite Slew Rate: 9 V/microsecond (symmetrical).

STEREO OPERATION

Audio Input Impedance: 600 ohms balanced, resistive, floating (adaptable to other impedances).
Audio Input Level: +10 dBm, ±1 dBm, for 100% modulation @ 400 Hz.
Audio Input Filters: 15 kHz LPF with delay equalization for minimum overshoot.
Frequency Response: ±0.5 dB, 30 to 15,000 Hz, 75µS pre-emphasis (flat, 25 or 50µS pre-emphasis selectable).
Total Harmonic Distortion: 0.05% or less @ 400 Hz.
SMPTE Intermodulation Distortion: 0.05%, 60 Hz/7 kHz, 4:1 ratio.
CCIF Intermodulation Distortion: 0.05% or less, 15 kHz/14 kHz, 1:1 ratio.
Transient Intermodulation Distortion: 0.05% (square wave/sine wave)
FM Signal to Noise: -80 dB or better below 100% modulation @ 400 Hz. 75µS de-emphasis.
Stereo Separation: 50 dB or better. 30-15,000 Hz (sine wave)
Dynamic Stereo Separation: 40 dB or better, 30-15,000 Hz (normal program content).
Linear Crosstalk: Main to Sub/Sub to Main due to amplitude and phase matching of left and right channels. 30-15,000 Hz, 45 dB minimum below 100% modulation.
Non-Linear Crosstalk: Main to Sub/Sub to Main due to distortion products. 70 dB minimum below 100% modulation.

SCA OPERATION

Modulation: Direct FM
Subcarrier Frequency: 67 kHz (39 to 95 kHz to order).
Subcarrier Frequency Stability: ±0.5% (330 Hz @ 67 kHz). 0 to 50 degrees C.
Subcarrier Harmonic Content: Less than 0.3%.
Subcarrier Envelope Decay: Greater than 100 msec from 90% to 10% subcarrier levels.
Modulation Capability: ±20% of subcarrier frequency.
Audio Input Impedance: 600 ohm balanced.
Data Input Impedance: 75 ohm unbalanced, resistive, DC coupled.
Input Levels: (Audio) adjustable +10 dBm to -10 dBm for ±6 kHz deviation @ 400 Hz. (Data) adjustable 1.0 to 4.0 V p-p for ±6 kHz deviation (DC coupled).
Pre-Emphasis: (Audio) 150 microseconds standard (75µS with internal jumper). (Data) no pre-emphasis.
Frequency Response: (Audio) ±0.5 dB, 10-10,000 Hz, exclusive of audio low pass filter. (Data) ±0.5 dB, DC-10,000 Hz.
Audio Low Pass Filter: Sixth order, -3 dB @ 4.3 kHz, standard (resistor changes for other values).
Data Low Pass Filter: Same as audio filter or may be bypassed.
Total Harmonic Distortion: Less than 0.5% throughout AF passband.
SMPTE Intermodulation Distortion: Less than 0.5%, 60 Hz/7 kHz, 1:1 ratio (audio pre-emphasis and LPF bypassed).
Crosstalk, SCA to Stereo: -60 dB or better below 100% modulation of left or right. 75µS de-emphasis.
Crosstalk, Stereo to SCA: -50 dB or better below ±6 kHz deviation of SCA using 150µS de-emphasis and FS-30 stereo generator.

FM-5C system performance is specified using model FM-250C Exciter, FS-30 Stereo Generator, and FC-30 SCA Generator, where applicable, measured at rated transmitter power of 5 kW into a 50 ohm resistive load.

Ordering Information

Model: FM-5C
Part No.: 909-5001-204
Description: 5 kW solid state FM transmitter, 87.5-108 MHz. Includes FM-250C FM Exciter, 220 VAC, 50/60 Hz operation.

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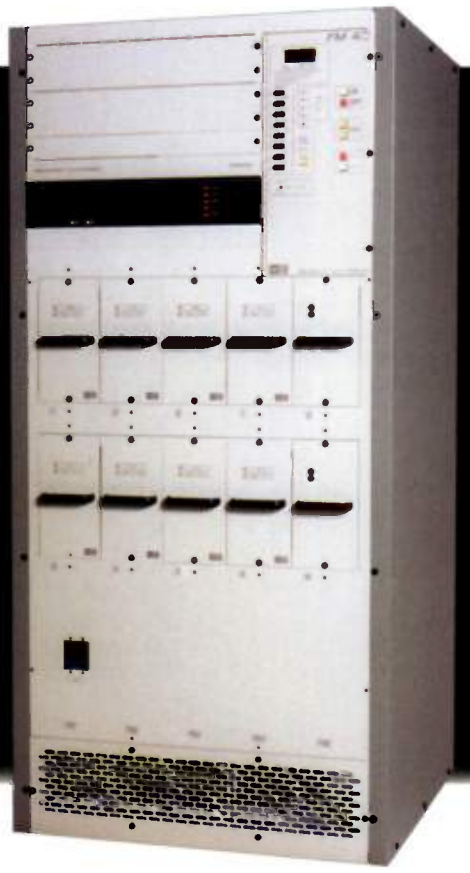
FM-4C

Solutions for Tomorrow's Radio

4 kW Solid State FM Transmitter

The Broadcast Electronics' 4 kilowatt Solid State FM transmitter has set the standards for audio quality, cost-efficiency, reliability and long life. The FM-4C offers proportional VSWR foldback which protects the power amplifier by automatically reducing output power to a safe operating level. The Solid State FM transmitters represent just one of our many solutions to your radio needs.



Features

- Contains the renowned FX-50 Exciter technology which is the broadcast standard for FM audio performance.
- Full RF redundancy - multiple front panel plug-in power amplifiers.
- Redundant P.A. power supplies are front plug-in units.
- True proportional (VSWR) foldback to keep the transmitter on the air even in the worst conditions.
- Advanced transmitter controller provides exceptional front panel transmitter control capabilities and extensive metering of individual modules.
- Conservative power rating.
- Integrated automatic power control system maintains constant RF output power.
- Developed with a low noise super cooling system that significantly extends transistor life.
- Frequency agile, N+1 compatible so you can have an automatic back-up for any signal in the band.
- Accessories are available: automatic exciter switcher, digital stereo generator or SCA generator.

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FM-4C

Solutions for Tomorrow's Radio

4 kW Solid State FM Transmitter

Performance Specifications

GENERAL

Power Output: 2,000 watts to 4,000 watts.
Frequency Range: 87.5 to 108 MHz, tuned to specific operating frequency. Exciter programmable in 10 kHz steps.
RF Output Impedance: 50 ohms.
Output Connector: 1-5/8" EIA flange.
VSWR: Rated power into 1.35:1 maximum. Capable of operating into higher VSWR with automatic power reduction. Open and short circuit protected at all phase angles at 50°C.
Frequency Stability: ±300 Hz, 0 to 50 degrees C.
Type of Modulation: Direct frequency modulation of carrier frequency.
Modulation Capability: Greater than ±350 Hz.
Modulation Indication: Peak reading, color coded, LED display with baseband overmodulation indicator.
Exciter: Solid state, 250 watt output, Model FM-250C, incorporating a digitally programmed synthesizer (10 kHz increments).
Pre-Emphasis: FCC 75µS, CCIR 50µS (where specified, 25µS [Dolby]) or flat response, selectable.
Asynchronous AM S/N Ratio: 55 dB below reference carrier with 100% AM modulation @ 400 Hz, 75µS de-emphasis (no FM modulation present).
Synchronous AM S/N Ratio: 50 dB below 5 kW reference carrier with 100% AM modulation @ 400 Hz, 75µS de-emphasis (FM modulation ±75 kHz @ 400 Hz @ 5 kW output power).
RF Harmonics: Suppression meets all FCC/DOC requirements and CCIR recommendations.
IMD Protection: 20 dB or better turn-around-loss or mixing loss to interfering signals.
AC Input Power: 195-252 VAC, 50/60 Hz, single phase. Three phase input power optional.
AC Power Consumption: 8kW typical at a 4kW RF power output, 50 ohm resistive load.
Power Factor: 0.99 or better at 230 VAC, 4 kW output power into 50 ohm load.
Overall Efficiency: 50% or better at 230 VAC. 50 ohms at 4000 watts.
Surge Protection: Tested with IEEE C62.41-1991 recommended waveforms for location category B3 and IEC 801-4 standard waveforms for severity level 4.
Maximum Altitude: 10,000 ft. (3048 M) @ 60 Hz. 7500 ft. (2286 M) @ 50 Hz.
Ambient Temperature Range: 0 to +50 degrees C.
Size: 30.64"W x 64"H x 30"D (77.83 x 162.56 x 76.2 cm).
Weight: 575 lbs. (261 kg) unpacked.
Safety Protection: Meets IEC 215 safety requirements.

MONAURAL OPERATION

Audio Input Impedance: 600 ohms balanced, resistive, adaptable to other impedances, 60 dB common mode suppression.
Audio Input Level: +10 dBm nominal for ±75 kHz deviation @ 400 Hz.
Audio Frequency Response: ±0.5 dB, 30 Hz to 15 kHz, selectable flat, 25, 50, 75 microsecond pre-emphasis.
Total Harmonic Distortion + Noise: 0.02% or less at 400 Hz.
SMPTE Intermodulation Distortion: 0.02% or less, 60 Hz/7 kHz, 4:1 ratio.
CCIF Intermodulation Distortion: 0.02% or less, 15 kHz/14 kHz, 1:1 ratio.
Transient Intermodulation Distortion: 0.02% or less sine wave/square wave.
FM S/N Ratio: 85 dB below ±75 kHz deviation @ 400 Hz measured in a 20 Hz to 30 kHz bandwidth with 75µS de-emphasis.

WIDEBAND COMPOSITE OPERATION

Composite Inputs: 3 total, (1) unbalanced and (1) balanced plus front panel test. All connectors BNC.
Composite Input Impedance: 10K ohm or 50 ohm, nominal, resistive selectable.
Composite Input Level: 3.5V p-p nominal, for ±75 kHz deviation.
Composite FM S/N Ratio: 85 dB below ±75 kHz deviation @ 400 Hz. Measured in a 20 Hz to 30 kHz bandwidth with 75µS de-emphasis.
Composite Harmonic Distortion + Noise: 0.02% or less @ 400 Hz.
Composite SMPTE Intermodulation Distortion: 0.02% or less, 60 Hz/7 kHz, 1:1 ratio.
Composite CCIF Intermodulation Distortion: 0.02% or less, 15 kHz/14 kHz, 1:1 ratio.
Composite Transient Intermodulation Distortion: 0.02% or less, sine wave/square wave.
Composite Amplitude Response: ±0.1 dB, 30 Hz to 53 kHz.
Composite Phase Response: ±0.25 degrees from linear phase, 30 Hz to 53 kHz.
Composite Group Delay: 125 nanoseconds.
Composite Slew Rate: 9 V/microsecond (symmetrical).

STEREO OPERATION

Audio Input Impedance: 600 ohms balanced, resistive, floating (adaptable to other impedances).
Audio Input Level: +10 dBm, ±1 dBm, for 100% modulation @ 400 Hz.
Audio Input Filters: 15 kHz LPF with delay equalization for minimum overshoot.
Frequency Response: ±0.5 dB, 30 to 15,000 Hz, 75µS pre-emphasis (flat, 25 or 50µS pre-emphasis selectable).
Total Harmonic Distortion: 0.05% or less @ 400 Hz.
SMPTE Intermodulation Distortion: 0.05%, 60 Hz/7 kHz, 4:1 ratio.
CCIF Intermodulation Distortion: 0.05% or less, 15 kHz/14 kHz, 1:1 ratio.
Transient Intermodulation Distortion: 0.05% (square wave/sine wave)
FM Signal to Noise: -80 dB or better below 100% modulation @ 400 Hz. 75µS de-emphasis.
Stereo Separation: 50 dB or better. 30-15,000 Hz (sine wave)
Dynamic Stereo Separation: 40 dB or better, 30-15,000 Hz (normal program content).
Linear Crosstalk: Main to Sub/Sub to Main due to amplitude and phase matching of left and right channels. 30-15,000 Hz, 45 dB minimum below 100% modulation.
Non-Linear Crosstalk: Main to Sub/Sub to Main due to distortion products. 70 dB minimum below 100% modulation.

FM-4C system performance is specified using model FM-250C Exciter and FS-30 Stereo Generator where applicable, measured at rated transmitter power of 4 kW into a 50 ohm resistive load.

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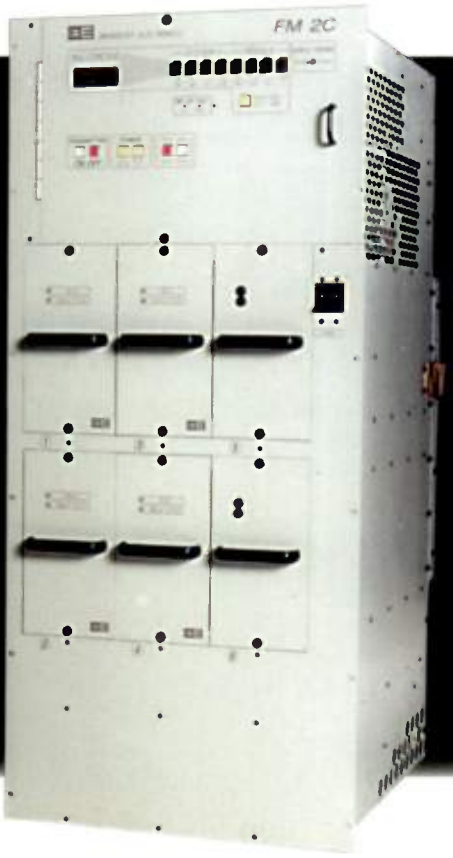
FM-2C

Solutions for Tomorrow's Radio

2 kW Solid State FM Transmitter



The Broadcast Electronics' 2 kilowatt Solid State FM transmitter has set the standards for audio quality, cost-efficiency, reliability and long life. The FM-2C offers proportional VSWR foldback which protects the power amplifier by automatically reducing output power to a safe operating level. The Solid State FM transmitters represent just one of our many solutions to your radio needs.

Features

- Contains the renowned FX-50 Exciter technology which is the broadcast standard for FM audio performance.
- Full RF redundancy - multiple front panel plug-in power amplifiers.
- Redundant P.A. power supplies are front plug-in units.
- True proportional (VSWR) foldback to keep the transmitter on the air even in the worst conditions.
- Advanced transmitter controller provides exceptional front panel transmitter control capabilities and extensive metering of individual modules.
- Conservative power rating.
- Integrated automatic power control system maintains constant RF output power.
- Developed with a low noise super cooling system that significantly extends transistor life.
- Frequency agile, N+1 compatible so you can have an automatic back-up for any signal in the band.
- Rack mountable - fits the standard 19-inch racks.
- Accessories are available: automatic exciter switcher, digital stereo generator or SCA generator.

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FM-2C

Solutions for Tomorrow's Radio

2 kW Solid State FM Transmitter

Performance Specifications

GENERAL

Power Output: 500 watts to 2,000 watts.
DC to RF Efficiency: 66% minimum, 70% typical.
Frequency Range: 87.5 to 108 MHz, tuned to specific operating frequency. Exciter programmable in 10 kHz steps.
RF Output Impedance: 50 ohms.
Output Connector: 1-5/8" EIA flange.
VSWR: Rated power into 1.5:1 maximum. Capable of operating into higher VSWR with automatic power reduction. Open and short circuit protected at all phase angles.
Frequency Stability: ±300 Hz, 0 to 50 degrees C.
Type of Modulation: Direct frequency modulation of carrier frequency.
Modulation Capability: Greater than ±350 kHz.
Modulation Indication: Peak reading, color coded, LED display with baseband overmodulation indicator.
Exciter: Solid state, 125 watt output, Model FM-100C, incorporating a digitally programmed synthesizer (10 kHz increments).
Pre-Emphasis: FCC 75µS, CCIR 50µS (where specified, 25µS [Dolby]) or flat response, selectable.
Asynchronous AM S/N Ratio: 55 dB below reference carrier with 100% AM modulation @ 400 Hz, 75µS de-emphasis (no FM modulation present).
Synchronous AM S/N Ratio: 50 dB below 2 kW reference carrier with 100% AM modulation @ 400 Hz, 75µS de-emphasis (FM modulation ±75 kHz @ 400 Hz).
IMD Protection: The output filtering supplied with the transmitter will be adequate to provide spurious and harmonic suppression as required below. Bandpass or notch filters required at sites used by multiple stations will be vendor supplied on an as needed basis. The module RF amplifier combining system provides 20 dB or more mixing Turn Around Loss to interfering signals.
RF Harmonics: Suppression meets all FCC/DOC requirements and CCIR recommendations.
AC Input Power: 195-252 VAC, 50/60 Hz, single phase.
Overall Efficiency: 46% at 230 VAC. 2000 watts into 50 ohms, 48% typical.
Altitude: 7500 ft. (2286 M) @ 50 Hz; 10,000 ft. (3048 M) @ 60 Hz.
Ambient Temperature Range: 0 to +50 degrees C.

MONAURAL OPERATION

Audio Input Impedance: 600 ohms balanced, resistive, adaptable to other impedances, 60 dB common mode suppression.
Audio Input Level: +10 dBm nominal for ±75 kHz deviation @ 400 Hz.
Audio Frequency Response: ±0.5 dB, 30 Hz to 15 kHz, selectable flat, 25, 50, 75 microsecond pre-emphasis.
Total Harmonic Distortion + Noise: 0.02% or less at 400 Hz.
SMPTE Intermodulation Distortion: 0.02% or less, 60 Hz/7 kHz, 4:1 ratio.
CCIF Intermodulation Distortion: 0.02% or less, 15 kHz/14 kHz, 1:1 ratio.
Transient Intermodulation Distortion: 0.02% or less, sine wave/square wave.
FM S/N Ratio: 85 dB below ±75 kHz deviation @ 400 Hz, measured in a 20 Hz to 30 kHz bandwidth with 75µS de-emphasis.

WIDEBAND COMPOSITE OPERATION

Composite Inputs: 3 total, (1) unbalanced and (1) balanced plus front panel test. All connectors BNC.
Composite Input Impedance: 10K ohm or 50 ohm, nominal, resistive, selectable.
Composite Input Level: 3.5V p-p nominal, for ±75 kHz deviation.
Composite FM S/N Ratio: 88 dB below ±75 kHz deviation @ 400 Hz. Measured in a 20 Hz to 30 kHz bandwidth with 75µS de-emphasis.
Composite Harmonic Distortion + Noise: 0.02% or less @ 400 Hz.
Composite SMPTE Intermodulation Distortion: 0.02% or less, 60 Hz/7 kHz, 1:1 ratio.
Composite CCIF Intermodulation Distortion: 0.02% or less, 15 kHz/14 kHz, 1:1 ratio.
Composite Transient Intermodulation Distortion: 0.02% or less, sine wave/square wave.
Composite Altitude Response: ±0.05 dB, 30 Hz to 100 kHz.
Composite Phase Response: ±0.25 degrees from linear phase, 30 Hz to 53 kHz.
Composite Group Delay: 125 nanoseconds.
Composite Slew Rate: 9 V/microsecond (symmetrical).

STEREO OPERATION

Audio Input Impedance: 600 ohms balanced, resistive, floating (adaptable to other impedances).
Audio Input Level: +10 dBm, ±1 dBm, for 100% modulation @ 400 Hz.
Audio Input Filters: 15 kHz LPF with delay equalization for minimum overshoot.
Frequency Response: ±0.5 dB, 30 to 15,000 Hz, 75µS pre-emphasis (flat, 25 or 50µS pre-emphasis selectable).
Total Harmonic Distortion: 0.05% or less @ 400 Hz.
SMPTE Intermodulation Distortion: 0.05%, 60 Hz/7 kHz, 4:1 ratio.
CCIF Intermodulation Distortion: 0.05% or less, 15 kHz/14 kHz, 1:1 ratio.
Transient Intermodulation Distortion: 0.05% (square wave/sine wave).
FM Signal to Noise: -82 dB or better below 100% modulation @ 400 Hz. 75µS de-emphasis.
Stereo Separation: 50 dB or better. 30-15,000 Hz (sine wave)
Dynamic Stereo Separation: 40 dB or better, 30-15,000 Hz (normal program content).
Linear Crosstalk: Main to Sub/Sub to Main due to amplitude and phase matching of left and right channels. 30-15,000 Hz, 45 dB minimum below 100% modulation.
Non-Linear Crosstalk: Main to Sub/Sub to Main due to distortion products. 70 dB minimum below 100% modulation.
38 kHz Suppression: 80 dB minimum below 100% modulation.
Pilot Stability: ±0.5 Hz, 0 to 50 degrees C.
Modes: Stereo, Mono L+R, Mono (L) and Mono (R) remote controlled. (See FS-30 data sheet for full details.)

FM-2C system performance is specified using model FM-100C Exciter and FS-30 Stereo Generator where applicable, measured at rated transmitter power of 2 kW into a 50 ohm resistive load.

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FM-3C

Solutions for Tomorrow's Radio

3 kW Solid State FM Transmitter

The Broadcast Electronics' 3 kilowatt Solid State FM transmitter has set the standards for audio quality, cost-efficiency, reliability and long life. The FM-3C offers proportional VSWR foldback which protects the power amplifier by automatically reducing output power to a safe operating level. The Solid State FM transmitters represent just one of our many solutions to your radio needs.

Features

- Contains the renowned FX-50 Exciter technology which is the broadcast standard for FM audio performance.
- Full RF redundancy - multiple front panel plug-in power amplifiers.
- Redundant P.A. power supplies are front plug-in units.
- True proportional (VSWR) foldback to keep the transmitter on the air even in the worst conditions.
- Advanced transmitter controller provides exceptional front panel transmitter control capabilities and extensive metering of individual modules.
- Conservative power rating.
- Integrated automatic power control system maintains constant RF output power.
- Developed with a low noise super cooling system that significantly extends transistor life.
- Frequency agile, N+1 compatible so you can have an automatic back-up for any signal in the band.
- Rack mountable - fits the standard 19-inch racks.
- Accessories are available: automatic exciter switcher, digital stereo generator or SCA generator.

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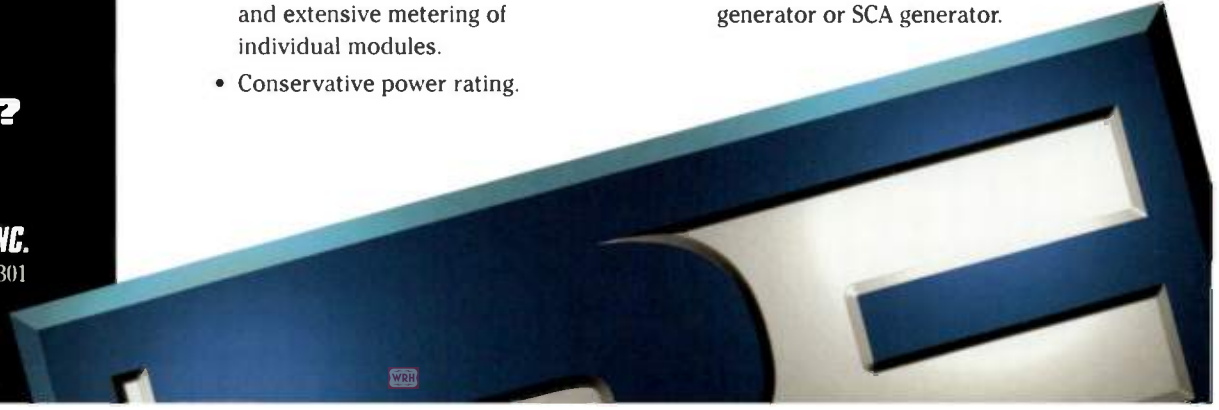

BE FM-3C

Solutions for Tomorrow's Radio

3 kW Solid State FM Transmitter

Performance Specifications

GENERAL

Power Output: 750 watts to 3,000 watts.
Frequency Range: 87.5 to 108 MHz. Exciter programmable in 10 kHz steps.
RF Output Impedance: 50 ohms.
Output Connector: 1-5/8" EIA flange.
VSWR: Rated power into 1.5:1 VSWR maximum, without output matching. Capable of operating into higher VSWR with automatic power reduction. Open and short circuit protected at all phase angles at 50° C.
Frequency Stability: ±300 Hz, 0 to 50° C.
Type of Modulation: Direct frequency modulation of carrier frequency.
Modulation Capability: Greater than ±350 kHz.
Modulation Indication: Peak reading, color coded, LED display with baseband overmodulation indicator.
Exciter: Solid state, 123 watt output, Model FM-100C, incorporating a digitally programmed synthesizer (10 kHz increments).
Pre-Emphasis: FCC 75µS, CCIR 50µS (where specified, or flat response, selectable).
Asynchronous AM S/N Ratio: 55 dB below reference carrier with 100% AM modulation @ 400 Hz, 75µS de-emphasis (no FM modulation present).
Synchronous AM S/N Ratio: 50 dB below 3 kW 75µS de-emphasis (FM modulation ±75 kHz @ 400 Hz @ 3 kW output power).
RF Harmonics: Suppression meets all FCC/DOC requirements and CCIR recommendations.
AC Input Power: 195-252 VAC, 50/60 Hz, single phase.
AC Power Consumption: 6kW typical at a 3kW RF power output, 50 ohm resistive load.
Power Factor: 0.99 or better at 230 VAC, 3000 W into 50 ohms.
Overall Efficiency: 50% or better at 230 VAC. 50 ohms at 3000 watts, 53% typical.
Surge Protection: Tested with IEEE C62. 41-1991 recommended waveforms for location category B3 and IEC 801-4 standard waveforms for severity level 4.
Maximum Altitude: 7500 ft. (2286 M) @ 50 Hz; 10,000 ft. (3048 M) @ 60 Hz.
Ambient Temperature Range: 0 to +50 degrees C.
Size: 19"W x 42"H x 27.72"D (48.3 x 106.68 x 70.41 cm).
Weight: 260 lbs. (117.9 kg) unpacked.

MONAURAL OPERATION

Audio Input Impedance: 600 ohms balanced, resistive, adaptable to other impedances, 60 dB common mode suppression.
Audio Input Level: +10 dBm nominal for ±75 kHz deviation @ 400 Hz.
Audio Frequency Response: ±0.5 dB, 30 Hz to 15 kHz, selectable flat, 25, 50, 75 microsecond pre-emphasis.
Total Harmonic Distortion + Noise: 0.02% or less at 400 Hz.
SMPTE Intermodulation Distortion: 0.02% or less, 60 Hz/7 kHz, 4:1 ratio.
CCIF Intermodulation Distortion: 0.02% or less, 15 kHz/14 kHz, 1:1 ratio.
Transient Intermodulation Distortion: 0.02% or less sine wave/square wave.
FM S/N Ratio: 85 dB below ±75 kHz deviation @ 400 Hz measured in a 20 Hz to 30 kHz bandwidth with 75µS de-emphasis.

WIDEBAND COMPOSITE OPERATION

Composite Inputs: 3 total, (1) unbalanced and (1) balanced plus front panel test. All connectors BNC.
Composite Input Impedance: 10K ohm or 50 ohm, nominal, resistive selectable.
Composite Input Level: 3.5V p-p nominal, for ±75 kHz deviation.
Composite FM S/N Ratio: 85 dB below ±75 kHz deviation @ 400 Hz. Measured in a 20 Hz to 30 kHz bandwidth with 75µS de-emphasis.
Composite Harmonic Distortion + Noise: 0.02% or less @ 400 Hz.
Composite SMPTE Intermodulation Distortion: 0.02% or less, 60 Hz/7 kHz, 1:1 ratio.
Composite CCIF Intermodulation Distortion: 0.02% or less, 15 kHz/14 kHz, 1:1 ratio.
Composite Transient Intermodulation Distortion: 0.02% or less, sine wave/square wave.
Composite Amplitude Response: ±0.05 dB, 30 Hz to 100 kHz.
Composite Phase Response: ±0.25 degrees from linear phase, 30 Hz to 53 kHz.
Composite Group Delay: 125 nanoseconds.
Composite Slew Rate: 9 V/microsecond (symmetrical).

STEREO OPERATION

Audio Input Impedance: 600 ohms balanced, resistive, floating (adaptable to other impedances).
Audio Input Level: +10 dBm, ±1 dBm, for 100% modulation @ 400 Hz.
Audio Input Filters: 15 kHz LPF with delay equalization for minimum overshoot.
Frequency Response: ±0.5 dB, 30 to 15,000 Hz, 75µS pre-emphasis (flat, 25 or 50µS pre-emphasis selectable).
Total Harmonic Distortion: 0.05% or less @ 400 Hz.
SMPTE Intermodulation Distortion: 0.05%, 60 Hz/7 kHz, 4:1 ratio.
CCIF Intermodulation Distortion: 0.05% or less, 15 kHz/14 kHz, 1:1 ratio.
Transient Intermodulation Distortion: 0.05% (square wave/sine wave)
FM Signal to Noise: -82 dB or better below 100% modulation @ 400 Hz, 75µS de-emphasis.
Stereo Separation: 50 dB or better. 30-15,000 Hz (sine wave).
Dynamic Stereo Separation: 40 dB or better, 30-15,000 Hz (normal program content).
Linear Crosstalk: Main to Sub/Sub to Main due to amplitude and phase matching of left and right channels. 30-15,000 Hz, 45 dB minimum below 100% modulation.
Non-Linear Crosstalk: Main to Sub/Sub to Main due to distortion products. 70 dB minimum below 100% modulation.
38 kHz Suppression: 80 dB minimum below 100% modulation.
Pilot Stability: ±0.5 Hz, 0 to 50 degrees C.
Modes: Stereo, Mono L+R, Mono (L) and Mono (R) remote controlled.

FM-3C system performance is specified using model FM-100C Exciter and FS-30 Stereo Generator where applicable, measured at rated transmitter power of 4 kW into a 50 ohm resistive load.

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ASi 10

Features

- AM HD Radio signal generator provides phase and magnitude directly to the BE solid state transmitter
- Provides complete AM solution and generates HD Radio and AM simultaneously
- Internal GPS for synchronization
- Time aligns AM and HD Radio signals for blending
- Receives audio via AES digital format
- 640 x 480 touch screen interface
- 5 RU 19" EIA rack mount

The ASi 10 from Broadcast Electronics takes advantage of the latest in HD Radio™ technology and the advanced capability of the BE solid-state AM transmitters to provide the most efficient implementation of an HD Radio system for AM available today. The ASi 10 accepts an AES/EBU signal from the studio and splits that into the digital and analog paths. The signal is then sent to separate processors before being returned to the ASi 10 where the timing of the analog and digital are synchronized and the digital signal is encoded. Then the two signals are combined and the phase and amplitude information is sent directly to the Broadcast Electronics solid-state AM transmitter. All controls on the ASi 10 are available via the full color VGA touch screen monitor on the front of the unit. This allows full time monitoring and easy access to all operating parameters. Broadcast Electronics has become the proven leader in technically advanced, cost effective AM systems, and the ASi 10 is the next technology breakthrough for AM.

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FSi 10

The FSi 10 HD Radio™ signal generator from Broadcast Electronics brings HD Radio digital transmission into the real world. This state-of-the-art product provides a low voltage data stream, LVDS, signal to the new FXi series exciter to be combined with the analog signal for use in either low level or high level combined FM systems. All system controls are available on the front panel with the use of a full VGA touch screen. The FSi 10 provides delay matching of the analog and HD Radio paths, and encoding of the HD Radio digital signal. When used with the FSi series digital FM exciter and its HD Radio plug-in option card, these two units provide an HD Radio plus FM output for use in low level combined systems, or an HD Radio only signal for use in high level combined implementations. The FSi 10 represents the culmination of years of research and testing conducted by Broadcast Electronics and iBiquity, and offers the most advanced system available today.

Features

- FM HD Radio signal generator provides baseband HD Radio directly to the FXi 60/250 digital exciter
- Allows operation in either HD Radio only or HD Radio + FM modes when paired with the FXi 60/250
- Internal GPS for synchronization
- Time aligns FM and HD Radio signals for blending
- Receives audio via AES digital format
- 640 x 480 touch screen interface
- 5 RU 19" EIA rack mount

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ASi 10

Features

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FSi 10

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Features

- FM HD Radio signal generator provides baseband HD Radio directly to the FXi 60/250 digital exciter
- Allows operation in either HD Radio only or HD Radio + FM modes when paired with the FXi 60/250
- Internal GPS for synchronization
- Time aligns FM and HD Radio signals for blending
- Receives audio via AES digital format
- 640 x 480 touch screen interface
- 5 RU 19" EIA rack mount

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FMi 73/31

Model FMi 73 shown here

Features

- Operation modes of FM, FM + HD Radio, and HD Radio only
- Comes standard with the FXi 60 FM/HD Radio Digital Exciter
- Comes standard with the FSi 10 HD Radio Signal Generator
- Optional audio bypass operation to ensure integrity of analog audio path
- Solid-state RF modules
- True proportional VSWR foldback
- Direct to Channel digital frequency synthesis
- Frequency agile to cover the entire FM band
- HD Radio Only Power Range:
  - FMi 73: 100 – 280Watts
  - FMi 31: 50 – 140Watts
- FM + HD Radio Power Range:
  - FMi 73: 300 – 700Watts
  - FMi 31: 150 – 350Watts
- Full front panel functional control
- 640 x 480 color GUI interface for exciter and signal generator operation

The FMi 73 transmitter is a 700W FM + HD Radio and 280W HD Radio only solid-state transmitter. The FMi 31 is a 350W FM + HD Radio and 140W HD Radio only solid-state transmitter. Both transmitters come standard with the FXi 60 FM/HD Radio Digital Exciter and FSi 10 HD Radio Signal Generator for all your HD Radio needs. These transmitters are capable of switching between FM mode, HD Radio only mode, and FM + HD Radio mode with ease providing the most flexibility in the market today.

Broadcast Electronics is the leading manufacturer of HD Radio transmission products in the world. For efficient, cost-effective solutions, visit our web site or call your local Broadcast Electronics representative.

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FMi 73/31

FMi 73/31 Specifications

GENERAL

RF Power Output Range:
- ***HD Radio only:*** FMi 73: 100-280W; FMi 31: 50-140W
- ***FM + HD Radio:*** FMi 73: 300-700W; FMi 31: 150-350W

Output Impedance: 50 ohms nominal
Output Connector: N Type Female
Overall Efficiency:
- ***HD Radio only:*** >15%
- ***FM+HD Radio:*** >35%

VSWR: Rated Power into 1.5:1 VSWR. Capable of operating in to higher VSWR with automatic power reduction. Open and short circuit protected at all phase angles.
Frequency Range: 87.5MHz to 108MHz; 100kHz increments
Frequency Stability:
- ***Internal 10MHz Ref.:*** ±300Hz, 0-50 degrees C
- ***External 10MHz Ref. (GPS):*** Determined by source

Modulation Capability: ±300kHz FM Mode
Modulation Modes: FM only, FM + HD Radio, and HD Radio only
Asynchronous AM S/N Ratio: 55dB below rated power with 100% AM at 400Hz and 75µsec de-emphasis (no modulation present)
Synchronous AM S/N Ratio: 50dB below rated power with 100% AM modulation at 400Hz and 75µsec de-emphasis (±75kHz modulation)
IMD Protection: 20dB or better turn-around loss or mixing loss to interfering signals
Spurious and Harmonic: Meets or exceeds all FCC requirements
Altitude: 10,000 ft. (3048M) @ 60Hz; 7,500 ft. (2286M) @ 50Hz
Cooling Air Requirement: 1000 CFM
Weight: FMi 73: 103lbs. unpacked; FMi 31: 75lbs. unpacked (without exciter)

AC INPUT

AC Voltage Requirement: 196 to 252VAC, 50/60Hz, Single Phase
Power Factor: 0.98 at 230VAC
Disconnect Size:
- ***HD Radio only:*** FMi 73: 10A; FMi 31: 6A
- ***FM + HD Radio:*** FMi 73: 20A; FMi 31: 15A

Actual Amperage draw at:
- ***Single Phase:***
- ***HD Radio only:*** FMi 73: 4.5A average; FMi 31: 3.0A average
- ***FM + HD Radio:*** FMi 73: 11A average; FMi 31: 6.0A average

AC Wire Size:
- ***Single Phase:*** FMi 73: #12 AWG; FMi 31: #14 AWG

Power Consumption:
- ***HD Radio only:*** FMi 73: 1,2+B800W @ 300W RF Output; FMi 31: 700W @ 140W RF Output
- ***FM + HD Radio:*** FMi 73: 1,500W @ 700W RF Output; FMi 31: 800W @ 350W RF Output

FM AUDIO PERFORMANCE, AES INPUT, FM + HD Radio MODE

Input Level: -2dBFS for 100% modulation
Input Frequency: 32, 44.1, 48, or 96kHz; 16-24bits
Impedance: 110 ohms
Connector: Wire - XLR, Optical - TosLink
Amplitude Response: ±0.5dB; 20Hz to 15kHz
IMD Distortion: 0.03% or better
THD + Noise:
- ***Stereo:*** 0.03% or better
- ***Mono:*** 0.005% or better

S/N Ratio:
- ***Stereo:*** 90dB or better below 100% modulation @ 400Hz; unweighted
- ***Mono:*** 85dB or better below 100% modulation @ 400Hz; unweighted

Stereo Separation: 70dB; 20Hz to 15kHz
Pilot Stability: ±0.3Hz; 0-50 degrees C

INTERNAL SCAs (2)

Frequency: 20kHz to 99kHz software programmable
Deviation: 2.5kHz to 10kHz
Injection Level: 2% to 15%
Pre-Emphasis: 0, 50µsec, 75µsec, or 150µsec.

The FMi 73/31 comes standard with:

FXi 60 HD Radio and Analog FM Digital Exciter

FSi 10 HD Radio Signal Generator

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FMi 402/301

Model FMi 301 shown here

The FMi 301 transmitter is a 2.8kW FM + HD Radio and 1.2kW HD Radio only solid-state transmitter. The FMi 402 transmitter is a 3.5kW FM + HD Radio and 1.5kW HD Radio only solid-state transmitter. Both transmitters come standard with the FXi 250 FM/HD Radio Digital Exciter and FSi 10 HD Radio Signal Generator for all your HD Radio needs. These transmitters are capable of switching between FM mode, HD Radio only mode, and FM + HD Radio mode with ease providing the most flexibility in the market today.

Broadcast Electronics is the leading manufacturer of HD Radio transmission products in the world. For efficient, cost-effective solutions, visit our web site or call your local Broadcast Electronics representative.

Features

- Operation modes of FM, FM + HD Radio, and HD Radio only
- Comes standard with the FXi 250 FM/HD Radio Digital Exciter
- Comes standard with the FSi 10 HD Radio Signal Generator
- Optional audio bypass operation to ensure integrity of analog audio path
- Solid-state RF modules
- Redundant power supplies
- True proportional VSWR foldback
- Direct to Channel digital frequency synthesis
- Frequency agile to cover the entire FM band
- HD Radio Only Power Range:
  - FMi 402: 1,000 – 1,500Watts
  - FMi 301: 750 – 1,200Watts
- FM + HD Radio Power Range:
  - FMi 402: 2,000 – 3,500Watts
  - FMi 301: 1,500 – 2,800Watts
- Full front panel functional control
- 640 x 480 color GUI interface for exciter and signal generator operation

HD GUARANTEED Radio

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FMi 402/301

FMi 402/301 Specifications

GENERAL

RF Power Output Range:
HD Radio only: FMi 402: 1,000-1,500W; FMi 301: 750-1,200W
FM + HD Radio: FMi 402: 2,000-3,500W; FMi 301; 1,500-2,800W
Output Impedance: 50 ohms nominal
Output Connector: 1 5/8" flange
Overall Efficiency:
HD Radio only: >25%
FM+ HD Radio: >50%
VSWR: Rated Power into 1.5:1 VSWR. Capable of operating in to higher VSWR with automatic power reduction. Open and short circuit protected at all phase angles
Frequency Range: 87.5MHz to 108MHz; 100kHz increments
Frequency Stability:
Internal 10MHz Ref.: ±300Hz, 0-50 degrees C
External 10MHz Ref. (GPS): Determined by source
Modulation Capability: ±300kHz FM Mode
Modulation Modes: FM only, FM + HD Radio, and HD Radio only
Asynchronous AM S/N Ratio: 55dB below rated power with 100% AM at 400Hz and 75µsec de-emphasis (no modulation present)
Synchronous AM S/N Ratio: 50dB below rated power with 100% AM modulation at 400Hz and 75µsec de-emphasis (±75kHz modulation)
IMD Protection: 20dB or better turn-around loss or mixing loss to interfering signals
Spurious and Harmonic: Meets or exceeds all FCC requirements
Altitude: 10,000 ft. (3048M) @ 60Hz; 7,500 ft. (2286M) @ 50Hz
Cooling Air Requirement: 2500 CFM
Weight: FMi 402: 575lbs. unpacked; FMi 301: 525lbs. unpacked (without exciter)

AC INPUT

AC Voltage Requirement:
3-Phase:
196 to 252VAC, 50/60Hz, 3-wire, closed delta
340 to 425VAC, 50/60Hz, 4-wire, wye only
Single Phase:
196 to 252VAC, 50/60Hz
Power Factor: 0.98 at 230VAC
Disconnect Size:
3-Phase:
HD Radio only: FMi 402: 35A; FMi 301: 30A
FM + HD Radio: FMi 402: 40A; FMi 301: 35A
Single Phase:
HD Radio only: FMi 402: 50A; FMi 301: 40A
FM + HD Radio: FMi 402: 60A; FMi 301: 50A
Actual Amperage draw at:
3-Phase:
HD Radio only: FMi 402: 20A; FMi 301: 15A
FM + HD Radio: FMi 402: 25A; FMi 301: 20A
Single Phase:
HD Radio only: FMi 402: 35A; FMi 301: 30A
FM + HD Radio: FMi 402: 45A; FMi 301: 35A
AC Wire Size:
3-Phase: FMi402: #8 AWG; FMi301: #8 AWG
Single Phase: FMi 402: #6 AWG; FMi 301: #6 AWG
Power Consumption:
HD Radio only: FMi 402: 5250W @ 1,500W RF Output; FMi 301: 4,200W @ 1,200W RF Output
FM + HD Radio: FMi 402: 7,000W @ 3,500W RF Output; FMi 301: 5,600W @ 2,800W RF Output

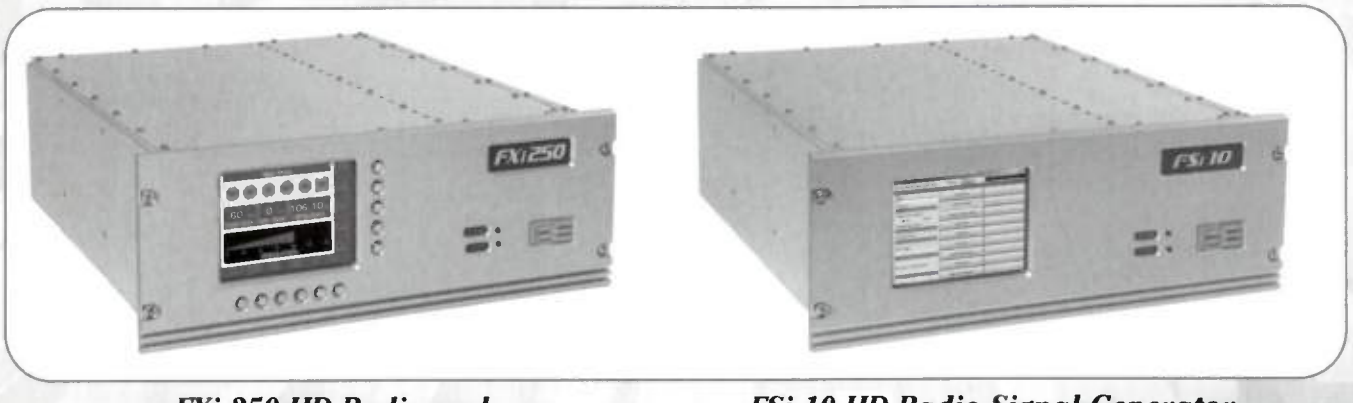
FM AUDIO PERFORMANCE, AES INPUT, FM + HD Radio MODE

Input Level: -2dBFS for 100% modulation
Input Frequency: 32, 44.1, 48, or 96kHz; 16-24bits
Impedance: 110ohms
Connector: Wire - XLR, Optical - TosLink
Amplitude Response: ±0.5dB; 20Hz to 15kHz
IMD Distortion: 0.03% or better
THD + Noise:
Stereo: 0.03% or better
Mono: 0.005% or better
S/N Ratio:
Stereo: 90dB or better below 100% modulation @ 400Hz; unweighted
Mono: 85dB or better below 100% modulation @ 400Hz; unweighted
Stereo Separation: 70dB; 20Hz to 15kHz
Pilot Stability: ±0.3Hz; 0-50 degrees C

INTERNAL SCAs (2)

Frequency: 20kHz to 99kHz software programmable
Deviation: 2.5kHz to 10kHz
Injection Level: 2% to 15%
Pre-Emphasis: 0, 50µsec, 75µsec, or 150µsec

The FMi 402/301 comes standard with:



FXi 250 HD Radio and Analog FM Digital Exciter

FSi 10 HD Radio Signal Generator

BROADCAST ELECTRONICS, INC.
4100 N. 24th Street • Quincy, IL 62305 • Phone: (217) 224-9600 • Fax: (217) 224-9607 • e-mail: bdcast@bdcast.com

BP 4500

45 Mbps Point-To-Point Digital Microwave Radios

Why wireless broadband?

The BP 4500 wireless radios deliver 45Mbps of full duplex bandwidth making it the perfect candidate for HD Radio Studio to Transmitter Links links with multiple transmitters at a site, Studio to Studio Links or any point to point application where increased capacity and maximum flexibility is desired

This radio has enough bandwidth capability to deliver your main channel audio at a full 44 1kHz or 48kHz sampling rate HD Coded Audio HD secondary Audio, and HD Advanced data services for multiple transmitters while still providing Ethernet connectivity serial data and telephone connections to your remote site

What are the BP 4500 radios?

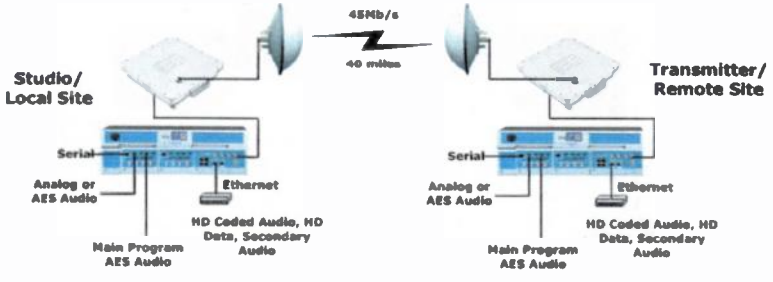
The BP 4500 is a line of high capacity point to point microwave radios Each radio supports 45 Mbps bandwidth full-duplex with Telco grade performance

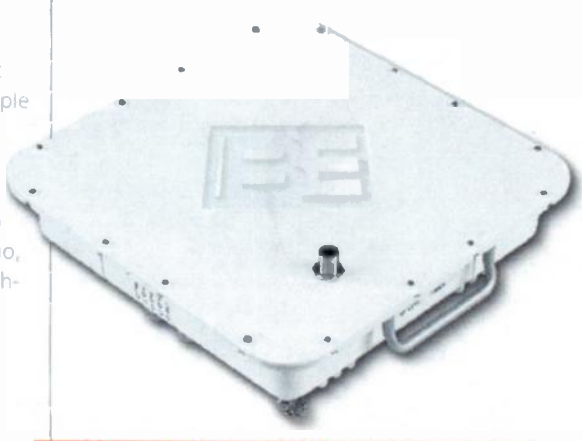
The BP 4500 radios operate in the license free band and operators can select a version offering transmission in the 5 3 GHz UNII band reaching up to 7 miles or a version supporting the 1st GHz ISM band reaching up to 40 miles Each radio can be ordered with either an integral antenna or a connector for an external antenna All BP 4500 radios include both DS3 and 10/100BaseT interfaces which are user software selectable

BP radios are optimized for audio voice data services and Ethernet backhaul applications BP radios are easy to deploy with a unique quick release install bracket for handy pole mounted installations

The BP 4500 offers customers:

- Unprecedented capacity and flexibility when implementing your point to point system
- Bi-directional link Your RPU backhaul can be sent through this link
- Ethernet connectivity to your site
- Carrier class reliability Five Nines
- Easy installation and maintenance with high MTBF rate
- Internal BERT and loopback tests





KEY PRODUCT FEATURES

- 45 Mbps Full Duplex Frequency Division Duplexing (FDD) operation for low latency and symmetrical backhaul
- User software selectable for DS3 or 10/100BaseT Ethernet modes
- Three distinct software selectable channel pairs for industry leading frequency coordination
- Advanced security settings allow three levels of user access
- Single weatherproof unit for outdoor applications (providing minimal RF cable loss) Extended temperature range 30 C to +65 C (22 F to 149 F)
- Integral antenna or optional connection for external flat or parabolic directional antennas
- 16 QAM modulation allowing up to 12 co-located radios without interference
- Two license free versions available 5 8GHz ISM band or 5 3GHz UNII band
- SNMP FTP Telnet, and Web Interface provided for ease of management configuration installation and operation of the radio
- Low part count contributing to a High Mean Time Between Failure Rate (MTBF) >7 years
- 99 999% uptime carrier class reliability meets or exceeds wireline standards
- Built in BERT tester for local and far end loopback testing
- 5 year product warranty and advance replacement service options

SPECS: BP 4500 45 Mbps Point-To-Point Digital Microwave Radios

GENERAL PRODUCT INFO	
FREQUENCY BAND	Full Duplex operation in either the UNII or ISM bands, depending on the model
SPECTRUM OPTIONS	5.250-5.350 GHz or 5.725-5.825 GHz
CAPACITY OPTIONS	1xDS3 Payload and 2x10/100BaseT Ethernet switched ports OR 2x10/100BaseT Ethernet switched ports
CHANNEL BANDWIDTH	16 MHz
DIGITAL INTERFACES	
1) DS3	
TYPE	1xDS3 per GR-499
LINE RATE	44.736 Mbps
LINE CODE	B3ZS
INTERFACE	75 Ω Unbalanced coax
CONNECTORS	TNC (75Ω)
2) 10/100BASET	
TYPE	2X10/100BaseT per IEEE802.3
ETHERNET MODE THROUGHPUT	45 Mbps
MAX DISTANCE (CPE to WaveLink)	300 feet
TRANSMITTER	
FREQUENCY RANGE (Frequency Agile)	5.250-5.350 GHz or 5.725-5.825 GHz
OUTPUT POWER (Adjustable)	+16 dBm
ATPC (Auto Transmit Power Control)	User selectable
TRANSMIT ATTN	1-30 dB adjustable below max power
FREQUENCY STABILITY MODULATION	±5 ppm
MODULATION	16 QAM with built-in equalization
RECEIVER	
TYPE	Double Heterodyne
SENSITIVITY, BER 10-6	-78 dBm or better, including Forward Error Correction (FEC)
MAX RF INPUT LEVEL	-35 dBm
FREQUENCY STABILITY	±5 ppm
ADJACENT CHANNEL REJECTION	≥40 dB (RF bandwidth of ≤16 MHz)
NETWORK MANAGEMENT	
SNMP	MIB II and private WaveLink functions
NMS/EMS	Standard SNMP based NMS, or Web Browser Interface
CRAFT INTERFACE	RS232, 9600bps, CLI
REMOTE ACCESS	HTTP, FTP and Telnet
STATUS INDICATORS/DIAGNOSTICS	
EXTERNAL LEDS	Power, Local Alarm, RF Link, 1xDS3 Input, 2xEthernet links
ALARMS	DS3 LOS, AIS, Radio TX, Radio RX, BER Threshold
STATUS	NMS IP addresses, BER, TX Power, RX Signal Level, Loopback Test Status, DS3 Input, Ethernet Input
CONFIGURATION CMDS	NMS IP addresses, TX Power, TX Mute, ATPC, Frequency, RSL, BER Alarm, Loopback Tests, BER Tests
DIAGNOSTIC TEST FEATURES	BER, Local/Remote/RF Loopbacks
PERFORMANCE MONITORING	Receive Signal Strength Indicator (RSSI)
POWER	
INPUT POWER RANGE	+21 to 60 VDC
POWER CONSUMPTION	36 Watts max
MECHANICAL	
DIMENSIONS (HxWxD)	12"x12"x4" (30x30x10cm)
WEIGHT	11 lbs (5Kg)
ENVIRONMENTAL	
TEMP. RANGE	-30°C to +65°C (-22°F to 149°F)
ALTITUDE	15,000 feet (4600 meters)
HUMIDITY	Outdoor/weatherproof

ANTENNAS	**FORWARD GAIN**	**FRONT/BACK RATIO**
INTEGRAL	21 dBi	40 dB
EXTERNAL PARABOLIC		
2 feet (.61m)	28.1dBi	38 dB
4 feet (1.22m)	34 dBi	46 dB

FCC INFO (US ONLY)	
5.3 GHZ OPTION	5.7 GHZ OPTION
QEWCX-DS3-53G	QEWCX-DS3-58G
Certified to FCC Part 15.407 Subpart E	Certified to FCC Part 15.247 Subpart C
UNII Certified	ISM Certified

REVISIONS:

4/5/04:
Original

COMPLIMENTARY EQUIPMENT:

BP 3400: 34 Mbps Point-to-Point Digital Microwave Radio
BP 800: 8 Mbps Point-to-Point Digital Microwave Radio
BP 600: 6.5 Mbps Point-to-Point Digital Microwave Radio
BP 400 INT: Integrated Network Terminal Chassis
BP 400 DS3 NAU: DS3 Network Access Unit
BP 400 AVSIM: Audio and Video Service Interface Module
BP 400 FXSIM: Telephone Service Interface Module
BP 400 SMPTE310: SMPTE 310 Service Interface Module

FAQs:

Q: What is the maximum data rate of the point-to-point radios?

A: BP 4500 is 45 Mbps. BP 3400 is 34 Mbps. BP 800 is 8 Mbps. BP 600 is 6.5 Mbps.

Q: Where is the radio located?

A: The radio is located on the tower or pole in order to minimize cable loss at the 5.3 or 5.8 GHz frequencies.

Q: What are the interfaces to the radio?

A: The BP Series of radios accepts coaxial DS3 interface or an RJ45 10/100 baseT connection.

Broadcast Electronics, Inc. • 4100 North 24th Street, P.O. Box 3606, Quincy, Illinois 62305-3606 U.S.A.
Telephone: (217) 224-9600 • Fax: (217) 224-9607 • E-Mail: bdcast@bdcast.com • www.bdcast.com

SPECS: BP 4500 45 Mbps Point-To-Point Digital Microwave Radios

GENERAL PRODUCT INFO

FREQUENCY BAND	Full Duplex operation in either the UNII or ISM bands depending on the model
SPECTRUM OPTIONS	5.250-5.350 GHz or 5.725-5.825 GHz
CAPACITY OPTIONS	1xDS3 Payload and 2x10/100BaseT Ethernet switched ports OR 2x10/100BaseT Ethernet switched ports
CHANNEL BANDWIDTH	16 MHz

DIGITAL INTERFACES

1) DS3	
TYPE	1xDS3 per GR-499
LINE RATE	44.736 Mbps
LINE CODE	B3ZS
INTERFACE	75 Ω Unbalanced coax
CONNECTORS	TNC (75Ω)
2) 10/100BASET	
TYPE	2X10/100BaseT per IEEE802.3
ETHERNET MODE THROUGHPUT	45 Mbps
MAX DISTANCE (CPE to WaveLink)	300 feet

TRANSMITTER

FREQUENCY RANGE (Frequency Agile)	5.250-5.350 GHz or 5.725-5.825 GHz
OUTPUT POWER (Adjustable)	16 dBm
ATPC (Auto Transmit Power Control)	User selectable
TRANSMIT ATTN	1-30 dB adjustable below max power
FREQUENCY STABILITY MODULATION	±5 ppm
MODULATION	16 QAM with built-in equalization

RECEIVER

TYPE	Double Heterodyne
SENSITIVITY BER 10-6	-78 dBm or better including Forward Error Correction (FEC)
MAX RF INPUT LEVEL	-35 dBm
FREQUENCY STABILITY	±5 ppm
ADJACENT CHANNEL REJECTION	>40 dB (RF bandwidth of ≤16 MHz)

NETWORK MANAGEMENT

SNMP	MIB II and private WaveLink functions
NMS/EMS	Standard SNMP based NMS or Web Browser Interface
CRAFT INTERFACE	RS232 9600bps CLI
REMOTE ACCESS	HTTP FTP and Telnet

STATUS INDICATORS/DIAGNOSTICS

EXTERNAL LEDS	Power Local Alarm RF Link 1xDS3 Input 2xEthernet links
ALARMS	DS3 LOS AIS Radio TX Radio RX BER Threshold
STATUS	NMS IP addresses BER TX Power RX Signal Level Loopback Test Status DS3 Input Ethernet Input
CONFIGURATION CMDS	NMS IP addresses TX Power TX Mute ATPC Frequency RSL BER Alarm Loopback Tests BER Tests
DIAGNOSTIC "ES" FEATURES	BER Local/Remote/RF Loopbacks
PERFORMANCE MONITORING	Receive Signal Strength Indicator (RSSI)

POWER

INPUT POWER RANGE	21 to 60 VDC
POWER CONSUMPTION	36 Watts max

MECHANICAL

DIMENSIONS (HxWxD)	12"x12"x4" (30x30x10cm)
WEIGHT	11 lbs (5Kg)

ENVIRONMENTAL

TEMP RANGE	-30 C to +65 C (-22 F to +149 F)
ALTITUDE	15,000 feet (4600 meters)
HUMIDITY	Outdoor/weatherproof

ANTENNAS

	FORWARD GAIN	FRONT/BACK RATIO
INTEGRAL	21 dBi	40 dB
EXTERNAL PARABOLIC		
2 feet (.61m)	28 dBi	38 dB
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FCC INFO (US ONLY)

5.3 GHZ OPTION	5.7 GHZ OPTION
OEWCX DS3 53G	OEWCX DS3 58G
Certified to FCC Part 15.407	Certified to FCC Part 15.247
Subpart E	Subpart C
UNII Certified	ISM Certified

REVISIONS:

4/5/04
Original

COMPLIMENTARY EQUIPMENT:

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BP-800 8 Mbps Point-to-Point Digital Microwave Radio
BP-600 6.5 Mbps Point to Point Digital Microwave Radio
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BP-400 DS3 NAU DS3 Network Access Unit
BP-400 AVSIM Audio and Video Service Interface Module
BP-400 FXSIM Telephone Service Interface Module
BP-400 SMPTE310 SMPTE 310 Service Interface Module

FAQs:

Q: What is the maximum data rate of the point to point radios?

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A. The radio is located on the tower or pole in order to minimize cable loss at the 5.3 or 5.8 GHz frequencies

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BP 4500

45 Mbps Point-To-Point Digital Microwave Radios

Why wireless broadband?

The BP 4500 wireless radios deliver 45Mbps of full duplex bandwidth making it the perfect candidate for HD Radio Studio to Transmitter Links links with multiple transmitters at a site Studio to Studio Links or any point to point application where increased capacity and maximum flexibility is desired

This radio has enough bandwidth capability to deliver your main channel audio at a full 44 1kHz or 48kHz sampling rate HD Coded Audio HD secondary Audio, and HD Advanced data services for multiple transmitters while still providing Ethernet connectivity serial data and telephone connections to your remote site

What are the BP 4500 radios?

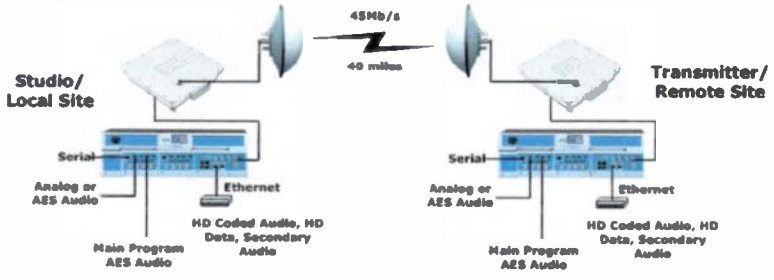
The BP 4500 is a line of high capacity point to point microwave radios Each radio supports 45 Mbps bandwidth full-duplex with Telco grade performance

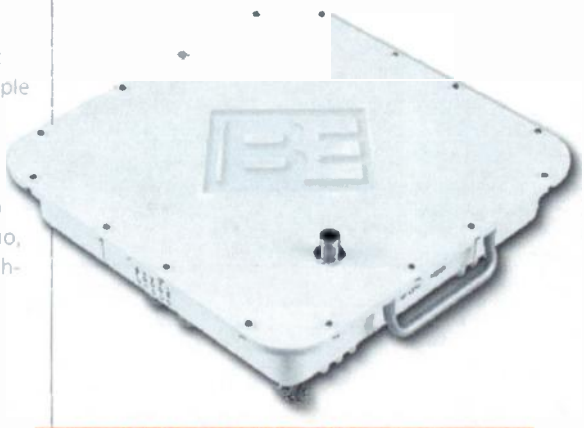
The BP 4500 radios operate in the license-free band and operators can select a version offering transmission in the 5 3 GHz UNII band reaching up to 7 miles or a version supporting the 1st GHz ISM band reaching up to 40 miles Each radio can be ordered with either an integral antenna or a connector for an external antenna All BP 4500 radios include both DS3 and 10/100BaseT interfaces which are user software selectable

BP radios are optimized for audio voice data services and Ethernet backhaul applications BP radios are easy to deploy with a unique quick release install bracket for handy pole-mounted installations

The BP 4500 offers customers:

- Unprecedented capacity and flexibility when implementing your point to-point system
- Bi-directional link Your RPU backhaul can be sent through this link
- Ethernet connectivity to your site
- Carrier class reliability Five Nines
- Easy installation and maintenance with high MTBF rate
- Internal BERT and loopback tests





KEY PRODUCT FEATURES

- 45 Mbps Full Duplex Frequency Division Duplexing (FDD) operation for low latency and symmetrical backhaul
- User software selectable for DS3 or 10/100BaseT Ethernet modes
- Three distinct software selectable channel pairs for industry leading frequency coordination
- Advanced security settings allow three levels of user access
- Single weatherproof unit for outdoor applications (providing minimal RF cable loss) Extended temperature range 30 C to +65 C (22 F to 149 F)
- Integral antenna or optional connection for external flat or parabolic directional antennas
- 16 QAM modulation allowing up to 12 co located radios without interference
- Two license-free versions available 5 8GHz ISM band or 5 3GHz UNII band
- SNMP FTP Telnet, and Web Interface provided for ease of management configuration installation and operation of the radio
- Low part count contributing to a High Mean Time Between Failure Rate (MTBF) >7 years
- 99 999% uptime carrier class reliability meets or exceeds wireline standards
- Built in BERT tester for local and far end loopback testing
- 5 year product warranty and advance replacement service options

SPECS: BP 4500 45 Mbps Point-To-Point Digital Microwave Radios

GENERAL PRODUCT INFO	
FREQUENCY BAND	Full Duplex Operation in either the UNII or ISM bands depending on the model
SPECTRUM OPTIONS	5.250-5.350 GHz or 5.725-5.825 GHz
CAPACITY OPTIONS	xDS3 Payload and 2x10/100BaseT Ethernet switched ports OR 2x10/100BaseT Ethernet switched ports
CHANNEL BANDWIDTH	16 MHz
DIGITAL INTERFACES	
1) DS3	
TYPE	1xDS3 per GR-499
LINE RATE	44.736 Mbps
LINE CODE	B3ZS
INTERFACE	75 Ω Unbalanced coax
CONNECTORS	TNC (75Ω)
2) 10/100BASET	
TYPE	2X10/100BaseT per IEEE802.3
ETHERNET MODE THROUGHPUT	45 Mbps
MAX DISTANCE (CPE to WaveLink)	300 feet
TRANSMITTER	
FREQUENCY RANGE (Frequency Agile)	5.250-5.350 GHz or 5.725-5.825 GHz
OUTPUT POWER (Adjustable)	+16 dBm
ATPC (Auto Transmit Power Control)	User selectable
TRANSMIT ATTN	1-30 dB adjustable below max power
FREQUENCY STABILITY MODULATION	±5 ppm
MODULATION	16 QAM with built-in equalization
RECEIVER	
TYPE	Double Heterodyne
SENSITIVITY BER 10-6	-78 dBm or better including Forward Error Correction (FEC)
MAX RF INPUT LEVEL	-35 dBm
FREQUENCY STABILITY	±5 ppm
ADJACENT CHANNEL REJECTION	≥40 dB (RF bandwidth of ≤16 MHz)
NETWORK MANAGEMENT	
SNMP	MIB II and private WaveLink functions
NMS/EMS	Standard SNMP based NMS or Web Browser Interface
CRAFT INTERFACE	RS232 9600bps CLI
REMOTE ACCESS	HTTP FTP and Telnet
STATUS INDICATORS/DIAGNOSTICS	
EXTERNAL LEDS	Power Local Alarm RF Link 1xDS3 Input 2xEthernet links
ALARMS	DS3 LOS AIS Radio TX Radio RX BER Threshold
STATUS	NMS IP addresses BER TX Power RX Signal Level Loopback Test Status DS3 Input Ethernet Input
CONFIGURATION CMDS	NMS IP addresses TX Power TX Mute ATPC Frequency RSL BER Alarm Loopback Tests BER Tests
DIAGNOSTIC TEST FEATURES	BER Local/Remote/RF Loopbacks
PERFORMANCE MONITORING	Receive Signal Strength Indicator (RSSI)
POWER	
INPUT POWER RANGE	21 to 60 VDC
POWER CONSUMPTION	36 Watts max
MECHANICAL	
DIMENSIONS (HxWxD)	12" x12" x4" (30x30x10cm)
WEIGHT	11 lbs (5Kg)
ENVIRONMENTAL	
TEMP RANGE	-30° C to +65° C (-22° F to +149° F)
ALTITUDE	15,000 feet (4600 meters)
HUMIDITY	Outdoor/weatherproof

ANTENNAS	**FORWARD GAIN**	**FRONT/BACK RATIO**
INTEGRAL	21 dB	40 dB
EXTERNAL PARABOLIC		
2 feet (.61m)	28.1dBi	38 dB
4 feet (1.22m)	34 dB	46 dB

FCC INFO (US ONLY)	
5.3 GHZ OPTION	5.7 GHZ OPTION
OEWCX DS3 53G	OEWCX DS3 58G
Certified to FCC Part 15.407	Certified to FCC Part 15.247
Subpart E	Subpart C
UNII Certified	ISM Certified

REVISIONS:

4/5/04
Original

COMPLIMENTARY EQUIPMENT:

BP-3400 34 Mbps Point-to-Point Digital Microwave Radio
BP-800 8 Mbps Point-to-Point Digital Microwave Radio
BP-600 6.5 Mbps Point-to-Point Digital Microwave Radio
BP-400-INT Integrated Network Terminal Chassis
BP-400-DS3-NAU DS3 Network Access Unit
BP-400-AVSIM Audio and Video Service Interface Module
BP-400-FXSIM Telephone Service Interface Module
BP-400-SMPTE310 SMPTE 310 Service Interface Module

FAQs:

Q: What is the maximum data rate of the point to point radios?

A: BP-4500 is 45 Mbps BP-3400 is 34 Mbps BP-800 is 8 Mbps BP-600 is 6.5 Mbps

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A: The radio is located on the tower or pole in order to minimize cable loss at the 5.3 or 5.8 GHz frequencies

Q. What are the interfaces to the radio?

A. The BP Series of radios accepts coaxial DS3 interface or an RJ45 10/100 baseT connection

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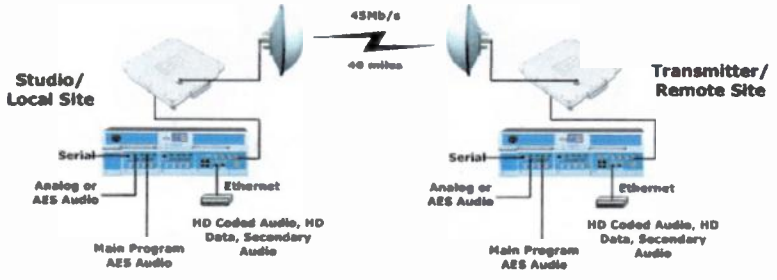

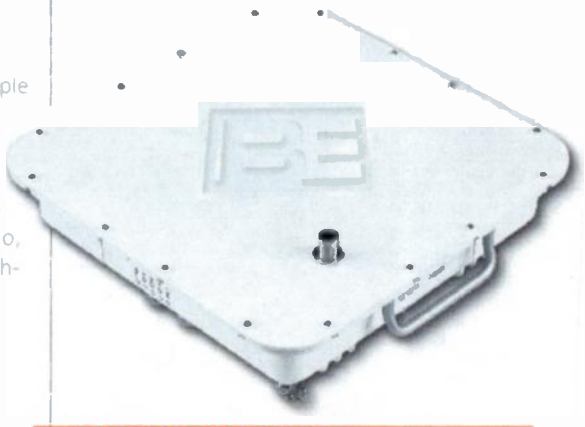

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- SNMP FTP Telnet, and Web interface provided for ease of management configuration installation and operation of the radio
- Low part count contributing to a High Mean Time Between Failure Rate (MTBF) >7 years
- 99 999% uptime carrier class reliability meets or exceeds wireline standards
- Built in BERT tester for local and far end loopback testing
- 5-year product warranty and advance replacement service options

SPECS: BP 4500 45 Mbps Point-To-Point Digital Microwave Radios

GENERAL PRODUCT INFO

FREQUENCY BAND	Full Duplex operation in either the UNII or ISM bands depending on the model
SPECTRUM OPTIONS	5.250-5.350 GHz or 5.725-5.825 GHz
CAPACITY OPTIONS	1xDS3 Payload and 2x10/100BaseT Ethernet switched ports OR 2x10/100BaseT Ethernet switched ports
CHANNEL BANDWIDTH	16 MHz

DIGITAL INTERFACES

1) DS3	
TYPE	1xDS3 per GR-499
LINE RATE	44.736 Mbps
LINE CODE	B3ZS
INTERFACE	75 Ω Unbalanced coax
CONNECTORS	TNC (75Ω)
2) 10/100BASET	
TYPE	2X10/100BaseT per IEEE802.3
ETHERNET MODE THROUGHPUT	45 Mbps
MAX DISTANCE (CPE to WaveLink)	300 feet

TRANSMITTER

FREQUENCY RANGE (Frequency Agile)	5.250-5.350 GHz or 5.725-5.825 GHz
OUTPUT POWER (Adjustable)	+16 dBm
ATPC (Auto Transmit Power Control)	User selectable
TRANSMIT ATTN	1-30 dB adjustable below max power
FREQUENCY STABILITY MODULATION	±5 ppm
MODULATION	16 QAM with built-in equalization

RECEIVER

TYPE	Double Heterodyne
SENSITIVITY BER 10-6	-78 dBm or better including Forward Error Correction (FEC)
MAX RF INPUT LEVEL	-35 dBm
FREQUENCY STABILITY	±5 ppm
ADJACENT CHANNEL REJECTION	≥40 dB (RF bandwidth of ≤16 MHz)

NETWORK MANAGEMENT

SNMP	MIB II and private WaveLink functions
NMS/EMS	Standard SNMP based NMS or Web Browser Interface
CRAFT INTERFACE	RS232 9600bps DCL
REMOTE ACCESS	HTTP FTP and Telnet

STATUS INDICATORS/DIAGNOSTICS

EXTERNAL LEDS	Power Local Alarm RF Link 1xDS3 Input 2xEthernet links
ALARMS	DS3 LOS AIS Radio TX Radio RX BER Threshold
STATUS	NMS IP addresses BER TX Power RX Signal Level Loopback Test Status DS3 Input Ethernet Input
CONFIGURATION CMDS	NMS IP addresses TX Power TX Mute ATPC Frequency RSL BER Alarm Loopback Tests BER Tests
DIAGNOSTIC TEST FEATURES	BER Local/Remote/RF Loopbacks
PERFORMANCE MONITORING	Receive Signal Strength Indicator (RSSI)

POWER

INPUT POWER RANGE	-21 to 60 VDC
POWER CONSUMPTION	36 Watts max

MECHANICAL

DIMENSIONS (HxWxD)	12 x12 x4 (30x30x10cm)
WEIGHT	11 lbs (5Kg)

ENVIRONMENTAL

TEMP RANGE	-30 C to +65 C (-22 F to +149 F)
ALTITUDE	15,000 feet (4600 meters)
HUMIDITY	Outdoor/weatherproof

ANTENNAS

	FORWARD GAIN	FRONT/BACK RATIO
INTEGRAL	21 dB	40 dB
EXTERNAL PARABOLIC		
2 feet (.61m)	28 dB	38 dB
4 feet (1.22m)	34 dBi	46 dB

FCC INFO (US ONLY)

5.3 GHZ OPTION	5.7 GHZ OPTION
OEWCX-DS3-53G	OEWCX-DS3-58G
Certified to FCC Part 15.407 Subpart E	Certified to FCC Part 15.247 Subpart C
UNII Certified	ISM Certified

REVISIONS:

4/5/04
Original

COMPLIMENTARY EQUIPMENT:

BP-3400 34 Mbps Point to Point Digital Microwave Radio
BP-800 8 Mbps Point to Point Digital Microwave Radio
BP-600 6.5 Mbps Point to Point Digital Microwave Radio
BP-400-INT Integrated Network Terminal Chassis
BP-400-DS3-NAU DS3 Network Access Unit
BP-400-AVSIM Audio and Video Service Interface Module
BP-400-FXSIM Telephone Service Interface Module
BP-400-SMPTE310 SMPTE 310 Service Interface Module

FAQs:

Q: What is the maximum data rate of the point to point radios?

A: BP-4500 is 45 Mbps BP-3400 is 34 Mbps BP-800 is 8 Mbps BP-600 is 6.5 Mbps

Q: Where is the radio located?

A: The radio is located on the tower or pole in order to minimize cable loss at the 5.3 or 5.8 GHz frequencies

Q: What are the interfaces to the radio?

A: The BP Series of radios accepts coaxial DS3 interface or an RJ45 10/100 baseT connection

Broadcast Electronics, Inc. • 4100 North 24th Street, P.O. Box 3606, Quincy, Illinois 62305-3606 U.S.A.
Telephone: (217) 224-9600 • Fax: (217) 224-9607 • E-Mail: bdcast@bdcast.com • www.bdcast.com

BP 4500

45 Mbps Point-To-Point Digital Microwave Radios

Why wireless broadband?

The BP 4500 wireless radios deliver 45Mbps of full duplex bandwidth making it the perfect candidate for HD Radio Studio to Transmitter Links links with multiple transmitters at a site Studio to Studio Links or any point to point application where increased capacity and maximum flexibility is desired

This radio has enough bandwidth capability to deliver your main channel audio at a full 44 1kHz or 48kHz sampling rate HD Coded Audio HD secondary Audio, and HD Advanced data services for multiple transmitters while still providing Ethernet connectivity serial data and telephone connections to your remote site

What are the BP 4500 radios?

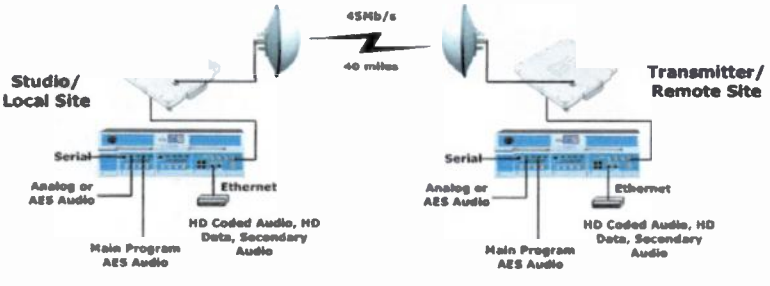
The BP 4500 is a line of high capacity point to point microwave radios Each radio supports 45 Mbps bandwidth full duplex with Telco grade performance

The BP 4500 radios operate in the license-free band and operators can select a version offering transmission in the 5 3 GHz UNII band reaching up to 7 miles or a version supporting the 1st GHz ISM band reaching up to 40 miles Each radio can be ordered with either an integral antenna or a connector for an external antenna All BP 4500 radios include both DS3 and 10/100BaseT interfaces which are user software selectable

BP radios are optimized for audio voice data services and Ethernet backhaul applications BP radios are easy to deploy with a unique quick release install bracket for handy pole-mounted installations

The BP 4500 offers customers:

- Unprecedented capacity and flexibility when implementing your point to point system
- Bi directional link Your RPU backhaul can be sent through this link
- Ethernet connectivity to your site
- Carrier class reliability Five Nines
- Easy installation and maintenance with high MTBF rate
- Internal BERT and loopback tests



KEY PRODUCT FEATURES

- 45 Mbps Full Duplex Frequency Division Duplexing (FDD) operation for low latency and symmetrical backhaul
- User software selectable for DS3 or 10/100BaseT Ethernet modes
- Three distinct software selectable channel pairs for industry leading frequency coordination
- Advanced security settings allow three levels of user access
- Single weatherproof unit for outdoor applications (providing minimal RF cable loss) Extended temperature range 30 C to +65 C (22 F to 149 F)
- Integral antenna or optional connection for external flat or parabolic directional antennas
- 16 QAM modulation allowing up to 12 co-located radios without interference
- Two license free versions available 5 8GHz ISM band or 5 3GHz UNII band
- SNMP FTP Telnet, and Web Interface provided for ease of management configuration installation and operation of the radio
- Low part count contributing to a High Mean Time Between Failure Rate (MTBF) >7 years
- 99 999% uptime carrier class reliability meets or exceeds wireline standards
- Built in BERT tester for local and far end loopback testing
- 5 year product warranty and advance replacement service options

BP 400 FXSIM

FXS SERVICE INTERFACE MODULE

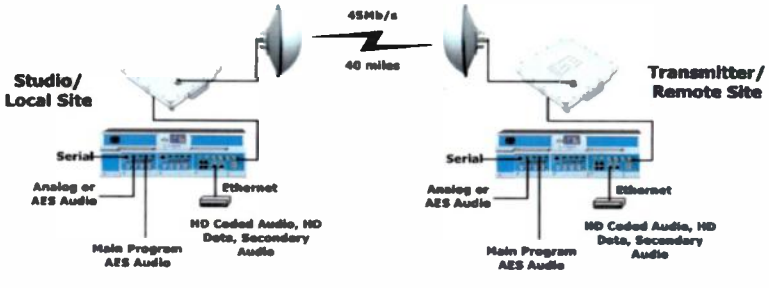
BP 400 FXSIM

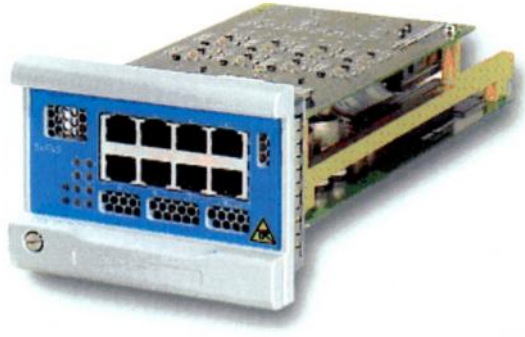
The FXS Service Interface Module can be installed into Broadcast Electronics new family of Integrated Network Terminal (INT) chassis and Optical Network Terminal (ONT) chassis, the BP 300 and BP 400, enabling the transport of eight independent FXS telephony streams per module.

Using advanced DSP technology, the unit supports all DTMF encode and decode functions and also offers echo cancellation capabilities. With its advanced embedded software, the FXS SIM offers extensive diagnostics and statistics capabilities.

When used together with Broadcast Electronics network adapter modules, the FXS SIM enables transport of voice calls over standard DS-3/E3, OC-3c/STM1c or OC-12c/STM4c compatible networks. Used in conjunction with BE's structured DS1/E1 gateway modules in either a point-to-point network or a point-to-multipoint Passive Optical Network, the FXS SIM offers a powerful voice aggregation solution complementing Broadcast Electronics multiservice network solution platform.

This solution may be an effective way to REDUCE your monthly operating budget by cutting out expensive telephone connectivity to where your links are already established.





KEY PRODUCT FEATURES

- Enables transmission of multiple FXS voice calls across broadband wide area networks
- Eight voice ports per FXS SIM, sixteen per BP 300/BP 400
- Integrated loopbacks and alarming, remote diagnostics
- Easy to use Web-Browser Craft Interface for on site configuration and alarm monitoring
- Full remote management from intuitive and easy to use to use BEAMS Management System
- FXS Loop Start and Private Line Automatic Ring Down functionality

SPECS: BP 400 FXSIM FXS Service Interface Module

FEATURES

Applications

- Voice calls in multiservice networks
- Voice service integration for business and MTU
- Voice hotline (PLAR)
- Voice aggregation over a FTTP passive optical network
- Voice over wireless or wire line SONET/SDH compatible networks
- Voice services for video and telemetry networks

Basic Features

- Ring generator, programmable voltage and frequency
- Battery voltage, programmable for short and long loop operation
- Programmable TX, RX levels
- Tone detection and generation
- Modem detection
- Fax pass-through
- Supports 8 short loop or 4 long loop ports per module

FXS PORT

Density: Eight ports per module

Connector: RJ48

Physical Connection: 2 wire

Loop Length: 6 DB

Data Transmission: V 34 Modem support

On Hook Transmission: Caller ID

Signaling Modes: Loop start, ground start

On-hook Transmission: For caller ID

Line Impedance: 600 Ω + 2.16 MF

Insertion Loss: Programmable

Frequency Response: For caller ID

Return Loss: ERL ≥ 19 DB; SRL ≥ 11DB

Loop Current: 18 MA min

Input Level Adjustment: -3 -- +3 DBM

Output Attenuation: -3 -- +3 DBM

Longitudinal Balance: 58 DB TO 3000 Hz, 53 DB > 3000 Hz

Ringing Load: REN = 2 at 1000 Ω loop resistance, 40V load

Ring Voltage: Programmable to 80V

Ringing Tone: Programmable 15 – 100 Hz

Compliance: TR-57, G.712, FCC Part 68

Remote Operation

All relevant alarms and statistics for proper operation and maintenance of the FXS SIM are available remotely via an embedded Web-based browser interface.

Element Management System

The FXS SIM can be remotely managed through the BE Management System (BEAMS). BEAMS provides complete service provisioning, fault and performance management and software administration capabilities.

Physical Dimensions

3 1"(H) X 4.2" (W) X 9.5" (D)

Environmental

Operation - 0 to +50 Celsius (32F to 122F), 5% to 90% humidity (N.C) when installed in BP 400 chassis

Storage - -40 to 70 Celsius (-40F to +158F), 5% to 90% humidity (N.C.)

Altitude - up to 10,000 feet (3,300 Meters)

Regulatory Compliance

- ANSI-FCC Part 15 Class A
- ANSI/UL: 1950, third edition
- CSA C22 2 No. 950-95

Ordering Information

8 Port FXS-SIM
This is a Service Interface Module for the BP 300 and BP 400 series chassis.

REVISIONS:

4/5/04:
Original

COMPLEMENTARY EQUIPMENT:

BP 4500 45 Mbps Point-to-Point Digital Microwave Radio
BP 3400 34 Mbps Point-to-Point Digital Microwave Radio
BP 800 8 Mbps Point-to-Point Digital Microwave Radio
BP 600 6.5 Mbps Point-to-Point Digital Microwave Radio
400 INT Integrated Network Terminal Chassis
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BP 400 SMPTE310

Service Interface Module

SMPTE 310M Service Interface Module

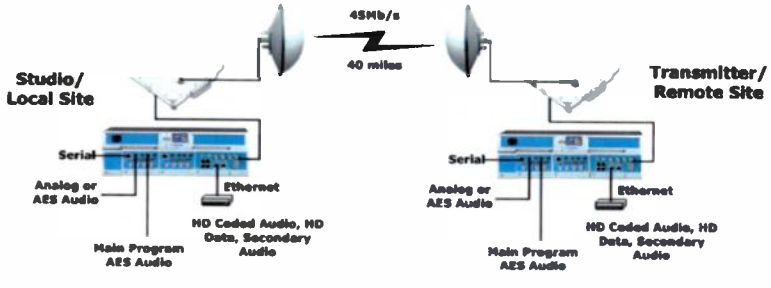
The SMPTE 310M SIM can be installed into Broadcast Electronics BP 400 (INT) Integrated Network Terminal.

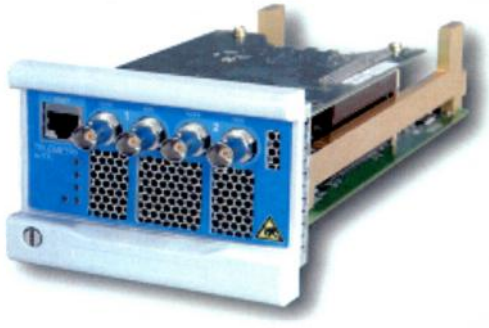
This option will allow the broadcaster to transport up to two bi-directional SMPTE 310 compliant streams at rates of 19.39 Mbps. The SMPTE 310 Synchronous Serial Interface can be used to carry MPEG-2 transport bit streams that contain compressed HDTV (High Definition TV) content.

Implementation of digital modulation and de-modulation of the SMPTE 310 stream, coupled with advanced circuit emulation techniques developed at BE, ensures robust transmission and recovery of the source stream in a variety of network environments. Particular attention has been paid in meeting the SMPTE 310 requirements for jitter, clock accuracy, and clock drift to ensure reliable performance.

The SMPTE 310 SIM can operate with the BE's DVB-ASI VSIM to provide an integrated DVB-ASI to DVB-SSI (SMPTE 310) conversion for additional cost saving.

The SMPTE 310 SIM can be coupled with the Broadcast Electronics AVSIM (Audio/Video Service Interface Module) and DS-3 NAU (Network Access Unit) to facilitate simultaneous transport of HDTV compressed and SDTV (Standard Definition TV) streams, as well as Ethernet data and TDM traffic (T1) over a single DS-3 circuit in a single chassis. Fiber-based network modules supporting OC-3 and OC-12 networks are also available in this configuration.





KEY PRODUCT FEATURES

- Simultaneous transport of two independent SMPTE 310M channels over DS-3, microwave, or fiber links
- Integral encoding/decoding (2 encoders and 2 decoders)
- Integrated loopback, BERT (Link Test), and alarming
- Four integral DS1 TDM serviceports
- User-friendly, web-based Local Craft Interface for configuration and alarm monitoring
- Ethernet interface for auxiliary data applications

SPECS: BP 400 SMPTE310 Service Interface Module

FEATURES

Decoding
The SMPTE 310 SIM uses an advanced DPLL (Digital Phase Locked Loop) architecture to process the SMPTE 310 source stream to ensure accurate decoding.

The decoded stream is then formatted into ATM cells for multiplexing and transmission across a broadband-network

Encoding
Upon receipt of the ATM cells, the SMPTE 310 source is reconstructed by generating a biphasic-mark coded stream using a digital modulator.

Use of dds (Direct Digital Synthesis) technology and a stable, accurate frequency source ensures generation of a stable output stream.

Remote Management and Operation
All relevant alarms and statistics for proper operation and maintenance of the SMPTE 310 SIM are available remotely via a web-based browser interface

Maintenance
An onboard BERT (Bit Error Rate Test) generator allows remote BERT testing.

The BERT supports the following test patterns:
- Alternating ones and zeroes
- Psuedo random 2^{11-1}
- Psuedo random 2^{15-1}

TECHNICAL SPECIFICATIONS

SMPTE 310M Port
Signal Characteristics - DVB-SSI (Synchronous Serial Interface), SMPTE 310M compliant

Signal - Bi-phase mark coded

Clock Frequency - 19,392658.46MHz ± 2.8 ppm (54.23 Hz)

Clock Drift - ± .028 ppm (.54 Hz) per second

Clock Jitter - < 2 ns p-p over BW of 1Hz – 193.92KHz

P-P signal amplitude - 800mV +/- 10%

Signal offset - 0.0 V +/- .5V

TECHNICAL SPECIFICATIONS CONTINUED

Physical Specifications
SMPTE 310 In
Density: 2 ports per SIM
Connector: Unbalanced 75 Ohm BNC

SMPTE 310 Out
Density: 2 ports per SIM
Connector: Unbalanced 75 Ohm BNC

Data control port
Density: 1 port per SIM
Connector: RJ45

Applications
- Studio Transmitter Links
- DVB-ASI to SMPTE 310 Conversion
- Broadcast, Off-Air Backhaul

Element Management System
The NAU can be remotely managed through the BE Access Management System (BEAMS) BEAMS provides complete service provisioning, fault and performance management and software administration capabilites.

Physical Dimensions
3 1"(H) x 4.2"(W) x 9 5" (D)

ENVIRONMENTAL
Operation - 0 to +50 Celsius (32F to 122F), 5% to 90% Humidity (N.C.) when installed in BP-400 chassis

Storage - -40 to 70 Celsius (-40F to -158F), 5% to 90% Humidity (N.C)

Altitude - Up to 10,000 feet (3,300 Meters)

Regulatory Compliance
- ANSI-FCC Part 15 Class A
- ANSI/UL. 1950, third edition
- CSA C22.2 No. 950-95

Ordering Information
SMPTE 310 Service Interface Module

REVISIONS:

4/5/04:
Original

COMPLEMENTARY EQUIPMENT:

BP 4500 45 Mbps Point-to-Point Digital Microwave Radio
BP 3400 34 Mbps Point-to-Point Digital Microwave Radio
BP 800 8 Mbps Point-to-Point Digital Microwave Radio
BP 600 6.5 Mbps Point-to-Point Digital Microwave Radio
BP 400 INT Integrated Network Terminal Chassis
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BP 600

6.5 Mbps Point-To-Point Digital Microwave Radios

Why Wireless Broadband?

The BP 600 wireless radios deliver 6.5 Mbps of full duplex bandwidth making it the perfect candidate for HD Radio Studio-to-Transmitter Links, links with multiple transmitters at a site, Studio-to-Studio Links, or any point-to-point application where increased capacity and maximum flexibility is desired.

This radio has enough bandwidth capability to deliver your main channel audio at a full 44.1kHz or 48kHz sampling rate, HD coded audio, HD secondary audio, and HD advanced data services while still providing Ethernet connectivity, serial data, and telephone connections to your remote site.

What are the BP 600 radios?

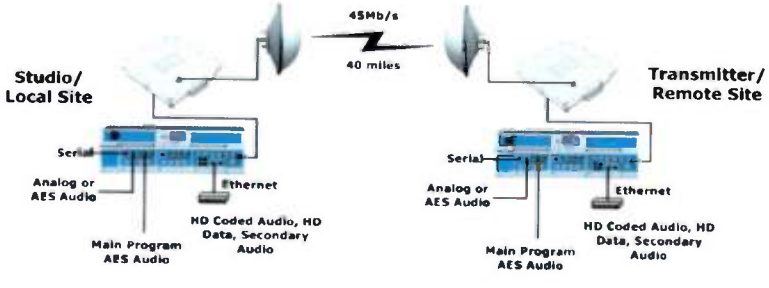
The BP 600 is a line of high capacity, point-to-point microwave radios. Each radio supports 8 Mbps bandwidth (up to 4 T1s), full-duplex, with Telco grade performance.

The BP 600 radios operate in the license-free 5.8GHz ISM band reaching up to 50 miles. Each radio can be ordered with either an integral antenna, or a connector for an external antenna. The BP 600 radios are all-outdoor compact units which house all RF equipment near the antenna.

BP radios are optimized for all traditional T1 voice, audio, and data services. BP radios are easy to deploy, with a unique quick release install bracket for handy pole mounted installations.

The BP 600 offers customers:

- Unprecedented capacity and flexibility when implementing your point-to-point system
- Bi-directional link. Your RPU backhaul can be sent through this link
- Ethernet connectivity to your site
- Carrier class reliability 'Five Nines'
- Easy installation and maintenance with high MTBF rate
- Internal BERT and loopback tests



KEY PRODUCT FEATURES

- 6.5 Mbps Full Duplex, Frequency Division Duplexing (FDD) operation for low latency and symmetrical backhaul
- License-free in the 5.8GHz ISM band with distances reaching up to 50 miles
- Single weatherproof unit for outdoor applications (providing minimal RF cable loss). Extended temperature range: -40°C to +70°C (-40°F to 158°F)
- QPSK or 16 QAM modulation allowing up to 24 co-located radios without interference
- SNMP, Craft, and Web Interface provided for ease of management, configuration, installation, and operation of the radio
- Integral antenna or optional connection for external flat or parabolic directional antennas
- Low part count contributing to a High Mean Time Between Failure Rate (MTBF) > 7 years
- 99.999% uptime carrier class reliability meets or exceeds wireline standards
- Built-in BERT tester for local and far end loopback testing
- 5-year product warranty and advance replacement service options

SPECS: BP 600 6.5 Mbps Point-To-Point Digital Microwave Radios

GENERAL PRODUCT INFO

FREQUENCY BAND	Full Duplex operation in the ISM band
SPECTRUM OPTIONS	5 725-5.825 GHz
CAPACITY OPTIONS	1, 2 or 4 E1s
COLLOCATING RADIOS	12 for 4xE1 23 for 2xE1 34 for 1xE1

DIGITAL INTERFACES

TYPE	1, 2 or 4 E1 per G 703
LINE RATE	6 5 Mbps
LINE CODE	HDB3
INTERFACE	E1
CONNECTORS	RJ45

TRANSMITTER

FREQUENCY RANGE	5 725-5.825 GHz
OUTPUT POWER	+20 dBm for 16 QAM +27 dBm for QPSK
TRANSMIT ATTN	>20 dB
FREQUENCY STABILITY MODULATION	±5 ppm
MODULATION	16 QAM or QPSK software selectable

RECEIVER

TYPE	Double Heterodyne	
SENSITIVITY, BER 10-6	16 QAM	QPSK
1xE1	-90 dBm	-94 dBm
2xE1	-87 dBm	-91 dBm
4xE1	-84dBm	-88 dBm
MAX RF INPUT LEVEL	-30 dBm, up to +10 dBm input with no damage	

NETWORK MANAGEMENT

SNMP	MIB II
NMS/EMS	Standard SNMP based NMS, or Web Browser Interface
CRAFT INTERFACE	RS232, 9600bps, CLI RS485 multi-drop

POWER

INPUT POWER RANGE	±21 to 60 VDC
POWER CONSUMPTION	36 Watts max

MECHANICAL

DIMENSIONS (HxWxD)	9"x5"x12" (23x13x30 5 cm)
WEIGHT	11 lbs (5Kg)

ENVIRONMENTAL

TEMP. RANGE	-40°C to +70°C (-40°F to 158°F)
ALTITUDE	4,500 meters (15,000 ft)
HUMIDITY	Outdoor/weatherproof

ANTENNAS

	FORWARD GAIN	FRONT/BACK RATIO
INTEGRAL	21 dBi	40 dB
EXTERNAL PARABOLIC		
-2 feet (61m)	28.1dBi	38 dB
-4 feet (1.22m)	34 dBi	46 dB

FCC INFO (US ONLY)

Certified to FCC Part 15 247 Subpart C (ISM Certified)

REVISIONS:

4/5/04:
Original

COMPLEMENTARY EQUIPMENT:

BP 4500 45 Mbps Point-to-Point Digital Microwave Radio
BP 3400 34 Mbps Point-to-Point Digital Microwave Radio
BP 800 8 Mbps Point-to-Point Digital Microwave Radio
BP 400 INT Integrated Network Terminal Chassis
BP 400 DS3NAU DS3 Network Access Unit
BP 400 AVSIM Audio and Video Service Interface Module
BP 400 FXSIM Telephone Service Interface Module
BP 400 SMPTE310 SMPTE 310 Service Interface Module

FAQs:

Q: What is the maximum data rate of the point-to-point radios?

A: BP 4500 is 45 Mbps BP 3400 is 34 Mbps BP 800 is 8 Mbps. BP 600 is 6 5 Mbps

Q: Where is the radio located?

A: The radio is located on the tower or pole in order to minimize cable loss at the 5 3 or 5.8 GHz frequencies

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BP 3400

34 Mbps Point-To-Point Digital Microwave Radios

Why Wireless Broadband?

The BP 3400 wireless radios deliver 34Mbps of full duplex bandwidth making it the perfect candidate for HD Radio Studio-to-Transmitter Links, links with multiple transmitters at a site, Studio-to-Studio Links, or any point to point application where increased capacity and maximum flexibility is desired.

This radio has enough bandwidth capability to deliver your main channel audio at a full 44.1kHz or 48kHz sampling rate, HD Coded Audio, HD secondary Audio, and HD Advanced data services for multiple transmitters while still providing Ethernet connectivity, serial data, and telephone connections to your remote site

What are the BP-600 radios?

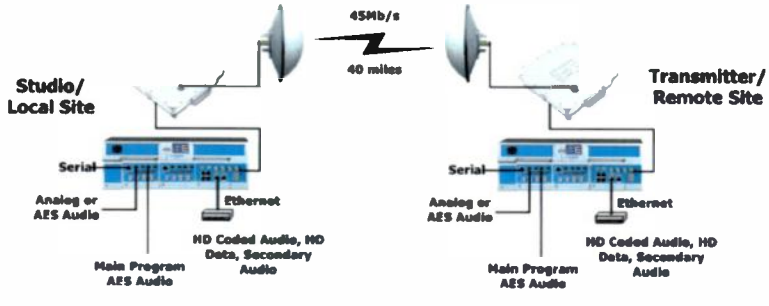
The BP 3400 is a line of high capacity, point-to-point microwave radios. Each radio supports 34 Mbps bandwidth, full-duplex, with Telco grade performance.

The BP 3400 radios operate in the license-free band, and operators can select a version offering transmission in the 5.3 GHz UNII band reaching up to 7 miles or a version supporting the 5.8 GHz ISM band reaching up to 40 miles. Each radio can be ordered with either an integral antenna, or a connector for an external antenna. All BP 3400 radios include both DS3 and 10/100BaseT interfaces, which are user software selectable.

BP radios are optimized for audio, voice, and data services and Ethernet backhaul applications. BP radios are easy to deploy, with a unique quick release install bracket for handy pole-mounted installations.

The BP 3400 offers customers:

- Unprecedented capacity and flexibility when implementing your point-to-point system
- Bi-directional link. Your RPU backhaul can be sent through this link
- Ethernet connectivity to your site
- Carrier class reliability 'Five Nines'
- Easy installation and maintenance with high MTBF rate
- Internal BERT and loopback tests



KEY PRODUCT FEATURES

- 34 Mbps Full Duplex, Frequency Division Duplexing (FDD) operation for low latency and symmetrical backhaul
- User software selectable for DS3 or 10/100BaseT Ethernet modes
- Three distinct software selectable channel pairs for industry leading frequency coordination
- Advanced security settings allow three levels of user access
- Single weatherproof unit for outdoor applications (providing minimal RF cable loss). Extended temperature range: -30°C to +65°C (-22°F to 149°F)
- Integral antenna or optional connection for external flat or parabolic directional antennas
- 16 QAM modulation allowing up to 12 co-located radios without interference
- Two license-free versions available: 5.8GHz ISM band or 5.3GHz UNII band
- SNMP, FTP, Telnet, and Web Interface provided for ease of management, configuration, installation, and operation of the radio
- Low part count contributing to a High Mean Time Between Failure Rate (MTBF) >7 years
- 99.999% uptime carrier class reliability meets or exceeds wireline standards
- Built-in BERT tester for local and far end loopback testing
- 5-year product warranty and advance replacement service options

SPECS: BP 3400 34 Mbps Point-To-Point Digital Microwave Radios

GENERAL PRODUCT INFO	
FREQUENCY BAND	Full duplex operation in either the UNII or ISM bands, depending on the model
SPECTRUM OPTIONS	5.250-5.350 GHz or 5.725-5.825 GHz
CAPACITY OPTIONS	1xE3 Payload and 2x10/100BaseT Ethernet switched ports OR 2x10/100BaseT Ethernet switched ports
CHANNEL BANDWIDTH	14 MHz
DIGITAL INTERFACES	
1) DS3	
TYPE	1xE3 per G.703
LINE RATE	34.368 Mbps
LINE CODE	HDB3
INTERFACE	75 Ω Unbalanced coax
CONNECTORS	TNC (75Ω)
2) 10/100BASET	
TYPE	2x10/100BaseT per IEEE802 3
ETHERNET MODE THROUGHPUT	34 Mbps
MAX DISTANCE (CPE to WaveLink)	100 meters
TRANSMITTER	
FREQUENCY RANGE (Frequency Agile)	5.250-5.350 GHz or 5.725-5 825 GHz
OUTPUT POWER (Adjustable)	+16 dBm
TRANSMIT ATTN	1-30 dB adjustable below max power
FREQUENCY STABILITY MODULATION	±5 ppm
MODULATION	16 QAM with built-in equalization
RECEIVER	
TYPE	Double Heterodyne
SENSITIVITY, BER 10-6	-78 dBm or better, including Forward Error Correction (FEC)
MAX RF INPUT LEVEL	-35 dBm
FREQUENCY STABILITY	±5 ppm
ADJACENT CHANNEL REJECTION	≥40 dB (RF bandwidth of ≤16 MHz)
NETWORK MANAGEMENT	
SNMP	MIB II and private WaveLink functions
NMS/EMS	Standard SNMP based NMS, or Web Browser Interface
CRAFT INTERFACE	RS232, 9600bps, CLI
REMOTE ACCESS	HTTP, FTP and Telnet
STATUS INDICATORS/DIAGNOSTICS	
EXTERNAL LEDS	Power, Local Alarm, RF Link, 1xE3 Input, 2xEthernet links
ALARMS	E3 LOS, AIS, Radio TX, Radio RX, BER Threshold
STATUS	NMS IP addresses, BER, TX Power, RX Signal Level, Loopback Test Status, E3 Input, Ethernet Input
CONFIGURATION CMDS	NMS IP addresses, TX Power, TX Mute, ATPC, Frequency, RSL, BER Alarm, Loopback Tests, BER Tests
DIAGNOSTIC TEST FEATURES	BER, Local/Remote/RF Loopbacks
PERFORMANCE MONITORING	Receive Signal Strength Indicator (RSSI), Ethernet Statistics
POWER	
INPUT POWER RANGE	±21 to 60 VDC
POWER CONSUMPTION	36 Watts max
MECHANICAL	
DIMENSIONS (HxWxD)	12"x12"x9" (30x30x10 cm)
WEIGHT	5 Kg (11lbs)
ENVIRONMENTAL	
TEMP. RANGE	-30°C to +65°C (-22°to149°F)
ALTITUDE	4,600 meters (15,000 ft)
HUMIDITY	Outdoor/weatherproof

ANTENNAS	**FORWARD GAIN**	**FRONT/BACK RATIO**
INTEGRAL	21 dBi	40 dB
EXTERNAL PARABOLIC:		
-2 feet (.61m)	28.1dBi	38 dB
-4 feet (1 22m)	34 dBi	46 dB

FCC INFO (US ONLY)	
5 3 GHZ OPTION	5.7 GHz OPTION
RVMWL-DS3-53G	RVMWL-DS3-53G
Certified to FCC Part 15.407	Certified to FCC Part 15 247
Subpart E	Subpart C
UNII Certified	ISM Certified

REVISIONS:

4/5/04:
Original

COMPLEMENTARY EQUIPMENT:

BP 4500 45 Mbps Point-to-Point Digital Microwave Radio
BP 800 8 Mbps Point-to-Point Digital Microwave Radio
BP 600 6.5 Mbps Point-to-Point Digital Microwave Radio
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BP 400 AVSIM Audio and Video Service Interface Module
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FAQs:

Q: What is the maximum data rate of the point-to-point radios?

A: BP 4500 is 45 Mbps. BP 3400 is 34 Mbps. BP 800 is 8 Mbps BP 600 is 6.5 Mbps

Q: Where is the radio located?

A: The radio is located on the tower or pole in order to minimize cable loss at the 5.3 or 5.8 GHz frequencies.

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BP 800

8 Mbps Point-To-Point Digital Microwave Radios

Why wireless broadband?

The BP 800 wireless radios deliver 8 Mbps of full duplex bandwidth making it the perfect candidate for HD Radio Studio-to-Transmitter Links, links with multiple transmitters at a site, Studio-to-Studio Links, or any point to point application where increased capacity and maximum flexibility is desired.

This radio has enough bandwidth capability to deliver your main channel audio at a full 44.1kHz or 48kHz sampling rate, HD Coded Audio, HD secondary Audio, and HD Advanced data services while still providing Ethernet connectivity, serial data, and telephone connections to your remote site.

What are the BP 800 of radios?

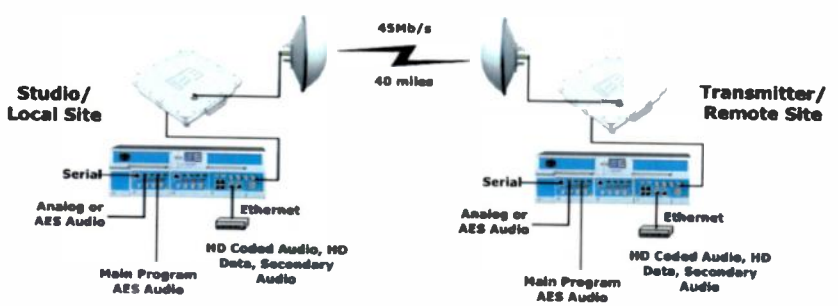
The BP 800 is a line of high capacity, point-to-point microwave radios. Each radio supports 8 Mbps bandwidth (up to 4 E1s) full-duplex, with Telco grade performance.

The BP 800 radios operate in the license-free 5.8GHz ISM band reaching up to 50 miles. Each radio can be ordered with either an integral antenna, or a connector for an external antenna. The BP 800 radios are all-outdoor compact units which house all RF equipment near the antenna.

BP radios are optimized for all traditional T1 voice, audio, and data services. BP radios are easy to deploy, with a unique quick release install bracket for handy pole- mounted installations.

The BP 800 offers customers:

- Unprecedented capacity and flexibility when implementing your point-to-point system
- Bi-directional link. Your RPU backhaul can be sent through this link
- Ethernet connectivity to your site
- Carrier Class reliability 'Five Nines'
- Easy installation and maintenance with high MTBF rate
- Internal BERT and loopback tests



KEY PRODUCT FEATURES

- 8 Mbps Full Duplex, Frequency Division Duplexing (FDD) operation for low latency and symmetrical backhaul
- Single weatherproof unit for outdoor applications (providing minimal RF cable loss). Extended temperature range: -40°C to +70°C (-40°F to 158°F)
- QPSK or 16 QAM modulation allowing up to 24 co-located radios without interference
- License-free in the 5.8GHz ISM band with distances reaching up to 50 miles
- SNMP, Craft, and Web Interface provided for ease of management, configuration, installation, and operation of the radio
- Integral antenna or optional connection for external flat or parabolic directional antennas
- Low part count contributing to a High Mean Time Between Failure Rate (MTBF) > 7 years
- 99.999% uptime carrier class reliability meets or exceeds wireline standards
- Built-in BERT tester for local and far end loopback testing
- 5-year product warranty and advance replacement service options

SPECS: BP 800 8 Mbps Point-To-Point Digital Microwave Radios

GENERAL PRODUCT INFO

FREQUENCY BAND	Full duplex operation in the ISM band
SPECTRUM OPTIONS	5.725-5.825 GHz
CAPACITY OPTIONS	1, 2 or 4 E1s
COLLOCATING RADIOS	12 for 4xE1 23 for 2xE1 34 for 1xE1

DIGITAL INTERFACES

TYPE	1, 2 or 4 E1 per G 703
LINE RATE	8.192 Mbps
LINE CODE	HDB3
INTERFACE	E1
CONNECTORS	RJ45

TRANSMITTER

FREQUENCY RANGE	5.725-5.825 GHz
OUTPUT POWER	+20 dBm for 16 QAM +27 dBm for QPSK
TRANSMIT ATTN	>20 dB
FREQUENCY STABILITY MODULATION	±5 ppm
MODULATION	16 QAM or QPSK software selectable

RECEIVER

TYPE	Double Heterodyne	
SENSITIVITY, BER 10-6	16 QAM	QPSK
1xE1	-90 dBm	-94 dBm
2xE1	-87 dBm	-91 dBm
4xE1	-84dBm	88 dBm
MAX RF INPUT LEVEL	-30 dBm, up to +10 dBm input with no damage	

NETWORK MANAGEMENT

SNMP	MIB II
NMS/EMS	Standard SNMP based NMS, or Web Browser Interface
CRAFT INTERFACE	RS232, 9600bps, CLI RS485 multi-drop

POWER

INPUT POWER RANGE	±21 to 60 VDC
POWER CONSUMPTION	36 Watts max

MECHANICAL

DIMENSIONS (HxWxD)	9"x5"x12" (23x13x30.5 cm)
WEIGHT	11 lbs (5Kg)

ENVIRONMENTAL

TEMP. RANGE	-40°C to +70°C (-40°F to 158° F)
ALTITUDE	4,500 meters
HUMIDITY	Outdoor/weatherproof

ANTENNAS

	FORWARD GAIN	FRONT/BACK RATIO
INTEGRAL	21 dBi	40 dB
EXTERNAL PARABOLIC:		
-2 feet (.61m)	28.1dBi	38 dB
-4 feet (1.22m)	34 dBi	46 dB

FCC INFO (US ONLY)

Certified to FCC Part 15.247 Subpart C (ISM Certified)

REVISIONS:

4/5/04:
Original

COMPLIMENTARY EQUIPMENT:

BP 4500 45 Mbps Point-to-Point Digital Microwave Radio
BP 3400 34 Mbps Point-to-Point Digital Microwave Radio
BP 600 6.5 Mbps Point-to-Point Digital Microwave Radio
BP 400 INT Integrated Network Terminal Chassis
BP 400 DS3NAU DS3 Network Access Unit
BP 400 AVSIM Audio and Video Service Interface Module
BP 400 FXSIM Telephone Service Interface Module
BP 400 SMPTE310 SMPTE 310 Service Interface Module

FAQs:

Q: What is the maximum data rate of the point-to-point radios?

A: BP 4500 is 45 Mbps. BP 3400 is 34 Mbps. BP 800 is 8 Mbps. BP 600 is 6.5 Mbps.

Q: Where is the radio located?

A: The radio is located on the tower or pole in order to minimize cable loss at the 5.3 or 5.8 GHz frequencies.

Q: What are the interfaces to the radio?

A: The BP Series of radios accepts coaxial DS3 interface or an RJ45 10/100 baseT connection.

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FMi 73/31

Model FMi 73 shown here

Features

- Operation modes of FM, FM + HD Radio, and HD Radio only
- Comes standard with the FXi 60 FM/HD Radio Digital Exciter
- Comes standard with the FSi 10 HD Radio Signal Generator
- Optional audio bypass operation to ensure integrity of analog audio path
- Solid-state RF modules
- True proportional VSWR foldback
- Direct to Channel digital frequency synthesis
- Frequency agile to cover the entire FM band
- HD Radio Only Power Range:
  - FMi 73: 100 – 280Watts
  - FMi 31: 50 – 140Watts
- FM + HD Radio Power Range:
  - FMi 73: 300 – 700Watts
  - FMi 31: 150 – 350Watts
- Full front panel functional control
- 640 x 480 color GUI interface for exciter and signal generator operation

The FMi 73 transmitter is a 700W FM + HD Radio and 280W HD Radio only solid-state transmitter. The FMi 31 is a 350W FM + HD Radio and 140W HD Radio only solid-state transmitter. Both transmitters come standard with the FXi 60 FM/HD Radio Digital Exciter and FSi 10 HD Radio Signal Generator for all your HD Radio needs. These transmitters are capable of switching between FM mode, HD Radio only mode, and FM + HD Radio mode with ease providing the most flexibility in the market today.

Broadcast Electronics is the leading manufacturer of HD Radio transmission products in the world. For efficient, cost-effective solutions, visit our web site or call your local Broadcast Electronics representative.

HD GUARANTEED Radio

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FMi 73/31

FMi 73/31 Specifications

GENERAL
RF Power Output Range:
HD Radio only: FMi 73: 100-280W; FMi 31: 50-140W
FM + HD Radio: FMi 73: 300-700W; FMi 31: 150-350W
Output Impedance: 50 ohms nominal
Output Connector: N Type Female
Overall Efficiency:
HD Radio only: >15%
FM+HD Radio: >35%
VSWR: Rated Power into 1.5:1 VSWR. Capable of operating in to higher VSWR with automatic power reduction. Open and short circuit protected at all phase angles.
Frequency Range: 87.5MHz to 108MHz; 100kHz increments
Frequency Stability:
Internal 10MHz Ref.: ±300Hz, 0-50 degrees C
External 10MHz Ref. (GPS): Determined by source
Modulation Capability: ±300kHz FM Mode
Modulation Modes: FM only, FM + HD Radio, and HD Radio only
Asynchronous AM S/N Ratio: 55dB below rated power with 100% AM at 400Hz and 75µsec de-emphasis (no modulation present)
Synchronous AM S/N Ratio: 50dB below rated power with 100% AM modulation at 400Hz and 75µsec de-emphasis (±75kHz modulation)
IMD Protection: 20dB or better turn-around loss or mixing loss to interfering signals
Spurious and Harmonic: Meets or exceeds all FCC requirements
Altitude: 10,000 ft. (3048M) @ 60Hz; 7,500 ft. (2286M) @ 50Hz
Cooling Air Requirement: 1000 CFM
Weight: FMi 73: 103lbs. unpacked; FMi 31: 75lbs. unpacked (without exciter)

AC INPUT
AC Voltage Requirement: 196 to 252VAC, 50/60Hz, Single Phase
Power Factor: 0.98 at 230VAC
Disconnect Size:
HD Radio only: FMi 73: 10A; FMi 31: 6A
FM + HD Radio: FMi 73: 20A; FMi 31: 15A

Actual Amperage draw at:
Single Phase:
HD Radio only: FMi 73: 4.5A average; FMi 31: 3.0A average
FM + HD Radio: FMi 73: 11A average; FMi 31: 6.0A average
AC Wire Size:
Single Phase: FMi 73: #12 AWG; FMi 31: #14 AWG
Power Consumption:
HD Radio only: FMi 73: 1,2+B800W @ 300W RF Output; FMi 31: 700W @ 140W RF Output
FM + HD Radio: FMi 73: 1,500W @ 700W RF Output; FMi 31: 800W @ 350W RF Output

FM AUDIO PERFORMANCE, AES INPUT, FM + HD Radio MODE
Input Level: -2dBFS for 100% modulation
Input Frequency: 32, 44.1, 48, or 96kHz; 16-24bits
Impedance: 110 ohms
Connector: Wire - XLR, Optical - TosLink
Amplitude Response: ±0.5dB; 20Hz to 15kHz
IMD Distortion: 0.03% or better
THD + Noise:
Stereo: 0.03% or better
Mono: 0.005% or better
S/N Ratio:
Stereo: 90dB or better below 100% modulation @ 400Hz; unweighted
Mono: 85dB or better below 100% modulation @ 400Hz; unweighted
Stereo Separation: 70dB; 20Hz to 15kHz
Pilot Stability: ±0.3Hz; 0-50 degrees C

INTERNAL SCAs (2)
Frequency: 20kHz to 99kHz software programmable
Deviation: 2.5kHz to 10kHz
Injection Level: 2% to 15%
Pre-Emphasis: 0, 50µsec, 75µsec, or 150µsec.

The FMi 73/31 comes standard with:

FXi 60 HD Radio and Analog FM Digital Exciter

FSi 10 HD Radio Signal Generator

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FMi 201/106

Model FMi 201 shown here

Features

- Operation modes of FM, FM + HD Radio, and HD Radio only
- Comes standard with the FXi 250 FM/HD Radio Digital Exciter
- Comes standard with the FSi 10 HD Radio Signal Generator
- Optional audio bypass operation to ensure integrity of analog audio path
- Solid-state RF modules
- Redundant power supplies
- True proportional VSWR foldback
- Direct to Channel digital frequency synthesis
- Frequency agile to cover the entire FM band
- HD Radio Only Power Range:
  - FMi 201: 500 – 840Watts
  - FMi 106: 200 – 560Watts
- FM + HD Radio Power Range:
  - FMi 201: 1,000 – 2,100Watts
  - FMi 106: 500 – 1,400Watts
- Full front panel functional control
- 640 x 480 color GUI interface for exciter and signal generator operation

HD GUARANTEED Radio

The FMi 201 transmitter is a 2.1kW FM + HD Radio and 840W HD Radio only solid-state transmitter. The FMi 106 is a 1.4kW FM + HD Radio and a 560Watt HD Radio only solid-state transmitter. Both transmitters come standard with the FXi 250 FM/HD Radio Digital Exciter and FSi 10 HD Radio Signal Generator for all your HD Radio needs. These transmitters are capable of switching between FM mode, HD Radio only mode, and FM + HD Radio mode with ease providing the most flexibility in the market today.

Broadcast Electronics is the leading manufacturer of HD Radio transmission products in the world. For efficient, cost-effective solutions, visit our web site or call your local Broadcast Electronics representative.

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FMi 201/106

FMi 201/106 Specifications

GENERAL

RF Power Output Range:
HD Radio only: FMi 201: 500-840W; FMi 106: 200-560W
FM + HD Radio: FMi 201: 1,000-2,100W; FMi 106; 500-1,400W
Output Impedance: 50 ohms nominal
Output Connector: 1 5/8" flange
Overall Efficiency:
HD Radio only: >20%
FM + HD Radio: >45%
VSWR: Rated Power into 1.5:1 VSWR. Capable of operating in to higher VSWR with automatic power reduction. Open and short circuit protected at all phase angles.
Frequency Range: 87.5MHz to 108MHz; 100kHz increments
Frequency Stability:
Internal 10MHz Ref.: ±300Hz, 0-50 degrees C
External 10MHz Ref. (GPS): Determined by source
Modulation Capability: ±300kHz FM Mode
Modulation Modes: FM only, FM + HD Radio, and HD Radio only
Asynchronous AM S/N Ratio: 55dB below rated power with 100% AM at 400Hz and 75µsec de-emphasis (no modulation present)
Synchronous AM S/N Ratio: 50dB below rated power with 100% AM modulation at 400Hz and 75µsec de-emphasis (±75kHz modulation)
IMD Protection: 20dB or better turn-around loss or mixing loss to interfering signals
Spurious and Harmonic: Meets or exceeds all FCC requirements
Altitude: 10,000 ft. (3048M) @ 60Hz; 7,500 ft. (2286M) @ 50Hz
Cooling Air Requirement: 1700 CFM
Weight: FMi 201: 260lbs. unpacked; FMi 106: 190lbs. unpacked (without exciter)

AC INPUT

AC Voltage Requirement: 196 to 252VAC, 50/60Hz, Single Phase
Power Factor: 0.98 at 230VAC
Disconnect Size:
HD Radio only: FMi 201: 40A; FMi 106: 25A
FM + HD Radio: FMi 201: 45A; FMi 106: 30A

Actual Amperage draw at:
Single Phase:
HD Radio only: FMi 201: 18A average; FMi 106: 12A average
FM + HD Radio: FMi 201: 21A average; FMi 106: 14A average
AC Wire Size:
Single Phase: FMi 201: #8 AWG; FMi 106: #8 AWG
Power Consumption:
HD Radio only: FMi 201: 3,800W @ 840W RF Output;
FMi 106: 2,800W @ 560W RF Output
FM + HD Radio: FMi 201: 4,200W @ 2,100W RF Output;
FMi 106: 3,500W @ 1,400W RF Output

FM AUDIO PERFORMANCE, AES INPUT, FM + HD Radio MODE

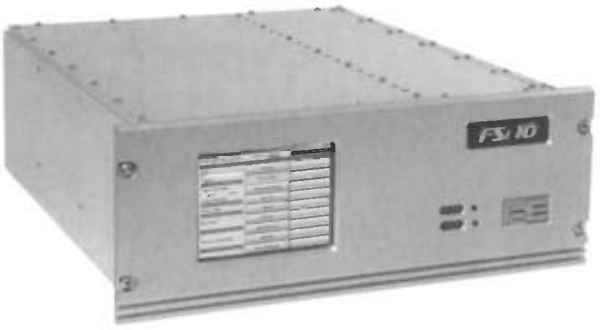
Input Level: -2dBFS for 100% modulation
Input Frequency: 32, 44.1, 48, or 96kHz; 16-24bits
Impedance: 110 ohms
Connector: Wire - XLR, Optical - TosLink
Amplitude Response: ±0.5dB; 20Hz to 15kHz
IMD Distortion: 0.03% or better
THD + Noise:
Stereo: 0.03% or better
Mono: 0.005% or better
S/N Ratio:
Stereo: 90dB or better below 100% modulation @ 400Hz; unweighted
Mono: 85dB or better below 100% modulation @ 400Hz; unweighted
Stereo Separation: 70dB; 20Hz to 15kHz
Pilot Stability: ±0.3Hz; 0-50 degrees C

INTERNAL SCAs (2)

Frequency: 20kHz to 99kHz software programmable
Deviation: 2.5kHz to 10kHz
Injection Level: 2% to 15%
Pre-Emphasis: 0, 50µsec, 75µsec, or 150µsec.

The FMi 201/106 comes standard with:

FXi 250 HD Radio and Analog FM Digital Exciter



FSi 10 HD Radio Signal Generator

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FMi 703

Features

- Operation modes of FM, FM + HD Radio, and HD Radio only
- Comes standard with the FXi 60 FM/HD Radio Digital Exciter
- Comes standard with the FSi 10 HD Radio Signal Generator
- Optional audio bypass operation to ensure integrity of analog audio path
- Hot-pluggable solid-state RF modules
- Redundant power supplies
- True proportional VSWR foldback
- Direct to Channel digital frequency synthesis
- Frequency agile to cover the entire FM band
- HD Radio Only Power Range: 1,250 to 2,800Watts
- FM + HD Radio Power Range: 3,000 to 7,000Watts
- Full front panel functional control
- 640 x 480 color GUI interface for exciter and signal generator operation

The FMi 703 transmitter is a 7kW FM + HD Radio and 2.8kW HD Radio only solid-state transmitter. The FMi 703 comes standard with the FXi 60 FM/HD Radio Digital Exciter and FSi 10 HD Radio Signal Generator for all your HD Radio needs. This transmitter is capable of switching between FM mode, HD Radio only mode, and FM + HD Radio mode with ease providing the most flexibility in the market today.

Broadcast Electronics is the leading manufacturer of HD Radio transmission products in the world. For efficient, cost-effective solutions, visit our web site or call your local Broadcast Electronics representative.

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FMi 703

FMi 703 Specifications

GENERAL

RF Power Output Range:
- *HD Radio Only:* 1000-3000W
- *FM + HD Radio:* 1000-7000W

Output Impedance: 50 ohms nominal
Output Connector: 3 1/8" EIA flange, 1 5/8" flange optional
Overall Efficiency:
- *HD Radio only:* >30%
- *FM + HD Radio:* >45%

VSWR: Rated power into 1.5:1 VSWR. Capable of operating in to higher VSWR with automatic power reduction. Open and short circuit protected at all phase angles.
Frequency Range: 87.5MHz to 108MHz; 100kHz increments
Frequency Stability:
- *Internal 10MHz Ref.:* ±300Hz, 0-50 degrees C
- *External 10MHz Ref. (GPS):* Determined by source

Modulation Capability: ±300kHz FM Mode
Modulation Modes: FM only, FM + HD Radio, and HD Radio only
Asynchronous AM S/N Ratio: 55dB below rated power with 100% AM at 400Hz and 75µsec de-emphasis (no modulation present)
Synchronous AM S/N Ratio: 50dB below rated power with 100% AM modulation at 400Hz and 75µsec de-emphasis (±75kHz modulation)
IMD Protection: 20dB or better turn-around loss or mixing loss to interfering signals
Spurious and Harmonic: Meets or exceeds all FCC requirements
Altitude: 10,000 ft. (3048M) @ 60Hz; 7,500 ft. (2286M) @ 50Hz
Cooling Air Requirement: 2700 CFM
Weight: 660lbs. standard unpacked

AC INPUT

AC Voltage Requirements:
- *3-Phase:* 196 to 252VAC, 50/60Hz, 3-phase, Closed Delta or WYE (3 or 4 wire); 340 to 435VAC, 50/60Hz, 3-phase, 4 wire, WYE only
- *Single Phase:* 196 to 252VAC, 50/60Hz, Single Phase

Power Factor: 0.98 at 230VAC
Disconnect Size:
- *3-Phase:*
- *HD Radio only:* 55Amp fuse disconnect recommended;
- *FM + HD Radio:* 70Amp fuse disconnect recommended
- *Single Phase:*
- *HD Radio only:* 80Amp fuse disconnect recommended;
- *FM + HD Radio:* 100Amp fuse disconnect recommended

Actual Amperage draw at:
- *3-Phase:*
- *HD Radio only:* 25A average
- *FM + HD Radio:* 35A average
- *Single Phase:*
- *HD Radio only:* 40A average
- *FM + HD Radio:* 60A average

AC Wire Size:
- *3-Phase:*
- *HD Radio only:* #6 AWG, copper, THHN or equivalent
- *FM + HD Radio:* #4 AWG, copper, THHN or equivalent
- *Single Phase:*
- *HD Radio only:* #3 AWG, copper, THHN or equivalent
- *FM + HD Radio:* #1 AWG, copper, THHN or equivalent

Power Consumption:
- *HD Radio Only:* 10kW @ 3kW RF output
- *FM + HD Radio:* 14kW @ 7kW RF output

FM AUDIO PERFORMANCE, AES INPUT, FM + HD Radio MODE

Input Level: -2dBFS for 100% modulation
Input Frequency: 32, 44.1, 48, or 96kHz; 16-24bits
Impedance: 110 ohms
Connector: Wire - XLR, Optical - TosLink
Amplitude Response: ±0.5dB; 20Hz to 15kHz
IMD Distortion: 0.03% or better
THD + Noise:
- *Stereo:* 0.03% or better
- *Mono:* 0.005% or better

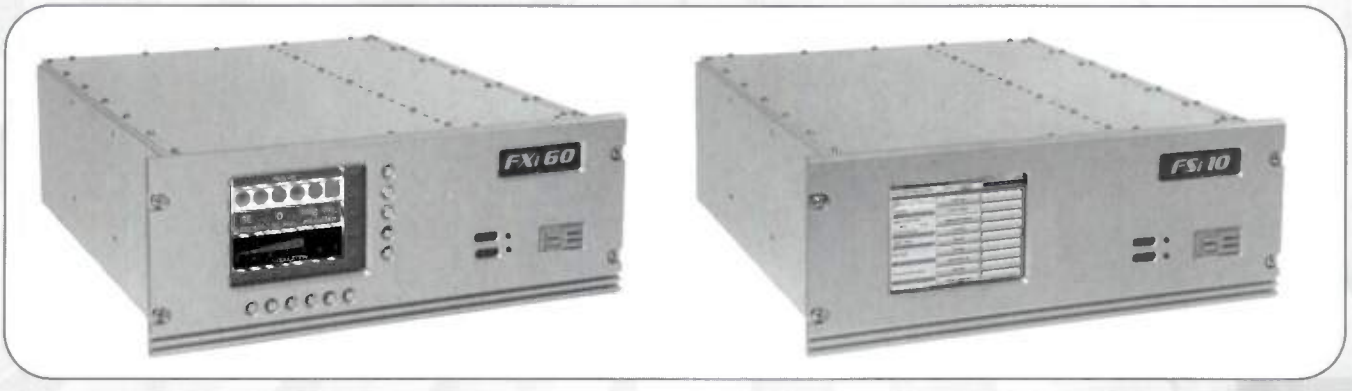
S/N Ratio:
- *Stereo:* 85dB or better below 100% modulation @ 400Hz; unweighted
- *Mono:* 90dB or better below 100% modulation @ 400Hz; unweighted

Stereo Separation: 70dB; 20Hz to 15kHz
Pilot Stability: ±0.3Hz; 0-50 degrees C

INTERNAL SCAs (2)

Frequency: 20kHz to 99kHz software programmable
Deviation: 2.5kHz to 10kHz
Injection Level: 2% to 15%
Pre-Emphasis: 0, 50µsec, 75µsec, or 150µsec.

The FMi 703 comes standard with:



FXi 60 HD Radio and Analog FM Digital Exciter

FSi 10 HD Radio Signal Generator

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FXi 60/250

Model FXi 60 shown here

Features

- Direct-to-channel (DTC) modulation – no analog up-conversion
- All inputs all the time – AES (wire or optical), L&R analog, composite and mono all standard
- HD Radio upgradeable – operational modes include FM only, HD Radio + FM, or HD Radio only
- 640 x 480 GUI interface provides ease of use and quick viewing of pertinent system information
- Universal input power supply with built-in power factor correction and high/low line detection

The FXi 60 from Broadcast Electronics is the first direct to channel FM exciter. The FXi 60 eliminates the need for analog up-conversion and the resultant noise and filtering requirements. The spurious emissions and noise associated with previous digital exciters are in the past. This technological break through offers more input flexibility than any other exciter available. The FXi 60 and its higher power version, the FXi 250, can accept AES/EBU wired or optical, left and right analog, balanced and unbalanced composite or mono inputs all as standard. The FXi 60 and FXi 250 have two internal SCA generators as standard equipment, as well as a basic internal RDS code. The FXis can also accept externally generated SCAs or RDS. HD Radio installations can also be accommodated with the use of an optional plug-in HD Radio interface board. This board allows the FXi exciters to be used as HD Radio only, HD Radio + FM or FM only. This flexibility will allow implementation of HD Radio now, or whenever it is appropriate. There is no need to wait any longer to see what new developments will be made; the FXi series exciters are all you will need.

HD GUARANTEED Radio

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FXi 60/250

FXi 60/250 Specifications

GENERAL

RF power Output:
60W: 5-60W
250W: 25-250W
Output Impedance: 50 ohms nominal
VSWR: Rated power (60 or 250W) into 1.5:1 VSWR. Open and short circuit protected at all phase angles.
Frequency Range: 87.5 MHz to 108 MHz; 100kHz increments, 10kHz when specified
Frequency Stability:
Internal TCXO: ±300Hz, -10C to +50C
External Output: ± accuracy of reference source
Audio Inputs: AES (wire & optical), L&R analog, composite, SCA/RBDS/RDS external generator input, SCA audio inputs (2); two internal SCA generators, internal RBDS/RDS generator
Modulation Type: Direct-to-channel digitally generated FM (no analog up-conversion); FM only, HD Radio only, or HD Radio + FM.
Modulation Capability: Up to 300kHz
Asynchronous AM S/N Ratio: 80dB below rated power reference carrier with 100% AM modulation at 400Hz, 75 ìsec de-emphasis with no FM modulation present
Synchronous AM S/N Ratio: 60dB below rated power reference carrier with 100% AM modulation at 400Hz, 75ìsec de-emphasis with FM modulation ±75kHz at 400Hz
Spurious and Harmonic: 85dB or better; low pass filter standard
AC Input: 90 to 264VAC; 47-63Hz
Power Factor: 0.98 or better
Surge Protection: Tested with IEEE C62.41-1991 recommended waveforms for location category B3 and IEC 801-4 standard waveforms for severity level 4
Regulatory: FCC; DOC, CE; CCIR; IEC 215 Safety

ENVIRONMENTAL

Temperature Range: -10° C to +50° C
Altitude: 10,000 ft. (3048M)
Humidity: 95% maximum; non-condensing

STEREO PERFORMANCE

Operational Modes: Stereo, mono (L+R), L only, R only
Input Level:
AES: -2dBfs for 100% modulation; 16-24 bits (32, 44.1, 48 or 96kHz typical rates for AES/EBU devices)
L&R: +10dBm for 100% modulation into 600 ohms
Impedance:
AES: 110 ohms balanced
L&R: 600 ohms or 10k selectable; balanced
Connector:
AES: Wire – XLR, Optical – Toshiba (TosLink)
L&R: XLR
Amplitude Response: ±0.5dB, 20Hz to 15kHz
THD+Noise: 0.03% or better
IMD Distortion: 0.03% or better
S/N Ratio: 85dB or better below 100% modulation @ 400Hz
Stereo Separation: 70dB, 20Hz to 15kHz
Linear Crosstalk: 70dB below 100% modulation; 20Hz to 15kHz; main to sub and sub to main
Pilot Stability: ±0.3Hz, 0° C to 50° C
Audio Overshoot: 2dB max
38, 57, 76, and 95kHz Suppression: 80dB below 100% modulation

COMPOSITE PERFORMANCE

Input Level: 3.5V p-p for 100% modulation into 10k ohms
Impedance:
Balanced: 10k ohms or 50 ohms selectable
Unbalanced: 10k ohms
Connector:
Balanced: BNC
Unbalanced: BNC
Amplitude Response: ±0.01dB; 20Hz to 53kHz; 0.1dB; 53kHz to 99kHz
Phase Response: ±0.1° from linear phase; 53kHz to 100kHz
THD + Noise: 0.005% or less
IMD Distortion: 0.005% or less
FM S/N Ratio: 90dB below 100% modulation @ 400Hz

MONO PERFORMANCE

Operational Modes: Mono (L+R), L only, R only
Input Level: 3.5V p-p for 100% modulation into 600 ohms
Impedance: 600 ohms or 10k ohms selectable
Connector: XLR
Amplitude Response: ±0.5dB; 20Hz to 15kHz
THD + Noise: 0.05% or less; 20Hz to 15kHz
IMD Distortion: 0.05% or less, 20Hz to 15kHz
FM S/N Ratio: 90dB below 100% modulation @ 400Hz

SCA 1&2 PERFORMANCE (INTERNAL)

Input Level: +10dB for 10% modulation into 600 ohms
Impedance: 600 ohms or 10k ohms selectable
Connector: D-Sub 9-position female
Amplitude Response: ±0.5dB; 20Hz to 7kHz
S/N Ratio: 60dB or better
Frequency: 20kHz to 99kHz; software programmable
Deviation: 2.5 to 10kHz; software programmable
Injection Level: 2 to 15%; software programmable

RBDS/RDS PERFORMANCE (INTERNAL)

Frequency: 57kHz
Injection Level: 2 to 15%; software programmable

SCA/RBDS/RDS (EXTERNAL)

Input Level: 3.5V p-p for 10% deviation
Impedance: 10k ohms unbalanced
Connector: BNC
Amplitude Response: ±0.5dB; 20Hz to 100kHz
19kHz Output: 19kHz synchronization clock for external RBDS/RDS operation 2.5V p-p into 50 ohms

PHYSICAL

Height: 7 inches
Width: 19" EIA rack mountable
Depth: No rear rails required – fits into 24" deep rack
Airflow: Intake and exhaust through back of unit
Weight: 38 lbs. unpacked

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FMi 1405

Features

- Operation modes of FM, FM + HD Radio, and HD Radio only
- Comes standard with the FXi 60 FM/HD Radio Digital Exciter
- Comes standard with the FSi 10 HD Radio Signal Generator
- Optional audio bypass operation to ensure integrity of analog audio path
- Solid-state RF modules
- Redundant power supplies
- True proportional VSWR foldback
- Direct to Channel digital frequency synthesis
- Frequency agile to cover the entire FM band
- HD Radio Only Power Range: – 2,000 – 5,600Watts
- FM + HD Radio Power Range: – 6,000 – 14,000Watts
- Full front panel functional control
- 640 x 480 color GUI interface for exciter and signal generator operation

The FMi 1405 transmitter is a 14kW FM + HD Radio and 5.6kW HD Radio only solid-state transmitter. This transmitter comes standard with the FXi 60 FM/HD Radio Digital Exciter and FSi 10 HD Radio Signal Generator for all your HD Radio needs. This transmitter is capable of switching between FM mode, HD Radio only mode, and FM + HD Radio mode with ease providing the most flexibility in the market today.

Broadcast Electronics is the leading manufacturer of HD Radio transmission products in the world. For efficient, cost-effective solutions, visit our web site or call your local Broadcast Electronics representative.

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FMi1405

FMi 1405 Specifications

GENERAL

RF Power Output Range:
- *HD Radio only:* 2,000 - 5,600W
- *FM + HD Radio:* 6,000 - 14,000W

Output Impedance: 50 ohms nominal
Output Connector: 3 1/8" EIA flange
Overall Efficiency:
- *HD Radio only:* >30%
- *FM + HD Radio:* >55%

VSWR: Radio Power into 1.4:1 VSWR . Capable of operating in to higher VSWR with automatic power reduction. Open and short circuit protected at all phase angles.
Frequency Range: 87.5MHz to 108MHz; 100kHz increments
Frequency Stability:
- *Internal 10MHz Ref.:* ±300Hz, 0-50 degrees C
- *External 10MHz Ref. (GPS):* Determined by source

Modulation Capability: ±300kHz FM Mode
Modulation Modes: FM only, FM + HD Radio, and HD Radio only
Asynchronous AM S/N Ratio: 55dB below rated power with 100% AM at 400Hz and 75µsec de-emphasis (no modulation present)
Synchronous AM S/N Ratio: 50dB below rated power with 100% AM modulation at 400Hz and 75µsec de-emphasis (±75kHz modulation)
IMD Protection: 20dB or better turn-around loss or mixing loss to interfering signals
Spurious and Harmonic: Meets or exceeds all FCC requirements
Altitude: 10,000 ft. (3048M) @ 60Hz; 7,500 ft. (2286M) @ 50Hz
Cooling Air Requirement: 2700 CFM
Weight: 1350lbs. standard unpacked

AC INPUT

AC Voltage Requirement:
- *3-Phase:* 196 to 252VAC, 50/60Hz, 3-phase, Closed Delta or WYE (3 or 4 wire); 340 to 435VAC, 50/60Hz, 3-phase, 4 wire, WYE only
- *Single Phase:* 196 to 252VAC, 50/60Hz, Single Phase

Power Factor: 0.98 at 230VAC
Disconnect Size:
- *3-Phase:*
- *HD Radio only:* 55Amp fuse disconnect recommended, per cabinet
- *FM + HD Radio:* 70Amp fuse disconnect recommended, per cabinet
- *Single Phase:*
- *HD Radio only:* 80Amp fuse disconnect recommended, per cabinet
- *FM + HD Radio:* 100Amp fuse disconnect recommended, per cabinet

Actual Amperage draw at:
- *3-Phase:*
- *HD Radio only:* 25A average, per cabinet
- *FM + HD Radio:* 35A average, per cabinet
- *Single Phase:*
- *HD Radio only:* 40A average, per cabinet
- *FM + HD Radio:* 60A average, per cabinet

AC Wire Size:
- *3-Phase:*
- *HD Radio only:* #6 AWG, Copper, THHN or equivalent
- *FM + HD Radio:* #4 AWG, Copper, THHN or equivalent
- *Single Phase:*
- *HD Radio only:* #3 AWG, Copper, THHN or equivalent
- *FM + HD Radio:* #1 AWG, Copper, THHN or equivalent

Power Consumption:
- *HD Radio only:* 18kW @ 5.6kW RF output
- *FM + HD Radio:* 26kW @ 14kW RF output

FM AUDIO PERFORMANCE, AES INPUT, FM + HD Radio MODE

Input Level: -2dBFS for 100% modulation
Input Frequency: 32, 44.1, 48, or 96kHz; 16-24bits
Impedance: 110ohms
Connector: Wire - XLR, Optical - TosLink
Amplitude Response: ±0.5dB; 20Hz to 15kHz
IMD Distortion: 0.03% or better
THD + Noise:
- *Stereo:* 0.03% or better
- *Mono:* 0.005% or better

S/N Ratio:
- *Stereo:* 85dB or better below 100% modulation @ 400Hz; unweighted
- *Mono:* 90dB or better below 100% modulation @ 400Hz; unweighted

Stereo Separation: 65dB; 20Hz to 15kHz
Pilot Stability: ±0.3Hz; 0-50 degrees C

INTERNAL SCAs (2)

Frequency: 20kHz to 99kHz software programmable
Deviation: 2.5kHz to 10kHz
Injection Level: 2% to 15%
Pre-Emphasis: 0, 50µsec, 75µsec, or 150µsec.

The FMi 1405 comes standard with:

FXi 60 HD Radio and Analog FM Digital Exciter

FSi 10 HD Radio Signal Generator

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HD GUARANTEED Radio

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FMi1405

FMi 1405 Specifications

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RF Power Output Range:
- *HD Radio only:* 2,000 - 5,600W
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Output Impedance: 50 ohms nominal
Output Connector: 3 1/8" EIA flange
Overall Efficiency:
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IMD Protection: 20dB or better turn-around loss or mixing loss to interfering signals
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Altitude: 10,000 ft. (3048M) @ 60Hz; 7,500 ft. (2286M) @ 50Hz
Cooling Air Requirement: 2700 CFM
Weight: 1350lbs. standard unpacked

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- *3-Phase:* 196 to 252VAC, 50/60Hz, 3-phase, Closed Delta or WYE (3 or 4 wire); 340 to 435VAC, 50/60Hz, 3-phase, 4 wire, WYE only
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FM AUDIO PERFORMANCE, AES INPUT, FM + HD Radio MODE

Input Level: -2dBFS for 100% modulation
Input Frequency: 32, 44.1, 48, or 96kHz; 16-24bits
Impedance: 110ohms
Connector: Wire - XLR, Optical - TosLink
Amplitude Response: ±0.5dB; 20Hz to 15kHz
IMD Distortion: 0.03% or better
THD + Noise:
- *Stereo:* 0.03% or better
- *Mono:* 0.005% or better

S/N Ratio:
- *Stereo:* 85dB or better below 100% modulation @ 400Hz; unweighted
- *Mono:* 90dB or better below 100% modulation @ 400Hz; unweighted

Stereo Separation: 65dB; 20Hz to 15kHz
Pilot Stability: ±0.3Hz; 0-50 degrees C

INTERNAL SCAs (2)

Frequency: 20kHz to 99kHz software programmable
Deviation: 2.5kHz to 10kHz
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BIG PIPE

Next Generation Media Transport

High Bandwidth Studio-Transmitter Media Transport
This is not your father's STL.
While existing wireless and terrestrial studio-to-transmitter links (STL) will remain an appropriate program and data transport choice for many, collocation and other factors demand more efficient solutions with greater bandwidth.

With Big Pipe's bi-directional capabilities up to a whopping 45 Mbps, you can interchange analog and digital audio, HD Radio data, Ethernet, serial data, video, and telephony via a wireless or wireline path. The bi-directional link eliminates the need for separate telemetry, communications, and RPU backhaul links. Scalable, flexible, and reliable, Big Pipe works just as well for studio facility interconnects and many other media transport needs.

Big Pipe simplifies integration among the mission-critical, high-value elements of your facilities and, because it comes from BE, you know that Big Pipe is designed for the realities of radio, including tight budgets and rock solid performance.

One product for all of your content and data needs
The modular structure of Big Pipe allows you to confidently buy the equipment you need today, while reducing the risks of rapid obsolescence or unpredictable expenses in the future. Its wide bandwidth makes it the perfect candidate for all point-to-point applications where increased capacity and maximum flexibility is desired. The 45 Mbps bandwidth has the capability to deliver your main channel audio at a full 44.1 kHz or 48 kHz sampling rate, HD coded audio, HD secondary audio, and HD advanced data services for multiple transmitters—while still providing Ethernet connectivity, serial data, and telephone connections to your remote site.

KEY PRODUCT FEATURES

- Scalable and flexible to meet your studio-to-transmitter, studio-to-studio, and any other media transport needs.
- Module design allows for maximum flexibility and configurability.
- Network Access Units (NAUs) available in DS3 (45Mbps coaxial), OC-3c (155Mbps fiber), or OC-12c (622Mbps fiber)
- Service Interface Modules (SIMs) for audio, video, telephone, serial, and SMPTE to suit your applications
- Audio inputs for AES or Analog L & R
- Ethernet connectivity for HD Radio Advanced Applications Services for data
- Hot-pluggable modules for easy installation, upgrades, or repair without service interruption
- 45Mbps bi-directional point-to point radios for wireless applications
- Radios are user software selectable for DS3 or 10/100BaseT Ethernet modes and are available in the 5.3GHz UNII band or 5.8GHz ISM band

BIG PIPE: Next Generation Media Transport

Integrated Network Terminal

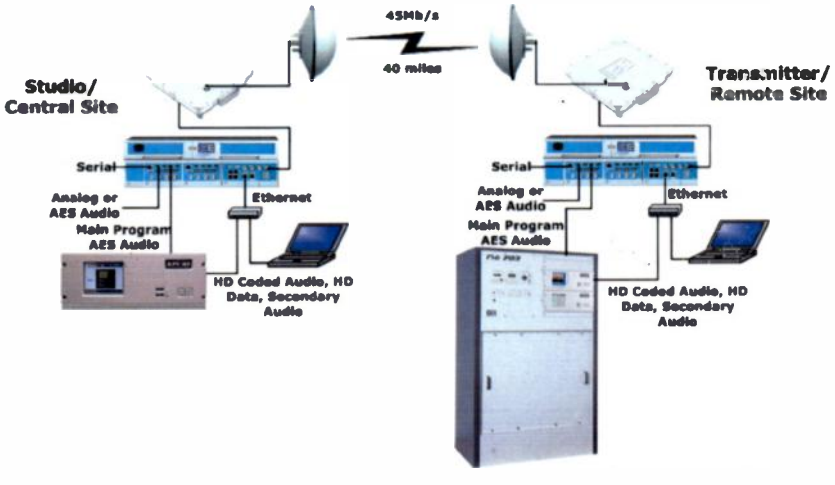
Content, data, and network interconnected to the Big Pipe are managed by the BP 400 INT. This modular chassis is configured by incorporating:

- Service Interface Modules (SIMs) for audio, video, telephone, and SMTPE timecode to suit your applications.
- Network Access Units (NAUs) for 45 Mbps interface to a network or wireless radio via coax. An NAU is also available for fiber networks.

The BP 400 INT interfaces with Ethernet switches, routers, ATM switches, and SONET/SDH ADMs, supporting a number of network configurations. Based on its quality of service, hot-swappable architecture, the BP 400 INT scales to support multiple DS1/E1s, LANs, telemetry ports, bi-directional compressed or uncompressed audio and video channels, DS3c ATM service interfaces or mixed combinations of these services in the same chassis.

Digital Microwave Radios

The BP Series is a line of high capacity, point-to-point microwave radios supporting up to 45 Mbps full-duplex bandwidth. The BP Series radios operate in license-free bands allowing operators to select transmission in the 5.3 GHz UNII band reaching up to 7 miles or the 5.8 GHz ISM band reaching up to 40 miles. Available either with an integral antenna or an external antenna connector, radios include software-selectable DS3 and 10/100BaseT interfaces.



REVISIONS:

4/5/04:
Original

COMPLEMENTARY EQUIPMENT:

BP 4500 45 Mbps Point-to-Point Digital Microwave Radio
BP 3400 34 Mbps Point-to-Point Digital Microwave Radio
BP 800 8 Mbps Point-to-Point Digital Microwave Radio
BP 600 6.5 Mbps Point-to-Point Digital Microwave Radio
BP 400 INT Integrated Network Terminal Chassis
BP 400 DS3 NAU DS3 Network Access Unit
BP 400 AVSIM Audio and Video Service Interface Module
BP 400 FXSIM Telephone Service Interface Module
BP 4C0 SMPTE310 Service Interface Module

FMi 1405 14kW FM + HD Radio/5 6kW HD only
FMi 703 7kW FM + HD Radio/2.8kW HD only
FMi 402 3 5kW FM + HD Radio/1 5kW HD only
FMi 301 2 8kW FM + HD Radio/1 2kW HD only
FMi 201 2.1kW FM + HD Radio/840W HD only
FMi 106 1 4kW FM + HD Radio/560W HD only
FMi 73 700W FM + HD Radio/280W HD only
FMi 31 350W FM + HD Radio/140W HD only
ASi 10 AM HD Signal Generator
FSi 10 FM HD Signal Generator
FXi 60/250 FM/HD Exciter
XPi 10 Exporter for HD Radio Data Applications

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BP 400 DS3NAU

DS3 Network Access Unit

BP 400 DS3NAU

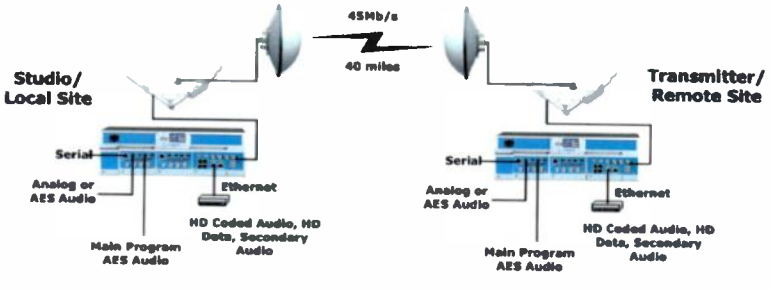
The DS3 network access unit is installed in the BP 400 INT to define the network interface for DS3 ATM applications. This module can connect directly to a DS3 network or to the BP 4500/3400 wireless radios for STL applications.

The network is configured at the DS3 physical level. BE's NAU supports ATM adaptation of IP and TDM, aggregation, multiplexing, and complete switching of ATM connections. ATM switching functions are supported by an onboard full-featured ATM switch. This engine supports ATM QoS on a per connection basis.

DS3 - VLAN - 10 / 100BT - DS1

Additionally, the DS3 NAU includes one 10/100BT and four DS1 service interfaces. The 10/100BT service port provides Ethernet over ATM functionality, as well as VLAN support with explicit rate controls for each connection. This capability makes it ideal for HD Radio applications. The TDM section provides four DS1 service ports that implement circuit emulation for ATM network migration. Each DS1 port provides additional n x 64K TDM switching and grooming capablity.

The DS3 NAU allows for service expansion via its internal control interface. When installed in the BP 400 chassis, the DS3 NAU will interface with any Broadcast Electronics "Service Interface Modules" (SIM) to aggregate and switch SIM traffic.



KEY PRODUCT FEATURES

- Dual ATM ports at the DS3 level
- Integrated, full-featured ATM switch
- One integral 10/100BT service port
- Four integral DS1 TDM service ports
- Integrated loopbacks and alarming
- User-friendly, web-browser type "Local Craft Interface"
- GUI and SNMP control (Graphic User Interface) provide excellent:
  - Monitoring
  - Alarms
  - Set-up
  - Maintenance

SPECS: BP 400 DS3NAU DS3 Network Access Unit

FEATURES

Applications
- ATM traffic termination
- LAN traffic termination
- Interworking

ATM Traffic Classes
- CBR.1
- VBR.1
- UBR.1

Connection Types
- PVC
- PVP
- SVC

Number of Connections
- 64K Logical
- 600 Physical

Service Class Parameters
- PCR
- SCR
- CDVT
- MBS

Per Connection Statistics, Ingress And Egress
- Total, maximum cells
- CLPO, CLPO+1 discards
- EPD, PPD discardS
- Tagged or dropped
- CRC, parity, checksum
- ATM error headers

OAM Support
Bi-directional F4/F5 per I 610

Performance Monitoring
PM per I 356

TECHNICAL SPECIFICATIONS

DS3 ATM Port
Density - 2 ports per module
Connector - 75 ohm BNC

Synchronization
- Network timing
- Loop timing
- Internal timing
- PLCP
- BITS (DS1 service ports)

Mapping
- Direct
- PLCP

10/100BT Service Port
Density - 1 port per module
Connector - RJ45
Service - RFC 1483/2684 MPOA over AAL5
VPN - 24 PN with explicit rate control and policing,
802 1q trunking

DS1 TDM service port
Density - 4 ports per module
Connector - RJ45
Se

TECHNICAL SPECIFICATIONS CONTINUED

Mapping - Structured, N X 64k
Synchronization -
- Recovered Timing from DS1 or DS3 PLCP
- Internal Timing

Expansion Port
Density - 2 SIMs per chassis
Connector - Backplane
Service - ATM

10BT Management Port
- Density - 1 port per module
- Connector - RJ45

Remote Operation -
All relevant alarms and statistics are available remotely via web-based browser interface.

Element Management System
The NAU can be remotely managed through the BE Access Management System (BEAMS). BEAMS provides complete service provisioning, fault and performance management and software administration capabilites

Physical Dimensions
3 1"(H) x 6 3"(W) x 9 5"(D)

Environmental Operation
0 to +50 Celsius (32F to 122F), 5% to 90% Humidity (N C.) when installed in TW 400 Chassis

Storage
-40 to 70 Celsius (40F to 158F), 5% to 90% Humidity N C)

Altitude
Up to 10,000 feet (3,300 Meters)

Regulatory Compliance
- ANSI-FCC Part 15 Class A
- ANSI/UL 1950, third edition CSA C22.2 No. 950-95

REVISIONS:

4/5/04:
Original

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BP 400 AVSIM

Audio/Video Service Interface Module

Full Bi-Directional Audio and Video Transport Over DS3 or LAN

BP 400 AVSIM

The AVSIM service interface module installs into the BP 400 INT chassis and provides bi-directional transmission of real time audio/video signals. A single BP 400 AVSIM can provide two AES stereo channels and analog L&R channel uni-directional or L&R analog audio bi-directional, or two L&R analog audio channels uni-directional. This capacity can be doubled simply by adding another VSIM into the BP 400 INT chassis. This flexibility makes it perfiect for your standard or HD STL needs.

The Encoder Engine

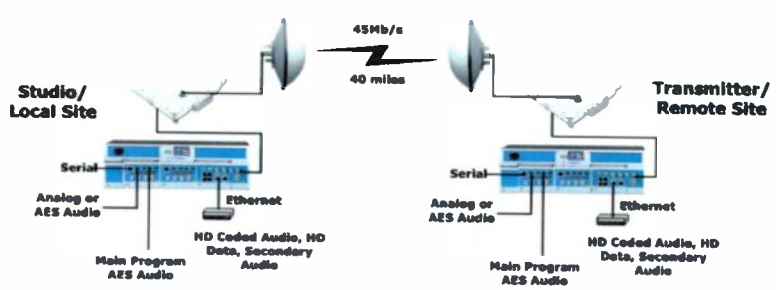
The encoder engine of the AVSIM sends a linear audio source in a bi-directional fashion in either analog or AES fashion. NTSC, PAL or SDI video signal uses the industry standard of MPEG-2 compression algorithm and encapsulates it for transport. The independent AVSIM Video MPEG decoder reconstructs the composite or SDI video signals. The AVSIM can also accept DVB-ASI streams for WAN transport. The AVSIM MPEG decoder may also be used as an integrated real time MPEG monitor of the source DVB-ASI stream.

Industry Standard Soultions

The AVSIM implements industry standard encapsulation methods for ATM, IP, and DVB-ASI WAN transport, allowing interworking with industry standard platforms. The AVSIM also supports transcoding between the various base band audio/video, compressed streams and protocol formats. Finally, via RFC 2684 encapsulation, the AVSIM supports IP-based encoding/decoding for transport over ATM networks.

Flexibility with Control

The AVSIM is interchangeable across Broadcast Electronics INT and ONT product platforms, allowing use in IP, ATM, SONET and/or Passive Optical Networking (PON) environments. Audio / Video service delivery is further simplified with Broadcast Electronics Access Management System (BEAMS); This provides a centralized service provisioning along with fault and performance management.



KEY PRODUCT FEATURES

- Broadcast quality audio and video
- 2 AES stereo channel and one L&R channel uni-directional
- Hot-pluggable into BP 400 INT chassis
- Supports analog & AES digital audio
- Supports composite video processing (NTSC, PAL), SDI, and DVB-ASI video formats
- Available with auxiliary Ethernet port for node monitor or RS-232 port for ancillary controls

SPECS: BP 400 AVSIM Audio/Video Service Interface Module

FEATURES

Applications
- Digital headend integration
- Broadcast
- Surveillance
- IDL, video conferencing

Video
- Composite (NTSC, PAL)
- SDI
- DVB-ASI

Audio
- Analog
- Digital (AES)

Compressed Video
Format: MPEG-2 TS, MP@ML
Sampling: 4:2:0
Bit Rates: 1 – 15 MB/S
GOP: I, IP, IPB, Variable length

Compressed Audio
Format:
- MPEG 1 Layer 2
- Linear SMPTE 302M

Sampling: 48K, 44 1K, 32K
Bit Rates: 192KB/S, 384KB/S

Protocol Support
- J.82 AAL1 w/FEC
- J 82 AAL1 W/O FEC
- J 82 AAL5
- UDP/IP
- RFC 2684 [IPOATM]

Remote Operation
All relevant alarms and statistics are available remotely via a Web-based browser interface

TECHNICAL SPECIFICATIONS

Video Input Ports
Density - 2, Source selectable
Impedance - 75Ω Unbalanced
Connector - BNC
Type - Composite or SDI

Video Output Ports
Density - 2 Ports
Impedance 75Ω Unbalanced
Connector - BNC
Type - Composite or SDI Comp.Video

Format - NTSC, PAL

I/O Level - 1 Volt P-P Nominal

Timing Sources
- External composite video
- External SDI video
- Internal timing reference
- MPEG recovered clock

TECHNICAL SPECIFICATIONS CONTINUED

DV I/O Level - 800 MV ± 10%
Interface - ITU-R BT.656

Analog Audio Input Ports
Density - 1 Stereo 2 mono
Impedance - >10 K OHMS/ 600 OHMS
Connector - Screw terminal

Analog Audio Output Ports
Density - 2 Mono or 1 stereo
Impedance - < 25 OHMS

I/O Level - +21DBM Clipping

Echo Cancellation: Built-in
Digital Audio Ports - 4 stereo
Interface - SMPTE 259M
Format - Embedded

Compression –
MPEG-2 L1 (2 channels)
SMPTE 302M (2 channels)

DVB/ASI Ports
Density - 1 Input/output, redundant
Impedance: 75Ω Unbalanced
Connector - BNC
Interface - EN 50083-9
Packet Size - 188, 204 W/FEC
FEC - 204/188 PER EN 300 429

Ethernet Port [10096]
Density - 1
Connector - RJ48
Interface: 10BaseT

RS-232 Port [10068]
Density - 1
Connector RJ48

Element Management System
The AVSIM can be remotely managed through the Broadcast Electronics Access System (BEAMS) that provides complete service provisioning, fault and performance management and software administration capabilities

Physical Dimensions
1.75"(H) X 17"(W) X 9.5"(D)

Environmental
0° C to 50° C (32° F to 122° F)
5% to 90% Humidity (N.C.)

Regulatory Compliance
- ANSI
- UL/C-UL
- FCC Part 15, Class B, CE

Ordering Information
BP10096-01 – Video service interface module with RS232 auxiliary port
BP10096-01 – Video service interface module with ethernet auxiliary port

REVISIONS:

4/5/04:
Original

COMPLEMENTARY EQUIPMENT:

BP 4500 45 Mbps Point-to-Point Digital Microwave Radio
BP 3400 34 Mbps Point-to-Point Digital Microwave Radio
BP 800 8 Mbps Point-to-Point Digital Microwave Radio
BP 400 INT Integrated Network Terminal Chassis
BP 400 DS3NAU DS3 Network Access Unit
BP 400 AVSIM Audio and Video Service Interface Module
BP 400 FXSIM Telephone Service Interface Module
BP 400 SMPTE310 SMPTE 310 Service Interface Module

Broadcast Electronics, Inc. • 4100 North 24th Street, P.O. Box 3606, Quincy, Illinois 62305-3606 U.S.A.
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BP 400 INT

Integrated Network Terminal

A Modular Strategy is the Key

The BP 400 INT chassis allows flexibility and scalability to meet all your needs for today's and tomorrow's STL. This Integrated Network Terminal (INT) is modular by design and allows configurations with multiple Service Interface Modules (SIMs) and Network Access Units (NAUs).

The NAU plug-in module defines the network interface for the BP-400. Available options include the BP 400 DS3NAU DS3/E3 network interface that allows 45 Mbps for interfacing to a network or wireless radio via coax. In addition, the BP 400 INT will accommodate the BP 400 OC12 and BP 400 OC3 NAU for fiber network interfaces.

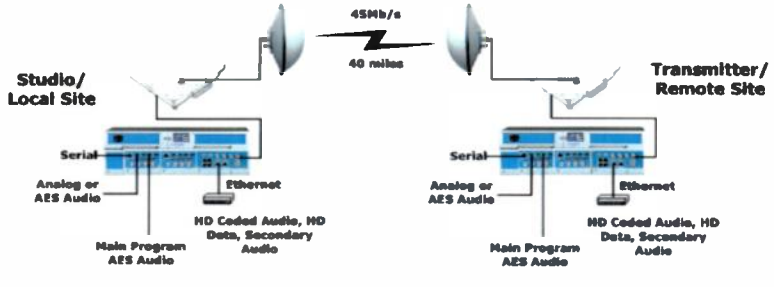
The SIM plug-in modules define the service interface and include Audio/Video SIM (BP 400 AVSIM), Telephone interface (BP 400 FXSIM), and even a SMPTE 310 SIM for HDTV applications (BP 400 SMPTE310).

Flexibility/Scalability Enable a Cost-Effective Future

Incorporating a multi-gigabit backplane, the BP 400 INT is capable of processing multiple high bandwidth service input signals, including uncompressed audio and video. Its flexibility allows utilization in a variety of configurations, supporting multiple applications. With full policing and shaping functionality, the BP 400 can interface to other Big Pipe products, other commercial IADs, Ethernet Switches, Routers, ATM Switches or SONET/SDH ADMs. It supports several network configurations including linear point-to-point, multicast Drop & Continue, daisy chain, and 1+1 path protected.

Simplified Operation and Maximized Reliability

Based on its Quality of Service (QoS), hot-swappable architecture, the BP 400 INT scales to support multiple DS1/E1s, LANs, telemetry ports, bi-directional compressed or uncompressed audio and video channels, DS3c ATM service interfaces or mixed combinations of these services in the same chassis. With local craft management and in-band remote management, the BP 400 INT features rapid point-and-click control and service provisioning. This feature enables remote monitoring, performance management and fault indication with ease. Additionally, with a CORBA interface and SNMP, the BP 400 can be integrated into legacy OSS systems. "Plug N Play" solutions with total flexibility for tomorrow's broadcaster.



KEY PRODUCT FEATURES

- Supports high bit rate audio video, data, voice and telemetry services
- Carrier-class design with field-replaceable fan tray and power supply
- Quality of Service (QoS)-enforced gigabit backplane accomodates multiple uncompressed audio and video channels or multiple Fast Ethernet/IP
- Plug-and-Play Service Interface Modules (SIMs): AVSIM, POTSIM, SMPTE-310, others on request
- Interchangeable Interface Modules with Broadcast Electronics "Big Pipe" equipment platform
- Network Interface Units (NAUs): DS3/E3, OC-12c/STM-4, or OC-3c/STM1

SPECS: BP 400 INT Integrated Network Terminal

FEATURES

Flexible Architecture
Enables Low-cost Service Delivery

The BP 400 Integrated Network Terminal (INT) is a modular platform designed for expansion without disruption of existing services. The hot-swappable service interface modules provide a wide range of TDM, ATM, and IP service interfaces. The high bandwidth capable BP 400 INT is designed to NEBS Level 3 and ETSI Class 3.2 standards, supporting both point-to-point, as well as point-to-multipoint environments

BP-400-INT Features:

- TDM: Service by AAL1 CES
- Ethernet/IP: RFC1483/2684 MPOA over AAL5
- VLAN: 802.1Q Trunking
- Audio/Video/Telemetry Services
- SVC Support
- Multicast Support
- In or Out-of-Band Management
- Trunk-to-Trunk Switching
- Daisy chain chassis

Management System

The comprehensive, integrated Broadcast Electronics Access Management System (BEAMS) supports BE's entire family of access products with fault, performance, configuration and service management, along with software administration capabilities for all nodes in any network configuration. This intuitive, web-based platform incorporates an advanced architecture written in Java utilizing CORBA application programming interfaces (APOIs)

TECHNICAL SPECIFICATIONS

Common Characteristics

Shelf Capacity

- 3 Frame Slots
- (1 Shelf Master, 2 Universal)
- Master slot supports all Broadcast Electronics NAU & PAU
- Universal Slot supports Subscriber Interface Modules
- 2 Gbit/sec backplane

Network Interfaces (NAU)

- 2 x DS3c/E3c UNI: co-axial electrical interface
- 2 x OC-3c/STM-1c UNI SM IR (1310nm) or LR (1550nm) fiber connections
- 2 x OC-12c/STM-4c UNI: SM IR (1310nm) fiber
- 1+1 Protection opt. on interfaces

TECHNICAL SPECIFICATIONS CONTINUED

Service Interfaces

- TDM structured or unstructured DS1, E1 (CES)
- ATM: Clear Channel DS3c
- IP: 10/100 BaseT, 802.1Q VLAN
- FR: DS1/E1 transport
- LAN: 10/100 BaseT
- VIDEO. NTSC/PAL/SDI
- TELEMETRY: TTL, ECL, RS-232, RS-530, RS422, V.35, HSSI

INT Capacity

Max 20 DS1/E1 interfaces
Max 9 10/100 BaseT LAN
2 DS3c ATM interfaces
2 TSIM (Telemetry Service Interface Modules)
2 VSIM (Video Service Interface Modules)
(various combinations of above)

Physical

5 25"(H) x 17 25"(W) x 11 03"(D)
ANSI and ETSI 19" or 23" rack compliant or desk mount
Chassis includes field replaceable fan tray and power supply

Environmental

Operation -5°C to +55°C (23°F to 131°F) 5% to 90% humidity (n c)
Storage -40°C to +70°C (-40°F to +158°F) 5% to 95% humidity (N C)

Power

DC: -48V nominal
AC 100 to 240 V +/-10% 50/60 Hz
Power 60 watts max

Regulatory Compliance

NEBS Level 3 capable
UL/C-UL
FCC Part 15 Class A (Shielded Cable)
Class B (Unshielded Cable)

REVISIONS:

4/5/04:
Original

COMPLEMENTARY EQUIPMENT:

BP 4500 45 Mbps Point-to-Point Digital Microwave Radio
BP 3400 34 Mbps Point-to-Point Digital Microwave Radio
BP 800 8 Mbps Point-to-Point Digital Microwave Radio
BP 600 6.5 Mbps Point-to-Point Digital Microwave Radio
BP 400 DS3 NAU DS3 Network Access Unit
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FMi 402/301

Model FMi 301 shown here

The FMi 301 transmitter is a 2.8kW FM + HD Radio and 1.2kW HD Radio only solid-state transmitter. The FMi 402 transmitter is a 3.5kW FM + HD Radio and 1.5kW HD Radio only solid-state transmitter. Both transmitters come standard with the FXi 250 FM/HD Radio Digital Exciter and FSi 10 HD Radio Signal Generator for all your HD Radio needs. These transmitters are capable of switching between FM mode, HD Radio only mode, and FM + HD Radio mode with ease providing the most flexibility in the market today.

Broadcast Electronics is the leading manufacturer of HD Radio transmission products in the world. For efficient, cost-effective solutions, visit our web site or call your local Broadcast Electronics representative.

Features

- Operation modes of FM, FM + HD Radio, and HD Radio only
- Comes standard with the FXi 250 FM/HD Radio Digital Exciter
- Comes standard with the FSi 10 HD Radio Signal Generator
- Optional audio bypass operation to ensure integrity of analog audio path
- Solid-state RF modules
- Redundant power supplies
- True proportional VSWR foldback
- Direct to Channel digital frequency synthesis
- Frequency agile to cover the entire FM band
- HD Radio Only Power Range:
  - FMi 402: 1,000 – 1,500Watts
  - FMi 301: 750 – 1,200Watts
- FM + HD Radio Power Range:
  - FMi 402: 2,000 – 3,500Watts
  - FMi 301: 1,500 – 2,800Watts
- Full front panel functional control
- 640 x 480 color GUI interface for exciter and signal generator operation

HD GUARANTEED Radio

Need Solutions?
www.bdcast.com

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Quincy, IL 62305
e-mail: bdcast@bdcast.com

FMi402/301

FMi 402/301 Specifications

GENERAL

RF Power Output Range:
- *HD Radio only:* FMi 402: 1,000-1,500W; FMi 301: 750-1,200W
- *FM + HD Radio:* FMi 402: 2,000-3,500W; FMi 301; 1,500-2,800W

Output Impedance: 50 ohms nominal
Output Connector: 1 5/8" flange
Overall Efficiency:
- *HD Radio only:* >25%
- *FM+ HD Radio:* >50%

VSWR: Rated Power into 1.5:1 VSWR. Capable of operating in to higher VSWR with automatic power reduction. Open and short circuit protected at all phase angles
Frequency Range: 87.5MHz to 108MHz; 100kHz increments
Frequency Stability:
- *Internal 10MHz Ref.:* ±300Hz, 0-50 degrees C
- *External 10MHz Ref. (GPS):* Determined by source

Modulation Capability: ±300kHz FM Mode
Modulation Modes: FM only, FM + HD Radio, and HD Radio only
Asynchronous AM S/N Ratio: 55dB below rated power with 100% AM at 400Hz and 75µsec de-emphasis (no modulation present)
Synchronous AM S/N Ratio: 50dB below rated power with 100% AM modulation at 400Hz and 75µsec de-emphasis (±75kHz modulation)
IMD Protection: 20dB or better turn-around loss or mixing loss to interfering signals
Spurious and Harmonic: Meets or exceeds all FCC requirements
Altitude: 10,000 ft. (3048M) @ 60Hz; 7,500 ft. (2286M) @ 50Hz
Cooling Air Requirement: 2500 CFM
Weight: FMi 402: 575lbs. unpacked; FMi 301: 525lbs. unpacked (without exciter)

AC INPUT

AC Voltage Requirement:
- *3-Phase:*
  196 to 252VAC, 50/60Hz, 3-wire, closed delta
  340 to 425VAC, 50/60Hz, 4-wire, wye only
- *Single Phase:*
  196 to 252VAC, 50/60Hz

Power Factor: 0.98 at 230VAC
Disconnect Size:
- *3-Phase:*
  HD Radio only: FMi 402: 35A; FMi 301: 30A
  FM + HD Radio: FMi 402: 40A; FMi 301: 35A
- *Single Phase:*
  HD Radio only: FMi 402: 50A; FMi 301: 40A
  FM + HD Radio: FMi 402: 60A; FMi 301: 50A

Actual Amperage draw at:
- *3-Phase:*
  HD Radio only: FMi 402: 20A; FMi 301: 15A
  FM + HD Radio: FMi 402: 25A; FMi 301: 20A
- *Single Phase:*
  HD Radio only: FMi 402: 35A; FMi 301: 30A
  FM + HD Radio: FMi 402: 45A; FMi 301: 35A

AC Wire Size:
- *3-Phase:* FMi402: #8 AWG; FMi301: #8 AWG
- *Single Phase:* FMi 402: #6 AWG; FMi 301: #6 AWG

Power Consumption:
- *HD Radio only:* FMi 402: 5250W @ 1,500W RF Output; FMi 301: 4,200W @ 1,200W RF Output
- *FM + HD Radio:* FMi 402: 7,000W @ 3,500W RF Output; FMi 301: 5,600W @ 2,800W RF Output

FM AUDIO PERFORMANCE, AES INPUT, FM + HD Radio MODE

Input Level: -2dBFS for 100% modulation
Input Frequency: 32, 44.1, 48, or 96kHz; 16-24bits
Impedance: 110ohms
Connector: Wire - XLR, Optical - TosLink
Amplitude Response: ±0.5dB; 20Hz to 15kHz
IMD Distortion: 0.03% or better
THD + Noise:
- *Stereo:* 0.03% or better
- *Mono:* 0.005% or better

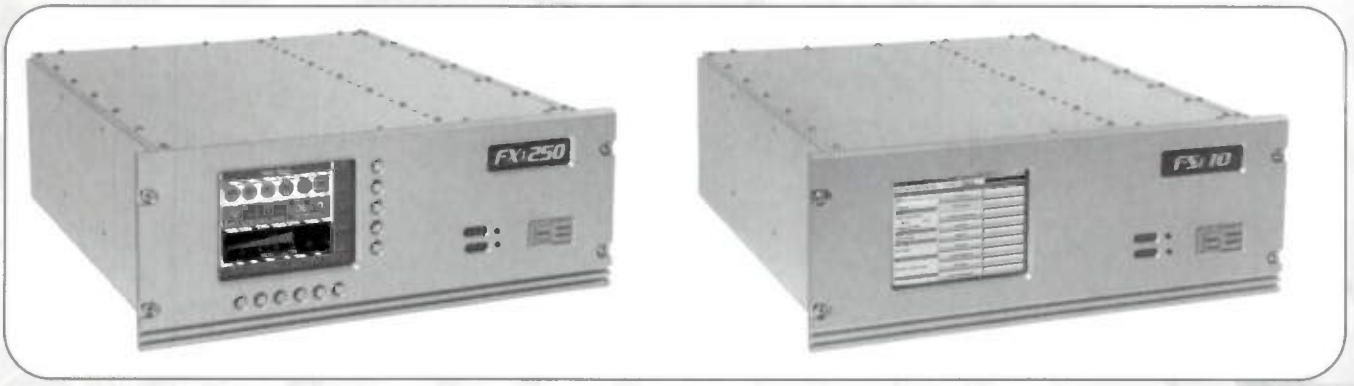
S/N Ratio:
- *Stereo:* 90dB or better below 100% modulation @ 400Hz; unweighted
- *Mono:* 85dB or better below 100% modulation @ 400Hz; unweighted

Stereo Separation: 70dB; 20Hz to 15kHz
Pilot Stability: ±0.3Hz; 0-50 degrees C

INTERNAL SCAs (2)

Frequency: 20kHz to 99kHz software programmable
Deviation: 2.5kHz to 10kHz
Injection Level: 2% to 15%
Pre-Emphasis: 0, 50µsec, 75µsec, or 150µsec

The FMi 402/301 comes standard with:



FXi 250 HD Radio and Analog FM Digital Exciter

FSi 10 HD Radio Signal Generator

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