The Broadcast Electronics Total Radio Guarantee

WHEREAS, you want to buy AM and FM transmission equipment confidently, without the risks of rapid obsolescence.

WHEREAS, you want to take advantage of today's RDS and tomorrow's HD Radio™ revenue-producing opportunities, such as Advanced Application Services and Tomorrow Radio.

WHEREAS, you want reliable and easy-to-implement tools for program content creation, management, and automation.

WHEREAS, you want to have choices on your technical path to HD Radio.

WHEREAS, you want to repurpose as much of your existing gear as possible when you add HD Radio transmission.

WHEREAS, you want to spend your money wisely now and avoid unpredictable expenses in the future, whether you are:

~ Implementing HD Radio this year or

~ Upgrading your analog plant this year and going HD Radio later.

THEREFORE, in consideration of the foregoing, Broadcast Electronics makes you, the purchasers and users of our technology, the following commitments:

BE guarantees that we will maintain our focus on improved integration among the mission-critical, high-value equipment in your facilities to achieve greater reliability, lower maintenance, and increased productivity.

BE guarantees that we will continue to strive to fulfill your programming and technical requirements with more powerful operational components developed for the realities of radio, including tight budgets.

AND FURTHER,

BE guarantees that any AM or FM transmitter you buy from BE today will be compatible with your future HD Radio plans.

BE guarantees that, should you purchase a transmitter from us in 2004 without HD Radio implementation, we will provide you with a firm quotation, valid for three years, on the BE HD Radio components you plan to purchase at a later date.

Choosing BE today will serve you well into the future. Contact us for details on this exclusive guarantee from the company that has been keeping its promises to you for over forty years.

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XPi 10

HD Radio Data Exporter and Encoder

The XPi 10 is a second generation HD Radio product that allows greater flexibility in your HD Radio implementation. When paired with BE's FXi 60/250 Digital FM Exciter equipped with an Exgine plug-in card, the XPi 10 allows all data and audio integration to occur at the studio. This means easier integration of Secondary Program Services (SPS) such as Tomorrow Radio, Program Associated Data (PAD) and other station and third party data streams. It also enables using a single-direction broadband studio-transmitter link (STL), having all processing at the studio and eliminating all PC-based equipment at your transmitter site. The result is a simpler and less expensive way to implement HD Radio with greater reliability and more control over your content.

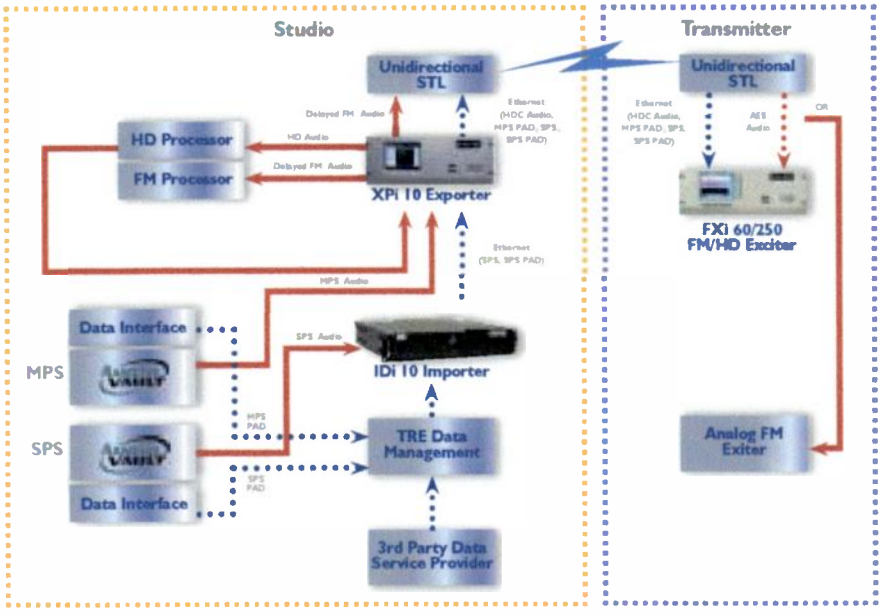
Functionally, the XPi 10 ingests your Main Program Service (MPS)—the audio content of both the analog transmission and primary HD Radio signal. It also ingests a data signal from a BE IDi HD Radio Data Importer that consists of additional HD Radio SPS audio programming, PAD for MPS and SPS and other data to be transmitted on the HD Radio signal. The XPi 10 encodes the MPS using iBiquity's HDC codec and combines it with the IDi data into a single, compact UDP stream. A final function of the XPi 10 is to delay the analog audio program so that the analog and HD Radio signals are synchronous at listeners' receivers.

The XPi 10 can also be located at the transmitter site with audio transported to the site by STL and data via a bidirectional Ethernet link. Should your requirements change, the XPi 10 can easily be redeployed to your studio.

The XPi 10 is based on BE's highly successful FSi 10 HD Radio Signal Generator. The advanced design concept of the FSi 10 allows stations with first generation HD Radio architecture using the FSi 10 at their transmitter site to easily and economically move to second-generation architecture. Simply adding a plug-in board to the FSi 10 converts it to an XPi 10. The conversion kit also includes the requisite Exgine card that relocates some of the HD Radio signal generation functionality to the FXi exciter.

KEY PRODUCT FEATURES

- HD Radio Data Exporter and Encoder improves on previous architectures for FM HD Radio
- Allows all data and audio integration, as well as processing, at the studio
- Fully-embedded HD Radio exciter (BE FXi 60/250) eliminates the need for PC-based equipment in a hostile transmitter site environment
- Permits use of conventional studio-transmitter link
- Interface connections for Main Program Services, Secondary Program Services, Program Associated Data for all audio channels and Advanced Application Services for enhanced data broadcast
- Graphical touchscreen interface
- Integrated audio synchronization, automated bypass function and internal GPS receiver



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IDi 10 and IDi 20

HD Radio Data Importer and Encoder

HD Radio is more than just a means for transmitting high-quality, digital audio. It provides the opportunity to build listenership and revenue through the delivery of compelling data services and multiple audio programs.

As part of our second-generation HD Radio technology, BE delivers the IDi HD Radio Data Importers. The IDi 10 and IDi 20 simplify your delivering powerful audio and data enhancements to your audience. Easy to install and configure, they integrate seamlessly with other BE HD Radio components, take full advantage of The Radio Experience range of broadcast data services and are compatible with AudioVAULT and other major radio automation products.

The overall transmitted HD Radio signal consists of two components. The first is the Main Program Service (MPS)—the audio content of both the analog transmission and primary HD Radio signal. The second component contains the data elements, including additional program channels. Called Secondary Program Services (SPS) and known by NPR's moniker, Tomorrow Radio, these audio channels are considered data until they are decoded by the listeners' receiver. Additional data elements include Program Associated Data (PAD) and other station and third party generated data.

The IDi encodes SPS audio and multiplexes it with PAD and other data. Further, it 'provisions' the overall HD Radio bandwidth, allocating for MPS, SPS and data. The resulting bitstream is delivered via Ethernet to BE's XPi 10 HD Radio Data Exporter and Encoder, where it is combined with the encoded HD Radio MPS for transport to the HD Radio exciter and transmitter.

Two models are now available. The IDi 10 provides a fixed, 32 kb/s SPS channel with no bitstream provisioning. The IDi 20 offers unlimited flexibility in managing the HD Radio system throughput for multiple SPSs. On release, the IDi 20 is limited to two secondary program channels, but future updates will expand the number of SPS channels supported. An IDi 10 may be upgraded to an IDi 20.

One IDi is required for each MPS in the local station cluster. If a studio facility creates content for more than one MPS, multiple IDi units may benetworked with a single control point able to manage all of them.

KEY PRODUCT FEATURES

- HD Radio Data Importer enables multiple-program, data-rich radio broadcasts
- Enables broadcast of Secondary Program Services (SPS), such as Tomorrow Radio
- Manages Program Associated Data (PAD) and Advanced Application Services (AAS) for display on HD Radio receivers
- Provisions HD Radio signal bandwidth
- Interface connections for Secondary Program Services Program Associated Data for all audio channels and Advanced Application Services for enhanced data broadcast
- Ethernet connection to BE XPi 10 HD Radio Data Exporter and Codec
- Control of multiple units via keyboard, monitor and mouse

Now Playing and Now Playing Plus

Radio Data Management Software and Services

Radio. It's not just about audio any more.

Enhanced data on FM, HD Radio and Internet streams can make your station more competitive

Now Playing and Now Playing Plus are part of The Radio Experience from BE. This suite of software and services makes it easy to feed station branding, program information, traffic and weather, even content associated text ads and promotions.

Because The Radio Experience is designed to manage every potential radio station data requirement, its integrated feature set is straightforward to implement—less time is spent on system configuration and more on creating compelling, revenue-enhancing data.

Two basic packages are offered. Now Playing provides Program Associated Data (PAD) text management for FM RDS, HD Radio main and secondary channels and station websites. Now Playing Plus offers a constellation of data possibilities, taking advantage of a full-time Internet connection to The Radio Experience Data Center.

Both software packages include a utility to multiplex multiple RDS data signals into a single RS-232 stream to conserve STL bandwidth. This can be extracted at the transmitter site using The Radio Experience RDi Accelerated RDS Generators or third party RDS equipment connected to The Radio Experience Dynamic Data Processor.

Now Playing

Title and artist (TA) are the information audiences want most about the songs to which they are listening. With Now Playing, providing TA and additional text, such as station branding, is readily managed over FM, HD Radio and websites.

Now Playing includes:

- Management of Title/Artist (TA) display
- Dynamic Program Service (PS) data is improved for the eight-character display found on most RDS equipped receivers
- Generic default messages can be displayed when PAD is not available, such as when music is not played—these messages may automatically change for each daypart
- Custom sequencing of RadioText—the 64-character message display available on more sophisticated receivers. Event-keyed substitution triggers messages—overriding TA—based on content metadata
- An optional Online Message Management and Monitoring Module provides rapid configuration of PAD display on receivers, including how call letters, frequency and other station branding is interleaved with title and artist

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Now Playing and Now Playing Plus

Radio Data Management Software and Services

Now Playing Plus

By assigning advanced data management functions to The Radio Experience Data Center, stations can leverage our vast database of program associated data and text. At the time a song begins to play, Now Playing Plus feeds basic program information from the studio to the Data Center via the Internet. Returned to the station for broadcast and streaming are enhanced data, website graphics integration and more.

Now Playing Plus consists of a software package installed at the station along with a monthly fee for Data Center services. It includes:

- All of the features included in Now Playing
- Expanded data types and management
  - Title/Artist data "laundering" substitutes station TA data with Data Center version to assure proper, easily-read and consistent display
  - Access to "previously-played" PAD information from day one of your deployment of Now Playing Plus
  - User defined dynamic PS display of TA for improved appearance on limited size display
  - Data Center provides interface for easier management of event-keyed message substitution
  - Lookup and display of CD title for PAD display
- Station website enhancements
  - Album art is provided by the Data Center for display
  - e-commerce module enables customers to purchase music from station-branded website
  - Now Playing Plus text and graphics available as a Flash movie for integration with BE's Son Xtream player and service
- Management and monitoring tools
  - A log of all data events generated is maintained as a text file at the Data Center for perpetual reference
  - Station status monitoring tool provides centralized overview for station groups
  - E-mail notification should station fail to generate data for user-defined maximum timeout
- Custom integration of third-party services (such as news, traffic and weather) can be provided

Current Available Data Examples

Program Associated Data (PAD)

- Messages associated with audio cut and included in audio file
- Song title and artist
- ID3 PAD available on HD Radios—composer, year, producer, etc

Live TAGS

- Metadata fields in live-streamed (e.g. satellite delivered) audio synchronized to playback

Near PAD

- Secondary message associated with audio cut, but not included in audio file
- Example—upcoming concert by artist whose song is playing

Non-PAD

- Station promotions and contests
- Traffic, weather, sports
- Holiday messages

R·D·D·S

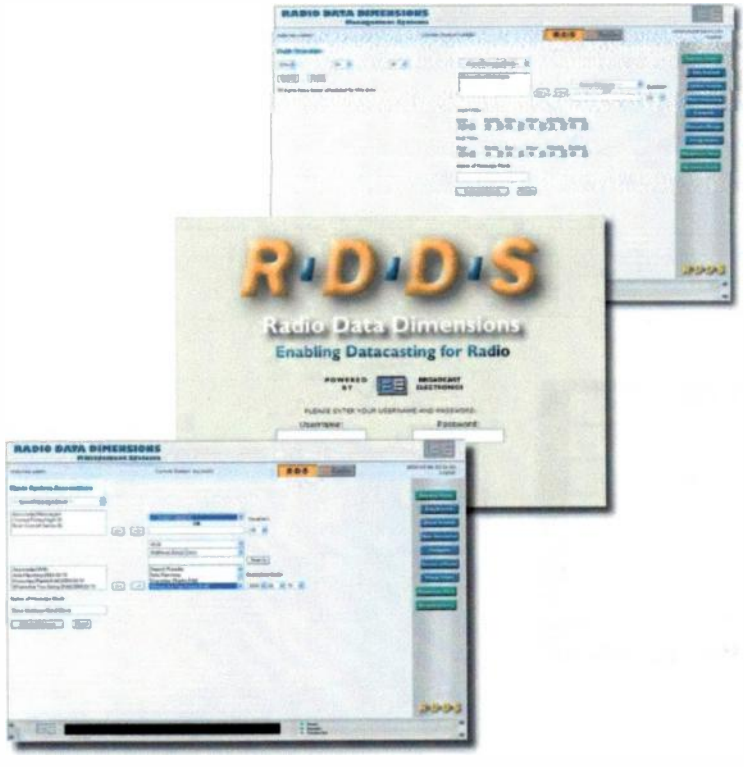
Enabling Datacasting for Radio

Radio Data Dimensions

Enter the world of datacasting for radio with Radio Data Dimensions. Many domestic broadcasters are employing PDS as the first step in enabling datacasting on FM. Broadcast Electronics is releasing Radio Data Dimensions (RDDS), an integrated software suite that allows RDS support. RDDS from BE provides support for Program Service (PS), Program Type (PTY), and RadioText (RT) including song Title/Artist, and other messages such as traffic bulletins. Included in our software applications is the unique ability to display station promotional material either on a rotation basis, or associated with audio. Working closely with your studio automation system, RDDS allows you to enter the world of datacasting with an all inclusive, cost effective software management tool.

Enabling HDRadio Data

RDDS will also manage all datacasting capabilities provided by HDRadio as well. RDDS will support both the Advanced Application Services (AAS) including expanded messaging, traffic maps and bulletins, alerting, and the Secondary Program Service (SPS) audio. From a single web-browser based application, RDDS will allow you to expand your listener offerings in this new competitive broadcast environment we face. One system can even manage multiple stations.



BENEFITS OF DATACASTING

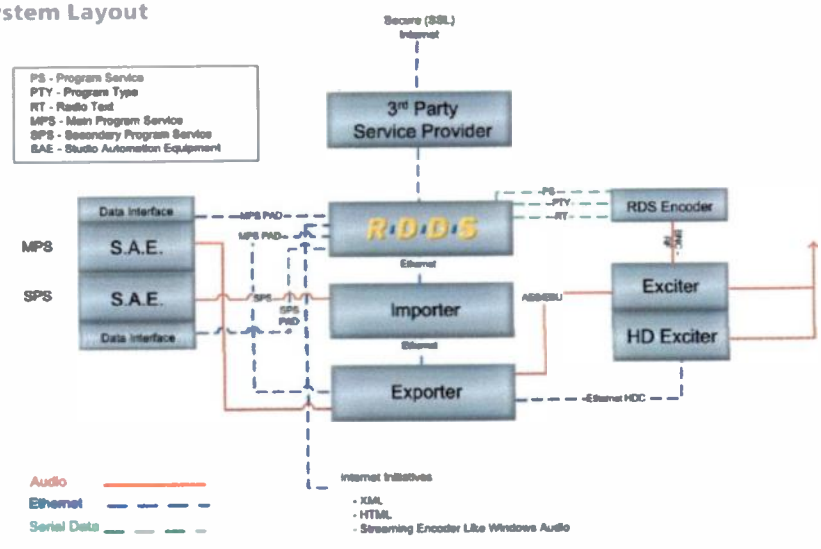
- Enhance station branding
- Strengthen listener loyalty
- Provide now playing information including song title/artist
- Cross-promote day parts, personalities
- Provide added value to your listeners
- Traffic bulletins
- News bulletins
- Weather
- Sports scores
- Gas prices
- PSAs, amber alerts
- Enhance advertising effectiveness
- Present telephone number
- Display advertiser URL
- Distribute coupon codes
- Offer additional sponsorship opportunities
- Position yourself for HDRadio datacasting
- Offer a secondary audio program
- Sell data bandwidth to others
- Add datacast information to your web site
- Compete against satellite radio on the car receiver

R·D·D·S

Enabling Datacasting for Radio

Data management must accommodate the disparate requirements of Radio Data Services (RDS) for analog FM, Advanced Application Services (AAS) for HDRadio, and internet streaming clients. BE's Radio Data Dimensions simplifies the use of PAD to feed your branding, program information, and text messages with traffic, weather, or even gas prices from third party providers. It also streamlines importing AAS data, including Tomorrow Radio, into your HDRadio stream.

System Layout



R·D·D·S manages the various disparate elements associated with Datacasting, including RDS protocols, and HDRadio's application interfaces. It acts as a virtual data traffic-cop, providing your station a single point of control for all your datacasting initiatives.

Receiver Display

Receivers supporting RDS and/or HDRadio data display messages with audio programming or scheduled by R·D·D·S.

SYSTEM FEATURES

- Controls today's RDS and tomorrow's HDRadio data opportunities
- Increases income and listener loyalty
- Enables datacasting
- Station branding
- Title and artist information
- Expanded advertiser support
- Day part program identification
- Sponsorship and promotional messages
- Amber alerts, emergency bulletins
- Traffic, weather and news
- Provides administrative tools
- Schedule clock generation
- Time-of day rotation
- Scrolling program service support
- HDRadio bandwidth provisioning
- Sales contract administration
- Easy access via web browser interface
- Provides web and internet streaming data interfaces
- Multiple station support
- Third party content provider sockets

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RDi 10 and RDi 20

Accelerated RDS Generators

Text is not boring.

When combined with radio audio, text provides compelling means to attract and retain listeners and advertisers. Radio Data System (RDS) adds text to FM programming in the form of station branding, Program Associated Data (PAD) and other information sought by your audience. A moderate cost investment can yield measurable gains.

The Radio Experience from BE helps you implement RDS with powerful, easy-to-use hardware to generate and monitor RDS transmissions, as well as a full range of software and services to deliver content. The full suite of products provides simplified and comprehensive data management for FM, HD Radio and station websites.

Uniquely featured and competitively priced, the RDi range of Accelerated RDS Generators provide the quality and features demanded by both engineering and programming. The RDi 20 includes comprehensive front panel controls and status display while the RDi 10 has identical features without the front panel display.

Why accelerate?

Listeners want to know "what's happening now". To improve the immediacy of PAD, the RDi RDS generators increase the rate at which receiver RadioText is refreshed. RadioText is the 64 character message display available on more sophisticated receivers. When an event occurs, such as a new song starting, an RDi can decrease the time necessary for new information to be displayed.

Other unique RDi features accelerate setup and operation. The RDi units can simultaneously feed RDS data to two analog transmitters, as well as an HD Radio exciter. When using BE's FXi 60/25 HD Radio plus FM Exciter, that connection is via RS-232.

A single RS-232 data channel may be looped through multiple RDi units, with each encoder configured to pull data from an appropriate channel. At the studio, The Radio Experience software combines the RDS data of multiple stations on a single RS-232 data stream, conserving STL bandwidth.

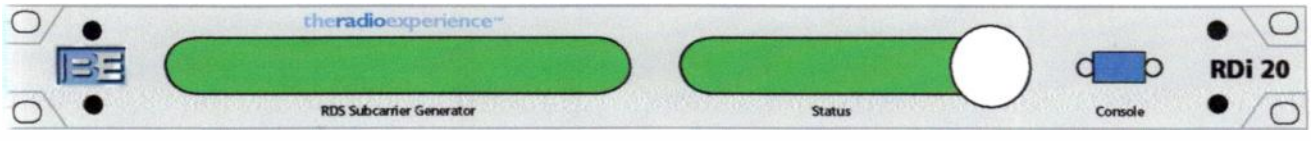
Hardware integration options include Ethernet (TCP/IP), RS-232 and RS-422. Both RDi models are easily configured and managed via a locally or remotely connected PC (no pesky jumpers to access under the hood) and are upgradeable via flash memory card.

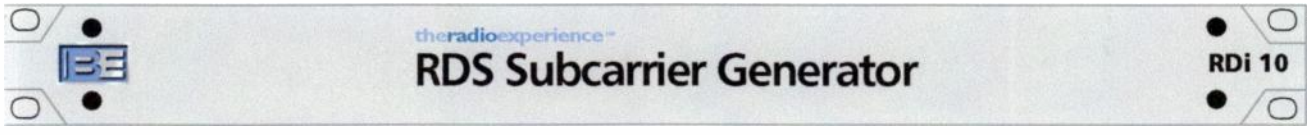
The RDi 20 front panel controls eliminate the need to drag a PC to the transmitter to adjust settings. Actual RDS content is displayed to confirm what the listener will see.

RDi Accelerated RDS Generators are free of digital noise at 57 kHz, incorporate advanced DSP-designs and come with comprehensive, practical documentation.

KEY PRODUCT FEATURES

- **Fully compatible with The Radio Experience *Now Playing* and *Now Playing Plus* radio data software and services**
- **Perfect choice for stand-alone and network-managed data services**
- **RadioText (Group 2A) acceleration to maintain listener attention**
- **Diverse control over creation of dynamic program service (PS) messages**
- **Data multiplexing permits multiple RDS encoders to share a single data channel simplifying operations at multi station facilities**
- **Hardware and protocol connectivity and control options reduce costs**
- **Dual sync supports main and backup transmitter**
- **RDi 20 provides front panel setup and operation, as well as a data monitor display**
- **HD Radio support**
- **Supports PI, PS, PTY, TP, TA, RT and AF**





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The Radio Experience
Accelerated RDS Accessories

DDP Dynamic Data Processor

- Enables data multiplexing with non-RDi encoders
- Extracts the RDS data of multiple stations on a single RS-232 data stream
- Conserves STL bandwidth
- Allows multi-station installations to benefit from RDi data multiplexing
- Simplifies configuration and operation
- Reduces overall costs of RDS implementation

The RDS Content Validation Monitor

- Designed to provide log of RDS message
- Frequency agile FM receiver adjusted through software
- All RDS message events can be saved locally as daily text file
- Messages may also be logged at The Radio Experience Data Center for users of *Now Playing Plus*—provides web access and analysis of logged messages
- Direct integration with *Now Playing* and *Now Playing Plus*
- RS-232 serial communications between receiver and host PC

RDSX RDS Upgrade

- Plug in board installs inside of existing RDS encoders such as Aztec FMB10 or Inovonics 711 to provide:
  - Data multiplexing enabling multiple RDS encoders to share a single data channel
  - TCP/IP connectivity
  - Dynamic PS

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 FXi 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.

- FM HD Radio™ signal generator provides baseband HD Radio™ directly to FXi60/250 Digital Exciter.
- When paired with FXi60/250 allows operation in either HD Radio™ only or HD Radio™ + FM modes.
- Internal GPS for synchronization.
- Time aligns FM and HD Radio™ signals for blending.
- Receives audio via AES digital format.
- 640+480 touch-screen interface.
- 5 RU 19" EIA Rack Mount.

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ASi 10

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 break through for AM.

- AM HD Radio™ signal generator provides phase and magnitude directly to 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.

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FMi 73/31

Model FMi 73 shown here

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.

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

Need Solutions?
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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: 3 1/8" EIA flange, 1 5/8" flange optional
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: 2700 CFM
Output Connector: "N" Type Female
Weight: FMi 73: 103lbs. unpacked; FMi 31: 75lbs. unpacked

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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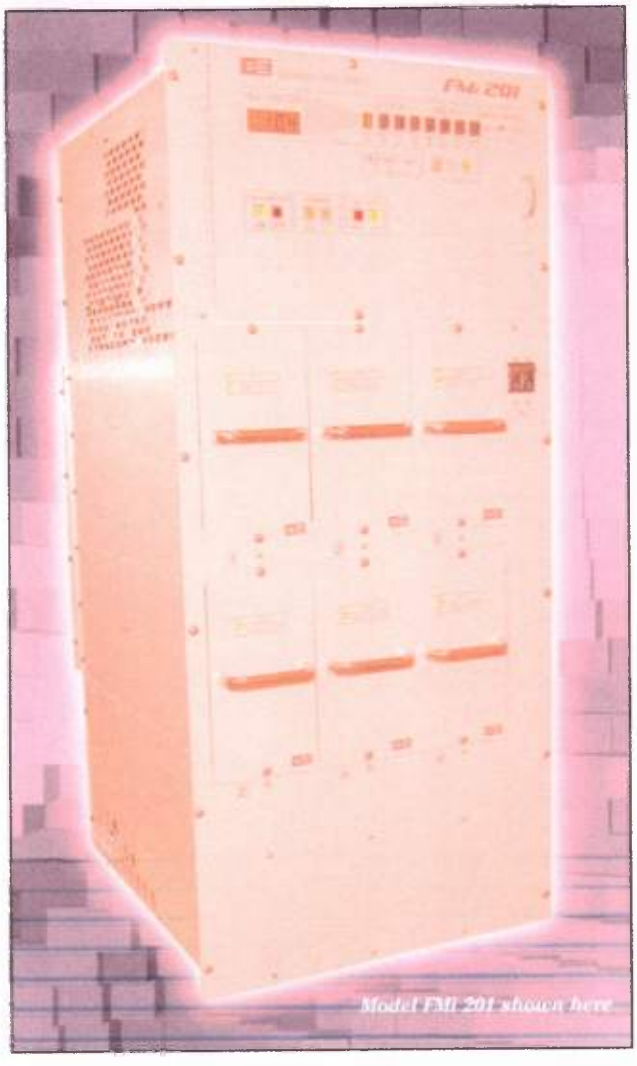
FMi 201/106



Model FMi 201 shown here

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.

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

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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: 3 1/8" EIA flange, 1 5/8" flange optional
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: 2700 CFM
Output Connector: "N" Type Female
Weight: FMi 201: 260lbs. unpacked; FMi 106: 190lbs. unpacked

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: 2,900W @ 840W RF Output; FMi 106: 1,900W @ 560W RF Output
FM + HD Radio: FMi 201: 2,100W @ 2,100W RF Output; FMi 106: 1,500W @ 1,400W RF Output

FM AUDIO PERFORMANCE, AES INPUT, FM + HD Radio MODE

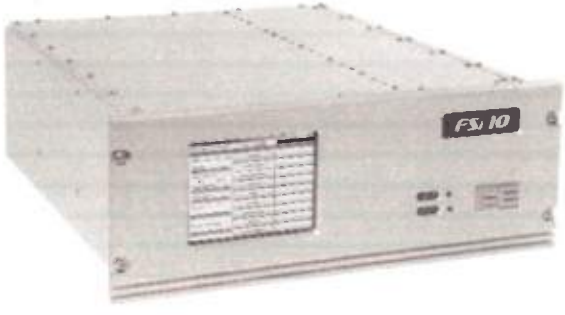
Input Level: -2dBFS for 100% modulation
Input Frequency: 32, 44.1, 48, or 96kHz; 16-24bits
Impedance: 110 ohms
Connector: Wire - XLR, Optical - TosLink
Amplitude Response: ±0.5dB; 20Hz to 15kHz
IMD Distortion: 0.03% or better
THD + Noise:
Stereo: 0.03% or better
Mono: 0.005% or better
S/N Ratio:
Stereo: 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 402/301

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

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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: 3 1/8" EIA flange. 1 5/8" flange optional.
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: 2700 CFM
Output Connector: "N" Type Female
Weight: FMi 402: 575lbs. unpacked; FMi 301: 525lbs. unpacked

AC INPUT
AC Voltage Requirement:
3-Phase: 340 to 440VAC, 50/60Hz
Single Phase: 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:
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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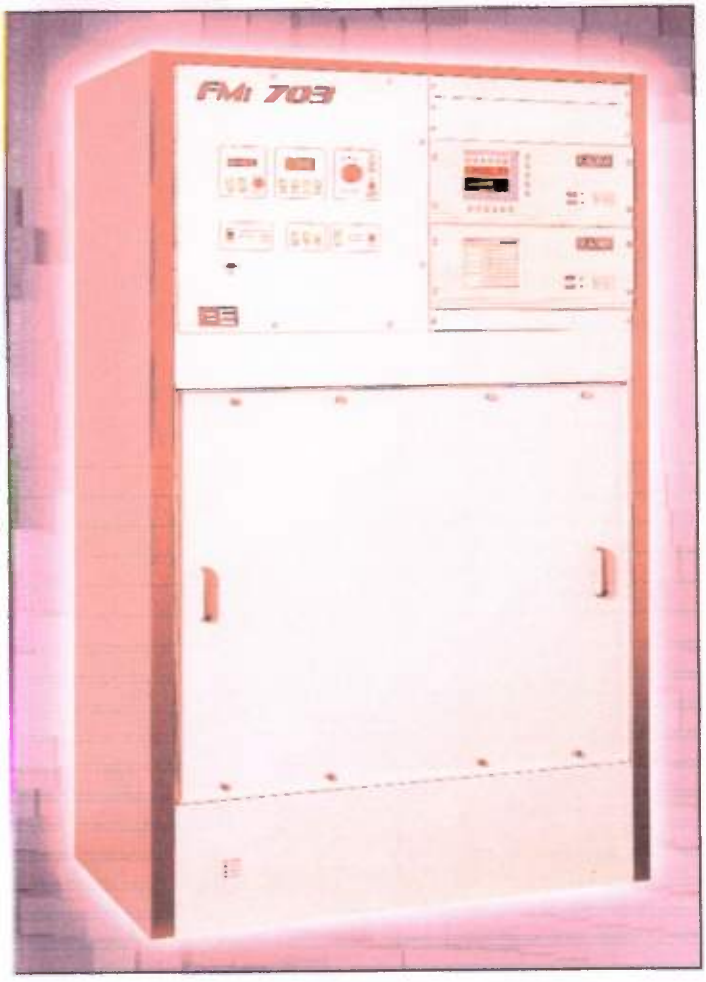
FMi 703



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
Output Connector: 3 1/8" EIA female (1 5/8" optional)
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: 50Amp fuse disconnect recommended;
FM + HD Radio: 100Amp fuse disconnect recommended
Single Phase:
HD Radio only: 75Amp fuse disconnect recommended;
FM + HD Radio: 150Amp fuse disconnect recommended
Actual Amperage draw at:
3-Phase:
HD Radio only: 25A average
FM + HD Radio: 50A average
Single Phase:
HD Radio only: 43A average
FM + HD Radio: 85A average
AC Wire Size:
3-Phase: 1 AWG, THHN or equivalent
Single Phase: 2/0 Copper, THHN or equivalent
Power Consumption:
HD Radio Only: 10kW @ 3kW RF output
FM + HD Radio: 17kW @ 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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FMi1405

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.

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

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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, 1 5/8" flange optional
Overall Efficiency:
HD Radio only: >30%
FM + HD Radio: >55%
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
Output Connector: 3 1/8" EIA female (1 5/8" optional)
Weight: 1350lbs. standard upacked

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: #4 AWG, Copper, THHN or equivalent
FM + HD Radio: #6 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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Big Pipe LT

1RU Ethernet-enabled STL

Not Just Another STL

Big Pipe LT takes the proven performance of our now technology leading Big Pipe and packs it in a single-rack space.

Flexible and reliable, Big Pipe LT works just as well for studio facility interconnects as it does for any other media transport need. And because it comes from BE, you know that Big Pipe LT is designed for the realities of radio, including tight budgets and the demand for rock solid performance.

Easy To Install

Hooking up Big Pipe LT is simple. Separate digital and balanced analog XLR connections are easily accessed on the back of the unit. Regardless of whether you choose to feed analog or digital audio to the transmit unit, both output types will be available on the receiving unit adding to the flexibility of the solution.

An industrial-duty 10/100 Ethernet connection can transmit audio on up to six simultaneous connections, each using different audio coding using either a standard RJ-45 connector or a Neutrik Ethercon RJ-45 connector.

Where required, Big Pipe LT can accept an external wordclock signal, sync to the incoming AES/EBU source, or use an internal clock. An RS-232 connection allows Big Pipe LT to also transport serial data.

Big Pipe LT is configured and monitored using a standard web browser on your network and can send e-mail alerts for key functions. Once configured, your settings are stored and maintained within the unit. In the case of network failure or power loss, the system will automatically reconnect when network connectivity or power returns.

Reliable Transport

Big Pipe LT features FEC (Forward Error Correction) and network jitter compensation/safety buffers configurable up to 5 seconds in 1 ms increments, allowing the system to function perfectly even on busy networks connections.

Supported sample rates for uncompressed 16-bit or 24-bit audio range between 8 kHz and 96 kHz. Supported sample rates for MPEG compressed 16-bit audio range between 16 kHz and 48 kHz.

Linear audio is handled with extremely low 5ms delays. Even when using compressed audio, delays are low. MPEG Layer II audio will see 45ms delays. MPEG Layer III audio may see delays up to 125ms.

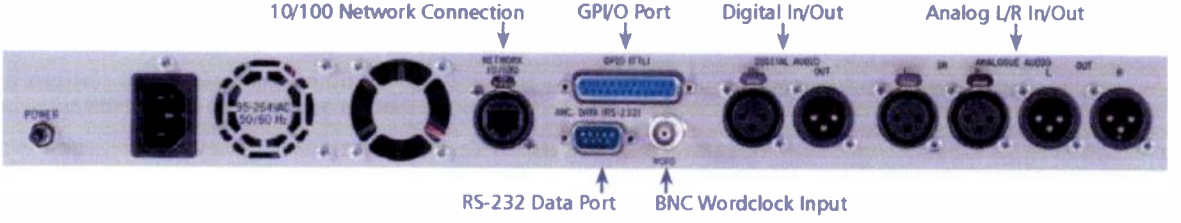
Key Product Features

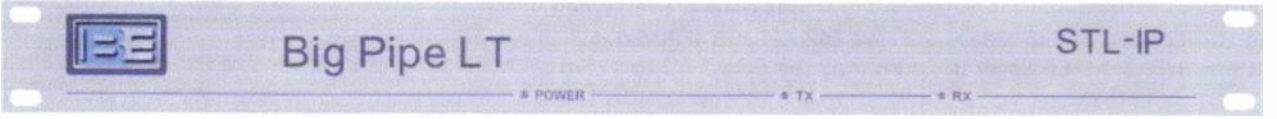
- Transmit and receive up to 24-bit, 96kHz broadcast quality audio
- Single or bi-directional operation
- Stereo and mono capability
- Handles compressed audio using built-in professional grade MPEG Layer II or MPEG Layer III coding/decoding, J.41, ADPCM, G.722 or our extra low-bitrate speech codec
- Built-in silence and audio overload detectors
- Capable of transporting serial data with a standard 9-pin RS-232 port
- Digital clock source is selectable between internal clock, clock from incoming AES/EBU source, or word-clock input
- GPI/O capability with 4 inputs, 4 outputs and 4 status output signals
- Multiple Ethernet output options include TCP/IP, UDP and UDP Multicast

Big Pipe LT

1RU Ethernet-enabled STL

Specification		Additional Notes
Analog Audio Inputs	Balanced Stereo inputs, 2x XLR (F)	-18 db nominal signal level. +18 db at analog inputs = 0 dbFS (digital full scale)
Analog Audio Outputs	Balanced Stereo outputs, 2x XLR (M)	-18 db nominal signal level. 0 dbFS (digital full scale) =+18 db at analog inputs
Digital Audio Input	Digital input XLR (F)	Input accepts both AES/EBU and SPDIF signals
Digital Audio Output	Digital output XLR (M)	AES/EBU output only
Source Audio Selection	User-selectable channel inputs to audio transmission modules	Supports Left channel, Right channel, Stereo, or Mono Mix (L+R)
Linear Audio Support	Uncompressed audio at 8 kHz to 96 kHz sample rate, 16 or 24 bit. Mono or Stereo modes.	Full-bandwidth linear audio with a 5 ms delay
MPEG Layer II and Layer III Support	Professional MPEG Layer II and Layer III coded audio at between 16 kHz and 48 kHz sample rate, 16 bit. Mono, Stereo, Joint-stereo and Dual-mono modes.	Full-bandwidth broadcast quality stereo audio at bi-trates between 128 kbps and 385 kbps. Mono audio from 64 kbps. 45 ms delay for MPEG Layer II, 125 ms delay for MPEG Layer III.
Additional Codec Support	Support for J.41, ADPCM, G.722 and the extra-low bandwidth LB-1 speech codec	Supports stereo audio up to 768 kbps, and mono audio as low as 12 kbps; delays range from 5 ms to 40 ms, depending on selected codec
Clock Input	BNC wordclock input	System clock-source is user-selectable between inter-nal clock, wordclock input or clock from incoming AES/EBU source
Ancillary Data Support	RS-232 serial connection for ancillary data in and out, D-Sub 9-Pin connector	Serial data can be transmitted/received alongside audio at up to 57600 bps
Ethernet Connection	10/100 Ethernet connection for TX/RX audio and web-management interface	Neutrik Ethercon RJ-45 connector, accepts standard RJ-45 connector or locking Ethercon cable
Network Mode Support	UDP, TCP/IP, UDP Multicast modes	Supports all IP networks including Telco, MPLS, Private/Dedicated circuits, LAN/WAN, Satellite, Wire-less (incl. WiFi), ATM, T1/E1 and Internet for IP codec operation
AC Power	96-264 VAC, 50-60 Hz	Autosensing for world-wide operation





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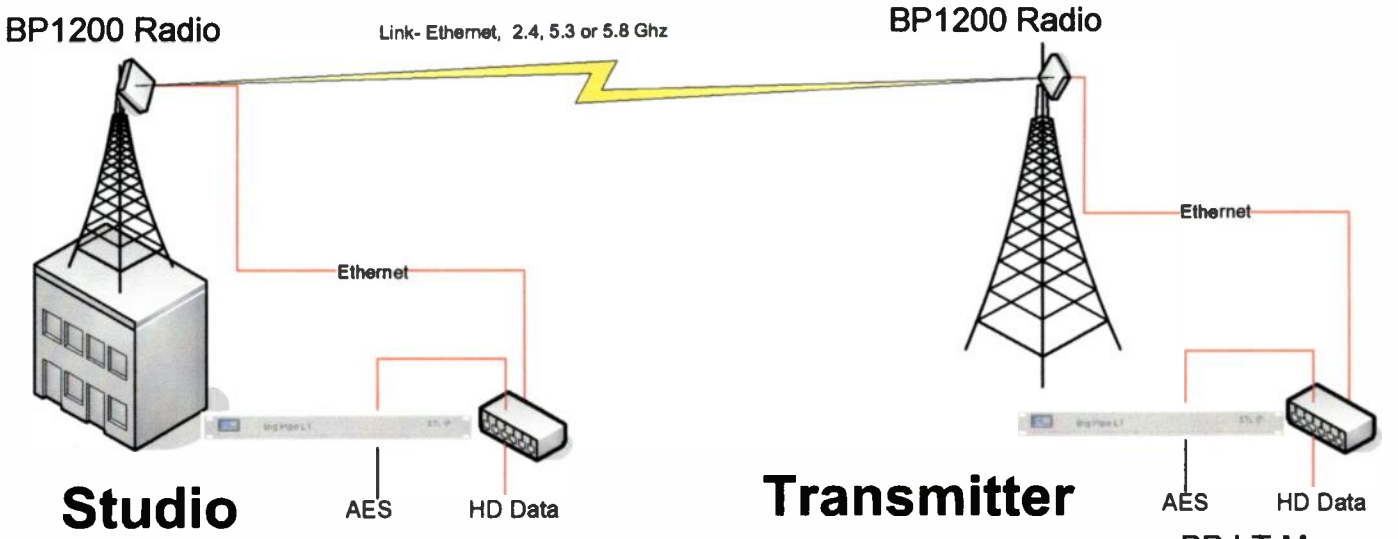
Big Pipe Configuration - BP-100LT/1200 Series- Typical system



Studio Site Support
AUDIO CONNECTIVITY
1 Channel *AES Audio Encode Studio- Decode*
AES and Stereo Analog XMTR
or
1 Channel *Analog Stereo Encode Studio- Decode*
AES and Stereo Analog XMTR
And
1 Channel AES Audio Encode XMTR- Decode
AES and Stereo Analog Studio
Or
1 Channel Analog Stereo Encode XMTR- Decode
AES and Stereo Analog Studio

HD Data- Supported
ETHERNET Connectivity- Supported with switch
T1 Connectivity- Up to 4 Channels Supported
RS232- Supported
POTS Connectivity- Not supported

Transmitter Site Support
AUDIO CONNECTIVITY
1 Channel *AES Audio Encode Studio- Decode*
AES and Stereo Analog XMTR
or
1 Channel *Analog Stereo Encode Studio- Decode*
AES and Stereo Analog XMTR
And
1 Channel AES Audio Encode XMTR- Decode
AES and Stereo Analog Studio
Or
1 Channel Analog Stereo Encode XMTR- Decode
AES and Stereo Analog Studio

HD Data- Supported
ETHERNET Connectivity- Supported with switch
T1 Connectivity- Up to 4 Channels Supported
RS232- Supported
POTS Connectivity- Not supported

BP100LT/1200 Typical System
Budgetary List Price- $16,250

NOTES:
Ethernet TDD Data link, non protected
Data rate varies with distance, typical 10-16 mbps
Unlicensed 2.4, 5.3 or 5.8 GHz
2' Dishes, Radomes, 100 m cables

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?

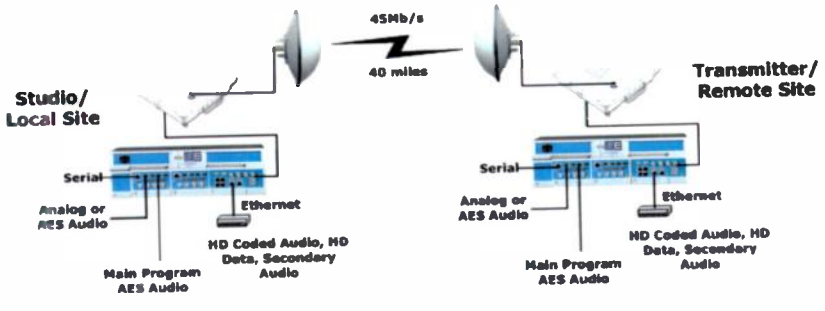
The BP 4500 is a line of high capacity, point-to-point microwave radios. Each radio supports 45 Mbps bandwidth, full-duplex, with Telco grade performance.

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
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.

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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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 3400 radios?

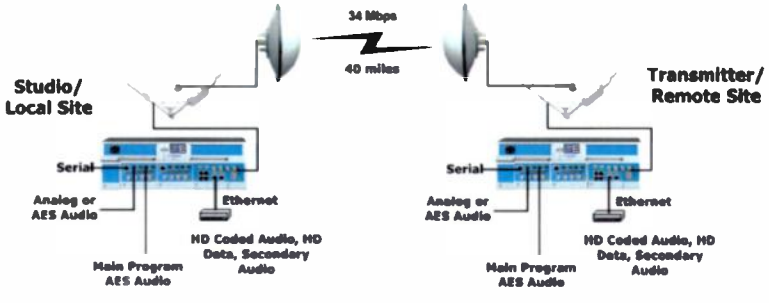
The BP 3400 is a line of high capacity, point-to-point microwave radios. Each radio supports 34 Mbps bandwidth, full-duplex, with Telco grade performance

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
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 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.

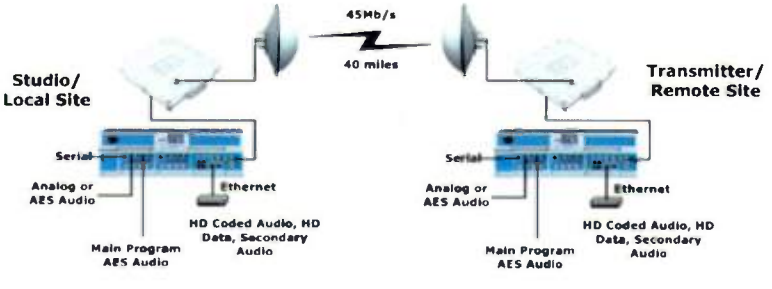
The SIM plug-in modules define the service interface and include Audio/Video SIM (BP 400 AVSIM), Telephone interface (BP 400 FXSIM), and even a SMPTE 310 SIM for HDTV applications (BP 400 SMPTE310).

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

WRH

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 (SIM)

- Audio: AES or Analog L & R
- 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
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BP 400 DS3NAU

DS3 Network Access Unit

BP 400 DS3NAU

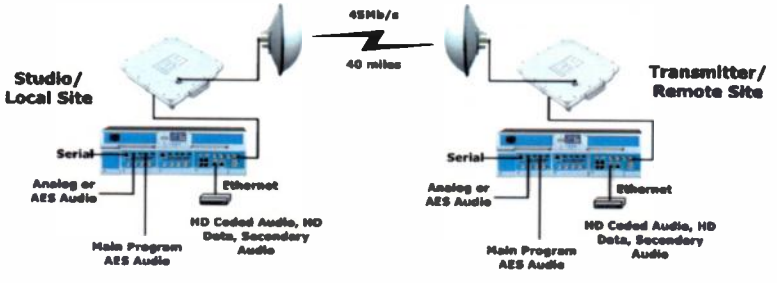
The DS3 network access unit is installed in the BP 400 INT to define the network interface for DS3 ATM applications. This module can connect directly to a DS3 network or to the BP 4500/3400 wireless radios for STL applications.

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

TECHNICAL SPECIFICATIONS CONTINUED

Density - 4 ports per module
Connector - RJ45
Service - CES, AAL1

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

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 AVSIM Audio and Video Service Interface Module
BP 400 FXSIM Telephone Service Interface Module
BP 400 SMPTE310 SMPTE 310 Service Interface Module

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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

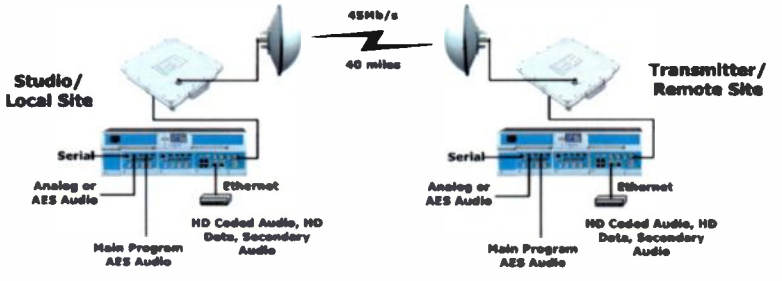
The encoder engine of the AVSIM sends a linear audio source in a bi-directional fashion in either analog or AES fashion. NTSC, PAL or SDI video signal uses the industry standard of MPEG-2 compression algorithm and encapsulates it for transport. The independent AVSIM Video MPEG decoder reconstructs the 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
- Available with 2 AES stereo channels and one L&R channel uni-directional
- Available with 4 AES stereo channels
- Available with 4 AES analog channels
- 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

WRH

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, 32<
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 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 FXSIM Telephone Service Interface Module
BP 400 SMPTE310 SMPTE 310 Service Interface Module

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BP 400 FXSIM

FX SERVICE INTERFACE MODULE

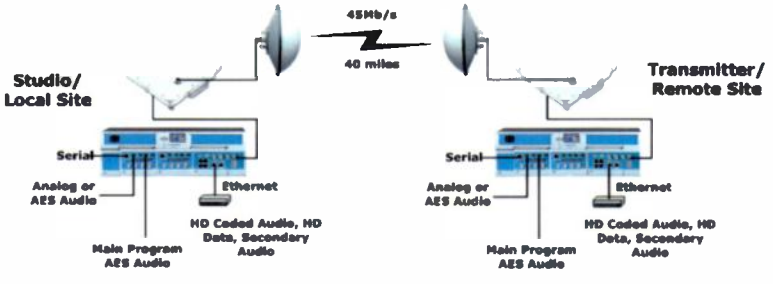
BP 400 FXSIM

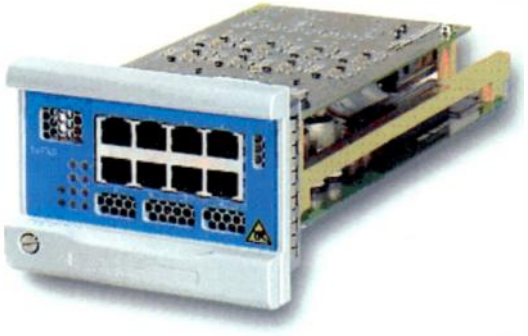
The FX Service Interface Module can be installed into Broadcast Electronics new family of Integrated Network Terminal (INT) chassis and Optical Network Terminal (ONT) chassis, the BP 300 and BP 400, enabling the transport of eight independent FXSIM telephony streams per module.

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 FXSIM offers extensive diagnostics and statistics capabilities.

When used together with Broadcast Electronics network adapter modules, the FXSIM IM 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 FXSIM 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 FXSIM voice calls across broadband wide area networks
- Eight voice ports per FXSIM, 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
- FXSIM Loop Start and Private Line Automatic Ring Down functionality

SPECS: BP 400 FXSIM FX 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

FXSIM 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 FXSIM are available remotely via an embedded Web-based browser interface.

Element Management System

The FXSIM 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 FXSIM
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
BP 400 AVSIM Audio and Video Service Interface Module
BP 400 DS3NAU DS3 Network Access Unit
BP 400 SMPTE310 SMPTE 310 Service Interface Module

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BP 400 SMPTE 310

Service Interface Module

SMPTE 310M Service Interface Module

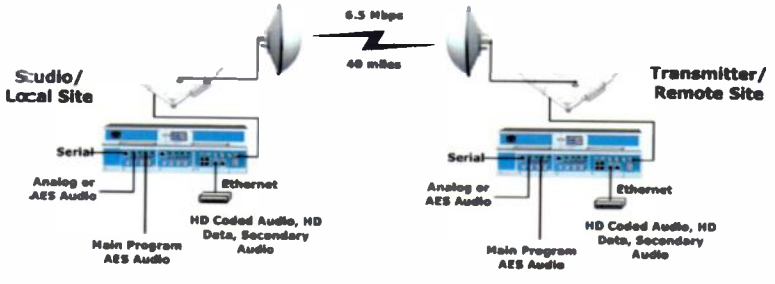
The SMPTE 310M SIM can be installed into Broadcast Electronics BP 400 (INT) Integrated Network Terminal.

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 remote y 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
BP 400 DS3 NAU DS3 Network Access Unit
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AM-1A

HD GUARANTEED Radio

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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e-mail: bdcast@bdcast.com

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 (3048 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 - 73 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.

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

FM-5T

5 kW High Power FM Transmitter

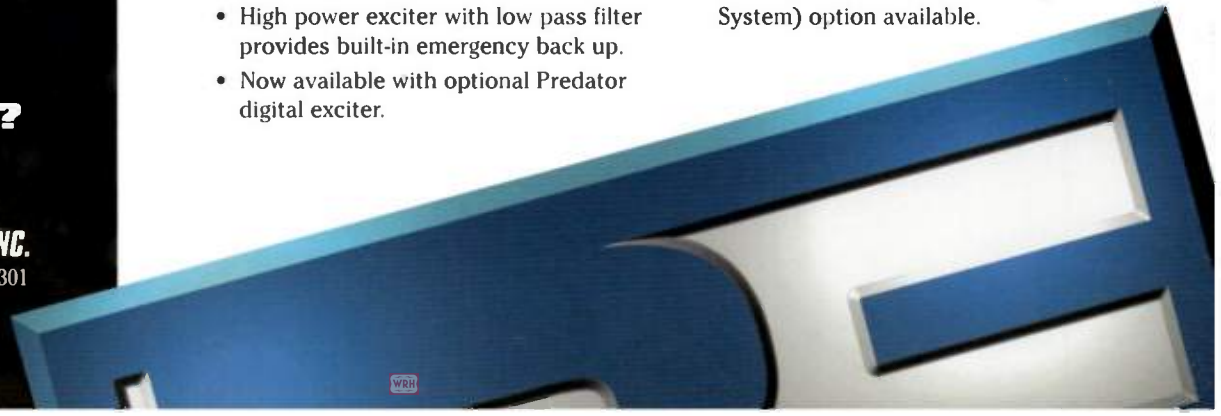
Solutions for Tomorrow's Radio

HD GUARANTEED Radio

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.
- 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 technology which has easily become the standard for FM audio performance.
- High power exciter with low pass filter provides built-in emergency back up.
- 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 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 elimination of the IPA stage improves overall reliability of the transmitter.
- RTDS (Remote Transmitter Diagnostic System) option available.



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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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AM-500A

HD GUARANTEED Radio

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 - 75 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 avg, 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

Solutions for Tomorrow's Radio

6 kW Solid State AM Stereo Transmitter

HD GUARANTEED Radio

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-10T

10 kW High Power FM Transmitter

Solutions for Tomorrow's Radio

HD GUARANTEED Radio

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 0.2%
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/FM-35T

30kW & 35kW High Power FM Transmitters

The Broadcast Electronics' 30kW & 35kW high power FM transmitters set the standard for audio quality, cost-efficiency, reliability and long life. These transmitters represent a new generation of high power tube transmitters and are backed by BE's commitment to quality.

Sold as an option for all T-Series transmitters, the Broadcast Electronics Remote Transmitter Diagnostic System (RTDS) offers unprecedented flexibility and access when monitoring transmitters. By providing more useful diagnostic information than any other remote control system available, RTDS allows you to conveniently monitor your transmitter's performance without making a trip to the transmitter site.

The T-Series FM transmitters represents just one of our many solutions to your radio needs.

Model FM-30T shown here

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 operation 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.
- Optional RTDS (Remote Transmitter Diagnositc System) allows you to conveniently monitor your transmitter's performance without making a trip to the transmitter site.

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HD GUARANTEED Radio

FM-30T/FM-35T

30kW & 35kW High Power FM Transmitters

FM-30T 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 10kHz steps.
RF Output Impedance: 50 ohms (others on special request).
Output Connector: 3 1/8" E I A 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 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).
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 Complement: (1) 8990/4CX 20,000A.
RF Harmonics Suppression: meets all FCC/DOC requirements and CCIR recommendations.

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: 80dB 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: 3.5V p-p nominal, for ±75 kHz deviation.
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 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, 40kHz to 100 kHz.

Frequently Asked Questions

MODEL FM-30T

Power Range:	7.5kW to 30kW
AC Voltage Requirements:	196 to 252VAC or 339 to 437VAC 50/60Hz, 3 phase
Configuration:	Closed Delta or WYE (3 or 4 wire)
Disconnect Size:	250 Amp fused disconnect recommended
Actual amperage draw at:	30kW - 133A, 27.5kW - 123A, 25kW - 110A, average, actual determined by line voltage, carrier frequency, etc.
AC wire size:	250 MCM copper, THW or equivalent
Power Consumption:	44.0kW at 30kW RF output
Phasemaster size (if needed):	T-12000 or T-12000-A (28kW - 40kW)
Cooling Air requirements:	1) PA cabinet: 1200 CFM 2) Driver cabinet: 500 CFM 3) HV power supply: convection
Air Outlet (PA exhaust) size:	Primary: Top of PA Cabinet (3' x 30") Secondary: Top of Driver (22" x 30") and Power Supply Cabinet (33" x 30")
Heat dissipation:	14kW (47,782 BTU/Hr) @ 30kW 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 14kW dissipated, a 3.98 ton A/C unit would be, needed (14,000 x 3.413 = 47,782/12,000 = 3.98)
Output connection size:	3 1/8" EIA Female
Course tuning line height:	4.5 inches at 88MHz, 17.5 inches at 108MHz
Standard distance for remote HV power supply:	30 feet
Weight: PA/Driver Cabinet:	1500 lbs
HV Power Supply:	1750 lbs

FM-30T/FM-35T

30kW & 35kW High Power FM Transmitters

FM-35T 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 10kHz 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 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 (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

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.
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 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 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, 40kHz to 100 kHz.

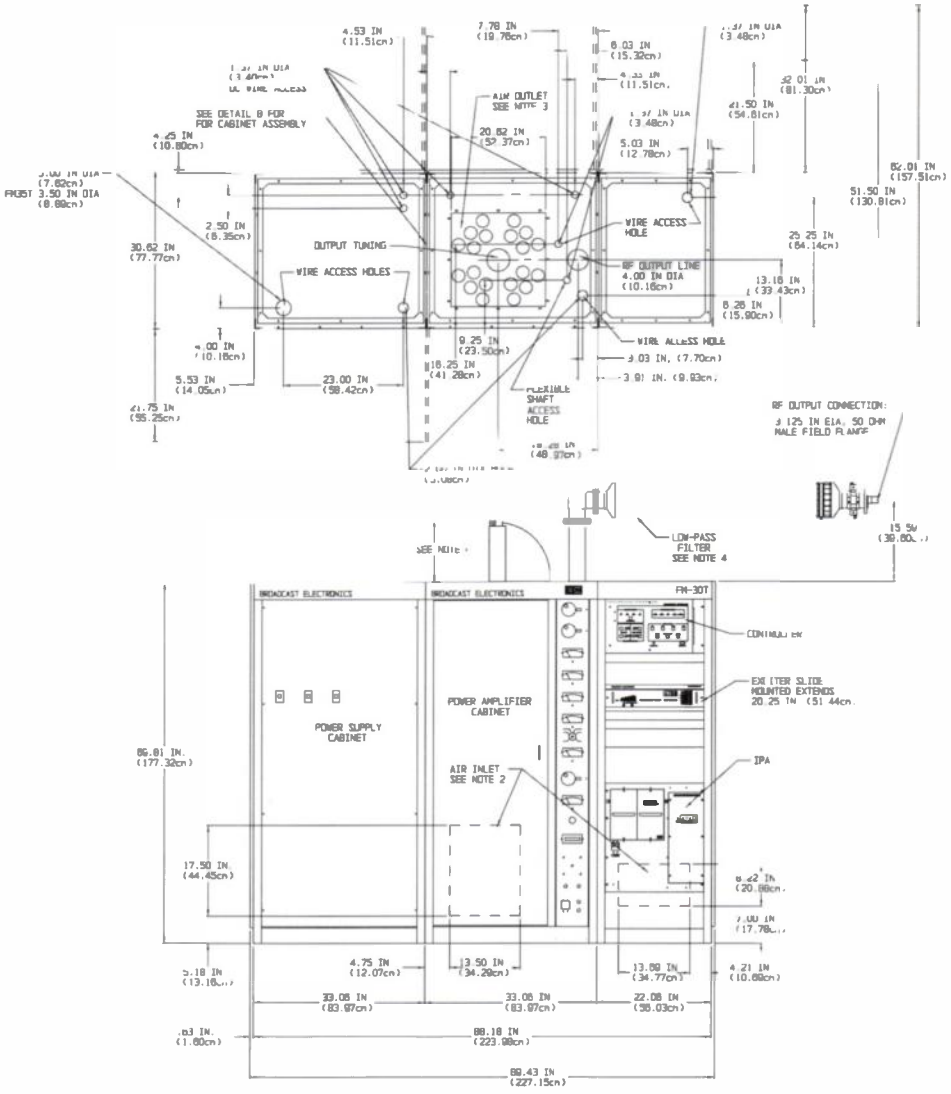
Frequently Asked Questions

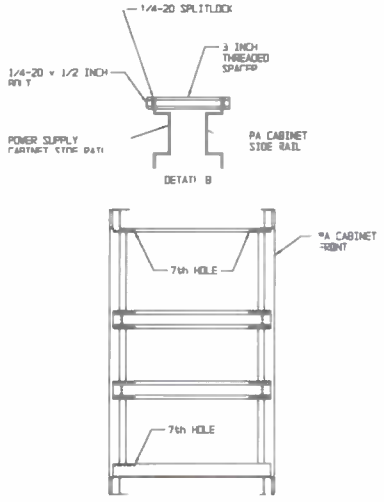
MODEL FM-35T

Power Range:	10kW to 38.5kW
AC Voltage Requirements:	196 to 252VAC or 339 to 437VAC 50/60 Hz, 3 phase
Configuration:	Closed Delta or WYE (3 or 4 wire)
Disconnect Size:	300 Amp fused disconnect recommended
Actual amperage draw at:	38kW - 172A, 35kW - 155A, 32kW-142A, average, actual determined by line voltage, carrier frequency, etc.
AC wire size:	350 MCM copper, THW or equivalent
Power Consumption:	51.0kW at 35kW RF output
Phasemaster size (if needed):	T-14000 or T-14000-A (50kW - 54.9kW)
Cooling Air requirements:	1) PA cabinet: 1200 CFM 2) Driver cabinet: 500 CFM 3) HV power supply: convection
Air Outlet (PA exhaust) size:	Primary: Top of PA Cabinet (33" x 30") Secondary: Top of Driver (22" x 30") and Power Supply Cabinet (33" x 30")
Heat dissipation:	16kW (54,608 BTU/Hr) @ 35kW 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 16kW dissipated, a 4.55 ton A/C unit would be needed (16,000 x 3.413 = 54,608/12,000 = 4.55)
Output connection size:	3 1/8" EIA Female
Course tuning line height:	4.5 inches at 88MHz, 17.5 inches at 108MHz
Standard distance for remote HV power supply:	30 feet
Weight:	PA
Cabinet:	1500 lbs
HV Power Supply:	1750 lbs

FM-30T/FM-35T

30kW & 35kW High Power FM Transmitters





PA/POWER SUPPLY CABINET ASSEMBLY NOTES:

1. Refer to detail "A" to locate the spacers. Refer to detail "B" and secure the spacers to the side rails of the PA cabinet with the 1/4-20 hardware as shown.
2. Remove the power supply side-panel. Position the power supply cabinet until the spacers are aligned with identical holes in the power supply cabinet side rails.
3. Refer to detail "B" and secure the cabinets with 1/4-20 hardware as shown. Replace the power supply side-panel.

NOTES:

1. Power supply cabinet may be located remotely from the PA/Driver cabinet if desired. 30 feet (9.14 m) standard.
2. Air inlet:
   1. Location: PA cabinet rear-panel dimensions
   Width: 13.5 inches (34.29 cm)
   Height: 17.5 inches (44.45 cm)
   Filter: 16 inches X 20 inches X 1 inch nominal. BEI P/N 407-0062.
   2. Location: Driver cabinet rear-panel dimensions
   Width: 13.69 inches (34.77 cm)
   Height: 8.22 inches (20.88 cm)
   Filter: 16 inches X 20 inches X 1 inch nominal. BEI P/N 407-0062.
3. Air outlet: Primary - top of PA cabinet. Secondary - top of power supply and driver cabinets.
4. RF output assembly:
   Connection: 3.125 inch EIA 50 ohm male field flange.
   Low-pass filter (BEI P/N 339-0022):
   Dimensions:
   Length: 52.12 inches (132.38 cm)
   Diameter: 6.13 inches (15.57 cm)
   Mounting: mechanical support required external to transmitter.
   Weight: 65 pounds (29.48 kg)
   Tuning line height (determined by transmitter frequency):
   Maximum: 15.5 inches (39.37 cm) @ 108 MHz
   Minimum: 4.5 inches (11.3 cm) @ 88 MHz
5. Cubage:
   PA/driver cabinet: 72 cubic feet (2 m^3) (1.25 m^3)
   Power supply cabinet: 44 cubic feet
6. Weight:
   PA/driver cabinet: 1500 pounds (682 kg)
   Power supply cabinet: 1750 pounds (794 kg)
7. Cooling air requirements:
   PA cabinet: 1200 cubic feet per minute (34 m^3/min)
   Driver cabinet: 500 cubic feet per minute (14.2 m^3/min)
8. AC input requirements:
   FM-30T: 196V to 252V AC 50/60 Hz or 339V to 437V AC 50 Hz, three-phase closed-delta or WYE, 250 amperes per phase maximum. Fused disconnect recommended.
   FM-35T: 196V to 252V AC 50/60 Hz or 339V to 437V AC 50 Hz, three-phase closed-delta or WYE, 300 amperes per phase maximum. Fused disconnect recommended.
9. Heat dissipation:
   FM-30T (30 kW output): 14 kW (48,000 BTU/H)
   FM-35T (35 kW output): 16 kW (55,000 BTU/H)
10. Power consumption:
    FM-30T: 44.0 kW for a 30 kW output, 0.94 power factor
    FM-35T: 51.0 kW for a 35 kW output, 0.94 power factor

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WRH

FM-500C1/FM-1C1

500W & 1000W Solid State FM Transmitter

The Broadcast Electronics' 500 Watt and 1000 Watt Solid State FM transmitters have set the standard for audio quality, cost-efficiency, reliability and long life. The FX-50 exciter delivers unmatched audio performance. These Solid State FM transmitters represent just one of the many solutions to your radio needs.

Model FM-1C1 shown here

Features

- Contains the renowned FX-50 Exciter technology 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 individual P.A. modules.
- 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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HD GUARANTEED Radio

FM-500C1/FM-1C1

500W & 1000W Solid State FM Transmitter

FM-500C1 Performance Specifications

GENERAL

Power Output: 125 watts to 500.
Frequency Range: 87.5 to 108 MHz, tuned to specific operating frequency. Exciter programmable in 10kHz 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 FX-50, incorporating a digitally programmed synthesizer (10 kHz increments). Predator digital exciter optional.
Pre-Emphasis: 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 de-emphasize (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.
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 60 Hz (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) unpacked; 140 lbs. (64kg) 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 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 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.
Composite Input Impedance: 10K ohm or 50 ohm, nominal, resistive, selectable.
Composite Input Level: 3.5V pp 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 Total 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: ±0.25 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).

Frequently Asked Questions

MODEL FM-500C1

Power Range:	125 Watts to 500 Watts
AC Voltage Requirements:	196 to 252VAC, 50/60 HZ
Configuration:	Single Phase
Disconnect Size:	15 Amp fused disconnect recommended
Actual amperage draw at:	1 Phase, 500 Watts RF output, 6 Amps, average, actual determined by line voltage, carrier frequency, etc...
AC wire size:	14 copper, AWG or equivalent
Power Consumption:	1.1kW at 500W RF output into 50 ohm resistive load
Cooling Air requirements:	1) 600 CFM - Amplifier 2) 100 CFM - Exciter 3) 700 CFM - Total
Air Outlet (PA exhaust) size:	At the top (19" x 18")
Heat dissipation:	800 Watt (2,730 BTU/Hr) at 500 Watt 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 800W dissipated, a .227 ton A/C unit would be needed (800 x 3.413 = 2,730/12,000 = .227)
Output connection size:	Type N
Rack Requirements:	19" Rack Universal Mounting rail spacing (.281 diameter holes or 10-32 taps) with 15 vertical rack units (26.25"). Depth 25" minimum
Weight:	FM-500C1 - 75 lbs, FX-50 - 38 lbs

FM-500C1/FM-1C1

500W & 1000W Solid State FM Transmitter

FM-1C1 Performance Specifications

GENERAL

Power Output: 250 watts to 1,000.
Frequency Range: 87.5 to 108 MHz, tuned to specific operating frequency. Exciter programmable in 10kHz 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 kHz.
Modulation Indication: Peak reading, color-coded LED display with baseband overmodulation indicator.
Exciter: Solid state, 50-watt output, Model FX-50, incorporates 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: 68 dB below reference carrier with 100% AM modulation @ 1000 Hz, 75µS de-emphasis (no FM modulation present).
Synchronous AM S/N Ratio: 58 dB below 1 kW reference carrier with 100% AM modulation @ 1000 Hz, 75 µS 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 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 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).

Frequently Asked Questions

MODEL FM-1C1

Power Range:	250 Watts to 1000 Watts
AC Voltage Requirements:	196 to 252VAC, 50/60Hz
Configuration:	Single Phase
Disconnect Size:	20 Amp fused disconnect recommended
Actual amperage draw at:	1 Phase, 1kW RF output, 11 Amps, average, actual determined by line voltage, carrier frequency, etc...
AC wire size:	12 copper, AWG or equivalent
Power Consumption:	2.2kW at 1kW RF output into 50 ohm resistive load
Cooling Air requirements:	1) 600 CFM - Amplifier 2) 100 CFM - Exciter 3) 700 CFM - Total
Air Outlet (PA exhaust) size:	At the top (19" x 18")
Heat dissipation:	1.5kW (5,120 BTU/Hr) at 1kW 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 1.5kW dissipated, a .43 ton A/C unit would be, needed (1500 x 3.413 = 5,120/ 12,000 = .43).
Output connection size:	Type N
Rack Requirements:	19" Rack Universal Mounting rail spacing (.281 diameter holes or 10-32 taps) with 15 vertical rack units (26.25") Depth 25" minimum.
Weight:	FM-1C1 - 103 lbs, FX-50 - 38 lbs

AM & FM Transmitters

In addition to our line of "C" Series Solid State FM transmitters, Broadcast Electronics also offers a line of high power FM transmitters, ranging from 5kW to 70kW. If your needs require AM transmitters, our family of AM Solid State transmitters range from 500 watts to 10kW.

All of our transmitters are HD Radio ready. Whether your needs are AM or FM, give us a call as we have a solution that is right for you.

Model AM-1A

Solid State AM Transmitter Line 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.

"T" Series Transmitter Advantages

- **Folded Half-Wave Cavity** – Patented, exclusive Broadcast Electronics output cavity technology eliminates plate blocker and sliding contacts, preventing mechanical failures and extending transmitter life.
- **True Proportional VSWR Foldback** – Exclusive Broadcast Electronics technology protects the transmitter under all antenna load conditions. Advanced automatic power control allows the transmitter to turn on into high VSWR, then return to full power when the problem is cleared.
- **Advanced Controller Design** – New state-of-the-art controller monitors virtually all operating parameters of the transmitter and facilitates remote monitoring and full connectivity.

Model FM-30T

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FM-3C

Solutions for Tomorrow's Radio

3 kW Solid State FM Transmitter

HD GUARANTEED Radio

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.

Need Solutions?
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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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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 FXi60)

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 FXi 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 1.5:1 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: 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

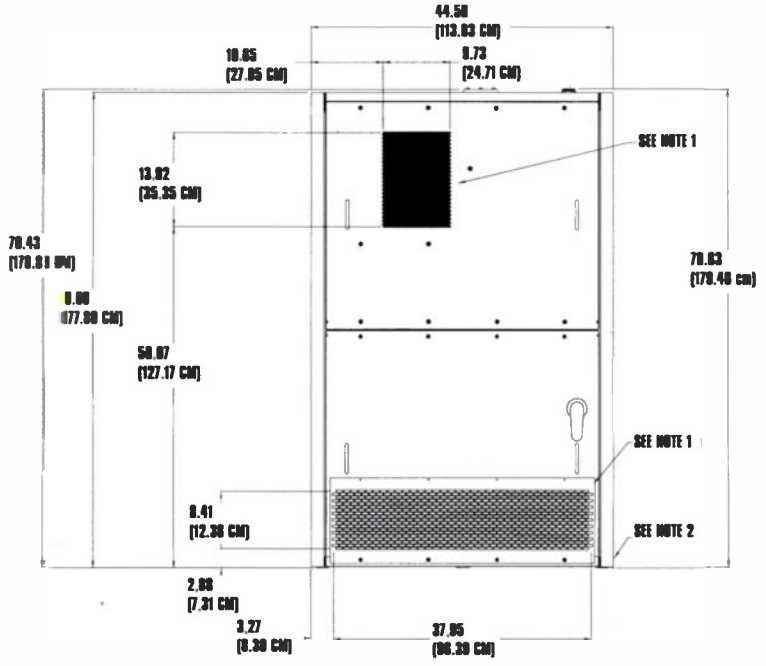
Power Range:	5kW to 10kW
AC Voltage Requirements:	196 to 252 VAC, 50/60 Hz, 3 phase, Closed Delta or WYE (3 or 4 wire) 340 to 435 VAC, 50/60 Hz, 3 phase, 4 wire, WYE only
Disconnect Size:	100 Amp fused disconnect recommended
Actual amperage draw at:	10kW - 50A, average, actual determined by line voltage, 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 outpu
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

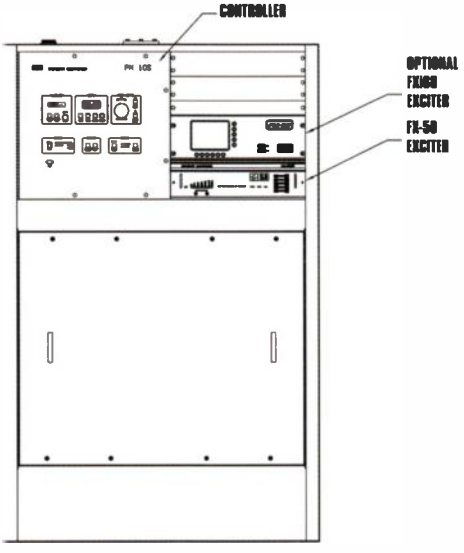
MODEL FM-10S [Single Phase]

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

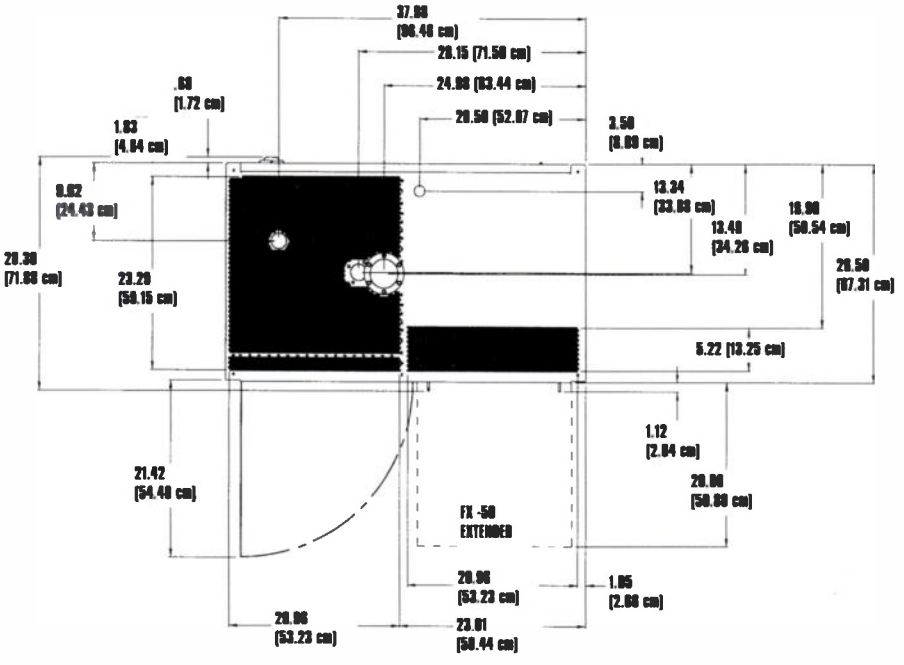




FM-10S

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 ohm 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 ohm 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 power units.
9. AC power consumption: 17 kW nominal at a 10kW RF output into a 50 ohm 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 252 VAC 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-150 amp, 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 @ 230 VAC 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.

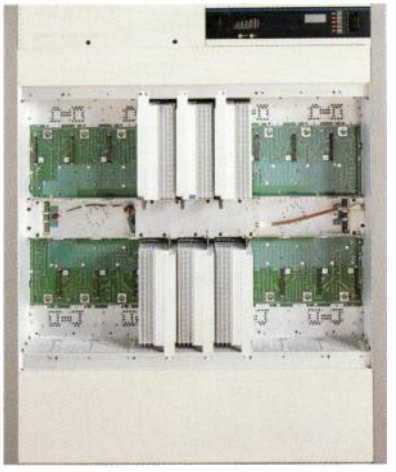
FXi 60 Digital Exciter

The FXi 60 is the first direct-to-channel digital FM exciter. The FXi 60 eliminates the need for analog up-conversion and the resultant noise and filtering requirements. It is HD Radio upgradeable with operational modes of FM only, HD Radio only, or FM + HD Radio. And it is available in 60 or 250 watts.

Automatic Power Control

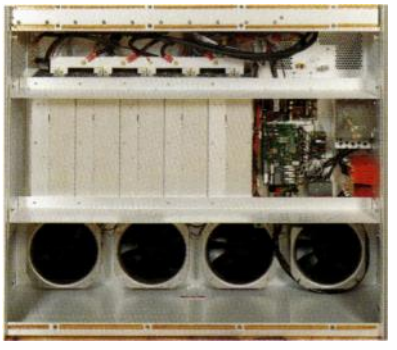
The integrated automatic power control system (APC) in all Broadcast Electronics' solid state transmitters maintains constant RF output power within 2.0% of the operator setting, regardless of fluctuations in incoming AC line voltage, RF drive level or antenna impedance. In addition, the sophisticated 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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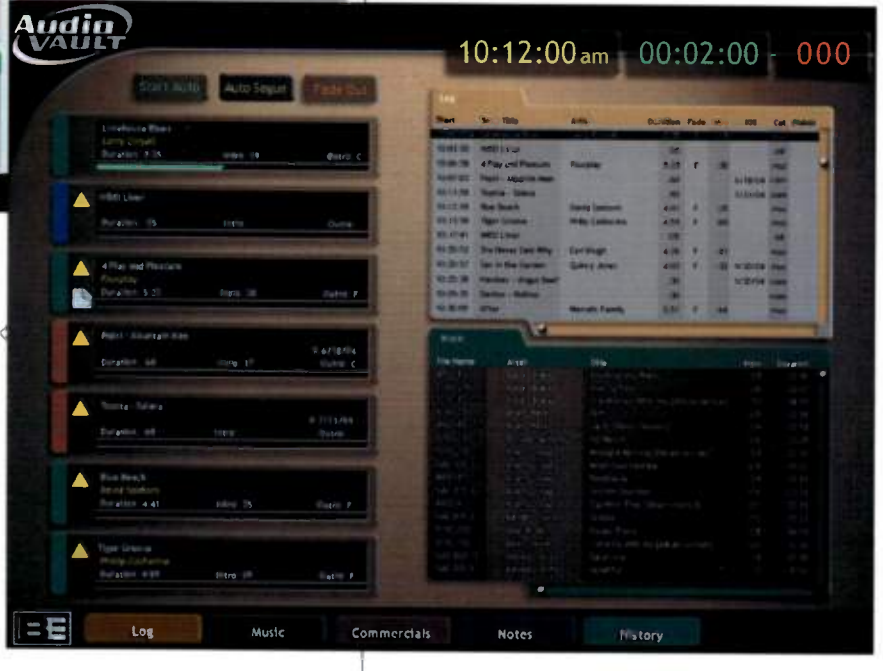
AudioVAULT

Flex-Screen in Version 9.0



AudioVAULT Version 9.0 Flex-Screen

Broadcast Electronics continues to integrate new software technology into our AudioVAULT hard disk storage and content management system for radio broadcast. In Version 9.0, for both VAULT² and VaultXpress customers, we will release Flex-Screen technology for AV-Air, the primary on-air graphical user interface. Based on a style-sheet concept, Version 9.0 lets you create a custom interface that matches your talents' workstyles.

Screen designs, under our security system, can be customized for each system operator. With Flex-Screen, all of the following can be tailored for each broadcast talent:

- Color palettes, ranging from primary to neon electric
- Location and orientation of tabs for navigation
- Number and location of play decks
- Data presented in schedule and inventory tabs
- Individualized quick-start palettes with drag and drop simplicity

AV-Air can now be tailored to fit your operating styles. From active morning shows to laid-back overnights, Flex-Screen allows you to get the most out of your format.

In addition to Flex-Screen, Version 9.0 will include additional value-added features such as Windows XP support, a second generation CD ripper, true IP networking, and additional data integration support for RDS and HD Radio. Current VAULT² and VaultXpress customers will receive Version 9.0 under the software maintenance plan.

KEY PRODUCT FEATURES

- Flex Screen designer for AV-Air, the primary on-air interface, for live, live-assist and automated operations
- Windows 2000 and XP operating system support
- True TCP/IP networking
- Support for Digigram's full line-up of professional audio broadcast cards
- SoundBlaster Live audio card support with DirectX drivers
- Multiple audio storage and playback redundancy options
- Satellite software for syndicated formats, and network record
- Audio ingest and editing applications
- Advanced schedule integration and voicetracking
- Wide area network management tools
- 24/7 call center technical support
- Software maintenance plan insuring access to all new features released

WRH

AudioVAULT: AV100 to VAULT² Platform Upgrade

Features/Benefits of the VAULT²

The new VAULT² platform employs the latest in technology advances. Summary benefits include:

- Audio Cards PCI
- Lower Cost DirectX Audio Card
- WAV File Standard
- 17 X Faster NFS
- Non-Proprietary File System
- On-Card Mixing
- Use of Off-the-Shelf Storage

AudioVAULT Product Family Review

Characteristic	AudioVAULT 100	VAULT²
Audio Hardware	BE Proprietary - AV100	Digigram VX, PCX, Mixart
	Record/Play	VX - Record/Play
	Play/Play DB	VX - 4 Play/Record
	Record/Play DB	Mixart - 4 Play/4 Record
		SoundBlaster
Software Versions	All up through 8.4X	All
PC Interface	ISA	PCI
Hardware Form Factor	Full Size Plug-In Card	Half Size PCI Card
Network Protocol	Netbios/Netbeui	TCP/IP
	TCP/IP	
Operating System		
Server	NT 4.0 SP5, 98 SE	Win 2000
Client	NT 4.0 SP5, 98 SE	Win 2000, 98 SE
	Windows 2000	Windows XP
Architecture	Server	Server & Peer-to-Peer
		Remote File System
		(Stream over Network to Workstation)
Audio File Format	BE Proprietary	Bdcast WAV, Cart Chunk
File System	BE Proprietary	Windows NTFS
Storage Interface	Narrow SCSI On-Card	Off-the-Shelf SCSI or IDE
		RAID, NAS
Multiple Audio Stream Mixing	No	Yes
Compression	Linear	Linear
	MPEG Layer 2	MPEG Layer 2
		MP3
Redundancy and Backup Options		
Redundant Servers via NFS	Yes	Yes
Off-the-Shelf Server Clustering	No	Yes
IDE Drives	No	Yes
Tape Backup	Limited	Yes - Off the Shelf
RAID I	Limited	Yes - Off the Shelf
RAID V	Limited	Yes - Off the Shelf
Fiber Channel/SAN/NAS	No	Yes
DirectX Support	No	Yes
Network	10/100 Mbps	10/100/1000 Mbps
Network File Transfer Speeds	80 Kbps	1.4 Mbps

History of the AudioVAULT 100

The AudioVAULT 100 platform is now over 10 years old. In the early 90's, Broadcast Electronics introduced a family of proprietary audio cards that were ISA-slot based along with accompanying daughter cards. At the time the design criteria for our platform included overcoming the limitations of computer hardware, software, and networking at that time. We were the first to support uncompressed audio, and the first to overcome the audio drop-outs associated with streaming audio over Ethernet networks. This platform has served many of us well. In fact, many of our customers are still operating on AV100's today.

AV100 to VAULT² Platform Migration

As we all know, computer and network technology has marched rapidly on. Today, the PCI slot is now ubiquitous, networks run at a least 100 Mbps, and disk drive technologies have advanced rapidly. We can almost say that Microsoft Windows has improved dramatically. In 1999, we released the VAULT² platform (includes the VaultXpress.) Using off-the-shelf audio cards, Windows NTFS file system, and the latest in computer technology, VAULT² offers feature and performance enhancements over our AV100 platform. Given our software compatibility across platforms, moving your existing audio assets to VAULT² is a simple and efficient process.

Incentive to Upgrade

While many of our customers have migrated to the newer VAULT² platform, many of you continue on with the AV100. We have had a single software load line for both platforms since the release of VAULT². We are rapidly approaching the point where we cannot continue to release a parallel feature set for both. In order to mitigate the financial implications for migration to VAULT², we have provided generous credits for conversion from the AV100. When upgrading, we offer credit towards the return of both AV100 R/P cards, and of all audio daughter boards from existing systems. Given the age of the AV100, 2004 will be the last year to receive these credits. If you are thinking about your upgrade, give your sales representative a call. Go VAULT² and get the performance enhancements today!

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FM-2C

2 kW Solid State FM Transmitter

Solutions for Tomorrow's Radio

HD GUARANTEED Radio

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.

Need Solutions?
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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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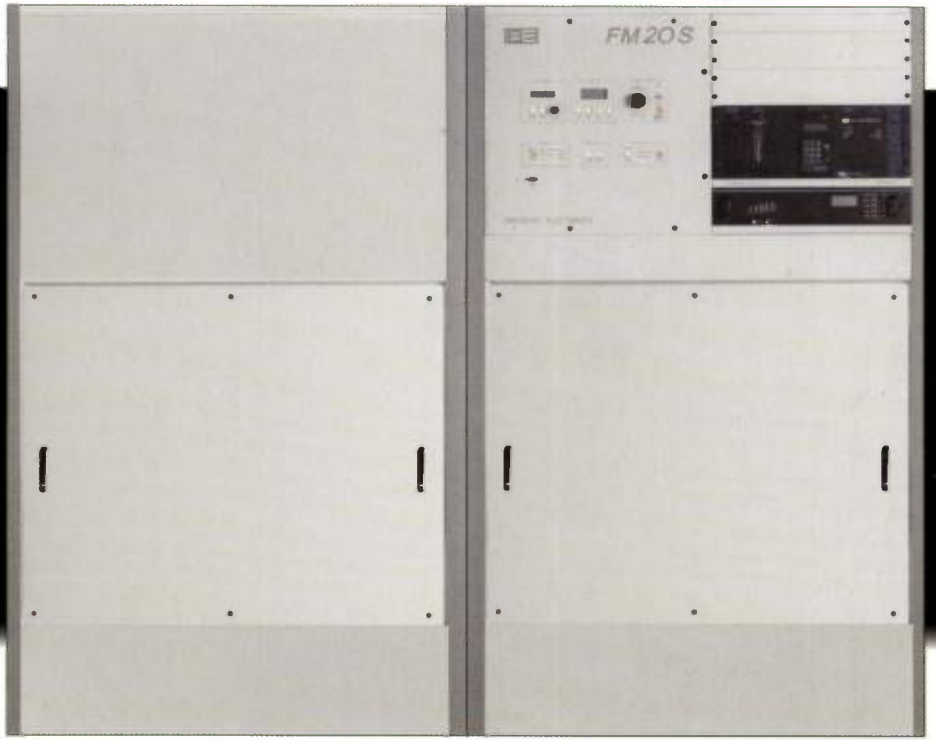
FM-20S

20 kW Solid State FM Transmitter

A solid combination of performance, reliability, ease of service and price define the new FM-20S 20kW solid state FM transmitter from Broadcast Electronics.

Engineered to the same exacting standards as our complete line of solid state FMs, the FM-20S 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. Optional standby exciter, IPA's and power supplies can give you full power standby without having to buy another transmitter.

The FM-20S' large lift off panels provide immediate access to every major assembly for fast and easy repair. In fact, the FM-20S 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 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 supplies provide full power operation with one supply removed in each 10kW section.
- 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.
- Built-in final combiner bypass allows operation of one half of the transmitter directly into antenna.
- Designed from the ground up for 20kW operation.
- Optional integral standby exciter and IPA's provide automatic change over of both.
- Available with optional Predator digital exciter.
- Internal combiner and reject load provide easy installation and smaller total footprint.
- Provision for larger, external reject load allows higher power output under internal mismatch condition.

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FM-20S

20 kW Solid State FM Transmitter

Performance Specifications

GENERAL

Power Output: 10,000 watts to 20,000 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.
VSWR: Rated power into 1.4:1 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 20 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 20 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. 20 kW output power into 50 ohm load.
Overall Efficiency: 57% or better at 230 VAC, 20,000 watts into 50 ohms, 60% 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: 89.0"W x 70"H x 26.5"D (225cm x 178cm x 68cm)
Weight: 1300 lbs. (590kg) standard unpacked
1370 lbs. (623 kg) with standby exciter, IPA and power supply options.

Frequently Asked Questions

MODEL FM-20S

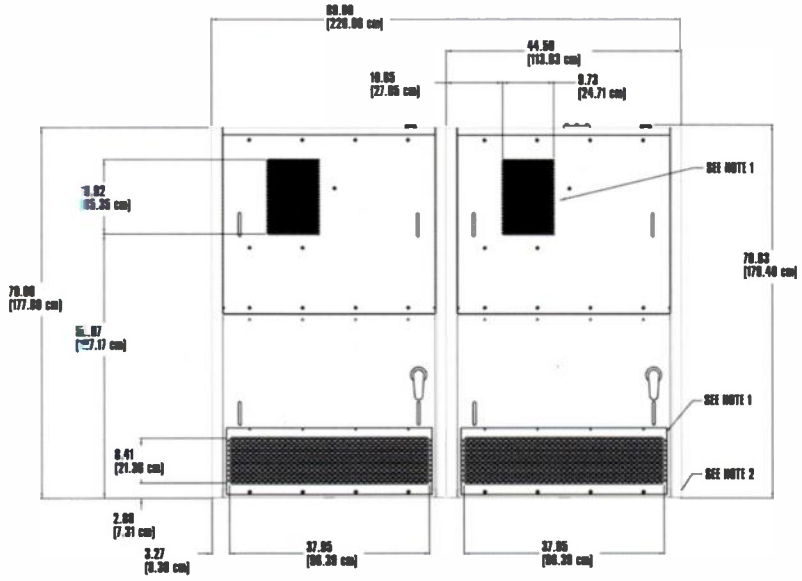
Power Range:	10kW to 20kW
AC Voltage Requirements:	196 to 252 VAC, 50/60 Hz, 3 phase, Closed Delta or WYE (3 or 4 wire) 340 to 435 VAC, 50/60 Hz, 3 phase, 4 wire, WYE only
Disconnect Size:	100 Amp fused disconnect recommended per cabinet.
Actual amperage draw at:	50A, average for each 10kW section approx. 100A total, (actual determined by line voltage, carrier frequency, etc.) per cabinet.
AC wire size:	1 AWG copper, THHN or equivalent
Power Consumption:	35kW at 20kW RF output
Cooling Air requirements:	5400 CFM total (2700 CFM per cabinet)
Air Outlet (PA exhaust) size:	Top of each cabinet (27" x 45")
Heat dissipation:	15kW (51,195 BTU/hr) at 20kW 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 15kW dissipated, a 4.27 ton A/C unit would be needed (15,000 x 3.413 = 51,195/12,000 = 4.27)
Output connection size:	3 1/8" EIA female
Weight:	1300 lbs. standard unpacked

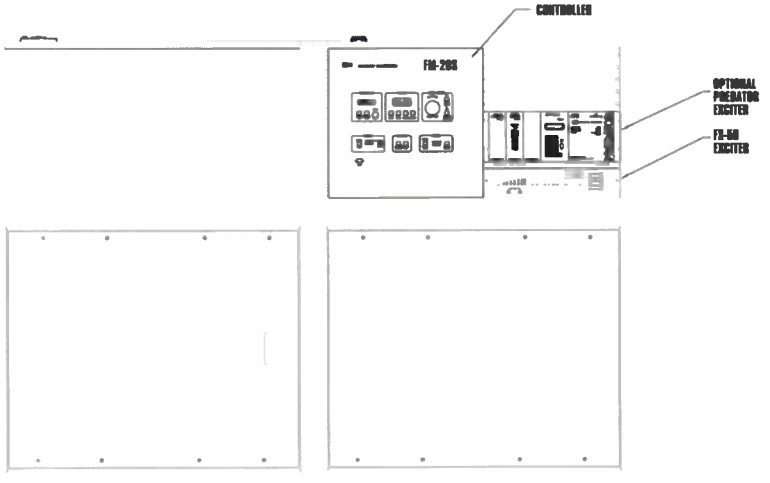
MODEL FM-20S (Single Phase)

Power Range:	10kW to 20kW
AC Voltage Requirements:	196 to 252VAC, 50/60 Hz, single phase
Disconnect Size:	150 Amp fused disconnect recommended per cabinet.
Actual amperage draw at:	85A, average for each 10kW section approx. 110 total, (actual determined by line voltage, carrier frequency, etc.) per cabinet.
AC wire size:	2/0 copper, THHN or equivalent per cabinet.
Power Consumption:	35kW at 20kW RF output
Cooling Air requirements:	5400 CFM total (2700 CFM per cabinet)
Air Outlet (PA exhaust) size:	Top of each Cabinet (27" x 45")
Heat dissipation:	15kW (54,608 BTU/hr) at 26kW 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 15kW dissipated, a 4.27 ton A/C unit would be needed (15,000 x 3.413 = 51,195/12,000 = 4.27)
Output connection size:	3 1/8" EIA female
Weight:	1300 lbs. standard unpacked

FM-20S

20 kW Solid State FM Transmitter

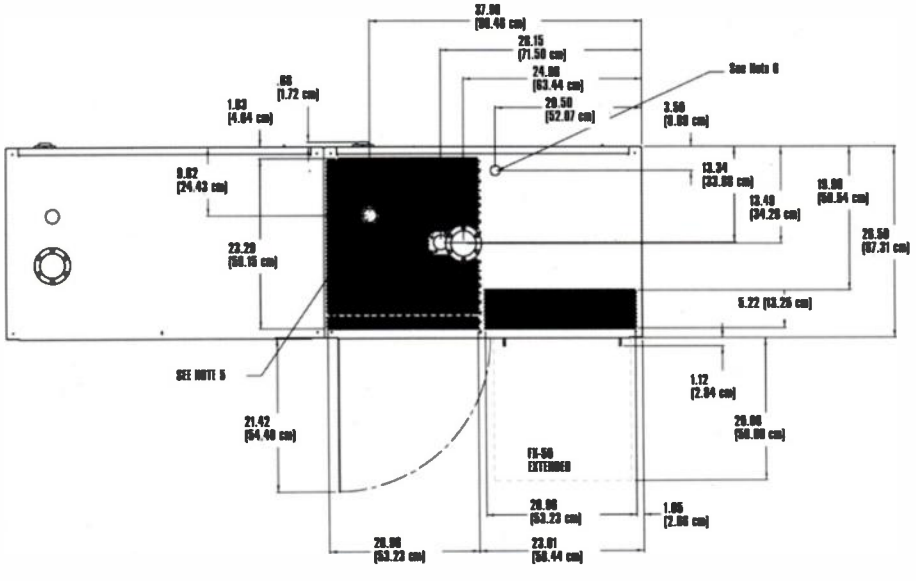




FM-20S

FM-20S NOTES:

1. Air inlet at rear of each cabinet 2400 cfm (68.0 3m 3/min) filter required.
2. Ground strap entry in lower right corner at rear of each cabinet.
3. RF Output Connection: 3-1/8 inch EIA 50 ohm female field flange.
4. Air outlet at top of each cabinet.
5. Access for AC power through each cabinet top access hole.
6. Access for remote control, modulation monitor, and audio connections through top of cabinet.
7. Heat dissipation: 16 kW (54,608 btu/h) nominal at a 20 kW RF output, 50 ohm resistive load. 20 kW (68,260 btu/h) at a 20 kW RF output into a 1.4:1 VSWR load.
8. Weight: 1300 lbs (590 kg) unpacked, 1370 lbs (623 kg) with optional exciter, IPA and power units.
9. AC power consumption: 35 kW nominal at a 20 kW RF output into a 50 ohm resistive load with a 230 VAC input. 40 kW at a 20kW RF output into a 1.5:1 VSWR load with a 230 VAC input.
10. AC power input per cabinet: 196 to 252 VAC 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-150 amp, wire size-2/0 copper awg. type THHN three phase: fuse size-100 amp, wire size-#1 copper awg. type THHN per cabinet.
12. Power factor - .98 @ 230 VAC with a 20kW RF output into a 50 ohm load.



FM-20S

20 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.

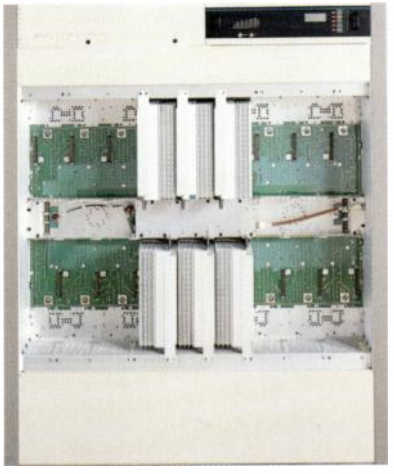
Predator Digital Transmitter/Exciter

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

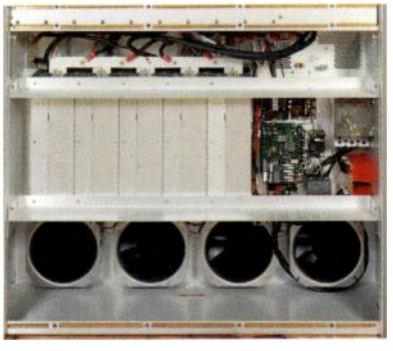
The integrated automatic power control system (APC) in all Broadcast Electronics' solid state transmitters maintains constant RF output power within 2.0% of the operator setting, regardless of fluctuations in incoming AC line voltage, RF drive level or antenna impedance. In addition, the sophisticated 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 panels allow 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-20S 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 in one cabinet operational. Optional redundant IPA's ensure 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-20S is the only transmitter in its class that offers true power supply redundancy. The FM-20S comes standard with four modular PA power supplies in each cabinet 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-20S can stay on the air with as many as three supplies off line in either cabinet in the optional configuration.

Cooling for the FM-20S is provided by eight ball bearing blowers. These high capacity air movers ensure 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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FM-100C/FM-250C/FX-50

50, 100 & 250 Watt Exciter/Transmitter

The FX-50, FM-100C, and FM-250C from Broadcast Electronics can bring existing FM transmitters up to digital quality standards and have the lowest distortion of any available exciter. As the acknowledged standard for FM audio performance, these exciters' breakthrough technology remains unsurpassed by more costly and complex digital exciters. With the superb specifications available in these products, these exciters are totally transparent to your broadcast signal.

Model FM-100C shown here

Features

- The FM-100C can serve as a reliable 125 watt stand-alone FM transmitter; the FM-250C can serve as a reliable 250 watt stand-alone FM transmitter, and the FX-50 can serve as a reliable 50 watt stand-alone FM transmitter.
- Computer-optimized phase locked loop greatly improves low frequency response.
- Contains a 250 watt MOSFET as the output device.
- Optional N+1 board allows selection of up to 10 different frequencies in local or remote locations.
- 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.
- With a signal to noise ratio that is typically 93dB, the FM-50 can handle all of the nuances and power of digital audio.

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HD GUARANTEED Radio

FM-100C/FM-250C/FX-50

50, 100 & 250 Watt Exciter/Transmitter

FM-100C Performance Specifications

GENERAL

Power Output: 10 to 125 W continuously variable (BNC connector) open and short circuit protected.

Frequency Range: 87MHz to 109MHz digitally programmable in 10kHz increments.

RF Output Impedance: 50 ohms.

Frequency Stability: 300Hz, +32°F to +122°F (0°C to +50°C).

Modulation Type: Direct FM at the carrier frequency.

Modulation Capability: 350kHz.

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).

AC Input Power: 97 to 133 VAC or 194 to 266 VAC, 50/60 Hz, 400 W maximum.

Ambient Temperature Range: +32ºF to +122ºF (0ºC to +50ºC).

Dimensions: 20.375"D x 7"H x 19"W (51.75 x 13.33 x 48.26 cm)

Net Weight: 42 lbs. (19 kg), packed 50 lbs. (22.7 kg).

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 ±75 kHz deviation at 400Hz, measured in a 20Hz to 200kHz bandwidth with 75µ 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, 15kHz/14kHz, 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.

MONAURAL OPERATION

Audio Input Impedance: 600 ohms balanced, resistive, adaptable to other impedances 60dB common mode suppression.

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

Audio Frequency Response: ±0.5dB, 30Hz to 15kHz; selectable flat, 25, 50 or 75µS pre-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, 15kHz/14kHz, 1:1 pairs).

Transient Intermodulation Distortion: 0.01% or less (square wave/sine wave).

FM S/N Ratio: 85dB below ±75kHz deviation @ 400Hz. Measured within a 20Hz to 200kHz bandwidth with 75µS de-emphasis.

FM-250C Performance Specifications

GENERAL

Power Output: 25 to 250 W continuously variable (BNC connector open and short circuit protected).

RF Output Impedance: 50 ohms.

Frequency Range: 87MHz to 109MHz digitally programmable in 10kHz increments.

Frequency Stability: ±300Hz, +32°F to 122°F (0°C to +50°C).

Modulation Type: Direct FM at the carrier frequency.

Modulation Capability: ±350kHz.

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 50 W reference carrier with 100% AM modulation at 1kHz, no de-emphasis (FM modulation ±75kHz and 1kHz).

AC Input Power: 97 to 133 VAC or 194 to 266 VAC, 50/60Hz, 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: 53 lbs (24 kg); packed 63 lbs (27 kg).

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 ±75kHz 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, 15kHz/14kHz, 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.

FM-100C/FM-250C/FX-50

50, 100 & 250 Watt Exciter/Transmitter

FM-250C Performance Specifications continued

MONAURAL OPERATION

Audio Input Impedance: 600 ohms balanced, resistive, adaptable to other impedances, 60dB common mode suppression.

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

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

Total Harmonic Distortion Plus Noise (THD+N): 0.01% or less at ±75kHz 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 86dB below 100% modulation. Twin tone, 15kHz/15kHz 1:1 pairs.).

Transient Intermodulation Distortion: 0.01% or less (square wave/sine wave).

FM S/N Ratio: 85dB below ±75kHz deviation @ 400Hz. Measured within a 20Hz to 200kHz bandwidth with 75µS de-emphasis.

FX-50 Performance Specifications

GENERAL

Power Output: 3 to 50 W continuously variable (BNC connector) open and short circuit protected.

RF Output Impedance: 50 ohms.

Frequency Range: 87MHz to 109MHz digitally programmable in 10kHz increments.

Frequency Stability: ±300Hz, +32°F to +122°F (0°C to +50°C).

Modulation Type: Direct FM at the carrier frequency.

Modulation Capability: ±350kHz.

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).

AC Input Power: 97 to 133 VAC or 194 to 266 VAC, 50/60Hz, 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"Hx19.00"D (44.96 x 13.33 x 48.26 cm).

Net Weight: 38 lbs (17.1 kg), packed 46 lbs (20.7 kg).

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 86dB below 100% modulation. Twin tone, 15kHz/14kHz, 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: ±0.1 degree from linear phase, 30Hz to 53kHz.

Composite Group Delay Variation: ±5 nanoseconds, 30Hz to 100kHz.

MONAURAL OPERATION

Audio Input Impedance: 600 ohms balanced, resistive, adaptable to other impedances, 60dB common mode suppression.

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

Audio Common Mode Rejection Ratio: Greater than 60dB.

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

Total Harmonic Distortion Plus Noise (THD+N): 0.005% or less (0.003% typical) at ±75kHz deviation and 50W RF output, 400Hz 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 86dB below 100% modulation. Twin tone, 15kHz/15kHz, 1:1 pairs).

Transient Intermodulation Distortion: 0.01% or less (square wave/sine wave).

FM S/N Ratio: 90dB below ±75kHz deviation @ 400Hz (93dB typical). Measured within a 20Hz to 200kHz bandwidth with 75µS de-emphasis. 94dB (96dB typical) with DIN "A" weighting.

FXi Digital Exciters

In addition to the analog exciters, Broadcast Electronics also offers digital exciters.

The FXi 60 from Broadcast Electronics is the first direct to channel digital FM exciter. The FXi 60 eliminates the need for analog up-conversion and the resultant noise and filtering requirements.

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 only, or FM + HD Radio.
- Available in 60 and 250 watt versions.
- 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.
- More input flexibility than any other exciter available.

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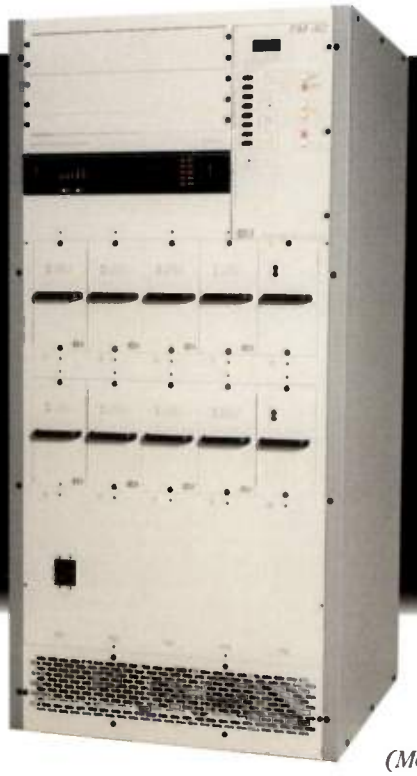
FM-4C/FM-5C

4 & 5 kW Solid State FM Transmitters

HD GUARANTEED Radio

The Broadcast Electronics' 4 & 5 kilowatt Solid State FM transmitters have set the standards for audio quality, cost-efficiency, reliability, and long life. These transmitters offer 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.



(Model FM-4C shown here)

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/FM-5C

4 & 5 kW Solid State FM Transmitters

FM-4C 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).

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.

FM-5C 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).

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.

Frequently Asked Questions

MODEL FM-4C

Power Range:	2.0kW to 4.0kW
AC Voltage Requirements:	196 to 252VAC Single Phase, 339 to 437VAC Three Phase 50/60Hz
Configuration:	Single Phase or Three Phase
Disconnect Size:	70 Amp fused disconnect recommended (Single Phase) 50 Amp fused disconnect recommended (Three Phase)
Actual amperage draw at:	1 Phase, 4.0kW RF output, 37 Amps average at 208VAC, actual determined by line voltage, carrier frequency, etc...(50 Amps maximun rated) 3 Phase, 4.0kW RF output, 22 Amps average at 208VAC, actual determined by line voltage, carrier frequency, etc...(30 Amps maximun rated)
AC wire size:	Single Phase -4 AWG copper, THHN or euqivalent for 70 Amps service Three Phase -6 AWG copper, THHN or euqivalent for 50 Amps service
Power Consumption:	8kW at 4kW RF output into 50 ohm resistive load
Cooling Air requirements:	2,200 CFM (62.3 cubic meter per minute)
Air Outlet (PA exhaust) size:	At top of Cabinet: 28" x 15", At front of Cabinet: 26.5"H x 5", and At rear of Cabinet 25" x 5"
Heat dissipation:	4.5kW (15,390 BTU/Hr) at 4kW RF output, 50 ohm resistive load
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 4.5kW dissipated, a 2.0 ton A/C unit would be needed (4,500 x 3.413 = 15,390/12,000 = 1.28)
Output connection size:	Type 1 5/8" EIA Field Flange
Weight:	525 lbs unpacked

MODEL FM-5C

Power Range:	2.5kW to 5.0kW
AC Voltage Requirements:	196 to 252VAC Single Phase, 339 to 437VAC Three Phase 50/60Hz
Configuration:	Single Phase or Three Phase
Disconnect Size:	80 Amp fused disconnect recommended (Single Phase) 50 Amp fused disconnect recommended (Three Phase)
Actual amperage draw at:	1 Phase, 5.0kW RF output, 46 Amps average at 208VAC, actual determined by line voltage, carrier frequency, etc...(60 Amps maximun rated) 3 Phase, 5.0kW RF output, 27 Amps average at 208VAC, actual determined by line voltage, carrier frequency, etc...(35 Amps maximun rated)
AC wire size:	Single Phase -3 AWG copper, THHN or euqivalent for 80 Amps service Three Phase -6 AWG copper, THHN or euqivalent for 50 Amps service
Power Consumption:	10kW at 5kW RF output into 50 ohm resistive load
Cooling Air requirements:	2,200 CFM (62.3 cubic meter per minute)
Air Outlet (PA exhaust) size:	At top of Cabinet: 28" x 15", At front of Cabinet: 26.5"H x 5", and At rear of Cabinet 25" x 5"
Heat dissipation:	5.5kW (18,805 BTU/Hr) at 5kW RF output, 50 ohm resistive load
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 5.5kW dissipated, a 2.0 ton A/C unit would be needed (5,500 x 3.413 = 18,805/12,000 = 1.56)
Output connection size:	Type 1 5/8" EIA Female Field
Weight:	575 lbs unpacked

Note: Sizing of "Fused Disconnect", "AC Wire" and "Air Conditioning Heat Dissipation", are based on the worst case operating conditions of low line voltage (196VAC), High load VSWR (1.5:1), and high ambient temperature (50 degrees C.)

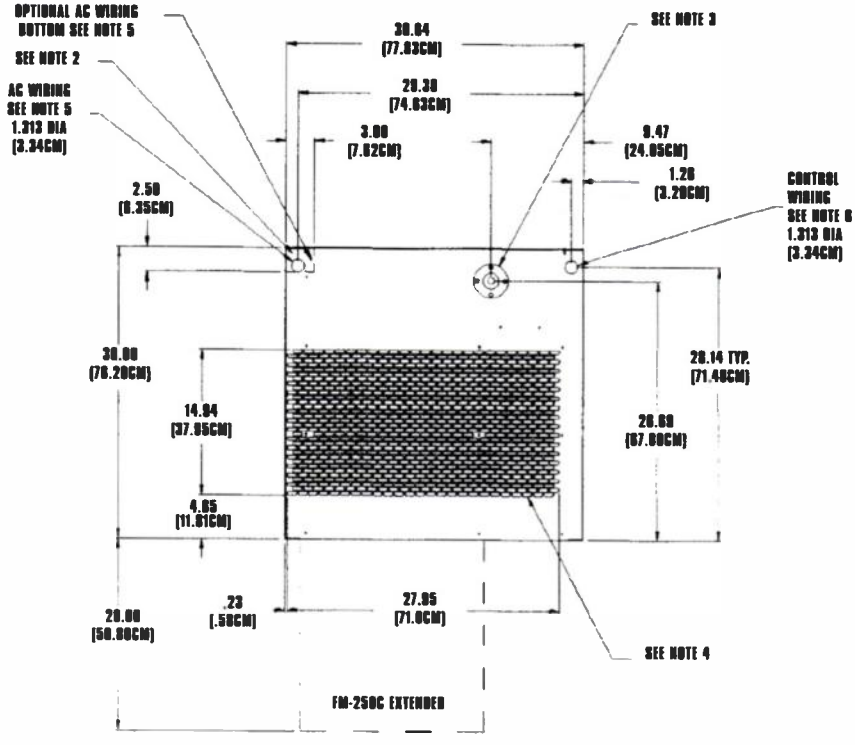
FM-4C/FM-5C

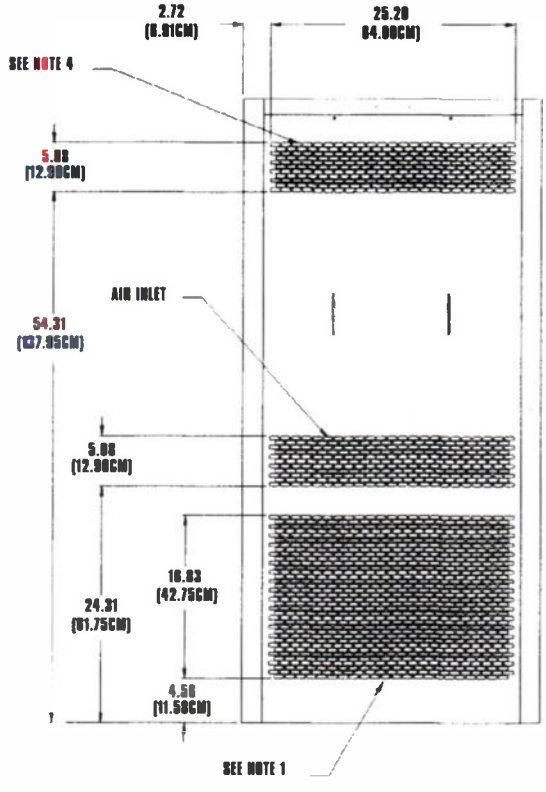
4 & 5 kW Solid State FM Transmitters

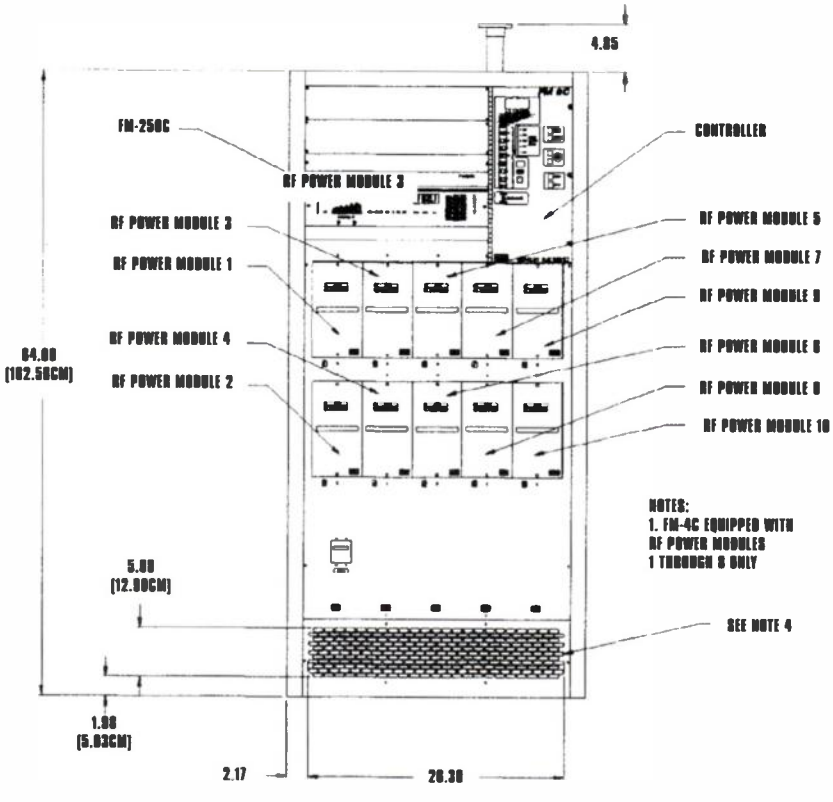
FM-4C/FM-5C

FM-4C/FM-5C NOTES:

1. Air inlet at rear of cabinet 2200 CFM (62.3m 3/min) filter required.
2. Ground strap entry in lower left corner at rear of cabinet.
3. RF output connection - 1 5/8" 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 - 5.5kW (18,805 BTU/H) at a 5kW RF output, 50 ohm resistive load. FM-4C - 4.5 kW (15,390 BTU/H) at a 4 kW RF output, 50 ohm resistive load.
8. AC power input: FM-5C - 196 to 252VAC 50/60 Hz 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 50/60 Hz 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. (238 kgs).







FM-4C/FM-5C

4 & 5 kW Solid State FM Transmitters

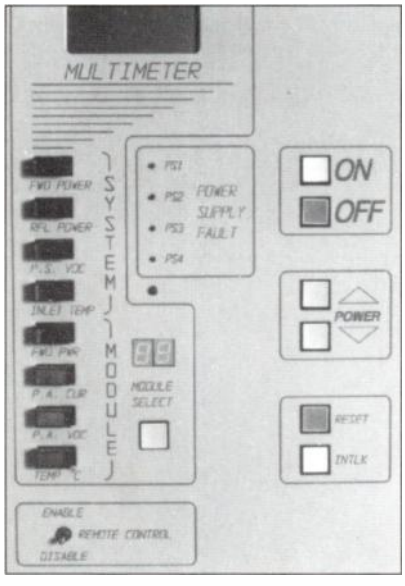
Predator Digital Transmitter/Exciter

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 FX-50 Exciter

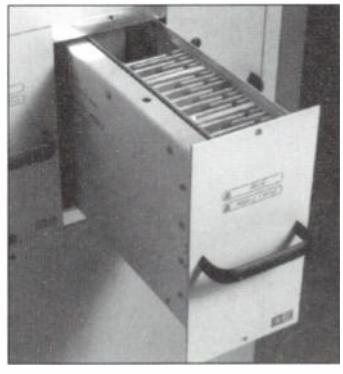
All Broadcast Electronics FM transmitters contain the renowned Broadcast Electronics' FX-50 Exciter technology, the acknowledged broadcast standard for FM audio performance. The FX-50's performance can bring existing FM transmitters up to digital quality standards, and has the lowest distortion of any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

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.

BROADCAST ELECTRONICS, INC.

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WRH


FMi 703
MULTIMETER
FAULTS
OPTIONS
STATUS
ON
OFF
FXi 60
60
FWD PWR
0
RFL PWR
106.10
FREQUENCY
MODULATION
Pure Digital. Clear Radio.
HD Radio

The Beginning and the Future of HD Radio™

Broadcast Electronics was there in the beginning. The engineering structures and testing methods relied heavily on our expertise, and thus was born HD Radio. But it is not enough to say that we were there in the beginning. We took a long, hard look at the technical and equipment specifications and concluded that HD Radio could be even better than originally designed

The original HD Radio system configurations and equipment packages were fine for field testing and development, but they don't allow for the technical advancements of tomorrow. BE has a better method. Our approach to HD Radio gives you more, both now and years from now. More flexibility to decide when and how to go digital; more cost savings because there's less equipment; and higher ROI because our HD Radio system is ready for tomorrow's new generation of HD Radio.

HD Radio is the format of the future. Our system is the future, engineered for today.

Broadcast Electronics.

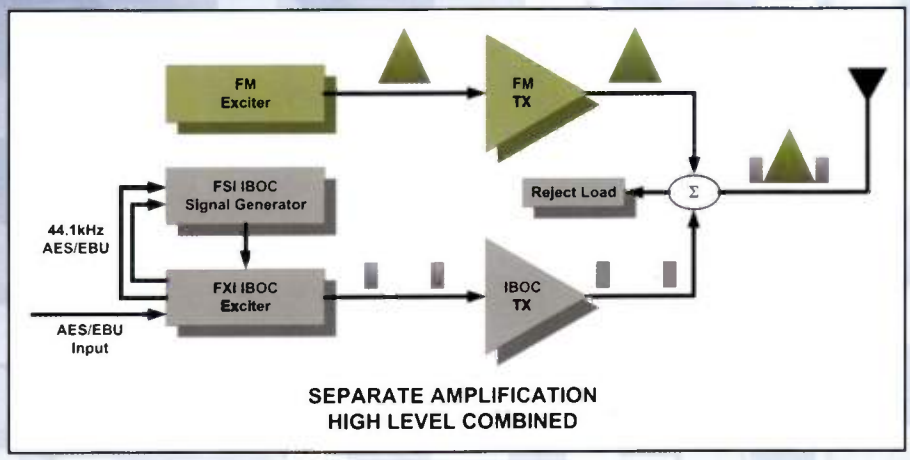
We Engineer For What's Next

At BE, our focus for over 42 years has been on what's best for the broadcaster. This dogged determination to do better and provide more has made us one of the most respected broadcast manufacturers in the world. We took this same approach when assessing the current HD Radio architecture. We weren't satisfied, and we knew you wanted more.

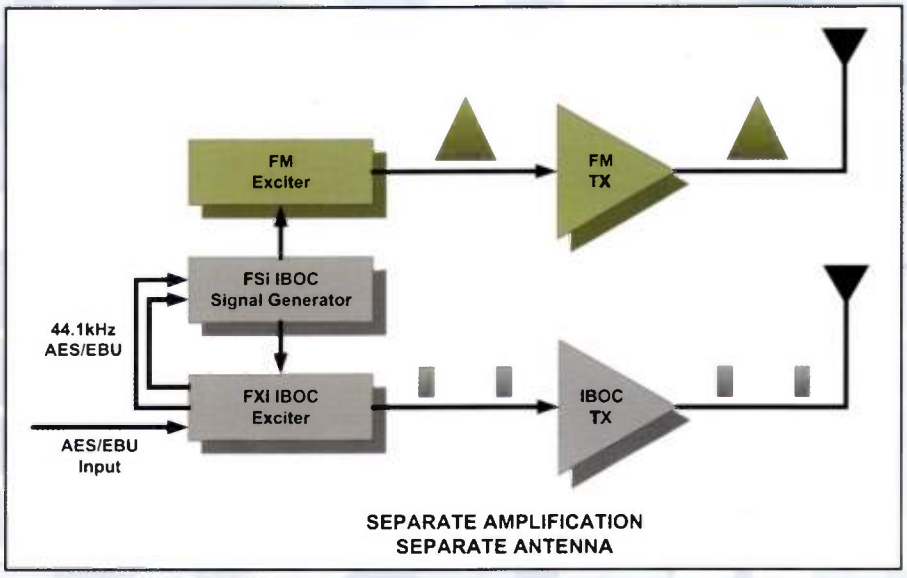
While others in the industry raced to develop standard systems and profit generating equipment configurations for HD Radio, we took another path. First, we developed an HD Radio system comprised of technology that works today and will work tomorrow. We were the first to offer complete HD Radio support from initial design to antenna configurations and licensing. And we developed a system that is completely tailored to your station's goals - no matter what they are.

For more information about HD Radio, call your BE Sales Representative at **888-232-3268**. Or visit our website at www.bdcast.com/HDRadio.

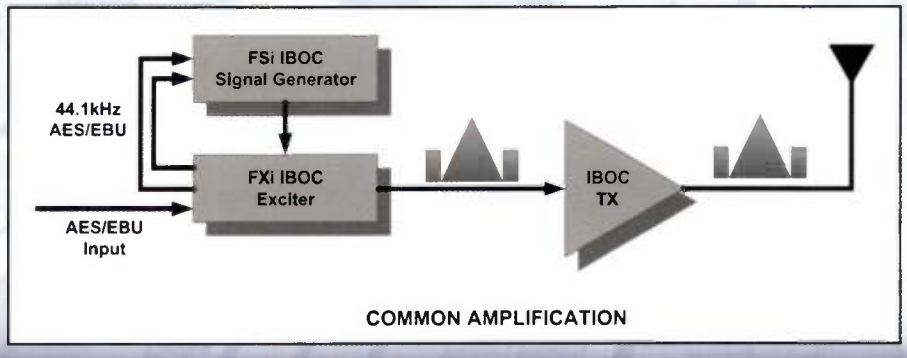
With You Every Step



SEPARATE AMPLIFICATION
HIGH LEVEL COMBINED



SEPARATE AMPLIFICATION
SEPARATE ANTENNA



COMMON AMPLIFICATION

Going HD is more than just the purchase of gear and flipping a switch. That's why you need a partner who understands every aspect of HD Radio from beginning to end. That partner is Broadcast Electronics. No other broadcast manufacturer has pledged their entire support and guidance from initial system evaluation to final digital broadcast. BE has. We'll help you understand the nuances and options inherent in your current system and signal path structure. We'll provide you with an overall plan, budget and options. We'll provide the equipment, the training, the installation and even bring in other manufacturers and antenna professionals to complete the entire process. We believe in the benefits of HD Radio and we'll make sure you get every one of them, every step of the way.

BE HD Radio System/Signal Paths
Based upon your station's current configuration, one of the system designs to the left is right for you.

. Engineering For What's Next.

FXi 60 / 250 HD EXCITERS

The first Direct To Channel Digital Exciters with more technological breakthroughs than any other on the market. Operates in FM only, HD only, or FM and HD modes. Accepts AES/EBU wired or optical, L and R analog, balanced and unbalanced composite or mono inputs; 2 internal SCA generators, standard; Internal RDS coder; Plug-in HD radio interface board; 2 power versions.

FM HD TRANSMITTERS

The broadest power range of any digital FM transmitters in the world and field proven. Redesigned for digital use in high level combined systems, common amp systems, or stand alone digital transmission.

FSi 10 SIGNAL GENERATOR

Our FM HD Radio Signal Generator provides baseband HD Radio directly to the FXi 60 / 250 Digital Exciters and will allow operation in either HD Radio only or HD radio plus FM modes. Internal GPS for synchronization; Received audio via AES digital format; 640x480 touch screen interface.

ASi 10 SIGNAL GENERATOR

Our AM Signal Generator takes advantage of the latest in HD Radio technology and the advanced capability of BE Solid State AM Transmitters to provide the most efficient implementation of HD Radio for AM today. Internal GPS for synchronization; Received audio via AES digital format; 640x480 touch screen interface.

BE Does It Better

Jumping into HD Radio is not without certain risks. There's an expense factor involved, for sure. But there are also timing questions to be answered and the future to be considered. At BE, we looked at all of these risks and designed an HD Radio system that minimizes these concerns.

Flexibility. Not every station's signal path is the same, so it all begins with a thorough system evaluation resulting in a HD Radio design proposal from BE. Our design offers you more flexibility to decide how to generate digital and when. Each proposal is tailored to your specific station; your goals for digital; your budget; and your system configuration. Whereas others will try to fit your station to their design, at BE we design to your standards.

Cost Savings. Existing HD Radio systems are designed to generate profit for certain manufacturers by loading you up with equipment. Not BE. Our equipment system is designed to save you money, because going digital is expensive enough. For example, our line of Direct To Channel Digital Exciters eliminates the need for expensive secondary exciters and multiplexers. The FXi 60 and FXi 250 exciters are engineered to generate your carrier signal directly at your station's frequency. Less equipment, less noise, and a lot less cost.

Return On Investment (ROI). Maximizing your investment in HD Radio is paramount. That's why our line of digital FM transmitters, AM transmitters, stereo generators and the new Digital Exciters are already engineered with upgrade path technology for the next generation of HD Radio. When you install a BE HD Radio system in your station, you're ready for tomorrow's new technology. This goes way beyond what others have available and allows you to upgrade later at a minimum of expense and hassle.