Flexiva™ High Power

Air-Cooled FM Transmitter for Analog and Digital Standards High Power - 5 kW to 80 kW

The Flexiva™ air-cooled FM solid-state transmitter family provides today's broadcaster with a single transmission platform capable of analog and digital operation. Incorporating field-proven GatesAir technology, Flexiva transmitters deliver world-class performance, reliability and quality.

Flexiva is designed for low- and high-power requirements, up to 80 kW, while utilizing the most compact design on the market today. Flexiva continues the legacy of the highly successful line of GatesAir FM transmitters and combines innovative, new quad-mode RF amplification and software-defined exciter technology to take FM transmission to the next level.

Featuring PowerSmart® technology, the Flexiva line offers unmatched efficiency that makes it ideal for all FM applications. The 50-volt LDMOS device technology delivers a dramatic increase in power density, lower operating costs and reduced cost of ownership over the life of the transmitter.

As the digital transmission leader, GatesAir has developed a solid core competency backed by years of experience in the complex technical areas that are essential for maximum transmitter performance. Customers can also count on GatesAir for implementation, and the company offers a range of support options from standard 24/7 telephone technical assistance and parts to installations, training, full system design and field maintenance contracts.

Product Features

Flexiva High Power Class Transmitter Features

- Identical power blocks for scalability. 5,000 Watts to 80,000 Watts
- Small and compact. 5 kW or 10 kW power blocks in only 16 rack units
- Common dual 1800 Watt Power Amplifier and IPA modules for all power levels simplifies spares
- Single-phase or 3-phase power, Delta or Wye configurations. 190 to 464 VAC
- 1:1 Power supply to Power Amplifier module maximizes redundancy
- Hot-Pluggable, hot-swappable power amplifier and power supply modules minimizes down-time and simplifies maintenance
- Simple, distributed hardware based control architecture uses analog circuits to control critical transmitter functions. Not reliant on a microprocessor for high reliability
- Hardware based life-support backup controller provides added robustness, reliability
- Can use any standard FM exciter or can be tightly integrated with FAX low power exciter

Flexiva Family Common Features

- Full power range from 1 to 80,000 Watts in two classes of the same family
- Fully broadband, 87.5 to 108 MHz — requires no tuning or adjustments
- Best-in-class power efficiency — lowest operating costs
- Extremely high power density; compact and lightweight space-saving design

- Latest state-of-the-art LDMOS-FET power amplifier technology
- High efficiency (96%) auto-ranging, hot pluggable power supplies
- Continuously variable speed fans optimize cooling, maximizes efficiency and minimizes fan noise
- Redundant internal cooling fans draw air from front to rear with ducted air options available
- Digital Ready: Quad-mode operation: FM, FM + HD Radio™, HD Radio only or DRM+
- Maintain power up to 1.5:1 VSWR. Proportional VSWR foldback for safe operation at reduced power into marginal loads (icy antenna etc.)
- Automatic restart after AC mains interruption; returns to previous operational mode
- Global control and monitoring via the World-Wide Web remote graphic user interface (GUI) works with any PC, tablet or smart-phone
- Full SNMP network control and monitoring support
- In-depth diagnostics and setup via an easy-to-use front-panel control
- Dual-Drive with automatic failover exciter switching
- N+1, Dual Transmitter and Main/Alternate and with automatic switching capability

Product Details

The Flexiva Advantage

Maximum Efficiency

>Flexiva is the most efficient solid-state FM transmitter available. Leveraging the PowerSmart architecture, 50-volt LDMOS device technology delivers a dramatic increase in power density, lower operating costs and reduced cost of ownership over the life of the transmitter.

Compact Footprint and Lightweight Design

Flexiva is the most compact FM transmitter on the market, with a significantly reduced size compared with other products in its power class. Ideally suited to fit in crowded, shared transmitter sites, Flexiva reduces the cost and space required in the facility, simplifies installation, lowers shipping costs and allows for easier maintenance.

Highest Power – Elegant Simplicity

Flexiva achieves market-leading power levels (up to 40 kW). Featuring distributed control architecture, Flexiva delivers outstanding reliability, and enables soft failure operation and simple serviceability.

Low to High Power, Analog or Digital

From very low power (5 W) to very high power (40 kW and beyond), the Flexiva family does it all. Whether it is 50 W of analog FM or 40 kW of FM+HD that is needed, Flexiva transmitters all provide the same outstanding value.

Improved Up Time

Hot-pluggable, redundant power amplifier (PA) and universal power supply (PS) modules make on-air servicing a breeze and eliminate costly service interruptions.

Reduced Service Costs

Lightweight and universal PA modules (broadband from 87.5 to 108 MHz; 4.5 kg) and PS modules (auto-ranging 90 to 264 VAC, 47 to 63 Hz; 2.5 kg) facilitate overnight/same-day shipment from a centralized depot for simplified and cost-effective spares holding. The use of lightweight modules virtually eliminates two-person lift requirements for routine maintenance. Flexiva also supports the simple replacement of pre-tuned amplifier pallets in the field, eliminating the need for complex tuning after FET replacement.

Smooth Upgradeability

Flexiva features world-class software-defined exciter technology, allowing for a seamless transition from analog to digital in the user's time frame.

Reliable, Distributed System Control

The Flexiva transmitter uses a hardware based central interface to a distributed hardware control system. Featuring extensive protection and full backup control capabilities, the distributed nature of the design provides for fast-acting independent protection at the module level for maximum reliability. A liquid-crystal control screen allows easy review of all operational parameters and easy diagnosis of any potential equipment problems. Front-panel buttons and bright LED indicators allow for simple control and feedback on all the key operating parameters. The navigation buttons allow for quick review, setup and recall of all menus via the front-panel screen. By simply connecting a PC to the front panel RJ-45 jack, the user can monitor and control all the settings locally on the PC. When integrated with single or dual Flexiva exciters, all control of the transmitter and exciter(s) are combined into a single IP address.

Advanced Global Monitoring and Control

In addition to local control, the Flexiva transmitter can be controlled from anywhere in the world with an intuitive, browser-based graphical user interface (GUI) over TCP/IP via a telecom or network connection with password protection. A rear RJ-45 jack is provided for LAN/WAN connection.

Full Simple Network Management Protocol (SNMP) facilities are provided for network management of the entire transmission system using industry-standard MIB protocols.

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Remote Communication

The following remote interfaces are available:

- GUI
- Ethernet network connection RJ-45 (10/100Base-T) with TCP/IP protocol
- Automated remote alarms in the event of a fault, which are sent via SNMP or e-mail with the connection to a network
- Simple, parallel interface to panels and remote control systems

Multi-System Controller (MSC)

To support greater redundancy, the Multi-System Controller (MSC) supports a range of backup options, including 1+1, full N+1 and dual-transmitter installations. The MSC monitors and controls the transmitter systems and controls RF switching.

Common Parts

The complete Flexiva line utilizes the same major parts — from the highest-power, air-cooled transmitter to the compact, low-power systems.

Advanced Digital Precorrection

GatesAir's Real-Time Adaptive Correction (RTAC®) is an advanced type of digital precorrection that enables the exciter to more fully utilize the transmitter power amplifier, yet maintain spectral mask compliance of the digital signal.

RTAC and adaptive non-linear correction is available in Flexiva transmitters and exciters, as well as the Flexstar Exciter. RTAC delivers the highest level of correction, resulting in a broadcast signal that is spectrally pure, while delivering the maximum power output and best efficiency.

There are two types of precorrection used: linear and nonlinear. Linear precorrection is for the non-ideal amplitude response and time response of the transmission system, including the power amplifier and any bandpass filters. Linear precorrection is helpful in optimizing the modulation performance of the transmitted digital signal so that less equalization is required at the receiver. Nonlinear precorrection is for the two major types of nonlinearity (AM->AM and AM->PM) in the RF power amplifier, which cause undesired spectral components and poor RF mask compliance.

AM to AM nonlinearity causes the RF power amplifier's output amplitude to not accurately track the input amplitude. Typically, this nonlinearity occurs near the peak output power of the amplifier, where saturation effects cause the output response to flatten as the input continues to increase and where the amplifier output goes to zero. AM to PM nonlinearity causes the RF power amplifier's output phase to not track the input phase. The amplifier acts like a phase modulator as the power output varies to follow the input signal, producing undesirable sidebands.

Precorrection can be implemented in many ways. In order of sophistication, they are:

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

Flexiva Configuration

Each Flexiva transmitter combines an FM exciter and one or more amplifier bays — each with various configurations of PA modules to achieve the rated power.

The amplifier bays contain several major systems:

Power Amplifier Module

This hot-pluggable, hot-swappable module features a pair of 50v LDMOS-FET based broadband (87.5-108 MHz) RF PAs that require no user adjustments. The PA modules are identical and fully interchangeable in each Flexiva transmitter. Each amplifier can be re-biased on-the-fly for operation in FM, FM + HD Radio and HD Radio only, or DRM+ mode.

Intermediate Power Amplifier Module (IPA)

Identical and swappable with the PA modules for models 10Kw and higher, the IPA module provides RF drive through the PA splitter to the input of the PAs. The IPA uses only one-half of the module leaving the other half as a standby IPA with automatic failover switching in the event of on-air IPA failure. This feature provides additional redundancy protection.

Power Supply Module

This hot-pluggable module is a 2400 W 48 V PS with a .98 power factor and mains input range of 90-264 V. The PS interface provides on/off functionality to the power supplies, a fan tachometer alarm and redundant feed to the cooling system. Each module also has +5 V output to redundantly drive the low-voltage control circuits and 1:1 power supply to power amplifier redundancy. Each 48 V power supply's output is also summed and fed to the dual IPA, fans and control system for maximum redundancy.

Cooling System

The air cooling system includes internal redundant fans that pull cool air from the front through a removable filter, allowing exhaust to exit through the rear of the transmitter. Systems integrated in GatesAir cabinets feature top exhaust to support ducting and, optionally, can have ducted air input plenum to permit top, bottom or rear air input.

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Control System

Featuring extensive protection and control capabilities, the main system control is located in the Flexiva amplifier bay and communicates directly with the Flexiva for fully integrated control and monitoring. Each PA module has dedicated control and monitoring to support on/off functionality and alarms for reflected power, temperature and current overloads. The control systems also provide for remote access via a parallel, SNMP and Web-enabled GUI.

Connecting What's Next
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Specifications

Specifications and designs are subject to change without notice

General	
Transmitter Type	Solid State VHF Power Amplifier for FM, HD Radio and DRM+
Exciter	Requires external FM Exciter
Frequency Range	87.5 to 108.0 Mhz, 10 kHz steps
Operating Modes	“Quad-Mode” on-the-fly switching between FM HD only, FM+HD or DRM+
Frequency Stability	±150 Hz
Power Stability	≤ ±0.25 dB
Asynchronous AM SNR	>60 dB
Synchronous AM SNR	>50 dB
RF Harmonic and Spurious	
Suppression	Meets or exceeds FCC, IC, CE, CCIR IRTU and IEC215 requirements
VSWR	Protected against open or short circuit, all phase angles
Compliance	RoHs, FCC, CE, IC, R&TTE 1999/5/EC compliant

Output Power- Max Watts	**FAX5K**	**FAX10K**	**FAX20K**	**FAX30K**	**FAX40K**
Nominal Power	5,000	10,000	20,000	30,000	40,000
FM Analog Power Range	500-5,500	1,000-11,000	2,000-22,000	3,000-33,000	4,000-44,000
FM+HD -20 dBc	4,500	9,000	18,000	27,000	36,000
FM+HD -14 dBc	3,500	7,000	14,000	21,000	28,000
FM+HD -10 dBc	2,650	5,300	10,700	15,900	21,200
HD Only -20 dBc	2,000	4,000	8,000	12,000	16,000
HD Only -14 dBc	1,850	3,700	7,400	11,000	14,800
HD Only -10 dBc	1,550	3,700	6,200	9,300	12,400
50 ohms RF Output Connector Un-Flanged * Optional Adapter	1-5/8" EIA	1-5/8" EIA	3-1/8" EIA	3-1/8" EIA	4-1/16" EIA 3-1/8” EIA*
Electrical	**FAX5K**	**FAX10K**	**FAX20K**	**FAX30K**	**FAX40K**
AC Input Voltage, VAC 47-63Hz Single Phase & 3-Phase (3-Wire) Delta: 3-Phase (4-Wire)Wye):	190-264 330-460				
Power Consupmtion MAX Watts	8,127	16,254	32,507	49,500	66,000
AC-RF Analog FM Efficiency at Nominal Power Typical:	72%				
Power Factor	0.99%				
Mechanical	**FAX5K**	**FAX10K**	**FAX20K**	**FAX30K**	**FAX40K**
Number of Power Amplifiers	7	14	28	42	56
Number of Power Supplies	4	7	14	21	28
Number of Fans	3	4	8	12	16
Air Flow max CFM m3/min: ft3/min:	500 850	1,000 1,699	2,000 3,398	2,400 4,078	3,200 5,437
Width	19 in. (48 cm)	19 in. (48 cm)	22 in. (59 cm)	47 in. (120 cm)	47 in. (120 cm)
Depth	29 in. (74 cm)	29 in. (74 cm)	37.5 in. (95.3 cm)	37.5 in. (95.3 cm)	37.5 in. (95.3 cm)
Height	16RU 28 in. (71 cm)	16RU 28 in. (71 cm)	44RU 83 in. (211 cm)	44RU 83 in. (211 cm)	44RU 83 in. (211 cm)
Weight (approx w/ modules installed)	145 lbs 66 kg	276 lbs 125 kg	1,002 lbs 455 kg	1,700 lbs 771 kg	1,850 lbs 839 kg

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Environmental	
Altitude	15,000 ft 3,000 (4,572 m) AMSL
Ambient Temperature Range	0 to +45° C inlet air temperature must not exceed 45° centigrade at sea level. Derate at 2° C per 1000 ft (300 m) AMSL
Humidity	95%, non-condensing
Audio Performance with Flexiva Exciter	
FM Modulation Capability	±150 kHz deviation, 200% modulation
Stereo Amplitude Response	±0.05 dB
Wideband Amplitude Response	≤ +/- 0.04 dB, 20 Hz to 53 kHz
Stereo Separation	≥70 dB
Crosstalk	≥70 dB
Total Harmonic Distortion	≤0.05%
Intermodulation Distortion	≤0.05%
Stereo FM SNR	≥83 dB 75 µs de-emphasis “A” weighting
Composite/Mono FM SNR	≥90 dB
Pre-emphasis	0, 25, 50, or 75 microseconds
Program Inputs with Flexiva Exciter	
Audio Inputs	2 AES3 audio or Composite/MPX over AES192. XLR 110 ohms balanced, -2.8 dBfs nominal; 0 dBfs to -15 dBfs, Up to 196 kb/s, 16, 24, 32 bits 1 Analog L/R, XLR, 10K/600 ohms balanced, Nominal +10 dBu +15 dBu maximum
MPX/Composite	2 BNC balanced 10 K/50 ohms -6 to +18 dBu (1 to 17.5 Vpp) 4 AES192 (selectable between AES3 audio and MPX/AES)
External SCA / RDS	2 BNC, unbalanced 10K ohms, 1.5 V nominal 4 V maximum
Internal RDS Generator	Internal Static RDS/RBDS generator Supports fields: TP, PI, PS, PTY, RT and 8 AF channels
Reference I/O with Flexiva Exciter	
External 10 MHz Clock Input	BNC female, unbalanced, 50 ohms, -10 dBm to +10 dBm
External 1 PPS Clock Input	BNC female, unbalanced, 50 ohms, TTL level
GPS Antenna Input w/	
Internal GPS Option	Optional GPS with supplied antenna +5v 30ma. +5v 30ma
10 MHz Clock Output w/	
Internal GPS Option	BNC female, unbalanced, 50 ohms, 0dBm
1 PPS Clock Output w/	
Internal GPS Option	BNC female, unbalanced, 50 ohms, TTL level
19 kHz Pilot Sync Output	BNC female, unbalanced, 50 ohms resistive, sinewave, phase adjustable, AC coupled, 4.5 V pk-pk nominal, unterminated
Remote Control I/O	
Ethernet Ports	2 RJ-45 100 Mb Ethernet/IP ports 1 front panel with DHCP server and fixed IP address for maintenance access 1 rear panel with static or dynamic IP address for LAN/WAN access to Web GUI and SNMP
Parallel GPI/O	DB25 female standard remote control GPI/O Active-low, 5v 100ma
Exciter Interface	2 DB15 female direct interface control for dual exciters

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