FLEXIVA™ GX

Ultra-Compact Air-Cooled FM Analog Transmitter/Exciter - 5kW and 10kW

The Flexiva™ GX air-cooled FM solid-state transmitter family provides today's broadcaster with an ultra-compact transmission platform. Incorporating field-proven GatesAir technology, Flexiva transmitters deliver world-class performance, reliability and quality.



Flexiva GX FM Transmitter Family Features

Flexiva is designed for power requirements up to 10 kW, while utilizing the most compact design on the market today. Flexiva GX continues the legacy of the highly successful line of GatesAir FM transmitters and combines innovative 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 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 a world leader in digital transmission technology, GatesAir expertly developed the Flexiva GX for optimal size, energy use, signal quality, and overall dependability. With multiple inputs and an integrated stereo encoder, it is a flexible, self-contained solution for a variety of FM broadcasting needs.

Customers can count on GatesAir for implementation. The company offers a range of support options from standard 24/7 telephone technical assistance and parts to installation, training, full system design and field maintenance contracts.

- Ultra-compact, space-saving 5RU design
- Broadband, fequency agile design 87.5 to 108 MHz requires no tuning or adjustments
- Best-in-class power efficiency for lowest operating costs
- State-of-the-art, direct-to-carrier digital modulator
- Integrated stereo encoder
- ITU-R BS412 peak program/multiplex power limiter
- Static RDS generator
- 2 AES, 1 analog L/R and 2 composite program inputs with automatic failover switching
- Digital MPX/Composite input over AES192 interface with fail-over switching
- Operation over a wide range of voltage and power stability conditions
- Operation at up to 1.5:1 VSWR with proportional foldback
- Full remote control capability including:
  - Web-based HTML GUI interface
  - SNMP v1, v2, v3
  - Parallel control/monitoring
  - Extensive Fault, Warning and Operational parameter logging
- N+1, dual transmitter and main/alternate; automatic switching capability
- Optional Features
  - GPS receiver for SFN synchronization
  - Intraplex IP Link 100e: STL via AOIP Linear, AES67, Icecast
  - Audio Processor, Audio Play out from USB
  - Intraplex redundancy and reliability

Product Features

Investment Security Based on Unrivaled Digital Experience

Transitioning to digital and delivering needed coverage require more than a financial investment — broadcasters must meet a whole new technical challenge. As broadcasting's digital radio transmission leader, GatesAir has developed a solid core competency backed by years of experience in the technical areas essential for maximum digital transmission performance. GatesAir has applied this expertise and developed transmitters for all digital standards, making the Flexiva Compact family of transmitters a confident investment.

GatesAir PowerSmart Technology Inside

Featuring GatesAir PowerSmart technology in its transmitter architecture, Flexiva offers superior power and efficiency. New LDMOS device technology delivers a dramatic increase in power density, lower operating costs and reduced cost of ownership over the life of the transmitter. Higher efficiency and cutting-edge thermal design means less wasted heat and lower cooling demands.

Compact Footprint and Lightweight Design

Flexiva GX Series 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.

Built-In GUI Interface

The graphical user interface (GUI) in the Flexiva Compact series transmitter works with only a web browser, with no software to install. The interface enables in-depth control and monitoring and easy setup from anywhere in the world. Flexiva products also support SNMP monitoring to deliver real-time status to your network management system.

Multiple Program Inputs with Automatic Fail-over Switching Including Digital

Composite over AES192

Five program inputs are available. There are 2 AES3 audio or composite/MPX over AES192, 1 analog left and right, and 2 analog composite (MPX) program inputs. Each input is monitored for valid program content and can be programmed to switch to a backup source if the main source should drop below a programmable threshold and time interval. Upon restoration, the program can automatically switch back to the main source after a user programmable time period.

Robust Operation and VSWR Protection

With ruggedized power amplifiers, coaxial combiners and sophisticated power control systems, Flexiva provides protection against antenna system short-circuits, opens and high VSWR while maximizing its ability to stay on the air. Flexiva can operate up to full rated power at up to a 1.5:1 VSWR with proportional fold-back into infinite VSWR. For added protection, a 4-strike, 3:1 VSWR shutdown is available along with a separate fast-acting analog VSWR protection circuit which mutes the transmitter instantly in the event of a sudden shorted or open antenna or line, to protect the transmitter and prevent sustaining arcing conditions.

Flexiva Configuration

Each Flexiva Compact Class transmitter combines a digital, direct-to-channel FM modulator and one or more power supply and power amplifier modules to achieve the rated power.

Digital Modulator

Continuing the legacy of Flexstar, the all new Flexiva Direct Digital Synthesis (DDS) modulator produces direct-to-carrier digital modulation of uncompromising precision and sonic clarity. The Flexiva modulator includes an integrated stereo encoder, RDS/RBDS encoder, GatesAir's patented "look-ahead" Digital Composite Limiter, an ITU-R 812 MPX power limiter, Translator ID generator and includes multiple auto-failover switching program inputs including digital Composite/MPX baseband over AES. It can also use an Intraplex IP Link 100e plugin module for built-in AoIP STL capabilities and an internal GPS as options.

Power Supply Module

This hot-pluggable, hot-swappable module is a 3500w, 54 Volt switch-mode power supply with an extremely wide AC input range and 96% AC/DC efficiency. The PS interface provides on/off functionality to the power supplies, a fan tachometer alarm and the cooling system.

RF Power System

The LDMOS-FET power amplifier device technology coupled with GatesAir's innovative "PowerSmart" amplifier design delivers a dramatic increase in power density. Redundant rugged amplifiers and low-loss combiners provide protection against lightning, antenna system short-circuits, opens and high VSWR while maximizing Flexiva's ability to stay on the air, lower operating and maintenance costs, thus reducing the cost of ownership over the life of the transmitter.

Cooling System

Flexiva GX's air-cooling system features redundant, continuously variable speed fans to provide quiet, efficient cooling over the transmitter's operating temperature range with plenty of headroom for abnormal conditions such as VSWR or high ambient temperatures. Critical component temperatures are monitored and fan speeds are adjusted continuously in order to maintain optimum operating temperatures.

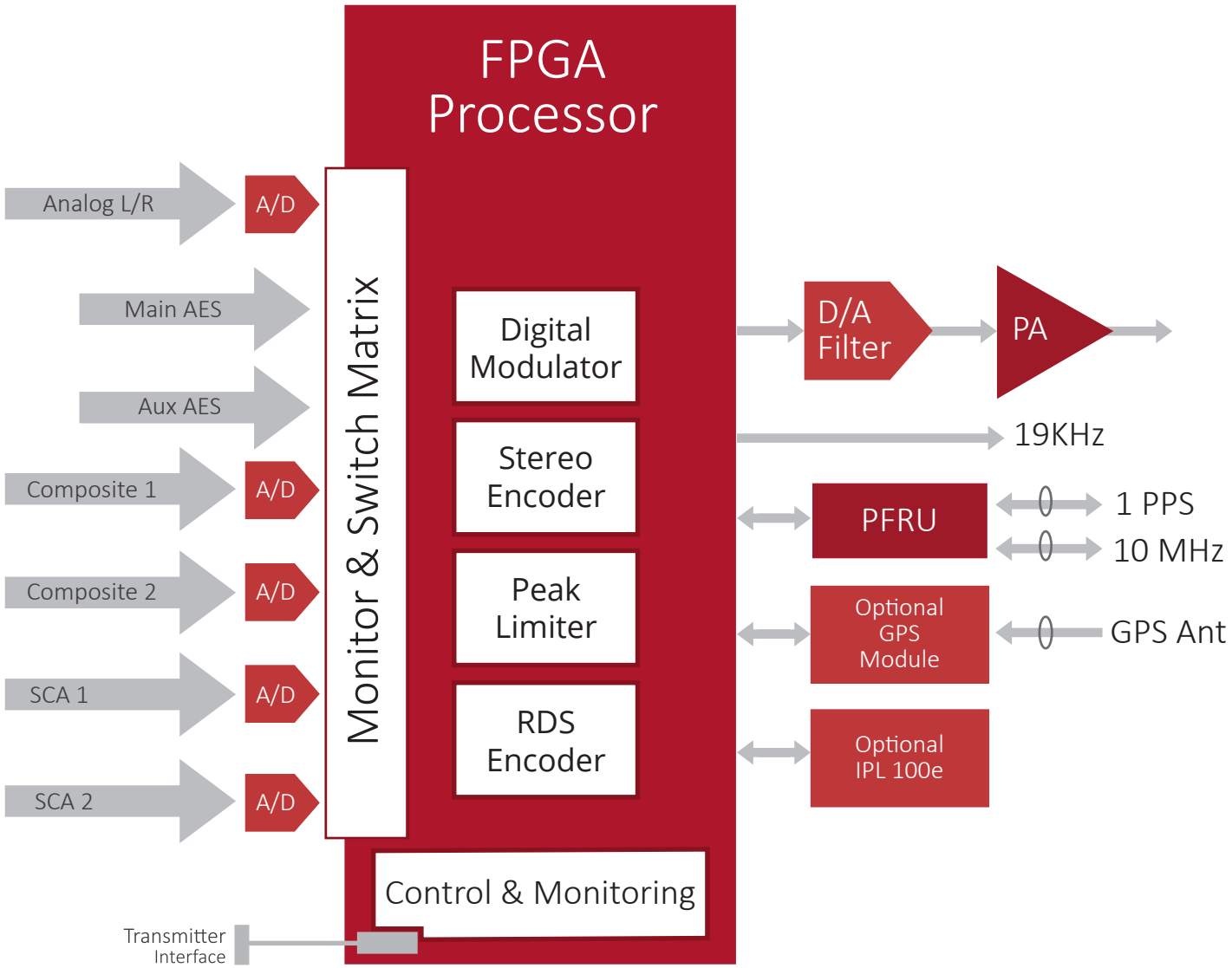
Cool air is pulled from the front panel through a removable, washable air filter, allowing exhaust to exit through the rear of the transmitter. Multiple systems can be integrated into cabinets to support ducted air input plenums.

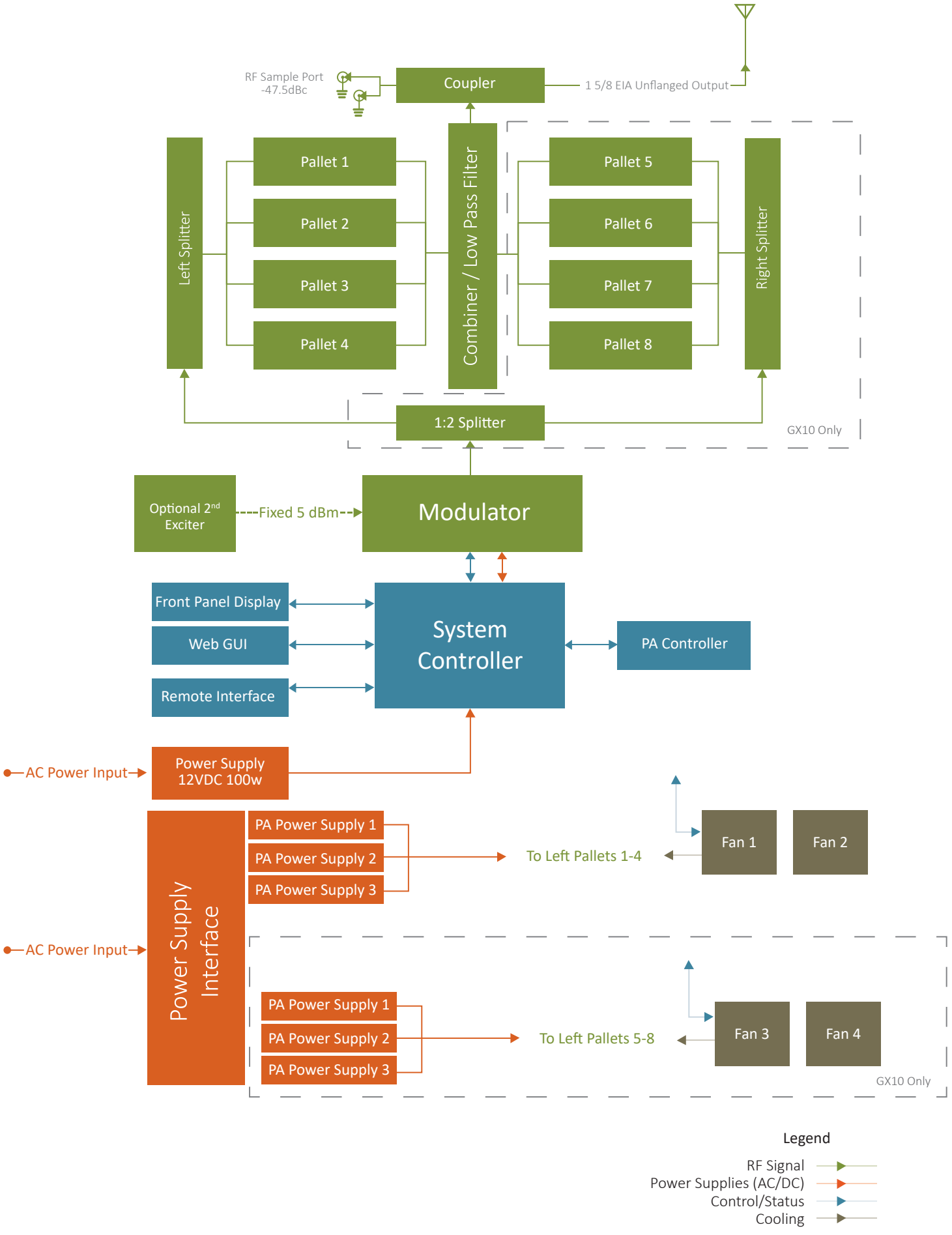
Control System

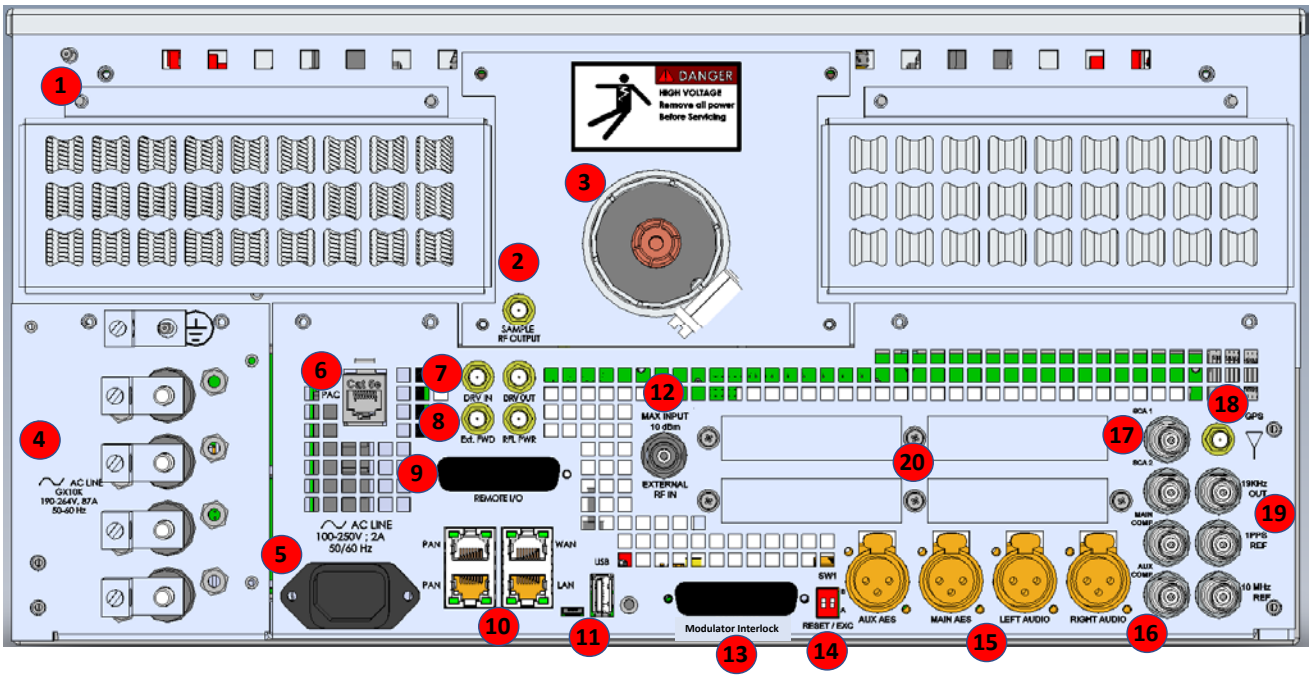
Flexiva GX's control system provides overall system management along with extensive monitoring, logging and control capabilities with fast-acting protection for maximum reliability. A front panel liquidcrystal (LCD) control screen, navigation buttons and bright LED indicators allow easy review, setup and recall of all operational parameters and easy diagnosis of any potential equipment problems. A front panel Ethernet connection allows instant local access with any laptop, tablet or smart phone with a Web browser for detailed diagnostics, control and monitoring through the feature-rich and intuitive Graphical User Interface. A separate rear Ethernet port allows Flexiva GX to be controlled and monitored over a LAN/WAN or from anywhere in the world via the World-Wide-Web. Full Simple Network Management Protocol (SNMP) facilities are also provided for network management of the entire transmission system using industry-standard MIB protocols.

A standard, configurable parallel GPI/O interface is also provided for interfacing to station remote control equipment.

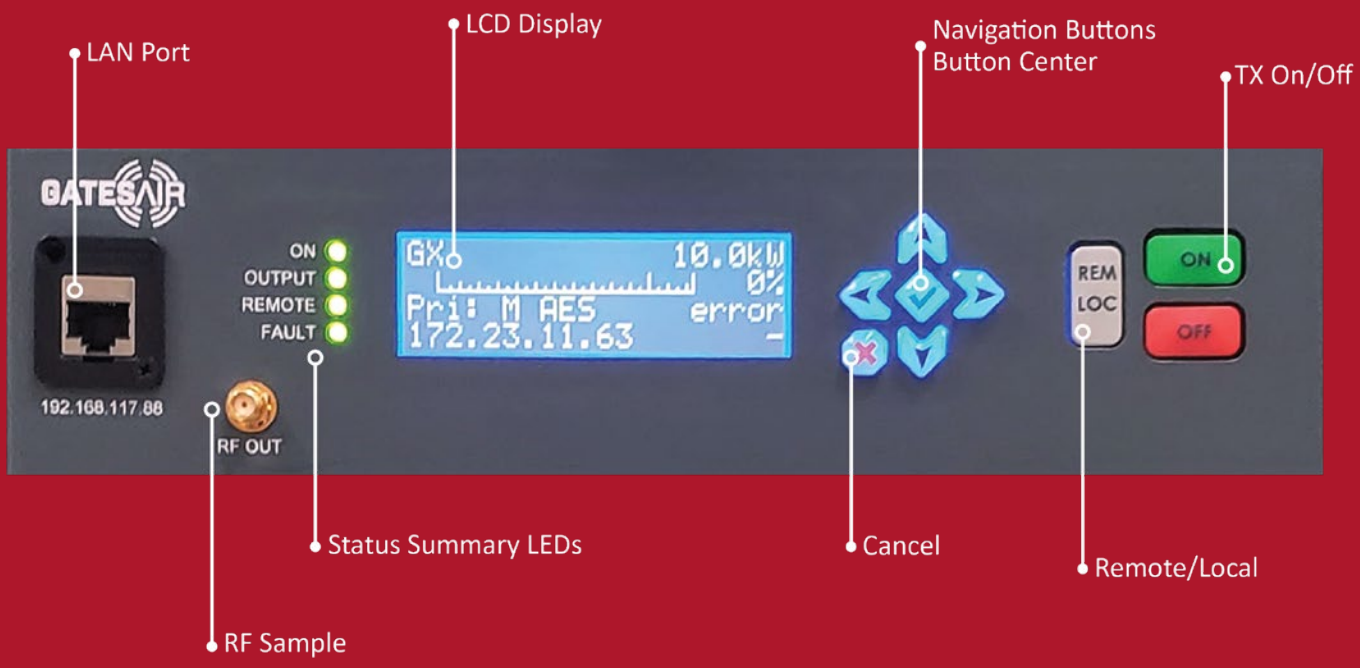
Flexiva™ Direct Digital Modulator




RF Sample Port
-47.5dBc
Coupler
1 5/8 EIA Unflanged Output
Left Splitter
Pallet 1
Pallet 2
Pallet 3
Pallet 4
Combiner / Low Pass Filter
Pallet 5
Pallet 6
Pallet 7
Pallet 8
Right Splitter
1:2 Splitter
GX10 Only
Optional 2nd Exciter
Fixed 5 dBm
Modulator
Front Panel Display
Web GUI
Remote Interface
System Controller
PA Controller
AC Power Input
Power Supply 12VDC 100w
Power Supply Interface
PA Power Supply 1
PA Power Supply 2
PA Power Supply 3
To Left Pallets 1-4
Fan 1
Fan 2
AC Power Input
PA Power Supply 1
PA Power Supply 2
PA Power Supply 3
To Left Pallets 5-8
Fan 3
Fan 4
GX10 Only
Legend
RF Signal
Power Supplies (AC/DC)
Control/Status
Cooling



1. Safety Ground.
2. RF Sample Port - Rear panel connection for modulation monitors or other test equipment.
3. RF Output - 1 5/8” Unflanged EIA RF Output connector.
4. AC Line Input - Configurable. See schematic package for jumper arrangement.
5. Single Phase AC Connection. -
6. PAC - For connection to the PAN Network.
7. Drive in/Out - Not used.
8. Ext. Power/Reflected Power - Not used.
9. Remote IO - Dedicated DB-25 type connector provides standard interfacing for transmitter control system connection.
10. Ethernet Port - Rear RJ45 connector provides fully configurable 100Base-T Ethernet for LAN/WAN connectivity and for the PAN Network.
11. USB/Micro USB Connection - Not used.
12. Dual-Drive Input - External, low-level digital modulator. Automatic failover switching.
13. Modulator Interlock - For Interlock Purposes ONLY.
14. SW1 - Left section resets modulator back to factory default state. Right section - do not change.
15. Program Audio Inputs - 2)AES-EBU, 1)L/R Analog. Configurable as part of auto-fail-over switching MUX.
16. Program Composite (MPX) Inputs - 2) Composite baseband inputs. Configurable as part of auto-fail-over switching MUX.
17. Aux Composite (SCA/RDS/RBDS) Inputs - 2) Baseband inputs for SCA and/or RDS/RDBS.
18. GPS Receiver Antenna - Optional high-quality integrated GPS recevier provides ultra-accurate reference for seamless SFN operation and reduces installation costs and space.
19. External Reference Input/Output - Support for single frequency networks (SFNs). Supports both 10MHZ and 1 PPS inputs. 1 PPS selectible impedance - high impedance (default) or 50 ohms.
20. Expansion slots for audio processing card, IPL-100e card and future use.



Flexiva™ GX

Specifications

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Output Power		GX5K	GX10K
Nominal Output Power (w)		5,000	10,000
FM Analog Range		500-5,500	1000-11,000
50 ohms RF Output Connector Un-Flanged		1-5/8" EIA	
Efficiency AC-to-RF		76%	76%
Electrical			
AC Input Voltage (47-63Hz)	Single Phase & 3-Phase	190-264 VAC	
	3-Phase (4-Wire)	330-460 VAC	
Power Factor		0.99 or better	
Mechanical			
Number of Power Amplifiers		4	8
Number of Power Supplies		3	6
Number of Fans		2	4
Air Flow Maximum	ft^3/min	400 cfm	800 cfm
	m^3/min	12 m^3/min	24 m^3/min
Width		19 in / 48 cm	19 in / 48 cm
Depth		29 in / 73.7 cm	29 in / 73.7 cm
Height		5RU - 8.75 in / 22.2 cm	5RU - 8.75 in / 22.2 cm
Weight	w/ PS modules installed	90 lbs	128 lbs
	w/ PS modules removed	76 lbs	95 lbs

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General Specifications	
Transmitter Type	Solid-state FM stereo analog and digital broadcast transmitter
Exciter	Direct-digital Synthesis, direct-to-channel modulator
RF Output Frequency Range	VHF Band II, 87.5-108.0 MHz, 10 kHz steps
Transmission Standards	FM Analog
Frequency Stability	±150 Hz <10-6 0° to 50° C using high accuracy internal TCXO. 10 MHz input for synchronization to external (GPS) reference. Automatic switching to internal oscillator if external reference fails
FM Modulation Capability	Adjustable nominal (100%) deviation to 200 kHz, default 75 kHz 320 kHz maximum deviation
Modulation Indication	Front panel UI Display to 140% Web GUI modulation display with peak hold auto-ranging (14%/140% full scale) 140%
Composite Peak Limiter	Integrated
Pre-emphasis	Selectable 0, 25, 50, or 75 microseconds
Power Stability	≤± 0.25 dB
Asynchronous AM S/N Ratio	65 dB minimum (>70 dB typical) below equivalent 100% amplitude modulation @ 400
Synchronous AM S/N Ratio	60 dB rms minimum (>70 dB typical) below equivalent 100% amplitude modulation @ 400 Hz with 75 uS deemphasis and 400 Hz highpass filter (FM deviation ±75 KHz by a 1 KHz sine wave). Measured at wideband input
RF Harmonic and Spurious Suppression	Meets or exceeds ETSI Requirements
VSWR Operation	Up to 1.5:1. User adjustable proportional foldback threshold from 1.3:1 to 1.5:1. Continued operation (with foldback) up to infinite VSWR or 4 strike shut down at 3:1 VSWR is user selectable Protected against sudden short and open circuit conditions with mute to remove sustained arcing conditions, at all phase angles.
Environmental	
Altitude	10,000 Ft. (3048m) AMSL
Ambient Temperature Range	0 to +45° C Inlet air temperature must not exceed 45° centigrade at sea level, de-rated at 2° C per 1000 ft (300 m) AMSL
Humidity	95%, noncondensing
Stereo Generator Performance (AES or Analog inputs)	
Modes	Selectable: Stereo, Mono L+R, Mono L, and Mono R
Pre-emphasis	Selectable 0, 25, 50, or 75 microseconds
Audio Low Pass Filter	Selectable, 15 kHz, 17 kHz, or BYPASS
Stereo Pilot Tone	19 kHz ± 0.1 Hz; injection adjustable injection level and phase shift
38 kHz, 57 kHz, 76 kHz, 95 kHz Suppression	>70 dB below ±75 kHz deviation
Stereo Separation	>80 dB AES, >75 dB analog 10 Hz to 15 kHz
Dynamic Stereo Separation	>72 dB 10 Hz to 15 kHz
Stereo Amplitude Response	±0.03 dB 10 Hz to 15 kHz referenced to selected pre-emphasis curve
Stereo Signal to Noise Ratio	>90 dB AES, 86 dB analog below 100% modulation at 400 Hz; measured in a 10 Hz to 15 kHz bandwidth with 75 µs de-emphasis and DIN “A” weighting

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Stereo Generator Performance (AES or Analog inputs) continued	
Stereo Total Harmonic Distortion	<0.03% THD+N, 10 Hz to 15 kHz, with 75 us de-emphasis
Stereo Intermodulation Distortion (L or R)	CCIF: 0.05% (14/15 kHz 1:1) SMPTE: 0.02% (60/7000 Hz 1:1)
Transient Intermodulation Distortion (TIM)	<0.05% (2.96 kHz square wave/14 kHz sine wave)
Linear Crosstalk	>70 dB below 100% modulation reference. (AES3 Input); L+R to L-R or L-R to L+R due to amplitude and phase matching of L&R channels (20 Hz-15 kHz)
Non-Linear Crosstalk	>70 dB below 100% modulation reference; L+R to L-R or L-R to L+R due to distortion products
Audio Overshoot	Less than 0.16 dB
Mono Performance (AES3 or analog input)	
Pre-emphasis	Selectable 0, 25, 50 or 75 microseconds
FM Mono Signal-to-Noise Ratio	>94 dB below 100% modulation at 400 Hz; measured in a 22 Hz to 22 kHz bandwidth with 75 µs de-emphasis and DIN "A" weighting
Amplitude Response	<±0.02 dB, 10 Hz to 15 kHz referenced to selected pre-emphasis curve
Total Harmonic Distortion	<0.01% AES input, 0.02% analog input THD+N, 10 Hz to 15 kHz, with 75 us de-emphasis
Intermodulation Distortion	CCIF: <0.03% (14/15 kHz 1:1) SMPTE: <0.03% (60/7000 Hz 1:1)
Transient Intermodulation Distortion (TIM)	<0.03% (2.96 kHz square wave/14 kHz sine wave)
Wideband Analog Input Performance	
FM Signal-to-Noise Ratio	>94 dB below 100% modulation at 400 Hz; measured in a 22 Hz to 22 kHz bandwidth with 75 µs deemphasis and DIN "A" weighting
Amplitude Response	<±0.03 dB 5 Hz to 53 kHz <±0.2 dB, 53 kHz to 100 kHz
Total Harmonic Distortion	<.008% THD+N over stereo sub band (5 Hz to 53 kHz) with 75 µs de-emphasis
Intermodulation Distortion	CCIF: <0.02% (14/15 kHz, Ratio 1:1) SMPTE: <0.02% (60/7000 Hz, Ratio 1:1)
Transient Intermodulation Distortion (TIM)	<0.02% (2.96 kHz square wave/14 kHz sinewave modulation)
Slew Rate	11.8 V/us -symmetrical
Phase Response Variation	±0.1° from linear phase, 20 Hz to 53 kHz
Group Delay Variation	±5 ns, 20 Hz to 53 kHz, ±30 ns, 53 kHz to 100 kHz
External SCA/RBDS Performance Based on External Generator	
SCA Format	Externally generated, analog FM subcarriers in the range 53 to 99 kHz
Sub-band Amplitude Response	±0.5 dB, 40 to 100 kHz highpass filtered
SCA Channel FM Signal-to-Noise Ratio	80 dB below ±6 kHz subcarrier deviation at 400 Hz with 150 µS de-emphasis
Harmonic Distortion	Less than 0.5% in audio passband of SCA generator
Intermodulation Distortion	SMPTE (60 and 7000 Hz, 1:1): 0.5% or less, no pre/de-emphasis, SCA generator low-pass filter bypassed
Crosstalk, SCA to Stereo	80 dB below 100% modulation, L or R channel with 75 us de-emphasis
Crosstalk, Stereo to SCA	80 dB below 100% modulation referenced to ±6 kHz deviation and 150 us de-emphasis
Crosstalk, SCA to SCA	80 dB below 100% modulation (referenced to ± 6kHz deviation and 150 us de-emphasis per channel
SCA Injection	67 kHz at 1.5 Vpp for 10%

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Program Inputs	
All program inputs are silence detecting with adjustable auto-switching and switch-back	
Audio Inputs - Digital	2 AES3 XLR 110 ohms balanced Range -15 dBfs to 0 dBfs , Up to 196 kb/s, 16, 24 bits
Audio Inputs - Analog	1 Analog L/R, XLR, 10 K/600 ohms balanced Range 0 dBu to +15 dBu max
Analog MPX/Composite	2 BNC Analog floating-unbalanced 10 K/50 ohms Range -6 dBu to +17 dBu max
AES192 Digital MPX/Composite	2 AES3 XLR (shared with AES audio) 110 ohms balanced Range -15 dBfs to 0 dBfs, 196 kb/s composite/MPX on L or R channels
External SCA / RDS	2 BNC, unbalanced 10 K ohms, 1.5 V nominal 4 V maximum
Internal RDS Generator	Internal Static RDS/RBDS generator Supports fields: TP, PI, PS, PTY, RT and 6 AF channels
Reference I/O	
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	+3 V or +5 30 ma SMA female
10 MHz Clock Output w/ Internal GPS Option	BNC female, unbalanced, 50 ohms, 0 dBm
1 PPS Clock Output w/ Internal GPS Option	BNC female, unbalanced, 50 ohms, TTL level
RF Sample outputs	2 SMA. 1 front panel and 1 rear -53 dBc, post harmonic filter
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 with 4 user selectable command inputs and status outputs Active-low, 5v 100 ma
Exciter Interface	DB15-female direct interface control for power amplifier
Internal Options	
GPS Receiver Option	Internal receiver for both GPS and GLONASS is available as an optional “plug-in” to the modulator board provides GPS derived precision discipline of the carrier and stereo pilot frequencies for HD Radio and SFN operation. Disciplined 10 MHz and 1pps outputs provided on BNC female connectors on the rear panel for referencing external devices such as SynchroCast and HD Radio Exporter. Supplied GPS kit includes GPS antenna with TNC connector, 50’ RG-223 double shielded cable, hardware and instructions for field installation standard. Longer cable lengths and high gain antenna available optionally
Optional Expansion Boards	
General	Provisions for up to 2 simultaneously implemented optional accessory 80 pin expansion cards on the modulator board
Compliance/Standards	RoHS 2011/65/EU Directive 2014/53/EU ETSI EN 60215 (Safety) ETSI EN 302 018 (ERM) ETSI EN 300 384 (Radio) FCC Part 73 (LP FM Type Acceptance) Industry Canada (IC) Brazil ANATEL CE Marked