

MODEL AR-FS-20U
Fast Switching Series
 225-450 MHz
 20 WATTS CW/PEP

Enhanced battlefield communications are achieved with the latest MANET waveforms and AR Modular RF's Fast Switching Series of tactical booster amplifiers. Operating in the 225 to 450 MHz UHF range, the **AR-FS-20U** unit provides 20 Watts output power across the band. Supporting fully automatic T/R Switching in less than 2 μ s and harmonic suppression, the unit continues AR Modular RFs long standing tradition of building rugged and reliable radio agnostic amplifiers.

The **AR-FS-20U** amplifier is set up for easy operation with minimum operator intervention for rapid deployment. A wide range of available RF input powers and DC Voltages, make the amplifier flexible for vehicle, drop kit, and airborne applications.

Extending the range and quality of tactical radios has never been easier.

Key Features:

- *Fast T/R Switching – under 2 μ s*
- *Fully Automatic, Auto-Sensing, T/R Switching Booster Amplifier with Automatic Harmonic Suppression*
- *Radio & Waveform Agnostic*
- *AM, FM, Narrowband, Wideband*
- *High Duty Cycle – 90% at 25°C, Indefinitely*
- *Mobile Form Factor*
- *NVG Compatible Interface*
- *Battery & Vehicle Operation*

Protections:

- *Input Overdrive*
- *Antenna mismatch*
- *Over Temperature*



The following specifications apply to the **AR Modular RF** booster model **AR-FS-20U** – a standard amplifier providing **20 Watts** output power from **225 to 450 MHz** with pass-through support outside of this band.

PERFORMANCE SPECIFICATIONS: AR-FS-20U
RF PERFORMANCE

SPECIFICATION		UNIT	MINIMUM	TYPICAL	MAXIMUM	NOTES
Amplifier Class		-	A/B			Modulation: AM, FM, Narrowband & Wideband
Frequency Response		MHz	225	-	450	Active TX/RX
Maximum Limits	Radio Port	W	-	-	5	Damage may occur above this level
	Antenna Port		-	-	5	Damage may occur above this level (<i>during Rx mode</i>)
	Overdrive Threshold	dB	Rated Input plus 3 dB (typical)			Amplifier switches to bypass upon overdrive
T/R Switching	TX Keying Threshold	dBm	15 ± 3			Independent of rated input power
	f ₁ ↔ f ₁	T/R	μs	-	2.0	Non-frequency hopping; 225 through 450 MHz; To 90% Signal Power
		R/T	μs	-	2.0	
	f ₁ ↔ f ₂	T/R	μs	-	10.0	Frequency hopping, 225 through 450 MHz; To 90% Signal Power
		R/T	μs	-	10.0	
	Active ↔ Bypass		msec	-	-	5
Bypass		-	Instantaneous			Full Duplex (<i>no TX/RX gain, minimum loss</i>)
Transmit	Rated Output Power	W	20	-	32	Rated output power achieved at rated input power
		dBm	43	-	45	
	Input Power for Rated Power	W	0.5	-	2.0	Rated Input Power (and subsequent gain) is factory configurable to achieve 20 Watts output power – See Ordering Information for configuration details
	Gain	dBm	20	-	33	
Receive	Loss	dB	-	1.5	2	Active RX Path (<i>passive, no LNA, 225 to 450 MHz</i>)
	Noise Figure	dB	-	3	10	
	Insertion Loss Passive Bypass (TX & RX)	dB	-	-	1.0	225 to 450 MHz
Radio / Antenna Port Impedance		Ohm	-	50	-	
VSWR Tolerance		-	-	-	Infinite	Protections against mismatch; Power delivered to load may be reduced or unit may switch to bypass
Spurious Outputs		dBc	-	-	-55	@ Rated output, < 100 kHz from carrier, 10 Hz RBW
			-	-	-70	@ Rated output, > 100 kHz from carrier, 10 Hz RBW
Harmonic Performance		dBc	-	-	-60	

RF performance metrics guaranteed at rated input power and 25 C
THERMAL

SPECIFICATION	UNITS	DETAILS	NOTES
Duty Cycle	%	90	At ambient temperature of 25°C or below, indefinitely
		<i>See Application Note TBD</i>	Duty cycle dependent on ambient environmental conditions, modulation (FM vs AM) and signal period



PRODUCT DETAILS – AR-FS-20U

DC POWER

SPECIFICATION	UNITS	TYPICAL @ 24 VDC	MODE
Input Voltage Range	VDC	18 to 28	
Power Consumption	W	85	Transmit (<i>at rated input power</i>)
		16	Receive
		12	Bypass

MECHANICAL & ENVIRONMENTAL

SPECIFICATION	UNITS	DETAILS	NOTES
Size	inches	5.0" W x 3.0" H x 6.0" L	Not including connectors
		5.0" W x 3.0" H x 6.9" L	Including connectors
Weight	lbs.	4.5	
Operating Temperature	C	-30°C to +60°C	Ambient, See Application Note for duty derating
Relative Humidity	%	95	Maximum, non-condensing
Cooling	-	Passive	Natural Convection / Radiation
Sealing	-	IP67	Waterproof to 1m for 30 minutes minimum
Construction	-	Aluminum housing with integrated heatsink	Black anodized

INTERFACE & CONTROL

The AR-FS-20U has interface and control elements on both the front and rear panels. The amplifier can be used standalone (only RF and DC power connections). Remote Monitor and Control interface is available. Contact Factory for details.

INTERFACE	PANEL	DETAILS	NOTES
Radio Connection	Rear	TNC-F	RF ports; Alternate connector options possible
Antenna Connection	Rear	TNC-F	
DC Power Connection	Rear	High-density, Multipin Circulator Connector	Compatible with Net Warrior connectors
Remote Monitor & Control	Front	High-density, Multipin Circulator Connector	USB, Custom high-speed digital (LVDS, open collector) and analog & digital interfaces available
Local Monitor & Control	Front	OLED Display, Buttons	Local interface to support monitoring and control of amplifier functions via OLED display and push buttons. Standard interface (<i>see Manual for details</i>): <ul style="list-style-type: none"> • Power State (ON/OFF, if DC applied) • Current Operation Mode: <ul style="list-style-type: none"> ○ Active TX/RX – <i>normal operation</i> ○ Bypass / Fault

PERFORMANCE STANDARDS

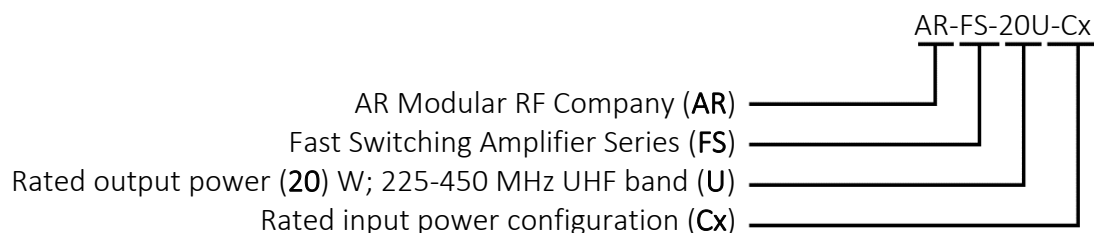
AR Modular RF booster amplifiers can be designed to meet many military standards including, but not limited to:

- MIL-STD-810x
- MIL-STD-461x
- MIL-STD-1399x

Please speak with your AR Modular RF Sales Representative if compliance to these or any other standards is required.

ORDERING INFORMATION

MODEL NUMBER	DESCRIPTION
AR-FS-20U	Standard model, 20 W rated output, 500 mW rated input (C1, base configuration)
AR-FS-20U-C2	Standard model, 20 W rated output, 2.0 W rated input (C2 configuration)



ACCESSORIES

MODEL NUMBER	DESCRIPTION
DC-3001	AR-FS series DC power cable – Fischer Ultimate 80 7-pin plug to pigtail/Anderson PP30 connector; 36"
BC-FS-20	AR-FS series DC power cable – Fischer Ultimate 80 7-pin plug to 2590 battery plug; 40"