

Model 1888 Remote Transceiver

EXHIBIT 4



Features

- Zero Frequency Offset
- Automatic Deviation Control
- Automatic Level Control
- Self Diagnostics / Alarm Alert
- Self-Arbitrating / Collision Free

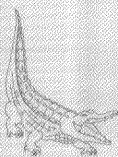
General Description

Alligator is the first to offer frequency agile systems with over-the-air adjustment and control of all operating parameters. Even frequency change and calibration can be performed without technician travel to the remote site. Alligator has advanced the MAS operation and maintenance technology to new limits with fully Automatic Global Frequency Calibration, Automatic Deviation Control and Automatic Level Control. The Model 1888 remote radio has an on board microprocessor which is constantly performing diagnostics to compare the operating limits preprogrammed in the radio. When maintenance is necessary, the Model 1888 will signal the control center via

Applications

- SCADA Systems
- Utility Data Communications
- Oil & Gas Pipeline Monitoring
- Water Systems
- Distribution Automation

the connecting Intelligence Electronic Device. Patented GatorTrac (No. 5,898,903) provides constant re-calibration of the remote radio's time base to track the frequency drift due to aging in the master radio's time base. Developed for the DA/DSM demonstration project sponsored by EPRI and NRECA, the Model 1888 has the self arbitrating capability to detect RF traffic and allows remote IEDs to send relevant real-time information without the use of traditional polling. This ability, coupled with the UCA™ open protocols, allows SCADA and Distribution Automation systems to operate in an unsolicited data delivery mode which results in maximum data throughput and most efficient spectrum utilization.



Alligator
Communications, Inc.

Specifications

Transmitter

RF Power:	5 Watts, adjustable 0.5 to 5 W
Impedance:	50 Ohms
Duty Cycle:	Continuous
Tx Attack Time:	< 1 ms
Frequency Stability:	.00015%(1.5 ppm) -30°C to +60°C
Bandwidth:	12.5 or 25 kHz
Modulation Deviation:	
12.5 kHz Band:	± 3.0 kHz Max.
25.0 kHz Band:	± 5.0 kHz Max.
Spurious and Harmonic Emissions:	- 65 dB
Tx Time-out Timer:	1-255 seconds
Audio input level:	-20 to +10 dBm
Frequency Response:	+1/-3 dB: 300 to 3000 Hz

Receiver

Type:	Double Conversion Super-heterodyne
Frequency Stability:	.00015%, (1.5 ppm) -30°C to +60°C
Bandwidth:	12.5 or 25.0 kHz
Sensitivity:	-117 dBm (0.3 μ V) 12 dB SINAD
Selectivity:	-100 dB min / Adjacent Channel
Desensitization:	-60 dB (EIA) at 12.5 kHz spacing -70 dB (EIA) at 25.0 kHz spacing
Inter-modulation:	-75 dB (EIA)
Spurious/Image Rejection	-80 dB
Audio Output levels:	-20/+6 dBm, Adjustable
Frequency Response:	
Filtered:	+1/-3 dB 300 - 3000 Hz
Unfiltered:	+1/-3 dB 300 - 6000 Hz
Bit Error Rate:	
1200 bps:	BER 1×10^{-6} at -110 dBm
4800 bps:	BER 1×10^{-6} at -110 dBm
9600 bps:	BER 1×10^{-6} at -103 dBm

Agency Certification

	360-512 MHz	895-960 MHz
FCC Rules:	Parts 90 & 15	Parts 101 (94)
FCC Identifier:	JIL1888B	JILMPR1888
FCC Emission Designators:	12K5F1D 12K0F2D 12K5F3D	12K5F1D 11K0F2D 12K5F3D
Underwriter Laboratories (UL):	Class 1, DIV 2 Groups A,B,C & D Hazardous locations	Class 1, DIV 2 Groups A,B,C & D Hazardous locations
Industry Canada Certification:	3073195403A	

Contact factory for other frequency bands and power levels.

General

Frequency:	360 - 512 MHz; 860 - 960 MHz
Input Voltage:	13.8 Vdc Nominal (11-16 Vdc)
Current Consumption:	
Receive Mode:	No options < 120 mA With options < 150 mA
Transmit (5W):	< 1.7 A
Data Rate:	300 to 9600 bps
Connectors:	
Antenna:	Type N female
Power:	4 Pin Circular (AMP-CPC)
Data:	DB-25 pin
Environment:	
Temperature:	-30° C to +60° C
Humidity:	95% at 40° C
Dimensions:	7½" × 7½" × 2¾"
Weight:	3 pounds

Options & Accessories

Diagnostics	Provides the ability to over-the-air monitor and change of all radio operating parameters & limits
Limits & Counters	Provides programmable power output, event counters, and diagnostic limits, each adjustable over the RF path
AGFC	To compensate for long term crystal aging, the internal TCXO is always calibrated to the associated master
ADC	To compensate for long term variations in modulation deviation to avoid risk of violation
ALC	To accommodate an audio input level anywhere from -20dBm to +10dBm without requiring any adjustment

Internal Modems:	
1200 bps	Bell 202 Compatible; Digital Interface - RS-232
300-9600 bps	Asynchronous operation; Digital Interfaces - RS-232
Internal DC/DC Converters:	24, 48, & 125 V _{DC}
Interface Modules:	
	HART Protocol Flow Transmitter Interface Board
	Orderwire Interface Module



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