TR-7750

VHF AM DIGITAL RADIO

JOTRON

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Jotron 7000 Series

- Excellent RF performance in congested areas
- Advanced digital signal processing (DSP)
- Remote control through Ethernet
- Easy set-up and control
- AM and VDL mode 2 operation
- Compact design
- In-band signalling for PTT and squelch
- Continuous duty cycle
- Offset carrier
- VoIP according to ED-137
- Start-up time <6 seconds
- Parallel operation (analogue and VoIP interfaces)

Excellent RF performance in congested areas
Careful analogue design is the key to achieving the best collocation capabilities possible. The 7000 series of radios are designed without compromising the synthesizers and analogue front end. Together with a linear power amplifier design and strict control by an ultra fast digital signal processor, making these the ultimate radios of choice for professional air traffic control applications.

Advanced digital signal processing (DSP)
The receiver and transmitter use the most powerful digital signal processors to perform the intermediate frequency (IF) and the audio frequency (AF) filtering. In addition, all the modulation and demodulation tasks are performed in the signal processor. This means improved product control, less tunable parts and improved reliability.

Remote control through Ethernet
The radio has alternative ways of being controlled, allowing it to fit easily into an existing onsite infrastructure. The radio is controlled and monitored using Simple Network Management Protocol (SNMP) and the Jotron dedicated Remote Control and Monitoring System (RCMS) or by a standard SNMP management application. Alternatively, setup and control can be either TCP/IP on the Ethernet, or the RS232/RS485 ports. The radio has a built in web-server for displaying current status and historical events.

Easy set-up and control
All parameters can be set and adjusted electronically from the front panel or from the remote interface. The front panel contains a graphical display, menu buttons and switches that are used during set up of the radio.

AM and VDL mode 2 operation
The radio can be operated in the following modes: AM voice, AM-MSK (ACARS) or D8PSK (VDL mode 2). AM voice mode is used with channel bandwidth 8.33 or 25 kHz and is au-

tomatically selected based on the frequency choice. AM-MSK mode is used when the radio is operated as the physical layer of an ACARS ground station. D8PSK mode is used when the radio is operated as the physical layer of a VDL ground station.

Compact and flexible design
A complete transceiver consists of 3 units; transmitter, receiver and power supply. A 3U/19'' sub-rack can hold one transceiver, up to 6 receiver units or 2 transmitter units, therefore offering a flexible and compact design.

BITE system
The Built In Test Equipment (BITE) system continuously monitors the technical parameters and reports real-time activity.

Keying options
The transmitter includes the following keying options: Positive and negative voltages (up to 50V), ground keying and phantom keying on the audio line. In addition, in-band tone signaling with configurable tones for easy integration is also an option.

Duty cycle
The transmitter is designed for continuous duty cycle. The unique cooling concept in the transmitter, keeps the temperature low, ensuring the best maximum operational life. This makes the radio the perfect choice for VOLMET and ATIS applications requiring continuous transmission.

Offset carrier
Up to 5 offset carriers are available using the temperature controlled oscillator in the transmitter.

Squelch system
The squelch system consists of a level and a noise compensated squelch, both are adjustable, which is useful in radio frequency congested areas. Relay contacts with configurable logic and in-band tone signaling are available, making this system flexible.

VoIP according to ED-137
VoIP has been an option in Jotron radios since 2009. These radios are fully compliant with the ED-137 standard. Additional options for IPv6 and G.729 compression codec for use through connections with bandwidth limitations are available. By using VoIP interface the audio delay is minimalized, therefore, comparable to a radio operated with an analogue or a TDM line.

Parallel operation on all interfaces
A Voice Communication and Control System (VCCS) using an analogue interface can be connected and operated in parallel with a VCCS VoIP interface, allowing a seamless transition between analogue and VoIP.

TECHNICAL SPECIFICATIONS

General – All units	AM 25 kHz	AM 8,33 kHz	AM MSK	D8PSK
Frequency range	118-137 MHz (118-156 MHz optional)			
RF Modes	6K80A3EJN	5K00A3EJN	13K0A2D	14K0G1DE
Keying time	< 5ms	< 5ms	< 5ms	< 500uSec
Bit rate			2,4 kbit/s	
Frequency response	300-3400 Hz	350-2500 Hz		
Frequency stability	< 1.0 ppm			
Data ports	RS232, RS485, SIP, NTP, 10/100 BaseT			
Protocol	SNMP, RTP, SIP, NTP, TCP/IP, HTTP, TFTP, DHCP and IPv6			
BITE monitoring	VSWR, Voltages, Currents, Levels, Lock detect, Temperature, Output power, Reflected power, a.o.			
Supply voltage, AC	85 to 264VAC, 47-63Hz			
Supply voltage, DC	21.6 - 31.2VDC negative ground (reduced output power when DC input is below 27VDC on standard power supplies. Full output power down to 21.6VDC when using PSU-7007. No degradation of the receiver performance over the full DC voltage range			
Start-up time	< 6 sec.			
MTBF	> 10 years / unit			
MTTR	< 30 minutes at lowest replaceable unit			

Transmitter (TA-7650)	AM 25 kHz	AM 8,33 kHz	AM MSK	D8PSK
Output power	1W to 50W,Adjustable in 0.1 dB step			1-25W
Adjacent channel power	> 70 dBc	> 70 dBc	> 70 dBc	> 65 dBc
Modulation level	up to 95%			
Distortion	< 2% @85% modulation, typically 0.5%			
Line input	600Ω, -36 - +10dBm			
Intermodulation protection ratio	≤ -55 dBc (TA7650), ≤ -70 dBc (TA7650LN)			
Tx timeout	5 to 300 seconds in 5 seconds steps			
Inband keying	Configurable tones: (2000-4000Hz in 1Hz step) and threshold level (-40 to -10dBm)			
Offset carrier	2, 3, 4 or 5 for 25 kHz and 2 for 8.33			
Differential group delay			< 60µs	
Power rise and release time				< 190µs, < 300µs
System constellation time				EVM < 3%
VSWR	1 : Infinity			
Duty cycle	100% continuous operation			
Power consumption	< 250VA			
Dimension Transmitter unit	142mm(28TE)(W) * 230mm(D) * 128mm (H), Weight 3.0 kg			
Dimension PSU unit	71mm (14TE)(W) * 303mm(D) * 128mm (H), Weight 1.3 kg			

Receiver (RA-7203)	AM 25 kHz	AM 8,33 kHz	AM MSK	D8PSK
Sensitivity analogue @1µV/30% pd	10dB SINAD (CCITT)			
Sensitivity VDL data @2µV/pd input				BER<10-3
Adjacent channel rejection	> 80dB	> 60dB	> 80dB	< 70db@2.ch
Intermodulation	> 80 dB			< 60dB
IF bandwidth	+/- 11kHz	+/- 3.5 kHz	+/- 11 kHz	+/- 11 kHz
Image and IF frequency response	> 110 dB			
Squelch operation	Adjustable -107dBm, 30dB /			
	S/N + carrier override			
	Activation time < 20ms			
	Hysteresis < 6dB			
Audio AGC	30% - 90%, < 1dB variation			
Signal / Noise	>55dB @up to +10 dBm input, 90% modulation			
Harmonic distortion	<2% @90% AM			
AGC range	-110dBm to +5dBm			
AGC attach time	< 50ms		< 40ms	
AGC decay time	< 250ms		< 60µs	
Differential group delay			< 60µs	
Inband squelch signal	Configurable tones: 100-5000Hz			
Line output	600Ω, -40 - +20dBm @90% modulation			
Cross-modulation	> 95dB @ 1MHz frequency offset			
Blocking	> 100dB @1MHz offset, > 110 dB out of band signals			
Dynamic range	> 120dB			
Spurious response rejection	> 95dB			
Dimension Receiver unit	71mm (14TE)(W) * 230mm(D) * 128mm (H), Weight 1.7 kg			

Options: Inband signalling, offset carrier operation, IPv6, G.729, VoIP, extended frequency and VDL-2

v.E

Standards

ICAO annex 10
EN300 676 (AM, AM-MSK),
EN301 841 (VDL2 – Physical layer)

Environmental

Temperature range:	-20°C to +55°C (operating) -40°C to +70°C (storage)
Humidity:	90% @ +40°C (non condensing)
Random vibration:	ETSI EN 3000019-2-2(V2.1.2) IEC 60068-2-64
Bump:	ETSI EN 3000019-2-2(V2.1.2), IEC 60068-2-29
Free fall:	ETSI EN 3000019-2-2(V2.1.2), IEC 60068-2-32
EMC:	EN 301 489 – part 22
SAFETY:	IEC 60950-1,CSA-C22.2 No. 60950

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