

SERIAL-IP

Serial data rate  
115400 bps

USB  
connectivity

RS-232  
RS-422  
RS-485

Air data rate up to  
230 kbps

Redundancy

0.1 to 5 W  
RF-power

DSP  
Signalling

Ethernet  
10/100  
Mbps

Packet  
Routing

AES  
encryption

SNMP

# SATELLAR

## XT 5R & XT 5RC

DIGITAL RADIO MODEM SYSTEM

- **SUPREME PERFORMANCE**
  - **FEATURE-RICH IP**
  - **REDUNDANCY OPTIONS**
- **MODULAR CONSTRUCTION**
  - **FLEXIBLE INSTALLATION**
- **EASY-ACCESS CONFIGURATION**

SATELLAR radio modems provide reliable data communications for mission-critical applications where a combination of stability, supreme performance and long range are required.

SATELLAR is designed to be flexible and expandable. It can be used in serial data or IP-transfer (TCP/IP) mode.

Support of remote management and over-the-air firmware updates reduces the number of site visits.

The Linux operating system enables IP routing and controls SATELLAR's internal operations. The radio modem has various IP technology features to support easy and smart integration with an existing infrastructure.

## MODULAR CONSTRUCTION – SELECT ONLY WHAT YOU NEED

The SATELLAR Digital System consists of the principal module Radio Unit (RU) and the Central Unit (CU). The RU alone can be used as a serial data radio modem and as a repeater in packet routing networks. The combination of CU and RU adds full TCP/IP radio modem functionality.

- SATELLAR XT 5RC – 5 W RU + CU
- SATELLAR XT 5R – 5 W RU



SATELLAR XT 5RC



SATELLAR XT 5RC w. DISPLAY



SATELLAR XT 5R

## IP FEATURES

- Redundant routing
- VRRP (Hot-standby switchovers)
- QoS, Firewall
- NTP
- VLAN
- Data compression
- Remote monitoring & management
- Serial data encapsulation

## SUPREME PERFORMANCE

- Long-range connections
- Low end-to-end latency
- Stable and constant performance figures
- Various IP features

## FLEXIBLE INSTALLATION

- Combines innovative modularity, compact unit size and low weight
- Installation on a flat surface or to a DIN rail
- All connectors are easily accessible on the bottom of the unit
- A wide operating voltage range and low power consumption

## EASY-ACCESS CONFIGURATION

- Web browser-based user interface
- SNMP for remote management
- Network Management System (NMS)
- USB for firmware updates and additional serial port with adapter
- Keypad and display to set and read settings and configure all SATELLARs in the network (optional)
- Over-the-air remote management and firmware updating

## EASY TO CONNECT

- 2 x D9; RS-232 & RS-422/485 interfaces
- RJ45 with Auto-MDIX interface for fast Ethernet
- USB host and device connections
- Data encryption according to AES-128 standard
- Built-in firewall for radio and wired IP network

## RADIO UNIT

Frequency	400 – 445 MHz (320 – 520 available in Q4/2015)
Tuning range	45 MHz
Channel width	12.5, 25, 150 kHz (programmable)
Carrier frequency configuration	Frequency programmability in 6.25 steps
Carrier frequency accuracy	+/- 2.5 ppm, at temp. -25 ... +55 °C
Carrier frequency long term stability	+/-2.0 ppm / 3 years
Forward error correction (FEC) configurable	off, rate 0.5 or rate 0.667

## TRANSMITTER PARAMETERS

Output power / SW adjusted	0.1, 0.2, 0.3, 0.4, 0.5, 1, 2, 5 W
Adjacent channel power typically	< -63 dBc (meas. method EN 300 113)
Maximum air interface data rates	230 kbps @ 150 kHz channel 38.4 kbps @ 25 kHz channel 19.2 kbps @ 12.5 kHz channel

## CENTRAL UNIT

CPU	ARM 9 @ ~ 200 MHz
RAM	64 MB RAM
ROM	128 MB flash
Display	2.4 ", 320 x 240 pixel, 65 k colours
Keypad	up, down, left, right, OK and two SW defined keys
USB interfaces	USB-host & USB-device USB2.0 full speed
Ethernet interface	10/100 Mbps Ethernet RJ-45 with Auto-MDIX

## COMMON PARAMETERS FOR RADIO AND CENTRAL UNIT

Temperature ranges	-25 ...+55 °C complies with the radio standards -30 ...+75 °C functional -40 ... +85 °C storage
Humidity	< 95 % @ 25 °C, non-condensing
Mounting	DIN rail (side or back) Direct on flat surface (with mounting clips)
Vibration	at least 10 - 500 Hz / 5 g without degradation in data transfer capability
Shock resistance	dropping height 1 m / all directions
IP rating	IP52
Operating voltage	+10.5 Vdc...+30 Vdc
Dimensions / weight	130 x 76.8 x 76.5 mm / 900 g (RU+CU) 130 x 55.5 x 76.5 mm / 680 g (RU only)

## STANDARDS COMPLIANCE

Radio requirements	EN 300 113-1, -2, EN 302 561
EMC	
- Radio Unit	EN 301 489-1, -5
- Central Unit	IEC 61000-6-2, IEC 61000-6-4
Safety	EN 60950-1
RoHS	2002/95/EC, 2002/96/EU, 2011/65/EU

## DATA LATENCY

Data latency typical  
(transparent mode, one byte transfer)

Channel width	Modulation	Latency FEC off	Latency FEC on	serial port speed
12.5kHz	4FSK	23 ms	41 ms	19.2 kbit/s
12.5kHz	8FSK	23 ms	34 ms	19.2 kbit/s
12.5kHz	16FSK	22 ms	31 ms	19.2 kbit/s
25kHz	4FSK	14 ms	23 ms	19.2 kbit/s
25kHz	8FSK	13 ms	19 ms	19.2 kbit/s
25kHz	16FSK	13 ms	18 ms	19.2 kbit/s
150kHz	4FSK	5.8 ms	6.6 ms	57.6 kbit/s
150kHz	8FSK	5.8 ms	6.8 ms	57.6 kbit/s
150kHz	16FSK	5.8 ms	7.0 ms	57.6 kbit/s

## RECEIVER PARAMETERS

Sensitivity (dBm, FEC OFF)

Channel spacing / air speed / modulation	Sensitivity (dBm, FEC OFF) BER 10E -3	Sensitivity (dBm, FEC OFF) BER 10E-6
150 kHz / 115200bps / 4FSK	-104	-97
25 kHz / 19200 bps / 4FSK	-116	-108
12.5 kHz / 9600 bps / 4FSK	-119	-114
150 kHz / 172800 bps / 8-FSK	-96	-89
25 kHz / 28800 bps / 8FSK	-108	-102
12.5 kHz / 14400 bps / 8FSK	-112	-105
150 kHz / 230400 bps / 16FSK	-88	-82
25 kHz / 38400 bps / 16-FSK	-102	-94
12.5 kHz / 19200 bps / 16FSK	-104	-97

## GENERAL

Interfaces - power	Screw terminal
Interfaces - DTE (D9 female)	2 ports: RS-232 and RS-422/485
Interfaces - RF	TNC female

## POWER CONSUMPTION\*

CU with display	2.0 W
CU w.o. display	1.4 W
RU power consumption typical at 12 Vdc	
RX	2.8 W
TX 0.1 W	7.3 W
TX 0.2 W	7.6 W
TX 0.5 W	8.8 W
TX 1.0 W	10.7 W
TX 2.0 W	12.5 W
TX 5.0 W	17.9 W

\* Combine CU and RU power consumption to get total power consumption



IP52



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