

# SATELLAR<sup>®</sup> Digital System

Radio Modem for Long Range Wireless Data Communication

• ETHERNET • INTEGRATED MODULAR SOLUTION • DSP RADIO WITH 45 MHz TUNING RANGE • LINUX OS



WIRELESS WORLD – LOCAL SOLUTION

# A UNIQUE DIGITAL RADIO MODEM SYSTEM

SATELLAR is designed to be flexible and expandable. It can be used in transparent or IP transfer (TCP/IP; UDP/IP), allowing operation in packet-based mode. The Linux operating system allows the design and addition of new functions and features. Over-the-air remote management and firmware updating are possible without the need to visit the installation site. Handy size, positioning of interface connectors on the bottom, a large color display and keypad make it a dream come true for the installer. Do you want to reduce your system costs long-term and embed SATELLAR as a part of your system?

## SUPREME PERFORMANCE

SATELLAR has many unique features compared to its challengers. The software radio technology provides opportunities to implement user-friendly characteristics. All the main RF functions, such as operation frequency, data rate, output power level, channel spacing and many other functions, can be selected by the user. The operating frequency range is 280... 520 MHz with a tuning range of 45 MHz. The maximum data rate over the air is currently 38.4 kbps.

SATELLAR communicates in many different ways: SATELLAR understands TCP/IP communication via Ethernet, and the traditional serial interface is also available. SATELLAR is equipped with a USB host and USB device connector. SATELLAR encrypts user data on the air interface by utilizing the AES-128 encryption standard, and the use of a built-in firewall ensures privacy both in the radio network and in the wired IP network.



Moreover, the system's heart and the brain is the Linux operating system, which gives SATELLAR its supreme performance. New functions and features can be designed and added via the Linux OS.

## MODULAR CONSTRUCTION – SELECT ONLY WHAT YOU NEED

The SATELLAR Digital System consists of different modules. The principal module is the Radio Unit (RU). The RU contains all RF parts as well as signaling and data processing functions. The RU alone can be used as a radio modem with serial interface and as a router in packet-routing networks. This unit is called the SATELLAR-1DS.

The Central Unit (CU) is always used incorporated with the RU. The CU has a micro-controller operated with the Linux OS. The CU processes all incoming and outgoing communication via the USB ports or the Ethernet. The SATELLAR-2DSd is equipped with a Graphical User Interface (GUI). The GUI makes it easy to configure and monitor operations. When the CU is connected to the RU, this combination works as a TCP/IP radio modem. The RU without the GUI is called the SATELLAR-2DS.

The modular construction philosophy makes it possible to design and incorporate Expansion Units (XUs) – like I/O, GSM and GPS units – for special and future needs. You can design your own expansion unit, based precisely on your needs. Any ideas?

USB 2.0	1W RF-power	DSP Signalling	Serial 57.6 kbps
Ethernet 10/100 Mbps	 Linux OS	Air data rate 19.2 / 28.8 / 38.4 kbps	MODULAR
 SATELNET Packet Routing	AES-128 encryption	280...520 MHz	





## MULTIDIMENSIONAL CONFIGURATION OPTIONS

SATELLAR's powerful features can be configured by various easily-accessible methods.

Both variants of the Central Unit include a web server, which can be accessed using any standard web browser. The web pages allow full access to all settings and applications of all units, including radio settings, status information, IP routing settings, encryption settings, log files and firmware updating. The web pages are naturally also accessible via the SATELLAR radio link once the network has been deployed, allowing easy remote management and firmware updating without the need to visit the installation site.

A CU equipped with a 2.4 inches color display and keypad provides a quick and simple way of changing settings and viewing local diagnostics immediately on-site, without the need for additional hardware. The display allows nearly the same functionality as the web interface, including access to remote device settings and local firmware updates using a USB memory stick.



## FLEXIBILITY IN INSTALLATION

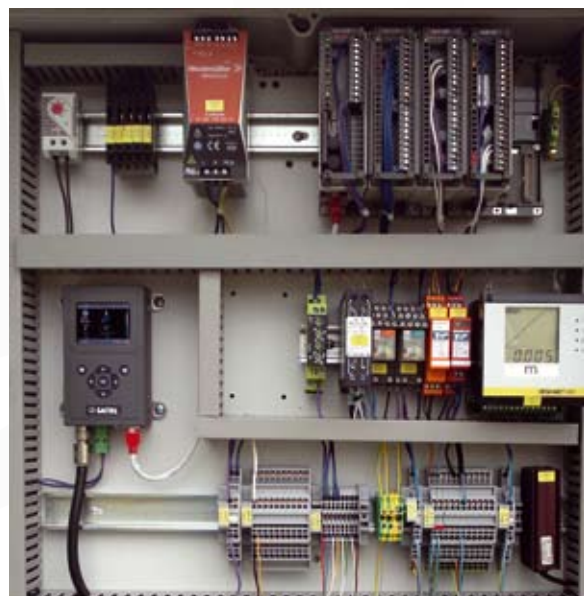
Its visionary design gives SATELLAR the look of a magnificent piece of automation art. Combining innovative modularity, compact unit size and low weight, it gives users supreme flexibility in cabinet mounts and usage.

Installing the SATELLAR-2DS(d) on a flat surface with mounting clips, or to a DIN rail – either from the back or side with specific DIN rail mounting clips – ensures uninterrupted access to the equipment's performance indicators.

All interfaces requiring cabling are located on the bottom of the unit, thus minimizing unused space in the cabinet corner. Actual cabling and installation work becomes easier and faster, as there is no need to detach the unit when these cables are connected.

A wide operating voltage range and low power consumption allow the use of several kinds of power supplies for various operating environments.

The SATELLAR-2DS(d) interfaces adhere to industry standards (D9; RS-232/422/485, in transparent mode, RJ-45 with Auto-MDIX, in packet-based mode), which widens the selection and availability of interface equipment.



# Technical specifications

## RADIO UNIT

### RADIO PARAMETERS

Frequency range	280 - 520 MHz *1)
Tuning range	45 MHz
Channel spacing	12.5 and 25 kHz, selectable
Carrier frequency configuration	Frequency programmability in 6.25 kHz steps
Carrier frequency accuracy	+/- 2.5 ppm, at temp. -25 ... +55 °C
Carrier frequency long term stability	+/-2.0 ppm / 3 years
Data latency (transparent mode)	< 18 ms @ 25 kHz channel
Forward error correction (FEC) configurable:	off, rate 0.5 or rate 0.667

### TRANSMITTER PARAMETERS

Output power	100 mW...1 W, SW adjustable with 100 mW steps
Adjacent channel power typically (meas. method EN 300113)	< -63 dBc
Maximum air interface data rates	38400 bps @ 25 kHz channel, 19200 bps @ 12.5 kHz channel

### RECEIVER PARAMETERS

Sensitivity (dBm, FEC OFF) Channel spacing / air speed	BER	
	10E-3	10E-6
25 kHz /19200 bps (4-FSK)	-116	-112
12.5 kHz /9600 bps (4-FSK)	-119	-115
25 kHz /38400 bps (16-FSK)	-102	-98
12.5 kHz /19200 bps (16-FSK)	-105	-98

### GENERAL

Power consumption	8.5 W at 1 W transmission 6 W at 100 mW transmission 3 W reception
Interfaces - power	Detachable / lockable Screw terminal
Interfaces - DTE (D9 female)	Options: a) RS-232 with handshaking b) RS-422/485/232 without handshaking
Interfaces - RF	TNC female
Mechanical dimensions	130 x 24.3 x 76.5 mm
Weight	300 g

## CENTRAL UNIT

CPU	ARM 9 @ ~ 200 MHz
RAM	64 MB RAM
ROM	128 MB flash
Display	2.4 ", 320 x 240 pixel resolution, 65 k colours
Keypad	up, down, left, right, OK (select) and two SW defined keys
Power consumption (no USB device connected)	2.0 W With UI 1.4 W Without UI
USB interfaces	USB-host & USB-device USB2.0 full speed
Ethernet interface	10/100 Mbit Ethernet RJ-45 with Auto-MDIX
Mechanical dimensions	130 x 21.7 x 76.5 mm
Weight	260 g

### COMMON PARAMETERS FOR RADIO AND CENTRAL UNIT

Standard compliance *2)	
Radio requirements	EN 300 113-1, -2, FCC Part 90
Emissions, immunity, radio unit	EN 301 489-1, -5, FCC Part 15
ESD, radio unit	EN 61000-6-2 level 4
Emissions, immunity, ESD central unit	EN 61000-6-2, 61000-6-4
RoHS	2002/95/EC
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 two 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
DC input range	+9 Vdc...+30 Vdc

Values are subject to change without notice.

\*1) Check the available versions from local SATEL distributor.

\*2) Check the local standard compliances from local SATEL distributor.

SATEL reserves the right to change the technical specifications or functions of its products.



SATELLAR-1DS  
Radio unit only

SATELLAR-2DS  
Radio unit + central  
unit without display

SATELLAR-2DSd  
Radio unit + central  
unit with display

SATELLAR-2DSd  
with expansion unit

Designed and manufactured in Finland by:



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