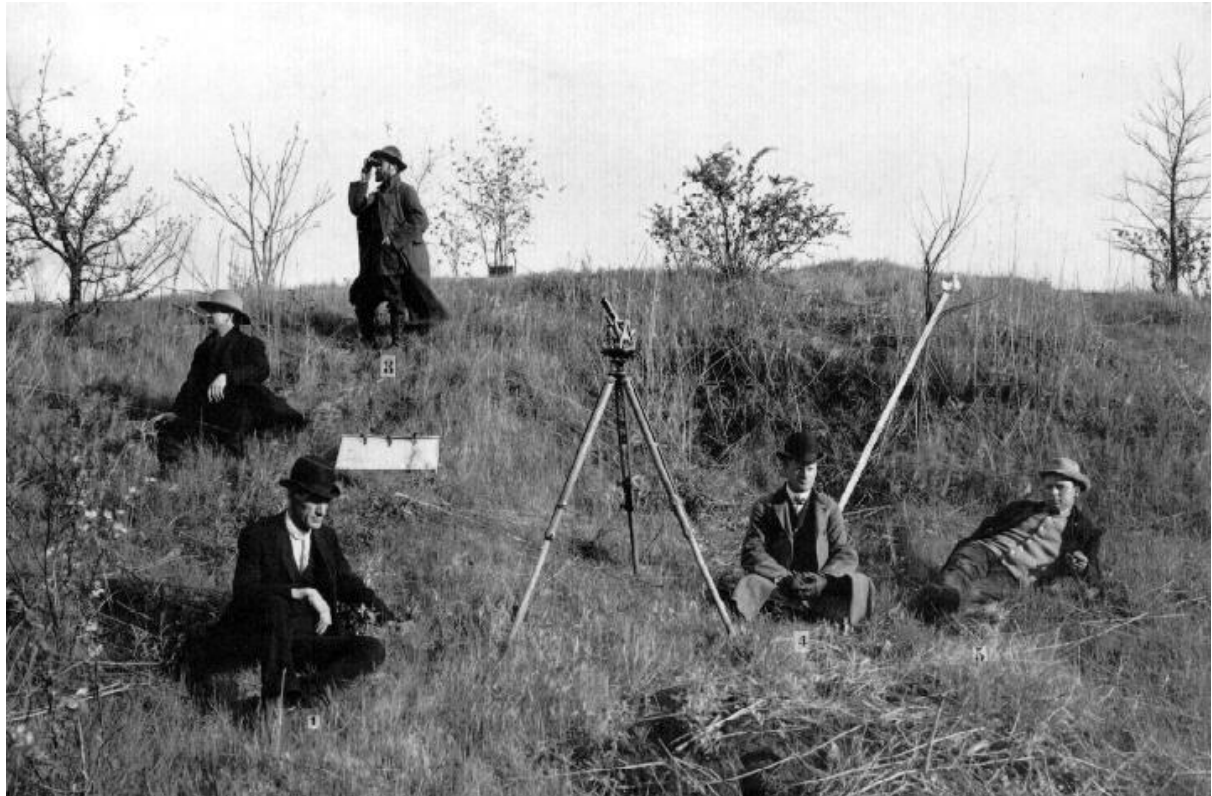
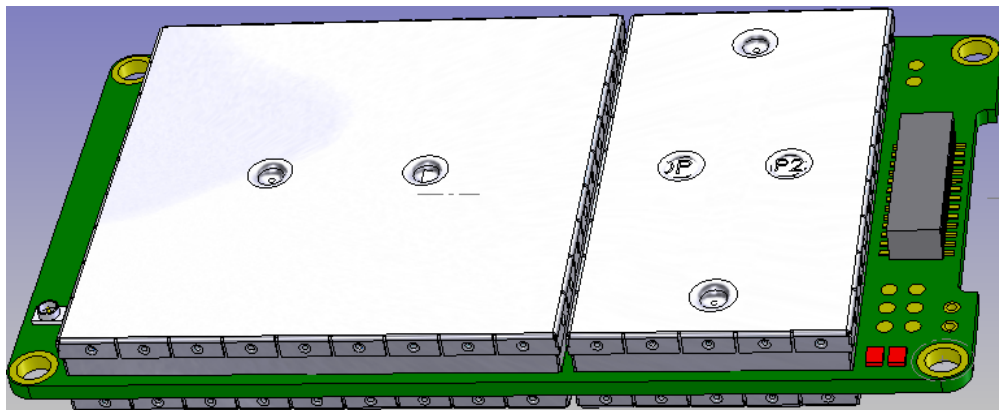


---- Waiting for wireless ----



SOLUTION

SATELLINE-M3-TR1, 70MHz transceiver module with changeable channel spacing provides you a compact flexible and lightweight solution



SATELLINE-M3-TR1 transceiver is a module specifically designed for small mechanics.

- The small current consumption and 50 g lightweight design makes this module an excellent combination for long range distance measurement applications.
- The module is equipped with all necessary features, such as 70 MHz tuning range, versatile connectivity, 3-9V and 6-30V voltage level ranges and attachable antenna connector.
- Settings and configuration is possible to make with a special SATEL Configuration Manager.
- Compatibility: **HW:** SATELLINE-3AS product line. **SW:** Configuration Manager, Saterm, PC Pro.
ADDITIONAL EQUIPMENT: LINK-series.

CONNECTORS AND PIN ORDER

Antenna connector

50 ohm, U.FL . The module can be supplied with different U.FL –XX cable adaptors. (XX= for example TNC, SMA, MCX, MMCX).

Pin order of the interface connector

26-pin	Satel Name	Level	Description	Direction by the modem
1	Vin	3-9 or 6-30Vdc	Oper. Voltage. All Vin pins are connected together	IN
2	Vin	3-9 or 6-30Vdc	Oper. Voltage. All Vin pins are connected together	IN
3	Vin	3-9 or 6-30Vdc	Oper. Voltage. All Vin pins are connected together	IN
4	Vin	3-9 or 6-30Vdc	Oper. Voltage. All Vin pins are connected together	IN
5	RTS_RS	RS-232 0...Vdc	Request To Send from DTE. Programming Mode. >3VDC or Not connected =	IN
6	MODE		Data Transfer Mode Note	IN
7	TD_RS	RS-232	Transmit Data from DTE to the radio modem	IN
8	DSR	RS-232	Data Set Ready. Indicates that the radio modem is ON	OUT
9	RD1_RS	RS-232	Receive Data to DTE from the radio modem	OUT
10	BOOT		For factory purposes	IN
11	Spare_1			
12	Spare_2			
13	CD_out TTL	TTL	Carrier Detected	OUT
14	GP			IN
15	GP			OUT
16	CD_RS*	RS-232	Carrier Detected	OUT
17	DTR	OFF ≤ 1... -15V. ON ≥ 1.2V...Vdc, or "open"	Data Terminal Ready. ON= the unit is ready for normal transfer mode OFF= the unit goes to low current consumption mode	IN
18	CTS_TTL/A/CD**	TTL	Clear to Send	OUT
19	RD2TTL/B/RD2_RS	TTL	Receive Data to DTE from the radio modem	OUT
20	TD2TTL/A/TD2_RS	TTL	Transmit Data from DTE to the radio modem	IN
21	RTS_TTL/B	TTL	Request To Send from DTE.	IN
22	CTS_RS	RS-232	Clear to Send	OUT
23	GND		Ground. All GND pins are connected together.	
24	GND		Ground. All GND pins are connected together.	
25	GND		Ground. All GND pins are connected together.	
26	GND		Ground. All GND pins are connected together.	

* CD, can be selected with R8 on the interface board (optional assembly).

** CD 3AS type, can be selected with R9 on the interface board (default assembly).

Note!

1. TTL-option eliminates 422-option and 422-option eliminates TTL-option.
2. Unused pins can be left unconnected.

OPERATING VOLTAGE AND INTERFACE (PWR-module)

The SATELLINE-3AS-TR1 radio modem has two (2) operating voltage ranges. The voltage level must be mentioned in the order. The operating voltage range is changed by replacing the PWR-module.

Nominal operating voltages: 3-9V and 6-30V.

Exact values: 3.2-8.5 V_{DC} or 6.5V - 28 V_{DC} +/-10%.

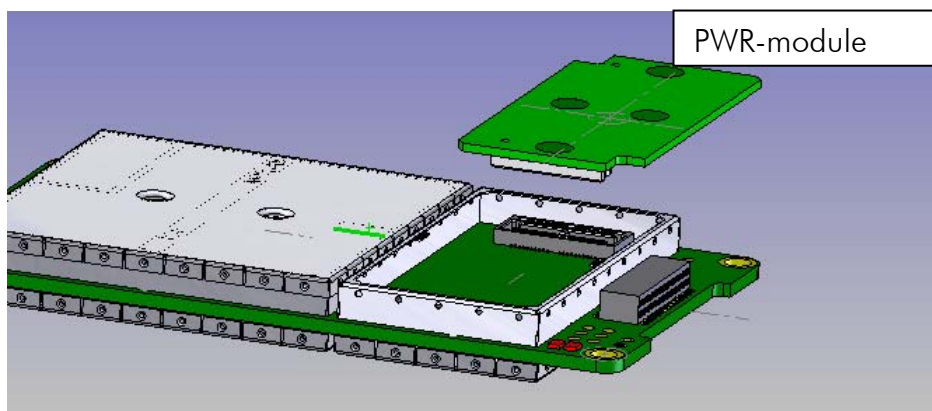
The Operating Voltage range is marked in the label.

Communication interfaces for 3-9V and 6-30V operating voltage variations:

Port 1: Always RS-232

Port 2: LVTTTL, TTL or RS-232/422

The 3-9V PCB is marked as SPL0006x and the 6-30V is marked as SPL0010x.



CONNECTORS

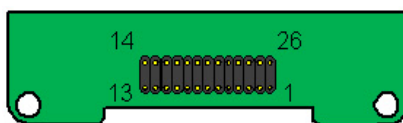
Antenna connector:
26-pin header, female:
26-pin strip, male:

Type

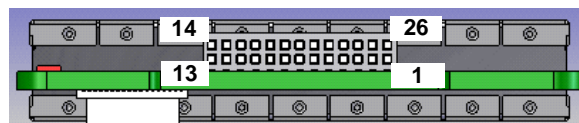
U.FL, U.FL-R-SMT
613-26-20-10-2-10
FTSH-113-04-L-DV

Manufacturer

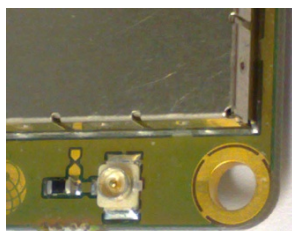
Hirose
Weitronic
Samtec



26-pin strip, male



26-pin header, female



FL-R-SMT



U.FL

+



TNC



MMCX

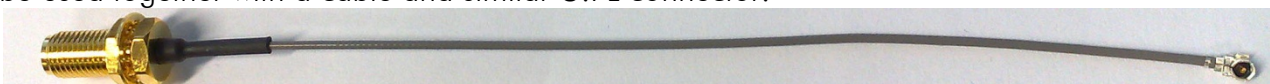


MCX



SMA

The PCB is equipped with surface mount U.FL-R-SMT antenna connector. Any antenna connector can be used together with a cable and similar U.FL connector.



TECHNICAL SPECIFICATIONS

SATELLINE-M3-TR1 complies with the following international standards:

- EN 300 113-2
- EN 301 489 (EMC-requirements)
- EN 60950 (Safety Standard)
- FCC CFR47 section 90

	RECEIVER	TRANSMITTER	Note!
Frequency Range	403...473 MHz		
Separate RX /TX frequencies	RX:403...473. MHz TX: 403...473		programmable
Channel Spacing	12.5 kHz / 20 kHz / 25 kHz		programmable
Tuning range	70 MHz		
Spurious Radiations	< 2 nW	EN 300 113 and CRF47 part90	
Frequency error tolerance	< 1 kHz		
Sensitivity	-114 dBm @ 12.5 kHz -111 dBm @ 25 kHz (BER < 10 E-3)		FEC ON See:Note 1
Co-channel Rejection	> -12 dB		FEC On
Adjacent Channel Selectivity	> 47 dB @12.5 kHz > 52 dB @ 25 kHz		FEC On
Intermodulation Attenuation	> 60 dB		FEC ON
Blocking	> 86 dB		FEC ON
Spurious Rejection	> 60 dB		FEC On
Spurious Emission	< -100 dBm	< -80 dBm on 3 rd harmonics *	* @1215 – 1240 MHz
Power Consumption	< 1.2 W	<3 W @ 0.5W output power <7 W @ 1W output power	
Power Consumption, Save Modes	SLEEP: 0.24 W typical DTR: 5mW		
Communication Mode	Half-Duplex		
Type of Emission	F1D		
Carrier power	100, 200, 500, 1000 mW		
Adjacent Channel Power	EN 300 113 and CRF47 part90		
Carrier power stability	< ±1.5 dB		

	DATA MODEM	
Timing	RS-232	
Electrical Interface	Port 1:RS-232, fixed *Port2: LVTTTL, TTL or RS-232/422	*Delivery options. RS-232/422 is programmable
Interface Connector	26-pin header socket, female as standard, others by request.	
Data speed of I/O-interface	300 – 38400 bps	
Data speed of Radio Interface	19200 bps (25 kHz channel) / 9600 bps (12.5 kHz channel)	
Data Formats	Asynchronous data	
Modulation	4FSK, GMSK (Pacific Crest TrimTalk)	

	GENERAL	
DC input ranges	Nominal voltage : 3-9 V and 6-30 V Full range: 3.2-8.5V or 6.5-28 Vdc +/-10%.	Delivery options
Temperature Ranges	-30 °C ... +65 °C	Functional
	-25 °C ... +55 °C	Complies with standards
	-40 °C ... +80 °C	Storage
Antenna Connector	50 ohm, U.FL	
Construction	PCB with sheet metal EMI shields	
Size L x W x T	96 mm x 56 mm x 9 mm	
Weight	50 g	

	OTHER MEASURES	
ESD-failure threshold	8 kV contact, 15 kV air discharge	
Immunity test	10V/m	

NOTE!

Due to radio electronic design, the receiver is about 6-15dB less sensitive on the following frequencies: 403.000MHz, 416.000MHz, 429.000MHz, 442.000MHz, 455.000MHz, 468.000MHz, 409.5875MHz and 469.2MHz.

Differences between SATEL M3-TR1 and SATELLINE-3AS

Feature	TR1	3AS
Frequency Range	403-473MHz	2 MHz band
Tuning range	70 MHz	2MHz
Channel Spacing	12.5 kHz / 20 kHz / 25 kHz	Fixed
Adjacent Channel Selectivity	> 47 dB @12.5 kHz > 52 dB @ 25 kHz	> 60 dB @12.5 kHz > 70 dB @ 25 kHz
Intermodulation Attenuation	> 60 dB	> 65 dB
Interface connector	2 row 26-pin, detachable	D-15, fixed
Display	No	Yes
Keypad	No	Yes
DC input ranges	Selectable: 3-9V and 6-30V	Fixed: 9-30V
Electrical Interface	RS-232/ RS-422, LVTTTL, TTL	RS-232, RS-422, RS-485
Antenna connector	50 ohm, U.FL + cable adapters with different RF-connector	Fixed TNC
Size L x W x T	96 x 56x 9 mm	137 x 67 x 29mm
Weight	50 g	250 g

Other notices of the TR1

NARS-adapters: When the lower range voltage module (PWR-module) is used, NARS-1F-4A must be used instead of NARS-1F.

Shock resistance: Dropping height 1 m/ all directions.

Vibration: At least 10-500 Hz/5 g without degradation in data transfer capability, when the module is supported to the chassis with soft material in the middle of the PCB (as in the picture below).

