CGR10/15

Complement to the user quide of terminal equipment

1 CONTENTS

2 INTRODUCTION

2.1 Description of the product

CGR10/15 is a 4-level FSK/GMSK UHF radio modem receiver, which provides a transparent data received from SATELLINE compatible radio modems manufactured by SATEL Oy.

CGR10/15 is to be integrated in the CS10/15 land survey system, which is a third party product. The applications of the device are in the field of surveying, engineering and constructional applications.

The housing for the CGR10/15 and the related mechanics are supplied by third party. Assembly of the mechanics can be done either by SATEL Oy or by third party. SATEL Oy is responsible for the required level of EMC characteristics related to the shielding of the radio modem.

The implementation of CGR10/15 is based on the SLR5 radio modem – the radio communication and the user interface is mostly similar. Main differences to SLR5 are:

1. The modem is a receiver instead of a transceiver.
2. CGR10/15 is delivered with a specific housing
3. User interface connector is USB instead of D-15 female.
4. User interface is USB instead of RS-232.
5. The operating voltage is 5 V instead of 6 V.
6. Antenna connector is external SMB instead of a D-connector combo SMB.

3 TECHNICAL SPECIFICATIONS

SATELLINE-CGR10/15 radio receiver modem module complies with the following international standards:
EN 300 113-2V.1.4.1
EN 301 489 (EMC-requirements)
EN 60950 (Safety Standard)
FCC CFR47 Part 15

	RECEIVER	TRANSMITTER	Note!
Frequency Range	403...473MHz		See Note 1
Channel Spacing	12.5 kHz/ 20 kHz / 25kHz		
Tuning range	70MHz		
Spurious Radiations	< 2nW		
Frequency error tolerance	< 1kHz		
Sensitivity	- 114 dBm @ 12.5 kHz -110 dBm @ 25 kHz (BER < 10 E-3)		FEC On
Co-channel Rejection	> 12 dB		FEC On
Adjacent Channel Selectivity	> 47 dB @ 12.5 kHz > 52 dB @ 25 kHz		FEC On
Intermodulation Attenuation	> 60dB		FEC On
Blocking	86dB		FEC On
Spurious Rejection	60dB		FEC On
Spurious Emission	< -100 dBm		
Power Consumption, typical	1.2W		
Power Consumption, Sleep ON	0.24W typical		

	DATA MODEM	
Timing	RS-232	
Electrical Interface	USB 5V (RD, TD, +VCC, GND)	
Data speed of I/O-interface	300 – 38400bps	
Data speed of Radio Interface	19200bps (25kHz channel) / 9600 bps (12.5kHz / 20 kHz channel)	
Data Formats	Asynchronous data	
Modulation	4FSK, GMSK	

	GENERAL	
Operating Voltage	+ 5.0 Vdc	
Temperature Ranges	-25°C...+55°C.	Complies with standards
	-30°C...+70°C.	Functional
	-40°C ...+85°C	Storage
Antenna Connector	50ohm, D-sub Combo-RF, Female	

	OTHER MEASURES	
ESD-failure threshold	8kV contact, 15kV air discharge	

Note 1
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.

3.1.1 Power supply

No separate power supply. The module gets the 5 V operating voltage directly from the CS10/15

The modem withstands a live insertion or removal from the CS10/15 without switching the power OFF.

3.2 Pin order of the main connector

SIGNAL NAME	DIRECTION	DESCRIPTION
+ 5 V	IN	Operation Power
USB +	IN/OUT	I/O
USB -	IN/OUT	I/O
GND	IN	Ground
GND	IN	Ground

4 DEFAULT VALUES

The radio receiver modem is shipped with the following default settings (unless otherwise specifically ordered):

DEFAULT VALUES OF THE ADJUSTABLE SETTINGS (the user can change these settings later on)		
Setting	Default value	Range
Radio frequency		
Operating RX frequency	438.000 MHz	Range: 403-473 MHz
Reference Frequency	438.000 MHz	Range: 403-473 MHz
Channel Spacing	25 kHz	Range:12.5 kHz, 20 kHz, or 25 kHz
Radio settings		
Signal threshold	-115 dBm	80-118 dBm
Radio Compatibility	SATEL 3AS	SATEL 3AS, Option1=PCC 4-FSK, Option 2=PCC GMSK, 3=TrimTalk
Addressing		
RX Address	OFF	ON/OFF
TX Address	OFF	ON/OFF
RX addressing to RS port	OFF	ON/OFF
TX address auto switch	OFF	ON/OFF
Serial port		
Interface	USB	Fixed. Note1.
Data speed	19200 bps	300, 600, 1200, 2400, 4800, 9600, 19200, 38400
Data bits	8	7, 8, 9.
Parity bits	None	None, Even, Odd.
Stop bits	1	1, 2
Handshaking		Handshaking lines apply to the DATA-port.
CTS	Clear to send	Clear to send, TX buffer state
CD	RSSI threshold	RSSI- threshold, Data on channel, Always ON.
RTS	Ignored	Ignored, Flow Control, Reception Control.
Pause length	3 bytes	3….255
Additional setup		
Error correction	OFF	ON/OFF
Error check	OFF	ON/OFF
Repeater	OFF	ON/OFF
SL-commands	ON	ON/OFF

Priority	TX	RX/TX
FullCR16 Check	OFF	ON/OFF
Routing	OFF	ON/OFF
Tests	OFF	ON/OFF

Note 1.
Externally the modem operates with USB, but due to USB-RS232- converter the internal interface is RS-232.

5 FUNCTIONAL DESCRIPTION

SATELLINE-CGR10/15 is a, 4-level FSK/GMSK UHF radio modem receiver, which receives transparent radio data from other radio modules compatible to SATELLINE radio modems manufactured by SATEL Oy.

The modem is used by customer's own User Interface. The commands are given through USB-interface.

5.1 Functional delays

Wakeup time from Power ON to modem ready	35 ms (typical)
RX-mode: Wakeup time from SLEEP to modem ready (triggered by IRQ-data when Data in TD-input)	40ms, typical