

COR3

27 July 2012, Issue 1

NBFM Multi-channel receiver for 868MHz SRD band

The COR3 is a 25kHz channel narrowband multichannel Category 1 compliant receiver intended for European 869.2-869.25MHz Social Alarm application. It can also be used for any 868-870MHz band Non-Specific SRD applications. The module offers a low power, reliable data link in an industry-standard pin out and footprint.



Figure 1: COR3-869-5-SAL receiver

Features

- Conforms to EN 300 220-2 (Category 1) and EN 301 489-3
- High performance double superhet, PLL Synthesizer with TCXO
- SAW front end filter
- Data rates up to 5 kbps for standard module
- Fully screened
- Feature-rich interface (RSSI, analogue and binary digital data outputs)
- User configurable via microcontroller UART
- Low power requirements

Applications

- Social Alarm
- Handheld terminals
- Heavy vehicle/machine remote controls
- EPOS equipment, barcode scanners
- Data loggers
- Industrial telemetry and telecommand
- In-building environmental monitoring and control
- High-end security and fire alarms
- Vehicle data up/download

Technical Summary

- Social Alarm frequencies: CH0: 869.2125MHz, CH1: 869.2375MHz
- Custom frequency within 865MHz - 870MHz
- Up to 32 channels controlled via UART interface (16 parallel selected)
- Supply range: 4.5V - 15V
- Current consumption: 25mA receive
- Data bit rate: 5kbps max. (standard module)
- Receiver sensitivity: -120dBm (for 12 dB SINAD)
- Size: 57 x 26 x 9mm

Evaluation platforms: NBEK + COR3 carrier

COR3-869

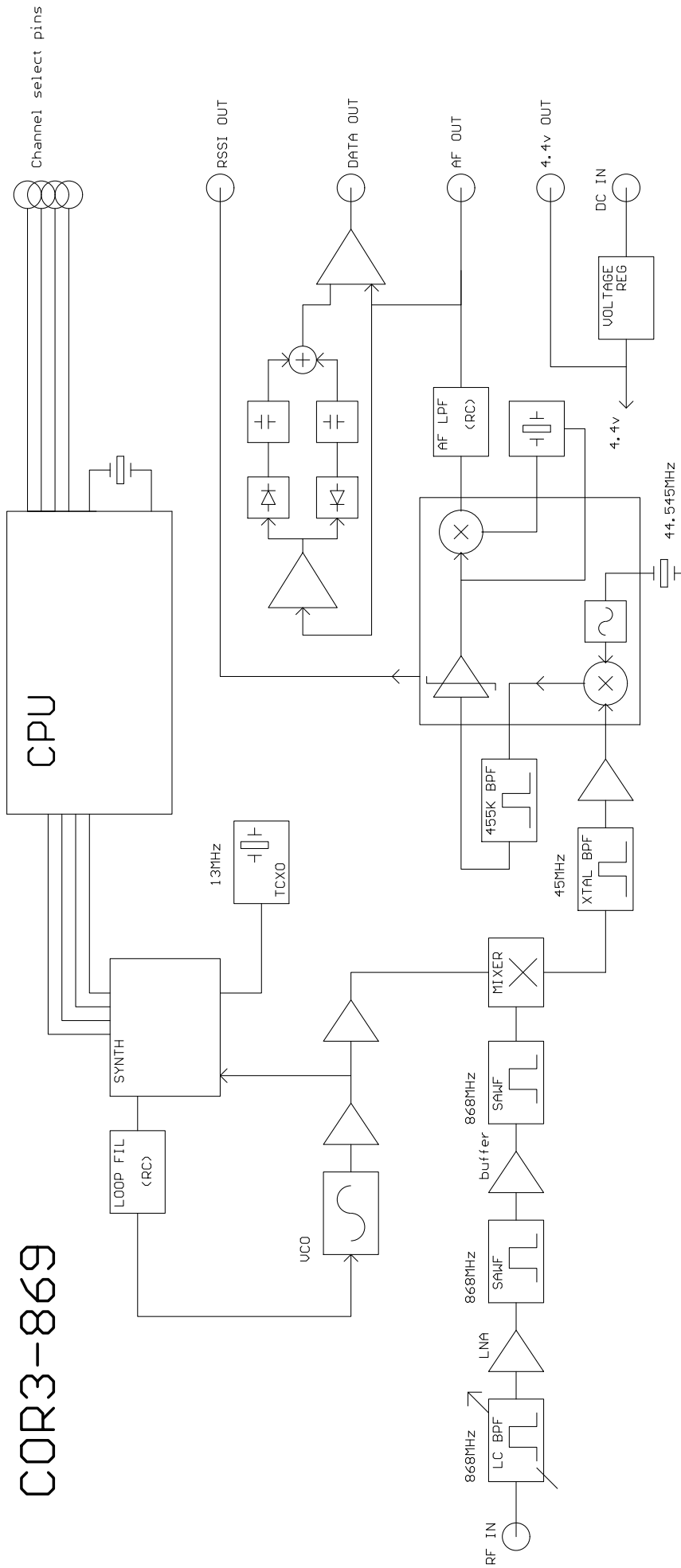


Figure 2: COR3 block diagram

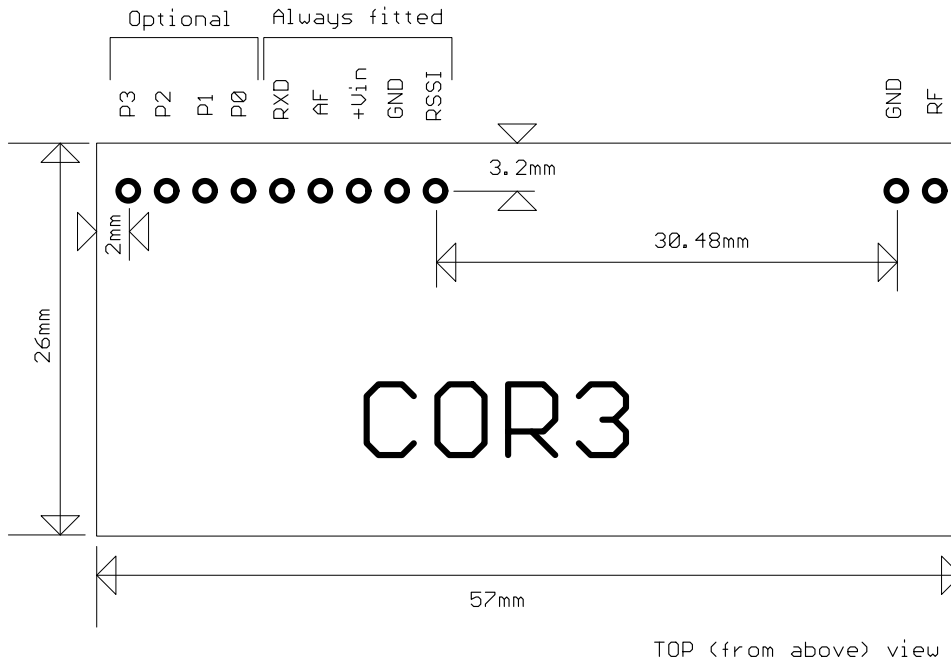


Figure 3: COR3 Flat mounted footprint

Pin Description - COR3

Pin	Name	Function
1A	RF in	50Ω RF input from antenna
2A	RF GND	RF ground, internally connected to the module screen and pin 2 (0V)
1	RSSI	DC level between 0.5V and 2.5V. 60dB dynamic range
2	GND	Ground (0V)
3	Vcc	Supply input 4.5V – 15V DC
4	AF	700mV p-p audio. DC coupled, approx 1V bias
5	RXD	Open collector output of data slicer suitable for Bi-phase codes Requires external pull-up resistor to required output voltage level
6	P0/PGM	Parallel Channel select LSB Serial frequency programming / configuration ¹
7	P1	Parallel Channel select
8	P2	Parallel Channel select
9	P3	Parallel Channel select MSB

Notes:

1. There is no pull-up on the open collector RXD output.
2. P0-P3 are inverted parallel frequency select inputs. They have 10k pullups to 4.4V
3. P0 requires a 4.4V level UART (inverted RS232) serial command strings for programming
4. A version of the LMR2 firmware is used (so most variants of the LM_series will also be possible for the COR3)
5. Two pinout versions are offered: With conventional pins, out of the bottom of the unit (flat mount) and with right-angle pins, to allow 'SIL' vertical mounting.
6. The actual pinout and footprint follows the NRX1/NRX2 type radio, with the addition of P0-P3

COR3 serial configuration commands

Serial data is sent to the unit on one of the parallel channel select pins (P0). It is very important that the unit does not 'decode' switch bounce in ordinary operation as a command string, or spurious re-writing of the e2prom will result. For this reason the user must send the 16-character string ENABLESERIALMODE (followed by a carriage return) to fully enable the serial command mode before sending any of the command strings listed below. Command mode is disabled on power down, or on reception of a # character. You must power the unit to successfully program it.

2400 baud, 8 bit data, no parity, 1 start bit, 1 or 2 stop bits, No flow control, 4.4V level UART (inverted RS232)

GOCHAN aa	Serial select of channel aa (0 to 31)
LOAD aa nnnnn	Set value of N for channel aa (channels 0 to 31)
SETPAR	Channel selected by 4 bit parallel input (0 to 15)
SETSER	Channel selected by most recent 'gochan' operation
RVALUE rrrr	Enter value for R register
SINGLE nnnnn	Set value of N for single channel operation. N value NOT stored in eeprom
<cr>	Process entry
I	Clear all buffers
#	Disable command mode

aa = a two digit channel number from 00 to 31

nnnnn = synthesizer N register value, (up to 65535)

rrrr = synthesizer R register value, (up to 16383)

$$R = \frac{f_{xial}}{f_{channelspacing}} = \frac{13MHz}{25kHz}, \text{ So } R=520$$

$$N = \frac{f_{RF} - IF}{f_{Channelspacing}} = \frac{868MHz - 45MHz}{25kHz} = 32920$$

Notes:

1. When If an N value greater than 65536 is needed then an offset of +65536 can be selected by setting bit 15 of the R value high
2. A pause of at least 50ms must be allowed between command strings (EEPROM programming time) SINGLE mode does not store the N value in EEPROM. Therefore the unit is inoperative after a power down until either another valid SINGLE command is received, or mode is changed by a GOCHAN, SETPAR or SETSER command. SINGLE mode is intended for frequency agile applications.
3. /SETPAR command should be issued at the end of channel programming to put the module back into parallel frequency select mode
4. User can modify the frequency table of 32channels to any desired frequency by changing N, R values of synthesizer within $\pm 1.5MHz$ of factory set Channel 0 frequency subject to the Radio Regulatory Band Allocation in the country of intended use.

Condensed specifications

Frequency	Social ALarm (SAL) variant: CH0:869.2125MHz, CH1:869.2375MHz User customisable frequencies: 865MHz – 870MHz (Versions on any other UHF should, in principle, be possible depending on SAW filter availability)
<i>Frequency stability</i>	±1.5kHz
<i>Channel spacing</i>	25kHz
<i>Number of channels</i>	32 channels controlled via UART interface (16 parallel selected)
Supply <i>voltage</i>	4.5V - 15V DC
<i>Current</i>	25mA
Operating temperature	-20°C to +55°C (Storage -30°C to +70°C)
Size	57 x 26 x 9 mm
Spurious radiations	Compliant with ETSI EN 300 220-2 (Category 1) and EN 301 489-3
Interface	
<i>user</i>	9pin 0.1" pitch molex (optionally 5 pin, without channel selects)
<i>RF</i>	2pin 0.1" pitch molex
Recommended PCB hole size	1.2mm (min.)
Intended approval	ETSI Radio standard EN 300 220-2 and EMC standard EN 301 489-3
Receive	
Sensitivity	-120dBm for 12 dB SINAD
<i>blocking</i>	>85dB
<i>adjacent channel</i>	-62dB Tested per. ETSI 300-220 v 2.3.1
<i>Image</i>	>70dB
<i>spurii</i>	>65dB
Spurious radiations	Compliant with ETSI 300-220-2 (Category 1) and EN 301 489-3
Outputs	RSSI, carrier detect, audio, data
Power on to valid audio	28ms
Power on to stable data out (50:50 mark / space)	50ms

Received Signal Strength Indicator

The COR3 has wide range RSSI that measures the strength of an incoming signal over a range of 60dB or more. This allows assessment of link quality and available margin and is useful when performing range tests.

The output on pin 1 of the module has a standing DC bias of up to 0.5V with no signal, rising to 2.5V at maximum indication (RF input levels of -40dBm and above). $\Delta V_{min-max}$ is typically 2V and is largely independent of standing bias variations.

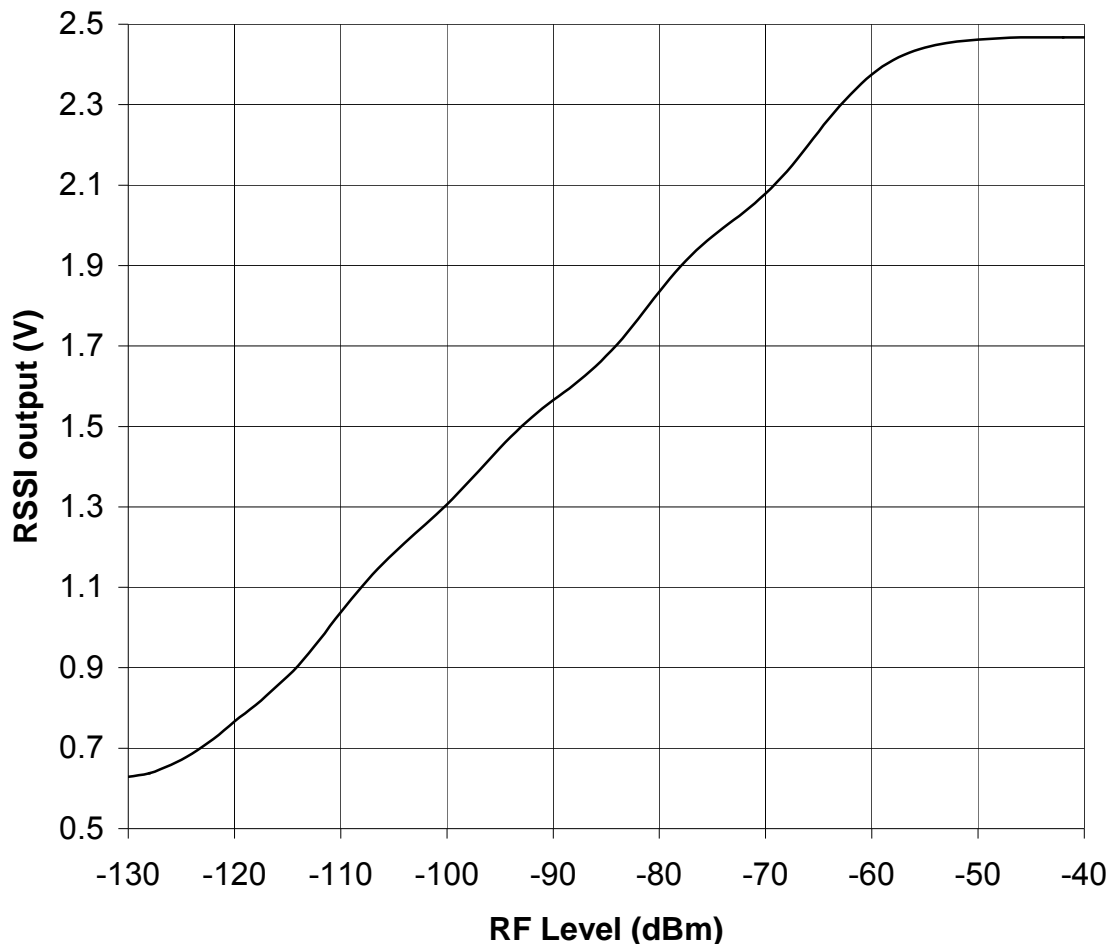


Figure 4: RSSI voltage variation with respect to RF level at COR3

Ordering Information

Part Number	Frequency	Module mounting	Pins
COR3-869.2125-5-H	869.2125MHz	Horizontal Mounting, Perpendicular pins	RF, RFGND, RSSI, GND, VCC, AF, RXD
COR3-869-5-SAL	869.2-869.25MHz	Vertical Mounting, Parallel pins	RF, RFGND, RSSI, GND, VCC, AF, RXD P0/PGM
COR3-869-5-SAL-H	869.2-869.25MHz	Horizontal Mounting, Perpendicular pins	RF, RFGND, RSSI, GND, VCC, AF, RXD P0/PGM
COR3-869-5	868-870MHz	Vertical Mounting, Parallel pins	RF, RFGND, RSSI, GND, VCC, AF, RXD P3, P2, P1, P0/PGM

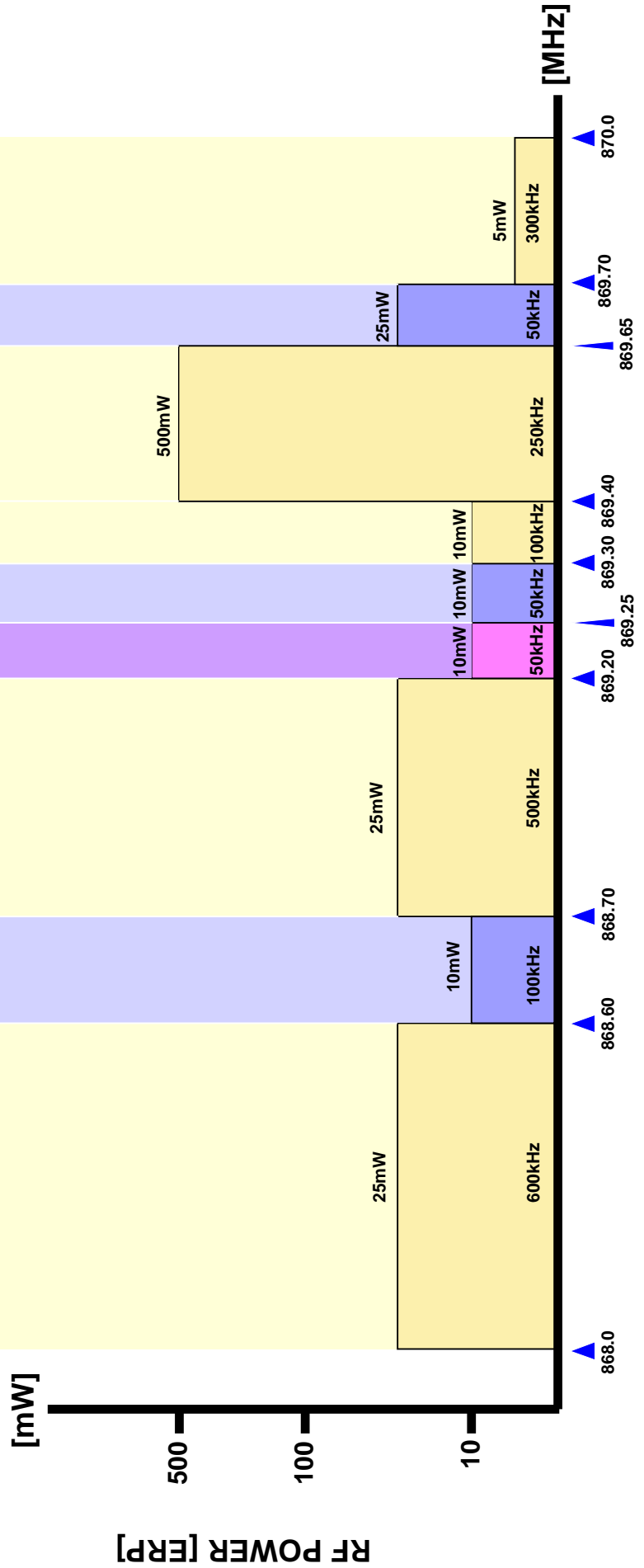
COR3 can be user programmed to any frequency within 865MHz-870MHz SAW filter bandwidth. It can be factory produced to a wide range of UHF sub-bands subject to availability of SAW filter.

COR3 can be mounted vertically on a PCB with parallel pins like in Figure 1. Alternatively, COR3 can be supplied with perpendicular pins for horizontal mounting parallel to host PCB ground plane.

Number of parallel channel selection pins depends on required frequency channels.

CEPT/ERC Rec 70-03, 868 MHz Band Plan

Applications	Non-specific SRD	Alarm	Non-specific SRD	Social Alarm	Alarm	Non-specific SRD	Alarm	Non-specific SRD
Channel Spacing	No Spacing	25kHz or WB	No Spacing	25kHz	25kHz	25kHz or Wide Band	25kHz	No Spacing
Duty Cycle	<1% or LBT	<1%	<0.1% or LBT	<0.1%	<1%	<10% or LBT	<10%	up to 100%



Radiometrix Ltd

**Hartcran House
231 Kenton Lane
Harrow, Middlesex
HA3 8RP
ENGLAND**

Tel: +44 (0) 20 8909 9595

Fax: +44 (0) 20 8909 2233

sales@radiometrix.com

www.radiometrix.com

Copyright notice

This product data sheet is the original work and copyrighted property of Radiometrix Ltd. Reproduction in whole or in part must give clear acknowledgement to the copyright owner.

Limitation of liability

The information furnished by Radiometrix Ltd is believed to be accurate and reliable. Radiometrix Ltd reserves the right to make changes or improvements in the design, specification or manufacture of its subassembly products without notice. Radiometrix Ltd does not assume any liability arising from the application or use of any product or circuit described herein, nor for any infringements of patents or other rights of third parties which may result from the use of its products. This data sheet neither states nor implies warranty of any kind, including fitness for any particular application. These radio devices may be subject to radio interference and may not function as intended if interference is present. We do NOT recommend their use for life critical applications.

The Intrastat commodity code for all our modules is: 8542 6000

R&TTE Directive

After 7 April 2001 the manufacturer can only place finished product on the market under the provisions of the R&TTE Directive. Equipment within the scope of the R&TTE Directive may demonstrate compliance to the essential requirements specified in Article 3 of the Directive, as appropriate to the particular equipment.

Further details are available on The Office of Communications (Ofcom) web site:

<http://www.ofcom.org.uk/>

Information Requests

Ofcom

Riverside House

2a Southwark Bridge Road

London SE1 9HA

Tel: +44 (0)300 123 3333 or 020 7981 3040

Fax: +44 (0)20 7981 3333

information.requests@ofcom.org.uk

European Communications Office (ECO)

Pebblinghus

Nansensgade 19

DK 1366 Copenhagen

Tel. +45 33896300

Fax +45 33896330

ero@ero.dk

www.ero.dk
