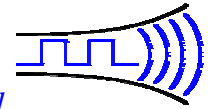


**NEW**

# Radiometrix



Hartcran House, 231 Kenton Lane, Harrow, HA3 8RP, England

Issue A, 29 January 2008

Tel: +44 (0) 20 8909 9595, Fax: +44 (0) 20 8909 2233

LSR2

**PRELIMINARY DATA SHEET**

## 375MHz NBFM low current Multi-channel Receiver

***The LSR2 is a low current multichannel design in an RX2M footprint/pinout. It is similar in performance to a LMR2 receiver but only draws 10mA at 3.1 -15V.***

***The standard -A version has a filtered audio output in place of the data out (but a -5 version has the usual data interface)***

Figure 1: LSR2-375-A

### Features

- Conforms to ETSI EN 300 220-3 and EN 301 489-3
- High performance double superhet, 128 channel PLL synthesizer
- 100mV RMS filtered audio. (or 'data out' in -5 version)
- Data rates up to 5 kbps (for -5 version)
- Fully screened. Low profile
- Feature-rich interface (RSSI, carrier detect, audio and digital data (-5 version))
- Incorporate a 1200baud modem (for -5 version)
- Re-programmable via RS232 interface
- Low power requirements

### Applications

- 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

- Operating frequency: 375MHz band
- 25kHz channel spacing
- 128 channels controlled via RS232 interface
- 8 channels selected by parallel interface
- Supply range: 3.1 - 15V
- Current consumption: 10mA
- Data bit rate: 5kbps max. (- 5 version)
- Receiver sensitivity: -118dBm (for 12 dB SINAD)
- Operating temperature: -30 - +60 °C
- Size: 59 x 38 x 10.5 mm

TBA

Figure 2: LSR2 block diagram

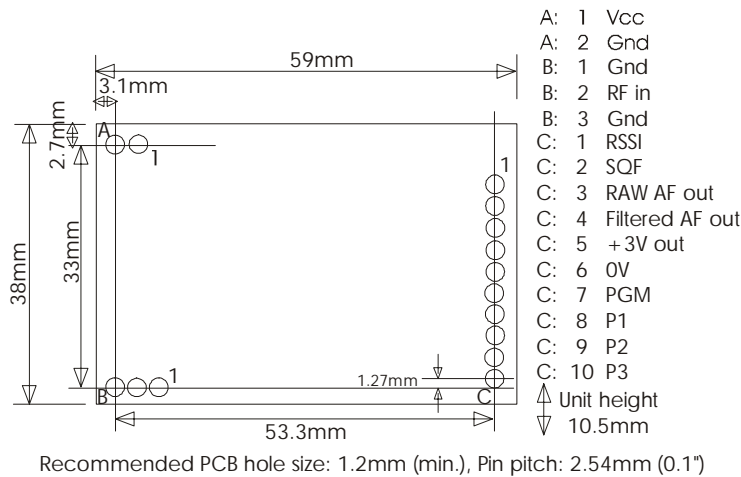


Figure 3: Provisional LSR2 footprint

**Pin Description**

Pin C	Name	Function
1	RSSI	DC level between 0.5V and 2.5V. 60dB dynamic range
2	SQF	Noise operated carrier detect. Open collector. ON/low = no signal
3	RAW AF out	200mV <sub>pk-pk</sub> audio. DC coupled, approx 1V bias. Muted by squelch
4	Filtered AF	100mV RMS filtered audio. (or 'data out' in -5 version)
5	+3V out	DC supply. 75mA maximum drain. Present if unit is powered.
6	0V	Ground
7	PGM	Serial programming/configuration input at RS232 level
8	P1	Parallel frequency select inputs. Inverted logic, 10K pullups to 3V
9	P2	
10	P3	

**NOTES:**

1. On this version, filtered AF is the (squelch muted, AC coupled) output of a lowpass filter. On -5 versions this pin is the open collector output of the data extractor.
2. Carrier detect on LSR2 mutes the AF and DATA outputs when RF input signal is <-123dBm. This can be factory disabled if required.
3. There are no pullups on the open collector outputs.
4. The 'modem' option is not available on the -A version. On -5 version the internal software incorporates a 1200baud dumb modem. It is a RS232 semi-intelligent (Transmit keyed when valid serial data is present, so no separate TX control needed. Coding in the datastream also permits the receiver to ignore noise and only output valid serial data) unit.
5. In modem mode parallel selection of channel is unavailable as the P1-P3 lines are used for input/output operations. This is compatible with the TX2M and the SMX2 internal modems

## LSR2 serial interface commands

2400 baud at RS232 level. 8 bit data, no parity, 1 start bit, 1 or 2 stop bits, No flow control.  
 Transmit (pin 3 on DB9) and Signal Ground (pin 5 on DB9) should be connected to PGM and 0V pin.

Command Format	Description
SINGLE nnnnn	Set value of N for single channel operation
GOCHAN xx	Serial select of channel xx (0 to 127)
LOADMX xx	Set highest permitted (serial selected) channel xx (others default to ch0)
LOADaa nnnnn	Set value of N for channel aa (channels 0 to 15)
LOADTB nnnnn	Set value of N for channel 16 (channels 17 to 127 then in sequence)
RVALUE rrrr	Enter value for R register
SETPAR	Channel selected by 3 bit parallel input (0 to 7). Disable modem
SETSER	Channel selected by most recent GOCHAN operation
SETMOD	Enable internal modem. Frequency selected by most recent GOCHAN or SINGLE
<CR>	Process entry (Carriage Return = 0D hex )
/	Clear all buffers
xx = channel number from 00 to 127 aa = two digit channel number from 00 to 15 nnnnn = synthesizer N register value, (up to 65535) rrrr = synthesizer R register value, (up to 16383)	

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

$$N = \frac{F_{RF} (\text{channel frequency}) - 45MHz (\text{rx IF offset})}{f_{Channelspacing}} = \frac{F_{RF} - 45MHz}{25kHz}$$

**Notes:**

1. A pause of at least 50ms must be allowed between command strings (EEPROM programming time)
2. 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.

## Condensed specifications (All details are provisional)

Frequency	375.475MHz
<i>Frequency stability</i>	±1.5kHz
<i>Channel spacing</i>	25kHz
<i>Number of channels</i>	128 channels selected via serial RS232 interface First 8 are individually programmable Next 112 are a sequential table 8 channels selected via parallel interface
Sensitivity	-118dBm for 12dB SINAD
image / spurious	-60dB
blocking	-80dB
adjacent channel	-60dB
Spurious radiations	<-60dBm (Compliant with ETSI EN 300 220-3 and EN 301 489-3)
Outputs	RSSI, Carrier Detect, Audio, (Data)
Supply <i>voltage</i>	3.1 -15V
<i>Current</i>	10mA
Operating temperature	-30 to +60 C (Storage -30 to +70 C)
Size	59x 38 x 10.5 mm
Interface	
<i>User</i>	8 pin 0.1" pitch molex
<i>Power</i>	2 pin 0.1" pitch molex
<i>RF</i>	3 pin 0.1" pitch socket in top of case
Recommended PCB hole size	1.2mm (min.)

**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/radiocomms/ifi/>*

*Information Requests  
Ofcom  
Riverside House  
2a Southwark Bridge Road  
London SE1 9HA  
Tel: +44 (0)845 456 3000 or 020 7981 3040  
Fax: +44 (0)20 7783 4033  
information.requests@ofcom.org.uk*

*European Radiocommunications Office (ERO)  
Peblingehus  
Nansensgade 19  
DK 1366 Copenhagen  
Tel. +45 33896300  
Fax +45 33896330  
ero@ero.dk  
www.ero.dk*