

## '102 SERIES RADIO / IR ENCODER TRANSMITTERS

- Highly Secure **KEELOQ** CODE HOPPING Protocol
- QM, FM or Infra Red
- Frequency Options; 315, 433, 915MHz
- LED Indication Of Transmission
- 1,2 or 4 Switch Versions Expandable To 15
- Power Saving Auto Shut Off Feature
- Automatically Transmits Battery Low Condition
- IP40 Rated Enclosure
- User Customisable Overlay
- Board Level Programmable
- 315MHz versions FCC Compliant
- 433MHz versions EMC Compliant



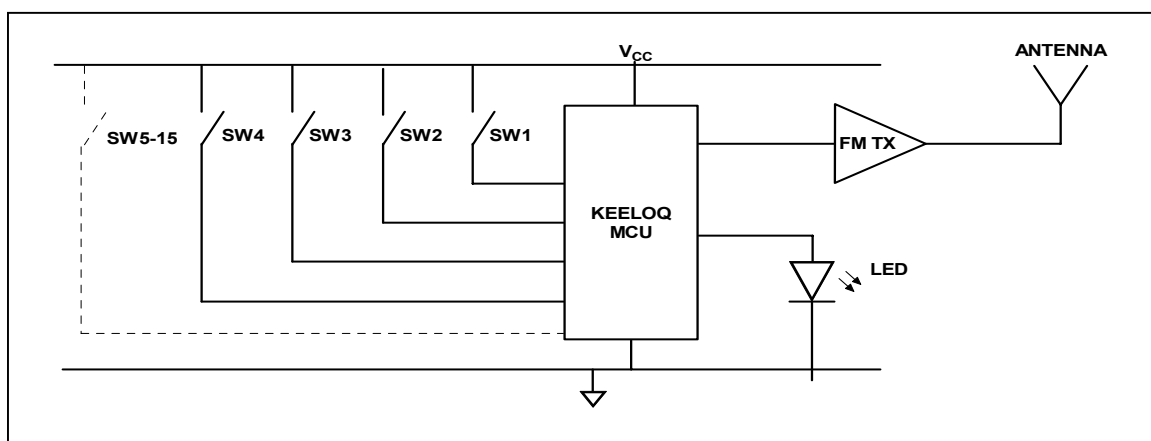
The RF Solutions 102 range of transmitter encoders are available as either FM, FMNB radio or Infra Red. The encoders use the KEELOQ encryption algorithm providing the worlds most advanced high security protocol. Each encoder may be used with one of RF Solutions decoders, or with one of the KEELOQ decoder I/C's.

Alternatively, the user may decode the KEELOQ algorithm and embed within a PIC Microcontroller . (Please see datasheet DS600).

When paired with one of the KEELOQ Rx decoder boards, a complete high security "code hopping" remote control system may be achieved. The transmitter is supplied as a complete product with battery ready to operate (PP3). Each encoder can be board level programmed with a specific manufacturer's ID code if required

Custom solutions may also be supplied unique to customer specific requirements. Please contact RF Solutions for further information.

### Block Diagram





## '102 SERIES RADIO / IR ENCODER TRANSMITTERS

### Low Battery

When the unit measures a low battery voltage level, the data transmitted includes a 'Low battery' status flag to the receiver decoder.

### Power Supply

The circuit has been designed to operate from a single PP3 battery supply. This will provide in excess of 1,000,000 transmissions.

**Note:** reverse voltage polarity connection may cause damage to the circuit.

### License Exemption (Radio Transmitters)

Europe: The transmitter encoders use ECM compliant radio transmitter modules and complies with ETSI330-220 and ETSI300-683.

USA: This device complies with part 15 of the FCC Rules.

Operation is subject to the following two conditions:

1. This device may not cause harmful interference, and
2. This device must accept any interference received, including interference that may cause undesired operation."

### KEELOQ Protocol Configuration

Each encoder is supplied ready programmed with a unique random serial number. The decoder has the ability to memorise this serial number using a simple learn procedure (please see decoder datasheet).

### How does KEELOQ technology work?

KEELOQ is based on a code hopping algorithm which provides Rock Solid Security. KEELOQ uses a programmable 64-bit encryption key that is unique to each device to generate 32-bit hopping code. The key length and hopping code combination reduces the possibility of unwanted access, due to code grabbing and code scanning, to essentially zero. Such CIA-like levels of security are desirable, but many manufacturers would expect them to be cost-prohibitive. KEELOQ offers the solution for affordable, Rock Solid Security that is the future of technology for the cars, homes and offices we wish to protect.

### Adding Additional Switches

Additional switches may be added through Connector J1. The four connections of J1-1, 2, 3, & 4 represent the four input lines to the HCS360 encoder device. These may be connected to a binary coded decimal (bcd) input to obtain 1 of 16 states. Connection J1-6 is connected to  $V_{CC}$ .

### Absolute Maximum Ratings

|                                   |                     |
|-----------------------------------|---------------------|
| Supply Voltage ( $V_{CC}$ to GND) | +5.5 to +15.8 Volts |
| Storage Temperature               | -10°C to +70°C      |
| Operating Temperature             | 0°C to +55°C        |
| Dimensions                        | 110mm x 65mm x 24mm |

| Electrical Characteristics      | Min     | Typical | Max     | Dimension |
|---------------------------------|---------|---------|---------|-----------|
| Supply Voltage                  | 8       | 9       | 12      | V         |
| Supply Current                  | 11      | 14      | 21      | mA        |
| Frequency                       |         |         |         |           |
| 315MHz FM                       |         | 315.00  |         |           |
| 433MHz QM / FM Wideband         |         | 433.92  |         |           |
| 433MHz FM Narrow band           | 434.050 | 434.075 | 434.100 | MHz       |
| 915MHz Narrow band              | 914.50  | 914.50  | 914.50  |           |
| RF Output Power (ERP) @ 433 MHz | -       |         | 10      | mW        |



## '102 SERIES RADIO / IR ENCODER TRANSMITTERS

### 'FM102' QM Series Encoders (Red Transmit LED)

| Part Number  | Description     | Freq (MHz) | Range** (Metres) | Compatible Decoders                                        |
|--------------|-----------------|------------|------------------|------------------------------------------------------------|
| 102C1-433QR1 | QM Encoder 1 Sw | 433.92     | 150              | FM-001B-433<br>FM-0011-433<br>FM-008C4B-433<br>U105C4A-433 |
| 102C2-433QR1 | QM Encoder 2 Sw | 433.92     | 150              |                                                            |
| 102C4-433QR1 | QM Encoder 4 Sw | 433.92     | 150              |                                                            |

### 'FM102' FM Series Encoders (Yellow Transmit LED)

| Part Number  | Description     | Freq (MHz) | Range** (Metres) | Compatible Decoders                                                 |
|--------------|-----------------|------------|------------------|---------------------------------------------------------------------|
| 102C1-315FR1 | FM Encoder 1 Sw | 315        | 200              | 008-315FR1                                                          |
| 102C2-315FR1 | FM Encoder 2 Sw | 315        | 200              |                                                                     |
| 102C4-315FR1 | FM Encoder 4 Sw | 315        | 200              |                                                                     |
| 102C1-433FR1 | FM Encoder 1 Sw | 433.92     | 200              | 001-433FR1<br>0011-433FR1<br>008-433FR4<br>009-433FR2<br>105-433FR2 |
| 102C2-433FR1 | FM Encoder 2 Sw | 433.92     | 200              |                                                                     |
| 102C4-433FR1 | FM Encoder 4 Sw | 433.92     | 200              |                                                                     |

### 'FM102' Narrow Band Series Encoders (Red Transmit LED)

| Part Number    | Description             | Freq (MHz) | Range** (Metres) | Compatible Decoders |
|----------------|-------------------------|------------|------------------|---------------------|
| 102C1-433NBFR2 | FM Narrow Band Enc 1 Sw | 434.075    | 1,000            | 105C4-433NBFR2      |
| 102C2-433NBFR2 | FM Narrow Band Enc 2 Sw | 434.075    | 1,000            |                     |
| 102C4-433NBFR2 | FM Narrow Band Enc 4 Sw | 434.075    | 1,000            |                     |

### 'IR102' Series Infra-Red Encoders (Red Transmit LED)

| Part Number | Description            | Range** (Metres) | Compatible Decoders |
|-------------|------------------------|------------------|---------------------|
| 102C1-IR2   | Infra Red Encoder 1 Sw | 20               | IR-105C4A           |
| 102C1-IR2   | Infra Red Encoder 2 Sw | 20               |                     |
| 102C1-IR2   | Infra Red Encoder 4 Sw | 20               |                     |

Should you require further assistance please contact

**R. F. Solutions Ltd.,**  
**Unit 21, Cliffe Industrial Estate,**  
**South Street,**  
**Lewes,**  
**E Sussex, BN8 6JL, England**

**Tel +44 (0)1273 898 000      Fax +44 (0)1273 480 661**

**Email [sales@rfsolutions.co.uk](mailto:sales@rfsolutions.co.uk)    <http://www.rfsolutions.co.uk>**

*R F Solutions is a member of the Low Power Radio Association.*

All Trademarks acknowledged and remain the property of the respected owners.

Information contained in this document is believed to be accurate, however no representation or warranty is given and R.F. Solutions Ltd. assumes no liability with respect to the accuracy of such information. Use of R.F.Solutions as critical components in life support systems is not authorised except with express written approval from R.F.Solutions Ltd.



Компания «ЭлектроПласт» предлагает заключение долгосрочных отношений при поставках импортных электронных компонентов на взаимовыгодных условиях!

Наши преимущества:

- Оперативные поставки широкого спектра электронных компонентов отечественного и импортного производства напрямую от производителей и с крупнейших мировых складов;
- Поставка более 17-ти миллионов наименований электронных компонентов;
- Поставка сложных, дефицитных, либо снятых с производства позиций;
- Оперативные сроки поставки под заказ (от 5 рабочих дней);
- Экспресс доставка в любую точку России;
- Техническая поддержка проекта, помощь в подборе аналогов, поставка прототипов;
- Система менеджмента качества сертифицирована по Международному стандарту ISO 9001;
- Лицензия ФСБ на осуществление работ с использованием сведений, составляющих государственную тайну;
- Поставка специализированных компонентов (Xilinx, Altera, Analog Devices, Intersil, Interpoint, Microsemi, Aeroflex, Peregrine, Syfer, Eurofarad, Texas Instrument, Miteq, Cobham, E2V, MA-COM, Hittite, Mini-Circuits, General Dynamics и др.);

Помимо этого, одним из направлений компании «ЭлектроПласт» является направление «Источники питания». Мы предлагаем Вам помощь Конструкторского отдела:

- Подбор оптимального решения, техническое обоснование при выборе компонента;
- Подбор аналогов;
- Консультации по применению компонента;
- Поставка образцов и прототипов;
- Техническая поддержка проекта;
- Защита от снятия компонента с производства.



#### Как с нами связаться

**Телефон:** 8 (812) 309 58 32 (многоканальный)

**Факс:** 8 (812) 320-02-42

**Электронная почта:** [org@eplast1.ru](mailto:org@eplast1.ru)

**Адрес:** 198099, г. Санкт-Петербург, ул. Калинина, дом 2, корпус 4, литера А.