Chipsmall

Chipsmall Limited consists of a professional team with an average of over 10 year of expertise in the distribution of electronic components. Based in Hongkong, we have already established firm and mutual-benefit business relationships with customers from,Europe,America and south Asia,supplying obsolete and hard-to-find components to meet their specific needs.

With the principle of "Quality Parts,Customers Priority,Honest Operation,and Considerate Service",our business mainly focus on the distribution of electronic components. Line cards we deal with include Microchip,ALPS,ROHM,Xilinx,Pulse,ON,Everlight and Freescale. Main products comprise IC,Modules,Potentiometer,IC Socket,Relay,Connector.Our parts cover such applications as commercial,industrial, and automotives areas.

We are looking forward to setting up business relationship with you and hope to provide you with the best service and solution. Let us make a better world for our industry!

Contact us

Smart Radio Telemetry Module

Features

- Simple and low cost

- 4 channel receiver module

- Range up to 500metres

- 4 digital input/outputs

- Minimal external components

- Secure data protocol

- Ultra low power 1.8—3.6V

- Easy pairing process

- 869.5MHz spot frequency

- +13dBm transmit power

- SMT or SIL package

- Incorporates self test mode

- CE compliant for EU licence free use

Applications

- Remote control

- Sensors

- IoT devices

- Remote switching

- Remote traffic lights

Description

The KAPPA-R receiver module provides a reliable radio link directly compatible with any of the RF Solutions handheld transmitter range on 868MHz such as the compact FOBBER key fob, the multi-buttoned ELITE-T8 as well as the long range ELITE-XT and the rugged, industrial SABRE. KAPPA-R868 can be used with the BRAVO-T868 as a module to module solution.
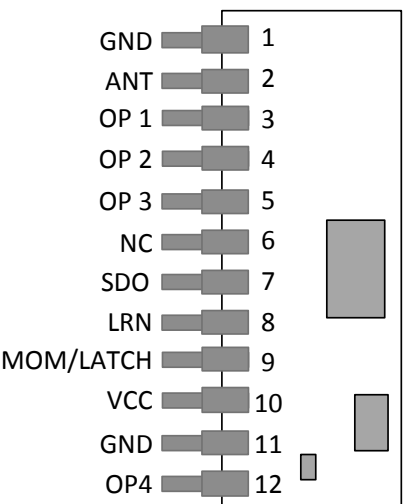
Ordering Information

Part No	Description
KAPPA-R868	Radio telemetry module SIL package 868MHz band
KAPPA-R868SO	Radio telemetry module SMT package 868MHz band

GND	1
ANT	2
OP 1	3
OP 2	4
OP 3	5
NC	6
SDO	7
LRN	8
MOM/LATCH	9
VCC	10
GND	11
OP4	12

Pin Description

Pin No	Name	Direction	Description
2	ANT	In	Antenna input/output 50ohm impedance
1, 11	GND	In	Connect to ground
3, 4, 5, 12	OP1-4	Output	Switched outputs: Active High Digital outputs: LVCMOS output drive
7	SDO	Output	Serial switch status data output pin. See Page 4 for details
8	LRN	In/Out	Learn switch input: normally 'high' momentarily connect to GND to enter Learn Mode. Also acts as an output for the Learn LED
9	MOM/LATCH	In	Set outputs as momentary or latching in operation. Internally tied high. Connect to GND for momentary Disconnect for latching
10	Vcc	In	Supply voltage

General description of operation

The KAPPA-T868 module is a small and simple to use receiver module which operates with RF Solutions transmitters. Operating range will be dependent on the transmitter used.

The versatile KAPPA-T868 module is able to be used to create systems which are module to module (using BRAVO-T868 or as a receiver for existing RF Solutions range of 868MHz transmitters such as:

FOBBER - Compact key fob transmitter with 50 - 100m
ELITE-T8 - Low profile compact handheld transmitter with 150 - 250m
ELITE-XT - Long range handsets with long battery life and range up to 2km
SABRE - Rugged industrial handheld transmitters with range up to 2km

KAPPA-R868 Operation

1. Operation

The KAPPA module will remain in a low power listening mode at all times when power is present.
When a valid packet is received it will wake and action any output state changes required.

2. Moment are or Latching Function

KAPPA actions button state change only, therefore momentary mode requires receipt of a "button down/input active" packet and a "button up/input not active" packet from a transmitter. In momentary mode on receiving a "button down" the KAPPA will hold its output active until a "button up" is received. In latching mode KAPPA must see "button down" then "button up" in order to make a state change to either activate or deactivate an output.

3, Pairing

Using Pin 8 it is possible to "pair" transmitters into the receiver memory as follows:

1.   Briefly GND Pin 8, the LED will flash once - this shows OP1 is selected
2.   GND Pin 8 again after release the LED will flash twice to show OP2 is selected
3.   Repeat above process to select OP3 or 4
4.   With the desired output selected (and before a 10sec timeout)
5.   Press the button or activate the input on the transmitter to be paired.
6.   This will complete the pairing and the LED will flash twice to confirm

Memory: maximum storage is 70 pairings.

Mode	LED	Description
Normal operation	Flickering ON	Module is receiving data
	OFF	No RF data is being transmitted/received
Learn and erase	ON	While input is connected to Vcc (ie during button press) . Flashes to show output selection and paring success Learn mode times out after 10 seconds
	Flashing twice	KAPPA pairing successful
	Flashes three times	ERASE successful

4. Erase

To erase the KAPPA memory and remove all stored transmitter input pairings press and hold the learn button for 10 seconds.
The LED will illuminate while the button is held and after release will flash 3 times to confirm memory erase is complete.

Above assumes LED connection as per schematic example on Page 5

5. Outputs

Outputs are LVTTL / LVCMOS at Vcc and are Active high.

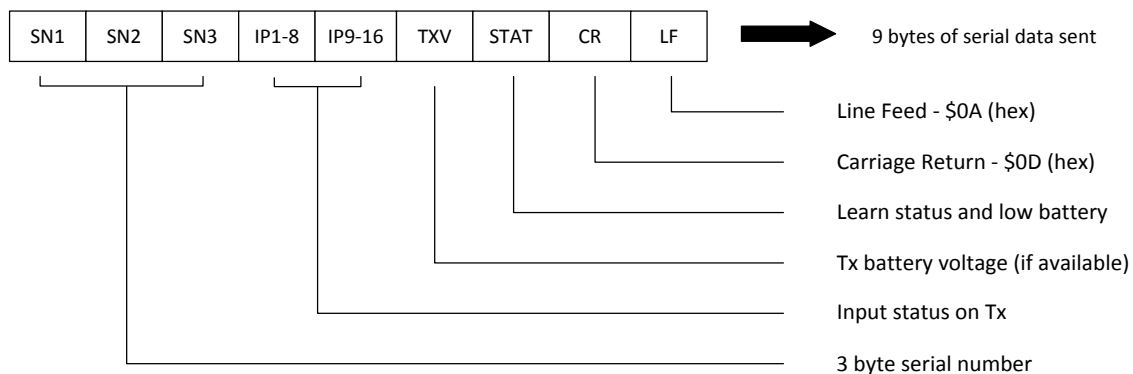## KAPPA Receiver module serial data output

Serial data output operation:

The KAPPA outputs the serial number, button and battery status of the transmitter encoder. This data may be fed directly to a microcontroller or RS232 type driver circuit which may then be fed directly to a PC serial port. Serial data is output on every packet receipt - this equates to every 1/4 second whilst a button is held down/ input active. This data is output is valid regardless of whether the Transmitter/Encoder has been learnt to the KAPPA or not. The serial data packet contains a learn bit to show if an encoder input is learnt.

Serial data configuration :

Baud Rate: 19,200
Data bits: 8
Parity: none
Stop bits: 1
Handshaking: none

Serial data format:

SN1	SN2	SN3	IP1-8	IP9-16	TXV	STAT	CR	LF

➡ 9 bytes of serial data sent

Line Feed - $0A (hex)

Carriage Return - $0D (hex)

Learn status and low battery

Tx battery voltage (if available)

Input status on Tx

3 byte serial number

Serial number [SN1 SN2 SN3]:

Made up of three 8-bit bytes where the most significant byte is transmitted first.
Example: 12ABAA (hexadecimal) or 0001 0010 1010 1011 1010 1010 (binary)

Tx input stats [IP1-8 IP9-16]: made up of two 8-bit bytes.

The low order byte is sent first representing inputs 8 down to 1 where the MSb is input 8 and the LSb is input 1. The high order byte is sent next representing inputs 16 down to 9 where the MSb is input 16 and the LSb is input 9.
A bit at state 1 represents an encoder input as active.
Using this method inputs can be multiplexed giving maximum versatility.
Example: 00000000   00010000   Shows input 13 active.
              10000000   00000000   Shows input 8 active
              10000001   10000000   Shows inputs 16, 8 and 1 active

Learn status and low battery:

One 8 bit byte:
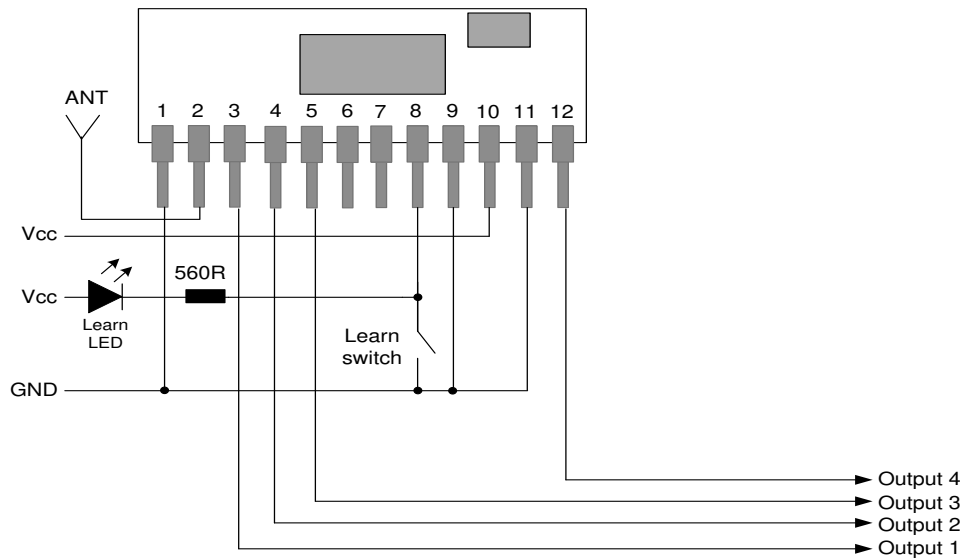Bit0 shows low battery on Tx - where 1 = Low battery
Bit1 shows learn status of Tx - where 1 = Learnt

Bespoke versions

Customised versions of the all transmitters, receivers and chipsets are available to provide a bespoke remote chipset for OEM applications. Please contact our sales or support teams for further information.
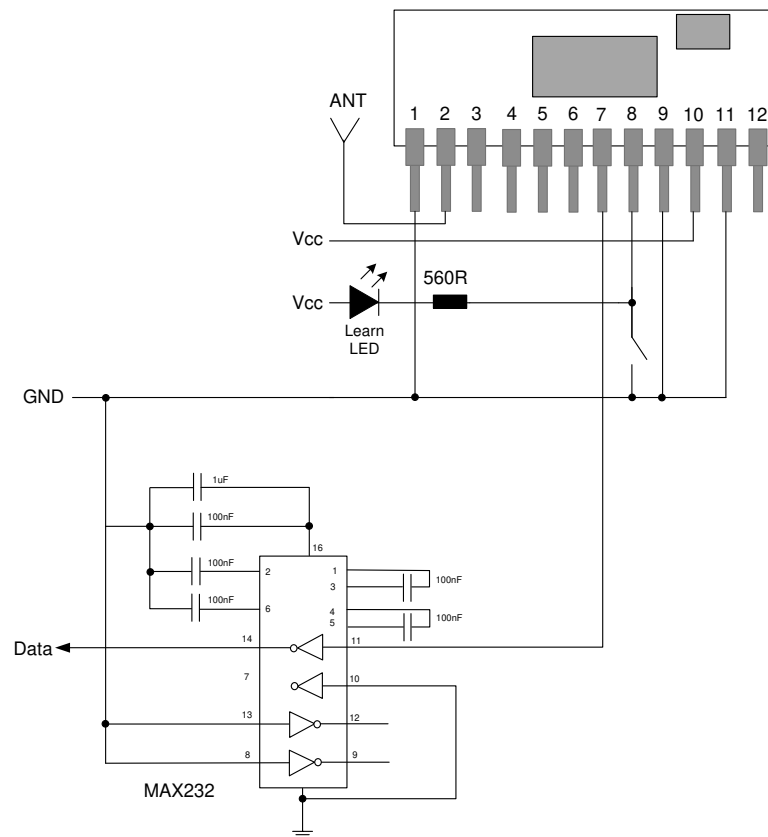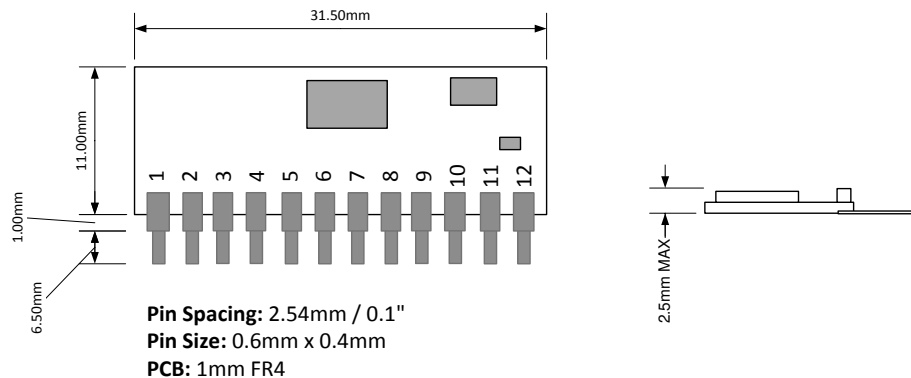
KAPPA example application circuit

Description:

This example shows a KAPPA module receiver with all 4 outputs connected.

Note: The external learn switch and learn LED are both shown connected in this example.

KAPPA connected with Serial data output via MAX232

KAPPA Receiver Module

Mechanical Dimensions

31.50mm

11.00mm

1.00mm

6.50mm

1 2 3 4 5 6 7 8 9 10 11 12

2.5mm MAX

Pin Spacing: 2.54mm / 0.1"
Pin Size: 0.6mm x 0.4mm
PCB: 1mm FR4

Range Considerations

The antenna choice and position directly affects the system range, keep it clear of any large metal parts. The best position is protruding vertically from the top of the product. This is often not desirable for practical reasons and thus a compromise may be needed. Note that the space around the antenna is as important as the antenna itself. All radio systems are dependent on a radio signal being received through airspace.
The range quoted is the optimal in direct line of sight without obstacles and in good atmospheric conditions.
Range is affected by many things, for example local environmental conditions, atmospheric conditions, interference from other radio transmitters. For evaluating the local environment please see our RF Meter (DS006).
In very worse case applications the range quoted may be reduced dramatically below the optimal range stated.

Self Test Mode

The KAPPA module incorporates a self test which is initiated by applying power with the learn button held down.
The KAPPA module then performs the following functions:

1. All outputs operate in turn 1-4 ON/OFF twice

2. All outputs flash ON/OFF 5 times - 1&3 and then 2&4

3. Transmits a full power RF signal for 5 seconds while flashing the learn LED

4. Enters RSSI (Received Signal Strength Indication) mode where outputs 1-4 are activated as a bar graph type output according to the strength of a valid RF signal received (from any carrier operating at the appropriate frequency (869.50MHz). 4 Outputs on being maximum strength.

5. A reset will be required to exit

KAPPA Receiver Module

Technical Specifications

Electrical Characteristics

Parameter		Min	Max	Units
Supply Voltage		1.8	3.6	V
Voltage on any Input	Vcc > 2.2V		5.8	V
	Vcc < 2.2V		Vcc+3.6	V
KAPPA-Rx Supply current:				
Max Input power (through RX antenna)			+5	dBm
Max Current Sourced / Sunk (Per I/O)			100	mA
Max Current Sourced / Sunk (Total)			200	mA

Temperature

Parameter	Min	Typical	Max	Units
Operating Temperature	-20		+55	ºC

RF Characteristics

	Min	Typical	Max	Units
Operating Frequency		869.5		MHz
Operating Freq for 915MHz version	915.00		915.27	MHz
Operating Temperature	-20		+55	ºC
KAPPA- Tx Output Power			+13	dBm
KAPPA- Tx—Rx FSK Raw RF Data Rate			9.6	Kbps
KAPPA- Rx Sensitivity		-121		dBm

Timing Characteristics

	Min	Typical	Max	Units
Time from TX button press to output activation		20		ms
Minimum on time for outputs	25			ms

KAPPA Receiver Module

RF Meter

RF Multi Meter is a versatile handheld test meter checking Radio signal strength or interference in a given area.

The Multi-Meter can both transmit and receive signals making it possible to test an installation location for suitability before installing equipment. The Multi-Meter is very hard wearing, long lasting and simple to use. It has 4 selectable frequencies, changeable at the touch of a button. It also has an auto shut off feature for battery saving.
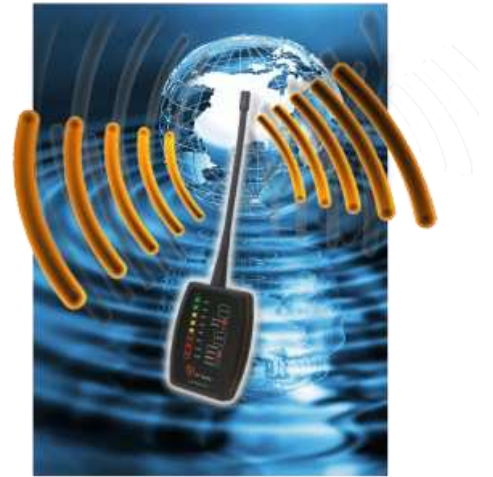
Recommended Antenna 868MHz

We have a range of antennas on 868MHz that are suitable for use with the KAPPA modules.

To view our range please visit our website:

http://www.rfsolutions.co.uk

RF Solutions Ltd. Recycling Notice
Meets the following EC Directives:

DO NOT
Discard with normal waste, please recycle.

ROHS Directive 2002/95/EC
Specifies certain limits for hazardous substances.

WEEE Directive 2002/96/EC
Waste electrical & electronic equipment. This product must be disposed of through a licensed WEEE collection point. RF Solutions Ltd., fulfills its WEEE obligations by membership of an approved compliance scheme.

Waste Batteries and Accumulators Directive 2006/66/EC
Where batteries are fitted, before recycling the product, the batteries must be removed and disposed of at a licensed collection point.

Environment Agency producer registration number:
WEE/JB0104WV.

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