



DESIGNERS AND MANUFACTURERS OF ELECTRONIC CONTROLS



**KAR-TECH**.com

# **MOD164**

900MHz MODULAR TRANSCEIVER

## **OEM INSTALLATION AND OPERATION MANUAL**

NOTE: THIS MODULE IS LIMITED TO OEM INSTALLATION ONLY

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HK

# MOD164 TRANSCEIVER

## INDEX

<b>DESCRIPTION</b> .....	<b>2</b>
<b>OPERATION</b> .....	<b>2</b>
<b>INSTALLATION</b> .....	<b>4</b>
<b>BEFORE APPLYING POWER!</b> .....	<b>6</b>
<b>TROUBLESHOOTING</b> .....	<b>6</b>
<b>TRANSCEIVER PICTORIAL</b> .....	<b>8</b>
<b>SPECIFICATIONS</b> .....	<b>8</b>
<b>INSTRUCTION TO THE USER</b> .....	<b>9</b>
<b>INDUSTRY CANADA STATEMENTS</b> .....	<b>10</b>

## **MOD164 TRANSCEIVER**

### **DESCRIPTION**

The MOD164 is a frequency hopping spread spectrum transceiver module designed to be compatible with US (FCC Part 15.247) and Canadian (RSS-210) regulations for license free use in the 900 MHz ISM band. The MOD164 is designed for mobile applications in accordance to Part 2.1091(b).

The MOD164 transceiver is only integrated into Kar-Tech remote control products by Kar-Tech, at Kar-Tech. There are no user serviceable parts on the MOD164 transceiver.

The MOD164 is not designed for multiple antenna applications and should not be used to transmit simultaneously with any other transmitter.

### **OPERATION**

The MOD164 is a radio transceiver module for the 900 MHz ISM bands. The transceiver microcontroller includes a CPU, GPI/O, a fully integrated frequency synthesizer, a power amplifier, a modulator and a receiver unit. The MOD164 microcontroller serial port is connected to the host via protection circuits. The data is sent through a serial port to RF processor and then to RF circuit to the antenna and the data received from antenna is sent to the serial port and to the host. The microcontroller is responsible for the control of the entire communication. The MOD164 transceiver contains a DC regulator which generates a constant 1.8 VDC for the digital circuitry. The RF section runs on the 3.3V supply.

## MOD164 TRANSCEIVER

The MOD164 hops on 50 channel frequencies that are selected in a pseudo random order. An example of the order is:

{48, 25, 17, 20, 41, 37, 36,  
10, 15, 44, 30, 6, 42, 33,  
5, 8, 28, 1, 23, 49, 16,  
3, 19, 29, 21, 43, 31, 9,  
18, 27, 22, 45, 13, 2, 32,  
11, 14, 46, 12, 24, 4, 7,  
38, 47, 35, 40, 50, 34, 39,  
26}

where Channel 1 is 902.5 MHZ  
and Channel 50 is 927.00 MHZ.

The dwell time of the hopping is 350ms. Each channel is used equally on average.

The receivers are matched to the transmitters to use the same hopping channel sequence and they hop channels in synchronization with the transmitter's signals.

## MOD164 TRANSCEIVER

### INSTALLATION

- 1) Solder the MOD164 transceiver directly to the host's compatible connector.
- 2) Print and attach the label as shown below:



- 3) Place a label on the outside of the host enclosure in a visible area. On the label, include the following:  
"Contains Transmitter Module FCC ID: P4U-MOD164" and "Contains Transmitter Module IC: 4534A-MOD164"
- 4) Connect the appropriate antenna. Either a ¼

wavelength wire, or a RPSMA ¼ wavelength antenna Linx Technology ANT-916-CW-QW-SMA

## MOD164 TRANSCEIVER

### Application Requirements:

A) Power the MOD164 Transceiver with 3.3VDC nominal voltage, with peak current draw of 150mA.

B) Do not remove the shield on the MOD164.

C) If you use something other than the  $\frac{1}{4}$  wave antenna or the wire antenna, the unit needs separate approval.

D) The antenna should be mounted at least 20cm from all persons, and must not transmit simultaneously with any other antenna or transmitter, except in accordance with FCC multi transmitter product procedures.

E) The MOD164 is to be installed only in mobile

applications. See Part 2.1091 for definitions of mobile and fixed applications.

F) Do not operate the MOD164 without an antenna.

G) Documentations: In the host's User Manual include the following:

a. That there are no user serviceable parts in the radio modules. They should not remove or install radio modules.

b. The "Instructions To The User" section.

c. The "Industry Canada Statement".

d. Include in the manual, "This device is granted for use in Mobile only configurations in which the antennas used for this

## **MOD164 TRANSCEIVER**

transmitter must be installed to provide a separation distance of at least 20cm from all person and not be co-located with any other transmitters except in accordance with FCC and Industry Canada multi-transmitter product procedures.”

### **BEFORE APPLYING POWER!**

- Check power and ground for proper polarity.
- Read the rest of this manual.

### **TROUBLESHOOTING**

There are no user serviceable parts in the MOD164 Transceiver. Contact your KAR-TECH representative for further instructions or servicing.

## **PARTS LIST**

<i><b>PART NUMBER</b></i>	<i><b>DESCRIPTION</b></i>
<b>021641A</b>	MOD164 RADIO TRANSCEIVER – WIRE ANTENNA
<b>021642A</b>	MOD164 RADIO TRANSCEIVER – RPSMA ANTENNA

There are no user-serviceable parts inside the transmitter or the receiver. Return the units for service.

The information, specifications, and illustrations in this manual are those in effect at the time of printing. We reserve the right to change specifications or design at any time without notice.



## MOD164 TRANSCEIVER

### TRANSCEIVER PICTORIAL



### SPECIFICATIONS

Equipment Class ..... Part 15 Spread Spectrum Transmitter  
FCC ID ..... P4U-MOD164  
ICC (Industry Canada Certification) ID ..... 4534A-MOD164

#### ***TRANSCEIVER***

Power supply ..... 3.3VDC  
Operating temperature - Radio..... -40°C to +85°C  
Storage temperature ..... -40°C to +100°C  
RF Frequency ..... 902.5-927 MHz  
RF Transmit power (EIRP) ..... 100 mW  
RF Receive Sensitivity ..... -126 dBm

## **MOD164 TRANSCEIVER**

### **INSTRUCTION TO THE USER**

This equipment has been tested and found to comply with the limits for a class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates radio frequency energy and if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- \* Reorient or relocate the receiving antenna.
- \* Increase the separation between the equipment and receiver.
- \* Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- \* Consult the dealer or an experienced radio/TV technician for help.

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.

**FCC CAUTION:** Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment.

## MOD164 TRANSCEIVER

### INDUSTRY CANADA STATEMENTS

This device complies with Industry Canada license-exempt RSS standard(s). Operation is subject to the following two conditions: (1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device.

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes : (1) l'appareil ne doit pas produire de brouillage, et (2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

Under Industry Canada regulations, this radio transmitter may only operate using an antenna of a type and maximum (or lesser) gain approved for the transmitter by Industry Canada. To reduce potential radio interference to other users, the antenna type and its gain should be so chosen that the equivalent isotropically radiated power (e.i.r.p.) is not more than that necessary for successful communication.

Conformément à la réglementation d'Industrie Canada, le présent émetteur radio peut fonctionner avec une antenne d'un type et d'un gain maximal (ou inférieur) approuvé pour l'émetteur par Industrie Canada. Dans le but de réduire les risques de brouillage radioélectrique à l'intention des autres utilisateurs, il faut choisir le type d'antenne et son gain de sorte que la puissance isotrope rayonnée équivalente (p.i.r.e.) ne dépasse pas l'intensité nécessaire à l'établissement d'une communication satisfaisante.

## **MOD164 TRANSCEIVER**

### **OEM Responsibilities to comply with FCC and Industry Canada Regulations**

The MOD164 Transceiver has been certified for integration into products only by the OEM integrators under the following conditions:

This device is granted for use in Mobile only configurations per Part 2.1091(b) in which the antennas used must be installed to provide a separation distance of at least 20cm from all person and not be co-located with any other transmitters except in accordance with FCC and Industry Canada multi-transmitter product procedures.

As long as the two conditions above are met, further transmitter testing will not be required. However the OEM integrator is still responsible for testing their end product for any additional compliance requirements required with this module installed.

If the above conditions are not met, then the FCC and Industry Canada authorizations are no longer valid and the FCC ID and IC Certification Number cannot be used on the final product. In these cases the OEM integrator is responsible for re-evaluating the end product and obtaining a separate FCC and Industry Canada authorization.

Recertification is also needed for all other operating configurations, including portable configurations with respect to part 2.1093 and different antenna configurations.