

MOD153

2.4GHz MODULAR TRANSCEIVER

OEM INSTALLATION AND OPERATION MANUAL

NOTE: THIS MODULE IS LIMITED TO OEM INSTALLATION ONLY

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HK

MOD153 TRANSCEIVER

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DESCRIPTION

The MOD153 is a direct sequence spread spectrum transceiver module designed to free use in the 2.4 GHz ISM band.

The MOD153 transceiver is only integrated into Kar-Tech remote control products by Kar-Tech, at Kar-Tech. There are no user serviceable parts on the MOD153 transceiver.

The MOD153 is not designed for multiple antenna applications and should not be used to transmit simultaneously with any other transmitter.

OPERATION

The MOD153 is a radio transceiver module for the 2.4 GHz 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 MOD153 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 MOD153 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.

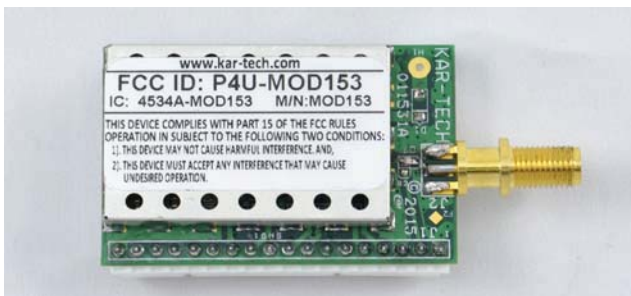
The MOD153 is Direct Sequence Spread Spectrum that can use one of 16 channels, where Channel 1 is 2.405GHZ and Channel 16 is 2.480 GHZ.

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The receivers are matched to the transmitters to use the same channel as the transmitter's signals.

INSTALLATION

- 1) Solder the MOD153 transceiver directly to the host's compatible connector.
- 2) Print and attach the label as shown below:



- 3) Connect the appropriate antenna.

Application Requirements:

- A) Power the MOD153 Transceiver with 3.3VDC nominal voltage, with peak current draw of 150mA.
- B) Do not remove the shield on the MOD153.

C) 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.

D) The MOD153 is to be installed only in mobile applications. Do not operate the MOD153 without an antenna.

E) 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.

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- 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 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.

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TROUBLESHOOTING

There are no user serviceable parts in the MOD153 Transceiver.

Contact your KAR-TECH representative for further instructions or servicing.

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.

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TRANSCEIVER PICTORIAL



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Power supply	3.3VDC
Operating temperature - Radio.....	-20°C to +55°C
Storage temperature	-40°C to +100°C
RF Frequency	2.405-2.48 GHz
Antenna Manufacturer	Kar-Tech, Inc.
Antenna Model.....	MOD153
Antenna Gain.....	1.1dBi

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INSTRUCTION TO THE USER

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.

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

NOTE: 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, uses and can radiate 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.

FCC Radiation Exposure Statement

This modular complies with FCC RF radiation exposure limits set forth for an uncontrolled environment. This transmitter must not

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be co-located or operating in conjunction with any other antenna or transmitter.

If the FCC identification number is not visible when the module is installed inside another device, then the outside of the device into which the module is installed must also display a label referring to the enclosed module. This exterior label can use wording such as the following: "Contains Transmitter Module FCC ID: P4U-MOD153"

when the module is installed inside another device, the user manual of this device must contain below warning statements;

1. 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.

(2) This device must accept any interference received, including interference that may cause undesired operation.

2. Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

The devices must be installed and used in strict accordance with the manufacturer's instructions as described in the user documentation that comes with the product

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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.

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OEM Responsibilities to comply with FCC and Industry Canada Regulations

This device complies with Industry Canada's licence-exempt RSSs. 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.

Cet appareil est conforme aux CNR exemptes de licence d'Industrie Canada . Son fonctionnement est soumis aux deux conditions suivantes :

- (1) Ce dispositif ne peut causer d'interférences ; et
- (2) Ce dispositif doit accepter toute interférence , y compris les interférences qui peuvent causer un mauvais fonctionnement de l'appareil.

IC Radiation Exposure Statement

This modular complies with IC RF radiation exposure limits set forth for an uncontrolled environment. This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

If the IC number is not visible when the module is installed inside another device, then the outside of the device into which the module is installed must also display a label referring to the enclosed module.

This exterior label can use wording such as the following:

“Contains IC: 4534A-MOD153”

when the module is installed inside another device, the user manual of this device must contain below warning statements;

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1. This device complies with Industry Canada's licence-exempt RSSs. 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.

2. Cet appareil est conforme aux CNR exemptes de licence d'Industrie Canada . Son fonctionnement est soumis aux deux conditions suivantes :

(1) Ce dispositif ne peut causer d'interférences ; et

(2) Ce dispositif doit accepter toute interférence , y compris les interférences qui peuvent causer un mauvais fonctionnement de l'appareil.

The devices must be installed and used in strict accordance with the manufacturer's instructions as described in the user documentation that comes with the product.

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EUROPE

CE NOTICE

This device has been tested and certified for use in the European Union. See the Declaration of Conformity (DOC) for specifics.

If this device is used in a product, the OEM has the responsibility to verify compliance of the final product to the EU standards. A declaration of Conformity must be issued and kept on file as described in the Radio and Telecommunications Terminal Equipment (R&TTE) Directive.

The 'CE' mark must be placed on the OEM product per the labeling requirements on the Directive.

Declaration of Conformity (DOC)

This DOC can be downloaded from the www.kar-tech.com.

The device complies with RF specifications when the device used at your body.

Caution: Must use the original antenna. Other antennas are not allowed to be used.

The device according to the regulation in Directive 1999/5/EC and complies with standards as follow:

EMC (Article 3.1b)	ETSI EN 301 489-1 V 1.9.2	Report No.: CTL1512313913-WE
	ETSI EN 301 489-17 V2.2.1 (2012-09)	
Radio (Article 3.2)	ETSI EN 300 328 V1.8.1	Report No.: CTL1512313913-WR
Safety (Article 3.1a)	EN 60950-1:2006+A11:2009+A1:2010+A12:2011+A2:2013	Report No.: CTL1512313913-WS
Health (Article 3.1a)	EN 62479: 2010	Report No.: CTL1512313913-WH
	[Titles, dates of publication of documents mentioned]	

The image shows the CE mark followed by the number 0700. The CE mark consists of the letters 'C' and 'E' in a stylized font, with the 'E' being taller than the 'C'. The number '0700' is in a bold, sans-serif font.