

XXTRA

SYNTHESIZED FM
RECEIVER OPERATION MANUAL



THE NOVAK XXTRA RECEIVER

Novak introduces the world's first small size, light weight, low power synthesized receiver for R/C cars and boats. Forget those extra receiver crystals, now selecting the frequency channel is as easy as rotating two switches.

Based on the rock-solid XXL circuitry, the XXtra adds a crystal-controlled phase locked loop oscillator, and five output channels for the ability to control extra servos. With outstanding range, superior noise rejection, low voltage operation (down to 3.0 volts DC), and solid state reverse voltage protection, the XXtra outperforms the competition. The XXtra works with all popular radio systems and DSC (Direct Servo Control) connections, and accepts Futaba, JR, Sanwa, Hitec, & new KO connectors.

SPECIFICATIONS

Case Size 1.65"x1.12"x0.52" (41.9x28.4x13.3mm)
 Weight 0.58 ounce (16.33 grams)
 Number of Channels Five
 Usable Sensitivity 3.0 microvolts
 Bandpass 50 dB down @ ±7.5 kHz
 Adjacent Channel Rejection >60 dB @ ±10.0 kHz
 3OIP (Third Order Intercept Point) >+4 dBm
 Voltage Range 3.0 to 10.0 volts DC
 Antenna Length 18 inches (45.72 cm)
 Current Consumption 18.0 mA (over full voltage range)

STEP 1 RADIO FREQUENCY CHANNEL SELECTION

The XXtra has been factory tuned and requires no further tuning. This section describes how to select frequency channel.

1. Frequency band is marked in purple circle on case label.
2. To set the frequency channel to match your transmitter, simply adjust the ten position rotary switches using a #1 phillips or small (1/8") flat blade screwdriver, rotate switches until they point to the proper channel numbers.
 - The 75 MHz receiver has 2 number sets on the 1st DIGIT switch. Top numbers are for Hitec & Futaba transmitters. Bottom numbers are for JR, Sanwa/Airtronics, KO, & Multiplex (MPX) transmitters. The 2nd DIGIT switch has 10 positions. To adjust a 75 MHz receiver to channel 76 (75.710 MHz) for use with a Futaba transmitter, rotate the 1st DIGIT rotary switch to the '7' position on the top, then rotate the 2nd DIGIT switch to the '6' position.
 - The USA 27 MHz receiver has only 1 rotary switch. With only 6 channels allowed on 27 MHz, there is no need for the 1st DIGIT switch. To adjust this receiver rotate the "2nd DIGIT" switch to desired frequency channel.
 - All other receiver bands have two rotary switches, and adjust by rotating the "1st DIGIT" switch to the first number of the desired frequency channel, then rotating the "2nd DIGIT" switch to the channel's second number.
 - EURO 40 MHz receiver channels are equal to the 3rd & 4th digits of the frequency. Adjust a 40 MHz receiver to channel 67 (40.675 MHz) by rotating the 1st DIGIT switch to the '6' position and the 2nd DIGIT switch to the '7'.
3. Transmitter crystals MUST be made by the transmitter maker and be on the same modulation and frequency band. EXAMPLE: Futaba FM/75 MHz transmitter crystal must be used with Futaba FM/75 MHz transmitter. Transmitter crystals are usually marked "TX".

STEP 2 INPUT PLUGS (Futaba, JR, Hitec, new KO/Sanwa/Air)

The XXtra receiver will accept Futaba, JR, Hitec, new-style Sanwa/Airtronics (the blue color Z connector), and new-style KO input plugs. These two sections (Step 2 is broken up into two different sections depending on which brand of servo or speed control you have) describe how to connect and/or change the plug plastics and wiring based on the brand of radio system components you have.

- **JR**
 - Insert the plug plastic of the servo or ESC's input harness into the receiver with the **BROWN wire toward the outside/bottom edge of the case** (marked NEG on label).
- **Hitec • Futaba • New KO • Air Z**
 - Insert the plug plastic of the servo or ESC's input harness into the receiver with the **BLACK wire toward the outside/bottom edge of the case** (marked NEG on label).

STEP 2 INPUT PLUGS (Sanwa/Airtronics & old KO)

With some older ESC's and servos, the sequence of the wires in the plastic connector housing needs to be changed. This is important, because the electronics inside the receiver may be damaged if the wiring sequence is incorrect. Changing the sequence is easy to do as described below.

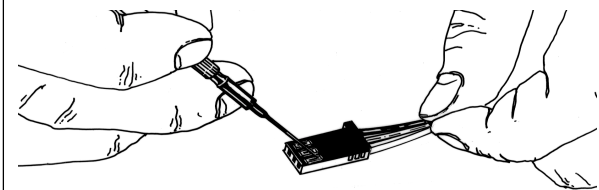
• Old-Style KO •

- Interchange the red and black wires in the KO plug plastic of the input harness as shown in the figure below.
- Insert the input plug into the receiver with the **BLACK wire toward the outside/bottom edge of the case.**

• Old-Style Sanwa/Airtronics •

- Interchange the middle black and red wires in the plug plastic of the input harness as in the figure below.
- Trim the plug plastic* as needed to fit into the XXtra. *Contact Novak to get JR style plug plastics if you do not want to trim.
- Insert the input plug into the receiver with the middle **BLACK wire toward the outside edge of the receiver.**

With a small flat blade screwdriver, gently lift the plastic prong until the wire and metal socket easily slides out of the plastic housing. Repeat for each wire.



STEP 3 MOUNTING INSTRUCTIONS

The XXtra should be mounted so the receiver 'floats' to avoid damage from vibration or shock, and position it where the case will not contact other rigid surfaces.

DO NOT USE TIE WRAPS TO MOUNT RECEIVER!

1. **Electric Cars & Boats**—Mount XXtra with the included double-sided tape as close to antenna mast as possible.
2. **Gas Cars & Boats**—Cut the included double-sided tape in half and double-layer it for extra dampening. Do Not use glue to mount the receiver!
3. **Tubular Plastic Antennas**—Run the antenna wire up through the plastic antenna tube and let the excess wire trail out the top of the tube.
4. **Rigid Antennas**—Wrap antenna wire around the mast with 1/4" spacing. Shrink wrap or tape the top to secure the wire and let the excess trail off the top of the mast. Do not cut or coil excess wire—Range will be reduced!

NOVAK XXTRA

• USA 75 MHz •

RECEIVER CHANNEL FREQUENCIES

CHANNEL # FREQUENCY (MHz)

| | |
|----|--------|
| 61 | 75.410 |
| 62 | 75.430 |
| 63 | 75.450 |
| 64 | 75.470 |
| 65 | 75.490 |
| 66 | 75.510 |
| 67 | 75.530 |
| 68 | 75.550 |
| 69 | 75.570 |
| 70 | 75.590 |
| 71 | 75.610 |
| 72 | 75.630 |
| 73 | 75.650 |
| 74 | 75.670 |
| 75 | 75.690 |
| 76 | 75.710 |
| 77 | 75.730 |
| 78 | 75.750 |
| 79 | 75.770 |
| 80 | 75.790 |
| 81 | 75.810 |
| 82 | 75.830 |
| 83 | 75.850 |
| 84 | 75.870 |
| 85 | 75.890 |
| 86 | 75.910 |
| 87 | 75.930 |
| 88 | 75.950 |
| 89 | 75.970 |
| 90 | 75.990 |

*TRANSMITTER CRYSTAL MUST BE SAME MAKER AND FREQUENCY BAND AS TRANSMITTER

NOVAK XXTRA

• 29 MHz •

RECEIVER CHANNEL FREQUENCIES

CHANNEL # FREQUENCY (MHz)

| | |
|----|--------|
| 10 | 29.725 |
| 11 | 29.735 |
| 12 | 29.745 |
| 13 | 29.755 |
| 14 | 29.765 |
| 15 | 29.775 |
| 16 | 29.785 |
| 17 | 29.795 |
| 18 | 29.805 |
| 19 | 29.815 |
| 20 | 29.825 |
| 21 | 29.835 |
| 22 | 29.845 |
| 23 | 29.855 |
| 24 | 29.865 |
| 25 | 29.875 |
| 26 | 29.885 |
| 27 | 29.895 |
| 28 | 29.905 |
| 29 | 29.915 |
| 30 | 29.925 |
| 31 | 29.935 |
| 32 | 29.945 |
| 33 | 29.955 |
| 34 | 29.965 |
| 35 | 29.975 |
| 36 | 29.985 |

*TRANSMITTER CRYSTAL MUST BE SAME MAKER AND FREQUENCY BAND AS TRANSMITTER

NOVAK XXTRA

• EURO 40 MHz •

RECEIVER CHANNEL FREQUENCIES

CHANNEL # FREQUENCY (MHz)

| | |
|----|--------|
| 66 | 40.665 |
| 67 | 40.675 |
| 68 | 40.685 |
| 69 | 40.695 |
| 70 | 40.705 |
| 71 | 40.715 |
| 72 | 40.725 |
| 73 | 40.735 |
| 74 | 40.745 |
| 75 | 40.755 |
| 76 | 40.765 |
| 77 | 40.775 |
| 78 | 40.785 |
| 79 | 40.795 |
| 80 | 40.805 |
| 81 | 40.815 |
| 82 | 40.825 |
| 83 | 40.835 |
| 84 | 40.845 |
| 85 | 40.855 |
| 86 | 40.865 |
| 87 | 40.875 |
| 88 | 40.885 |
| 89 | 40.895 |
| 90 | 40.905 |
| 91 | 40.915 |
| 92 | 40.925 |
| 93 | 40.935 |
| 94 | 40.945 |
| 95 | 40.955 |
| 96 | 40.965 |
| 97 | 40.975 |
| 98 | 40.985 |
| 99 | 40.995 |

*TRANSMITTER CRYSTAL MUST BE SAME MAKER AND FREQUENCY BAND AS TRANSMITTER

STEP 4 HOOK-UP INSTRUCTIONS

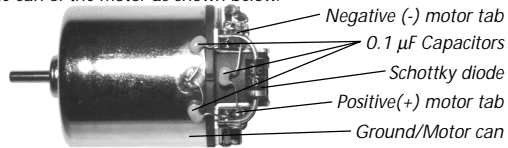
1. INSTALL MOTOR CAPACITORS

Electric motors generate radio noise that can cause radio interference. Included are three 0.1 μ F (50V) non-polarized, ceramic capacitors. These capacitors must be installed on every motor to help reduce the noise generated by the motor and also to prevent possible damage to the speed control.

Solder 0.1 μ F (50V) capacitors between:

- POSITIVE (+) motor tab & NEGATIVE (-) motor tab.
- POSITIVE (+) motor tab & GROUND tab*.
- NEGATIVE (-) motor tab & GROUND tab*.

*If your motor does not have a ground tab, solder the capacitor leads to the can of the motor as shown below.



Extra 0.1 μ F capacitors are available in novak kit #5640.

2. INSTALL SCHOTTKY DIODE (if required)

Consult your speed control's operation manual to determine if an external Schottky diode is required. Use of an external Schottky diode (even if your ESC already has one in it) will increase the efficiency and reduce the operating temperature of the ESC.

NEVER USE A SCHOTTKY WITH A REVERSIBLE ESC

- Solder the lead CLOSEST to the silver stripe on the Schottky diode to the POSITIVE (+) motor tab.
- Solder the lead OPPOSITE the silver stripe on the Schottky diode to the NEGATIVE (-) motor tab.

Schottky diodes are available in Novak kit #5640.

3. CONNECT STEERING SERVO

After the input harness wires on the steering servo have been configured to match receiver (Refer to Step 2), plug the steering servo into channel 1 on the XXtra.

4. CONNECT SPEED CONTROL OR THROTTLE SERVO

After the input harness wires on the ESC or throttle servo have been configured to match receiver (Step 2), plug the ESC or servo into channel 2 on the XXtra.

5. CONNECT AUXILIARY SERVOS

After the input harness wires on any auxiliary servos have been configured to match receiver (Step 2), plug the auxiliary servos into channels 3, 4, or 5 on the XXtra.

6. COVER OPEN SERVO RECEIVER CHANNELS

Use the included case slot plugs to cover remaining channel openings. 2 and 3 channel plugs are included.

7. OPTIONAL USE OF EXTERNAL BATTERY PACK

A 4 or 5-cell receiver battery pack can be used if erratic radio operation is experienced during hard acceleration. Consult ESC manual for proper installation and usage.

The external battery pack's plug inserts into the XXtra with the **positive (+) wire in the middle** and the **negative (-) wire towards the outside/bottom edge** of the case.

STEP 5 DSC CONNECTION

The XXtra receiver will work with all DSC cords. Insert the input plug on DSC cord into the receiver's BAT/DSC input slot. Refer to the manufacturer's operating instructions for details on using the DSC cord feature.

If you do not have control of the servos when the DSC cord is connected to the transmitter and the receiver, reverse wiring sequence in the DSC cord input plug plastic and try again.

TROUBLE-SHOOTING GUIDE

Servo And/Or Speed Control Does Not Work

- Make sure steering servo is plugged into channel 1 and throttle servo or speed control is in channel 2.
- Check color sequence of input plugs—Refer to Step 2.
- ESC or electronics are not connected to battery pack.
- Check wiring and connections.
- Channel selector switches not on same frequency channel as transmitter, or bad transmitter crystal—Refer to Step 1.

Receiver Glitches/Throttle Stutters On Acceleration

- Motor capacitors broken or missing—Refer to Step 4.
- Receiver or antenna too close to speed control, power wires, battery, or motor—Relocate receiver/antenna.
- Bad connections—Check wiring and connections.
- Motor brushes worn—Replace brushes. Motor may also be worn and need to be rebuilt.
- Excessive current going to motor—Use milder motor or a smaller pinion gear.
- Bad transmitter crystal—Check system with another.
- Voltage to receiver is too low—Try using an external receiver battery pack. Refer to Step 4.
- Possible internal damage—Refer to service procedures.

FCC APPROVAL 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 this instruction manual, 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 correcting the interference by one or more of the following measures: (1) Reorient or relocate the receiver's antenna; (2) Increase the separation between the equipment and receiver; (3) Consult an experienced radio/TV technician for help.

SERVICE PROCEDURES

Before sending your receiver for service, review the Trouble-Shooting guide and the instructions. The receiver may appear to have failed when other problems exist.

After reviewing the instructions, if you feel that your XXtra requires service, please obtain the most current product service options and pricing by one of the following methods:

WEBSITE: We have an abundance of information available for our receivers, and all of our products. Print a copy of the **PRODUCT SERVICE FORM** from the SERVICE section of the website. Fill out the needed information on this form and return it with the Novak product that requires servicing.

PHONE/FAX/E-MAIL: If you do not have access to the internet, contact our customer service department by phone, fax, or e-mail as listed in the CUSTOMER SERVICE section below, and they will supply you with current service options and send you a **PRODUCT SERVICE FORM**.

WARRANTY SERVICE: For warranty work, you **MUST CLAIM WARRANTY** on the **PRODUCT SERVICE FORM** and include a valid cash register receipt with purchase date on it, or an invoice from previous service work. If warranty provisions have been voided there will be service charges.

ADDITIONAL NOTES:

- Hobby dealers or distributors are not authorized to replace Novak products thought to be defective.
- If a hobby dealer returns your receiver for service, submit a completed **PRODUCT SERVICE FORM** to the dealer and make sure it is included with the receiver.
- Novak Electronics, Inc. does not make any electronic components (transistors, resistors, etc.) available for sale.

PRODUCT WARRANTY

Novak Electronics, Inc. guarantees the XXtra receiver to be free from defects in materials and workmanship for a period of 120 days from the original date of purchase (verified by dated, itemized sales receipt). Warranty does not cover incorrect installation, components worn by use or excessive force, altering the antenna, exceeding the recommended input voltage, using wrong transmitter crystal, improper use of an external receiver battery pack, using the receiver without its case, tampering with the electronics, allowing water, moisture, or any foreign material to enter receiver or come in contact with the PC board, incorrect installation/wiring of input plug plastics, or any damage caused by vibration, shock, or a crash. In no case shall our liability exceed product's original cost. We reserve the right to modify warranty provisions without notice. Because Novak electronics, Inc. has no control over connection and use of receiver, no liability may be assumed nor will be accepted for damage resulting from the use of this product. Every receiver is thoroughly tested and tuned before leaving our facility, and is therefore considered operational. By the act of connecting/operating receiver, the user accepts all resulting liability.

CUSTOMER SERVICE

Monday-Thursday: 8:00am-5:00pm (PST)

Friday: 8:00am-4:00pm (closed every other Fri.)

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NOVAK XXTRA

• EURO 27 MHz •

RECEIVER CHANNEL FREQUENCIES

| CHANNEL # | FREQUENCY (MHz) |
|-----------|-----------------|
| 04 | 26.995 |
| 05 | 27.005 |
| 06 | 27.015 |
| 07 | 27.025 |
| 08 | 27.035 |
| 09 | 27.045 |
| 10 | 27.055 |
| 11 | 27.065 |
| 12 | 27.075 |
| 13 | 27.085 |
| 14 | 27.095 |
| 15 | 27.105 |
| 16 | 27.115 |
| 17 | 27.125 |
| 18 | 27.135 |
| 19 | 27.145 |
| 24 | 27.195 |
| 30 | 27.255 |

• EURO 41 MHz •

RECEIVER CHANNEL FREQUENCIES

| CHANNEL # | FREQUENCY (MHz) |
|-----------|-----------------|
| 11 | 41.110 |
| 12 | 41.120 |
| 13 | 41.130 |
| 14 | 41.140 |
| 15 | 41.150 |
| 16 | 41.160 |
| 17 | 41.170 |
| 18 | 41.180 |
| 19 | 41.190 |
| 20 | 41.200 |

*TRANSMITTER CRYSTAL MUST BE SAME MAKER AND FREQUENCY BAND AS TRANSMITTER

European Regional Frequency Chart—Cut along dash lines to remove

NOVAK XXTRA

• JAPAN/ASIA 27 MHz •

RECEIVER CHANNEL FREQUENCIES

| CHANNEL # | FREQUENCY (MHz) |
|-----------|-----------------|
| 01 | 26.975 |
| 02 | 26.995 |
| 03 | 27.025 |
| 04 | 27.045 |
| 05 | 27.075 |
| 06 | 27.095 |
| 07 | 27.125 |
| 08 | 27.145 |
| 09 | 27.175 |
| 10 | 27.195 |
| 11 | 27.225 |
| 12 | 27.255 |

• JAPAN/ASIA 40 MHz •

RECEIVER CHANNEL FREQUENCIES

| CHANNEL # | FREQUENCY (MHz) |
|-----------|-----------------|
| 61 | 40.610 |
| 63 | 40.630 |
| 65 | 40.650 |
| 67 | 40.670 |
| 69 | 40.690 |
| 71 | 40.710 |
| 73 | 40.730 |
| 75 | 40.750 |

*TRANSMITTER CRYSTAL MUST BE SAME MAKER AND FREQUENCY BAND AS TRANSMITTER

29MHz & Japan/Asia Regional Frequency Charts—Cut along dash lines to remove

NOVAK XXTRA

• USA 27 MHz •

RECEIVER CHANNEL FREQUENCIES

| CHANNEL # | FREQUENCY (MHz) |
|-----------|-----------------|
| 1 | 26.995 |
| 2 | 27.045 |
| 3 | 27.095 |
| 4 | 27.145 |
| 5 | 27.195 |
| 6 | 27.255 |

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*TRANSMITTER CRYSTAL MUST BE SAME MAKER AND FREQUENCY BAND AS TRANSMITTER

USA Regional Frequency Chart—Cut along dash lines to remove