

MANUAL FOR RX700 LR and NR



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Revision/ updates

Date, updates, and person	Affected pages, ETC
Revision 1.2 03-12-2013, By Patrick M	ALL

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Preface

Before reading this manual please read our TX manual. Several repeated sections are committed from this manual and are only explained once in the TX manual.

Technical specifications NR

The receiver board is 26 x 54 mm

Weight: 6.5 gr. without antenna wire - 8.5 gr. With antenna wire.

Sensitivity: -102dBm

Input supply voltage range: 4-10V

Servo signal pulse output: 3.3V positive.

Radio band: 433 & 444Mhz multi band and multi frequency hopping system.

Temperature range: -40C to +70C tested

Receiver 8ch - optimized input filter so it can co-exist with strong 2.4Ghz on board video transmitters.

Wire antenna mounted directly on the Rx.

The extra pin in ch 12 connector is RSSI out. Ch 12 connector is also PPM out when < 12ch are used.

PPM out is the same as sum-signal and this is of course fully compatible with MikroKopter controller board, all RX have this SUM and RSSI out.

Technical specifications LR

Improved input filter, now even better attenuation for 900 - 1300 - 2400 video transmitters virtually impossible to jam. Improved distance of the servo connectors, now all 12 can be mounted at the same time and no bending or problems.

The receiver have the following dimensions:

Width	34 mm.	
Length	62 mm.	including angled connector
Height	10 mm.	
Weight:	16 gr.	

Double LNA Low Noise Amplifier frontend with fast signal switch for the best signal.

Two MCX connector coax dipole wire antennas come with each RX t - Weight 5.4 grams each.

The extra pin in ch 12 connector is RSSI out. It's now buffered so loading of the RSSI out is uncritical, 1k ohm Zout, It is also filtered to avoid less jumpy OSD readings.

CH 12 connector is also PPM out when < 12ch are used (auto mode is the default).

PPM out is the same as sum-signal and this is of course fully compatible with MikroKopter controller board and all RX types and models have this.

Sensitivity:	-113dBm to -114dBm
Input supply voltage range:	4-6V (rx uses 134mA at 5V)
Servo signal pulse output:	3.3V positive
Radio band:	433 & 444Mhz multi band and multi frequency hopping system.
Temperature range:	-40C to +70C tested

Binding

The binding function stores the TX signal unique ID code and PPM frame rate and number of servos into the receiver; this must be done every time the number of servos is changed on the RC unit. (or another RC system is used with this system). The binding procedure is explained in the TX manual.

Failsafe preface

The push button on the top of the TX is used both for binding and to store Failsafe into the receiver. When the button is pressed, while the TX is powered on the unit is binding. When the TX is in normal flight mode, the button is used to store failsafe.

The different modes of failsafe in the receiver manual are:

- The “Normal”
- The “Sequential”
- The “None”

All kinds of FAILSAFE storing and testing should be carefully performed with the plane firmly grounded. It's normally good use full failsafe style to program the plane to shut off the motor and turn slowly to the left side. Some FPV/UAV systems can use other settings; the user should know what is best for his usage. Always test if it's working as expected before a flight – Test if recall the wanted function and recover again when the TX is powered back on.

The 3 Failsafe in detail

Link to binding guide on YouTube: <http://www.youtube.com/watch?v=9BO-uwYcfys>

The *normal* kind of failsafe is one set of servo positions stored in the receiver. This setting will be recalled and used when the radio signal is lost for about 1 second. To store a set of servo positions, push and hold the button for 1 second and then release it. Please be sure not to push it again the next 5 seconds.

The “Sequential” works almost the same way. The difference is that you push the button again under 5 sec and then release to store the next set of servo positions. This can be repeated 3 times to use all 3 servo

memories. They are recalled in same order as stored and when/if the radio signal is recovered the return to normal flight is the reverse way.

The procedure is as followed:

The radio signal is lost - recall 1, recall 2, recall 3.

Radio signal is back, - recall 2, recall 1, live.

It will run scan mode which means, if a good package is received while it is in recall 2 state, it will go directly to recall 1 and then back live. Each recall state takes about 0.3 seconds then it recall the next state. This special kind of failsafe can be used to handle special features on some multi rotor flight controller boards to activate the RTH or safe landing procedures, depending on how you moved your switches while you stored the fail safes.

The “None” is when the receiver doesn’t have any positions stored at all. In this way nothing will be recalled and it will simply hold last known good position of all servos. To clear the failsafe memory, hold the button for 5 sec.

A little side note on failsafe storing. The Receiver will loose radio link and recall failsafe settings, while you activate a storing. The reason for this is the kind of memory used for this is a bit slow and while the CPU waits for the saving it’s not able to maintain a perfect hopping sequence. This is perfectly normal but it is not normally seen when you only store one set of positions, since the values you recall while you hit save are mostly the same as your active positions.

Ch12/PPM options

The signal CH12/PPM - If you use under 12ch you will always get PPM out of the ch12 connector. However if you need PPM out and use 12 channels then you simply configure it to be in PPM OUT (See special features configurations for guidelines how to do this).

RSSI output



Link to guide on YouTube: <http://www.youtube.com/watch?v=Xo0Mu1N-okI>

The little extra PAD over the CH12 connector is the RSSI output. This is an analog voltage that reveals how strong the signal is from the TX. Many OSD types can use this voltage to display a calibrated 0-100% readout on the screen display. The minimum and maximum voltages are a little bit different from RX to RX, so you must perform a new calibration if you swap a receiver in your system.

Connectors Servo

Look carefully at the connector pins and the PCB. The edge rows are all GROUND, the centre row are +5V and all top pins are the servo channels out.

Serial Debug Output

The upgrade connector pin out

1 = GROUND (2, 3, 6 are not connected)

4 = Radio data (do not connect anything to this pin in flight mode)

5 = Debug data output

The debug out is a 3.3V serial signal, can be used for OSD or onboard flight recorders,

The data format is very simple, 9600 Baud 8N1.

The data you will get are:

G: number of Good data packages received

B: number of Bad data packages received

F: number of Failsafe recalled

Values are counted from RX power up and will be zeroed again at next power up, so it is possible to land, connect to a PC via serial port converter and see the values for the flight, before you power off the RX. The serial debug can also be use full to test failsafe storing and recalling, it writes in clear text what it is doing. And it is also active during power up and under special mode setting configurations.

Special Features Configurations

Link to binding guide on YouTube: <http://www.youtube.com/watch?v=3LkoTTGNRUg>

The receiver can be configured to do a few things other than normal.

How to configure (if you don't need to configure, just power it up as normal)

POWER OFF

Connect a 2.54mm 2 pin jumper (a short circuit connection)

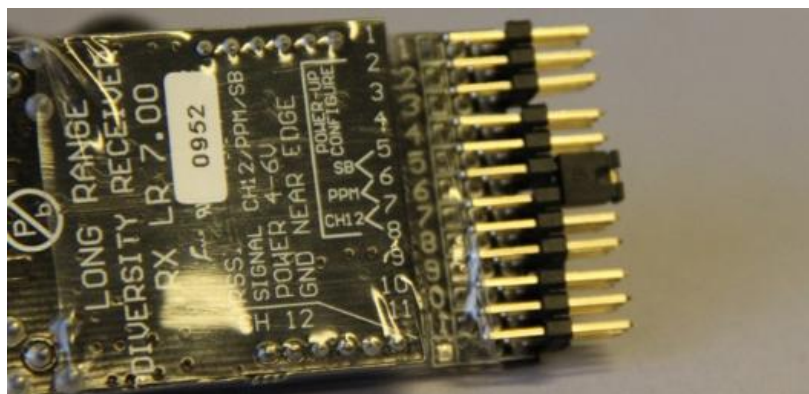
On servo channel 6-7 (YES between the two signals, they are now shorted together)

Power up the RX

See LED D1 is lit, this one is closest to same side as ch6

Now you stored a permanent setting: PPM out even if you use 12channels.

Power off, remove jumper, connect your servoes, test all works.



POWER OFF

Connect a 2.54mm 2 pin jumper (a short circuit connection)

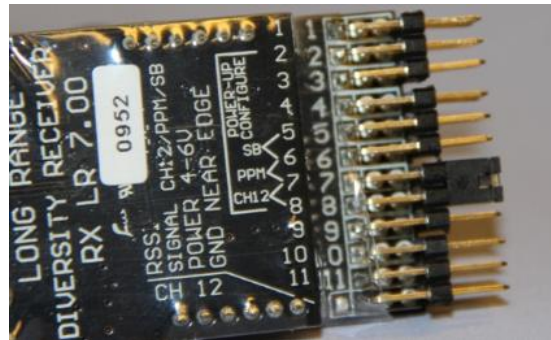
On servo channel 7-8 (YES between the two signals, they are now shorted together)

Power up the RX

See LED D2 is lit, this one is closest to same side as ch8

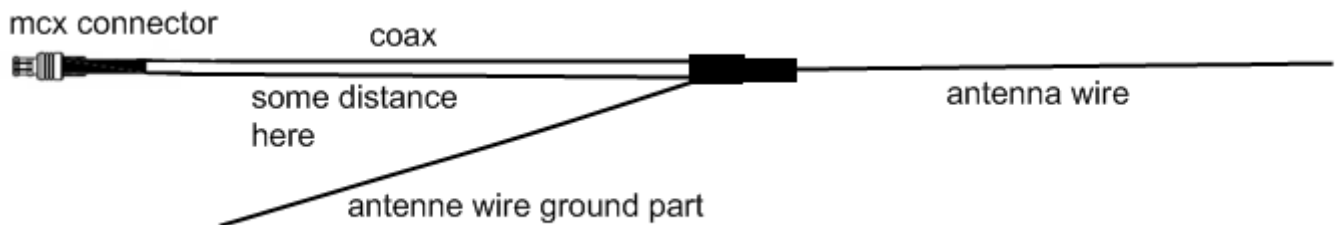
Now you stored a permanent setting: servo ch 12 out, if you use 12channels.

Power off, remove jumper, connect your servoes, test all works.

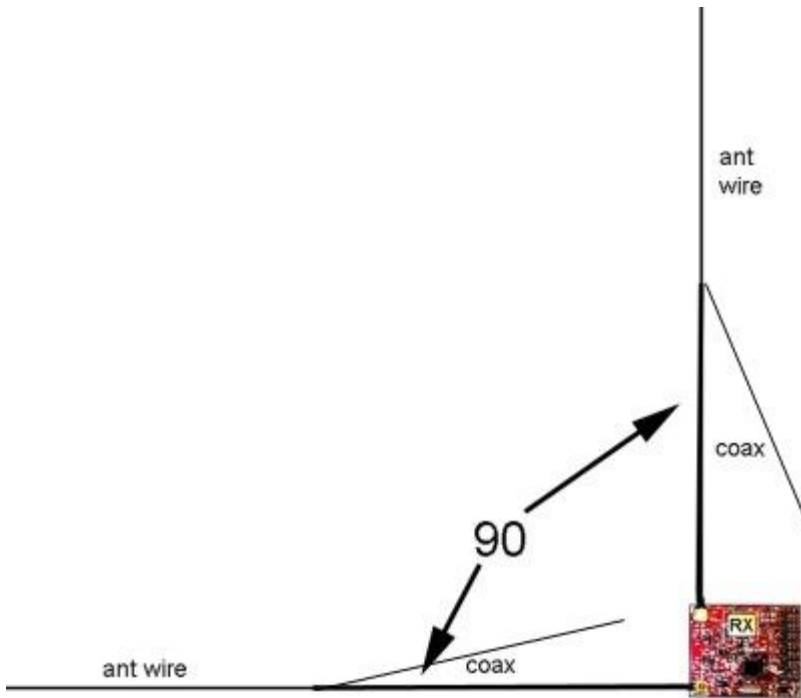


If you use under 12ch, you will of course always get PPM out of the ch12 connector, after a setting change, or PPM timing change or number of channels assigned, you must always perform a bind and store failsafe and test all settings works.

Antenna Setup



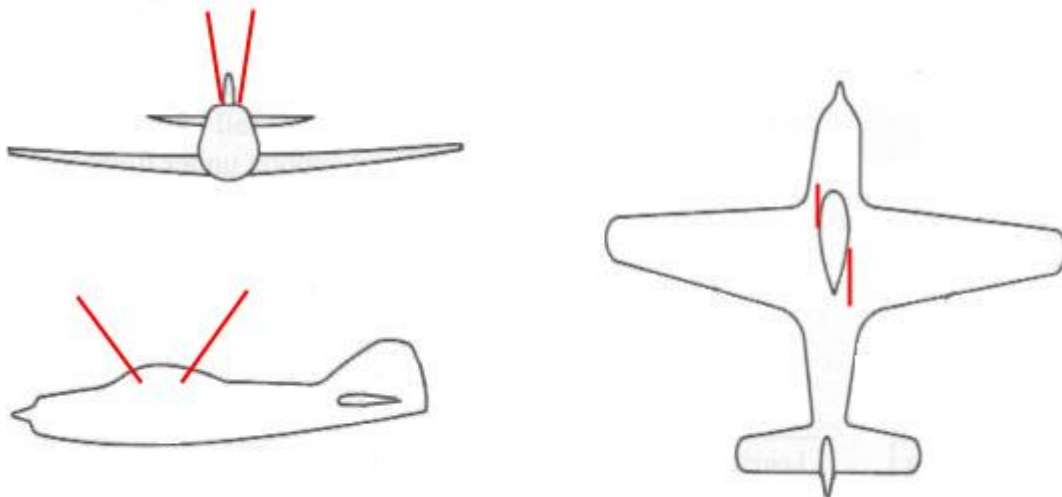
The ground wire must be separated a bit from the coax. There are no rules of how much of a distance, but 3-5 cm is normally used.



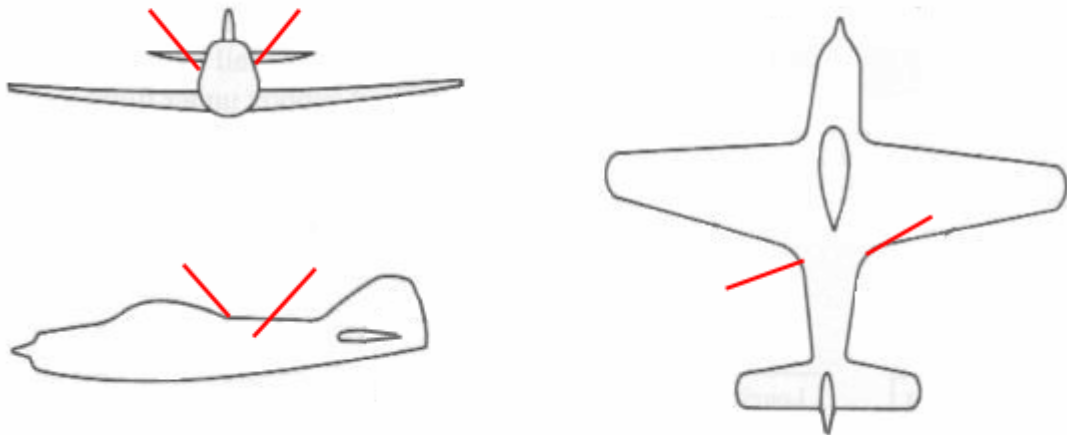
RX antennas always have to mount with a 90 degree from each other. With this setup there will be no lost-spots. See this example with an airplane.

- The antennas are the red lines.

option V up, FRONT-BACK



option V up, LEFT-RIGHT



Also some general rules.

Mount all types of receivers as far away from transmitters and cameras.

All types of metal, carbon, wires, electronics, must be kept away from antennas and its ground wires, too close located wires can "short-circuit" an antennas function.

Do not lay down the V flat horizontally, like on a delta wing. This will be the most easy thing to do, but it is the worst result possible for long range, since the TX antenna is normally pointed up, vertically.

Firmware upgrading

Use the 6 pin female connector it is clearly marked with UPGRADE or FIRMWARE UPGRADE, note the arrow to pin 1 and also the upgrade text is located closest to pin 1. Actually any USB interface with FTDI232 chipset can be used - the Arduino bootloader type or our own called TSLRS-USB. They both fit directly into this 6 pin row.

First install FTDI virtual com port driver

<http://www.ftdichip.com/Drivers/VCP.htm>

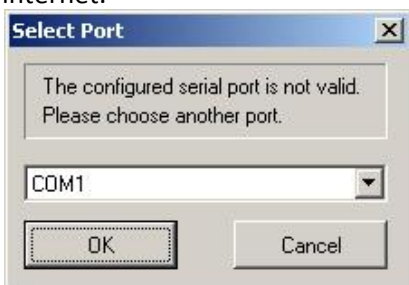
Then download mcuboot original version (some users might find version 1.3 works better if win7 or win8)

http://webx.dk/rc/uhf-link3/mcuboot.e_x_e

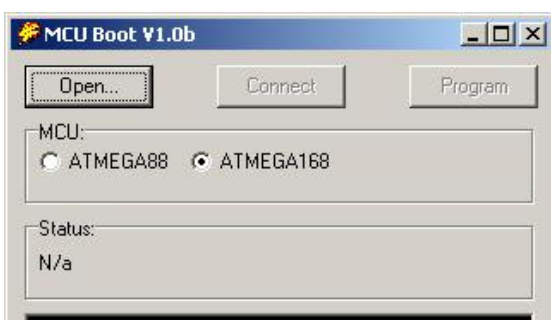
If this version doesn't work with your version operating system, please try this mcuboot version 1.3

http://webx.dk/rc/uhf-link3/mcuboot13.e_x_e

Rename e_x_e extension to exe, this mcuboot.exe is made using Borland some PC's might need some DLL files, in that case you will be notified about their names, if so, ask support or search for them on the internet.

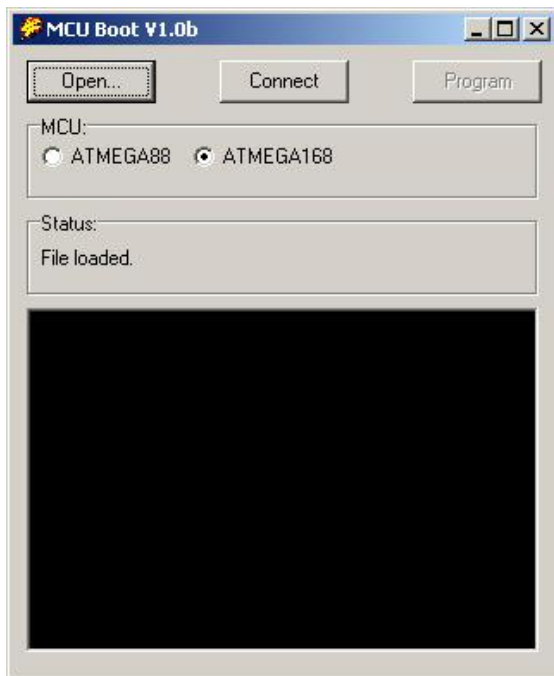


Select right comport - check your virtual comport number is right if you use USB, click OK

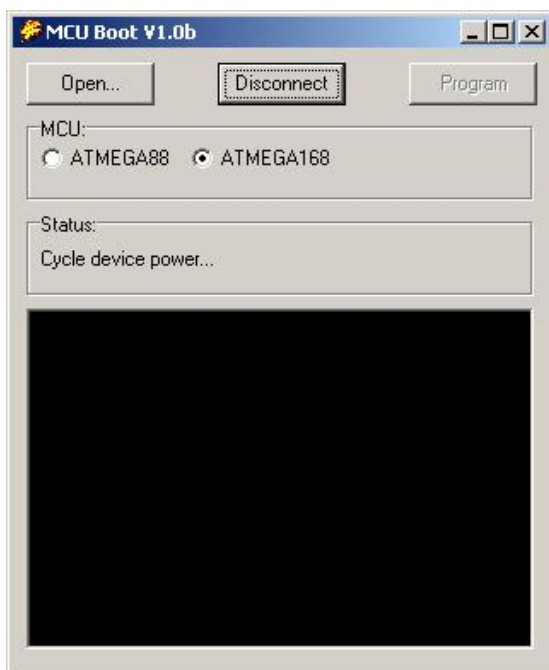


Browse to the HEX file you got via email, using OPEN.

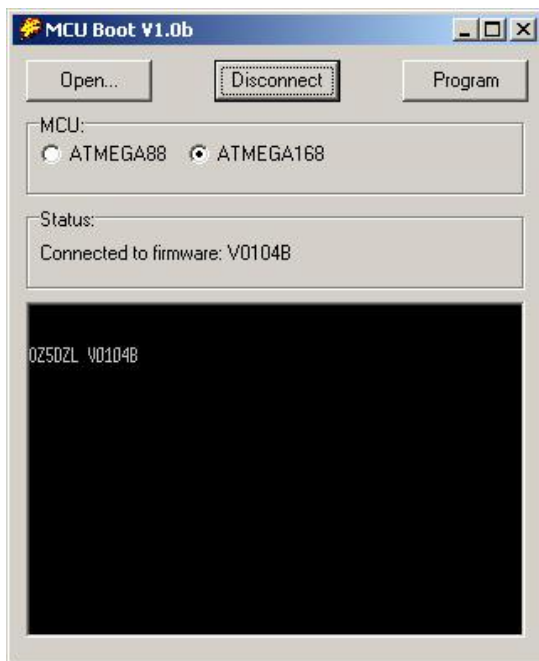
Remember the TX hex is for TX unit, and the RX hex is for the RX.



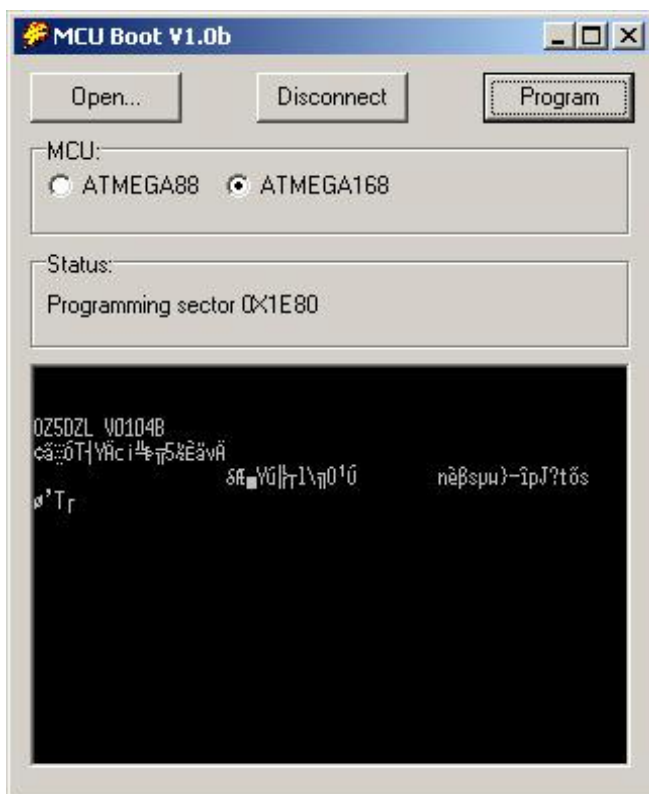
File is accepted and loaded, pull down the window so you can see the black status area, click CONNECT



Mcuboot now instruct you to cycle powersupply it means actually you POWER UP RX or TX unit NOW



Now you should be connected to the "secret" bootloader program



Click Program and look on the screen and status area checksum bytes.



After 7 sec your unit is upgraded. The Bootloader will exit and mcuboot will say Programming done, now check that firmware is working and new features work as expected. You MUST read about the features of your new software so you know how to use it. You must expect to perform new bind and new store failsafe after an upgrade.

Option Board for RX LR 7.01

The option board contains a data modulator, so live flight data from the OSD is modulated into audio that is then transferred to ground station via the video links audio channel. This option board is ONLY compatible with RX LR 7.01 and up.

THIS SECTION WILL BE UPDATED WHEN THE OPTION BOARD IS RELEASED.

LED indicators

The NR has got one LED it simply indicates valid supply voltage.

The LR has got two LED's one located near each antenna connector.

The normal operation of the LED's are during flight and installation to show what antenna signal is the strongest, since that is the selected signal.

FAST Blinking LED during power up indicates search mode.

FAST Blinking LED during flight, indicates failsafe is recalled and search mode is now running.