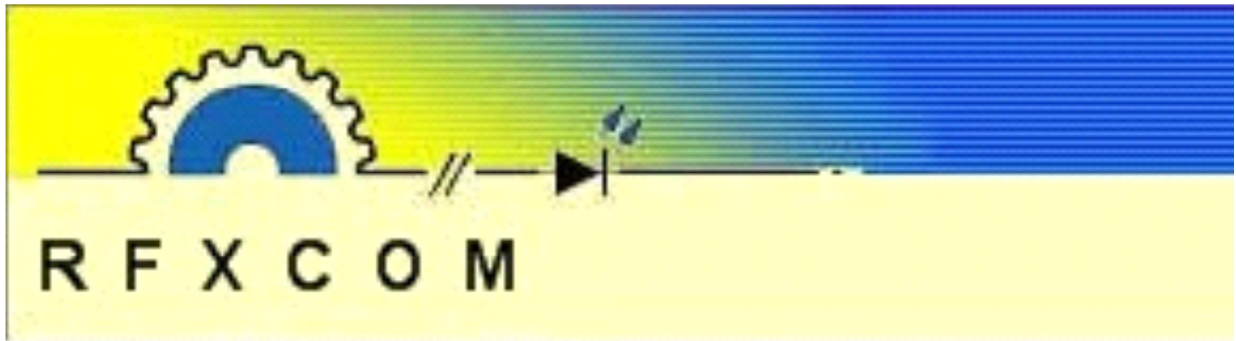




RFXtrx

USB RF transceiver

User guide



www.rfxcom.com

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2. RFXtrx RF transceiver general information

The RFXtrx transceiver is communicating over one USB port with the application. The RFXtrx enters for 2 seconds the boot loader (red LED is on) and after this it starts the receive/transmit firmware. For developers, the communication protocols over USB are described in the SDK.

2.1. RFXtrx315 supported protocols

2.1.1. RFXtrx315 configured for 310MHz

Protocol	receive	transmit
US X10 lighting	Y	Y
US X10 security	Y	Y

2.1.2. RFXtrx315 configured for 315MHz

Protocol	receive	transmit
Visonic CodeSecure	planned	-
Visonic PowerCode	Y	Y

2.2. RFXtrx433 supported protocols

Protocol	receive	transmit
X10 lighting X10, Xdom, ebode	Y	Y
X10 security	Y	Y
ARC (address code wheels) HomeEasy, KlikAanKlikUit, ByeByeStandBy, Intertechno, ELRO, AB600, Düwi, DomiaLite, COCO	Y	Y
ELRO AB400D, Flamingo, Impuls, Phenix, Sartano	-	Y
EMW100, EMW200	-	Y
Waveman	-	Y
Impuls	-	Y
AC (learning button) HomeEasy UK, KlikAanKlikUit, Chacon, NEXA, DI.O, Intertechno	Y	Y
HomeEasy EU	Y	Y
ANSLUT	Y	Y
Ikea Koppla	-	Y
AD LightwaveRF, Siemens	Y	Y
AE Blyss	Y	Y
Digimax	Y	-
RTS10 / RFS10 / TLX1206	-	Y
HE105	-	Y
Mertik Maxitrol	Y	Y
X10 Ninja/Robocam	Y	Y
La Crosse TX2, TX3, TX4, TX17, WS2300	Y	-
TFA TS15C, TS34C, 30.3133	Y	-
Oregon 1.0 THR128,THR138,THC138	Y	-
Oregon 2.1 / Huger	Y	-

THC238/268, THN122N/132N, THWR288A, THRN122N, AW129, AW131, THGN122N/123N, THGR122NX, THGR228N, THGR238/268, RTGR328N, THGR328N, THGR918, THGRN228NX, THGN500, BTHR918, BTHR918N, BTHR968, RGR126, RGR682, RGR918, STR918, WGR918, UVN128, UV138, RTGR328N		
Oregon 3.0 THGR810, WTGR800, PCR800, WTGR800, WGR800, UVN800	Y	-
Oregon BWR101/BWR102	Y	-
Oregon GR101	Y	-
OWL CM113, cent-a-meter, Electrisave	Y	-
OWL CM119 / CM160	Y	-
UPM/Esic WT260, WT260H, WT440H, WT450, WT450H, WDS500, RG700	Y	-
Viking 02035, 02038, 02811	Y	-
KD101 smoke detector	Y	Y
Harrison curtain	-	Y
BlindsT0: RollerTrol, Hasta *receive is only with all other protocols disabled.	Y*	Y
BlindsT1: Hasta old	Y	Y
ATI Remote Wonder	Y	Y
ATI Remote Wonder Plus	Y	Y
ATI Remote Wonder II (only available in hardware version 1.0)	Y	-
PC Remote	Y	Y
RFXSensor	Y	-
RFXMeter	Y	-
RUBiCSON stektermometer 48659, 48695	Y	-
Visonic CodeSecure	planned	-
Visonic PowerCode	Y	Y
Meiantech keyfob cmd	Y	Y
RC5 (IR)	-	planned

2.3. Sensitivity influenced by enabled protocols

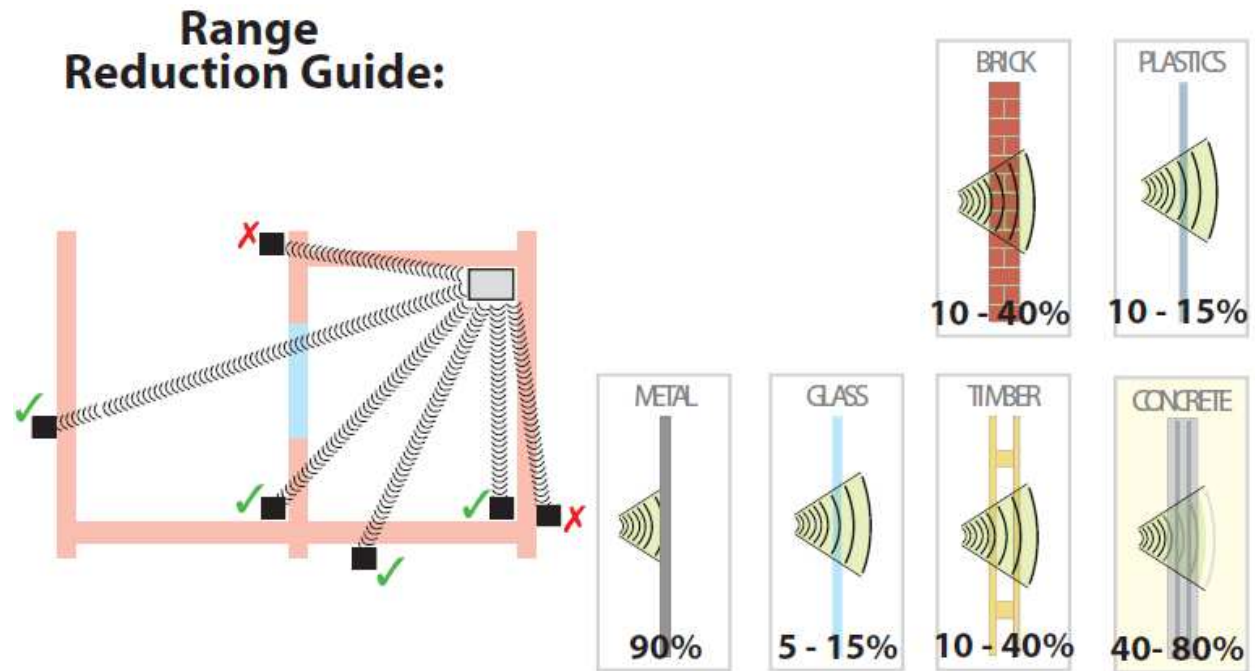
The sensitivity of the receiver part is highly influenced by the number of protocols enabled. Lesser protocols enabled will make the receiver more sensitive for the enabled protocols.

There are a few protocols that will reduce or even eliminate receiving of other protocols if enabled. For example: if the AD (LightwaveRF, Siemens) protocol is enabled it can stop receiving of Meiantech/Atlantic, Oregon, Visonic and Mertik.

	X10	ARC	AC	HomeEasy EU	Meiantech/Atlantic	Oregon	ATI	Visonic	Mertik	AD	Hideki/UPM	La Crosse	FS20	ProGuard	BlindsT0	BlindsT1	AE	Rubicson	FineOffset/Viking	RFU3	RFU4	RFU5	RFU6
X10																							
ARC																							
AC																							
HomeEasy EU																							
Meiantech/Atlantic																							
Oregon																							
ATI																							
Visonic																							
Mertik																							
AD																							
Hideki/UPM																							
La Crosse																							
FS20																							
ProGuard																							
BlindsT0																							
BlindsT1																							
AE																							
Rubicson																							
FineOffset/Viking																							
RFU3																							
RFU4																							
RFU5																							
RFU6																							

2.4. RF range reduction

The RF signals operating distance is reduced when the signal has to pass through walls.



2.5. Home Automation software

For the list of Home Automation software that supports for the RFXtrx see the web site www.rfxcom.com

2.6. Dimensions

The dimensions of the RFXtrx are: 83.5 x 42 x 15 mm
Total height from bottom to antenna top is 122mm

2.7. Electrical

The RFXtrx is powered by the 5 Volt of the USB interface.

Operating current;

Receive mode:	28 mA (0.14Watt)
Transmit mode:	45 mA

3. Install the USB driver

The RFXtrx has the FTDI FT232R USB interface chip installed.

The USB drivers are available at <http://www.ftdichip.com/Drivers/VCP.htm>

4. Run RFXmngr or RFXflash on Linux under Mono

Open a Terminal screen in Linux (Ctrl-Alt-T)

Execute once:

Install Mono:

[sudo] apt-get install mono-runtime

Install VisualBasic support under Mono:

[sudo] apt-get install libmono-microsoft-visualbasic8.0-cil

If the USB device is created as ttyACMx you will need to create a link between /dev/ttyACMx and a serial port /dev/ttySx.

This is not necessary if the device is created as /dev/ttyUSBx !!

[sudo] ln -sf /dev/ttyACM1 /dev/ttyS3

Note: sudo must be entered without brackets []. sudo is required if not running as super user.

Launch the RFXflash.exe program.

[sudo] mono RFXflash.exe

OR

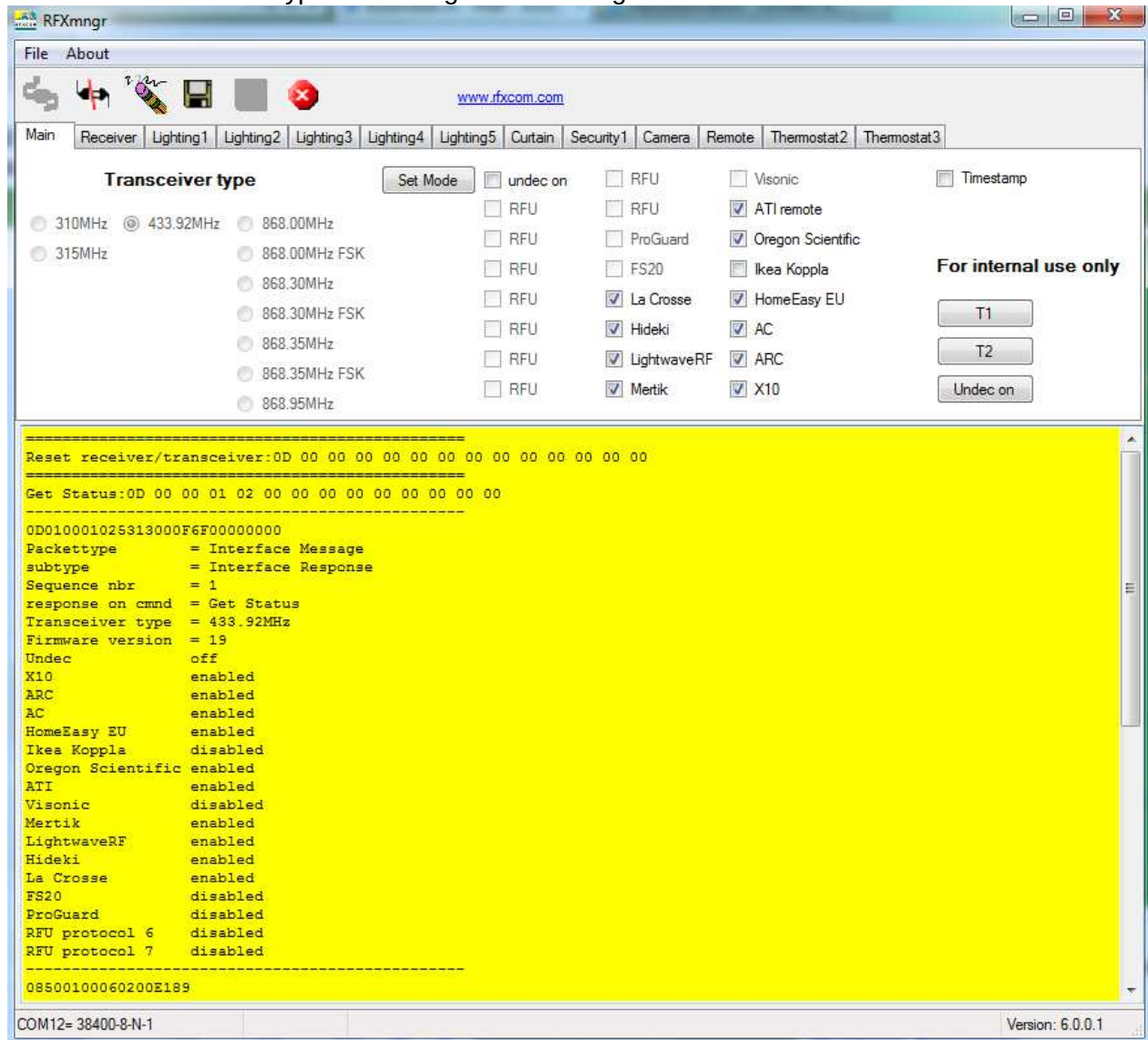
Launch the RFXmngr.exe program.

[sudo] mono RFXmngr.exe

5. RFXmngnr test program

The RFXmngnr program supports decoding of received data and allows you to transmit commands.

After the connection the RFXmngnr program transmits a Reset and Get Status command so that it will know the RFXtrx type and configuration settings:



Transmitter protocols are always enabled but receiver protocols can be disabled. This is very useful because the receiver will become more sensitive when protocols not used are disabled. So select only the protocols to be used, click Set mode and on the Receiver tab click Save Settings.

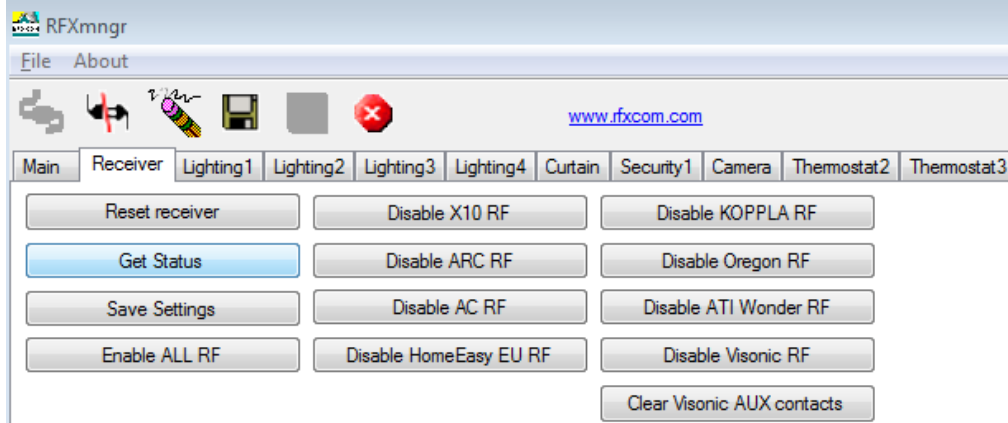
Note that these settings are lost after a firmware update and need to be set again.

5.1. Receiver

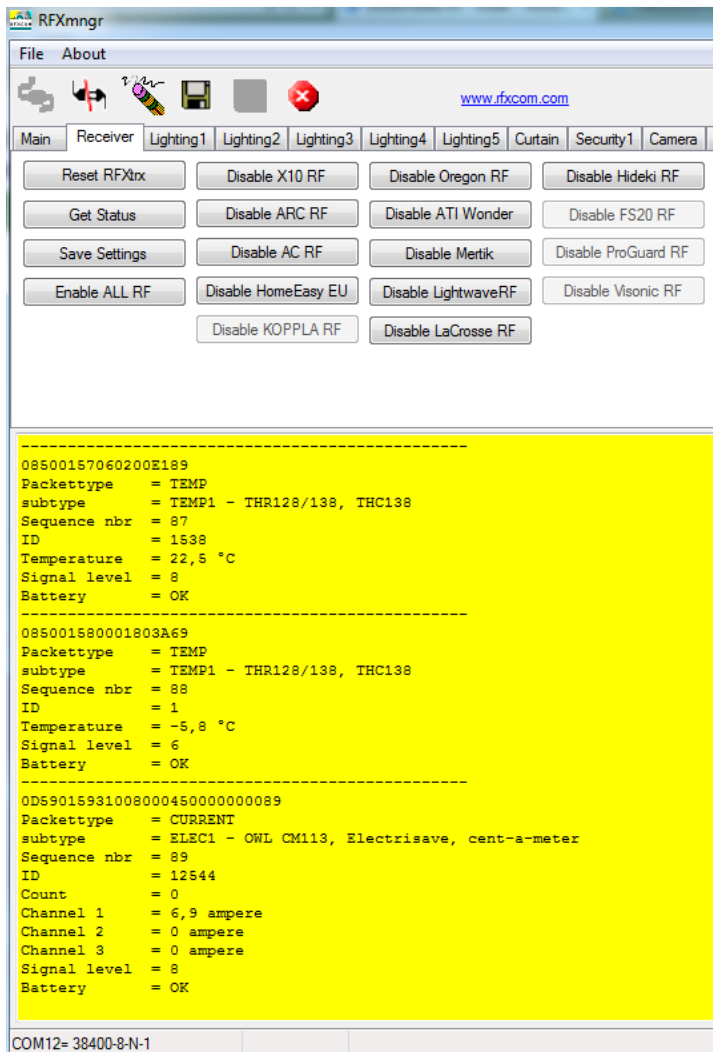
The RF protocols to be received can be configured on the Receiver tab or on the Main tab at Set Mode.

Click Save Settings to save the selected protocols in non-volatile memory of the RFXtrx. This configuration is now restored every time after a power up.

Note that these settings are lost after a firmware update and need to be set again.

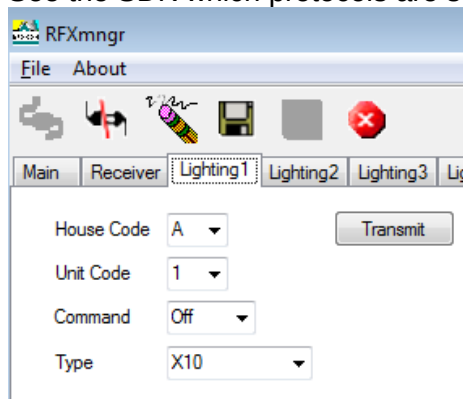


The received RF data is decoded and displayed in the yellow window.

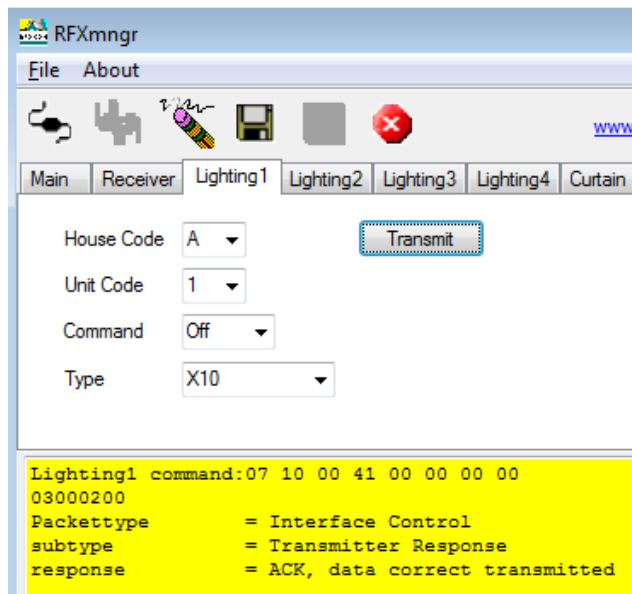


5.2. Transmitter

The tabs after Receiver are used to send commands to the transmitter.
For example Lighting1 is used to send X10, ARC and some more.
See the SDK which protocols are supported on the different tabs.



The transmitted commands are displayed in the yellow window including the acknowledge send by the RFXtrx, in the example below the 030000200 = ACK, data correct transmitted.



6. Flash update of the RFXtrx

6.1. *Update firmware in the RFXtrx*

Firmware is flashed in the RFXtrx using this procedure:

1. Depending on the RFXtrx type download the latest RFXtrx315_yy.hex, RFXrec433_yy.hex or RFXtrx433_yy.hex firmware file.
2. Connect the RFXtrx to a Windows system or Linux under MONO
3. Stop any program that is connected to the RFXtrx.
4. Start the RFXflash program (version 4.0.0.0 or higher)
5. Select the USB RFXtrx COM port and click the CONNECT button, (the red LED should switch on now)
6. Load the correct.hex firmware file for your RFXtrx,
7. Click the WRITE button,
8. Click the Normal Execution mode button.

IMPORTANT:

1. Do not interrupt the flash procedure when started.
2. It can happen that the flash procedure ends with a pop-up screen indicating errors. Just disconnect the RFXtrx and start again at step 5 until the flash procedure is finished without errors.

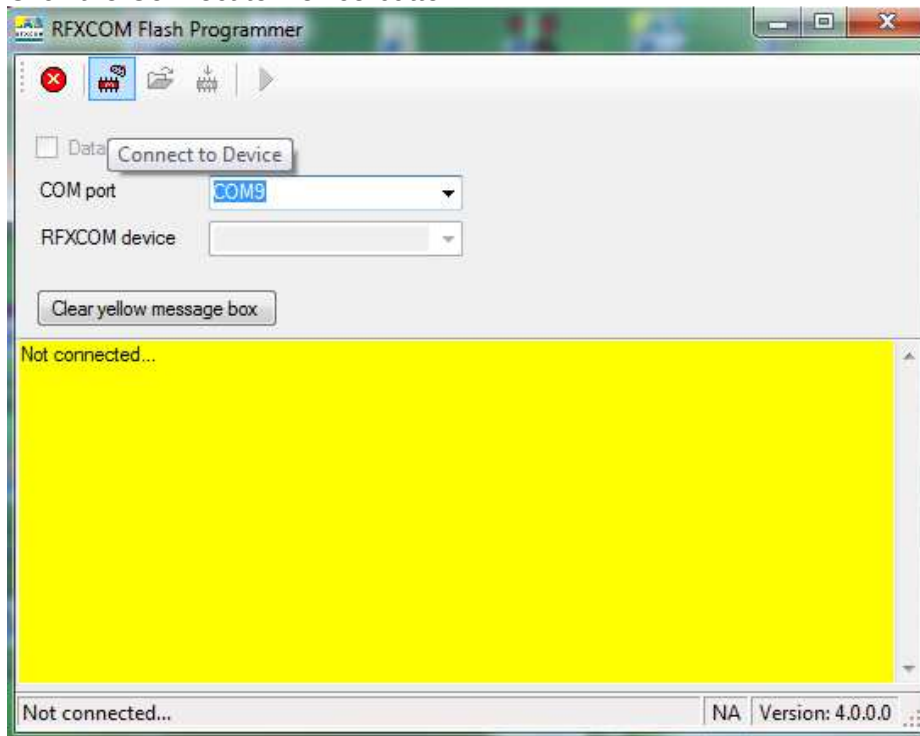
If the red LED does not switch on if you click the CONNECT button:

1. Check if you have selected the correct USB COM port.
2. If you have flashed the RFXtrx before and interrupted the flash procedure it is possible that the RFXtrx does not enter the flash state. Contact support@rfxcom.com for help.

Note: Receiver Settings are lost after a firmware update and have to be set again.

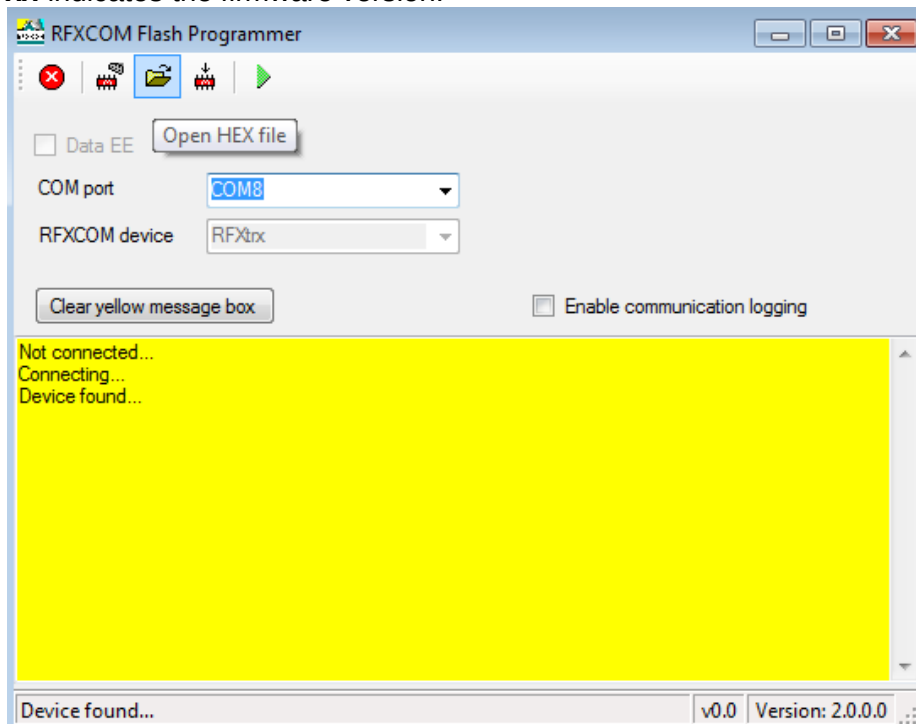
6.2. Update firmware in the RFXtrx step by step

- Click the Connect to Device button.

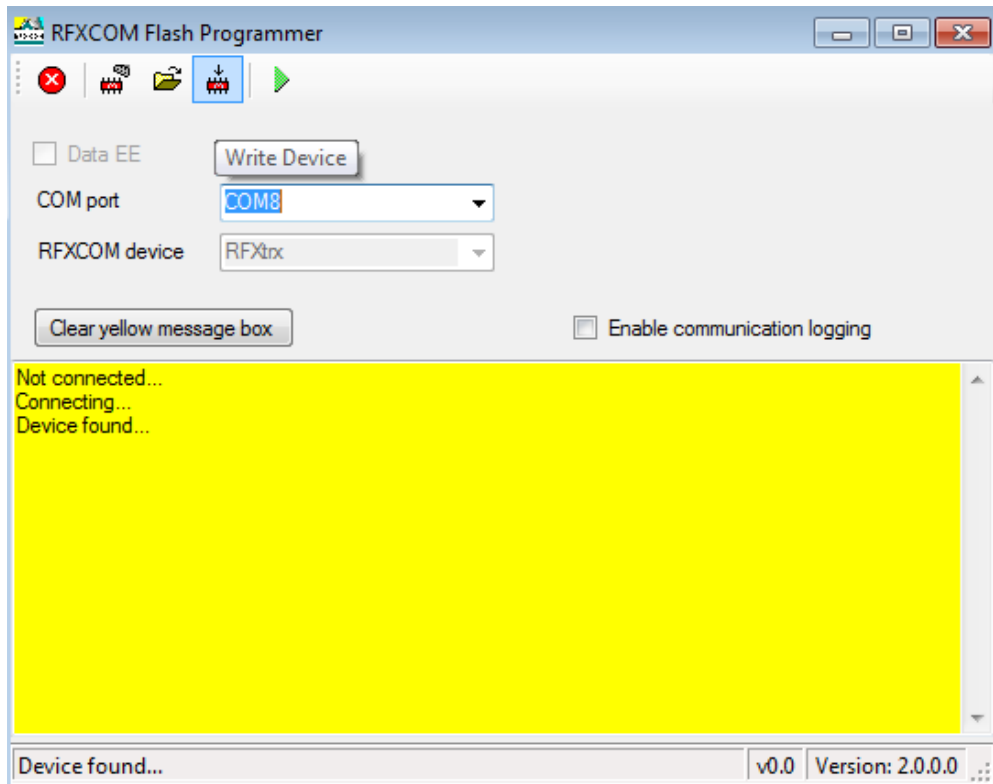


The RFXtrx will automatically switch from normal mode to the bootloader now.

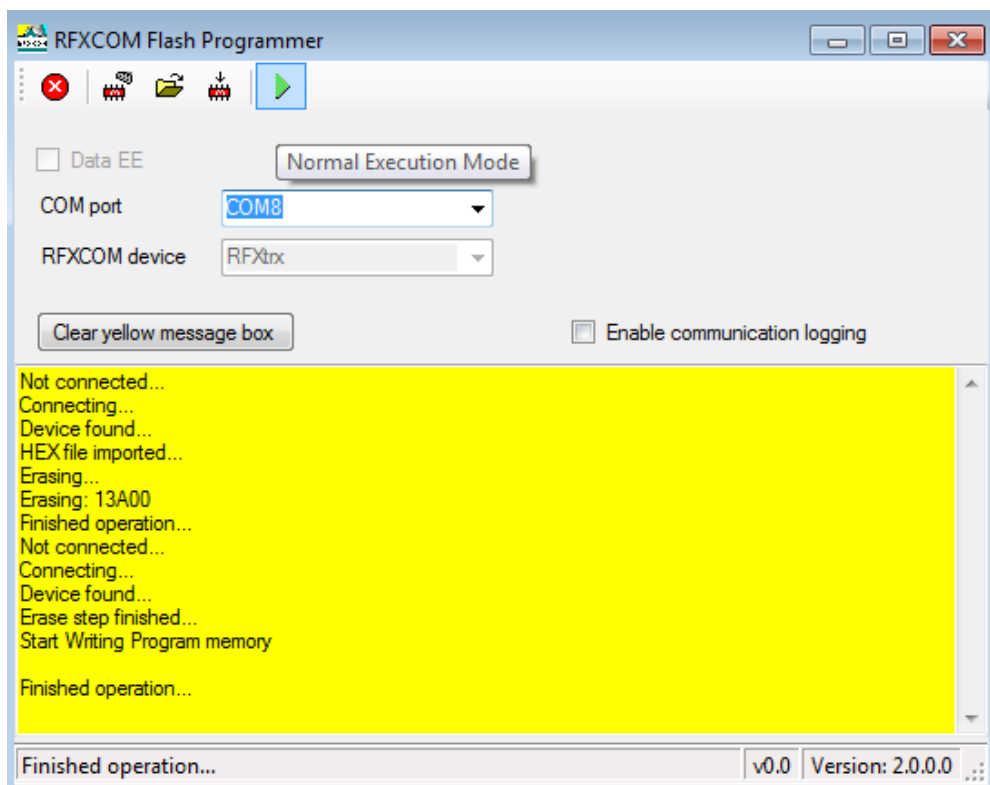
- Click the Open HEX file button and load the RFXtrx`yyy`_`xx`.hex file
Be sure to load the latest firmware file for the RFXtrx.
`yyy` indicates the RFXtrx frequency, so load the RFXtrx433 for an RFXtrx433!
`xx` indicates the firmware version.



- Click the Write device button and the RFXtrx is flashed.



- Click on the Normal Execution Mode button to set the RFXtrx to running mode.



Note: Receiver Settings are lost after a firmware update and have to be set again.

7. RFXtrx433 Code tables

7.1. Remote commands

7.1.1. X10 RF Remote

Dec	Hex	Button
2	02	0
18	12	8
34	22	4
56	38	Rewind
58	3A	Info
64	40	CHAN+
66	42	2
82	52	Ent
96	60	VOL+
98	62	6
99	63	Stop
100	64	Pause
112	70	Cursor-left
113	71	Cursor-right
114	72	Cursor-up
115	73	Cursor-down
116	74	Cursor-up-left
117	75	Cursor-up-right
118	76	Cursor-down-right
119	77	Cursor-down-left
120	78	left mouse
121	79	left mouse-End
123	7B	Drag
124	7C	right mouse
125	7D	right mouse-End
130	82	1
146	92	9
160	A0	MUTE
162	A2	5
176	B0	Play
182	B6	Menu
184	B8	Fast Forward
186	BA	A+B
192	C0	CHAN-
194	C2	3
201	C9	Exit
209	D1	MP3
210	D2	DVD
211	D3	CD
212	D4	PC / Shift-4
213	D5	Shift-5
214	D6	Shift-Ent
215	D7	Shift-Teletext
216	D8	Text
217	D9	Shift-Text
224	E0	VOL-
226	E2	7
242	F2	Teletext
255	FF	Record

7.1.2. ATI Remote Wonder

Dec	Hex	Button	Dec	Hex	Button
0	00	A	54	36	rename TAB
1	01	B	55	37	Acquire image
2	02	power	56	38	edit image
3	03	TV	57	39	Full screen
4	04	DVD	58	3A	DVD Audio
5	05	?	112	70	Cursor-left
6	06	Guide	113	71	Cursor-right
7	07	Drag	114	72	Cursor-up
8	08	VOL+	115	73	Cursor-down
9	09	VOL-	116	74	Cursor-up-left
10	0A	MUTE	117	75	Cursor-up-right
11	0B	CHAN+	118	76	Cursor-down-right
12	0C	CHAN-	119	77	Cursor-down-left
13	0D	1	120	78	V
14	0E	2	121	79	V-End
15	0F	3	124	7C	X
16	10	4	125	7D	X-End
17	11	5			
18	12	6			
19	13	7			
20	14	8			
21	15	9			
22	16	txt			
23	17	0			
24	18	snapshot ESC			
25	19	C			
26	1A	^			
27	1B	D			
28	1C	TV/RADIO			
29	1D	<			
30	1E	OK			
31	1F	>			
32	20	<-			
33	21	E			
34	22	v			
35	23	F			
36	24	Rewind			
37	25	Play			
38	26	Fast forward			
39	27	Record			
40	28	Stop			
41	29	Pause			
44	2C	TV			
45	2D	VCR			
46	2E	RADIO			
47	2F	TV Preview			
48	30	Channel list			
49	31	Video Desktop			
50	32	red			
51	33	green			
52	34	yellow			
53	35	blue			

7.1.3. ATI Remote Wonder Plus

Dec	Hex	Button			
0	00	A	35	23	F
1	01	B	36	24	Rewind
2	02	power	37	25	Play
3	03	TV	38	26	Fast forward
4	04	DVD	39	27	Record
5	05	?	40	28	Stop
6	06	Guide	41	29	Pause
7	07	Drag	42	2A	TV2
8	08	VOL+	43	2B	Clock
9	09	VOL-	44	2C	TV
10	0A	MUTE	45	2D	VCR
11	0B	CHAN+	46	2E	RADIO
12	0C	CHAN-	47	2F	TV Preview
13	0D	1	48	30	Channel list
14	0E	2	49	31	Video Desktop
15	0F	3	50	32	red
16	10	4	51	33	green
17	11	5	52	34	yellow
18	12	6	53	35	blue
19	13	7	54	36	rename TAB
20	14	8	55	37	Acquire image
21	15	9	56	38	edit image
22	16	txt	57	39	Full screen
23	17	0	58	3A	DVD Audio
24	18	Open Setup Menu	112	70	Cursor-left
25	19	C	113	71	Cursor-right
26	1A	^	114	72	Cursor-up
27	1B	D	115	73	Cursor-down
28	1C	FM	116	74	Cursor-up-left
29	1D	<	117	75	Cursor-up-right
30	1E	OK	118	76	Cursor-down-right
31	1F	>	119	77	Cursor-down-left
32	20	Max/Restore Window	120	78	Left Mouse Button
33	21	E	121	79	V-End
34	22	v	124	7C	Right Mouse Button
			125	7D	X-End

7.1.4. Medion Remote

Dec	Hex	Button	Dec	Hex	Button
0	00	Mute	54	36	rename TAB
1	01	B	55	37	Acquire image
2	02	power	56	38	edit image
3	03	TV	57	39	Full screen
4	04	DVD	58	3A	DVD Audio
5	05	Photo	112	70	Cursor-left
6	06	Music	113	71	Cursor-right
7	07	Drag	114	72	Cursor-up
8	08	VOL-	115	73	Cursor-down
9	09	VOL+	116	74	Cursor-up-left
10	0A	MUTE	117	75	Cursor-up-right
11	0B	CHAN+	118	76	Cursor-down-right
12	0C	CHAN-	119	77	Cursor-down-left
13	0D	1	120	78	V
14	0E	2	121	79	V-End
15	0F	3	124	7C	X
16	10	4	125	7D	X-End
17	11	5			
18	12	6			
19	13	7			
20	14	8			
21	15	9			
22	16	txt			
23	17	0			
24	18	snapshot ESC			
25	19	DVD MENU			
26	1A	^			
27	1B	Setup			
28	1C	TV/RADIO			
29	1D	<			
30	1E	OK			
31	1F	>			
32	20	<-			
33	21	E			
34	22	v			
35	23	F			
36	24	Rewind			
37	25	Play			
38	26	Fast forward			
39	27	Record			
40	28	Stop			
41	29	Pause			
44	2C	TV			
45	2D	VCR			
46	2E	RADIO			
47	2F	TV Preview			
48	30	Channel list			
49	31	Video Desktop			
50	32	red			
51	33	green			
52	34	yellow			
53	35	blue			

7.2. Harrison address conversion to switch settings

The address used is converted to the address selected in the Harrison curtain motor using the table below.

switch	1	2	3	4		5	6	7	8
	H	H	H	H		X	X	X	X
A	0	1	1	0	1	0	0	0	0
B	0	1	1	1	2	0	0	0	1
C	0	1	0	0	3	0	0	1	0
D	0	1	0	1	4	0	0	1	1
E	1	0	0	0	5	0	1	0	0
F	1	0	0	1	6	0	1	0	1
G	1	0	1	0	7	0	1	1	0
H	1	0	1	1	8	0	1	1	1
I	1	1	1	0	9	1	0	0	0
J	1	1	1	1	10	1	0	0	1
K	1	1	0	0	11	1	0	1	0
L	1	1	0	1	12	1	0	1	1
M	0	0	0	0	13	1	1	0	0
N	0	0	0	1	14	1	1	0	1
O	0	0	1	0	15	1	1	1	0
P	0	0	1	1	16	1	1	1	1

H H H H = House code

X X X X = device code

Switch position in the motor:

Up = 1

Middle = not used!!!!

Down = 0

Examples:

If you assign the address E7 (1000 0110) to the curtain motor then set the switches to: 1=up, 2=down, 3=down, 4=down, 5=down, 6=up, 7=up, 8=down

If you assign the address A2 (0110 0001) to the curtain motor then set the switches to: 1=down, 2=up, 3=up, 4=down, 5=down, 6=down, 7=down, 8=up

7.3. Flamingo, AB400, IMPULS switch settings

Note that the HC (House Code A-P) is the house code used in programs and has no direct relation with the A,B,C,D,E buttons on the remotes!

	1	2	3	4		5	6	7	8	9	10		5	6	7	8	9	10	<== switches
HC=====					DC=====								DC=====						
A	0	0	0	0	1	0	0	0	0	0	0	33	0	0	0	0	0	0	1
B	0	0	0	1	2	0	0	0	1	0	0	34	0	0	0	1	0	0	1
C	0	0	1	0	3	0	0	1	0	0	0	35	0	0	1	0	0	0	1
D	0	0	1	1	4	0	0	1	1	0	0	36	0	0	1	1	0	0	1
E	0	1	0	0	5	0	1	0	0	0	0	37	0	1	0	0	0	0	1
F	0	1	0	1	6	0	1	0	1	0	0	38	0	1	0	1	0	0	1
G	0	1	1	0	7	0	1	1	0	0	0	39	0	1	1	0	0	0	1
H	0	1	1	1	8	0	1	1	1	0	0	40	0	1	1	1	0	0	1
I	1	0	0	0	9	1	0	0	0	0	0	41	1	0	0	0	0	0	1
J	1	0	0	1	10	1	0	0	1	0	0	42	1	0	0	1	0	0	1
K	1	0	1	0	11	1	0	1	0	0	0	43	1	0	1	0	0	0	1
L	1	0	1	1	12	1	0	1	1	0	0	44	1	0	1	1	0	0	1
M	1	1	0	0	13	1	1	0	0	0	0	45	1	1	0	0	0	0	1
N	1	1	0	1	14	1	1	0	1	0	0	46	1	1	0	1	0	0	1
O	1	1	1	0	15	1	1	1	0	0	0	47	1	1	1	0	0	0	1
P	1	1	1	1	16	1	1	1	1	0	0	48	1	1	1	1	0	0	1
					17	0	0	0	0	1	0	49	0	0	0	0	1	1	1
					18	0	0	0	1	1	0	50	0	0	0	1	1	1	1
					19	0	0	1	0	1	0	51	0	0	1	0	1	1	1
					20	0	0	1	1	1	0	52	0	0	1	1	1	1	1
					21	0	1	0	0	1	0	53	0	1	0	0	1	1	1
					22	0	1	0	1	1	0	54	0	1	0	1	1	1	1
					23	0	1	1	0	1	0	55	0	1	1	0	1	1	1
					24	0	1	1	1	1	0	56	0	1	1	1	1	1	1
					25	1	0	0	0	1	0	57	1	0	0	0	1	1	1
					26	1	0	0	1	1	0	58	1	0	0	1	1	1	1
					27	1	0	1	0	1	0	59	1	0	1	0	1	1	1
					28	1	0	1	1	1	0	60	1	0	1	1	1	1	1
					29	1	1	0	0	1	0	61	1	1	0	0	1	1	1
					30	1	1	0	1	1	0	62	1	1	0	1	1	1	1
					31	1	1	1	0	1	0	63	1	1	1	0	1	1	1
					32	1	1	1	1	1	0	64	1	1	1	1	1	1	1

Examples:

A1 0000000000

A15 0000111000

N2 1101000100

N11 1101101000

0 = switch off

1 = switch on

7.4. Phenix, IDK YC-4000S switch settings

Note that the HC (House Code A-P) is the house code used in programs and has no direct relation with the A,B,C,D,E buttons on the remotes!

HC	switch				DC	switch				
	1	2	3	4		5	A	B	C	D
=====										
A	0	0	0	0	1	0	0	0	0	0
B	0	0	0	1	2	0	0	0	1	0
C	0	0	1	0	3	0	0	1	0	0
D	0	0	1	1	4	0	0	1	1	0
E	0	1	0	0	5	0	1	0	0	0
F	0	1	0	1	6	0	1	0	1	0
G	0	1	1	0	7	0	1	1	0	0
H	0	1	1	1	8	0	1	1	1	0
I	1	0	0	0	9	1	0	0	0	0
J	1	0	0	1	10	1	0	0	1	0
K	1	0	1	0	11	1	0	1	0	0
L	1	0	1	1	12	1	0	1	1	0
M	1	1	0	0	13	1	1	0	0	0
N	1	1	0	1	14	1	1	0	1	0
O	1	1	1	0	15	1	1	1	0	0
P	1	1	1	1	16	1	1	1	1	0
					17	0	0	0	0	1
					18	0	0	0	1	1
					19	0	0	1	0	1
					20	0	0	1	1	1
					21	0	1	0	0	1
					22	0	1	0	1	1
					23	0	1	1	0	1
					24	0	1	1	1	1
					25	1	0	0	0	1
					26	1	0	0	1	1
					27	1	0	1	0	1
					28	1	0	1	1	1
					29	1	1	0	0	1
					30	1	1	0	1	1
					31	1	1	1	0	1
					32	1	1	1	1	1

8. EC Declaration of Conformity

EC Declaration of Conformity

RFSmartLink declares that the product:

RFXtrx

Brand: RFXCOM Type: RFXtrx433

conforms with the essential requirements and other relevant provisions of the following directives and complies with the following standards applied:

R&TTE Directive 99/5/EC	EN 300 220-1 V2.3.1 (2010-02)
	EN 300 220-2 V2.3.1 (2010-02)
Low-voltage Directive 2006/95/EC	IEC 60950-1 (2005-12)
EMC Directive 2004/108/EC	EN 301 489-1 V1.9.2 (2011-09)
	EN 301 489-3 V1.4.1 (2002-08)

A copy of the original can be obtained from sales@rfxcom.com

9. Warning:

RF signals are possible disturbed and it has not been justified for this equipment at uses in circumstances where life-threatening or dangerous situations are possible.

10. Copyright notice

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11. Revision history

Version 0.0 – August 18, 2011

Initial version.

Version 1.0 – October 30, 2011

RFXflash under Mono added.

Version 2.0 – December 30, 2011

Updated for the production version with FTDI USB chip

Version 2.1 – January 18, 2012

Link for ACM to serial port added in Linux instruction.

EC Declaration of Conformity added

Version 2.2 – February 8, 2012

Protocols overview added

Screen dumps updated

Version 2.3 – February 16, 2012

Novatys planned

Version 2.4 – February 25, 2012

General information updated

Version 2.5 – March 1, 2012

Chapter added how to run RFXmngn or RFXflash on Linux.

Version 2.6 – March 14, 2012

Code tables added

Cresta, UPM added

Version 2.7 – March 15, 2012

Flash procedure updated

Version 2.8 – March 31, 2012

Phenix table added

Version 2.9 – March 31, 2012

AB400 and Phenix address extended

Version 2.10 – April 16, 2012

Linux USB - tty configuration updated

Version 2.11 – May 14, 2012

List of supported protocols updated.

Version 2.12 – June 8, 2012

Chapter added how to run RFXmngn or RFXflash on Mac OS

Version 2.13 – July 15, 2012

List of supported protocols updated

Version 2.14 – August 4, 2012

List of enabled protocols influence added

RFXtrx315 added

Version 2.15 – August 18, 2012

Enabled protocols table changed

Version 2.16 – August 26, 2012

Rubicson stektermometer added

ATI Remote Wonder II added

Version 2.17 – August 28, 2012

Table “sensitivity influenced” updated

Version 2.18 – September 18, 2012

Chapter 2.3 updated: BlindsT0 disables all other protocols

Version 2.19 – September 25, 2012

RFXFlash version required changed to 4.0.0.0

Version 2.20 – September 28, 2012

RF range reduction guide added