RFXtrx433
USB RF transceiver
User guide

www.rfxcom.com

1. Table of Contents

2. RFXtrx433 RF transceiver general information

The RFXtrx433 transceiver is communicating over one USB port with the application.
The RFXtrx433 enters for 2 seconds the boot loader and after this it starts the receive/transmit firmware.
For developers, the communication protocols over USB are described in the SDK.

2.1. Supported protocols

It supports a number of RF protocols in flash memory so that it can easily be upgraded by the user.

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
Chacon 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
Digimax	Y	-
RTS10 / RFS10 / TLX1206	-	Y
HE105	-	Y
Mertik Maxitrol	Y	Y
X10 Ninja/Robocam	Y	Y
Cresta	Y	-
La Crosse, TX2, TX3, TX4, TX17	Y	-
TFA, TS34C	Y	-
UPM Esic, WT440H, WT450H	Y	-
Oregon 1.0, THR128,THR138,THC138	Y	-
Oregon 2.1 / Huger 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	Y	-
Oregon 3.0, THGR810,THGN800,WTGR800,PCR800,WTGR800,WGR800,UVN800	Y	-
Oregon BWR101/BWR102	Y	-
Oregon GR101	planned	-
OWL CM113, cent-a-meter, Electrisave	Y	-
OWL CM119 / CM160	Y	-
KD101 smoke detector	Y	Y
Harrison curtain	-	Y
ATI Remote Wonder	Y	Y
ATI Remote Wonder II	Y	Y
PC Remote	Y	Y
RFXSensor	Y	-
RFXMeter	Y	-

2.2. Home Automation software

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

2.3. Dimensions

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

2.4. 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.

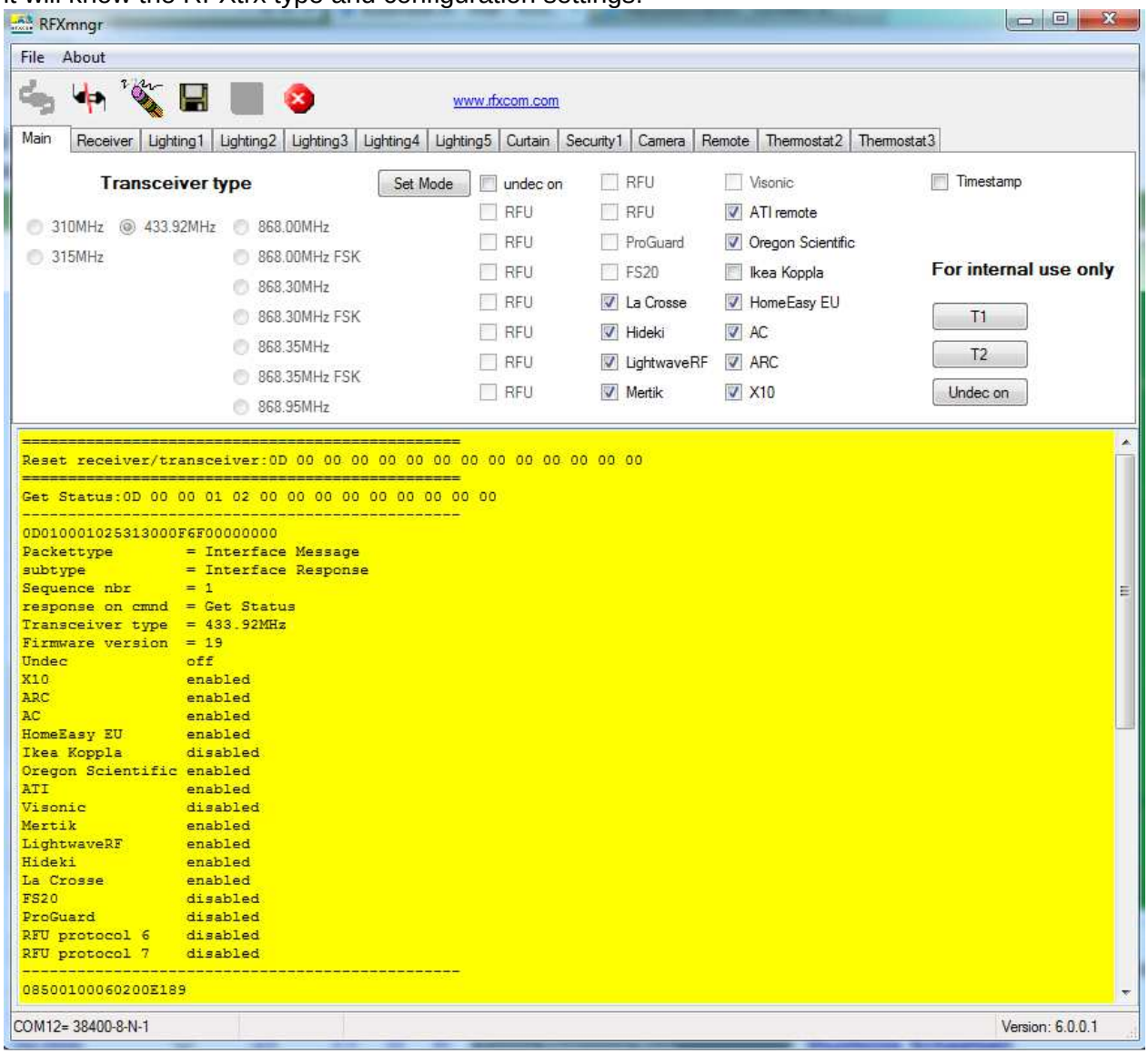
Launch the RFXflash.exe program.
[sudo] **mono RFXflash.exe**

OR

Launch the RFXmngr.exe program.
[sudo] **mono RFXmngr.exe**

5. RFXmngr test program

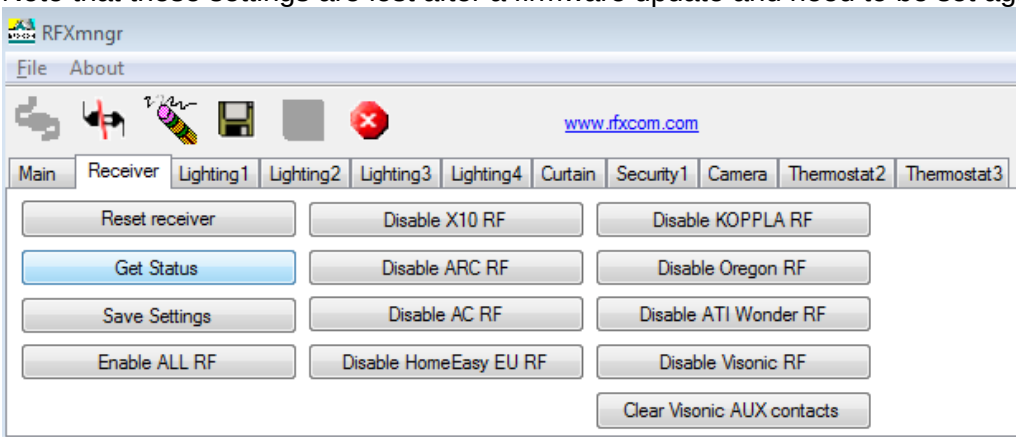
The RFXmngr program supports decoding of received data and allows you to transmit commands.
After the connection the RFXmngr program transmits a Reset and Get Status command so that it will know the RFXtrx type and configuration settings:



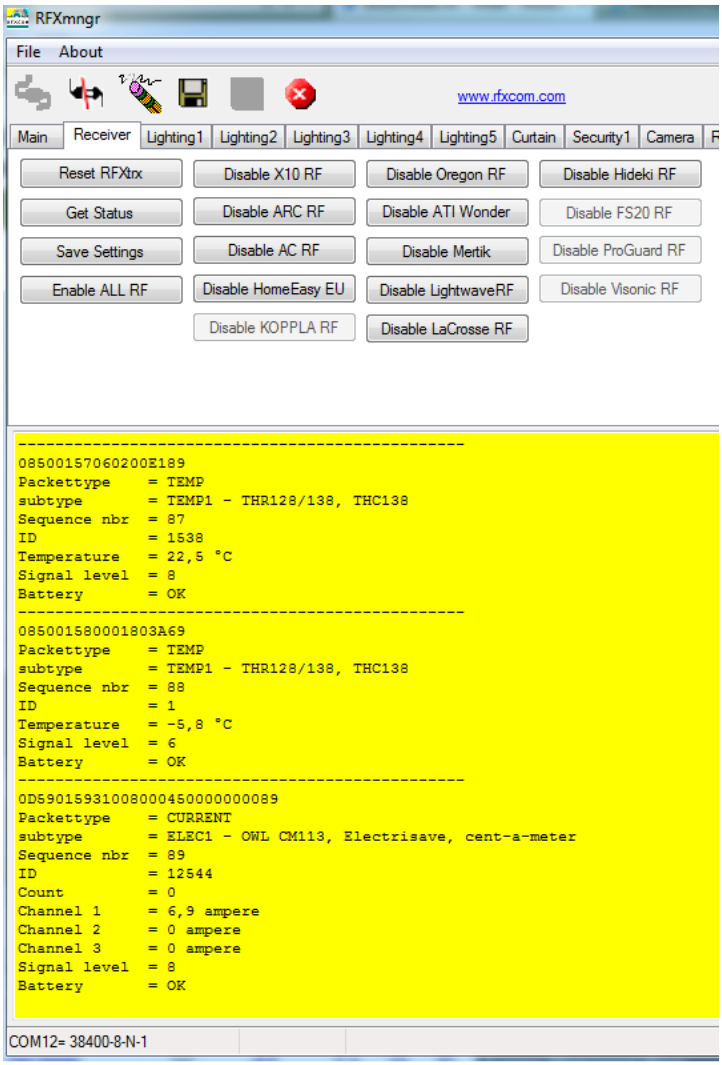
Transmitter protocols are always enabled but receiver protocols can be disabled. This is very useful because the receiver will become more sensitive when protocols not used are disabled. So select only the protocols to be used, click Set mode and on the Receiver tab click Save Settings. Note that these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

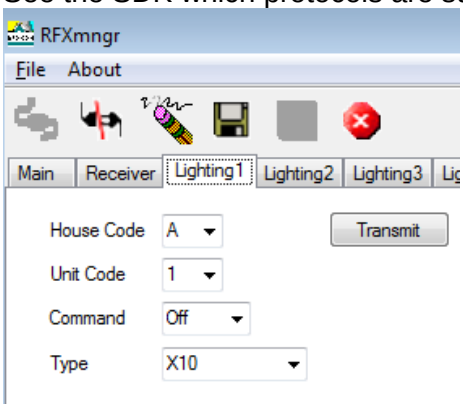


The received RF data is decoded and displayed in the yellow window.

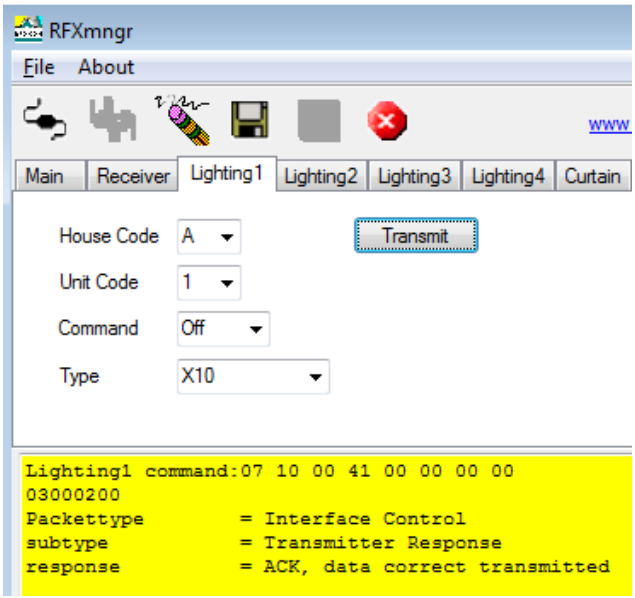


5.2. Transmitter

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 RFXtrx433

6.1. Update firmware in the RFXtrx433

Firmware is flashed in the RFXtrx433 using this procedure:

1. Download the latest 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 RFXtrx433
4. Start the RFXflash program (version 3.0.0.0 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 if finished without errors.

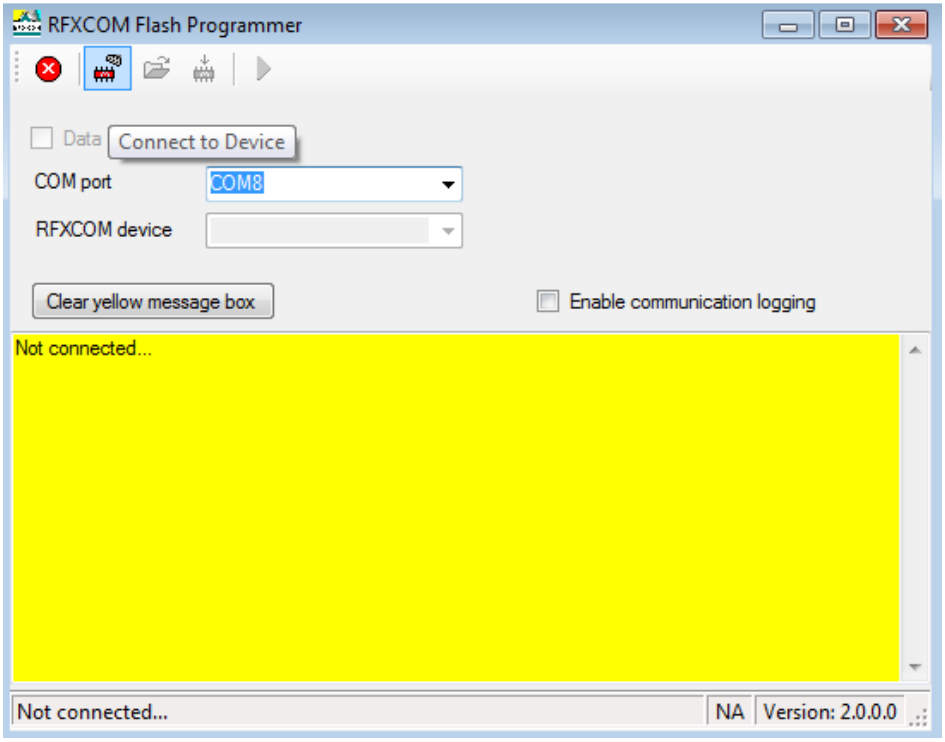
If the red LED does not switch on if you click the CONNECT button:

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.

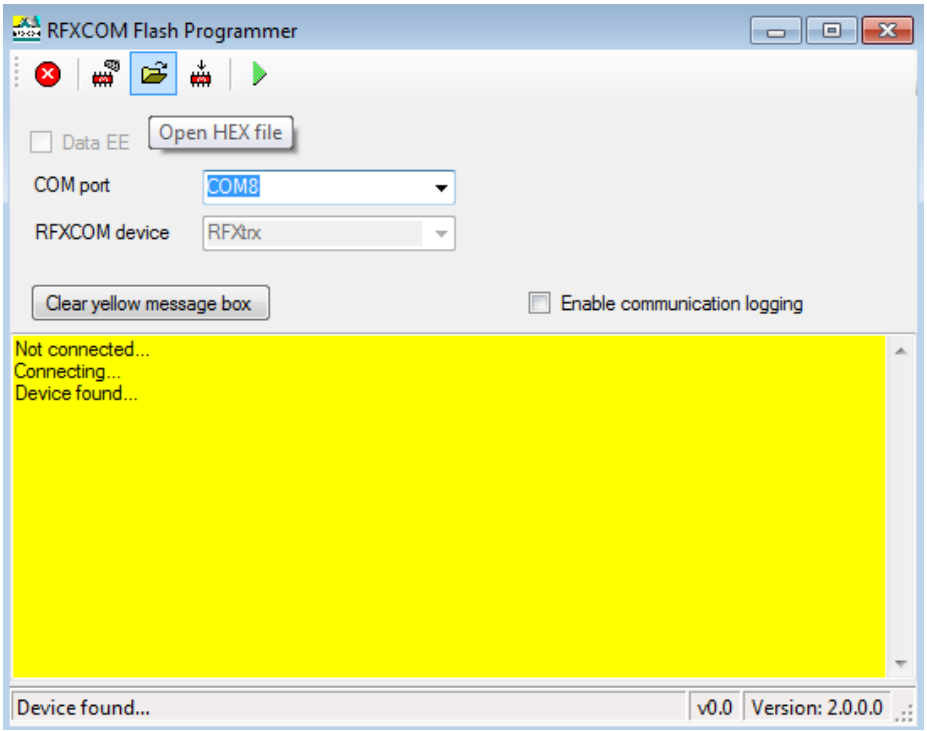
6.2. *Update firmware in the RFXtrx433 step by step*

- Click the Connect to Device button.

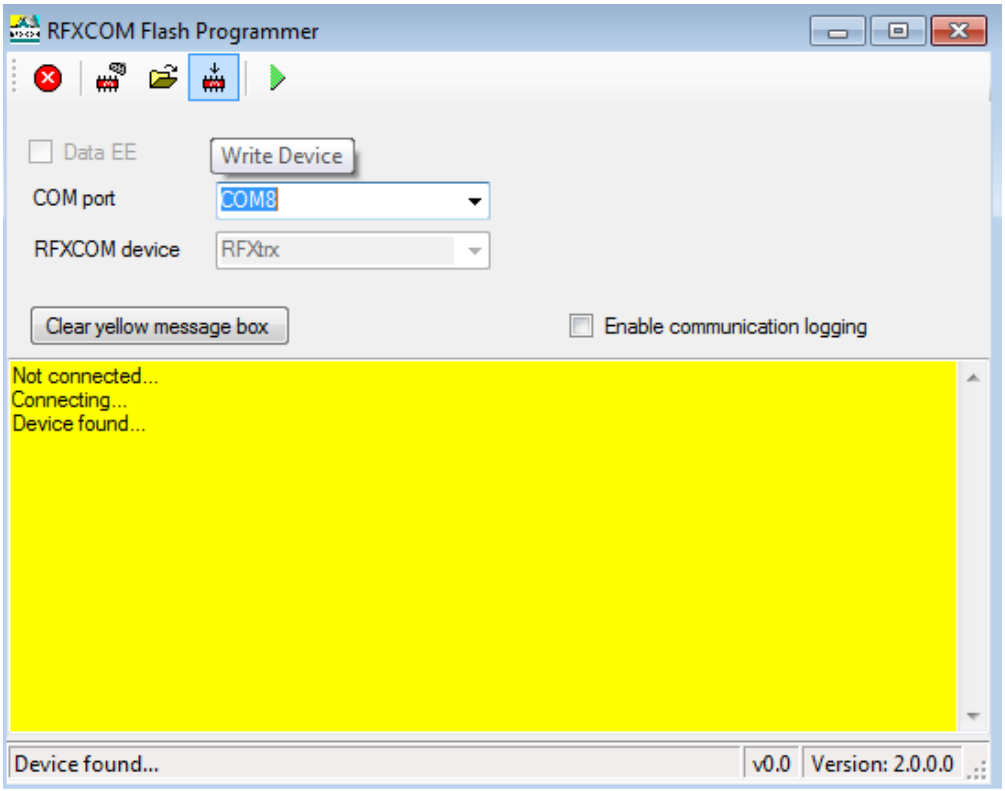


The RFXtrx433 will automatically switch from normal mode to the bootloader now.
If the bootloader is not entered see the next chapter “Force bootload”.

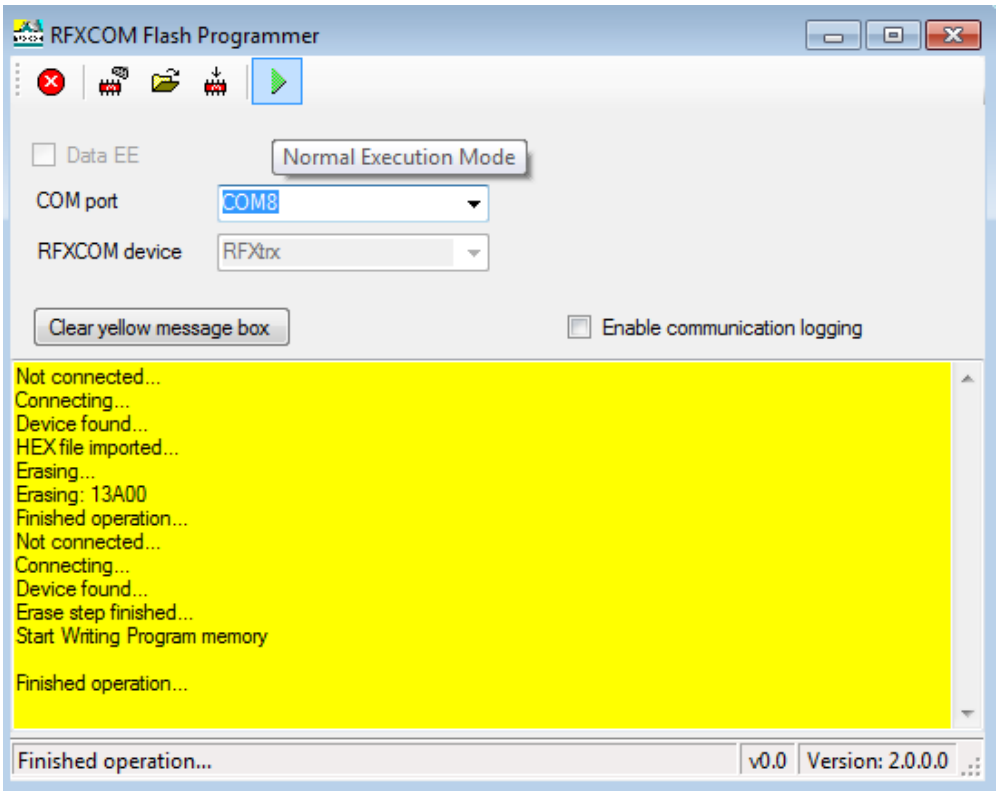
- Click the Open HEX file button and load the RFXtrx***yyy_xx***.hex file
Be sure to load the latest firmware file for the RFXtrx.
yyy indicates the RFXtrx frequency, so load the RFXtrx433 for an RFXtrx433!
xx indicates the firmware version.



- Click the Write device button and the RFXtrx433 is flashed.



- Click on the Normal Execution Mode button to set the RFXtrx433 to running mode.



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

7. 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
0	00	A
1	01	B
2	02	power
3	03	TV
4	04	DVD
5	05	?
6	06	Guide
7	07	Drag
8	08	VOL+
9	09	VOL-
10	0A	MUTE
11	0B	CHAN+
12	0C	CHAN-
13	0D	1
14	0E	2
15	0F	3
16	10	4
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
54	36	rename TAB
55	37	Acquire image
56	38	edit image
57	39	Full screen
58	3A	DVD Audio
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	V
121	79	V-End
124	7C	X
125	7D	X-End

7.1.3. ATI Remote Wonder Plus

Dec	Hex	Button
0	00	A
1	01	B
2	02	power
3	03	TV
4	04	DVD
5	05	?
6	06	Guide
7	07	Drag
8	08	VOL+
9	09	VOL-
10	0A	MUTE
11	0B	CHAN+
12	0C	CHAN-
13	0D	1
14	0E	2
15	0F	3
16	10	4
17	11	5
18	12	6
19	13	7
20	14	8
21	15	9
22	16	txt
23	17	0
24	18	Open Setup Menu
25	19	C
26	1A	^
27	1B	D
28	1C	FM
29	1D	<
30	1E	OK
31	1F	>
32	20	Max/Restore Window
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
42	2A	TV2
43	2B	Clock
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
54	36	rename TAB
55	37	Acquire image
56	38	edit image
57	39	Full screen
58	3A	DVD Audio
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 Button
121	79	V-End
124	7C	Right Mouse Button
125	7D	X-End

7.1.4. Medion Remote

Dec	Hex	Button
0	00	Mute
1	01	B
2	02	power
3	03	TV
4	04	DVD
5	05	Photo
6	06	Music
7	07	Drag
8	08	VOL-
9	09	VOL+
10	0A	MUTE
11	0B	CHAN+
12	0C	CHAN-
13	0D	1
14	0E	2
15	0F	3
16	10	4
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
54	36	rename TAB
55	37	Acquire image
56	38	edit image
57	39	Full screen
58	3A	DVD Audio
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	V
121	79	V-End
124	7C	X
125	7D	X-End

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

Examples:

A1	0 0 0 0 0 0 0 0 0 0
A15	0 0 0 0 1 1 1 0 0 0
N2	1 1 0 1 0 0 0 1 0 0
N11	1 1 0 1 1 0 1 0 0 0

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 1 2 3 4	DC	switch 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 CE

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

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 RFXmngr 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