

Manual to the Weather Satellite Receiver **R2FX**



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2m Receiver for APT Mode Satellites

Introduction

With the R2Fx you get a receiver which is designed for the reception APT signals from low-orbit weather satellites on the 137MHz band. This are e.g. those of the American NOAA series or the Russian Meteor and Okean satellites. In addition it is possible with a suitable converter to receive the geo-stationary satellites like Meteosat which transmits on 1.6GHz.

Wide IF filters and a highly linear demodulator provides optimal picture quality even with weak signals. The excellent receiver noise figure makes an additional pre-amplifier obsolete.

Thanks to the implemented scan mode it is easy to find up the satellites even with no access to a satellite tracking software.

A novelty that no other low-cost Sat-receiver can provide is it's antenna diversity capability. This gives pictures without any signal drops during the whole pass even with simple antennas.

Safety precautions

The receiver complies to the national and European requirements for electromagnetic compatibility. The reception of weather transmissions in the EC is free for everybody.

Technical modifications of the receiver by the user causes loss of guarantee. There is no liability against damage of the receiver which is due to disregard of this manual. Also there is no liability for incidental or indirect damages arising from that.

Please supply the receiver only with well filtered DC voltage between 5 and 12 Volts. Voltages which exceed this value even for a short time can damage the device seriously. Find below further information for power supply.

Included items

- 2m-receiver R2Fx
- AC Mains adapter
- 3,5mm connector
- Manual

Preparing for use

Supply the receiver only from the enclosed AC adapter or from the 5V supply of the PC. The power supply cable shall be plugged into the connector which is labeled with **DC**. Watch the polarity if you use another cable than that of the original AC adapter. The R2Fx does not have a power switch. It is on if you attach the power. In that case at least on of the LEDs on the front is on.

Connection to a PC or hardware demodulator

The receiver provides an audio signal of approximately 500mV_{RMS}. To get a picture out of this signal it must be demodulated. In general this is done by the PC. The receiver is either connected to the sound card or to an external hardware demodulator which is connected to the serial interface of the PC if the computer itself does not have an audio interface. Suitable external demodulators are e.g. Harifax 3 or the HamCom interface.

With a build-in audio interface things becomes really easy. You connect the 3.5mm connector of the receiver to the line input of the sound card. You can use mono or stereo connectors. In the latter case the signal comes out only at the center pin. The sound card of the PC in most cases has the same connector so that a one-to-one cable fits best.

The receiver output is compatible to all yet know sound cards or hardware demodulators. For further information how to connect this devices refer to the specific manuals.

Meanwhile there is plenty of public domain and shareware software available which supports APT reception.

Connection of an antenna

The receiver has two 50Ω BNC connector for the antenna. Since the satellites are working in the 2m-Band in principal all 2m-antennas are suitable. The satellites are in a relatively low orbit therefore they normally have strong signals. This means that you don't need a directional antenna. The best solution is an omni-directional antenna. This makes tracking superfluous.

However due to multi path propagation of the satellite RF (e.g. reflections from walls or hills) there often are drop outs on the signal which can be seen as annoying noisy stripes on the picture. With the diversity circuit the receiver selects automatically on which of both antenna inputs the signal quality ist better. So if you connect two antennas e.g. a vertical and a horizontal dipol it is very likely that you don't get any signal drop-out during the whole pass. The two LEDs marked with A1 and A2 show which of the antennas is currently in use.

A certain attention should be spend on the feed line to the antenna. The cable shall not be too thin and too long. For distances up to 20m R58 is fine. Up to 60m RG213 can be used. For longer distances an additional pre-amplifier directly mounted at the antenna could be necessary. DC supply of a remote amplifier is supported by the receiver. Please ask by e-mail for details.

How to select the frequency

The receiver includes 6 memory channels. Channels 1 to 4 are pre-programmed with the currently used satellite frequencies. Channels 5 and 6 are provided for operation with 1.6GHz converters for geo-stationary satellites. Please see the table for the channel allocation. The same data you find on a sticker on the lower cover or the receiver.

- Channel 1: 137,300 MHz
- Channel 2: 137,400 MHz
- Channel 3: 137,500 MHz
- Channel 4: 137,625 MHz
- Channel 5: 137,850 MHz
- Channel 6: 134,000 MHz

It is possible to re-program the channels. Please send an e-mail if you are interested in further information.

By pressing the key labeled **SELECT** you can proceed cyclically from one channel to the next. For each channel there is a correponding LED on the front plate.

If you press the key for more than 2 seconds the receiver starts cyclically to scan the channels 1 to 5. If there is a sufficiently strong signal it remains on that channel. If the signal vanishes the scan mode is resumed after a latency time of 5 seconds.

Display of the signal strength

On the front cover you see four green LEDs which indicate the strength of the received signal. The table shows the relation between RF input power and the numbers of active LEDs. As soon as the first LED is on the scanning stops. This signal strength is sufficient then for the most decoders to provide pictures in good quality. As soon if the signal is strong enough to activate the second LED the picture is practically free of noise.

LEDs	RF input power	RF input voltage
1	-120 dBm	0,22 μ V
2	-110 dBm	0,71 μ V
3	-100 dBm	2,2 μ V
4	-90 dBm	7,1 μ V

Power supply from the PC

Sometimes it is impractical to supply the receiver from the AC adapter. In this cases it is possible to obtain the DC supply from the PC provided that it has a game port or a Midi interface. This is the case at nearly all sound cards. You need a two wire cable which on one side has a 2.1mm DC plug and on the other a 15-pin Sub-D connector. See the table how to connect the wires:

Polarity	DC connector	Midi/Game-Port
Plus	Center conductor	Pin 1
Minus	Outer conductor	Pin 4, 5 and 8

Technical data

Frequency range	134 ... 139 MHz
Channel spacing	10kHz
IF bandwidth	30kHz
Number of channels	total 6, 5 of them scanable
Sensitivity	0,22 μ V at 20dB S/S+N (SINAD/CCITT)
Distortion at 1kHz AF	1%
AFC-pulling range	\pm 10kHz
Supply voltage	5 – 12V, 50mA
Size	113x85x31mm

User interface	Key for channel selection LEDs for signal strength LEDs for channel display LEDs for antenna switch
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Connectors	Antenna (50 Ω ,BNC) AF-Output (500mV _{rms} , 600 Ω) Power supply
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E-mail address: df2fq@amsat.org , internet page: www.df2fq.de (currently in German only)