

General questions and problems

What power supply do I need?

You need a stabilized 12V, 1A power supply. It must be stabilized since the end stage of the modulator is powered directly by the supply. Total current for the modulator, encoder and baseband board is circa 500 mA, but startup current can be more.

Do I have to connect a display and keys?

No, the D-ATV transmitter can also work without LCD and keyboard.

Picture related

The quality of the digital picture is not perfect!

The compressed picture can never be better than the original input signal. Compression always causes artifacts and loss of information. But, because the transmit path is 'lossless', even with signal to noise ratios of 10 dB and worse, the picture quality is constant and independent of transmit path quality. This is due to the heavy error detection and correction.

Why do I see many MPEG artifacts with a noisy input source?

It is extremely difficult to compress a noisy picture with MPEG. Use the noise filter to reduce noise before compression and/or lower the resolution.

The average noise filter filters heavier, the median filter is more subtle. For lower bitrates (under 3 Mbit/sec) it is recommend using one of the noise filters.

Which 'scan type' should I use?

The 'scan type' is the way the DCT coefficients are scanned. Alternate is more suited for interlaced pictures (like camera and TV pictures). Zig zag scan is better for progressive (non-interlaced) scanned pictures.

For SIF mode zigzag is recommended, since the SIF mode only uses odd fields of the picture and thus are always progressive!

Which resolution is recommended for which bitrate?

It depends on your own requirements! High resolutions at low bitrates give a sharper picture but more movement artifacts. As a rule of thumb:

D1 (720x576)	4-10 Mbit/sec
2/3 D1 (480x576)	3-5 Mbit/sec
1/2 D1 (356x576)	2-4 Mbit/sec
SIF (356x288)	1-2 Mbit/sec

What can I do against radar interference?

Radar and other non-continuous interference can cause large picture errors which will remain for several 100's of milliseconds. By using shorter GOP's (e.g. 3..6), more 'I frames' will be transmitted, this enables faster restoring of the distorted picture.

The received picture is sometimes black and white!

This is because the MPEG encoder clock 'locks' on the video source at its input. The decoder clock on its turn locks to the encoder clock, and the decoder clock is also used to recover the color carrier.

When the encoder is unable to lock properly, e.g. when you switch between video sources, apply unstable (noisy) video or non-standard video (game consoles), the decoder clock, and thus the color carrier frequency, will also drift away.

My Nokia 9500 receiver gives heavy movement artifacts!

The 'good old' Nokia Mediamaster 9500 can give picture errors when receiving the D-ATV.COM transmitter. This occurs when the picture changes (e.g. due to abrupt camera movements). This effect seems to be caused by a decoder incompatibility bug in the Nokia since we saw exactly the same effect on an Eutelsat transponder (the 'Stream' network). The error is never seen on any other MPEG decoder or DVB-S receiver.

My Nokia 9500 receiver gives no picture at all!

Depending on the software version you're using ('Dr Overflow'...), this receiver could 'hang'!

Especially after applying noisy or distorted signals it often happens that no picture and/or sound comes out. Sometimes it helps when you 'hop' between the channels. In extreme cases you need to unplug the mains cord!

Modulator and RF related

What is the 'symbol rate' and what can I do with it?

The 'symbol rate' is the number of transmitted I/Q pairs. An I/Q pair contains 2 bits of information in the case for DVB-S. A higher symbol rate means more transmitted data and more RF bandwidth. As a rule of thumb, the occupied RF bandwidth is approx. $1.4 * \text{the symbol rate}$.

What is the 'FEC' and what can I do with it?

The FEC or forward error correction setting enables you to find a compromise between signal to noise ratio and bitrate.

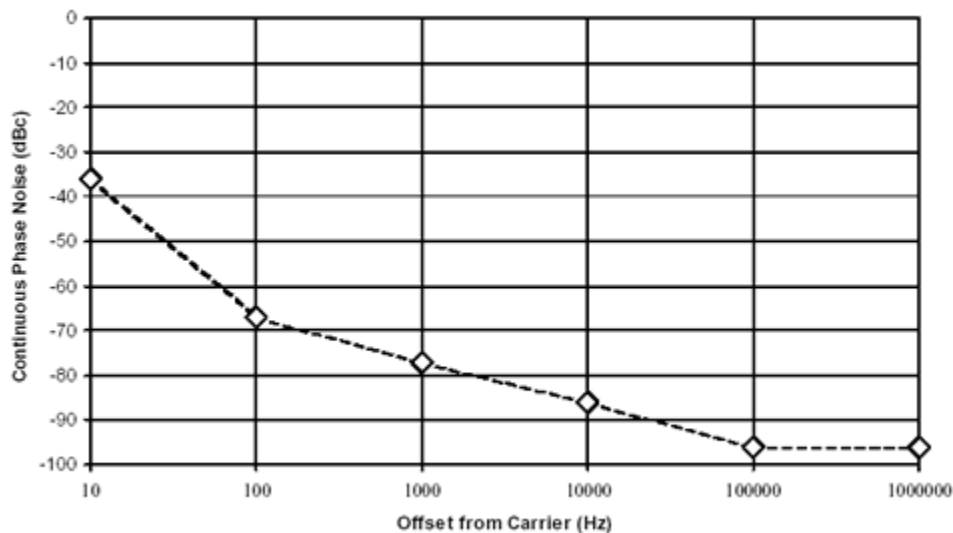
Changing the FEC has no influence on the RF bandwidth, but changes the ratio between useful (video/audio) data and error correction data.

If you set the FEC to 1/2, about 54% of the transmitted data is used for error correction. This enables the receiver to recover very noisy signals, but leaves not much bits for the picture and audio.

I have plenty RF power but the receiver won't lock

If your power amplifier is non-linear you produce a bad spectrum and lots of inter-symbol interference, causing receiving problems. Also take care for RF feedback to the modulator, it can be sensitive for that!

Note that receive converters (e.g. for 13cm) can also add lots of noise to the signal! The local oscillator of the converter must have low phase noise! Preferably the phase noise plot of a converter LO should be as following:



Digital receivers need signals with a correct input level, optimal is -60 .. -30 dBm, so take care that your pre-amplifiers and converters have enough gain.

Does the output power depend on the symbol rate?

The output power is within +/- 0.15dB for all symbol rates!

System Information tables

Do I get more power when I change these funny 'ID' numbers?

No! These funny ID numbers have no relation with output power! These ID's are related to DVB-SI and can cause problems if you mess them up. If you don't know what you're doing, leave them on their default values!

More explanation will follow later...