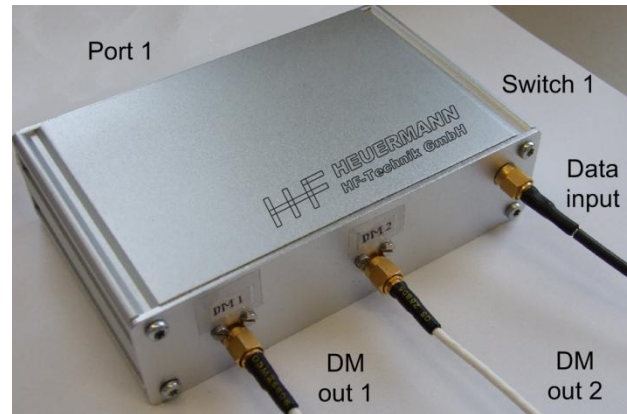


# OEM Unidirectional Data Radio Modem

## "miniTrans 2401"

### Features

- High speed data transfer modem
- Transfer rate of up to 25 MBit/s
- ECL or TTL compatible output
- Wide band spectrum spreading
- Internal noise source integrated
- Port for external spreading code
- Robust data link
- Resistant against small band jamming and fading
- Tap-proof link
- 20 dBm RF power
- 800 m outdoor range



miniTrans 2401 transmitter unit

### Application

OEM wired/radio modem replacement for data rates of up to 25 MBit/s for a point to point data transfer (comparable to OFDM systems) with digital input and digital output.

Systems in development for broadcast and/or mobile applications

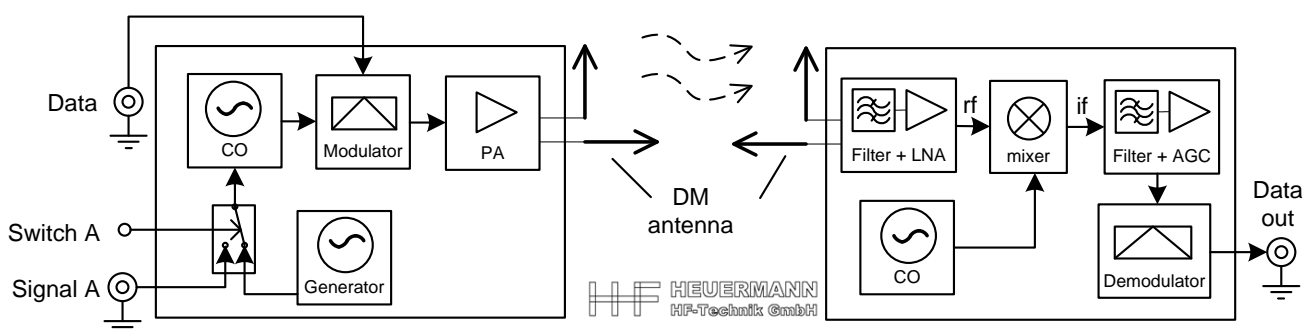


Fig 1: Functional block diagram of the miniTrans 2401 radio system

### Product description

The miniTrans 2401, consisting of a transmitter and a receiver unit, is a unidirectional high speed data modem applicable for data rates of up to 25MBit/s. With its unique, true differential modulation (so called dual mode radio, DM-Radio), the system provides the benefits of an orthogonal frequency-division multiplexing (OFDM) system with a single carrier and can be used to replace the corresponding hardware.

Due to the system architecture and the implemented modulation scheme, practically all spread spectrum signals can be implemented externally (port 1) alternative to the internal *noise* source. Using the internal noise source leads to a spectral spreading of approximately 25 MHz, providing furthermore a tap-proof radio link.

The system can be delivered with either a compact dualfeed patch antenna or a quasi turnstile Yagi antenna for more range or a better link reliability.

## Specifications

Parameter	Min	Typ	Max	Unit	Remarks
Carrier frequency	2.42	2.45	2.46	GHz	ISM frequency band
Output power			20	dBm	Corresponding to ISM specification
Bandwidth	30		60	MHz	Dependent on the data rate and applied spectrum spreading
Supply voltage	4.5		15	V	Transmitter and receiver unit
Current consumption			350	mA	Transmitter and receiver unit

## Physical properties

Data interface: RJ45, SMA or BNC (other interfaces on request)  
 Height x width x depth: 30 x 130 x 80 (mm<sup>3</sup>)  
 Weight: 750 g

## Application circuit

The miniTrans 2401 consists of a transmitter unit and a receiver unit and can be used, similar to an OFDM system, to transmit data with a rate of up to 25 MBit/s in a point to point setup. Unlike OFDM systems, based on the patented Dual Mode Radio implemented, the miniTrans 2401 carrier uses a single carrier. The true differential modulation scheme enables a wide band spectrum spreading, making the radio link highly robust against small banded jamming signals and fading.

The transmitter unit offers a data interface for digital data input and two SMA output ports to be connected to the DM antenna. The unit has an integrated noise generator going up to over 10 MHz, which can be used to achieve a spectrum spreading of the carrier with a 25 MHz bandwidth. Using this noise generator leads to tap-proof radio link. The unit can switch to an external signal generator to realize the spectrum spreading. Omitting the external source at this switch position turns off the spread spectrum functionality.

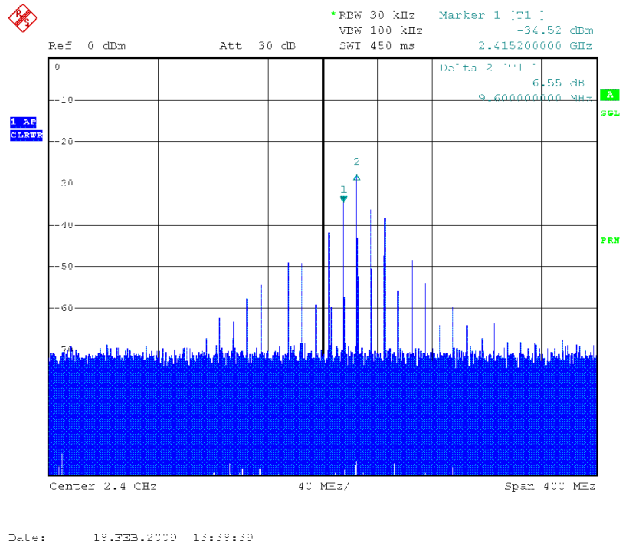
The receiver unit is realized similar to the transmitter unit and offers two SMA ports for the DM antenna connection as well as a digital data interface.

The system is offered with either a compact dual feed patch antenna with a gain of over 6 dBi or alternatively a turnstile Yagi construction with a gain of 12 dBi. The maximum available range is achieved with the latter antenna

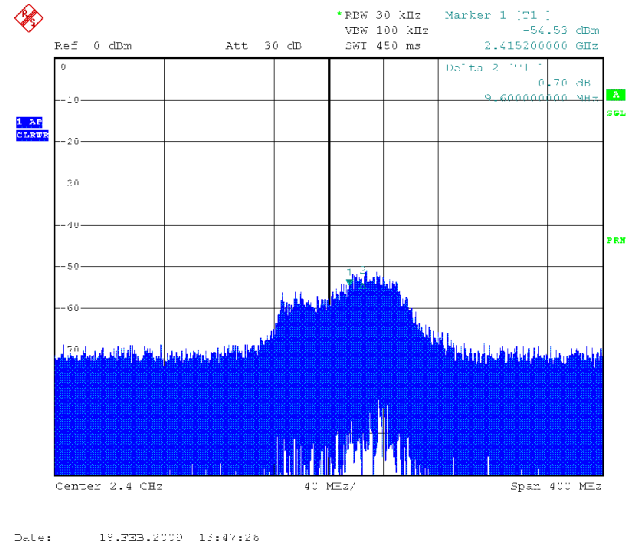
It is recommended to implement the miniTrans 2401 radio system as an OEM modem, supporting its functionality with a data transmit protocol to enhance the system performance regarding the bit error rate.

## Typical performance

The impact of the spread spectrum functionality on the transmitted spectrum is demonstrated in Fig. 2 and Fig. 3, where a 10 MBit/s clock signal has been measured at a distance of about 2 m with the integrated noise source switched off and on respectively. This leads to a reduction in the peak output power by about 20 dB and a spectrum spreading to about 40 MHz.



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Fig. 2: Spectral measurement of a 10 MBit/s clock signal prior to spectrum spreading

Fig. 3: Spectral measurement of a 10 MBit/s clock signal with integrated noise generator

The corresponding time domain measurements for a 10 MBit/s and a 25 MBit/s clock signals are presented in Fig. 4 and Fig. 5 respectively. The clear and open observable "eyes" provide the basis for the following digitalization of the signal using a comparator.

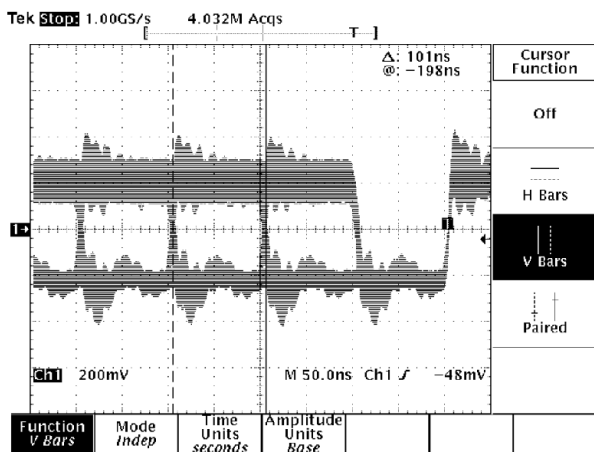


Fig. 4: Time domain measurement of a 10 MBit/s clock signal with spectrum spreading

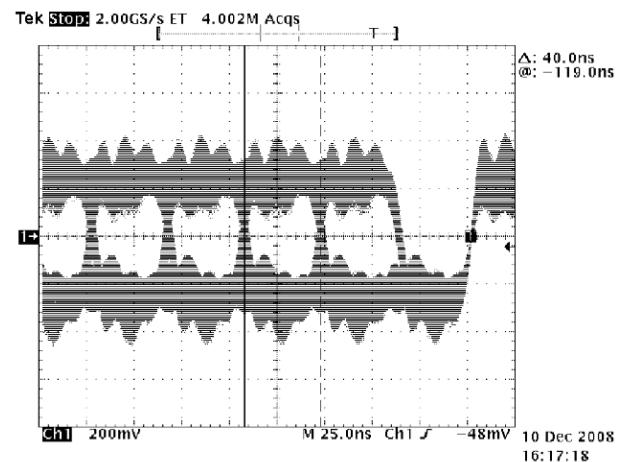


Fig. 5: Time domain measurement of a 25 MBit/s clock signal with spectrum spreading

## Ongoing developments

The major developments in progress include major improvement in the maximal data rate and system range. Furthermore, a new modulation scheme is being tested, aiming to enable a broadcast and providing the system benefits for mobile applications.

## Ordering number

Model: miniTrans 2041

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