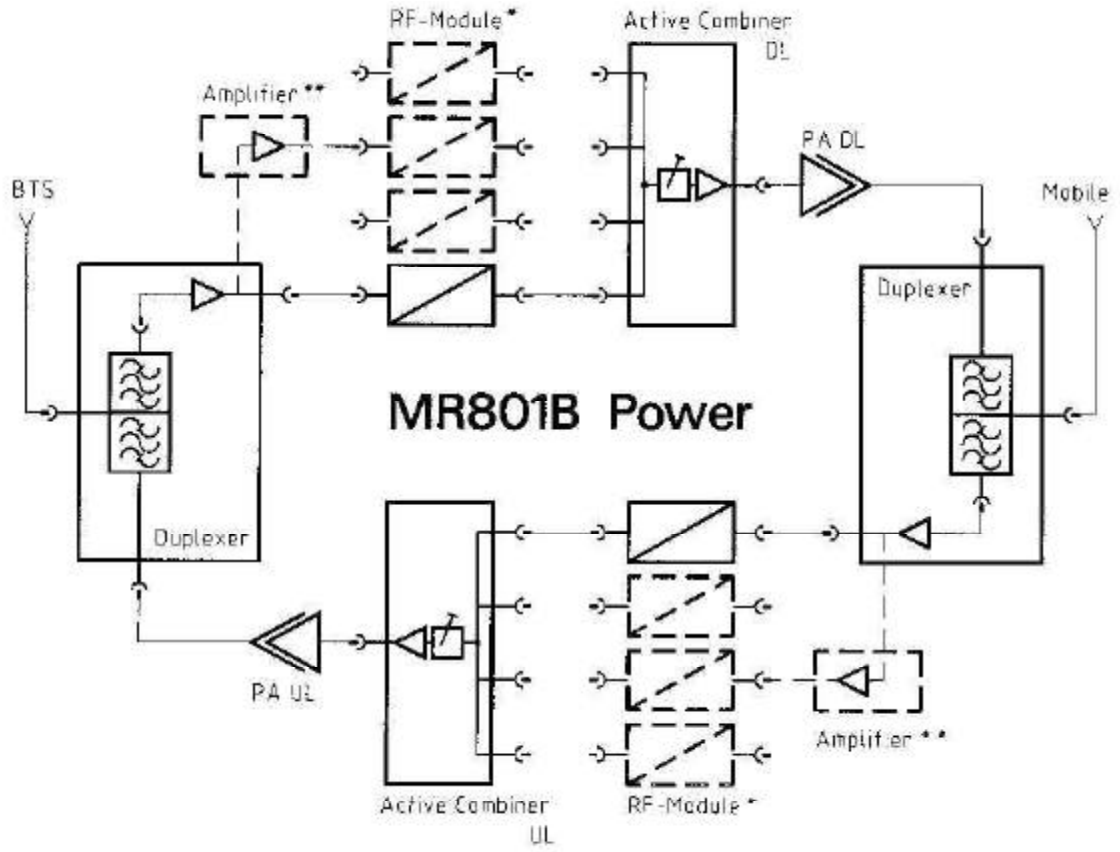
2 Functional description

The Repeater MR801B Power can be equipped from one to four bands or channels.

The following block diagram shall illustrate the configuration of the system.



*: one physical module contains UL and DL
**: with more than two channels, the amplifiers are included; both are in one housing

figure 2-1 Block diagram of MR801B Power

2.1 General

The Repeater consists of two amplifier chains, which are connected antiparallel. The receive path of one direction is connected to the transmit path of the other direction by a frequency separation unit, in the following denominated as a duplexer, which combines both signals to an antenna (See chapter 2.5).

After the duplexer the signals get to a pre-amplifier and afterwards to an RF module (See chapter 2.2). Then the signals are combined by the active combiner (See chapter 2.6) and afterwards amplified by the feed forward amplifier (See chapter 2.9), which provides the required output power.

After the final amplifier a power detection measures the output power and controls the gain. This is called Automatic Level Control (ALC) and keeps intermodulations below an adjustable value. Finally, the signals are fed to the built-in antenna of the Repeater.

2.2 RF modules

The task of the RF modules is to amplify the receive signals and to convert them into an intermediate frequency. The signals, then, proceed a filter stage comprising of highly selective filters, and run through a digital controllable attenuator. The attenuation can be set in steps of 2 dB, locally or remotely. By using the same synthesizer frequency, that was used to convert the signals down to intermediate frequency, the intermediate frequency is mixed up to the original frequency.

The synthesizer is controlled via an I²C-Bus. In case of a breakdown in mains, gain and frequency data are non-volatile stored in an EEPROM on board.

See figure 2-2 Top view of an RF module for an exemplary channel or band module.

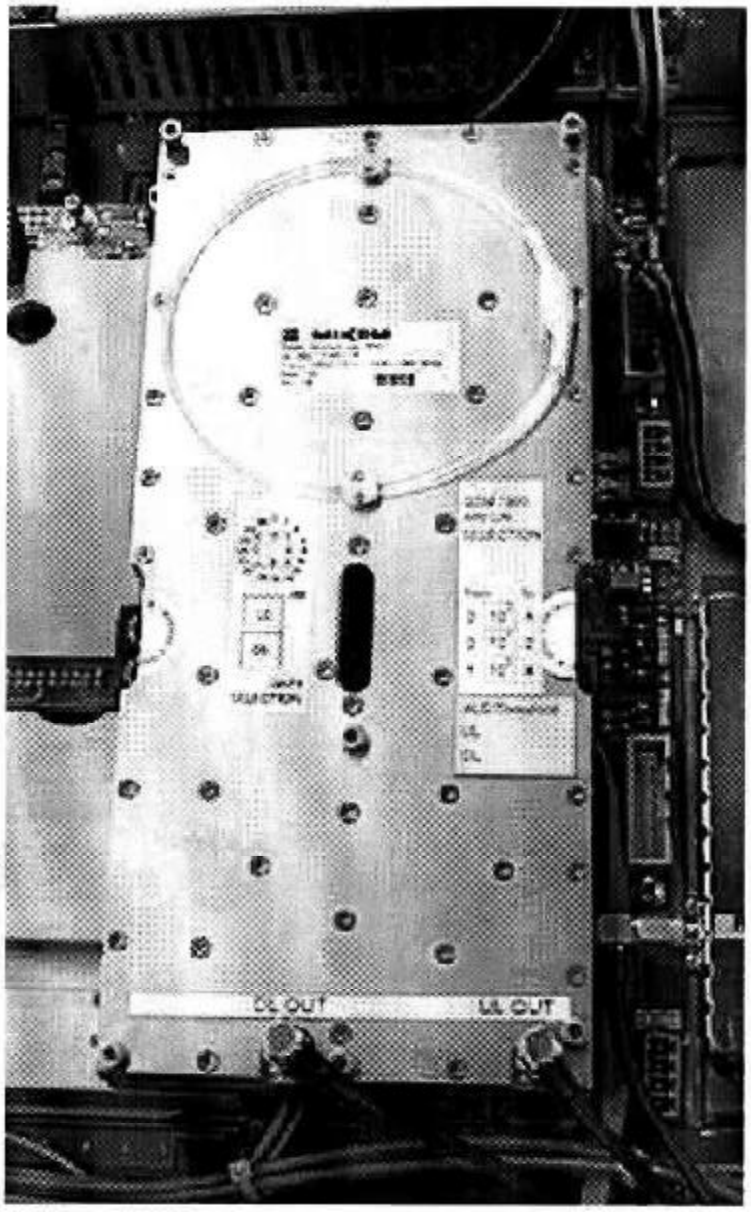


figure 2-2 Top view of an RF module

2.3 Mother board

The function of the mother board is the communication between the RF modules and the control module via the I²C-Bus.

In the three and four channel configuration of the Repeater there is a mother board on the left and on the right side, whereas in the one and two channel configuration there is only one mother board implemented on the right side of the Repeater.

Mother boards are located underneath the RF modules.

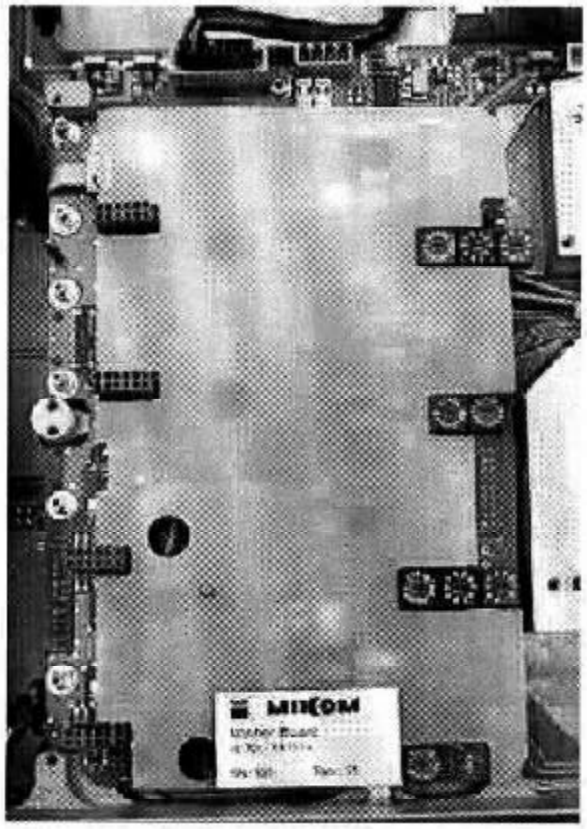


figure 2-3 Top view of a mother board

2.4 Control module SM 2009

The control module SM 2009 is a DOS compatible micro computer. The whole communication between the operator and the Repeater can be done via the control module. By using either the RS232 interface in connection with a modem card and a mobile the Repeater can be controlled remotely or locally by using a VT100 terminal, i.e. a PC emulating the VT100 terminal.

Frequency and gain, power down of RF stages and ALC can be controlled and status messages can be received remotely. In case a modem or a mobile is connected, automatic alarm messages can be received.

The data transfer between the control module SM 2009 and the mother board is realized by the I²C-Bus system.

The I²C-Bus concept was developed by Philips for the serial connection of integrated circuits within one device. Two wires, SDA - serial data and SCL - serial clock, carry information between the devices connected to the bus. Each device is recognized by a unique address and can operate either as transmitter or receiver.

All MR801B Power configuration parameters are stored in an EEPROM on the control module if a power supply failure occurs.

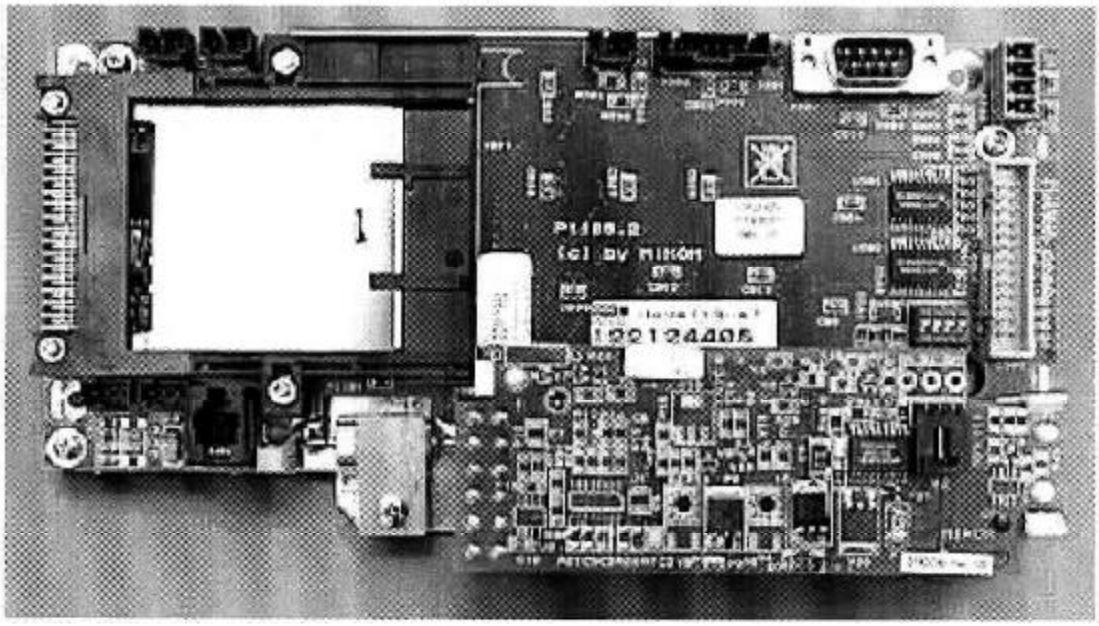


figure 2-4 Top view of the control module

2.5 Duplexer

The task of the duplexer is to isolate uplink from downlink, i.e. isolate transmit path from receive path. The pass bandwidth of the duplexer is the entire width of the uplink band and the downlink band.

UL frequency	DL frequency
824 - 849 MHz	869 - 894 MHz

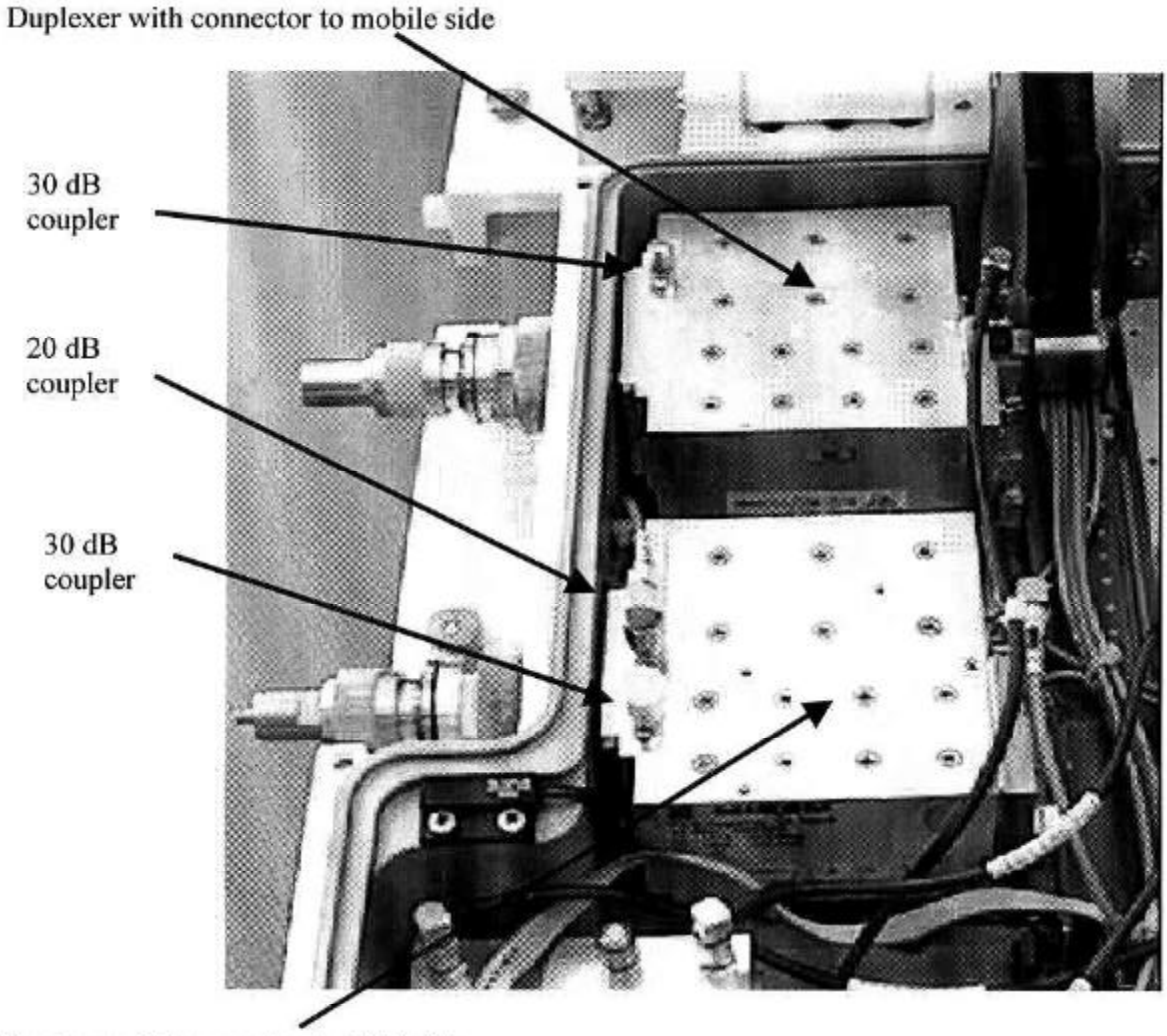


figure 2-5 Top view of the duplexers

2.6 Active combiner

After passing through the RF modules, the signals will be combined by the active combiner module in the UL and in the DL path. The active combiner will be followed by the feed forward amplifier.

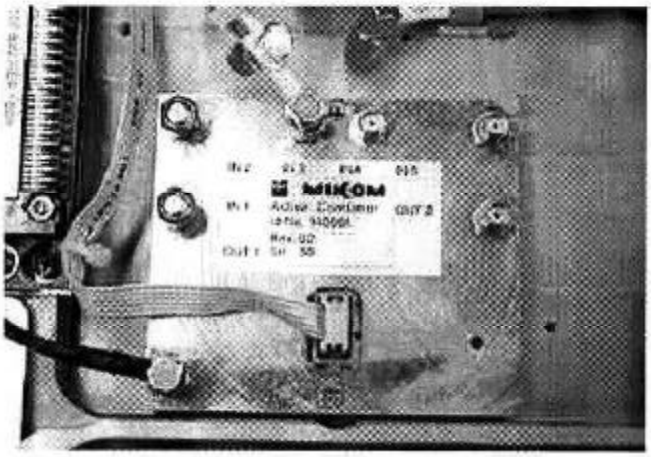


figure 2-6 Top view of the active combiner module

2.7 Measuring aids

With built-in RF probes test signals can be applied or detected. The probes provide a coupling factor of 30 dB respectivly 20 dB. Each duplexer (uplink and downlink) is equipped with one 30 dB coupler, the UL Input duplexer additionally with a 20 dB coupler for a modem or mobile (See chapter 4 Optional equipment). This facilitates measurements under all operational conditions, while an antenna or a dummy load may be connected.

The position of the couplers on the duplexers is shown in figure 2-5 Top view of the duplexers.

2.8 Power supply

For the MR801B Power four power supplies are necessary.
Power supplies are available with different mains power. See list below for available power supplies.

- 115 VAC ± 15% / 40 - 65 Hz
- 230 VAC ± 15% / 40 - 65 Hz
- 185 - 320 VAC / 40 - 65 Hz
- 24 VDC
- 42 to 60 VDC
- 80 to 130 VDC

The following figure shows the mounting position of the power supplies in the MR801B Power cabinet.

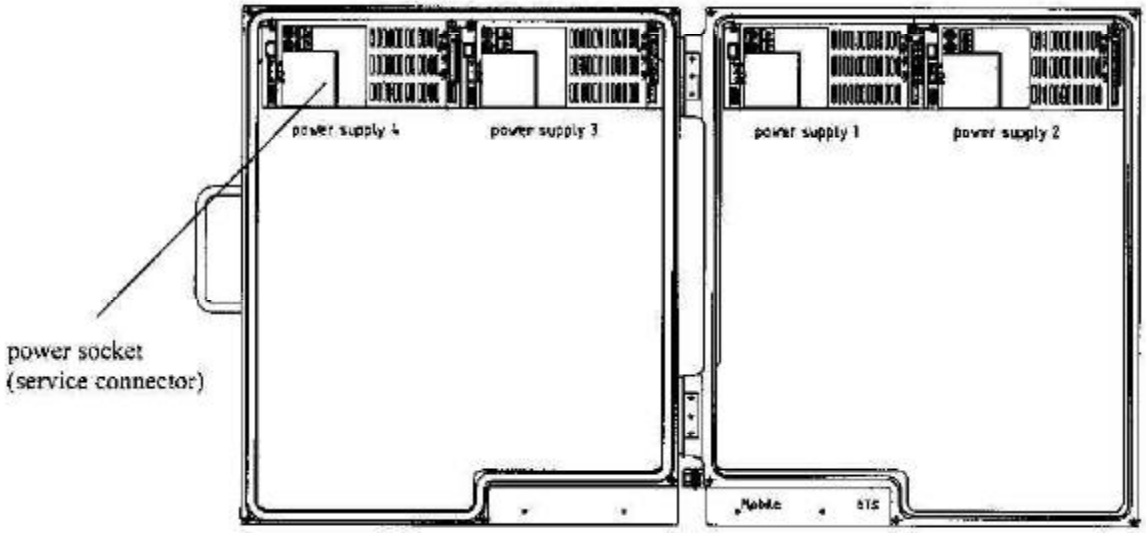


figure 2-7 Mounting position of power supplies

Each power supply is equipped with a power socket, protected with two fuses. Each power supply can be switched on or off by means of an external switch. The modules of the Repeater are voltage free if all power supplies are switched off. The power socket, however, is still provided with mains power.

See figure 2-8 ON / OFF position of external switch.

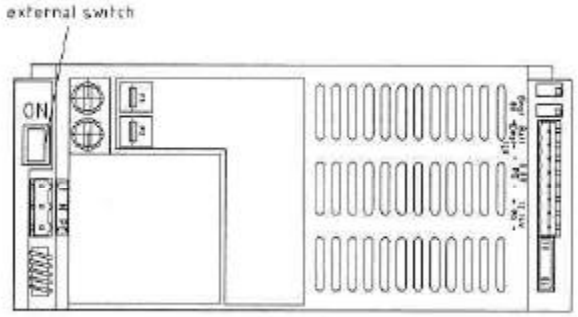


figure 2-8 ON / OFF position of external switch

☞ **Note:** **To switch the whole Repeater voltage free, you have to remove the fuses F1 and F2 on the screw terminal.**

The power supply is factory-set.

2.9 Feed forward amplifier

The feed forward amplifier is the final stage which enables high output power as well as a high ICP3. One amplifier has to be installed for each path, the uplink and downlink.

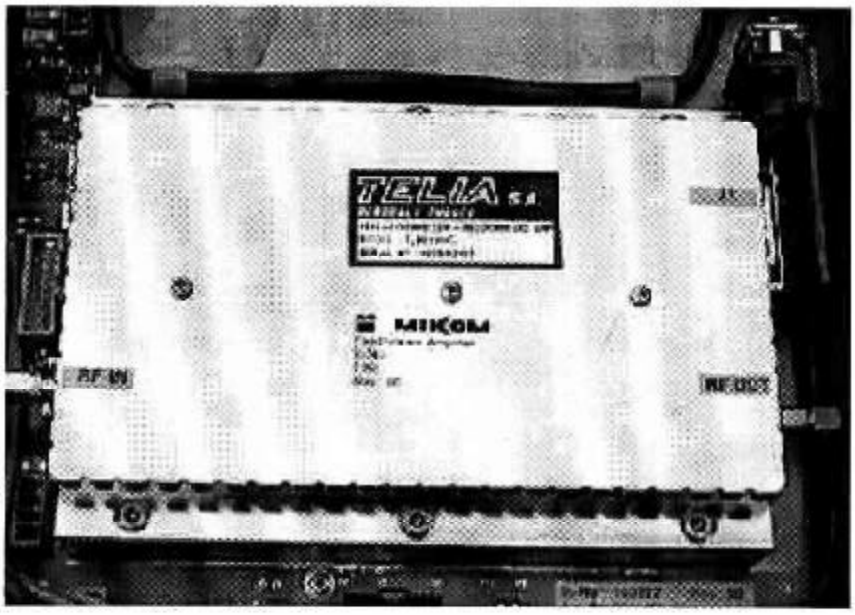


figure 2-9 Top view of the feed forward amplifier