Powerful backpack amateur radio system for the 10-meter band

Text and photos: W. Palme, DK5EI (formerly DL8ABH)

The following describes the construction of a compact and mains-independent portable station that can be built with readily available components. It is ready for immediate use and suitable for both DX and short-range communications.
The current frequent band openings in the 10 m band as well as my conviction that amateur radio technology can provide valuable assistance in emergencies or disasters have prompted me to build a compact, spontaneously deployable and mains-independent (emergency) radio system.
Any existing 10-meter amateur radio mobile transceiver with AM, FM, SSB and (if possible) CW can serve as the base unit. In my case it is a President Lincoln II+, which was hardly used in the shack.

The deliberate restriction to the 10m amateur radio band is particularly suitable for the planned installation in several respects:

- During heightened sunspot activity, frequent band openings are to be expected, which can occur around the clock. This allows worldwide radio contacts with minimal antenna effort and low power.
- At the same time, the ground wave can be used constantly for short-range radio. Similar to CB radio, distances of 20-30 kilometers can be bridged. Transmitting from higher locations such as hills and mountains, using larger and more effective antennas as well as increasing the transmit power can improve the range enormously.
- In times of low sunspot activity, band openings due to Sporadic E (ES) or Aurora occur only rarely. The band then appears "dead", but radio communication over the ground wave is possible all year round.
- In winter the signals are stronger than in summer, but the band closes earlier.

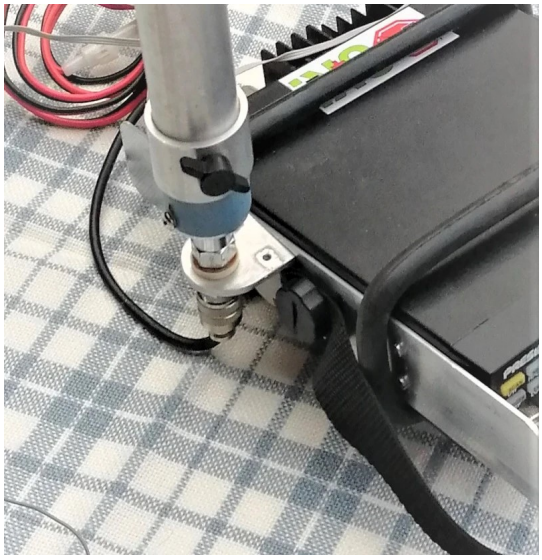
(according to: WIKIPEDIA GERMANY 10 meter band propagation conditions)

The 10m band radio is suitable for use as a DX portable station as well as a "radio phone" at close range, comparable to 2m/70cm handheld radios. However, we have not only FM, but also AM, SSB and CW to offer and the range can be increased by QRO (up to 30 watts).
As an emergency radio station, it should meet the following criteria:

- light weight, easily packable and transportable
- mains power independent, battery powered, using renewable sources to be usable in remote areas
- pre-assembled and compact, to ensure quick start-up in emergency situations, "all in, all on": minimal assembly and disassembly activities
- be protected by suitable measures against wear and tear or destruction during outdoor operation by dirt, wetness, force.

In order to save weight, only absolutely necessary components are installed, "loose" components are wrapped in cloths for protection and the whole thing is carried in a small hiking backpack that also has room for hiking rations, writing utensils and tools. instead of being stowed in a bulky "emergency case".
In order to be able to attach larger, heavier portable antennas, such as the MP1, to the device, a strong aluminum bracket with screwed PL mounting foot is attached to the side of the transceiver to protect the device's own antenna socket. More effective antennas, such as dipoles, "Up and Outer" or a 10 meter full wave loop can also be connected if an emergency situation requires it.

To protect the display and protruding controls from impact damage, bumps, scratches, side protectors made of flat aluminum profiles (50x3 mm) are attached to the device housing, protruding 1.5 to 2 centimeters at the front and rear. In addition, the device is provided with all-round protection in the form of two bulging solid rubber rings placed over it. They can be found in plumbing stores under the designation rolling ring seal Mengering, A ring DN 12.
To protect the device from moisture or rain, it can be placed in a large freezer bag,



Conclusion

The radio described is lightweight and easy to carry in a backpack. It can be used anywhere because it is mains-independent. A reduction to the essential components avoids unnecessary ballast. The pre-installation of the components saves the annoying searching and wiring, so that a spontaneous radio operation is possible within 2-3 minutes. By using the 10-meter amateur radio band, DX connections can be made over the space wave at band openings. At the same time, short-range communications using the ground wave are possible throughout the year. The performance and range of the 10-meter amateur radio is superior to UHF and VHF handheld radios with the use of effective antennas, higher RF output power, and different modes of operation.