

Technical Information
Operating Instructions

FM614

Impressum

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General Information about DCF77

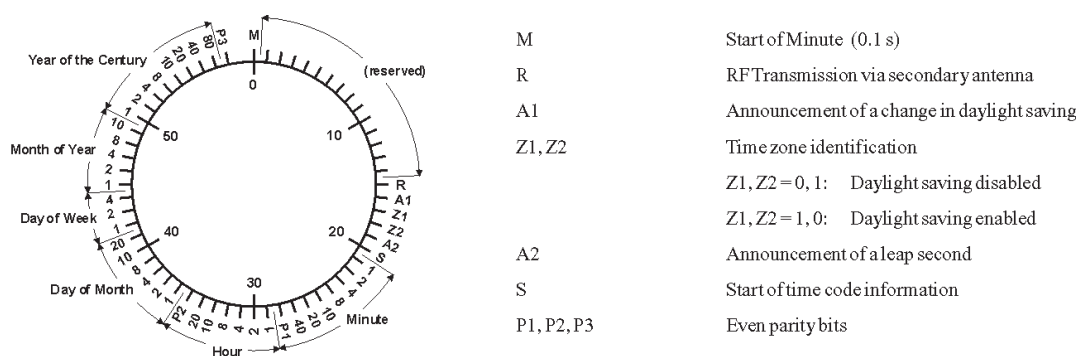
Like radio remote clocks the field strength meter FM614 receives the signal from the long wave transmitter DCF77. This long wave transmitter installed in Mainflingen near Frankfurt/Germany transmits the reference time of the Federal Republic of Germany. This time reference is either the Central European Time (Mitteleuropäische Zeit, MEZ) or the Central European Summer Time (Mitteleuropäische Sommerzeit, MESZ). The transmitter is controlled by the atomic clock plant at the Federal Physical Technical Institute (PTB) in Braunschweig/Germany and transmits the current time of day, date of month and day of week in coded second pulses. Once every minute the complete time information is available.

At the beginning of every second the amplitude of the high precision 77.5 kHz carrier frequency is lowered by 75% for a period of 0.1 or 0.2 sec. The length of these time marks represent a binary coding scheme using the short time mark for logical zeroes and the long time mark for logical ones. The information on the current date and time as well as some parity and status bits can be decoded from the time marks of the 15th up to the 58th second every minute. The absence of any time mark at the 59th second of a minute signals that a new minute will begin with the next time mark.

Our radio remote clocks decode the highly accurate information on date and time within a wide range around Germany. So some of our clocks are installed in Bilbao/Spain as well as in the city of Umeå in northern Sweden - fully satisfying the requirements of the users. The radio remote clocks automatically switch to summertime and back. The reception of the time information is free of charge and does not need to be registered.

Generally it is important to position the antenna in an optimal way. It should be mounted at least 30 centimeters away from the clock unit and from solid steel. The antenna should be aligned at a right angle to the direction of the transmitter (Frankfurt).

Figure: Decoding Scheme



General information about position of antenna

The antenna of DCF-receivers includes a ferrite rod which must be aligned to the transmitter. For best reception the longitudinal side of the antenna must point to Frankfurt. The antenna should be installed with a distance of at least 30cm to all metal objects because they would detune the antenna resonance. A distance of several meters to computer monitors must be kept. If they are running in a high screen resolution mode, their line frequency is close to the carrier frequency of the DCF-transmitter, which would cause a worse or no reception.

Features of FM614

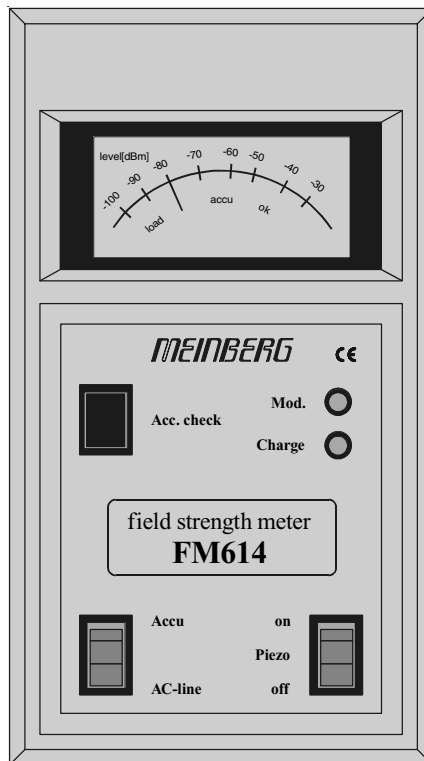
The FM614 has been developed to help service technicians in finding the best possible position for installing a DCF antenna or receiver module.

It includes two synchronous demodulators for the DCF-signal. One signal path detects the field strength of the 77.5 kHz-signal at the output of the antenna, the second receiver circuit demodulates the timing marks. The determined signal level is indicated by an analog display, the timing marks are made visible by a LED and can be observed acoustic by a piezo buzzer.

The FM614 is designed for both AC-line and accu supply. During AC-supply the internal accus are charged. This state is signalled by a LED, overcharging is not possible. If the FM614 often runs in accu supply mode, the accumulators should be discharged (unplugg power supply cable and switch into accu supply mode) at times to avoid the loss of capacity. The status of capacity can be checked with the help of the analog display.

The scope of supply includes an active ferrite antenna AI01, a AC-power cord and a coaxial antenna cable (RG174).

Front panel layout



Handling of FM614

a) Mode of operation

Use switch "Accu / AC-line" to choose one of the modes accu or AC-supply.

b) Charging

The accumulators are charged whenever the FM614 is plugged to the AC-power-supply. LED "Charge" indicates this status.

c) Checking the capacity

By pressing key "Acc. check" the status of capacity is indicated by the analog display. With the help of the marking it is possible to recognize if the accus have to be charged. The antenna shouldn't be connected to carry out this test.

d) Measurement of field strength

The antenna AI01 has to be connected to the input of FM614 by using the coaxial cable to perform this test. By varying the position of the antenna or the alignment to the transmitter, the maximum of field strength can be found. Besides a high field strength the flashing of the LED "Mod." exactly in rhythm of the timing marks is important. This marks can be observed acoustic by a piezo buzzer.



If the FM614 isn't in use for a longer period, it should be stored with switch position "AC-Line" to avoid deep-discharging of the internal accus.

Technical specification FM614

Indicating range:	output level of antenna: -100 dbm to -30 dbm
Measuring precision:	5%
AC power supply:	230V/0.5W
Internal power supply:	5.0V
Operating time:	approximately 8 hours with charged accus
Temperature range:	0 ... 50°C
Case:	Plastic sloped case Elegant of company Bobla Dimensions: 200mm x 112mm x 64mm
Connectors:	Power cord receptacle for mains supply SMB-connector for antenna cable
Scope of supply:	FM614 in sloped case, AC-power cord active antenna AI01, antenna cable RG174 (3m)

CE Label



This device conforms to the directive 89/336/EWG on the approximation of the laws of the Member States of the European Community relating to electromagnetic compatibility.

