



Frequency range:	137 - 141MHz, smoothly in steps of 10kHz
Function SCAN:	137.00 137.30 137.40-137.50 137.62 137.85-141.00MHz,
Intermediate frequencies:	10.7MHz and 455 kHz
Input sensitivity:	0.4 μ V (rms-typ.) for 12dB SINAD
Output signal:	2400Hz amplitude modulated (black 5% and white 87%)
Display:	LCD single line, 16 displayed characters
Current consumption:	70mA, (with converter LNC1700 250-500mA)

Table 2 : Specification of the receiver.

141MHz will make it possible to use the converter for the METEOSAT 7 satellite. This makes it possible to process information from both channels, the first channel (1691MHz) converts to 137.50MHz and the second channel (1694.50MHz) converts to 141.00 MHz.

The circuit diagram of the receiver is shown in Fig 1. It was originally developed for the nearby ham frequency range of 144-146MHz [3]. The circuit of the receiver is designed for wideband FM (bandwidth 30kHz). The low-frequency WEEFAX signal is sent from the output to the PC sound card. The frequency synthesiser PLL and LCD display are controlled by an ATMEL micro-computer.

The receiver is a double conversion superhetrodyne. Design of the receiver has been significantly simplified by using an MC 3362P (IC1) integrated circuit made by Motorola [5], which comprises all main elements of modern FM receiver. All that is required to connect to the MC3362P is an input band-pass filter, a resonant circuit for the first mixer oscillator, 2 ceramic filters for 10.7MHz and 455kHz, a quartz crystal oscillator for the second mixer, a resonant circuit for the demodulator and few other passive components. We will thus obtain an excellent receiver with a rather simple circuit and with supply voltage of 2-5V [12].

3.1 Input circuits of the receiver

The signal from the antenna (or from the

converter) go to a capacitance divider C2-C3 (input impedance adjustment). The divider together with L1 forms the first tuned circuit, the "hot end" of which is connected to T1 a dual gate MOS-FET, preferably "low-noise" type BF982. T1 ensures sufficient amplification of the input signal. Resistor R3 suppresses the tendency of input amplifier to oscillate, but it does reduce overall amplification. The signal from resistor R3 is further filtered by a band-pass filter L2-C5, L3-C8, L4-C11+C12 with the bandwidth of approximately 4MHz. Critical coupling between the band-pass filter circuits is determined by serial connection of SMD capacitors C6 + C7 and C9 + C10. The signal passes through the capacitance divider C11+ C12 to the input of the first mixer in IC1 with mixing signal from oscillator (L5, C33).

3.2 PLL Oscillator

The stability of the oscillator for the first mixer is achieved using a PLL with reference frequency of 4MHz. IC4 is a Philips SAA1057 single chip synthesiser designed for tuning of VHF FM radio receivers with medium frequency bandwidths [4, 6]. It was produced in 1983, but surprisingly enough it is still available on the market and at very good price. In the circuit shown in Fig 1 the synthesiser can be tuned from 110MHz to 150MHz with steps of 10kHz using a maximum tuning voltage of 4.5V. The tuning voltage (max. 5.5V) is taken from the power supply to the pin 7 of IC4. R14, C25 and C26 are the passive com-