

## *Chapter 1 Specifications and Tuning*

### **Specifications**

|                                 |                              |
|---------------------------------|------------------------------|
| Frequency:                      | 72-73MHz band                |
| RF Output Power:                | 250mW                        |
| Deviation:                      | 1.60Kc                       |
| No. of Channels:                | 9 - 12                       |
| Pulse Space @ Neutral:          | 1500uS                       |
| Frame Time:                     | 20mS                         |
| Operation Power Supply Voltage: | 7.2Vdc                       |
| Current Drain:                  | 232mA +/- 10%                |
| Operating Temperature:          | -4°F (-20°C) to 122°F (50°C) |

### **Description of Module**

Description of the Synthesizer-RF-module: Transmitter 72MHz:

The RF-Part of the Synthesizer-module consists of a three stage VCO-controlled transmitter. The power supply for the VCO ( Voltage Controlled Oscillators ) with transistor T1 (oscillator) and T2 (decoupling) is done by an integrated voltage stabilizer (5V,IC4). During scanner activity this voltage is switched off. (VCO-off). The capacitance diode D1 serves for frequency tuning. Frequency Modulation is done by the capacitance diode D3. For deviation alignment serves the trimmer potentiometer P1. An resistor/capacitor low pass filter is used to rounding the rectangular modulation voltage in such a way that the modulated carrier is weakened by 45 dB at a distance of 10 kHz.

The Channel frequencies are controlled by the Phase locked loop circuit IC2. This circuit is controlled and supervised by an microcontroller, build in the RF-Module. The reference oscillator, responsible for the frequency accuracy, works with an high quality 6.4 MHz crystal. Crystal data: crystal frequency 6.400 MHz tolerance +/-1 0ppm

The VCO- output signal is distributed by an resistor network R1 6, R1 7, R37, R53) to the PLL- circuit and the driver stage. Over a capacitive coupling the driver stage is feed. The bias point of this stage is temperature compensated by the silicone diode D1,

The tuned output of the driver circuit is inductively linked to the base of the power amplifier transistor. The power supply to the output stage is done by the choke coil L7. The matching of the output impedance to the exact impedance of the rod antenna is done by a double PI also used for harmonic filtering. Power output is approximately 250mW. The length of the rod antenna is approximately 1.10 cm

To supply the PLL circuit and the microcontroller a stabilized voltage of 3.3 Volt is produced trough the IC3. Transistor T6 and T7 serves for switching the driver stage off for frequency changes and teacher-pupil operation.