Circuit description of CYBORG-RF Remote Unit

1. Remote Board

When the voltage of TX-B+ terminal which is connected to the MPU control board is applied to high, the transmitter is activated and the RF signal is radiated through Antenna. The Encoded Data from MPU control board is applied to the stage of FM MOD OSC (Q3,L8,C23,L9,C24,L10,D3), and modulated to FSK signal which frequency is 49.75277 MHz, and converted to the triple frequency of 149.2593 MHz. The signal is fed to the LC tuning circuit (L7,C19) and filtered the unwanted signals, and fed to the Tripler Amp Stage (Q2,L6,C14). The final frequency is converted to 447.775 MHz and also tuned through the L.C tuning circuit (L5,C10) and fed to the final Power Amplifier Stage (Q1,L4,TC1). The signal is filtered and matched there Impedance by the Antenna Matching circuit (L3,C2,C3,C4) and radiated from the Antenna through the T/R Switching stage (D1,D2).

When the voltage of Battery-save terminal is applied to high, the receiver circuit is activated. The FSK modulated RF signal induced from the antenna is fed to LPF (L11,L12,C33) and amplified by the receiver RF amplifier stage (Q4,Q5,L13,TC3), also this signal is mixed by the 1st Mixer amplifier stage (Q6), and converted the 1st LO frequency to the 1st IF frequency (21.4 MHz).

The 1st LO stage is consisted of the 2-stage, the X-tal OSC/Tripler stage (Q10,L16,C67,L18,C71) is directly oscillated the frequency of 47.375 MHz, and tripled to the frequency of 142.125 MHz. The signal is tuned by the LC tuning circuit (L15,C63), and fed to the tripler amplifier stage (Q9,L14,C58). The 1st LO frequency is 426.375 MHz.

The 1st IF signal from the 1st Mixer stage is compensated the loss of the IF filter by the compensated amplifier stage (Q7), is fed to the FM IF IC (U1). This signal is mixed with the 2nd LO frequency (20.945 MHz) and converted to the 2nd IF frequency of 455 KHz. The signal is filtered by the Ceramic BPF (CF3), and amplied by the internal Limiter/amplifier stage of the FM IF IC, and demodulated the AF signal by the Discriminator (CF3). The signal is wave-shaped through the LPF stage (R24,25,26,C51,52,53) and fed to the internal Data Amp stage and converted to the digital data. The Data is fed to the MPU control board through the RX-Data terminal.

2. Control/Display Board

When the voltage is supplied from the Battery, the voltage is converted to 3V by the D/D converter stage (L1,U3,D1,L2,U4,D2) and applied to the MPU (U5) stage.

Simultaneously, Test mode of the LCD is processed, after finished test mode, the receiver and transmitter is turned to standby the mode. In order to reducing the operating times, we adopted to the Key Touch Wake-up function and the Watch-dog Sleep functions. When you pressed any button, the MPU wake up the Sleep mode, the operating will be started, and performed the functions of operating accorduing to the button, and displayed the icon to the LCD panel. When the button is depressed, the mode is directly turned to the receiver mode and waited the data signal during any times, When the data is received well, then analysed the status code and displayed to the LCD panel, and beeped to the Buzzer according to the status.

The LCD is display the various icon and the staus of remote conditions.