

Appendix G. Operational Description

This device is mainly consisted of the two part as of the transmitter(control box) and receiver(display) unit. Circuit description of each part is as follows.

1. Control Box(Transmitter)

1) Pulse Output

- . CNT1 : Left1 sensor input/output

Pulse signal from the MPU IC(U1) pin21 is amplified by the Q1 and then transferred to the sensor through the matching trans(TH1)

- . CNT2 : Left2 sensor input/output

Pulse signal from the MPU IC(U1) pin22 is amplified by the Q2 and then transferred to the sensor through the matching trans(TH2)

- . CNT3 : Right2 sensor input/output

Pulse signal from the MPU IC(U1) pin23 is amplified by the Q3 and then transferred to the sensor through the matching trans(TH3)

- . CNT4 : Right1 sensor input/output

Pulse signal from the MPU IC(U1) pin24 is amplified by the Q4 and then transferred to the sensor through the matching trans(TH4)

2) Receiving Signal Selection

- . CNT1 : Left1 sensor input/output

The signal to CNT1 is inputted to the U2 through the circuitry R3,C3,D2 in the condition of low level of the pin 9 and 10 of the Multiplexer(U2)

- . CNT2 : Left2 sensor input/output

The signal to CNT1 is inputted to the U2 through the circuitry R7,C4,D4 in the condition of low level of the pin 9 and high level of pin10 of the Multiplexer(U2)

- . CNT3 : Right2 sensor input/output

The signal to CNT3 is inputted to the U2 through the circuitry R8,C5,D6 in the condition of high level of the pin 9 and low level of the pin10 of the Multiplexer(U2)

- . CNT4 : Right1 sensor input/output

The signal to CNT4 is inputted to the U2 through the circuitry R9,C6,D5 in the condition of low level of the pin 9 and 10 of the Multiplexer(U2)

3) Receiving signal amplify

- . EQ AMP(U5-3) : The signal from the U2 pin3 is amplified at the EQ-AMP and the AMP gain is controlled by the U1.

- . Bandpass Filter(U5-2) : 40 KHz frequency band is passed through this filter.

- . Power AMP(U-1) : The receiving signal from the bandpass filter is finally amplified in this AMP circuit.

- Comparator(U-4) : The amplified signal is compared to the reference voltage and then converted into the digital signal.

4) TX Part

Tx circuitry is consisted of OSC, Doubler, Drive AMP and Power AMP.

- Q12 : Overtone Oscillation circuitry consisted of the X2.
- C49 : Trimmer condenser for adjust the Tx frequency
- D14 : Varactor diode make FM modulation the signal data from the MPU(U1)
- Q13 and Q14 : AMP. Circuit.
- Q15 : power AMP. Circuit.

2. Display Unit(Receiving Part)

The receiver use the super heterodyne circuitry and consisted of local oscillator mixer IF amp, detector and comparator.

- Overtone Osc. of 1st local OSC. : Q7,X3
- C22 : Trimmer of the local frequency
- Q4 : 1ST IF frequency(21.4MHz) is made in this stage by mixing the signal from the antenna and 1st local frequency
- U1 : FM IF AMP.
- CF1 : Bandpass filter for 2nd IF Frequency
- X5 ; QUAD detection circuit for AF signal.

3. MCU IC Part

MCU IC part is consisted of the EEPROM, SHIFT REGISTER, FND and BUZZER.