2. Theory of Operation

2.1 RF board

2.1.1 ANT (ANTENNA1)

The antenna uses a two pole loop antenna.
This antenna picks up the designated signal and connects them to the LNA.

2.1.2 LNA (Q104, Q105, Q109)

The received signal by antenna is input to the amplification circuit.
This amplifier is low noise high gain amplifier.

2.1.3 BPF (F101)

The extraneous signals such as image and spurious that amplified through the LNA are attenuated approximately 50dB by SAW(Surface Acoustic Wave) filter with low insertion loss characteristics.
In addition extraneous radiation from the unit is suppressed.

2.1.4 1'st local OSC

In the local oscillator circuit is 4'th overtone PLL(Phase Locked Loop) oscillator which is a VCO(Voltage Controlled Oscillator) circuit and the target frequency is filtered by the band pass filter, and controlled PLL IC.

$F_{LO} = F_R - 21.4MHz$

F_{LO}: *Local Frequency*

F_R: *Receiving carrier Frequency*

2.1.5 MIXER (Q103)

The RF signal (received signals) which has passed through the SAW filter and the 1st local oscillator signal are input to the mixer and converted to 21.4㎒(1'st IF), regardless of the value of the receiving carrier frequency.

2.1.6 BPF (F102)

BPF is a narrow band X-tal filter (21.4㎒).
It's major function is to attenuate the adjacent channel signal and assure selectivity characteristics.

2.1.7 IF AMP (Q102)

The received signal converted to the 1'st IF is amplified by transistor amplifier circuit.

2.1.8 IF IC (U101)

The IF signal and 2'nd local oscillator signal are input to the 2'nd mixer circuit and converted to 2'nd IF(455㎑) by internal mixer and amplifier. The discriminator using quadrature detection is used to convert the frequency deviation quantify into voltage change for demodulation. the base band signal(sine wave) is compared to the reference voltage which is the integral value of the received data in order to convert it into a binary digital signal.

2.1.9 Motor Drive

The main structure of the motor(Vibration) driving circuit is transistor which formed by one transistor and vibrator.
The signal from port of MPU(Main Process Unit/MCU) is passed through resistor(R125) and transistor(Q106).

2.2 DIGITAL board

2.2.1 MPU (U1)

MPU is control IC for all processing and function control in the pager and carry out following function.

- Key input processing
- EEPROM control
- LCD back light(EL) control
- Vibrator control
- Alert(Buzzer) control
- LCD control
- Display received and stored message
- Other function control

2.2.2 DECORDER (U2)

Decorder operate the following function.

- Establishment and maintenance of synchronization with receiver signal
- Control of RF section power
- Comparison of the reception address

2.2.3 SRAM (U3)

SRAM is memory storage IC for received message.

2.2.4 EEPROM (U6)

EEPROM is Frequency, CAPCODE and other program option data storage.

2.2.5 LCD (LCD1)

LCD module displays received message, icon and menu. All data received from MPU displays through data line by parallel.

2.2.6 DC/DC converter (U7)

Power for pager operation is necessary 3 Voltage, but battery for pager provided 1.5 Voltage so this IC converts current from 1.5 Voltage to 3 Voltage.

2.2.7 Backup Battery (BT1)

Backup battery is tentative data storage IC of all received messages, real time storage for data protection when battery replaced.

2.2.8 Buzzer Drive

The main structure of the buzzer(alert) driving circuit is transistor formed by one transistor and buzzer.
The signal from port of MPU(Main Process Unit/MCU) is passed through resistor(R17)and transistor(Q1).