

BC-2000 OPERATIONAL DESCRIPTION

TRANSMITTER

1. Microphone and VOX

Voice pick up by the condenser microphone (MIC) is pre-amplified by TR1 and fed into IC1 for AGC, ensuring that the maximum modulation deviation will not exceed the limit while keeping distortion low. After the signal is processed by IC1, it is fed into two routes. One route goes through the pre-emphasis low pass network consisting of R12, R13, C14, C15 and C16, amplified by TR4 and fed into the modulator. Another route goes through the amplifier TR2, detector D1 and D2 to obtain a DC voltage. This voltage controls the open and close of TR15. When this value is high, output from pin 19 of IC5 is also high while pin 3 becomes low, thus blocking TR10. Output from TR9 is V_{DD1} (+4.5V) and the unit enters transmit mode. If this DC voltage becomes low, output from pin 19 is also low while pin 3 goes high, thus saturating TR10, output from TR9 V_{DD} is 0V and the unit enters standby mode.

2. Modulator and oscillator network

The modulator and oscillator network consist of D3, TX1/TX2, C23, C24 and TR5. Audio signal and data signal are fed through R20, C20 and C19, R22 respectively into the FM modulator to modulate the carrier. The network resonance frequency is three times the base frequency of the crystal. TR6, T3, C27 and TR7, T2, C29 are the two stages pre-amplifier, providing a basic gain for the final stage RF amplifier which consist of TR8, C32, C33, C34 and T1. This RF amplifier maximises the power send to the antenna and filters off the spurious harmonics.

3. Temperature sensing circuit

IC4, RT and VR3 make up an oscillator, the value of RT changes as temperature changes, thus changing the oscillating frequency. Pin 7 of IC5 (MCU) detects this frequency, if it lies outside the pre-set range, pin 2 of IC5 becomes high, a warning signal will be transmitted. The pre-set range is selected by SW5.

4. Movement detection circuit

Signal from the BSM-1 movement sensor mat is input through JACKE to pin 6 of IC5. If the signal is varying between high and low voltage level, output from pin 2 of IC5 is high. If the signal remains low for 20 seconds, output from pin 2 becomes low, a warning signal will be transmitted.

5. Battery low detection circuit

TR11 and TR12 build up a voltage detection circuit. When voltage of V_{DD} is higher than +5V, DZ1 is made conductive so as TR12, TR11 is blocked. LED1 (R) lights up while LED1 (G) is off, indicating power supply to the unit is normal. When the V_{DD} falls below +5V, DZ1 is blocked so as TR12, TR11 becomes conductive. LED1 (R) goes off while LED1 (G) lights up, indicating battery low.

6. Night light control circuit

TR13, TR14 and SW2 make up the control circuit, using SW2 to select the different modes.

7. Digital Code Selection

The 16 different codes can be selected using the SW5 four-position dip switch.

8. Power supply circuit

The unit can operate from external 9V DC supply or dry cells (6V). IC2 and IC3 provide a regulated 4.5V and 4.3V supply respectively to the various circuits.
