

TOUCH PULSE DIALER WITH REDIAL

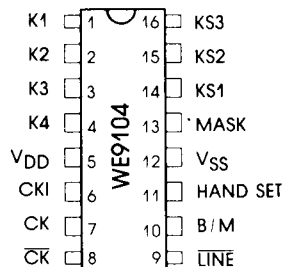
GENERAL DESCRIPTION

The WE9104 is a monolithic CMOS integrated circuit which converts keyboard inputs into pulse signal outputs simulating a rotary telephone dial. It is designed to operate directly from the telephone line and can be interfaced properly to meet telephone specifications in system utilizing loop disconnect signaling.

FEATURES

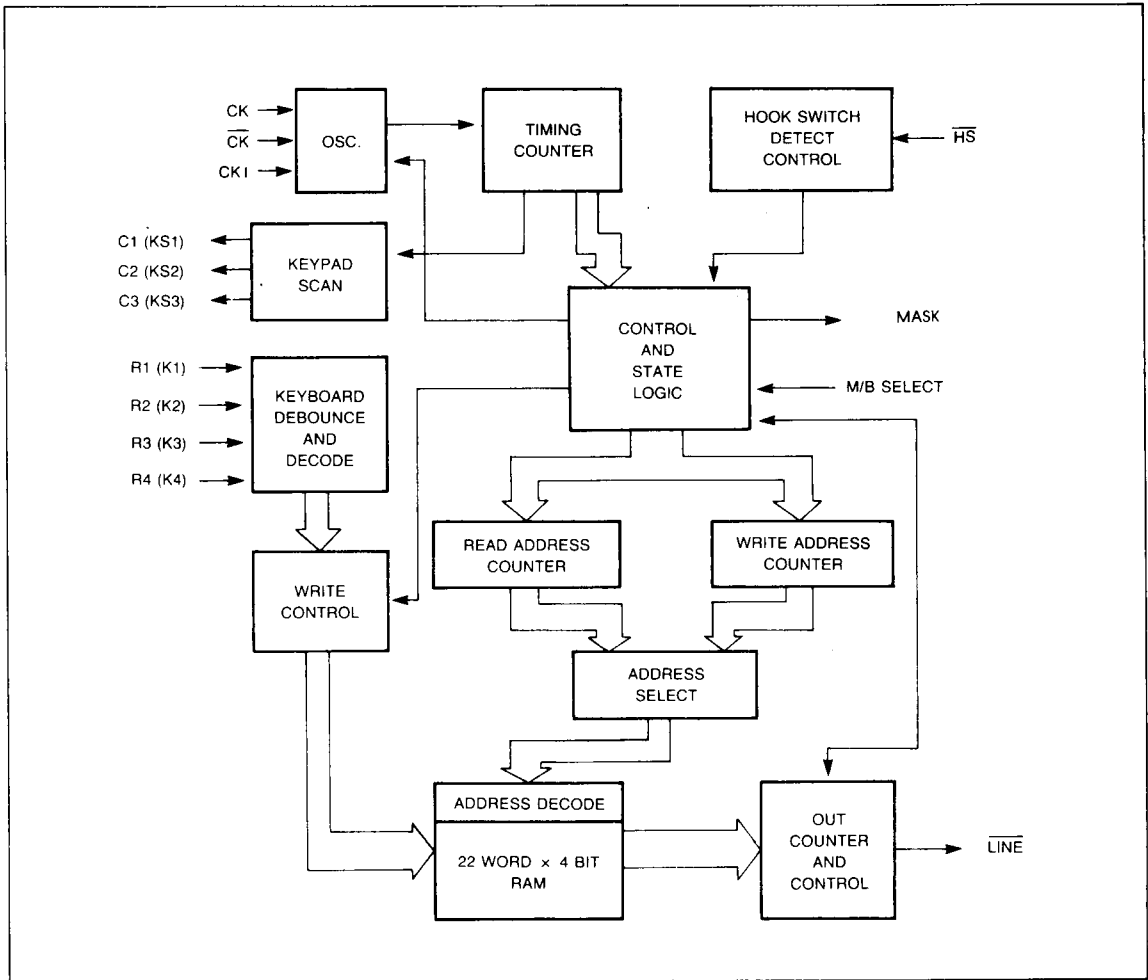
- 2.0V to 5.5V supply voltage.
- Low power standby mode for redial.
- Inexpensive RC oscillator used as frequency reference.
- Redial with either a * or # input.
- Inter digital pause (9104: 800ms.)
- Pin selectable Break/Make.
- Provision for rapid Testing.
- Dialer reset for line power breaks 200mS.
- 22 digit capacity for redial.
- Inexpensive 4x3 matrix single contact keypad.

PIN CONFIGURATION



PULSE DIALER

BLOCK DIAGRAM



ABSOLUTE MAXIMUM RATINGS

| CHARACTERISTICS | RATING | UNIT |
|-----------------------|-------------|------|
| DC Supply Voltage | 5.5 | V |
| Operating Temperature | -20 to +60 | °C |
| Storage Temperature | -55 to +120 | °C |

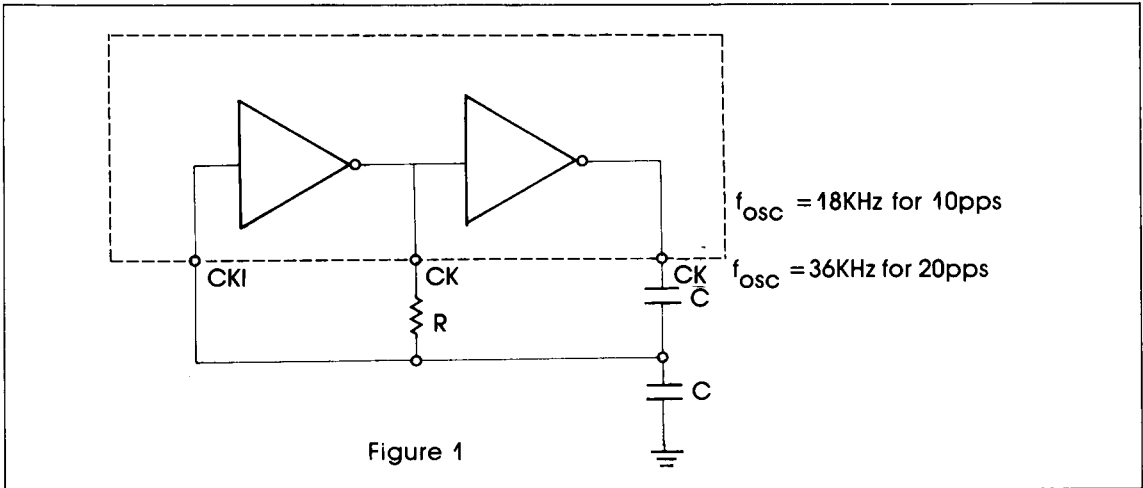
ELECTRICAL CHARACTERISTICS

$V_{DD} = 5V$, $V_{SS} = 0V$, $T_A = 25^\circ C$, unless otherwise specified.

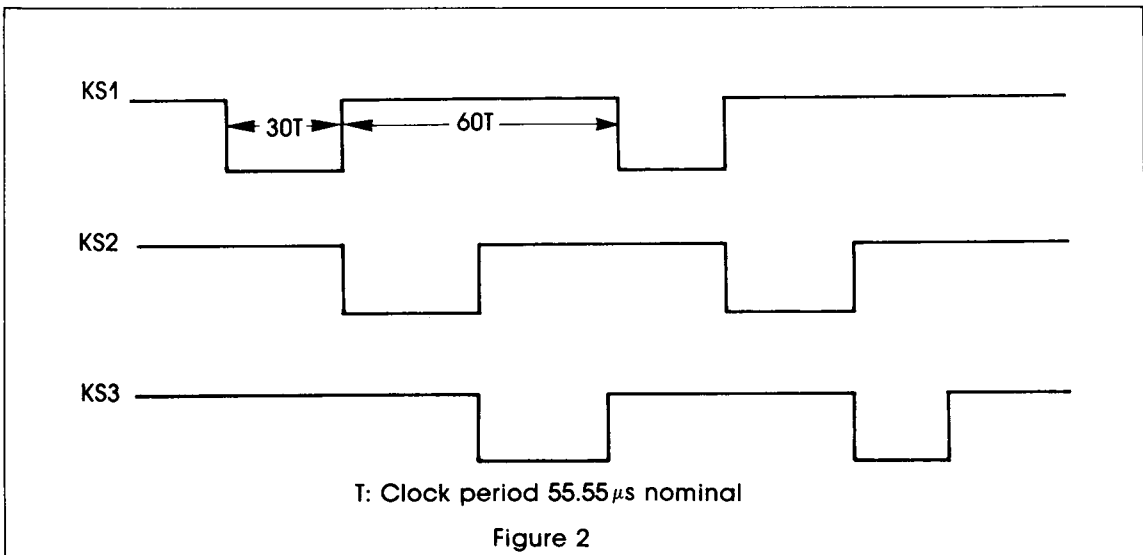
| PARAMETER | CONDITION | LIMIT | | | UNITS |
|---|--|----------------------|----------------------|----------------------|-------------------|
| | | MIN | TYPE | MAX | |
| Logic 0:B:M | | -0.3 | 0.0 | 1.5 | V |
| All Other Inputs | | -0.3 | 0.0 | 1.5 | V |
| Logic 1:B:M | | $V_{DD} - 1.5$ | V_{DD} | $V_{DD} + 0.3V$ | V |
| All Other Inputs | | $V_{DD} - 1.5$ | V_{DD} | $V_{DD} + 0.3$ | V |
| Keypad Inputs | $V_{in} = V_{SS}$ | 40 | 60 | 150 | μA |
| Sink Current:B:M | $V_{in} = V_{DD}$ | 0.0 | 0.1 | 1.0 | μA |
| Key Depression Period | $V_{in} = V_{SS}$ or V_{DD} | 30.0 | 40.0 | | mS |
| Mask Sink Current Drive Current | $V_{DD} = 2.0V$ $V_O = 1V$ $V_O = V_{DD} - 1V$ | 2 1 | 10.0 6.0 | | mA |
| Line Sink Current Leakage Current | $V_{DD} = 2.0V$ $V_O = 1V$ $V_O = 2.0V$ | 2 | 7.0 0.0 | 1.0 | mA μA |
| Clock Frequency | $V_{DD} = 2.0V$ $V_{DD} = 3.9V$ $V_{DD} = 5V$ | 14.3 17.2 17.8 | 17.2 18.0 18.2 | 18.1 18.6 19.5 | KHz KHz KHz |
| Stand-by Current | $V_{DD} = 5V$ | | 0.5 | 4 | μA |
| Operating Current | $V_{DD} = 5V$, Not Key in | | 8.0 | 40.0 | μA |
| | $V_{DD} = 5V$, Key in | | 30.0 | 200.0 | μA |

FUNCTION DESCRIPTION

Clock oscillator-The clock oscillator consists of two inverters, the frequency of oscillation being controlled by external components connected to these three pins.

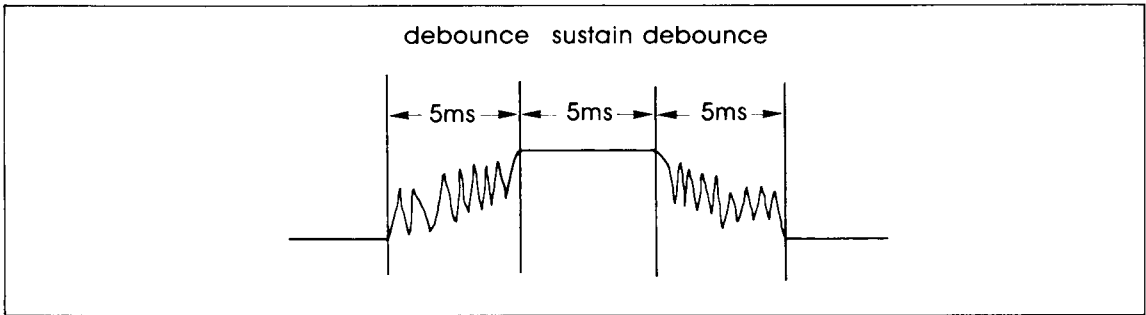


Keypad Scan, Input and Debounce-The keypad scan is at the rate of 200Hz, its waveform is shown in Figure 2.



The keypad input are normally held at high by means of on-chip pull up resistors. When a key is depressed, the dialers identifies the key by examining all four keypad inputs

To prevent mutple reading of digits due to contact bounce, the dialer incorporates circuitry which delay the reading of data until certain conditions are met. This operates as follows:



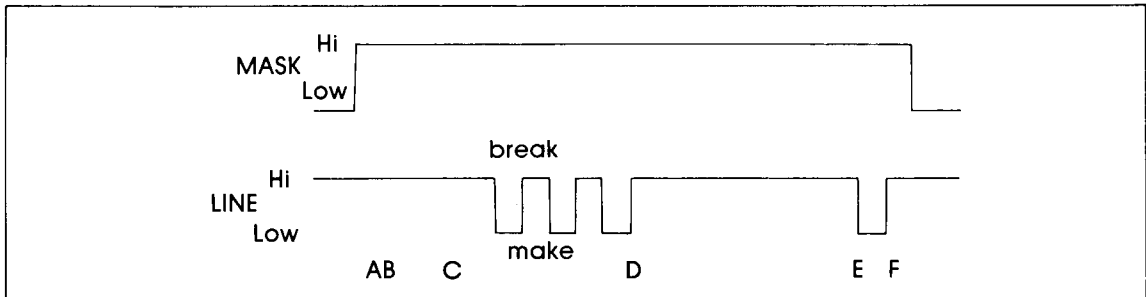
Hook Switch Detect Control-External circuitry connected to Handset Pin is used to indicate whether the telephone handset is on-hook or off-hook, these two states being represented by Logic Hi and Logic Low respectively.

make period and IDP the output device is switched off. The output drives an external bipolar transistor that sequentially opens the telephone loop a number of times equal to the input digit selected.

Line Output-The output stage consists of an N-channel open-drain device sinking current to V_{SS} . During a dial pulse break period the output device is switched on and during the

Mask Out-This pin is used to control the muting of the telephone network during out dialing.(See Figure 3)

PULSE
DIALER



Time Intrval

$T_{EF} = n \times 100ms$ where n = digit dialed.

$T_{AB} = 5-10ms$ after end of bounce, $T_{BC} = 800ms$

Figure 3

$T_{CD} = n \times 100ms$ where n = digit dialed, $T_{DE} = 800ms$

REDIAL-After normal dialing, ON-HOOK OFF-HOOK * or #, then last number dialed can be redialed out.

TYPICAL APPLICATION CIRCUIT (B/M=67:33)
