



# TOUCH PULSE DIALER WITH REDIAL

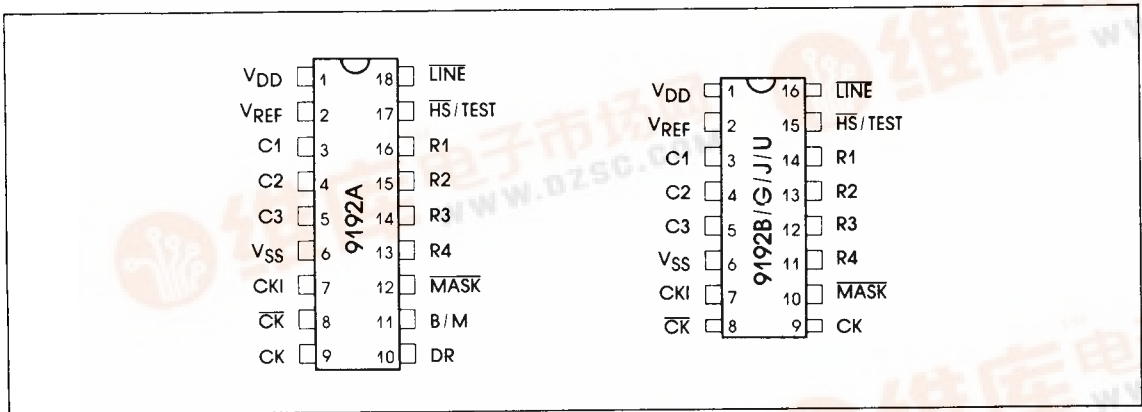
## GENERAL DESCRIPTION

The WE9192 Series are CMOS monolithic integrated circuit, they can work at low voltage, low operating current and with high noise immunity. Operating directly off the telephone line supply.

## FEATURES

- 2.5V to 5.5V Supply Voltage.
- Low Stand-by Power Consumption.
- Inexpensive RC Oscillator Network.
- High Line Out Break-Down Voltage.
- Continuous Mute.
- On Chip LINE OUT and MASK OUT.
- Redial with either a "\*" or a "#" Key Depressed.
- 16 Digits Capacity for Redialing.
- Uses Either Inexpensive Signal Contact XY Matrix Keyboard or Standard 2-of-7 Keyboard with Negative Common.

## PIN CONFIGURATION



PULSE DIALER

TABLE 1

9192 SERIES	BREAK/MAKE	DIALING RATE	PIN
**9192A	pin selectable	pin selectable	18
9192B	60/40	10pps	16
9192G	66/33	10pps	16
**9192J	60/40	20pps	16
**9192U	66/33	20pps	16





## ABSOLUTE MAXIMUM RATINGS

CHARACTERISTICS	RATINGS	UNIT
DC Supply Voltage	6.0	V
Operating Temperature	-20 to +60	°C
Storage Temperature	-55 to +125	°C

## ELECTRICAL CHARACTERISTICS

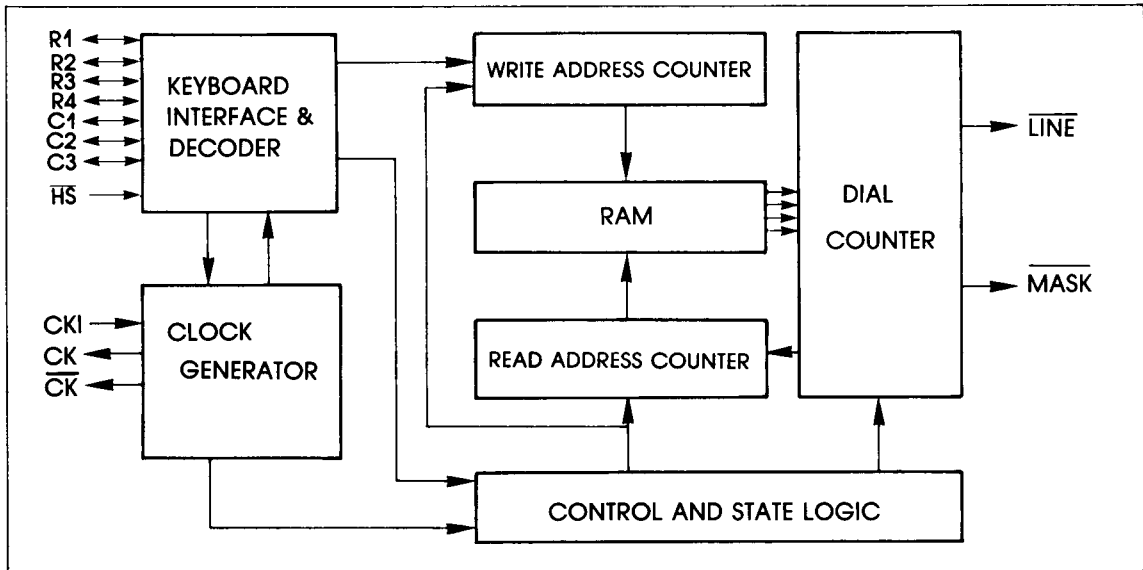
$T_A = 25^\circ\text{C}$ ,  $V_{SS} = 0\text{V}$

CHARACTERISTICS	SYMBOL	TEST CONDITION			LIMITS			UNITS
		$V_{DD}$	$V_{IN}$	$V_{OUT}$	MIN	TYP	MAX	
Supply Voltage	$V_{DD}$				2.5		5.5	V
Input Current (HS)	$I_{HS}$	2.5	0			20		$\mu\text{A}$
Key Contact Resistance	$R_{KI}$	5.0					1	$\text{k}\Omega$
Keyboard Capacitance	$R_{CI}$	5.0					30	pF
Mask Sink Current	$I_{MOS}$	2.5		0.5		3		mA
Line Out Sink Current	$I_{LOS}$	2.5		0.5		5		mA
Key Input Level (R1-R4, C1-C3)	$K_{IL}$				$V_{SS}$		$0.2V_{DD}$	V
2-of-7 Input Mode	$K_{IH}$				$0.8V_{DD}$		$V_{DD}$	V
Keyboard Resistance Pull-up (Pull-Down)	$K_{IRU}$ / $K_{IRD}$	2.5 / 2.5				170 / 6		$\text{k}\Omega$
Memory Retention Current	$I_{MR}$	1.0				0.1		$\mu\text{A}$
Mask off Leakage	$I_{MLKG}$	5.5		5.5		0.001		$\mu\text{A}$
Line off Leakage	$I_{LLKG}$	5.5		15		8		$\mu\text{A}$
$V_{REF}$ Output Source Current	$I_{REF}$	5				4.5		mA

**ELECTRICAL CHARACTERISTICS**

( $V_{SS} = 0V$ ,  $T_A = 25^\circ C$ )

PARAMETER	SYM	TEST CONDITION	LIMIT			UNIT
			MIN	TYP	MAX	
Operating Current	$I_{DD}$	$V_{DD}=5.5V$	$V_{REF}=V_{SS}$	5.8	10	mA
			$V_{REF}=OPEN$	200	300	$\mu A$
	$F_o$	$R_E=2M\Omega$ $R_D=220K\Omega$ $C_D=390pF$ $V_{DD}=3.0V-3.5V$	3.8	4	4.2	KHz
Frequency Stability	$\Delta f/f$	$V_{DD}=2.5-3.5V$		$\pm 2.5$	$\pm 4$	%
		$V_{DD}=3.5-5.5V$				
Key Input Debounce Time	$T_{DB}$	$F_{OSC}=4KHz$		10		mS
Oscillator Start-up Time	$T_{OS}$	$V_{DD}=2.5V$		1		mS
LINE OUT Dial Rate	$L_{DR}$	PIN 10 is tied to $V_{SS}$ $F_{OSC}=1KHz$		10		PPS
Inter-Digital Pause	$T_{IDP}$	PIN 10 is tied to $V_{SS}$ $F_{OSC}=4KHz$		800		mS

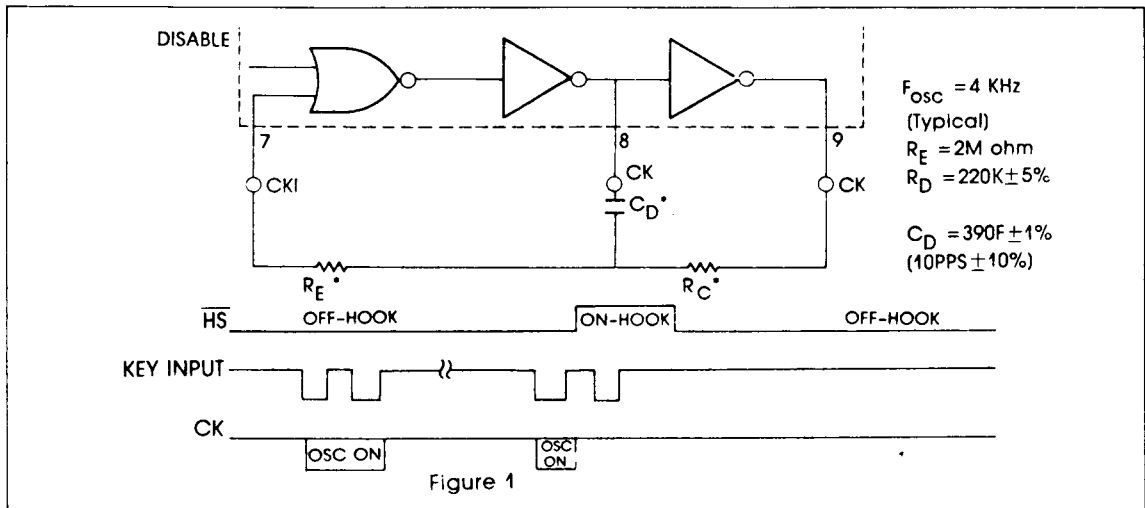


PULSE  
DIALER

## FUNCTIONAL DESCRIPTION

Clock Oscillator - The clock oscillator consists of a NOR gate and two inverters, the frequen-

cy of oscillation being controlled by external components.



### V<sub>DD</sub> POWER SUPPLY

This is the positive supply. The supply voltage range between 2.5 and 5.5 volts.

### V<sub>REF</sub> REFERENCE

The V<sub>REF</sub> output provides a negative reference voltage relative to the V<sub>DD</sub> supply. Its magnitude is a function of the internal parameters which define the minimum operating voltage of each part. The V<sub>REF</sub> pin is simply tied to V<sub>SS</sub> (Pin 6). The internal circuit with its associated I-V characteristic is shown in Figure 4.

### HOOK SWITCH CONTROL AND TEST

External circuitry connected to HANDSET/TEST PIN is used to indicate whether the telephone handset is ON-HOOK or OFF-HOOK, these two states being represented by Logic Hi or floating and Logic Low respectively. In the off-hook mode, this pin normally by held at logic Low. A change from Off-hook mode to on-hook mode while the device is outpulsing

causes the remaining digits to be outpulsed at 100X the normal rate (B/M ratio is then 50/50). When come off-hook pushing the either a "\*" or "#" key stored the memory number can be redialed.

### REDIAL

The keyboard inputs are retained in the memory and therefore can be redialed out by going off-hook and pushing either "\*" or "#" key.

### LINE AND MASK OUTPUT

The loop disconnect dial pulses appear at LINE OUTPUT (LINE) pin. the output stage consists of an open-drain N-channel transistor. During a dial pulse break period the output device is switched on and during the make period and IDP the device is switched off. The Mask output is used to control the muting of the telephone network during out dialing. The output is an open-drain N-channel transistor designed to drive an external bipolar transistor.

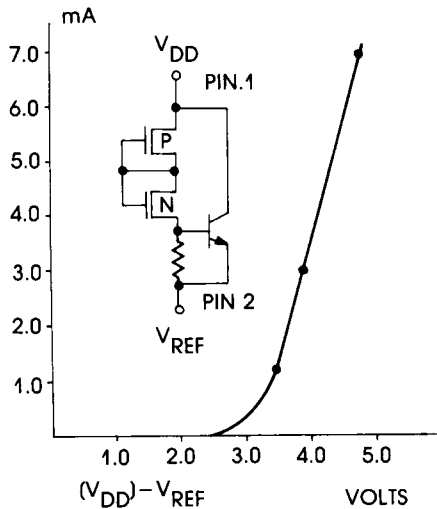


Figure.4. V<sub>REF</sub> TYPICAL I-V CHARACTERISTICS

**\*\*Break/Make (B/M) Selection (only in 9192A)**  
 This pin controls the Break/Make ratio of the pulse output. The Break/Make ratio is con-

trolled by connecting V<sub>SS</sub> or V<sub>DD</sub> to this pin as shown in the Table 2.

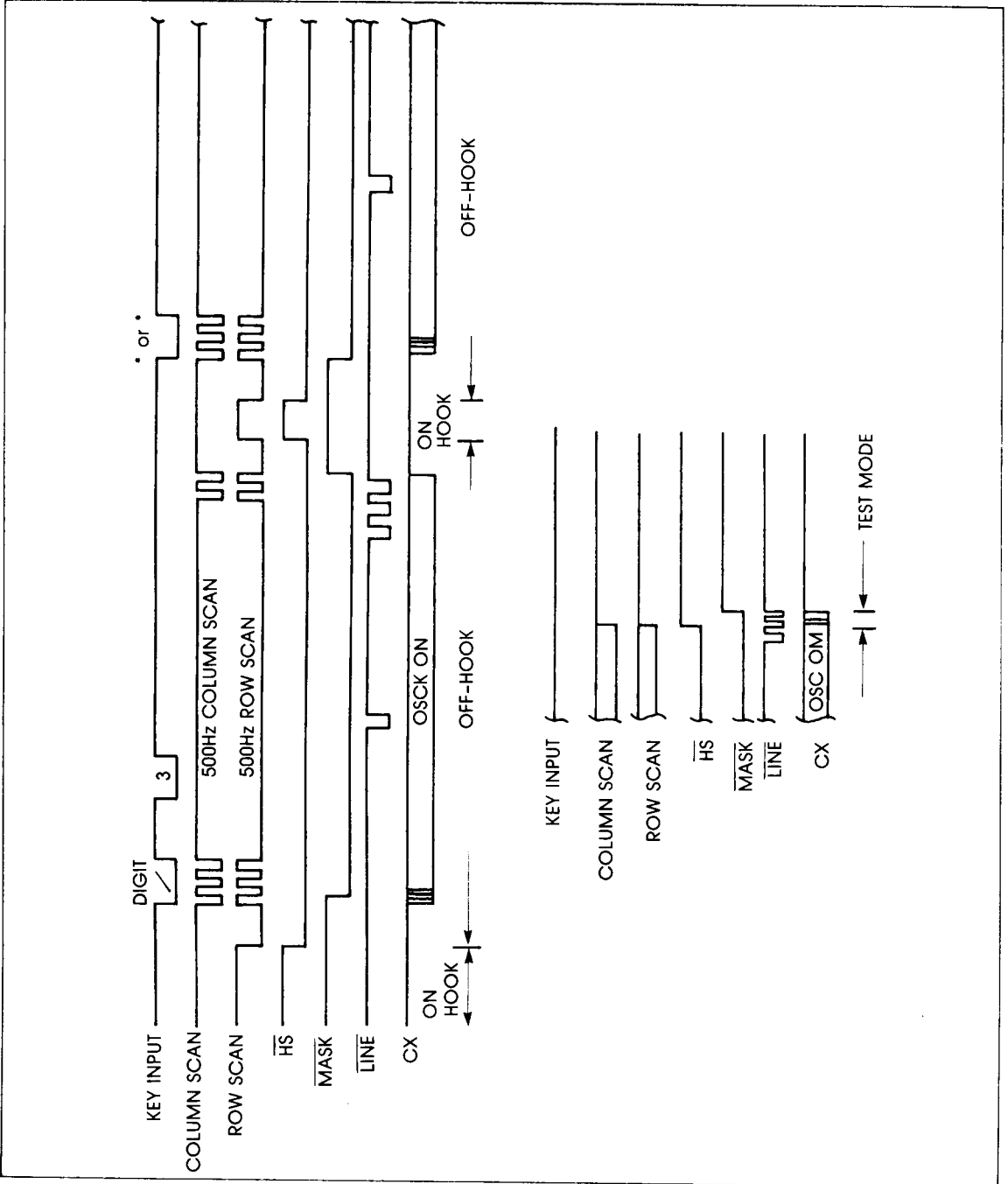
INPUT TO B/M PIN	LINE OUTPUT	
	BREAK	MAKE
V <sub>DD</sub>	66%	34%
V <sub>SS</sub>	60%	40%

**\*\*Dialing Rates(DR) Selection (only in 9192A)**  
 The dialing rate is derived by dividing down the dial rate oscillator frequency. Table 3 shows the relationship of the dialing rate

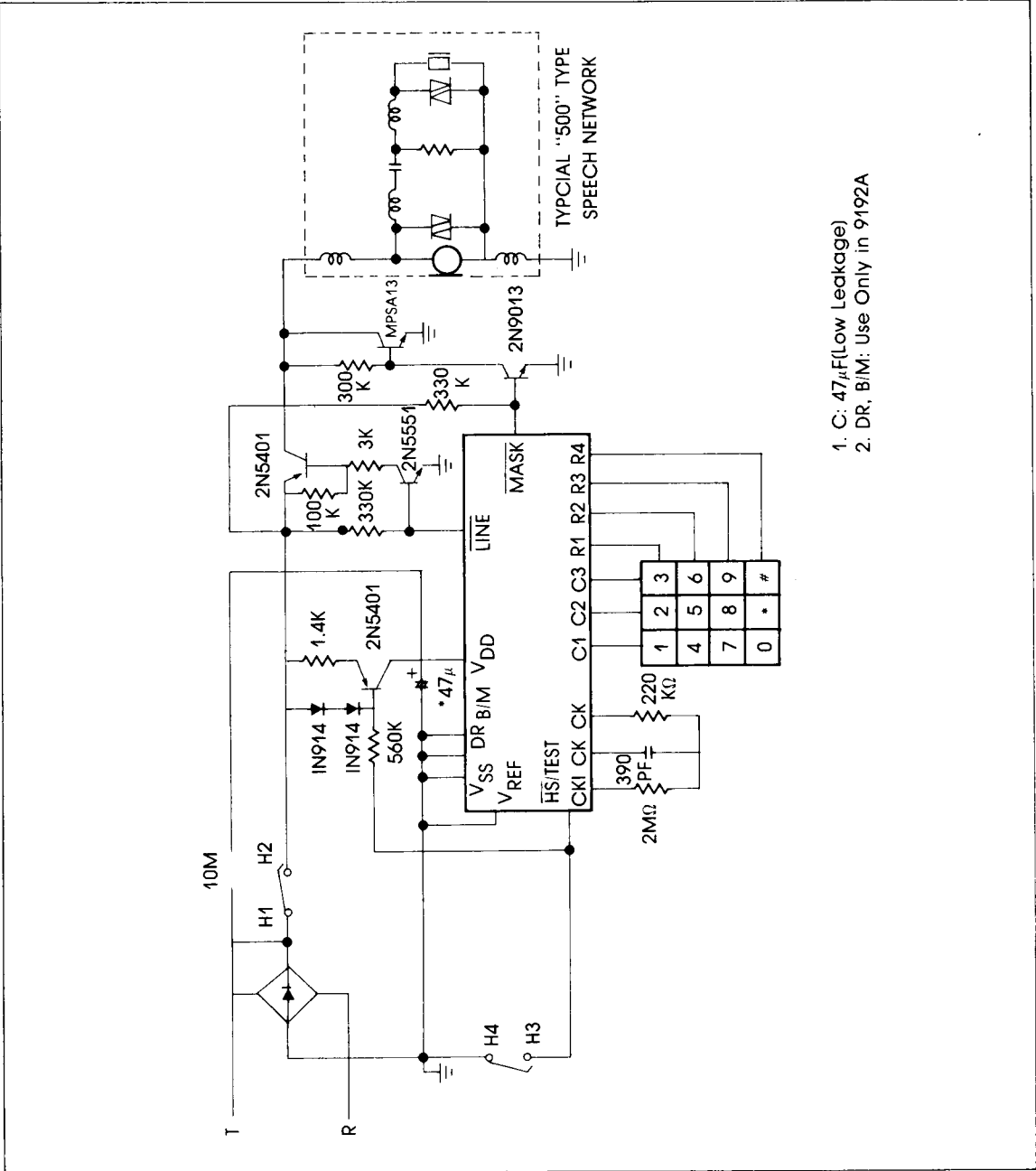
and IDP with the OSC. Different dialing rates can be selected by connection the pin V<sub>DD</sub> or V<sub>SS</sub> will select a pulse of either 20PPS or 10PPS respectively.

INPUT TO THE OR AND IDP PINS	LINE OUTPUT		NOTES
	DR(PPS)	IDP(ms)	
V <sub>DD</sub>	20	400	F <sub>osc</sub> = 4KHz
V <sub>SS</sub>	10	800	

Table 3: Dialing Rate Selection



APPLICATION CIRCUIT



- 1. C: 47µF(Low Leakage)
- 2. DR, B/IM: Use Only in 9192A