LB1005AB
LB1005BB

PRELIMINARY DATA

AN AT&T PRODUCT

GENERAL-PURPOSE TELEPHONE TONE RINGERS

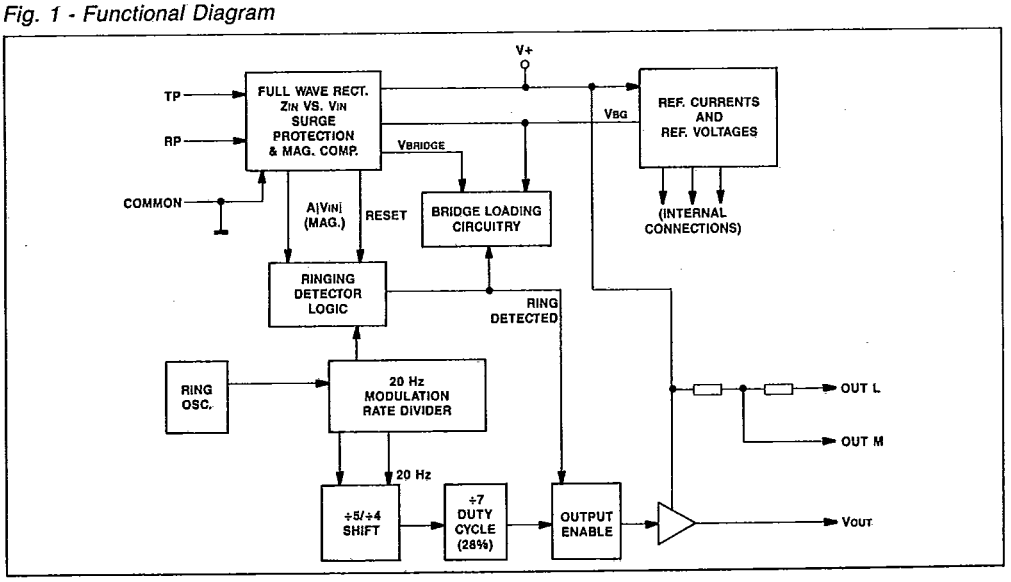
- TIGHT OUTPUT FREQUENCY CONTROL (±3%) FOR MAXIMUM ACOUSTIC OUTPUT
- EXTERNAL COMPONENTS REQUIRED ARE TWO CAPACITORS AND ONE RESISTOR
- MEETS BOTH TYPE A AND B RINGING REQUIREMENTS (40 V_{RMS} < V_{IN} < 150 V_{RMS}, 15 Hz < f_{IN} < 68 Hz) AS SPECIFIED BY EIA RS-470 ON FCC PART 68
- IMMUNE TO ROTARY DIAL PULSING (BELL TAP)
- MEETS INPUT IMPEDANCE CRITERIA SPECIFIED BY EIA RS-470 AND AT&T TECHNICAL PUBBLICATION 47001
- POLARITY GUARD PROVIDES 2000V LIGHTNING SURGE PROTECTION WHEN CONNECTED AS IN FIG. 8
- ON CHIP VOLUME CONTROL RESISTORS PROVIDED
- PROVIDES ESSENTIALLY NO LOADING UNDER NON-RINGING CONDITIONS
- RINGER EQUIVALENCY: 0.8 B WHEN CONFIGURED AS IN FIG. 8.

Minidip Plastic

ORDERING NUMBER: LB1005AB (MINIDIP-A)
LB1005BB (MINIDIP-B)

These devices provide a telephone alerter function with an output tone warbling between the base frequency and 1.25 times that of the base frequency, at a 20Hz modulation rate. Both devices meet all known standard criteria for telephone alerters, and also drive piezoelectric transducers directly. The LB1005AB is a tone ringer having an 1800Hz base frequency, and is particularly suited for applications where space for the alerter is at a premium. The LB1005BB is a tone ringer having a 1200Hz base frequency. This device produces a more pleasing tone where required space is available for the alerter.

Fig. 1 - Functional Diagram



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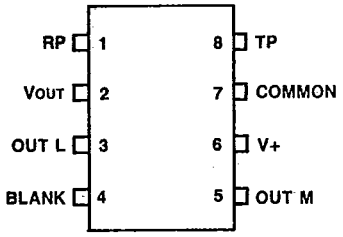
PIN CONFIGURATION



PIN DESCRIPTION

Pin	Symbol	Description
1 8	TP RP	Tip Prime (TP) and Ring Prime (RP) are the inputs to the device. AC ringing signals from the telephone line energize the detector circuit.
2	V_{OUT}	Tone ringer output which drives the alerter.
3	OUTL	Control option for lower volume output.
4	Blank	This pin may be used as a tie point for external components. Voltage applied to this pin should not exceed 30 volts.
5	OUTM	Control option for medium volume output.
6	V+	Internal supply voltage. This voltage is usually derived from the AC signal which is present on the Tip-Ring pair. This pin must have a 10 μF capacitor to common for energy storage and «smoothing» purposes. For «stand alone applications», an external voltage may be used to bias this pin.
7	Common	Circuit Common (not necessarily physical or system ground).

ABSOLUTE MAXIMUM RATINGS (at 25°C unless otherwise specified)

Parameter	Value	Unit
Operating Voltage (V+ – RP)	30	V
Operating Voltage (V_{OUT} – RP)	30	V
Operating Current (TP or RP)	±100	mA
Output Current (V_{OUT})	±30	mA
Non-Recurrent Peak Surge Current, TP or RP (t≤1ms)	±500	mA
Ambient Operating Temperature Range	–20 to +75	°C
Storage Temperature Range	–40 to +125	°C
Pin Temperature (Soldering 15 sec)	300	°C
Power Dissipation (Package Limitations)	600	mW

Stresses in excess of those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. This is a stress rating only and functional operation of the device at these or any other conditions in excess of those indicated in the operational sections of this specification is not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

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ELECTRICAL CHARACTERISTICS (at 25°C unless otherwise specified)

Parameter	Test Conditions		Min	Typ	Max	Unit
Power Supply Current	V+ = 28V	(See Fig. 2)	200	455	900	μA
Power Supply Current	V+ = 15V	(See Fig. 2)	200	450	800	
TP Current, No Load	V_{TP-RP} = 20V[1]	(See Fig. 3)	250	585	850	
RP Current, No Load	V_{TP-RP} = −20V[1]	(See Fig. 3)	−250	−585	−850	
Input Threshold Voltage, TP or RP	V+ = 10V[2]	(See Fig. 4)	6.0	7.4	8.0	V
I_{TP}	V_{TP-RP} = 4.5V	(See Fig. 5)	—	32	65	μA
	V_{TP-RP} = −4.5V	(See Fig. 5)	—	−32	−65	
Clamp Voltage	I_{TP} = 20mA[3]	(See Fig. 6)	22.5	25.8	33	V
Clamp Voltage	I_{TP} = −20mA[3]	(See Fig. 6)	−22.5	−25.8	−33	
Clamp Voltage	I_{TP} = 100mA[3]	(See Fig. 6)	—	3.6	5.5	
Clamp Voltage	I_{TP} = −100mA[3]	(See Fig. 6)	—	−3.6	−5.5	
Frequency	V+ = 15V[4] (See Fig. 7, Note 6)	LB1005AB	1746	1800	1854	Hz
	V_{TP} = 15V V_{RP} = 0	LB1005BB	1164	1200	1236	
Modulation Rate	I_{TP} = 10mA[5]	(See Fig. 7, Note 7)	16	20	24	

NOTES:

1. The specified current is measured after ringing has been detected (30 to 40 ms).
2. With the proper voltage applied to V+, the threshold voltage is defined as the TP-RP voltage at which the device detects a ringing signal, as seen at the LED OUT pin or the alerter output (V_{OUT}-Common).
3. The potential between TP and RP is measured with the specified current at TP.
4. The output frequency and modulation rate between V_{OUT} and Common are measured with the specified voltage at V+, TP and RP. These measurements are obtained after ringing has been detected (30 to 40 ms).
5. The output frequency and modulation rate are measured with the specified current at TP and after ringing has been detected (30 to 40 ms).

TEST CIRCUITS

Fig. 2

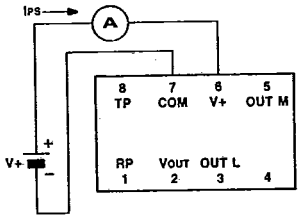
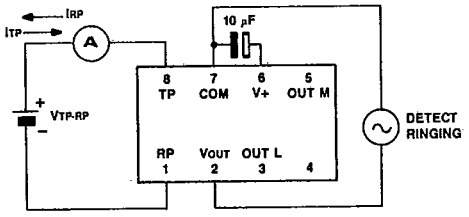


Fig. 3



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TEST CIRCUITS (Continued)

Fig. 4

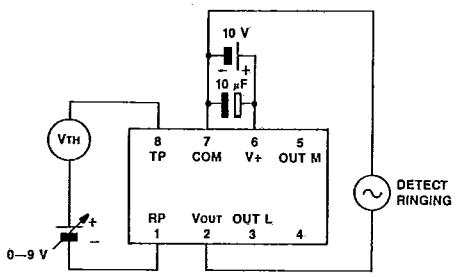


Fig. 5

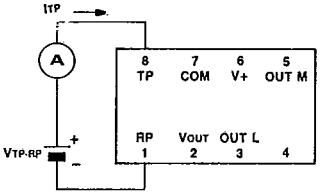


Fig. 6

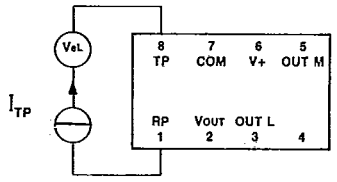
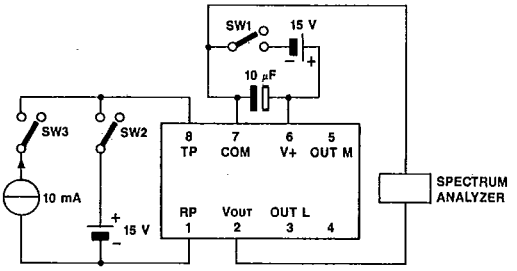


Fig. 7



Notes: 6: Measure Frequency with SW1 and SW2 closed; SW3 open.
7: Measure Modulation Rate with SW1 and SW2 open; SW3 closed.

APPLICATION

The LB1005AB or the LB1005BB requires only two capacitors, one resistor, and an alerter to provide tone ringing functions from any standard Tip-Ring telephone pair. These devices operate over widely varying ringing waveforms (15 to 68 Hz at 40 to 150 V_{RMS}). A tone ringer derives its power by rectifying the AC ringing signal from the Tip-Ring pair of a telephone loop. It uses this power to activate a tone generator, and then transfers most of this power to an alerter after the ringing has been detected. There is essentially no loading under non-ringing conditions. Selectable on-chip resistors allow the volume of the alerter output to be adjusted (see application circuit in Fig. 8). This device does not have to depend upon power derived from the Tip-Ring inputs to become operational. Connecting an external voltage source to V+ will also allow the device to operate in what is described as «stand alone applications». The tone generator circuitry includes an oscillator and frequency divider which produce specified tones and the tone modulation rate. The LB1005BB has an output warble frequency range of 1200 to 1500 Hz at a 20 Hz modulation rate. The LB1005AB has an output warble frequency range of 1800 to 2250 Hz at a 20 Hz modulation rate.

APPLICATION (Continued)

Figure 8 - Typical Application