M-988 MF R1 Receiver

The Teltone® M-988 Multifrequency Receiver is a high-quality circuit module intended for use in detection of trunk signals as outlined in AT&T and Bellcore MF Standards, and in CCITT recommendations for System R1 and Signaling System Number 5.

Using advanced circuit integration techniques, the M-988 provides the high performance demanded of such devices—in a compact form. The power consumption of the M-988 is less than half that of similar devices.

Features

- Meets Bellcore, AT&T, and CCITT standards
- 2-of-6 outputs
- ±5 volt supply, low power
- Tone error indicator
- Gain adjustment with external resistor
- Compact package

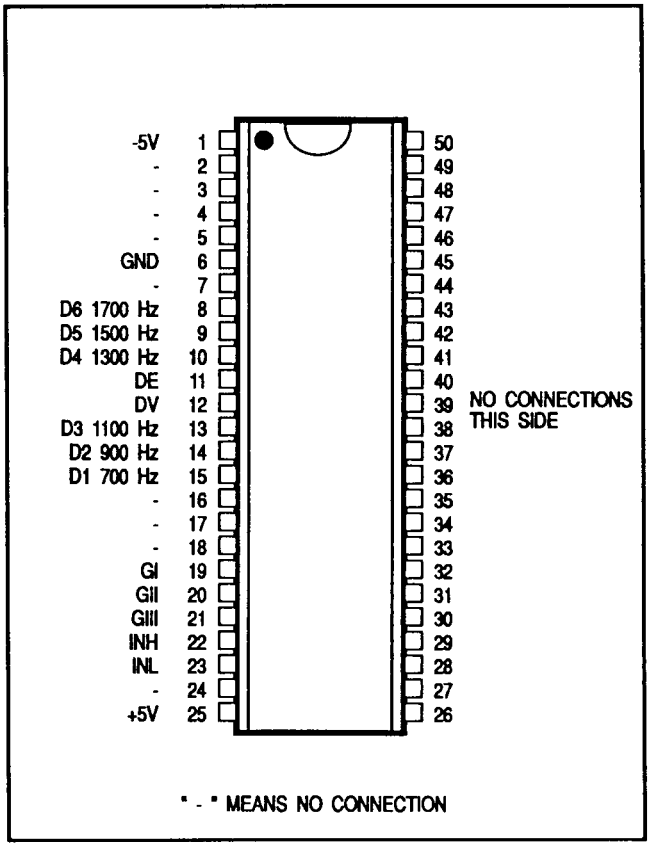

Figure 1 Pin Diagram

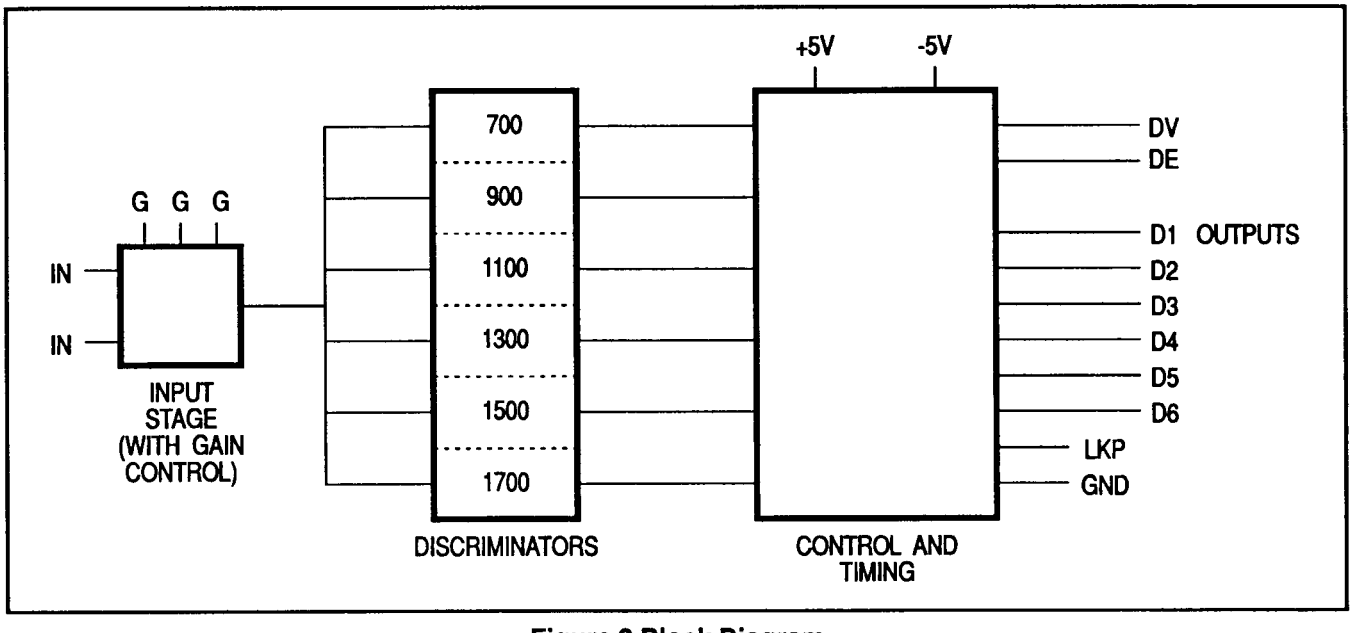

Figure 2 Block Diagram

Table 1 Specifications				
Parameter	**Min**	**Max**	**Units**	**Notes**
Receive frequency tolerance	±(1.5% + 5 Hz)			
Detect level	-34	-5	dBm	600 ohm
Not-detect level		-43	dBm	
Detect time (all sigs)	30		ms	Pin 27 open or at ground
Detect time (KP only)	55		ms	Pin 27 at +5 V
Tone burst mask timing		10	ms	
Interval detect timing	20		ms	
Interval mask timing		10	ms	
C-message S/N ratio	20		dB	
Power consumption		25	mA	Nominal V
Operating temeperature	0	+70	°C	Ambient
Output drive	1		mA	0.5 V off either rail
Dimensions: 2.25 x 2.65 x 0.5 inches maximum (57 x 67 x 12.7 mm)				

Table 2 Timing Specifications					
Parameter		**Symbol**	**Min.**	**Max.**	**Units**
Tone time, KP (LKP = V_{DD})	detect	T_{on}	55	—	ms
	reject	T_{on}		30	ms
Tone time, KP (LKP = D_{GND})	detect	T_{on}	30	—	ms
	reject	T_{on}		10	ms
Tone time, all others	detect	T_{on}	30	—	ms
	reject	T_{on}	—	10	ms
Pause time	detect	T_{pse}	20	—	ms
	reject	T_{br}	—	10	ms
Data setup time		T_{su}	6	—	µs
Data hold time		T_H	7	—	µs
Tone skew tolerance		Tskew	—	4	ms
Strobe pulse width		—	20	—	ms
Strobe separation		—	20	—	ms
Rise time DV, DE, D0-D5, 10-90%	CL = 20 pF	T_r	—	100	ns
Fall time DV, DE, D0-D5, 10-90%	CL = 20 pF	T_f	—	100	ns
Data enable time	CL = 20 pF	T_{en}	—	100	ns
Data disable time		T_{dis}	—	100	ns
Strobe reset time	CL = 20 pF	T_{rst}	—	100	ns

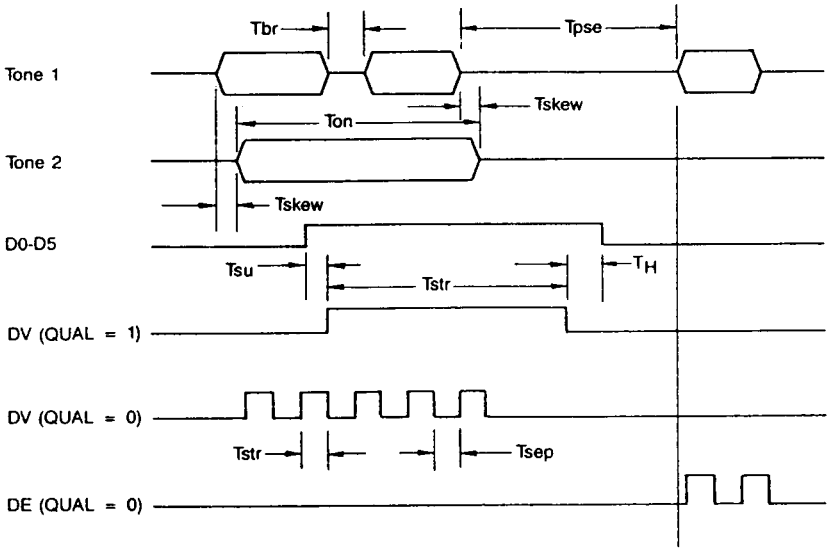

Figure 3 Timing Diagram

Table 3 M-988 Sensitivity Data			
GI to GII	**+dB**	**GII to GIII**	**-dB**
51K	1.5	51K	-1.5
36K	2.1	36K	-2.1
27K	2.7	27K	-2.7
20K	3.5	20K	-3.5
15K	4.4	15K	-4.4
10K	6	10K	-6

Notes:
1. Power requirement: Total 25 mA max, -5 Volt 7 mA max.
2. Tip and Ring: Tip to INH, Ring to INL, differential amplifier inputs are capacitivity coupled.
3. Strobe pins DV and DE: Valid data is indicated on the DV strobe pin, and data errors are indicated on the DE strobe pin. Whenever a valid 2 of 6 code has been detected, the DV strobe rises and remains high until the code stops. When an invalid code is detected, e.g., 1 of 6, 3 of 6, etc., the DE strobe remains high until all errors stop or a valid tone pair is detected. The DV and DE strobes will never be high simultaneously.

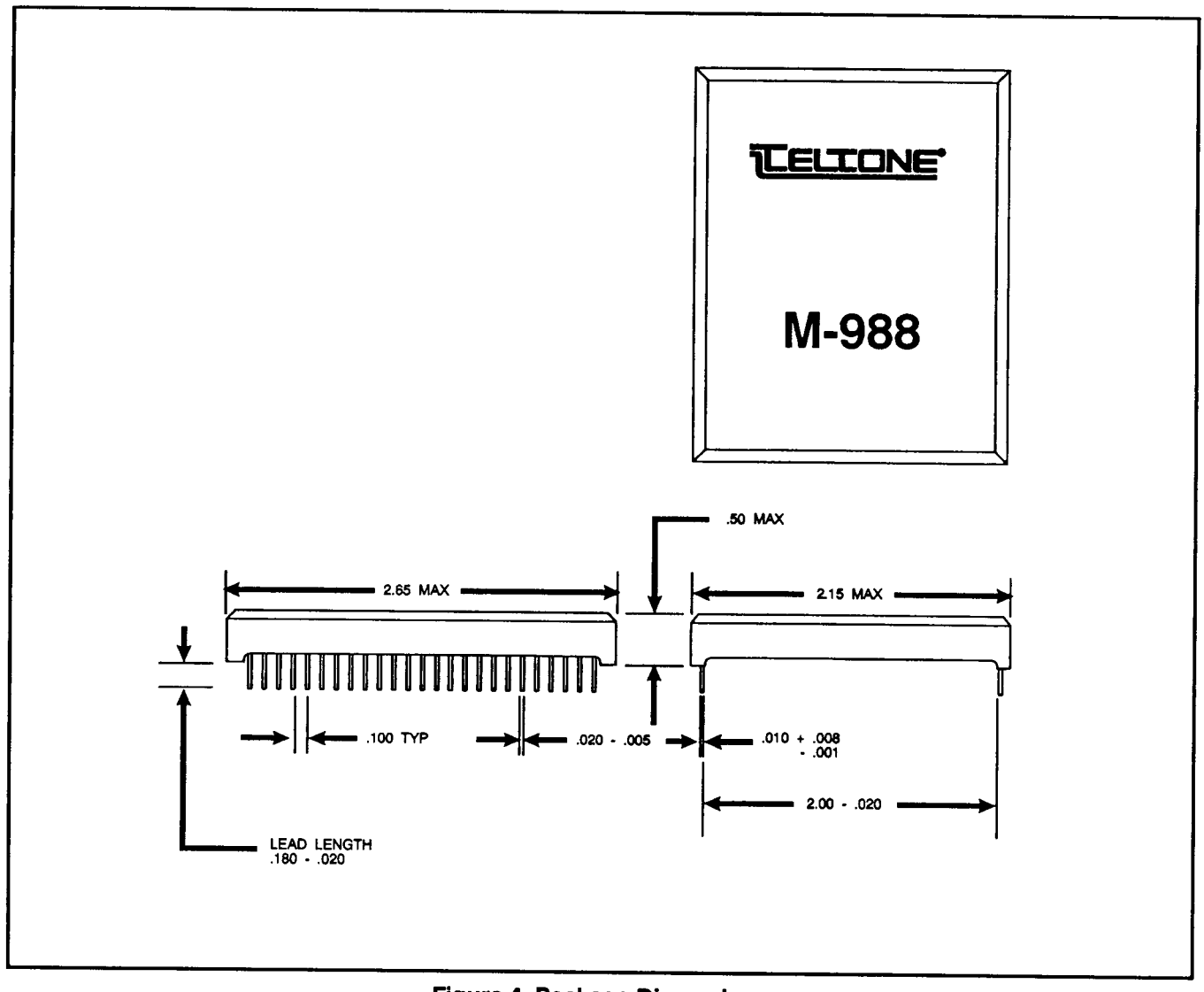

Figure 4 Package Dimensions