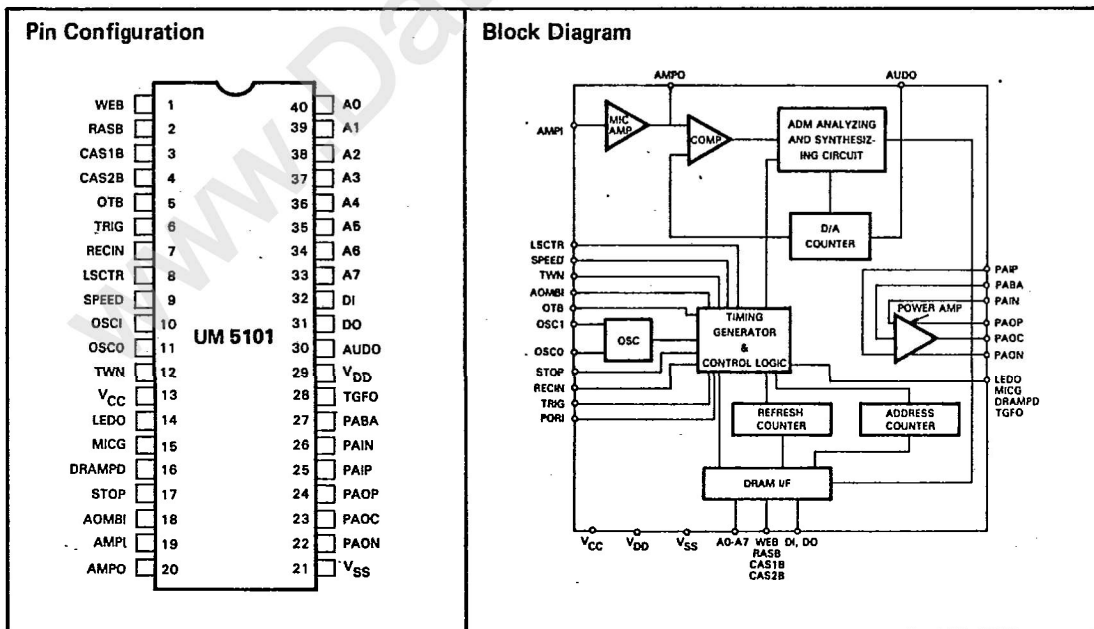**UMC**

UM5101

Voice Recording and Reproducing

ADVANCED PRODUCT DESCRIPTION

Features

- DRAM is used as a voice data memory. One or two 64K DRAM can be selected by pin

- Bit rates can be selected by changing oscillator frequency and pin control (8K-32K bps)

- Built-in voice recording mic-amplifier and voice reproducing power amplifier minimizes the external components to a minimun

- Built-in 8-bit D/A converter

- The RC oscillator makes sample rate changing feasible

- Low stand-by current in stand-by mode

- Talking back mode and manual control mode is selected

- Single power supply (Vmax. = 9V)

General Description

UM5101 is an ADM voice recording & reproducing IC. Voice data is stored in external DRAM which can be directly connected to UM5101.

Pin Configuration

WEB	1	A0 40
RASB	2	A1 39
CAS1B	3	A2 38
CAS2B	4	A3 37
OTB	5	A4 36
TRIG	6	A5 35
RECIN	7	A6 34
LSCTR	8	A7 33
SPEED	9	DI 32
OSCI	10	DO 31
OSCO	11	AUDO 30
TWN	12	V_DD 29
V_CC	13	TGFO 28
LEDO	14	PABA 27
MICG	15	PAIN 26
DRAMPD	16	PAIP 25
STOP	17	PAOP 24
AOMBI	18	PAOC 23
AMPI	19	PAON 22
AMPO	20	V_SS 21

UM 5101

Block Diagram

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UM5101

Electric Characteristics

Operation Voltage 9V
Stand-by Current . . . .   Typical 2μA at V_{DD} = 5V
Output Buffer Current
    LEDO 6mA
    TGFO 5mA
    MICG 1.5mA
    DRAMPD 2.5mA
    Others 0.5mA

Functional Description

The operation of UM5101 is very simple.   It can be generally described in the following state diagram below:
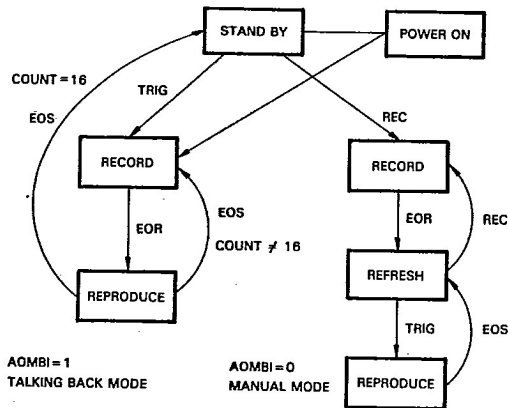
REC = RECIN pin is triggered
TRIG = TRIG pin is triggered
EOR = End Of Record
EOS = End Of Speech

Talking Back Mode

It will enter the record state after power is on or the TRIG pin is stimulated in stand-by state. When the recording has been completed, it will automatically change to reproduce state. If the counting number is less than sixteen, it will go to record state again after reproducing is finished. This procedure will continue until the counting number equals to sixteen. After that, it goes to standby state.

Manual Mode

In this mode   it will stay in stand-by only after power on. The trigger of the REC pin makes it enter the record state. After the end of the record, it goes to refresh state in order to keep the DRAM data.   It can enter the reproduce state when it is in refresh state and TRIG pin is stimulating.   However it must return to refresh state after the end of recording or reproducing.

Pin Description
AMPI, AMPO

Microphone amplifier input and output.   Amplifier's gain can be control via external resistor which connects between these two pins.

LSCTR

Low speed control pin is used to guarantee the RAS width meets the requirement of DRAM. When low sample rate is desired. This pin should be in "H" level and the sample rate is equal to $f_{OSC}/32$ (f_{OSC} = Oscillating frequency). When normal this pin is in "L" level and the sample rate is $f_{OSC}/16$. However this pin should be in "H" when sample rate is below 12.5KHz.

SPEED

Speed controls the output voice rate.   As this pin is in "H" level, the output rate will increase by two during voice reproduction.

TWN

If this pin is in "H" level, the voice output will be reproduced twice after each trigger

AOMBI

Automatic or manual mode control pin indicate the current mode of this IC. When this pin is in "H", it is in talking back mode. After a trigger it will start to record the voice and then reproduce it.   The process will be carried out 16 times.   When this pin is in "L", it is in manual mode. It will stay in stand-by after power is on. If REC pin is triggered, it will start to record and go to refresh state after recording end. Then it will enter record or reproduce state by stimulating RECI pin or TRIG pin.

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OTB

This pin is used to indicate one or two DRAMs being connected externally. When OTB is "H", one DRAM is connected. It should be "L" if two DRAMs are connected.

OSCI, OSCO

Oscillator input and output pin. A resitor is placed between these two pins in order to oscillate. If 11 pin OSCO is triggered low, the talking back function will pause for a period as long as trigger time.

STOP

If talking back operates over two times and the STOP pin is triggered by high, then talking back function will immediately stop.

RECIN

In manual mode, it will enter record state when this pin is triggered.

TRIG

In talking back mode, it will carry out record and reproduce 16 times, when this pin is triggered. In manual mode, it will enter reproduce state when this pin is triggered, a CdS can be used to trigger this pin.

V_{DD}, V_{SS}

Power pins.

A0 ~ A7

DRAM address pins.

WEB, RASB, CAS1B, CAS2B

DRAM control timing pins.

DI, DO

DRAM data input and output pins.

LEDO

N-channel open drain output. It will stay in "L" during the record state.

MICG

N-channel open drain output. It will stay in "L" during the record state.

DRAMPD

N-channel open drain output. It will stay in "L" when it is not in standby state.

TGFO

P-channel open drain output. It will stay in "H" during the reproduce state.

PAIP, PABA, PAIN, PAOP, PAOC, PAON

Power amplifies input and output pins. PAIP is positive terminal. PAOP is used to drive PNP transistor. PAON is used to drive NPN transister. PAOC is connected to output push-pull. PAIN is negative terminal. PABA is bias input pin.
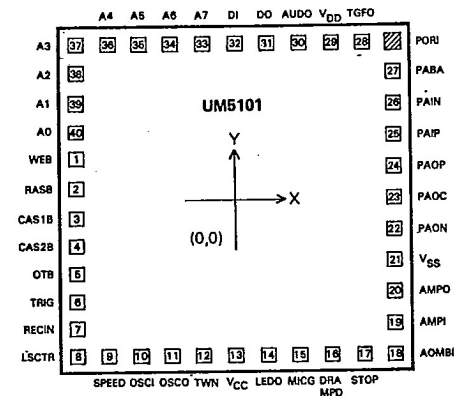
AUDO

D/A reproducing output.

V_{CC}

Power supply for logic-level conversion. The high level of output pins: A0-A7, DI, RASB, CAS1B, CAS2B, WEB is "V_{CC}". V_{CC} should less than or equal to V_{DD}.

Barding Diagram

Pad No.	X	Y	Pad No.	X	Y
1.	−1352.04	485.90	21.	1368.04	−489.46
2.	−1360.93	274.57	22.	1389.89	−263.40
3.	−1352.04	24.38	23.	1368.04	−27.43
4.	−1352.04	−204.47	24.	1368.04	226.06
5.	−1352.04	−440.94	25.	1368.04	454.91
6.	−1360.93	−680.47	26.	1368.04	694.44
7.	−1360.93	−927.10	27.	1368.04	937.51
8.	−1312.93	−1180.59	▨	1368.04	1163.57
9.	−1082.55	−1173.48	⁻28.	1003.05	1183.89
10.	−839.47	−1180.59	29.	781.56	1180.59
11.	−595.88	−1169.92	30.	494.54	1180.59
12.	−376.43	−1173.48	31.	277.62	1191.01
13.	77.47	−1253.49	32.	46.99	1180.59
14.	286.00	−1253.49	33.	−166.12	1183.89
15.	550.93	−1253.49	34.	−391.92	1183.89
16.	764.03	−1253.49	35.	−609.09	1183.89
17.	1038.10	−1197.61	36.	−826.52	1180.59
18.	1263.90	−1187.45	37.	−1052.58	1183.89
19.	1368.04	−958.09	38.	−1352.04	1152.91
20.	1368.04	−711.45	39.	1360.93	930.40
			40.	1352.04	708.41

unit: μm
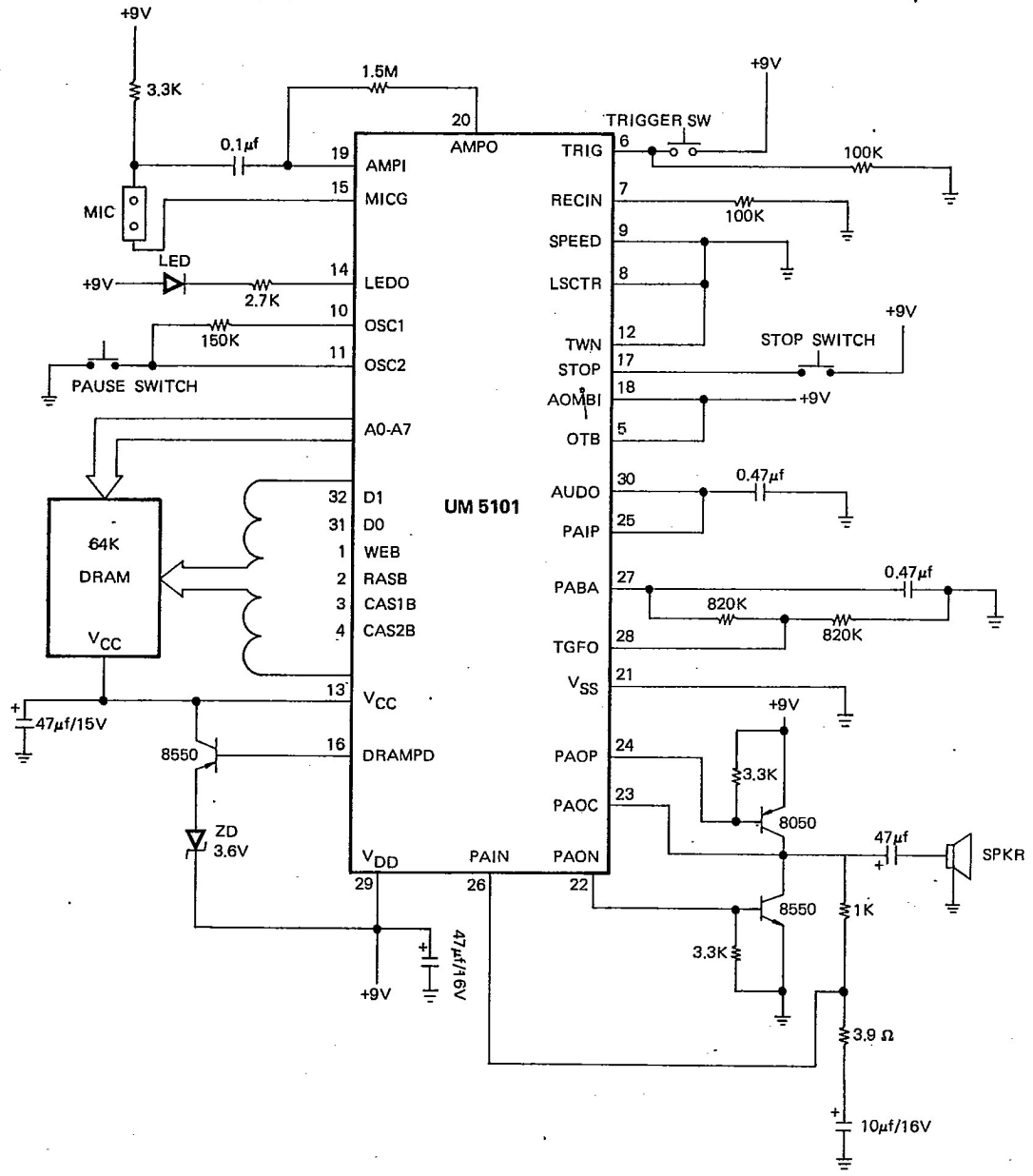
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Application Circuit

(For Talking Back Mode)

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Application Circuit

(For Talking Back Mode)

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Application Circuit

(For Talking Back Mode)

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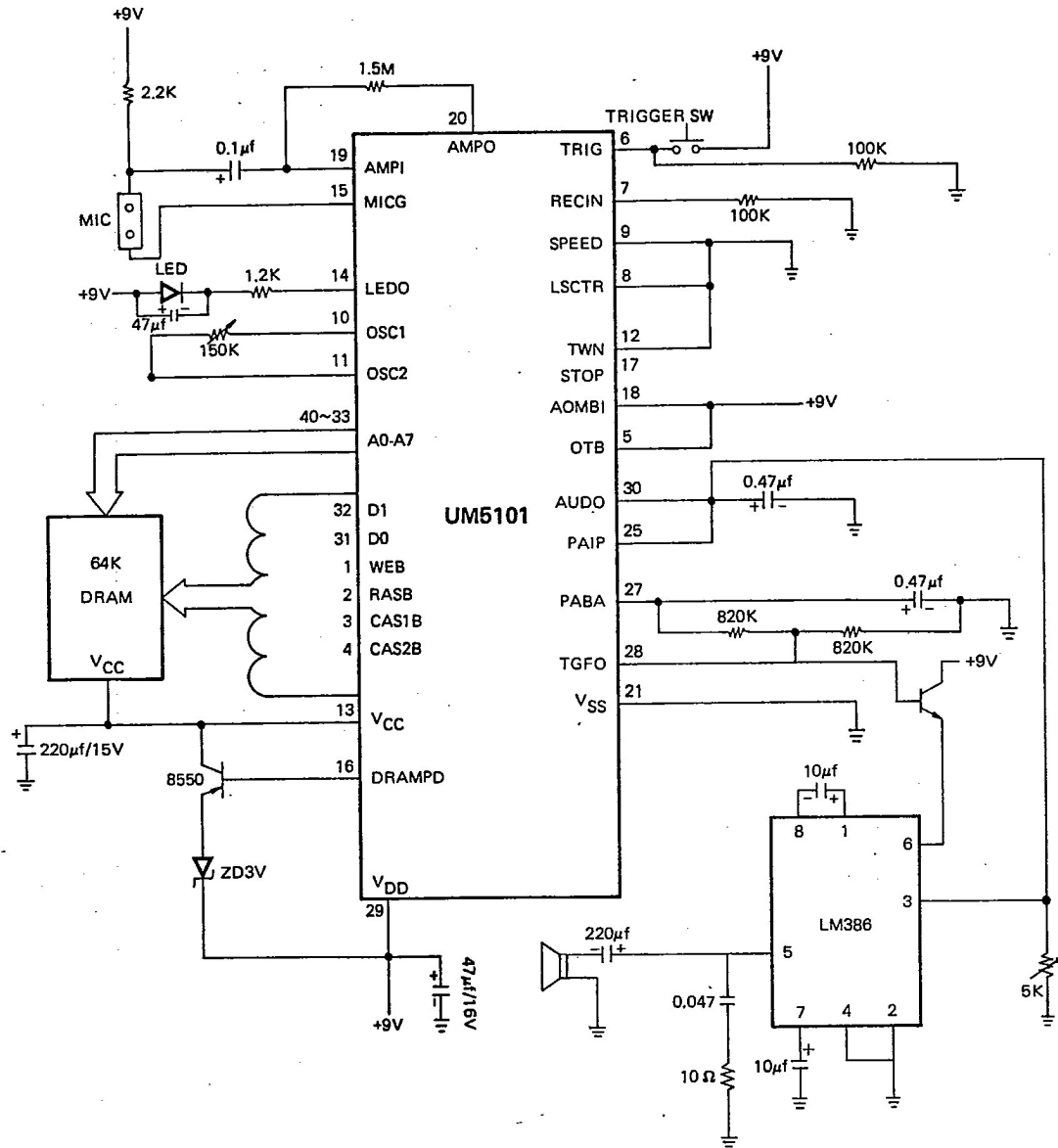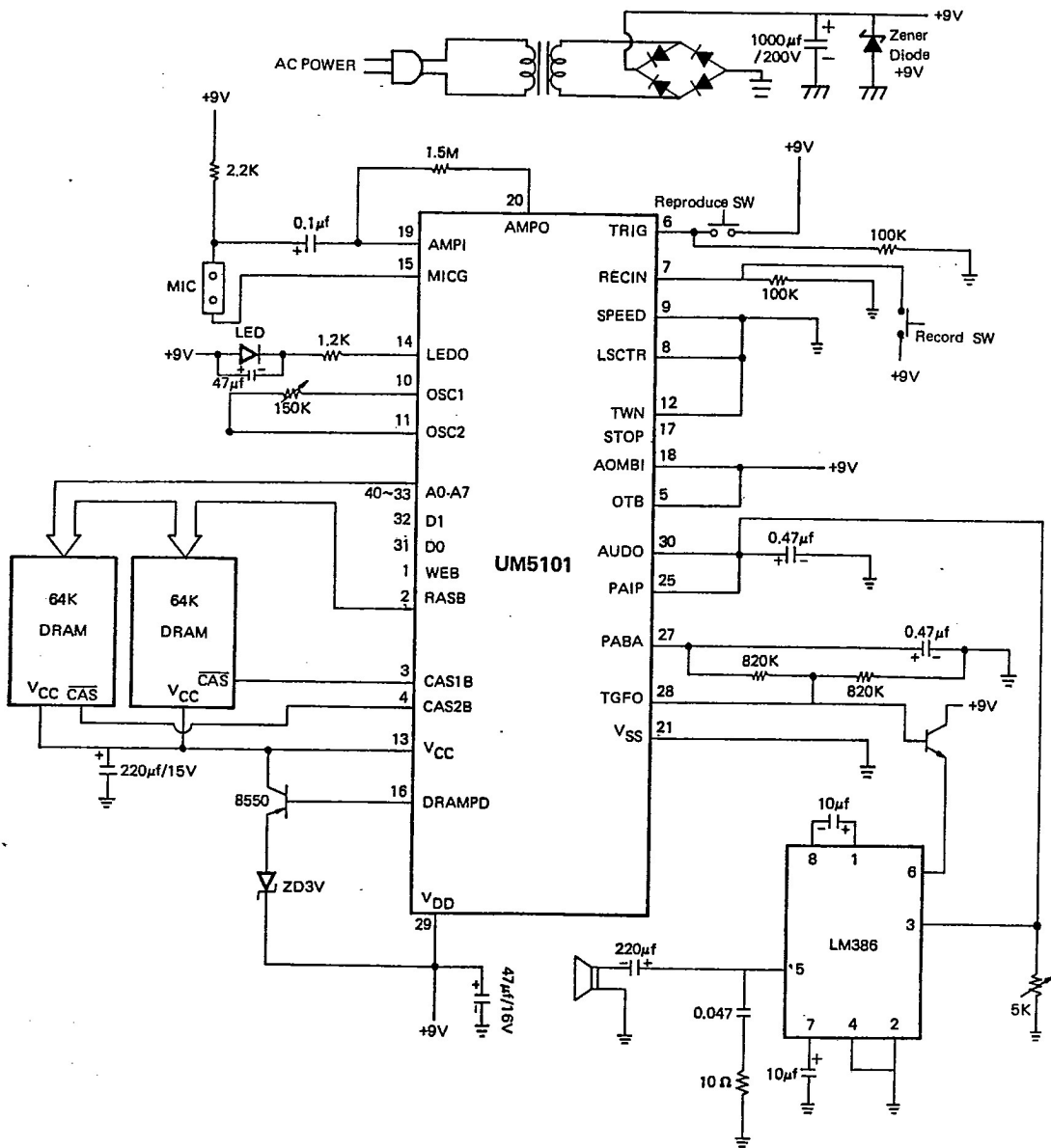
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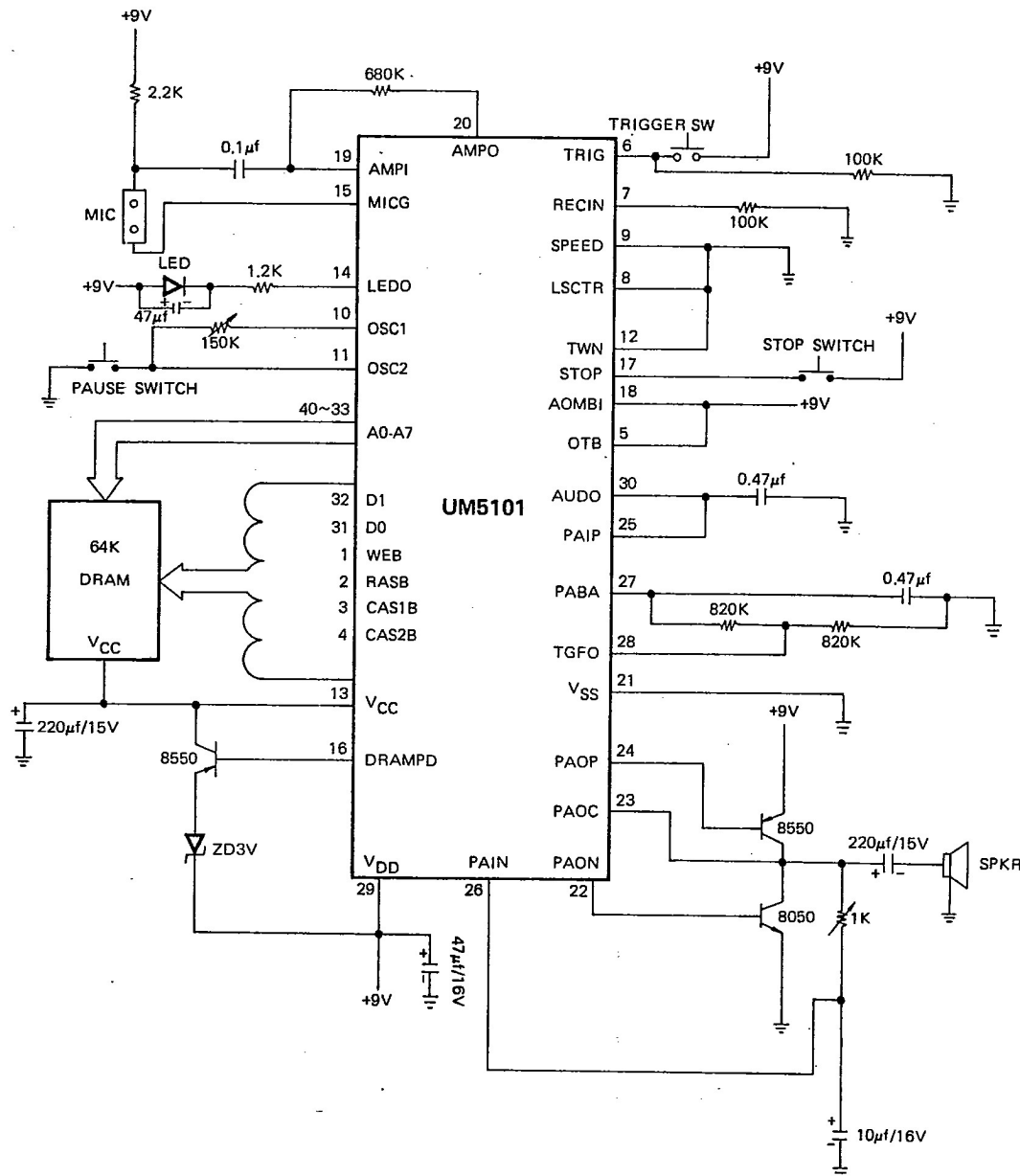
UM5101

Application Circuit

(For Message Box with AC Power)

AC POWER

1000μf /200V   Zener Diode +9V   +9V

+9V

2.2K

1.5M

20 AMPO

0.1μf

19 AMPI

15 MICG

MIC

LED

1.2K

+9V

14 LEDO

47μf

10 OSC1

150K

11 OSC2

40~33 A0-A7

32 D1

31 D0

1 WEB

2 RASB

UM5101

64K DRAM   Vcc CAS

64K DRAM   Vcc CAS

3 CAS1B

4 CAS2B

220μf/15V

13 Vcc

8550

16 DRAMPD

ZD3V

Vdd

29

+9V

47μf/16V

TRIG 6   Reproduce SW

RECIN 7   100K

100K

SPEED 9

LSCTR 8

Record SW

+9V

TWN 12

STOP 17

AOMBI 18   +9V

OTB 5

AUDO 30   0.47μf

PAIP 25

PABA 27   0.47μf

820K

TGFO 28   820K

Vss 21   +9V

10μf

8 1

6

3

LM386

220μf

5

0.047

7 4 2

10 Ω

10μf

5K

6-17