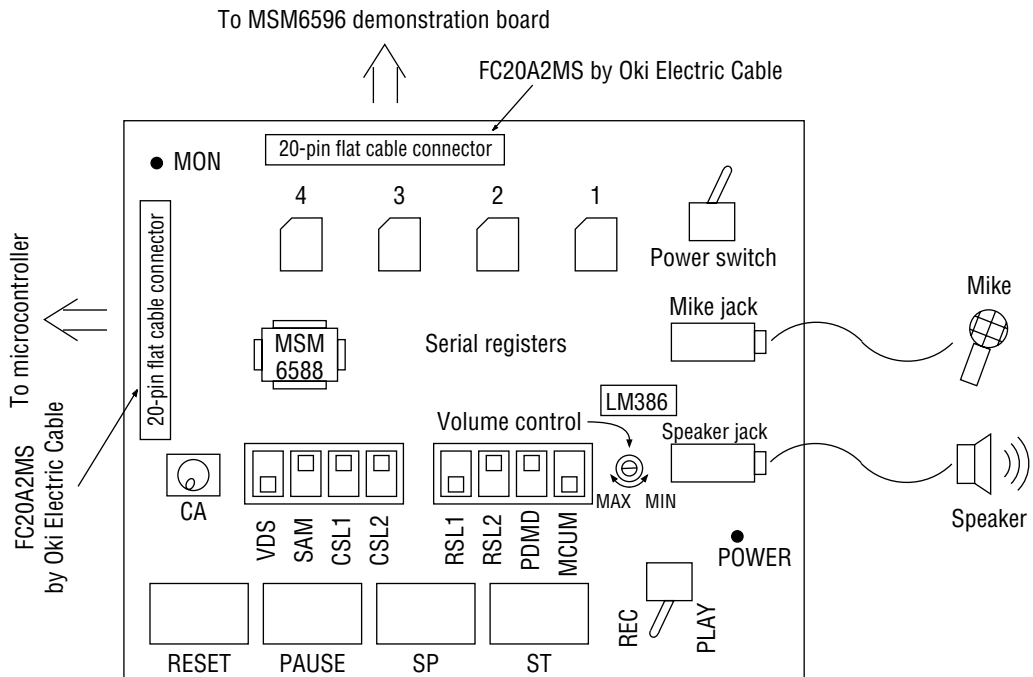**OKI** Semiconductor

MSM6588 DEMO BOARD

MSM6588 Demonstration Board

BOARD DESIGN

CONDITIONS SETTING PROCEDURE

Set the recording conditions with the two DIP switches and one rotary switch. After setting the switches, recording for 85 seconds can be done using the two serial registers of 1M-bit at 8 kHz sampling (3-bit ADPCM 8 kHz sampling).

1.   Set MCUM of the DIP switch to OFF.
      The MSM6588 enters the stand-alone mode. (When the MCUM is set to ON the MSM6588 enters the microcontroller interface mode.)

2.   Set RSL1 and RSL2 of the DIP switches as shown in the table below depending on the number of serial registers mounted.

RSL2	OFF		ON	
RSL1	OFF	ON	OFF	ON
Number of serial registers	256K or 512K-bit 1pc.	1M-bit 1pc.	1M-bit 2pcs.	1M-bit 4pcs.

3.   Specify the control mode and channel number for recording by CSL1 and CSL2 of the DIP switch.

CSL2	OFF		ON	
CSL1	OFF	ON	OFF	ON
Control mode	Fixed mode			Flex mode
Number of channels	8-word	4-word	2-word	8-word

Fixed mode:

The recording time of each channel is the time equivalent of the memory capacity equally divided by the memory capacity of the external serial registers and the number of channels.

The recording of each channel can be obtained from the following equations.

$$\text{Recording time} = \frac{1.024 \times 1024 \text{ (K bit)} \times \text{Number of serial registers}}{\text{Sampling frequency (kHz)} \times 3 \text{ (bit)} \times \text{Number of channels}} \text{ (sec)}$$

For example, the recording time for each channel with two serial registers on two channels at the sampling frequency of 8 kHz (RSL1=OFF, RSL2=ON, CSL1=OFF, CSL2=ON and SAM=ON) is as shown below.

$$\text{Recording time} = \frac{1.024 \times 1024 \text{ (K bit)} \times 2}{8 \text{ (kHz)} \times 3 \times 2} \fallingdotseq 44 \text{ (sec)}$$

Flex mode:

The recording time of each channel becomes available within the range of the memory capacitor for the external serial registers and is recorded to ch0, ch1, ... and ch7.

4.   Set the rotary switch (CA) to the channel to be recorded.

CA	Fixed Mode			Flex Mode
	8-word	4-word	2-word	8-word
0	ch0	ch0	ch0	ch0
1	ch1			ch1
2	ch2	ch1		ch2
3	ch3			ch3
4	ch4	ch2	ch1	ch4
5	ch5			ch5
6	ch6	ch3		ch6
7	ch7			ch7

5.   Specify the sampling frequency at SAM of the DIP switch.

SAM	OFF	ON
Sampling frequency	$\dfrac{f_{osc}}{768}$	$\dfrac{f_{osc}}{512}$
f_{samp}	(5.3 kHz)	(8.0 kHz)

The frequencies within the parentheses are at the original oscillation f_{OSC}=4.096 MHz.

6.   Set the PDMD of the DIP switch to ON.

OFF: The MSM6588 enters the power-down state except recording and playback.
ON: The MSM6588 always enters the stand-by state. The time lag up to starting the playback decreases after input.

7.   Select whether or not the voice is activated by VDS with the DIP switch.

OFF: Ordinary mode, the voice is not activated.
ON: The voice is activated.

Note: When the activation of the voice is required, use the DC stabilized power supply without using the battery driving power. In the case of the battery, the power fluctuation of a few mV in starting the recording is amplified and results in determining that there is sound.

RECORDING PROCEDURE

1.   Turn the toggle switch on the upper right of the demonstration board to ON to engage power. The LED on the lower left of the demonstration board lights.

2.   Set the conditions as specified in the Conditions Setting Procedure section.

3.   Set the toggle switch on the lower right of the demonstration board to REC to select the recording mode.

4.   Press the ST button and record the voice via the mike. During recording, the LED (MON) on the demonstration board lights.

5.   When the voice is recorded to the last of the channel memory, the recording automatically finishes. To stop recording halfway through, press the SP button.

PLAYBACK PROCEDURE

1.   Set the toggle switch on the lower right of the demonstration board to PLAY to select the playback mode.

2.   Press the ST button to start the playback. During the playback, the LED (MON) comes on.

3.   When the playback is complete, the recording is automatically terminated. To stop the playback halfway through, press the SP button again.

4.   Use the volume control to adjust the playback volume.

PAUSE PROCEDURE OF RECORD/PLAYBACK

1.   When the PAUSE button is pressed during record/playback, the record/playback pauses.

2.   Press the ST button again, and the playback starts again.

Stand-alone Type

FC20A2MS by Oki Electric Cable
20-pin flat cable connector (plug)
(For microcontroller interface)

In microcontroller interface, this is not mounted

HEX SW

DIP SW

DIP SW

RA 1 100 kΩ
RA 2 100 kΩ
RA3 100 kΩ

R.ST

R2 100 kΩ

2 kΩ R 3

DGND

Mike jack

HSJ - 0186 - 01 - 031

COM MIC
LINE
SG

C10 0.47 µF R5 10 kΩ
R6 100 kΩ C14 51 pF
C11 0.4 µF
R7 10 kΩ
R8 470 kΩ C15 51 pF

AV_DD DV_DD

D1 1D01
C2 +1000 µF C1 0.1 µF R11 5.1 kΩ

AGND DGND

IC 5 — MSM6588

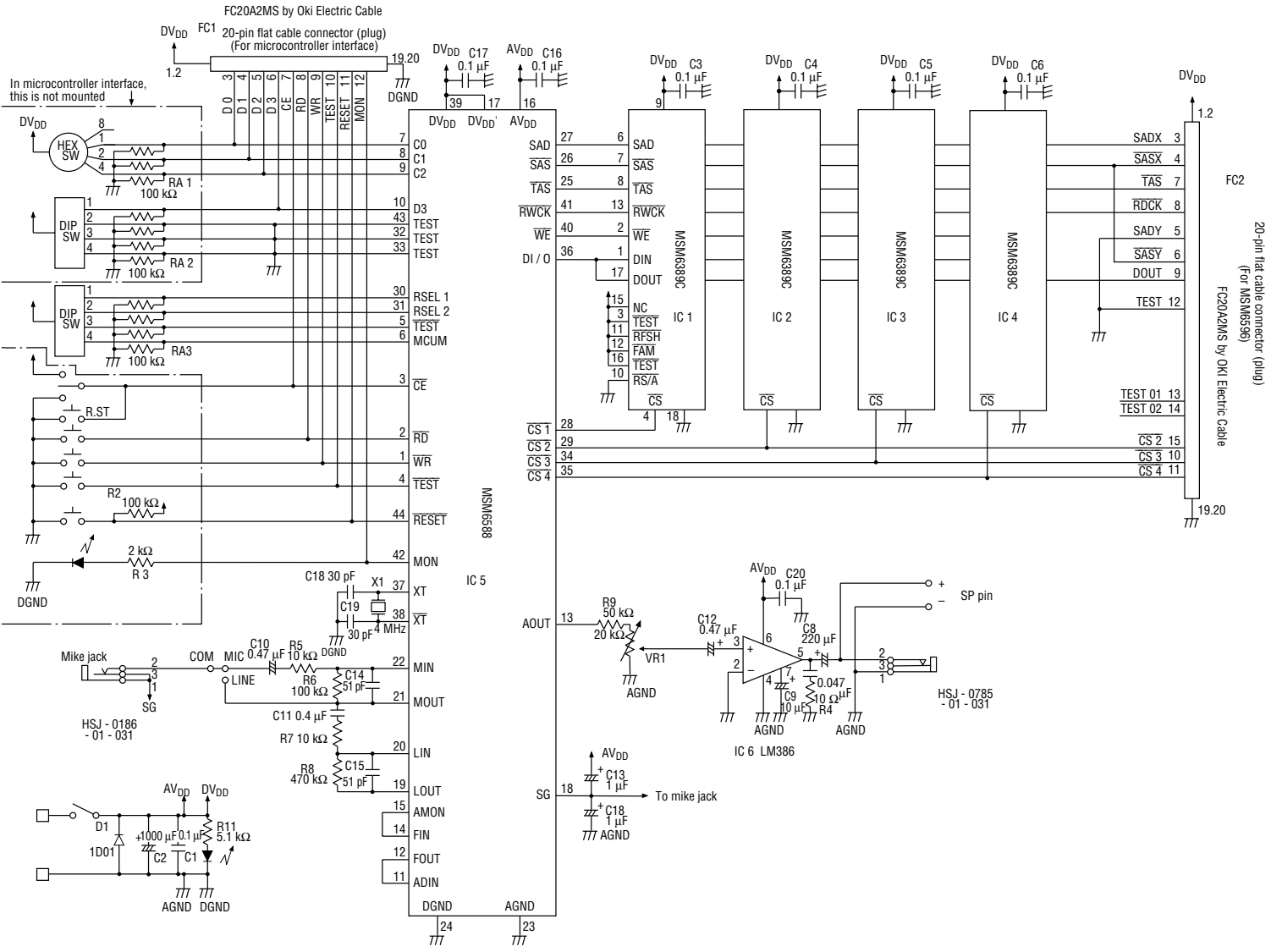| Pin	Signal
7	CA 1
8	CA 2
9	CA 3
10	VDS
43	SAM
32	CSEL 1
33	CSEL 2
30	RSEL 1
31	RSEL 2
5	PDMD
6	MCUM
3	REC / PLAY
2	ST
1	SP
4	PAUSE
44	RESET
42	MON
37	XT
38	XT
22	MIN
21	MOUT
20	LIN
19	LOUT
15	AMON
14	FIN
12	FOUT
11	ADIN
24	DGND
23	AGND

DV_DD DV_DD' AV_DD

C18 30 pF X1 4 MHz C19 30 pF

DGND

AOUT 13

SG 18

AV_DD C13 1 µF C18 1 µF AGND

To mike jack

DV_DD FC1 1.2 D0 D1 D2 D3 CE RD WR TEST RESET MON 19.20 DGND

DV_DD C17 0.1 µF 39
AV_DD C16 0.1 µF 17 16

DV_DD C3 0.1 µF 9
DV_DD C4 0.1 µF
DV_DD C5 0.1 µF
DV_DD C6 0.1 µF

IC 1 — MSM6389C

SAD 27	6	SAD
SAS 26	7	SAS
TAS 25	8	TAS
RWCK 41	13	RWCK
WE 40	2	WE
DI/O 36	1	DIN
	17	DOUT
	15	NC
	3	TEST
	11	RFSH
	12	FAM
	16	TEST
	10	RS/A
	4	CS
CS 1 28	18	

IC 2 — MSM6389C CS
IC 3 — MSM6389C CS
IC 4 — MSM6389C CS

CS 1 28 29
CS 2 29 CS 2 34
CS 3 34
CS 4 35

DV_DD FC2 1.2
20-pin flat cable connector (plug)
(For MSM6596)
FC20A2MS by OKI Electric Cable

SADX	3
SASX	4
TAS	7
RDCK	8
SADY	5
SASY	6
DOUT	9
TEST	12
TEST 01	13
TEST 02	14
CS 2	15
CS 3	10
CS 4	11
19.20	

R9 50 kΩ 20 kΩ VR1

AGND

C12 0.47 µF

AV_DD C20 0.1 µF

C8 220 µF 0.047 µF R4 10 Ω

C9 10 µF AGND

IC 6 LM386

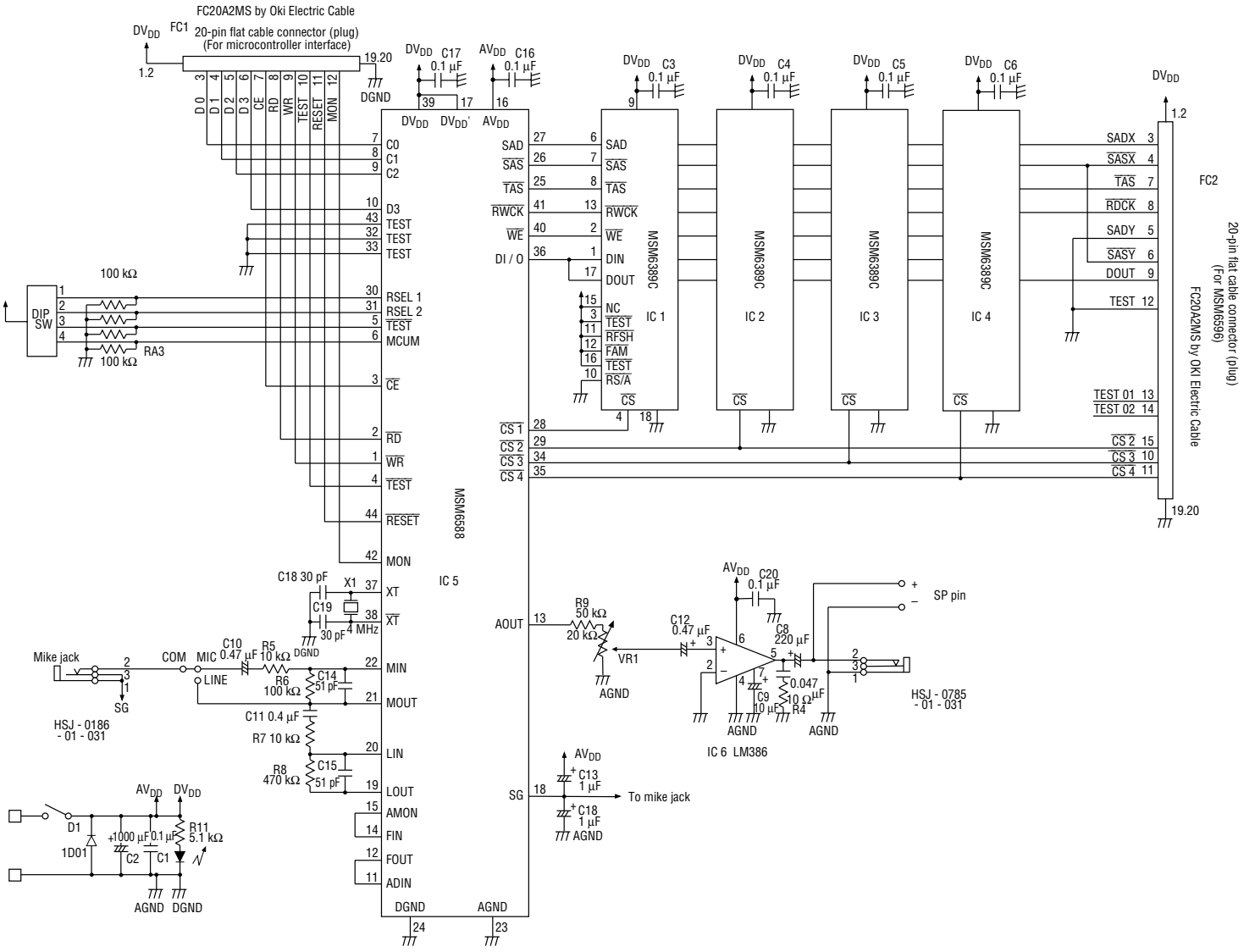+ − SP pin

HSJ - 0785 - 01 - 031

AGND

Microcontroller Interface Mode

Change method for microcontroller interface mode

Note: 10-pin (VDS), 43-pin (SAM), 32-pin(CSEL1), and 33-pin (CSEL2) should be grounded.

Microcontroller Type

FC20A2MS by Oki Electric Cable
FC1 20-pin flat cable connector (plug)
(For microcontroller interface)

DV_DD

1.2

19.20

DGND

D0 3
D1 4
D2 5
D3 6
CE 7
RD 8
WR 9
TEST 10
RESET 11
MON 12

DV_DD C17   AV_DD C16
       0.1 µF   0.1 µF
39 17   16

DV_DD DV_DD' AV_DD

DV_DD C3   DV_DD C4   DV_DD C5   DV_DD C6   DV_DD
       0.1 µF   0.1 µF   0.1 µF   0.1 µF
9   1.2

FC2

SAD   27   6 SAD   SADX 3
SAS   26   7 SAS   SASX 4
TAS   25   8 TAS   TAS   7
RWCK 41   13 RWCK   RDCK 8
WE   40   2 WE   SADY 5
DI/O 36   1 DIN   SASY 6
          17 DOUT   DOUT 9

          MSM6389C   MSM6389C   MSM6389C   MSM6389C

          15 NC   IC 1   IC 2   IC 3   IC 4
           3 TEST   TEST 12
          11 RFSH
          12 FAM
          16 TEST
          10 RS/A

CS 1 28   4   18   CS   CS   CS   TEST 01 13
CS 2 29   TEST 02 14
CS 3 34   CS 2 15
CS 4 35   CS 3 10
                                                                 CS 4 11

          FC20A2MS by OKI Electric Cable
          20-pin flat cable connector (plug)
          (For MSM6696)

          19.20

C0   7
C1   8
C2   9

D3   10
TEST 43
TEST 32
TEST 33

100 kΩ

DIP 1
SW   2
     3
     4

RSEL 1 30
RSEL 2 31
TEST   5
MCUM   6

100 kΩ RA3

CE   3

RD   2

WR   1

TEST 4

RESET 44

MON 42

MSM6588

IC 5

C18 30 pF X1
           37 XT
C19   38 XT
   30 pF 4 MHz

Mike jack
     2
COM MIC C10 0.47 µF R5 10 kΩ
     3   DGND
     1 LINE R6   C14 51 pF 22 MIN
SG   100 kΩ   21 MOUT

HSJ - 0186
- 01 - 031

C11 0.4 µF

R7 10 kΩ

R8   C15 51 pF 20 LIN
470 kΩ   19 LOUT

                     15 AMON
                     14 FIN
                     12 FOUT
                     11 ADIN

AV_DD DV_DD
       R11
D1   5.1 kΩ
       +1000 µF 0.1 µF
1D01   C2 C1

AGND DGND

DGND AGND
24   23

AOUT 13

SG   18

R9
50 kΩ
20 kΩ VR1

AGND

AV_DD C20
       0.1 µF
C12 0.47 µF 6
        3   C8
                 220 µF
        2   5
             7
        4   C9   R4
                 10 µF 0.047 10 Ω µF

AGND AGND

IC 6 LM386

+ SP pin
−

2
3
1

HSJ - 0785
- 01 - 031

AV_DD
+ C13
   1 µF

+ C18   To mike jack
   1 µF

AGND

SETTING PROCEDURE OF CONDITIONS (Microcontroller Type)

Set the recording conditions by one DIP switch.

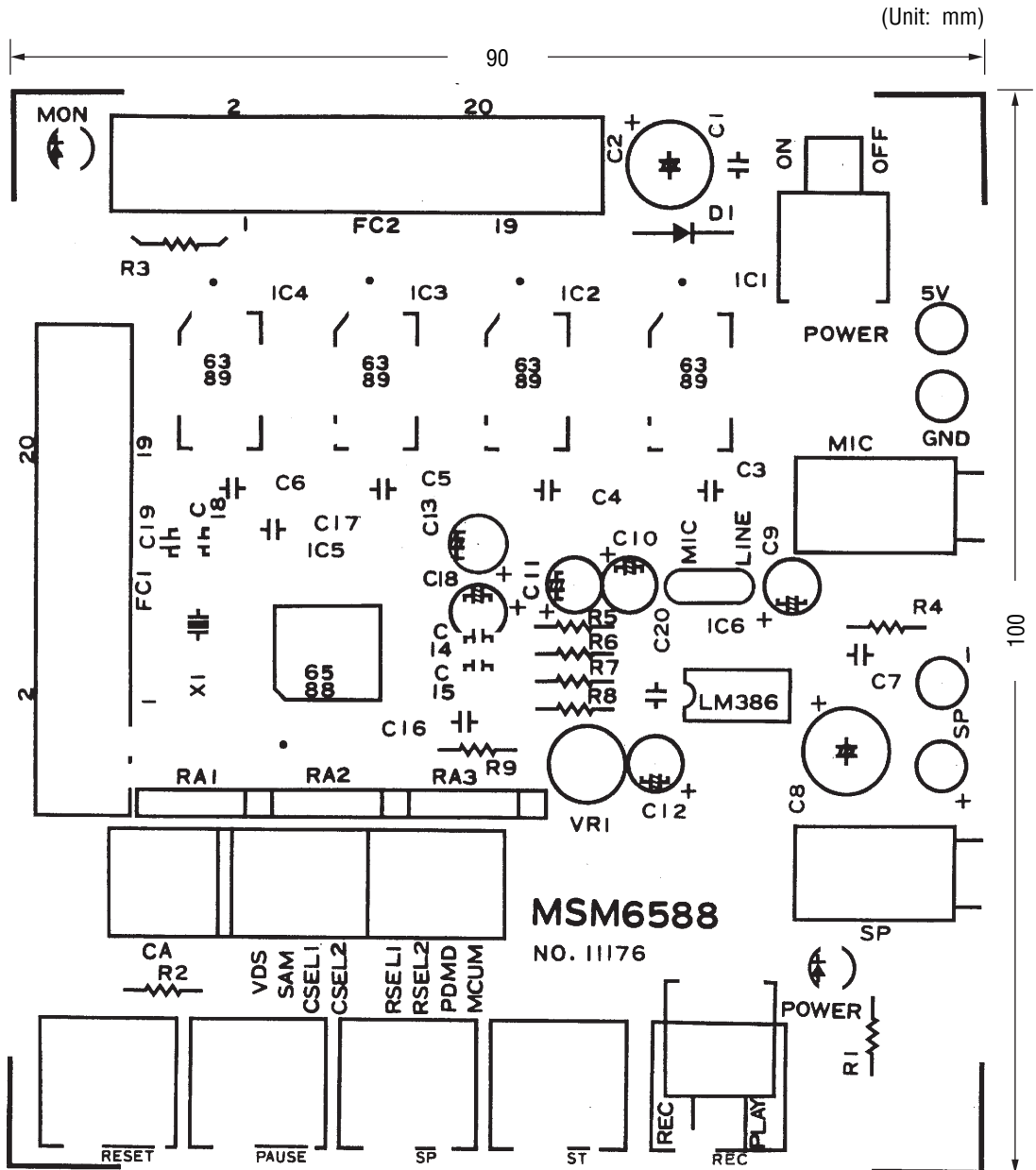Set the RSL1 and RSL2 of DIP switch as listed below according to the number of serial registers to be mounted.

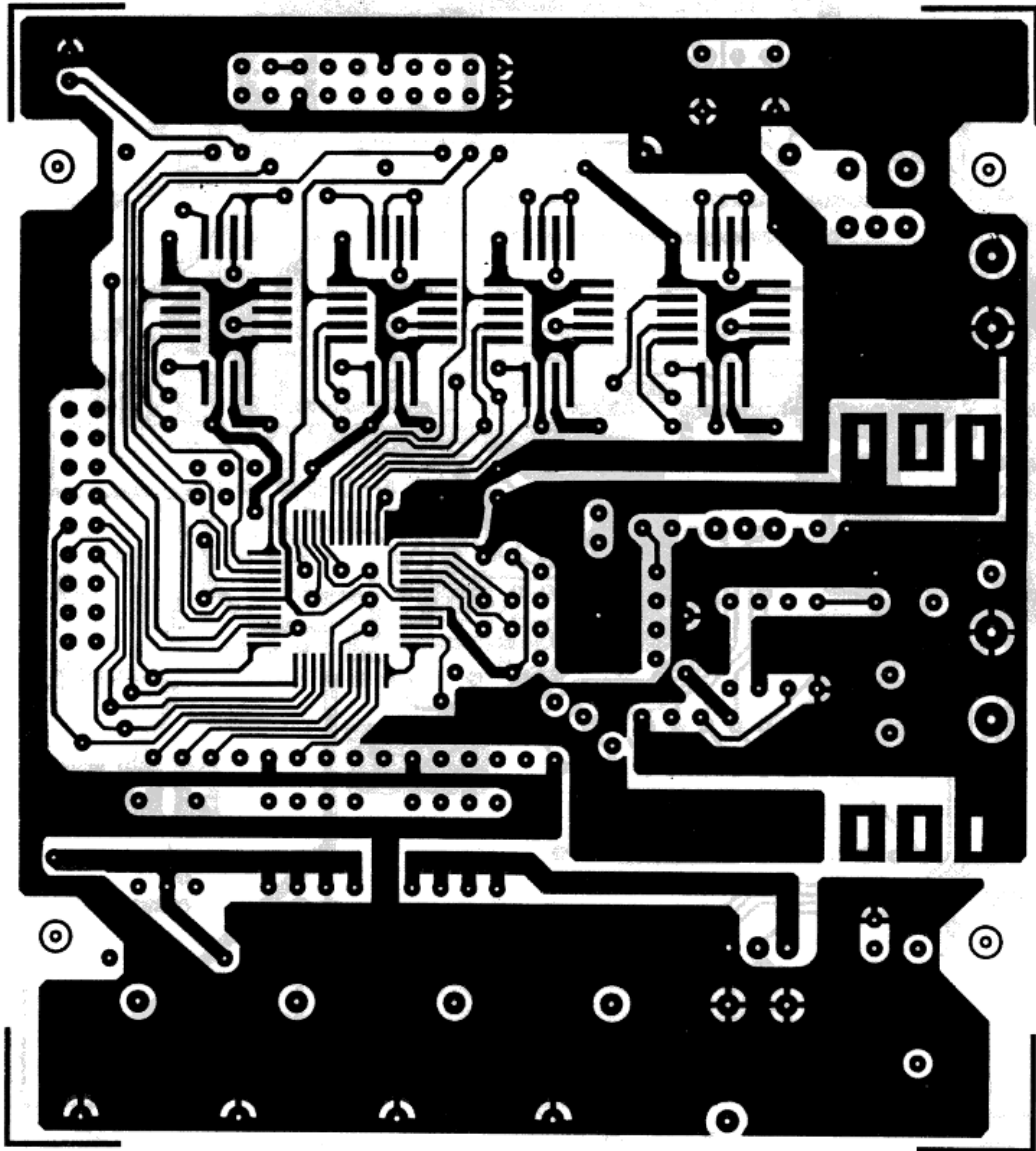| RSL2	OFF		ON	
RSL1	OFF	ON	OFF	ON
Number of Serial Registers	256Kbits or 512Kbits 1 piece	1Mbits 2 pieces	1Mbits 3 pieces	1Mbits 4 pieces

Set the PDMD of DIP switch to ON side.

Set the MCUM of DIP switch to ON side.

PATTERN LAYOUT

Silk Screen

(Unit: mm)

Mounting Side

Solder Side
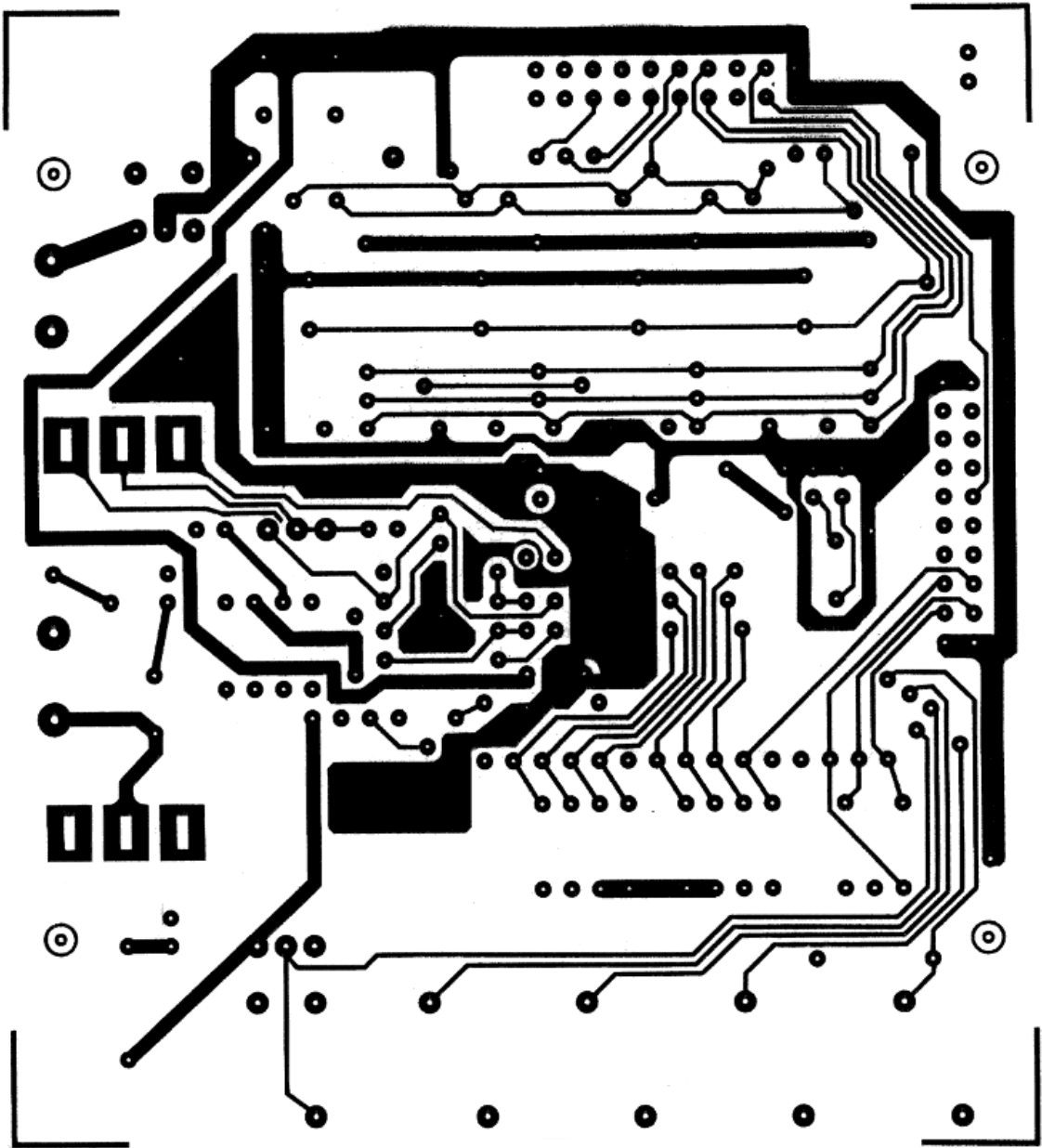
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