MOS INTEGRATED CIRCUITS

μPD1710G-027, μPD1710G-227

PLL FREQUENCY SYNTHESIZER AND CONTROLLER FOR FM/MW TUNER

The μPD1710G-027, μPD1710G-227 (52 pin flat package) is a CMOS LSI circuit having a PLL frequency synthesizer and controller for FM/MW reception in the USA, Oceania and Japan.

A combination of the μPD1710G-027, μPD1710G-227 and μPB553AC prescaler realizes a multifunction high-performance FM/MW digital tuning system, for use in car stereo, home stereo, or radio cassette recorder.

FEATURES

- The Japanese MW band has wide band range (522 to 1629 kHz) for automotive radio information
- Dynamic display on LED/FIP or static display on LCD/FIP (with μPD6320G/μPD6321G)
- Dot or digit display for preset memory
- Sufficient preset memory capacity for 18 FM stations (6 x 3) and 6 MW stations
- Auto tuning function (seek operation), manual tuning function, scan function for holding 5 seconds, and preset scan function for automatically receiving preset memory station for 5 seconds
- Optional functions such as LOCAL, LOUDNESS, METAL, Dolby NR*, STEREO, and AMS
- Complete lead muting to prevent popping sound caused by outputting a band selection signal from controller side
- Output of $\overline{\text{AGC-CUT}}$ signal to prevent malfunctions during autotuning
- Check tone output for key operation (with external oscillator)
- Dimmer function (for dynamic display)
- 12 hour timer function
- The following is compatible family of μPD1710G-027, μPD1710G-227

μPD1710G-213	for Europe, Dynamic display only
μPD1710G-015	for Europe, Static display only
μPD1710G-117	for South Africa, Dynamic/Static display

- 52 pins plastic flat package
- Selectable lead type

Lead bent type:	μPD1710G-027-00
Straight lead type:	μPD1710G-227-03

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FUNCTIONS

Received Frequency, Channel Spacing, Reference Frequency, and Intermediate Frequency

AREA	BAND	FREQUENCY RANGE	CHANNEL SPACING	REFERENCE FREQUENCY	NUMBER OF CHANNELS	INTERMEDIATE FREQUENCY
USA	FM	87.9 to 107.9 MHz	200 kHz	25 kHz	101	10.700 MHz
			100 kHz		201	10.725 MHz
	MW	530 to 1 620 kHz	10 kHz	10 kHz	110	450 kHz
		522 to 1 629 kHz	9 kHz	9 kHz	124	
Japan	FM	76.1 to 89.9 MHz	100 kHz	25 kHz	139	−10.700 MHz −10.675 MHz
	MW	522 to 1 629 kHz	9 kHz	9 kHz	124	450 kHz

Radio Functions

(1) AUTO UP and AUTO DOWN (sawtooth wave mode)
(2) MANUAL UP and MANUAL DOWN (sawtooth wave mode)
(3) SCAN (up direction only)
(4) PRESET SCAN
(5) Preset memory for 18 FM stations (6 stations x 3) and 6 MW stations (24 stations total)
(6) Last station memory for 3 FM stations and 1 MW station
(7) LOCAL control output
(8) LOUDNESS control output
(9) STEREO control output (for both FM and AM)
(10) $\overline{\text{AGC-CUT}}$ signal output during autotuning
(11) Preset memory display (dot or digit)
(12) Band selection method
  (i) FM1, FM2, FM3, and MW keys
  (ii) FM and MW keys (FM key for [→ FM1 → FM2 → FM3] or [→ FM1 → FM2])
  (iii) BAND key (for [→ FM1 → MW])

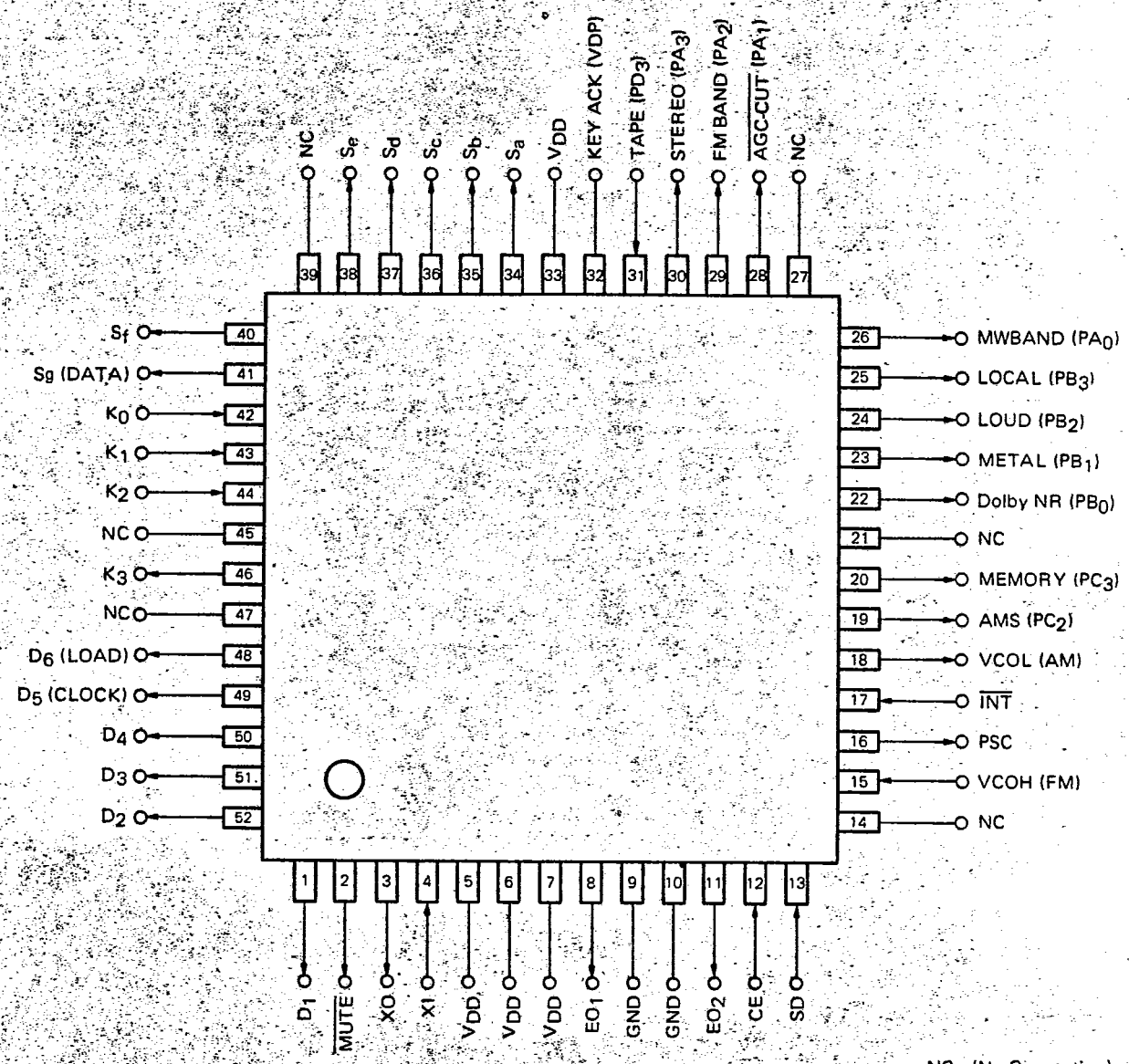
Cassette Tape Functions

(1) METAL control output
(2) Dolby NR control output
(3) AMS control output
(4) LOUDNESS control output

Timer Functions

(1) 12-hour display (AM/PM is not displayed.)
(2) Hours and minutes can be adjusted individually.
(Press the [MEMORY ENABLE] and [MANUAL UP], [MANUAL DOWN] keys simultaneously.)

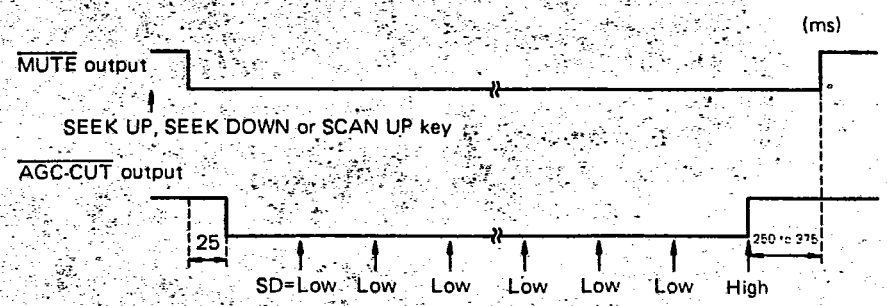
PIN CONFIGURATION (Top View)



NC (No Connection)

PIN DESCRIPTION

PIN NO.	PIN SYMBOL	DESCRIPTION
2	$\overline{\text{MUTE}}$	Active low (Kills the sound (popping) when the PLL is unlocked or the TAPE pin is set ON/OFF.) This pin goes to low level unconditionally when the CE pin goes to low level (backup state). (See the MUTE output timing chart for details.)
3 4	XO XI	Connect a 4.5 MHz crystal oscillator to these pins.
5 6 7 33	V_{DD}	Device power supply pins for supplying 5 V ±10 % for operation. The voltage may be lowered to 2.5 V when the timer is not used (CLOCK is OFF) or for backup. The V_{DD} falling time must be 500 ms or less; if longer, the internal power on reset circuit may not operate normally. V_{DD} must be started from 0 V; otherwise normal operation will not be resumed.
8 11	EO_1 EO_2	Charge pump output pins for the PLL phase detector. Since the same signal is output to pins 8 and 11, these pins may be connected to the low pass filter (LPF) on either the FM or MW side.
9 10	GND	Connect either or both of these pins to the system ground (GND).
12	CE	Device selection signal input pin. Set this pin at high level to operate the device or at low level when the device is unused. High level . . . . . Normal operation Low level . . . . . When CLOCK is ON, holds the memory, sets the display OFF, stops the PLL operation, and starts only the internal timer. When CLOCK is OFF, holds the memory, sets the display OFF, and stops all internal operations. The maximum backup current at this time is 10 μA. For an application not using the timer function, only a low current (a maximum of 10 μA) is necessary for memory backup when this pin is at low level. A high or low level signal less than 134 μs is not accepted. CE must be started from 0 V; otherwise, the internal reset circuit will not operate properly.
13	SD	Active high (Detects whether a broadcast station is detected during autotuning (SEEK UP, SEEK DOWN, or SCAN UP).) After PLL is locked, a high level signal must be input within 40 ms.
15	VCOH (FM)	This pin is used to input the signal obtained by dividing the FM station signal to 1/16 or 1/17 with the μPB553AC prescaler. Since this pin is connected to an AC amplifier, isolate the DC with a capacitor.
16	PSC	Pulse swallow control output connected to the PSC pin of μPB553AC prescaler via C or R.
17	$\overline{\text{INT}}$	External interrupt input. Pull up to V_{DD} because this pin is not used.
18	VCOL (AM)	MW station signal input. Since this pin is connected to an AC amplifier, isolate the DC with a capacitor.
19	AMS	This pin is interlocked with the AMS key. The output is reversed each time this AMS key pressed. The output is valid only when the TAPE pin is at high level (tape mode); otherwise, this pin is at low level.
20	MEMORY	When the [MEMORY ENABLE] key is pressed while the frequency is displayed (radio mode), the memory enters the write mode for approximately 5 seconds and this pin outputs a high level signal. Connect a driver to this pin to light the memory lamp. When STATIC display is selected, this is also displayed at the same time from the static driver side.
22 23	Dolby NR METAL	Pins 22 and 23 are interlocked with the [Dolby NR] and [METAL] keys respectively. Each time the Dolby NR or METAL key is pressed, the related output is toggled. The output is valid only when the TAPE pin is at high level (tape mode); otherwise, this pin is at low level.
24	LOUDNESS	This pin is interlocked with the [LOUD] key. Each time the LOUDNESS key is pressed, the output is toggled. This pin is always valid regardless of the TAPE pin state.

PIN NO.	PIN SYMBOL	DESCRIPTION
25	LOCAL	This pin is interlocked with the LOCAL key. Each time the LOCAL key is pressed, the output is toggled. The output is valid only when the TAPE pin is at low level (radio mode); otherwise, this pin is at low level.
26	MW BAND	MW tuner control output. The output is at high level only when the TAPE pin is at low level (radio mode) and MW is selected; otherwise, this pin is at low level.
28	$\overline{\text{AGC-CUT}}$	When the [SEEK UP], [SEEK DOWN], or [SCAN UP] key is pressed (autotuning), the following $\overline{\text{AGC-CUT}}$ signal is output (active low). This signal stabilizes the STOP operation during autotuning.  This signal may also be used as an autotuning indicator output.
29	FM BAND	FM tuner control output. The output is at high level only when the TAPE pin is at low level (radio mode) and FM is selected (FM1, FM2, or FM3); otherwise, this pin is at low level.
30	STEREO	This key is interlocked with the STEREO key. Each time the STEREO key is pressed, the output is toggled. The output is valid only when the TAPE pin is at low level; otherwise, this pin is at low level. The STEREO output is valid when FM or MW is selected.
31	TAPE	Input pin for setting the tape mode (high level) or radio mode (low level).
32	KEYACK	This pin is at high-level for approximately 40 ms after the controller accepts a key input. A key click can be generated by connecting an external oscillator.
34 35 36 37 38 40 41	S_a S_b S_c S_d S_e S_f S_g (DATA)	For dynamic display (when STATIC is OFF) Active high (display segment signal outputs and key return signal sources) For static display (when STATIC is ON) Active high (serial data output (S_g only) to static driver and key return signal sources)
42 43 44 46	K_0 K_1 K_2 K_3	Key return signal input from key matrix Pull down this pin with a resistor of approximately 22 kΩ to enhance reading at low level.
48 49 50 51 52 1	D_6 (LOAD) D_5 (CLK) D_4 D_3 D_2 D_1	For dynamic display (when STATIC is OFF) Active high (display character signal outputs and key return signal sources (D_1 to D_3) For static display (when STATIC is ON) Active high (clock output (D_5) and strobe output (D_6) to static driver and key return signal sources (D_1 to D_3)

CONTENTS

1. KEY MATRIX 7
   - 1.1 CONFIGURATION OF KEY MATRIX 7
   - 1.2 SWITCH CONNECTION 7
   - 1.3 KEY MATRIX CONNECTION 8
   - 1.4 DESCRIPTION OF KEY MATRIX 9
2. DISPLAY 15
3. TIMING CHARTS 17
4. APPLICATION CIRCUIT 20
5. ELECTRICAL CHARACTERISTICS 21
   - 5.1 ABSOLUTE MAXIMUM RATINGS 21
   - 5.2 RECOMMENDED OPERATING CONDITIONS 21
   - 5.3 DC CHARACTERISTICS 22
   - 5.4 AC CHARACTERISTICS 22
6. PACKAGE DIMENSIONS 23

1. KEY MATRIX

1.1 CONFIGURATION OF KEY MATRIX

OUTPUT \ INPUT	K_3 (46)	K_2 (44)	K_1 (43)	K_0 (42)
S_a (34)	SEEK UP	SEEK DOWN	SCAN UP	AMS
S_b (35)	MANUAL UP	MANUAL DOWN	M5	M6
S_c (36)	M1	M2	M3	M4
S_d (37)	LOCAL	LOUD	METAL	Dolby NR
S_e (38)	RECALL	PRESET SCAN	MEMORY ENABLE	STEREO
S_f (40)	FM / FM1 / BAND	FM2	FM3	MW
S_g (41)	DIMMER	FMSEL1	FMSEL2	PRIO
D_1 (1)		MWSEL	BAND1	BAND2
D_2 (52)	IF	CLOCK	CHDISP	STATIC
D_3 (51)	BLANK			

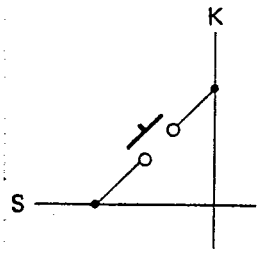
Momentary switch

Alternate or transistor switch

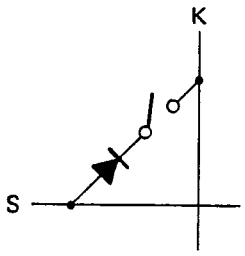
Diode matrix (Diode short circuit)

1.2 SWITCH CONNECTION

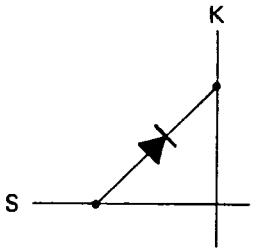
Momentary switch



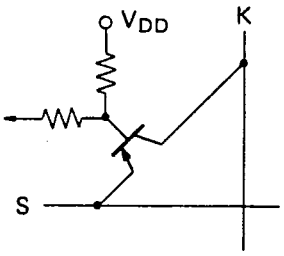
Alternate switch

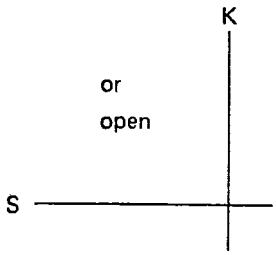


Diode matrix



Transistor switch



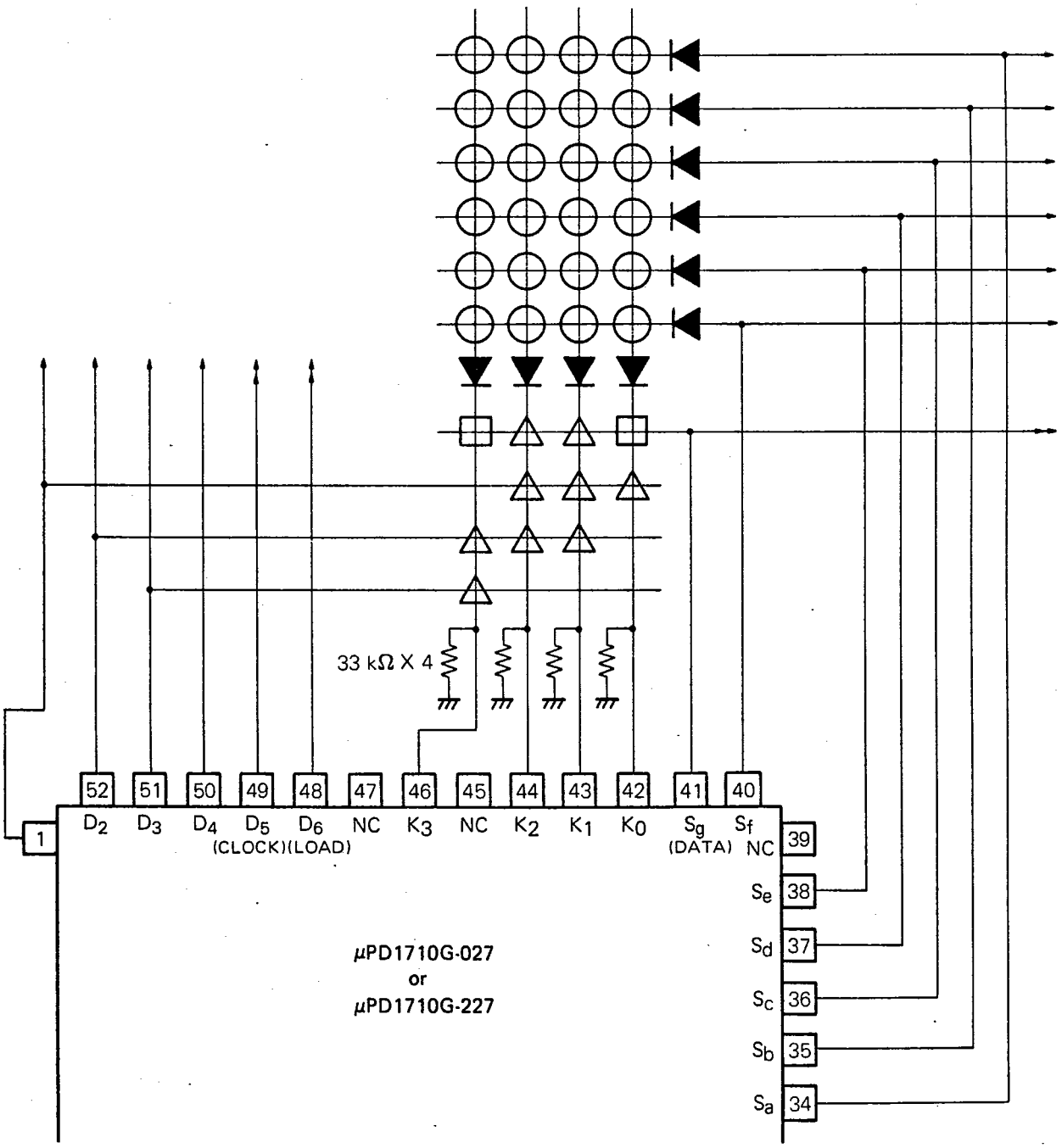


1.3 KEY MATRIX CONNECTION

Momentary switch

Alternate or Transistor switch

Diode matrix



1.4 DESCRIPTION OF KEY MATRIX

1.4.1 INITIALIZATION DIODE SWITCHES

There are 10 initialization diode switches. They are read when the V_{DD} pin is first powered (power on reset) or when the CE pin goes to high level (CE reset). The switch settings are ignored in all other states.

A switch is set by closing (ON) or opening (OFF) a matrix crosspoint with a diode.

(1) FM band area setting switches
FMSEL1, FMSEL2

(2) MW band channel spacing setting switch
MW-SEL

(3) FM IF setting switch
IF

(4) The timer function setting switch
CLOCK

(5) Band selection method setting switches
BAND1, BAND2

(6) Preset memory display setting switch
CH-DISP

(7) Static or dynamic display setting switch
STATIC

SYMBOL	FUNCTION
FMSEL1 FMSEL2	FM band area setting switches

FMSEL1	FMSEL2	AREA	FREQUENCY RANGE	CHANNEL SPACING
0	0	USA	87.9 to 107.9 MHz	200 kHz
0	1	Japan	76.1 to 89.9 MHz	100 kHz
1	0	Oceania	87.9 to 107.9 MHz	100 kHz
* 1	1	–	–	–

* Do not set both the FMSEL1 and FMSEL2 switches simultaneously; if you do, the band (area) cannot be set correctly.

MW-SEL — MW band channel space setting switch.

MWSEL	FREQUENCY RANGE	CHANNEL SPACING
0	530 to 1 620 kHz	10 kHz
1	522 to 1 629 kHz	9 kHz

IF — FM IF setting switch

(MHz)

IF	USA	JAPAN	OCEANIA
0	10.700	–10.700	10.700
1	10.725	–10.675	10.725

CLOCK — Switch for setting whether to use the timer function.

CLOCK	TIMER FUNCTION
0	Unused.
1	Used

When using the timer function (CLOCK=OFF), set the display mode by a combination of the PRIO and BLANK switches.

SYMBOL	FUNCTION

BAND1, BAND2

Band (FM1, FM2, FM3, or MW) selection method setting switches.

BAND1	BAND2	KEYS USED	USABLE BANDS FM1	FM2	FM3	MW
0	0	FM, MW	○			○
		FM1, FM2, MW	○	○		○
		FM1, FM2, FM3, MW	○	○	○	○
1	1	FM, MW → FM1 → FM2 →	○	○		○
0	1	FM, MW → FM1 → FM2 → FM3 →	○	○	○	○
1	0	BAND → FM1 → MW →	○			○

Note: FM1, FM, and BAND indicate the same key at the crosspoint of Sf and K3. In this explanation, different key names are used for easy understanding.

CHDISP

Preset memory display setting switch. A dot or digit display can be selected for the preset memory.

Use this switch for dynamic display; for static display, set the preset memory display with pin 32 (DOT/$\overline{SEG}$) of the μPD6320G/μPD6321G driver.

CHDISP	DISPLAY SETTING
0	Numeric display
1	Dot display

STATIC

Switch for setting static or dynamic display

STATIC	DISPLAY SETTING
0	Dynamic display
1	Static display

Static Display

Connect the μPD6320G/μPD6321G external static driver and transfer data from the controller side to the driver side via the CLOCK (D_5), DATA (Sg), and LOAD (D_6) pins.

Dynamic Display

Use a matrix comprising Sa to Sg and D_1 to D_5 for dynamic display.

SYMBOL	FUNCTION
BLANK	Switch for setting whether to display blank or the timer when tape is loaded (TAPE pin=high) in other than the timer priority display mode (PRIO=0). When PRIO=0 and TAPE input=high BLANK: 0 — Timer display; 1 — Display OFF (blank) When tape is loaded (TAPE input=high) in the timer priority display mode (PRIO=ON), the timer is displayed unconditionally regardless of the BLANK switch state.

1.4.2 ALTERNATE SWITCHES

DIM and PRIORITY are alternate switches. Unlike switches for initial setting, these alternate switches may be used at any time.

SYMBOL	FUNCTION
DIM	Switch for changing (4:1) the display intensity for dynamic display (STATIC=0). DIM: 0 — Bright (duty 1/8); 1 — Dark (duty 1/32) For static display (STATIC=1), the DIM function is unusable and the DIM switch state is ignored.
PRIO	Switch for setting timer display priority mode PRIORITY: 0 — No priority for timer display; 1 — Priority for timer display

1.4.3 MOMENTARY SWITCHES AND FUNCTIONS

There are 24 momentary switches:

SYMBOL	FUNCTION
SEEK UP SEEK DOWN	Autotuning keys. A broadcast station is scanned in the up or down direction in the sawtooth mode until the SD pin goes to high level; once the SD pin goes to high level, this frequency is held. Autotuning can be stopped by pressing this key twice, regardless of the SD pin state. Static display : 38 ms/step Dynamic display : 42 ms/step
MANUAL UP MANUAL DOWN	Manual tuning key. The frequency is increased or decreased by one step each time this key is pressed. If this key is held down for 0.5 second or more, the station frequency is scanned at high speed. The speed varies according to the band. (Sawtooth wave mode) Static display : 38 ms/step (FM/MW) Dynamic display : 42 ms/step (FM/MW) During timer display, these keys are used for time adjustment. The minute or hour can be adjusted by pressing the MANUAL UP or MANUAL DOWN key together with the MEMORY ENABLE key.
SCAN UP	Autoscanning key. A broadcast station frequency is sought in the up direction in the sawtooth wave mode until the SD pin goes to high level. When the SD pin goes to high level, this frequency is held for 5 seconds, then the next broadcast station frequency is sought. This operation continues until a key operation is performed. Autoscanning can be stopped by pressing the SCAN key twice. The scan speed is the same as when the SEEK UP key is pressed.
PRESET SCAN	Key for automatically calling the preset memory for 5 second period. Like a SCAN key operation continues until a key operation is performed. To stop scanning at the specified preset channel during 5 second holding, press the PRESET SCAN key again; or check the channel display, then press the necessary preset memory key (M1 to M6). If this key is pressed while receiving the preset memory, scanning starts from the next memory; if this key is pressed while receiving a broadcast frequency not in the preset memory, scanning starts from M1. When this PRESET SCAN key is pressed, the preset memory is called unconditionally in the sequence of → M1 → M2 → M3 → M4 → M5 → M6 → This key must not be used in application having fewer than six preset buttons.
MEMORY ENABLE	Key for writing new frequency in the preset memory. When this key is pressed, the ME display is on for approximately 5 seconds (the MEMORY output remains at high level for approximately 5 seconds). Press one of the M1 to M6 keys, then write the new frequency during this period of time. If no key operation is performed during the 5 seconds, the ME display goes OFF and frequency writing is disabled. To reset the memory write mode before 5 seconds lapse, press the MEMORY ENABLE key again or press any key other than the M1 to M6 keys. During timer display, this key is used for time adjustment. The minute or hour can be adjusted by pressing the MANUAL UP MANUAL DOWN key while pressing the MEMORY ENABLE key.

SYMBOL	FUNCTION
FM / FM1 / BAND FM2 FM3 MW	Band selection keys. The display and power control signals (FM and MW outputs) are selected with these keys. These keys can be used in various ways according to the initialization diode switch settings. (See BAND1 and BAND2 for details.) When the device is first powered, FM1 is selected.
RECALL	Key for selecting frequency and timer displays.
LOUD LOCAL STEREO METAL Dolby NR AMS	Optional function keys. Each time one of these keys is pressed, the related output is toggled. When the device is first powered, these output pins go to low level. The valid keys (and outputs) vary according to the mode as follows:

KEY AND OUTPUT	TAPE INPUT AT HIGH LEVEL	TAPE INPUT AT LOW LEVEL	
		FM	MW
LOUDNESS	O	O	O
LOCAL	X	O	O
STEREO	X	O	O
METAL	O	X	X
Dolby NR	O	X	X
AMS	O	X	X

O ; Enables key input and validates output.
X ; Ignores key input.
The output is at low level.

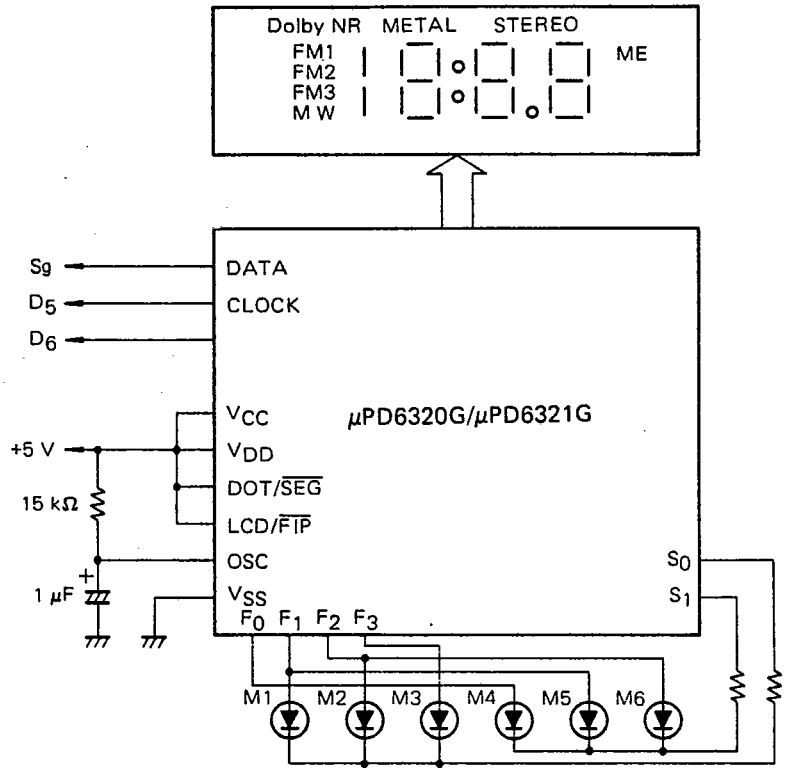
Since these pins have only additional latch functions determined by the mode, they may be used for other purposes.

M1 M2 M3 M4 M5 M6	Keys for calling or writing preset memory. Each key is independently related to FM1, FM2, FM3, and MW. These six keys can store a total of 24 frequencies (6X3 FM frequencies and 6 MW frequencies). When the V_{DD} is first powered, the lowest frequency of the band is written in the memory.

LCD/FIP Static Display (STATIC=1)

Use μPD6320G/μPD6321G static driver.

(For static LCD)



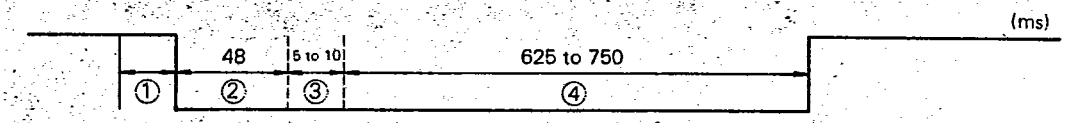
Flag Explanations (μPD6320G/6321G)

FLAG	PIN NUMBER	DISPLAYED CONTENT
D_1	26	MW
D_2	27	FM2
D_3	28	FM1
D_4	29	(Highest digit position)
D_5	4	Dolby NR
D_6	5	METAL
D_7	6	FM3
D_8	8	ME
D_9	13	STEREO
D_{10}	18	D.P.
D_{11}	22	COLON

3. TIMING CHART (MUTE OUTPUT (ACTIVE LOW) TIMING CHART)

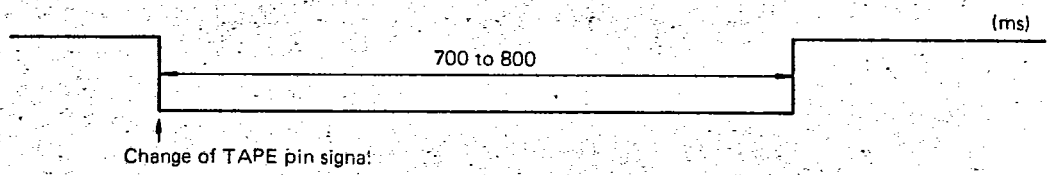
① Key debounce time (approximately 15 ms)
② MUTE leading time
③ Time for setting the frequency division ratio and updating display contents
④ MUTE trailing time
⑤ Wait time before SD pin signal detection
⑥ Wait time before PLL lock (This value varies according to the constant of external LPF and so forth.)

(1) When the receiving band is changed (FM/MW)

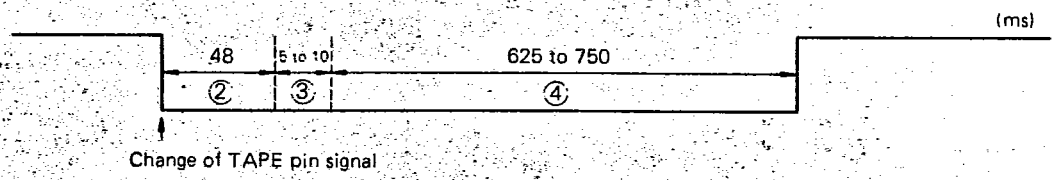


(2) When the TAPE pin output is changed

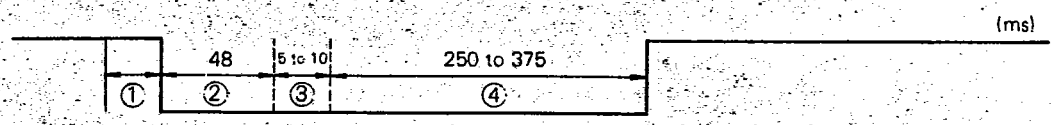
(i) Low (RADIO) → High (TAPE)



(ii) High (TAPE) → Low (RADIO)

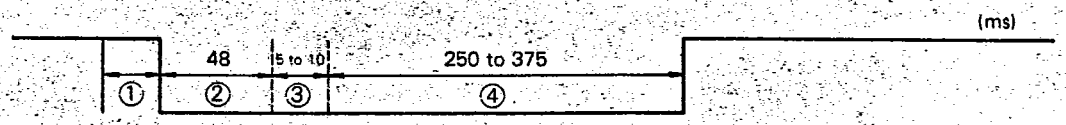


(3) When preset memory is called

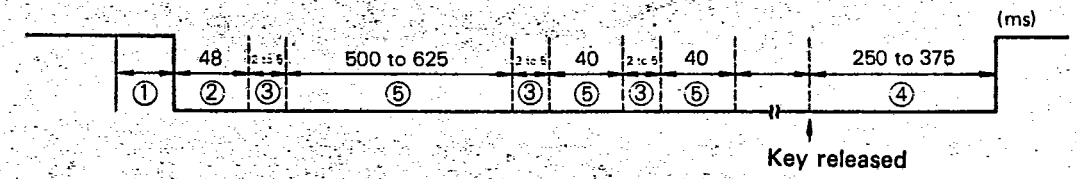


(4) When MANUAL UP, MANUAL DOWN key is pressed

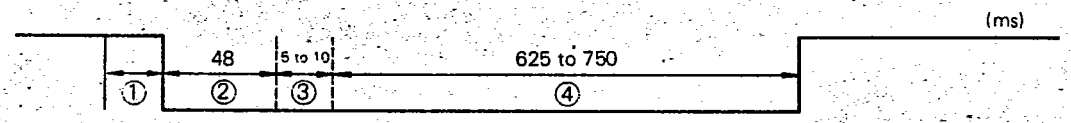
(i) When the key is pressed not longer than 500 ms (step scanning)



(ii) When the key is pressed 500 ms or more (fast scanning)

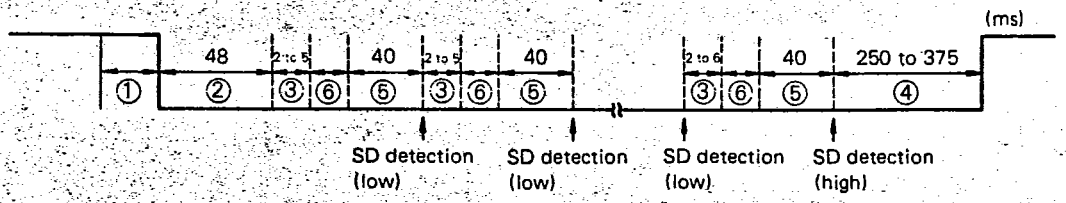


(iii) Band edge (upper limit → lower limit, lower limit → upper limit)

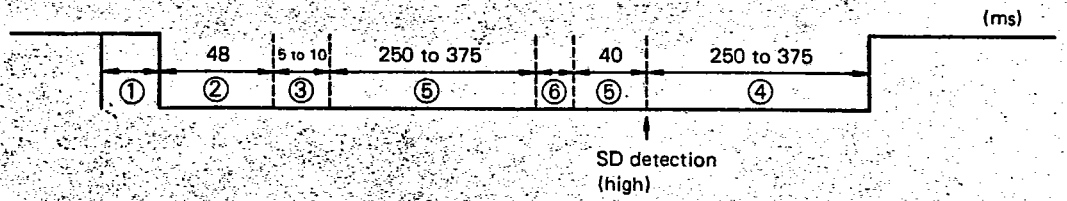


(5) When SEEK UP, SEEK DOWN key is pressed

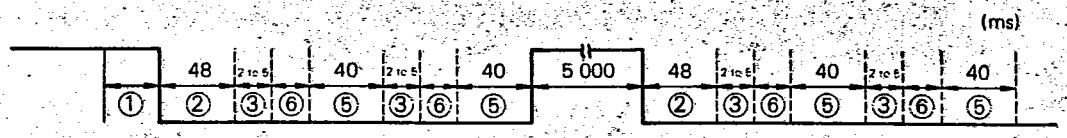
(i) Normal



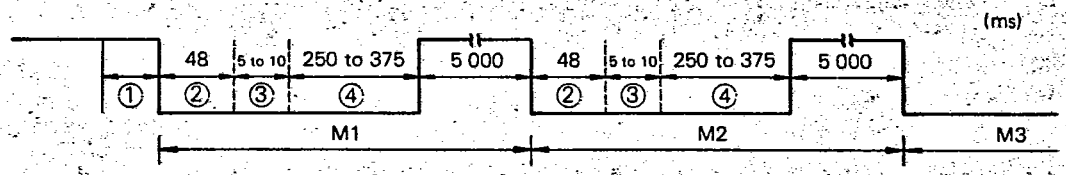
(ii) Band edge (upper limit → lower limit, lower limit → upper limit)



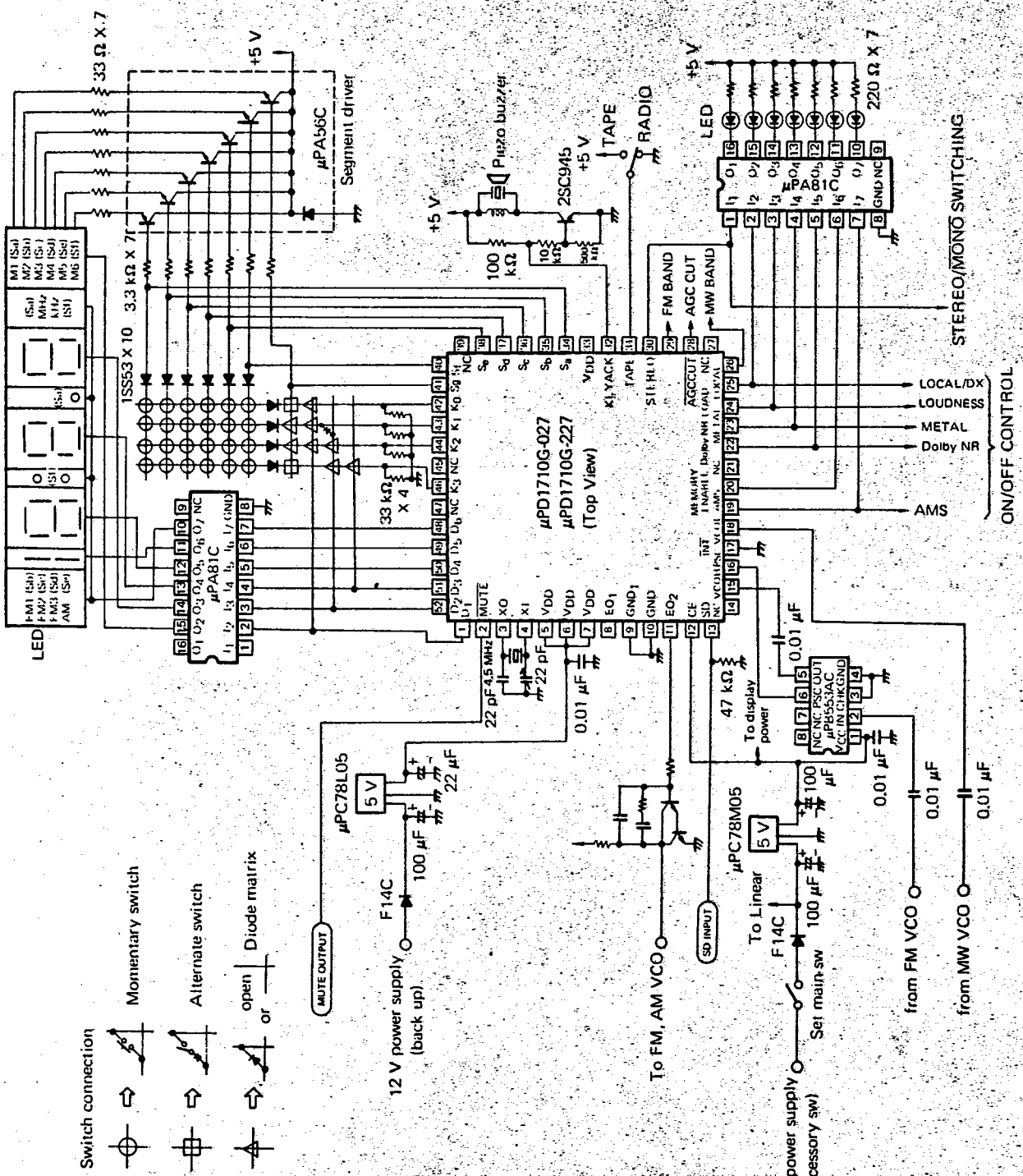
(6) When SCAN UP key is pressed



(7) When RESET SCAN key is pressed



4. APPLICATION CIRCUIT



The application circuit and circuit constant presented in this report are not for mass production taking parts deviation or temperature characteristics into consideration.
For patent regarding the circuits in this report, NEC does not bear any responsibility.

5. ELECTRICAL CHARACTERISTICS

5.1 ABSOLUTE MAXIMUM RATINGS (T_a = 25 °C)

Power Supply Voltage	V_{DD}	−0.3 to +6.0	V
Input Voltage	V_I	−0.3 to +V_{DD}	V
Output Voltage	V_O	−0.3 to +V_{DD}	V
Output Absorption Current	I_O	10	mA
Operating Temperature	T_{opt}	−35 to +75	°C
Storage Temperature	T_{stg}	−35 to +125	°C

5.2 RECOMMENDED OPERATING CONDITIONS

CHARACTERISTIC	SYMBOL	MIN.	TYP.	MAX.	UNIT	CONDITION
Power Supply Voltage	V_{DD}	4.5	5.0	5.5	V	CE=High
Data (RAM) Hold Voltage	V_{DDH}	2.5		5.5	V	No Clock mode (CLOCK=0) and CE=Low
Power Supply Voltage	V_{DDC}	3.8	5.0	5.5	V	Clock mode (CLOCK=1) and CE=Low
Power Voltage Rise Time	t_{rise}			500	ms	V_{DD}=0 → 4.5 V

5.3 DC CHARACTERISTICS (V_{DD}=+4.5 to +5.5 V; T_a=−35 to +75 °C)

CHARACTERISTIC	SYMBOL	MIN.	TYP.	MAX.	UNIT	CONDITION
High Level Input Voltage	V_{IH1}	0.8 V_{DD}		V_{DD}	V	SD pin
High Level Input Voltage	V_{IH2}	0.7 V_{DD}		V_{DD}	V	I/O port and CE pin (see Note)
High Level Input Voltage	V_{IH3}	0.6 V_{DD}		V_{DD}	V	K0 to K3 pins
Low Level Input Voltage	V_{IL1}	0		0.3 V_{DD}	V	I/O port and CE pin (see Note)
Low Level Input Voltage	V_{IL2}	0		0.2 V_{DD}	V	K0 to K3 and SD pins
High Level Output Voltage	V_{OH1}	4.0			V	EO1 and EO2 pins I_{OH}=−0.5 mA
High Level Output Voltage	V_{OH2}	4.0			V	D_1 to D_6, MUTE, I/P port (see Note) I_{OH}=−0.2 mA
High Level Output Voltage	V_{OH3}	3.0			V	PSC pin I_{OH}=−0.1 mA
High Level Output Voltage	V_{OH4}	3.0			V	Sa to Sg pins I_{OH}=0.5 mA
Low Level Output Voltage	V_{OL1}			0.5	V	EO1 and EO2 pins, and I/O port (see Note) I_{OL}=0.5 mA
Low Level Output Voltage	V_{OL2}			0.5		D_1 to D_6, MUTE, and PSC pins I_{OL}=0.2 mA
High Level Input Current	$+I_{IH1}$	10	40	100	μA	K0 to K3 pins V_{IN}=V_{DD}=5.5 V
High Level Input Current	$+I_{IH2}$		300		μA	XI pin (for pulling down) V_{IN}=V_{DD}=5.0 V
Low Level Input Current	$-I_{IL1}$		300		μA	AM and FM pins (for pulling up) V_{IN}=0, V_{DD}=5.0 V
Output Leakage Current	I_L		10^{-3}	1	μA	EO1 and EO2 pins (T_a=25 °C) V_{IN}=0, V_{DD}=5.0 V
Working Current	I_{DD1}		3		mA	Except I/O current from I/O pins
Data (RAM) Hold Current	I_{DD2}	-		10	μA	No Clock mode (CLOCK=0) and CE=0 T_a=25 °C, V_{DD}=5.0 V
Timer Current	I_{DD3}		0.6		mA	Clock mode (CLOCK=1) and CE=0, V_{DD}=5.0 V

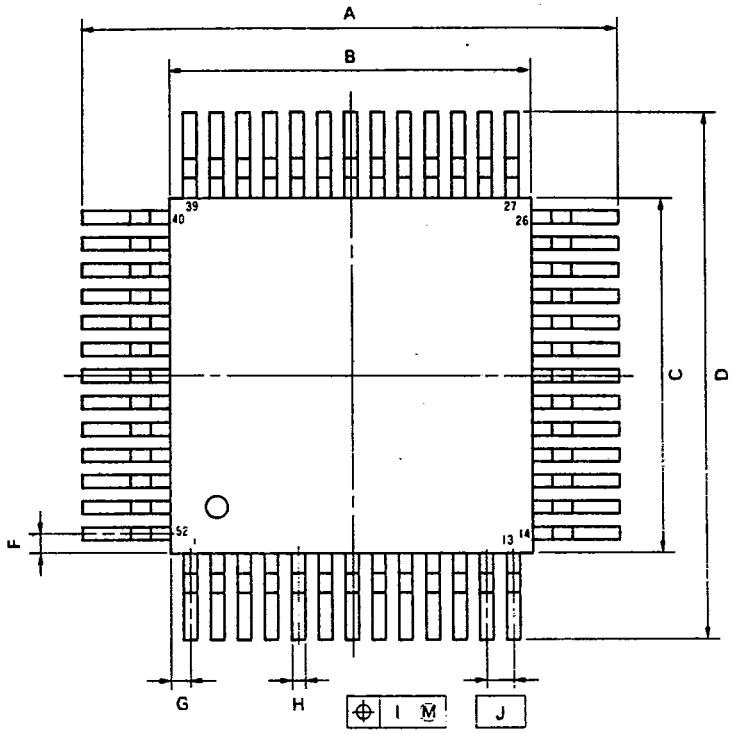
Note: I/O port means the KEY ACK, TAPE, STEREO, FM BAND, AGC CUT, MW, LOCAL, LOUDNESS, METAL, Dolby NR, MEMORY, and AMS pins.

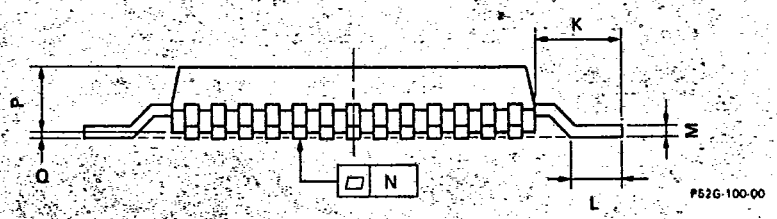
5.4 AC CHARACTERISTICS (V_{DD}=+4.5 to +5.5 V; T_a=−35 to +75 °C)

CHARACTERISTIC	SYMBOL	MIN.	TYP.	MAX.	UNIT	CONDITION
Operating Frequency	f_{AM}	0.5		2.5	MHz	AM pin, V_{in}=1.0 V_{p-p} (MIN.), DC cut
Operating Frequency	f_{FM}	0.5		8.8	MHz	FM pin, V_{in}=0.8 V_{p-p} (MIN.), Square wave, DC cut

6. PACKAGE DIMENSIONS (Unit: mm)

μPD1710G-027-00





NOTE
Each lead centerline is located within 0.20 mm (0.008 inch) of its true position (T.P.) at maximum material condition.

ITEM	MILLIMETERS	INCHES
A	$21.0^{+0.3}$	$0.827^{+0.016}$
B	$14^{+0.2}$	$0.551^{+0.008}_{-0.004}$
C	$14^{+0.2}$	$0.551^{+0.008}_{-0.004}$
D	$21.0^{+0.4}$	$0.827^{+0.016}$
F	1.0	0.039
G	1.0	0.039
H	$0.40^{+0.10}$	$0.016^{+0.004}_{-0.003}$
I	0.20	0.008
J	1.0 (T.P.)	0.039 (T.P.)
K	$3.5^{+0.2}$	$0.138^{+0.008}_{-0.004}$
L	$2.2^{+0.2}$	$0.087^{+0.008}_{-0.004}$
M	$0.15^{+0.10}_{-0.05}$	$0.006^{+0.004}_{-0.002}$
N	0.15	0.006
P	$2.6^{+0.2}_{-0.1}$	$0.102^{+0.008}_{-0.004}$
Q	$0.1^{\pm 0.1}$	$0.004^{\pm 0.004}$

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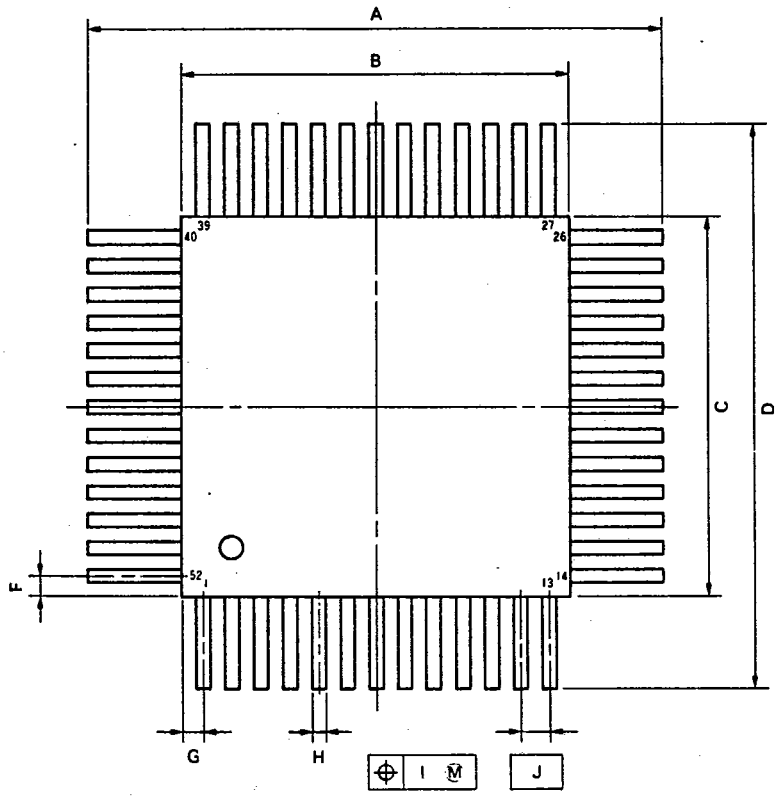

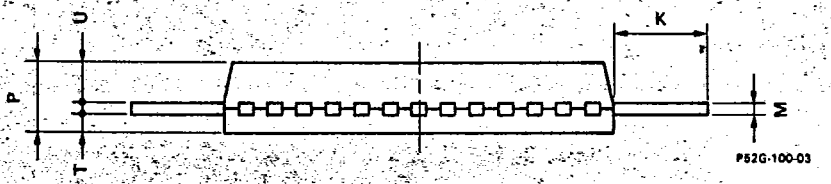

NOTE
Each lead centerline is located within 0.20 mm (0.008 inch) of its true position (T.P.) at maximum material condition

ITEM	MILLIMETERS	INCHES
A	$19.8^{+0.4}$	$0.780^{+0.016}_{-0.015}$
B	$14^{+0.2}$	$0.551^{+0.008}_{-0.007}$
C	$14^{+0.2}$	$0.551^{+0.008}_{-0.007}$
D	$19.8^{+0.4}$	$0.780^{+0.016}_{-0.015}$
F	1.0	0.039
G	1.0	0.039
H	$0.40^{+0.10}$	$0.016^{+0.004}_{-0.003}$
I	0.20	0.008
J	1.0 (T.P.)	0.039 (T.P.)
K	$2.9^{+0.2}$	$0.114^{+0.008}_{-0.007}$
M	$0.15^{+0.10}_{-0.05}$	$0.006^{+0.004}_{-0.002}$
P	$2.6^{+0.2}_{-0.1}$	$0.102^{+0.008}_{-0.004}$
T	1.0	0.039
U	1.45	0.057