

# MOS DIGITAL INTEGRATED CIRCUIT

## $\mu$ PD1986C

*no 1501*

### REMOTE CONTROL TRANSMITTER CMOS LSI

#### DESCRIPTION

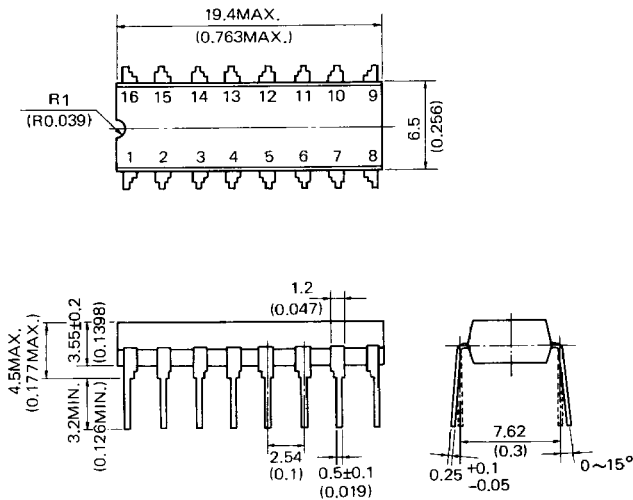
$\mu$ PD1986C is CMOS IC for controlling the transmitter of remote control system for TV set etc. By using with  $\mu$ PD1987C which is the receiver control IC, the direct channel control system can be obtained. When infrared emitting diode is used as transmitter element, this system will be very stable against any interference. The package is 16 pins plastic dual in-line package type.

#### FEATURES

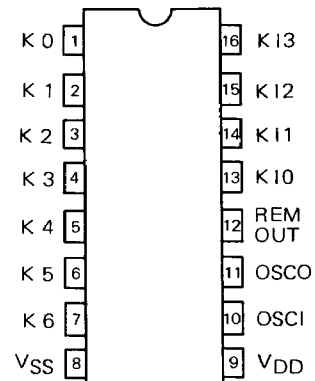
- Capable to transmit 27 commands;
 

Channel 1 – 10	Channel up, down	Volume up, down
Mute on/off	Power on/off	Option*
  - Minimum misoperation by infrared transmission
  - Wide operation voltage range (2.7 – 7.2V)
  - Low power consumption ( $I_{DD} = 1 \mu A$  at KEY OFF condition)
- \*  $\mu$ PD1987C is not able to decode this option code.

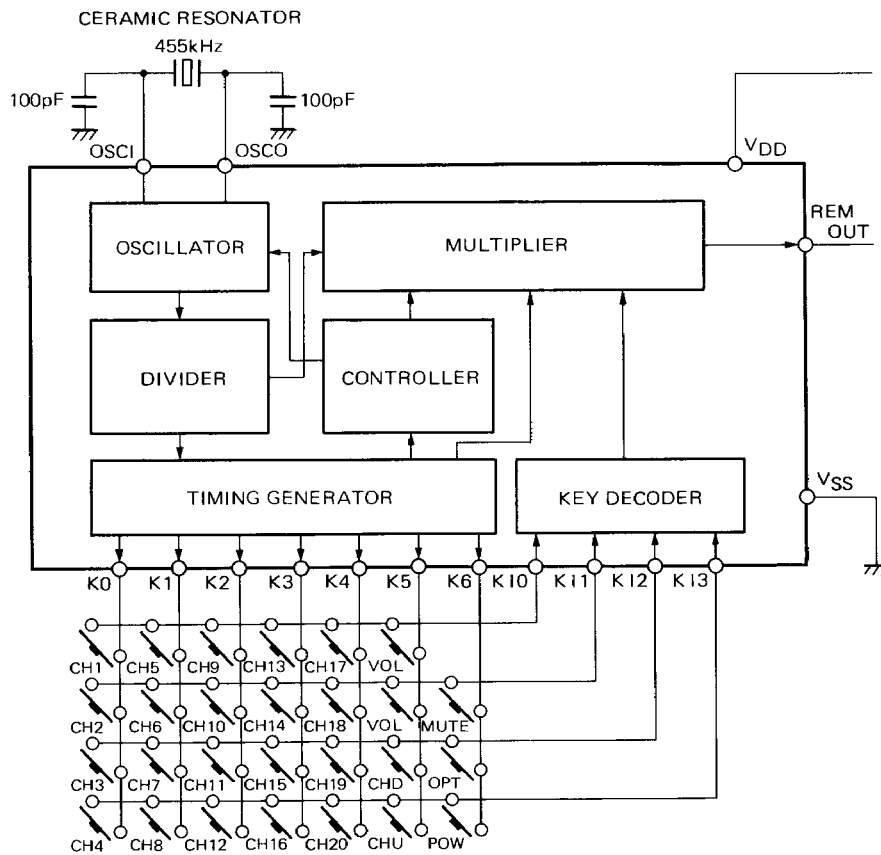
#### PACKAGE DIMENSIONS in millimeters (inches)



#### CONNECTION DIAGRAM (Top View)



## BLOCK DIAGRAM



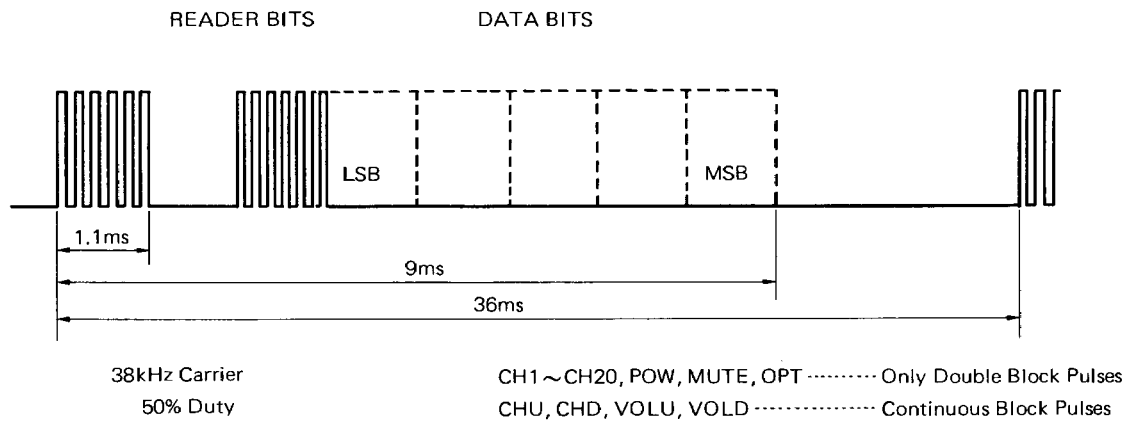
## ABSOLUTE MAXIMUM RATINGS ( $T_a = 25^\circ\text{C}$ )

Supply Voltage	$V_{DD}-V_{SS}$	-0.3 to +8.0	V
Input Voltage	$V_{IN}-V_{SS}$	-0.3 to $V_{DD}$	V
Output Current	$I_{OH}(\text{REM})$	-10.0	mA
Power Dissipation	$P_d$	360	mW
Operating Temperature Range	$T_{opt}$	-20 to +75	$^\circ\text{C}$
Storage Temperature Range	$T_{stg}$	-40 to +125	$^\circ\text{C}$

## ELECTRICAL CHARACTERISTICS ( $T_a = -20$ to $+75^\circ\text{C}$ , $V_{DD} = 6.0\text{ V}$ )

CHARACTERISTIC	SYMBOL	MIN.	TYP.	MAX.	UNIT	TEST CONDITIONS
Supply Voltage	$V_{DD}$	2.7	6.0	7.2	V	
Supply Current	$I_{DD}(\text{OP})$		0.3	1.0	mA	OSC=455kHz
Supply Current	$I_{DD}(\text{ST})$			1.0	$\mu\text{A}$	OSC STOP, $T_a=25^\circ\text{C}$
Input High Voltage	$V_{IH}(\text{KI})$	$0.7V_{DD}$		$V_{DD}$	V	
Input Low Voltage	$V_{IL}(\text{KI})$	0		$0.3V_{DD}$	V	
Output High Voltage	$V_{OH}(\text{REM})$	$V_{DD}-1$		$V_{DD}$	V	$I_{OL}=-1.0\text{mA}$
Input Pulldown Current	$I_{IL}(\text{KI})$	-10		-100	$\mu\text{A}$	$V_{IN}=V_{DD}, T_a=25^\circ\text{C}$

PIN	FUNCTION		
8	VSS	Ground	
9	VDD	Positive supply 2.7 to 7.2 Volt.	Operating voltage is wideband
10	OSCI	Oscillator Input	455kHz Ceramic Resonator CSB455A (MURATA JAPAN)
11	OSCO	Oscillator Output	
12	REM OUT	Remote Signal Output	See Fig 1 and Table 1
13~16	K10~K13	Key Input 0~3	
1~7	K0~K7	Key Output 0~7	



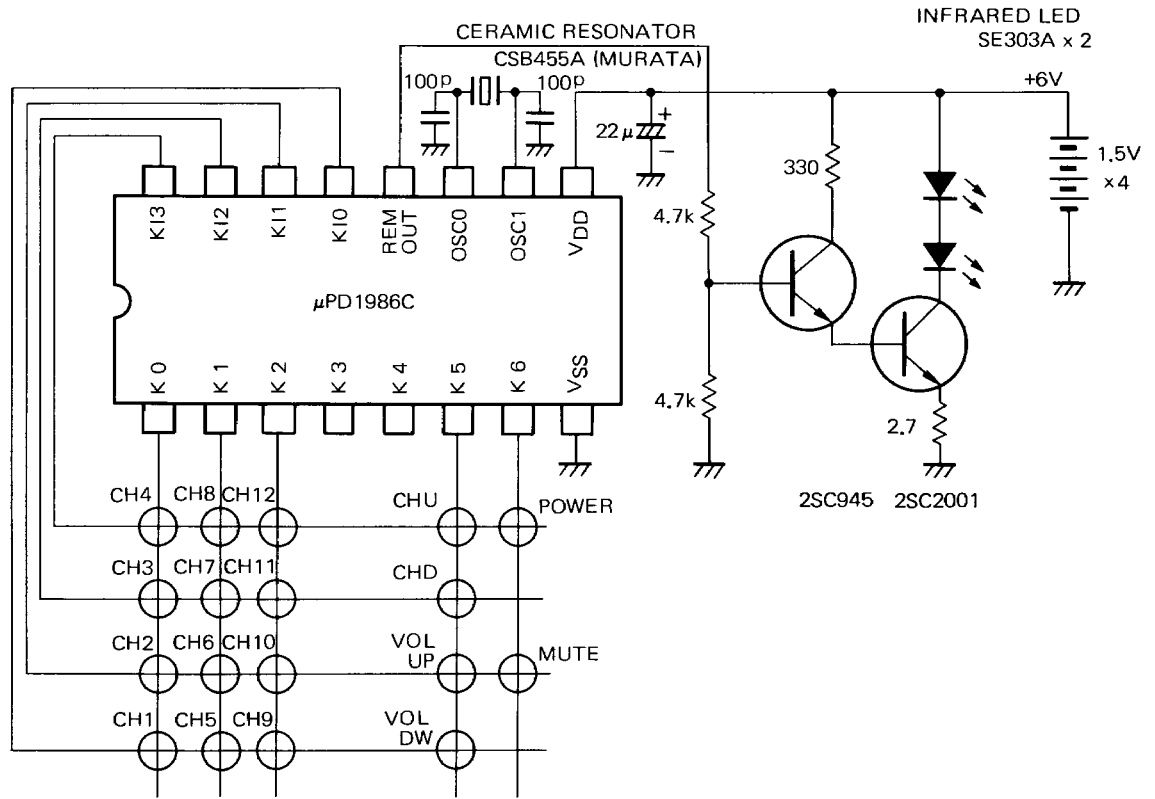
**Fig. 1 Remote Signal Output (1 Block)**

CONNECTION		FUNCTION		DATA BIT CODE				
K IN	K OUT			MSB		LSB		
K10	K 0	CH 1	DIRECT ADDRESS CHANNEL 1	0	0	0	0	0
K11	K 0	CH 2	DIRECT ADDRESS CHANNEL 2	0	0	0	0	1
K12	K 0	CH 3	DIRECT ADDRESS CHANNEL 3	0	0	0	1	0
K13	K 0	CH 4	DIRECT ADDRESS CHANNEL 4	0	0	0	1	1
K10	K 1	CH 5	DIRECT ADDRESS CHANNEL 5	0	0	1	0	0
K11	K 1	CH 6	DIRECT ADDRESS CHANNEL 6	0	0	1	0	1
K12	K 1	CH 7	DIRECT ADDRESS CHANNEL 7	0	0	1	1	0
K13	K 1	CH 8	DIRECT ADDRESS CHANNEL 8	0	0	1	1	1
K10	K 2	CH 9	DIRECT ADDRESS CHANNEL 9	0	1	0	0	0
K11	K 2	CH 10	DIRECT ADDRESS CHANNEL 10	0	1	0	0	1
K12	K 2	CH 11	DIRECT ADDRESS CHANNEL 11	0	1	0	1	0
K13	K 2	CH 12	DIRECT ADDRESS CHANNEL 12	0	1	0	1	1
K10	K 3	CH 13	DIRECT ADDRESS CHANNEL 13	0	1	1	0	0
K11	K 3	CH 14	DIRECT ADDRESS CHANNEL 14	0	1	1	0	1
K12	K 3	CH 15	DIRECT ADDRESS CHANNEL 15	0	1	1	1	0
K13	K 3	CH 16	DIRECT ADDRESS CHANNEL 16	0	1	1	1	1
K10	K 4	CH 17	DIRECT ADDRESS CHANNEL 17	1	0	0	0	0
K11	K 4	CH 18	DIRECT ADDRESS CHANNEL 18	1	0	0	0	1
K12	K 4	CH 19	DIRECT ADDRESS CHANNEL 19	1	0	0	1	0
K13	K 4	CH 20	DIRECT ADDRESS CHANNEL 20	1	0	0	1	1
K10	K 5	VOLD	VOLUME DOWN	1	1	0	0	0
K11	K 5	VOLU	VOLUME UP	1	1	0	0	1
K12	K 5	CHD	CHANNEL DOWN	1	1	0	1	0
K13	K 5	CHU	CHANNEL DOWN	1	1	0	1	1
K11	K 6	MUTE	MUTE ON/OFF	1	1	1	0	1
K12	K 6	OPT	OPTION	1	1	1	0	0
K13	K 6	POW	POWER ON/OFF	1	1	1	1	1

Table 1 Data bit code

# APPLICATION CIRCUIT

## ○ EXAMPLE OF 18 FUNCTION TRANSMITTER CIRCUIT



## ○ EXAMPLE OF CONSTANT CURRENT LED DRIVE CIRCUIT

