

DESCRIPTION

ES56061 is a low cost digital key control circuit with CMOS process. It converts frequencies by the first A/D converting the input signal and then changing the sampling frequency in the following D/A converter.

APPLICATIONS:

- KARAODE system
- Video disc player

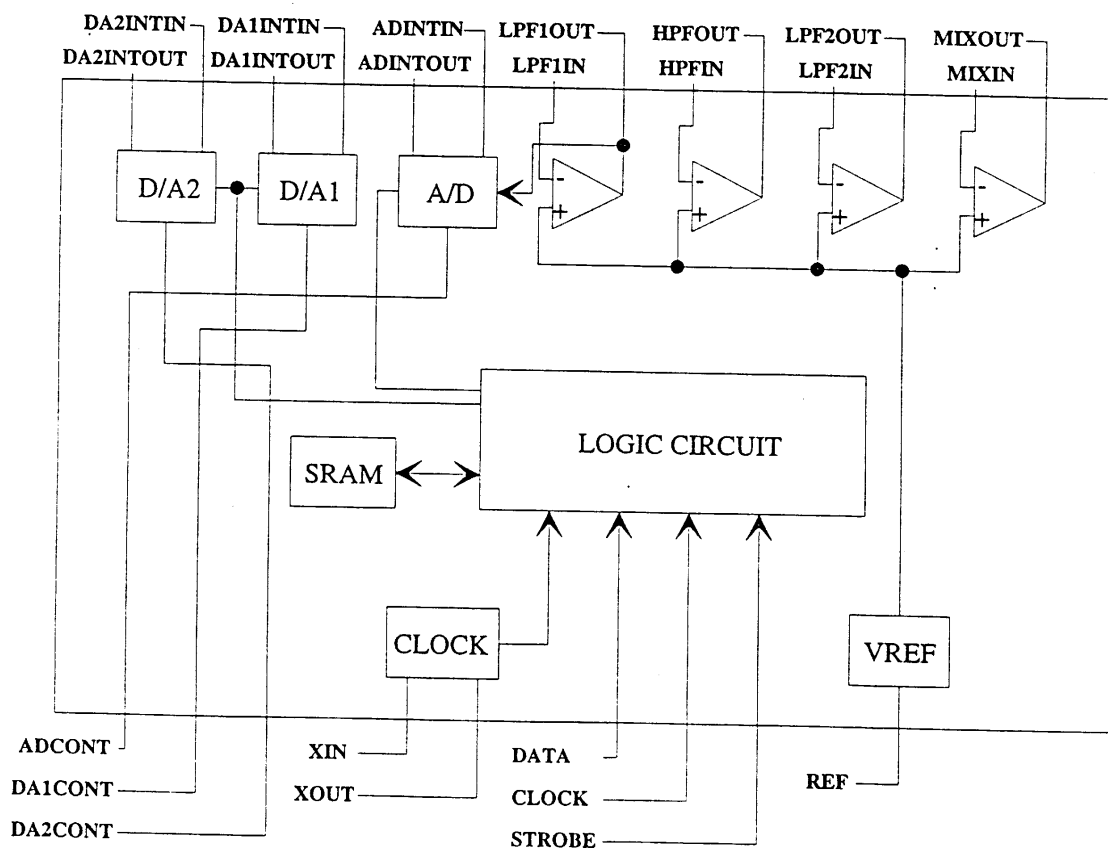
FEATURES

- High integrated circuit including A/D converter, D/A converter, low-pass filter, high pass filter, 32k-bit SRAM, and digital control logic circuit
- Built-in auto reset circuit
- Low distortion and low noise
- Key controlled from -20 to +20 points by 3 lines clocked serial data bus
- +5V single power supply

1996.11.27

BLOCK DIAGRAM

BLOCK DIAGRAM



PIN DESCRIPTION

PIN NO.	PIN NAME	TYPE	DESCRIPTION
1	ADCONT	-	Adaptive time constant for A/D conversion
2	DA1CONT	-	Adaptive time constant for A/A1 conversion
3	DA2CONT	-	Adaptive time constant for A/A2 conversion
5	XIN	I	Oscillator input (16MHz crystal oscillator)
6	XOUT	O	Oscillator output
7	DATA	I	Serial bus data input
8	CLOCK	I	Serial bus data input
9	STROBE	I	Serial bus data input
12	REF	O	Voltage reference 1/2Vcc
13	GND	-	Ground
14	VCC	-	Power supply
15	MIXOUT	O	LPF & HPF signals mixer output
16	MIXIN	I	LPF & HPF signals mixer input
17	LPF2OUT	O	Low pass filter 2 output
18	LPF2IN	I	Low pass filter 2 input
19	HPFOUT	O	High pass filter output
20	HPFIN	I	High pass filter input
21	LPF2OUT	O	Low pass filter 1 output
22	LPF2IN	I	Low pass filter 1 input
23	ADINTIN	I	A/D conversion integrator input
24	ADINTOUT	O	A/D conversion integrator output
25	AD1INTIN	I	A/A1 conversion integrator input
26	DA1INTOUT	O	A/D1 conversion integrator output
27	DA2INTIN	I	A/A2 conversion integrator input
28	DA2INTOUT	O	A/D2 conversion integrator output
4,10,11	NC	-	No connected

PIN CONFIGURATION

1	ADCONT	DA2INTOUT	28
2	DA1CONT	DA2INTIN	27
3	DA2CONT	DA1INTOUT	26
4	NC	DA1INTIN	25
5	XIN	ADINTOUT	24
6	XOUT	ADINTIN	23
7	DATA	LPF1IN	22
8	CLOCK	LPF1OUT	21
9	STROBE	HPFIN	20
10	NC	HPFOUT	19
11	NC	LPF2IN	18
12	REF	LPF2OUT	17
13	GND	MIXIN	16
14	VCC	MIXOUT	15

ES56061

ABSOLUTE MAXIMUM RATINGS

Parameter	Symbol	Limits	Unit
Supply voltage	V_{CC}	6.0	V
Supply voltage	V_{CC}	100	mA
Digital input voltage	V_{IN}	$-0.3 \sim V_{CC} + 0.3$	V
Power dissipation	P_D	800	mW
Operating temperature	T_{OP}	$-20 \sim 75$	$^{\circ}C$
Storage temperature	T_{STG}	$-40 \sim 125$	$^{\circ}C$

ELECTRICAL CHARACTERISTICS

($V_{CC}=5V$, $F_{IN}=1KHz$, $V_1=15dBm$, $T_a=25^{\circ}C$ when key is F0, nules otherwise noted)

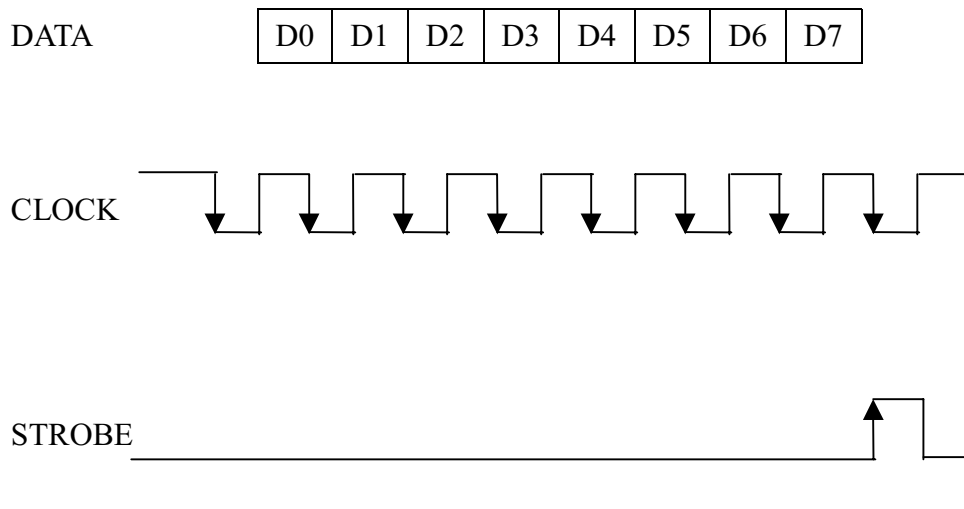
Parameter	Symbol	Test condition	Min	Typ	Max	Unit
Supply current	I_{CC}	Quiescent	-	20	30	mA
Voltage gain	G_v		-3	0	3	dB
Distortion	THD	$V_0=-15dBm$, 30KHz LPF	-	0.5	1	%
Noise voltage	No		-	-80	-70	dBm
Output voltage	V_{OMAX}	THD=10%	1	1.6	-	V

Note:0 dBm=775 Vrms

FUNCTIONAL DESCRIPTION

Key control system:

3 lines clocked serial bus



There are two major modes to change the key:

- VMC(variable music control mode)
- VSC(variable speed control mode)

VMC maintains high sound quality in key variation between -4 and +3 and is used by control orchestra music for KARAOKE.

VSC provides lower sound quality but variable key range as wide as ± 1 octave or more, which is used by compensation is reproduction of source in double speed playback.

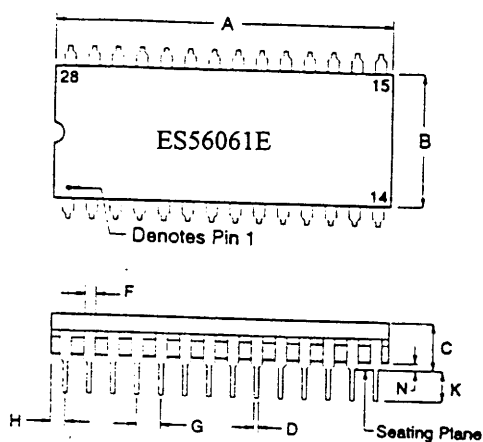
The key control contents are shown in the next table. VMC mode is set by D5='L'. VSC mode is set by D5='H'. D6 & D7 are reserved and set to 'L'. F0 indicates no change in musical intervals, i.e., equal to the input frequency. F+n or F-n indicates that musical intervals become higher or lower by semitone 'n'. The key change frequency for at $F \pm n$ for the input frequency f_i is calculated by the following equation:

$$F_o = f_i * 2^{\pm(n/12)}$$

D0	D1	D2	D3	D4	D5=L	D5=H	D6	D7
H	H	H	H	H		F+20	L	L
L	H	H	H	H		F+18	L	L
H	L	H	H	H		F+16	L	L
L	L	H	H	H		F+14	L	L
H	H	L	H	H		F+13	L	L
L	H	L	H	H		F+11	L	L
H	L	L	H	H		F+9	L	L
L	L	L	H	H		F+8	L	L
H	H	H	L	H		F+7	L	L
L	H	H	L	H	F+6		L	L
H	L	H	L	H	F+5	F+5	L	L
L	L	H	L	H	F+4	F+4	L	L
L	L	H	L	H	F+3	F+3	L	L
L	H	L	L	H	F+2	F+2	L	L
H	L	L	L	H	F+1	F+1	L	L
L	L	L	L	H	F0	F0	L	L
H	H	H	H	L	F-1	F-1	L	L
L	H	H	H	L	F-2	F-2	L	L
H	L	H	H	L	F-3	F-3	L	L
L	L	H	H	L	F-4	F-4	L	L
H	H	L	H	L	F-5	F-5	L	L
L	H	L	H	L	F-6	F-6	L	L
H	L	L	H	L	F-7	F-7	L	L
L	L	L	H	L		F-8	L	L
H	H	H	L	L		F-9	L	L
L	H	H	L	L		F-11	L	L
H	L	H	L	L		F-12	L	L
L	L	H	L	L			L	L
H	H	L	L	L		F-14	L	L
L	H	L	L	L		F-16	L	L
H	L	L	L	L		F-18	L	L
L	L	L	L	L		F-20	L	L

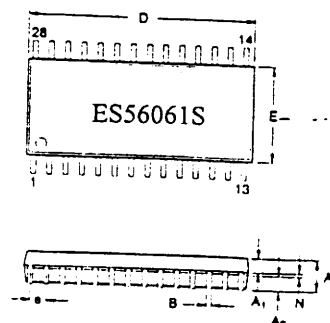
PACKAGE DRAWING

28-PIN DIP



MILLIMETERS		
DIM	MIN	MAX
A	34.54	37.34
B	12.70	14.99
C	4.29	5.08
D	0.38	0.53
F	0.76	1.78
G	2.54 BASIC	
H	0.76	2.41
J	0.18	0.38
K	2.54	3.81
L	15.24 BASIC	
M	0°	15°
N	0.51	2.29

28-PIN SOP



MILLIMETERS		
DIM	MIN	MAX
A	2.31	2.39
A ₁	1.045 BASIC	
A ₂	1.045 BASIC	
B	0.35	0.48
D	17.81	18.06
E	7.42	7.62
e	1.27 BASIC	
N	0.23	0.32
L	10.11	10.57