



MICROCLOCK

MK2745-24 DVD/MPEG Clock Source

Description

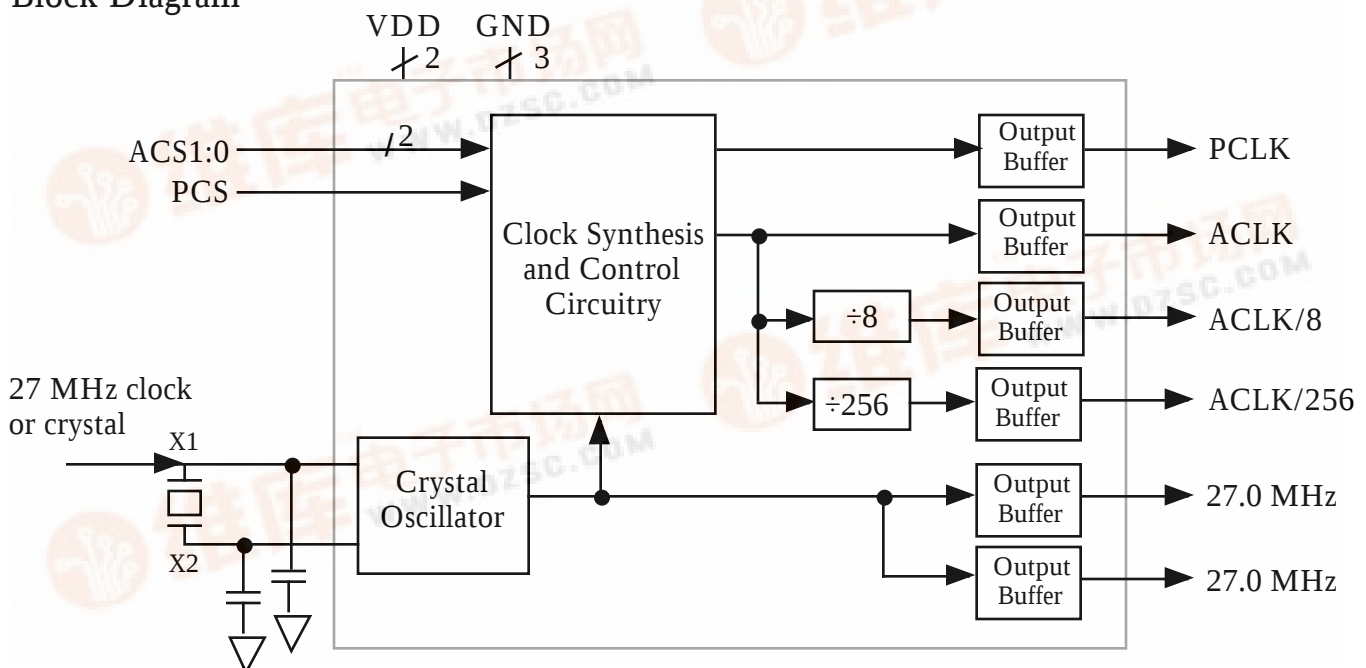
The MK2745-24 is a low cost, low jitter, high performance clock synthesizer for DVD and other MPEG 2 based applications. Using analog Phase-Locked Loop (PLL) techniques, the device accepts a 27.00 MHz fundamental mode crystal or clock input to produce multiple audio output clocks, a processor clock, and two 27 MHz clocks. The audio clocks are frequency locked to the 27.00 MHz using our patented zero ppm error techniques, allowing audio and video to track exactly, thereby eliminating the need for large buffer memory.

MicroClock manufactures the largest variety of DVD, Set-Top Box, and multimedia clock synthesizers for all applications. Consult MicroClock to eliminate crystals and oscillators from your board.

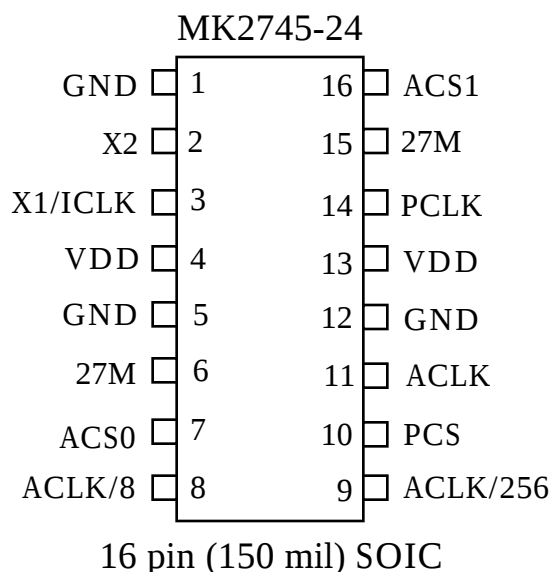
Features

- Packaged in 16 pin narrow (150 mil) SOIC 
- Ideal for AuraVision's notebook DVD solutions
- Patented zero ppm audio clock error for exact audio clock sampling rates, plus 32x and 256x clocks of the sampling frequencies
- Selectable audio sampling frequencies support 32, 44.1, 48 and 96 kHz in most DACs
- 27.00 MHz fundamental crystal or clock input
- Selectable processor frequencies
- Two clocks of 27 MHz
- Zero ppm error in all clocks
- 25mA output drive capability at TTL levels
- Advanced, low power, sub-micron CMOS process
- 3.0V to 5.5V operating voltage
- See also the MK2712 for NTSC/PAL clocks

Block Diagram



Pin Assignment



Audio Clocks Selection Table (in MHz)

ACS1	ACS0	ACLK	ACLK/8	ACLK/256
0	0	24.576	3.072	96.0 kHz
0	1	11.2896	1.4112	44.1 kHz
1	0	8.192	1.024	32.0 kHz
1	1	12.288	1.536	48.0 kHz

Processor Clock (MHz)

PCS	PCLK
0	40
1	60

0 = connect directly to ground

1 = connect directly to VDD

Pin Descriptions

Number	Name	Type	Description
1	GND	P	Connect to ground.
2	X2	XO	Crystal connection. Connect to 27 MHz crystal. Leave unconnected for clock input.
3	X1/ICLK	XI	Crystal connection. Connect to 27 MHz crystal or connect to 27 MHz input clock.
4	VDD	P	Connect to +3.3 V or +5 V. Must be same as other VDD.
5	GND	P	Connect to ground.
6	27M	O	27.00 MHz clock output.
7	ACS0	I	Audio Clock Select 0. Selects audio clocks per table above.
8	ACLK/8	O	Audio Clock divided by 8 output. Determined by status of ACS1, ACS0. See table above.
9	ACLK/256	O	Audio Clock divided by 256 output. Determined by status of ACS1, ACS0. See table above.
10	PCS	I	Processor Clock Select pin. Selects PCLK per table above.
11	ACLK	O	Audio Clock output. Determined by status of ACS1, ACS0. See table above.
12	GND	P	Connect to ground.
13	VDD	P	Connect to +3.3 V or +5 V. Must be same as other VDD.
14	PCLK	O	Processor Clock output. Determined by status of PCS. See table above.
15	27M	O	27.00 MHz clock output.
16	ACS1	I	Audio Clock Select 1. Selects audio clocks per table above.

Key: I = Input, O = output, P = power supply connection



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Electrical Specifications

Parameter	Conditions	Minimum	Typical	Maximum	Units
ABSOLUTE MAXIMUM RATINGS (note 1)					
Supply voltage, VDD	Referenced to GND			7	V
Inputs and Clock Outputs	Referenced to GND	-0.5		VDD+0.5	V
Ambient Operating Temperature		0		70	°C
Soldering Temperature	Max of 20 seconds			260	°C
Storage temperature		-65		150	°C
DC CHARACTERISTICS (VDD = 5.0V unless noted)					
Operating Voltage, VDD		3		5.5	V
Input High Voltage, VIH, X1/ICLK pin only		VDD/2 + 1	VDD/2		V
Input Low Voltage, VIL, X1/ICLK pin only			VDD/2	VDD/2 - 1	V
Input High Voltage, VIH		2			V
Input Low Voltage, VIL				0.8	V
Output High Voltage, VOH	IOH=-25mA	2.4			V
Output Low Voltage, VOL	IOL=25mA			0.4	V
Output High Voltage, VOH, CMOS level	IOH=-8mA	VDD-0.4			V
Operating Supply Current, IDD	No Load, note 2		37		mA
Short Circuit Current	Each output		±100		mA
Input Capacitance			7		pF
AC CHARACTERISTICS (VDD = 5.0V unless noted)					
Input Frequency			27.000		MHz
Output Clock Rise Time	0.8 to 2.0V			1.5	ns
Output Clock Fall Time	2.0 to 0.8V			1.5	ns
Output Clock Duty Cycle	At VDD/2	40		60	%
Frequency synthesis error, all clocks			0	1	ppm
Absolute Jitter, short term	Variation from mean		200		ps

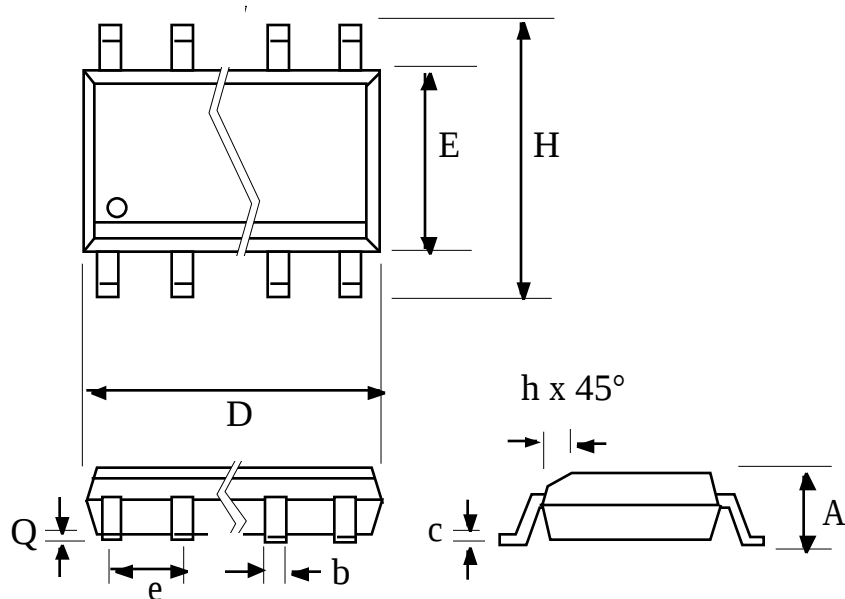
Notes: 1. Stresses beyond those listed under Absolute Maximum Ratings could cause permanent damage to the device. Prolonged exposure to levels above the operating limits but below the Absolute Maximums may affect device reliability.
2. With VDD=3.3V, processor clock at 60MHz, and ACLK at 12.288MHz.

External Components

The MK2745-24 requires a minimum number of external components for proper operation. Decoupling capacitors of 0.1μF should be connected between VDD and GND (on pins 4 and 5, and pins 13 and 12), as close to the MK2745-24 as possible. A series termination resistor of 33Ω may be used for each clock output. If a clock input is not used, the 27.00 MHz crystal must be connected as close to the chip as possible. The crystal should be a fundamental mode (do not use third overtone), parallel resonant, 50ppm or better. Crystal capacitors should be connected from pins X1 to ground and X2 to ground. The value of these capacitors is given by the following equation, where C_L is the crystal load capacitance: Crystal caps (pF) = $(C_L - 6) \times 2$. So for a crystal with 16pF load capacitance, two 20pF caps should be used.

Package Outline and Package Dimensions

16 pin SOIC narrow



Symbol	Inches		Millimeters	
	Min	Max	Min	Max
A	0.055	0.070	1.397	1.778
b	0.013	0.019	0.330	0.483
c	0.007	0.010	0.191	0.254
D	0.385	0.400	9.779	10.160
E	0.150	0.160	3.810	4.064
H	0.225	0.245	5.715	6.223
e	.050 BSC		1.27 BSC	
h		0.016		0.406
Q	0.004	0.01	0.102	0.254

Ordering Information

Part/Order Number	Marking	Shipping packaging	Package	Temperature
MK2745-24S	MK2745-24S	tubes	16 pin narrow SOIC	0-70°C
MK2745-24STR	MK2745-24S	tape and reel	16 pin narrow SOIC	0-70°C

Rev. 04218, version A . First publication, Preliminary.
Rev. 10088, version B. Production.

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