



Video and Audio Switch for PAL-SECAM 21-Pin Interface

Overview

The LA7156 is a switching IC for use with the PAL and SECAM 21-pin connector interface. The LA7156 integrates video and audio switches in a single chip, and allows significant block reorganization and integration by providing function switching outputs with current limiters, 75 Ω video drivers, muting and other functions. The LA7156 provides a diverse set of functions, including support for single-wire serial bus control that allows complex logic to be handled by microprocessor software.

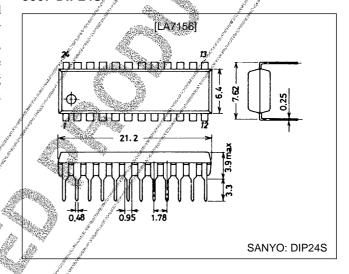
Functions and Features

- Three audio and three video switching systems
- Audio output and video decoder output muting function
- Video input sync chip clamp
- Two 6 dB video amplifier plus 75 Ω driver systems
- · VPS decoder output
- FSS output with current limiting
- 5 V regulator built-in
- Serial control

Package Dimensions

unit: mm

3067-DIP24S



Specifications

Absolute Maximum Ratings at Ta = 25°C

	A S	A. 27 (4.00 A)			
Parameter	11	Symbol	Conditions	Ratings	Unit
Maximum supply voltage	//	V _{CC} max		15	V
Allowable power dissipation		Pd max	Ta,≝ 65°C	800	mW
Operating temperature	# A &	Topr		-20 to +65	°C
Storage temperature		Tstg		-55 to +150	°C

Operating Conditions at Ta = 25°C

Parameter	Symbol	Conditions	Ratings	Unit
Recommended supply voltage	V _{CC}		9, 12	V
Operating supply voltage range	V _{CC} op		8 to 13	V

Operating Characteristics at $Ta=25^{\circ}C,\,V_{CC}$ = 9 V and 12 V

Parameter	Symbol	Conditions	min	typ	max	Unit
Current drain	I _{CC}	No input	32	40	48	mA
FSS output high level voltage 1	VHFSS1	V_{CC} = 9 V, load resistance: 10 kΩ	7.5	8.9	9.0	V
FSS output low level voltage 1	VLFSS1	V_{CC} = 9 V, load resistance: 10 kΩ	, fr	0	0.5	V
FSS output high level voltage 2	VHFSS2	V_{CC} = 12 V, load resistance: 10 kΩ	10.5	11.9	12.0	V
FSS output low level voltage 2	VLFSS2	V_{CC} = 12 V, load resistance: 10 kΩ	11	0	0.5	. V
FSS output cutoff current 1	I _{CUTOFF} 1	V _{CC} = 9 V, the outflow current when the FSS output is grounded	and the same of	9.3	40.0	mA
FSS output cutoff current 2	I _{CUTOFF} 2	V _{CC} = 12 V, the outflow current when the FSS output is grounded		9.8	40.0	mA
[Audio Switch Block]		gg de garage		19.160 (15)	part and	
Total harmonic distortion	THD	V _{IN} = 1 Vrms, f = 1 kHz, R _{OUT} = ∞	(1) (1) (1) (1) (1) (1)	. 0.02	1	%
Maximum output voltage	V _O max	The output level when f = 1 kHz and THD = 2%	2	3		Vrms
Output noise voltage	V _{NO}	Rg = 600 Ω, DIN audio filter		-100	-90	dBV
Voltage gain A	VG _A	The TP6 and TP8 output levels when V _{IN} = 1 Vrms and f = 1 kHz	-1.4	1.8	2.5	dB
Interchannel crosstalk A	CTA	V _{IN} = 1 Vrms, f = 1 kHz		<i>j</i> −90	-70	dB
Muting attenuation A	VmuteA	V _{IN} = 1 Vrms, f = 1 kHz		– 90	-70	dB
Output offset voltage	Vof	The offset voltage when the switch has changed state	11	0	20	mV
Input impedance A	Z _{IN} A		/40	50	60	kΩ
[Video Switch Block]			11			
Voltage gain V	VG _V	The TP2 and TP5 output levels when V _{IN} = 1 Vp-p and f = 4.43 MHz	-1	0	+1	dB
Frequency characteristics	Vf	V _{IN} = 1 Vp-p, f = 100 k/7 MHz	-1.5	-0.5	+0.5	dB
Second harmonic	H2	V _{IN} = 1 Vp-p, f = 4.43 MHz		-45	-40	dB
Third harmonic	НЗ	V _{IN} = 1 Vp-p, f ≠ 4.43 MHz		-50	-45	dB
Interchannel crosstalk V	CTV	V _{IN} = 1 Vp-p, f = 4.43 MHz		-50	-40	dB
Muting attenuation V	VmuteV	V _{IN} = 1 Vp-p, f = 4:43 MHz		-50	-40	dB
Output voltage	V _{OUT}	The TP5 DC voltage with no input		0.7	1.0	V
[Control Block]	•	7/ 202 20 //	•	•		
Serial control input high level	Vsh		4		5	V
Serial control input middle level	Vsm		2		3	V
Serial control input low level	Vs/		0		1	V
Pin 2 input high level	√2H		4		V _{CC}	V
Pin 2 input low level	√ y⁄2L		0		2	V
Pin 20 input high level	/V20H		4		V _{CC}	V
Pin 20 input middle level	V20M	12 1	2		3	V
Pin 20 input low level	V20L	<u> </u>	0		1	V
Pin 7 output high level	V7H	The TP9 DC voltage when SW3 is in the A position	4.5	5.0	5.5	V
Pin 7 output low level	¥7L	The TP9 DC voltage when SW3 is in the B position	0		1	V
Note: In the exercise of his restartible	And listed to the list	a characteristics items that do not differ between V 0	\/ and 12 \/ a	ra liatad aa th	a como itom	1

Note: In the operating characteristics listed above, characteristics items that do not differ between V_{CC} = 9 V and 12 V are listed as the same item.

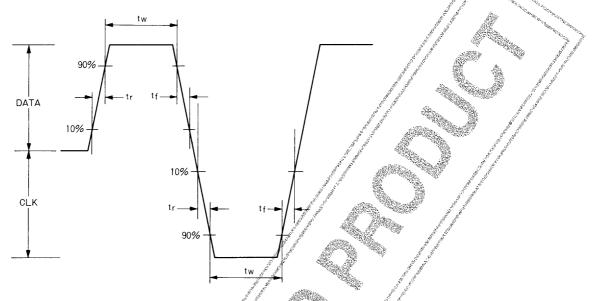
1. Forced to low when pin 2 is open.

2. Forced to the middle level when pin 20 is open.

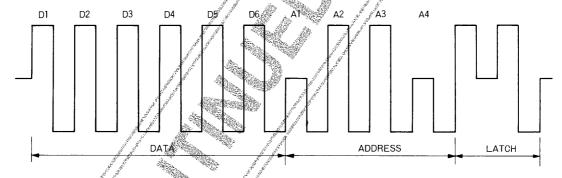


Timing Characteristics

Parameter	Symbol	Conditions	min	typ	max	Unit
Minimum input pulse width	t _W		2	di w.		μs
Rise time	tr			A STATE OF THE STA	20	μs
Fall time	tf		6		20	μs



Serial Control Input Specifications



LA7156 Command Address

Address	A1	A 2	A3 A4
State	<i># J</i> L	Н	رايا 👭
		The same of the sa	SSe 8 6

Switch Logic Values Table

The LA7156 provides the following switching control with control of pin 20.

1. Normal mode (when pin 20 is high)

In this mode, the LA7156 functions, including switching, FSS output and muting, can be controlled from the six bits of serial data transferred from the microprocessor. However, note that the video and andio system switch operate at the same time in this mode.

					X // P 3/2	
DAT	ГА1	Switch state		DATA4	Switch state	Note
H A		A.SW1-A, V.SW1-A	1, 2	Н	A SW3-A, V.SW3-A, pin 7 high	1, 2
L	-	A.SW1-B, V.SW1-B	1, 2	L	A,\$W3-B, V;\$W3-B, pin 7 low	1, 2
DATA2	DATA3	Switch state	Note	DATA5	FSS output state	Note
Н	L	A.SW2-A, V.SW2-A	1, 2	Н 🔏	Output high	
L	L	A.SW2-B, V.SW2-B	1, 2	L //	Output low	
_	Н	A.SW2-C, V.SW2-C	1, 2	DATA6	Muted state	Note
			•	/H/ ²	Muted	
				//L ((Mute released	

Note: 1. All the audio switch and the video SW3 outputs are forcibly muted when DATA6 is high or in muting mode.

2. Preset mode (when pin 20 is middle or low)

This mode uses the LA7156 internally set up logic and the six bits of data are allocated to the VCR operating states to allow the switch states to be changed.

Serial Data

External Input Data

DATA No.	Item	H /	L.	Pin No.	Item	Н	L
D1	Power on/off	On	Off 101	P2 /	Decoder in	Scramble	Normal
D2	VCR/TV	VCR	100 St. Co.	W //			
D3	Pay CH/Normal CH	Pay	Normal				
D4	EXT/Tuner	₽ ₽ FXT 🦠	Tuner	77			

Truth Table

D6

Pin 20: Open or Middle

PB/EE Mute on/off

D1	D2	/ D3 🦪	D4	D5,	P2	A.V.SW1	A.V.SW2	A.V.SW3	FSS out	Pin 7 out
L	— Je	/ - W	*	17	Н	А	С	Α	L	Н
L	-41		<u> </u>	11-	L	Α	С	Α	L	Н
Н	Æ		L /	∮″ L	Н	Α	A	Α	L	Н
Н		+	L //	L	L	А	С	Α	L	Н
Н	//H		¥ Å	L	Н	А	Α	Α	Η	Н
H	/ H	_	3 ⁴ kg ⁴	L	L	А	С	Α	Η	Н
H yell yell	Ĺ	. 4. 5.	<i>J</i>	L	Н	А	В	Α	L	Н
H /		* – /	H	L	L	А	В	Α	L	Н
₹ ₩	H	- 1	Н	L	Н	А	В	Α	Η	Н
H. The	Ŧ	71	Н	L	L	А	В	Α	Η	Н
H	-	7-7	_	Н	Н	А	*	Α	Η	Н
Н	The state of the s	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	_	Н	L	А	*	Α	Н	Н

Note: The previous state is retained even if another switch is changed.

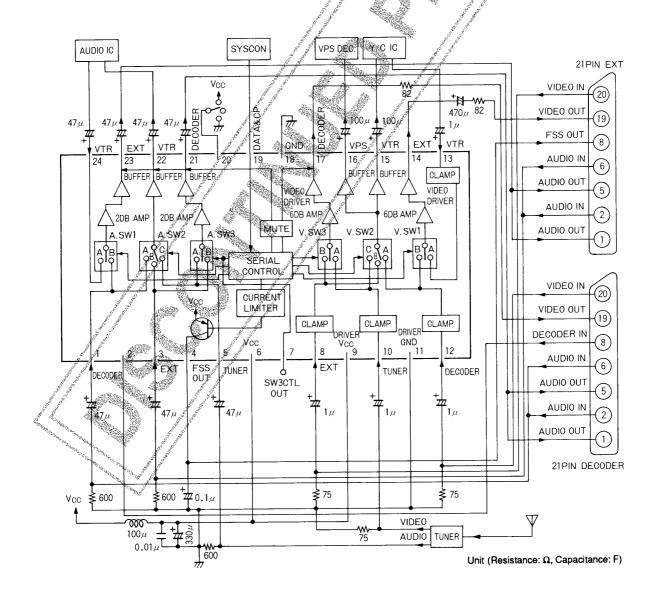
^{2.} A.SW indicates the audio system switches and V.SW indicates the video system switches.

Pin 20: Low

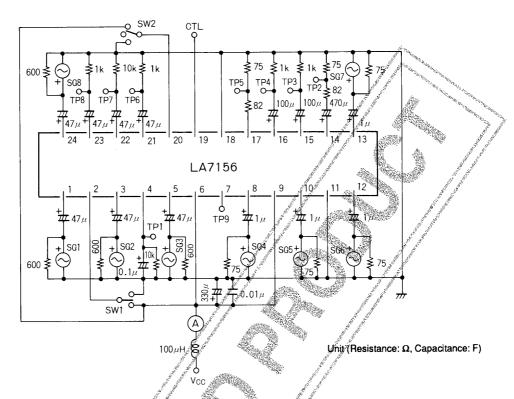
D1	D2	D3	D4	D5	P2	A.V.SW1	A.V.SW2	A.V.SW3	FSS out	Pin 7 out
L	1	-	_	1	Н	В	А	В	Н	L
L	_	_	_	_	L	В	А	B/	L L	L
Н	L	L	L	L	Н	В	С	/B/	H	L
Н	L	L	L	L	L	А	С	//B	Esta La Paris	L
Н	Н	L	L	L	Н	А	C ,	Α	H	H
Н	Н	L	L	L	L	А	C //	A	H	Ŧ,
Н	L	Н	L	L	Н	А	A, A	A	ŶŶ	∮ ∮ H
Н	L	Н	L	L	L	А	£ A	* A	, L /	H
Н	Н	Н	L	L	Н	А	/ A .	A	H // /	Ι
Н	Н	Н	L	L	L	Α ,	/ / C	Α	₩//	Н
Н	L	_	Н	L	Н	Α 🦨	/ A	В.	/ H	L
Н	L	_	Н	L	L	A // //	В	В	/ / L	L
Н	Н	_	Н	L	Н	A j	A	В	J H	L
Н	Н	_	Н	L	L	, A	В	B J f	Н	L
Н	_	_	_	Н	Н	A		* 2	Н	*
Н	_	_	_	H	L	/ A	* 50	J * * * * * * * * * * * * * * * * * * *	Н	*

Note: The previous state is retained even if another switch is changed.

Block Diagram and Recommended Circuit Diagram



Test Circuit



Input and Output Pin Circuit Diagrams

Unit (Resistance: Ω, Current source: A)

Pin No.	Symbol	,t/O circuit	DC voltage	Note
1 3 5 24	A _{IN} 1 A _{IN} 2 A _{IN} 3 A _{IN} 4	100, Vec 500 500 100 µ	1/2 V _{CC} + 0.7 V	
2	DEC IN	56k -W- \$13k		
4	FSS O UT	V _{cc} 40k ₹	V _{CC} – 0.2 V	
0	- CC	J. gef		

Continued from preceding page.

Unit (Resistance: Ω , Current source: A)

Pin No.	Symbol	I/O circuit	DC voltage	Note
7	SW3 CTL OUT	1.5k 27k	H: 5.0 V L: 0 V	
8 10 12 13	V _{IN} 1 V _{IN} 2 V _{IN} 3 V _{IN} 4	VCC	2.5 V	
9	DRIVER V _{CC}			
11	DRIVER GND			
14	V _{OUT} 1	500, <i>u</i> 0	1.6 V	External connection
17	V _{OUT} 2			
15	Vout3	100%	1.6 V	Signal processing IC connection
16	Voiit4	200 ★ 1k	1.6 V	Signal processing IC connection
18	GND	and the state of t		

Continued from preceding page.

Unit (Resistance: Ω , Current source: A)

Pin No.	Symbol	I/O circuit	DC voltage	Note
19	D/C IN	5V REG VCC 50μ 50μ 50μ 50μ	2.5 V	
20	MODE CTL IN	5V REG Vcc 50, 10 50, 1	2.5.M	
21	A _{OUT} 1		1/2/Vec	External connection
23	A _{OUT} 2			External confidences
22	A _{OUT} 3	Vec 400,u	1/2 V _{CC}	Signal processing IC connection

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