

VCR auto tracking interface

BA7047S

The BA7047S is a microcomputer-interface IC for VCR auto-tracking. It includes two input amplifiers, a peak detector circuit, output amplifiers and a comparator timing circuit. The IC outputs the peak detection output for input video and audio FM signals.

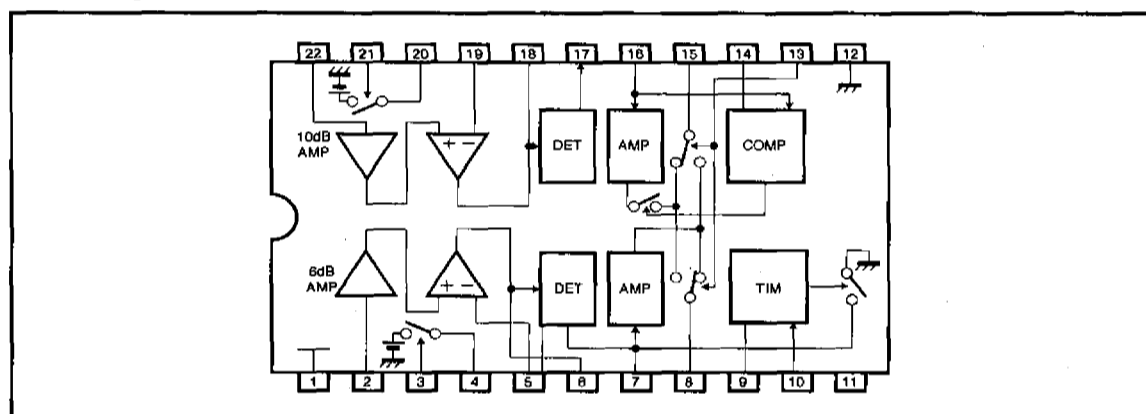
●Applications

VHS video cassette recorders

●Features

- 1) Inverting input pin and internal switch allow construction of different types of filters.
- 2) Built-in output switching allows both audio and video signals to be processed using one A/D port.
- 3) A built-in comparator detects presence or absence of Hi-Fi audio.
- 4) A timing circuit suppresses the effects of head switching noise.

●Block diagram



●Absolute maximum ratings (Ta=25°C)

Parameter	Symbol	Limits	Unit
Applied voltage	V _{CC}	8	V
Power dissipation	P _d	500 *	mW
Operating temperature	T _{opr}	-25~70	°C
Storage temperature	T _{stg}	-55~125	°C

* Reduced by 5.0mW for each increase in Ta of 1°C over 25°C.

●Recommended operating conditions (Ta=25°C)

Parameter	Symbol	Min.	Typ.	Max.	Unit
Operating voltage	V _{cc}	4.5	5.0	5.5	V

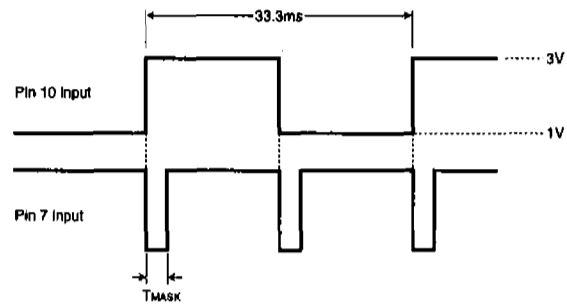


Fig. 1 Pin 7 and pin 10 input waveforms

VCR components  Auto tracking interface

●Electrical characteristics (Unless otherwise specified Ta=25°C and Vcc=5V)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions	Measurement Circuit
Circuit current	I _{CC}	9.0	14.0	19.0	mA		
6dB amplifier voltage gain	G ₆	3.5	6.0	8.0	dB	f=1MHz, V _{in} =0.5V _{P-P}	
6dB amplifier frequency characteristic	F ₆	-0.5	+1.0	+2.5	dB	7MHz / 1MHz, V _{in} =0.5V _{P-P}	
10dB amplifier voltage gain	G ₁₀	7.0	10.0	12.0	dB	f=1MHz, V _{in} =0.5V _{P-P}	
10dB amplifier frequency characteristic	F ₁₀	-2.0	+0.0	+2.0	dB	5MHz / 1MHz, V _{in} =0.5V _{P-P}	
Detector characteristic V1	V ₇	—	0.25	0.30	V	V _{in} =0.0V _{P-P}	
Detector characteristic V2	V _{7-I}	0.9	1.2	1.4	V	f=7.0MHz, V _{in} =1.0V _{P-P}	
Detector characteristic A1	V ₁₇	—	0.25	0.30	V	V _{in} =1.0V _{P-P}	
Detector characteristic A2	V _{17-I}	0.9	1.2	1.4	V	f=0.5MHz, V _{in} =1.0V _{P-P}	
Output amplifier characteristic V1	V _{80-LI}	1.50	1.75	2.00	V	V _{in} =1.0V	
Output amplifier characteristic V2	V _{80-HI}	4.7	4.9	5.0	V	V _{in} =3.0V	
Output amplifier characteristic A1	V _{150-LI}	1.50	1.75	2.00	V	V _{in} =1.0V	
Output amplifier characteristic A2	V _{150-HI}	4.7	4.9	5.0	V	V _{in} =3.0V	
Switch impedance V-OFF	Z _{4-OFF}	20k	100k	∞	Ω	f=1.0MHz, V _{in} =0.5V _{P-P}	
Switch impedance A-OFF	Z _{20-OFF}	20k	100k	∞	Ω	f=1.0MHz, V _{in} =0.5V _{P-P}	
Switch impedance V-ON	Z _{4-ON}	—	50	90	Ω	f=1.0MHz, V _{in} =0.5V _{P-P}	
Switch impedance A-ON	Z _{20-ON}	—	50	90	Ω	f=1.0MHz, V _{in} =0.5V _{P-P}	
Overall characteristic V	V _{80-O}	1.00	1.55	2.10	V	f=1.0MHz, V _{in} =0.5V _{P-P}	
Overall characteristic A	V _{150-O}	1.80	2.70	3.40	V	f=1.0MHz, V _{in} =0.5V _{P-P}	
Output switching V-F	V _{8-F}	0.50	0.75	1.00	V	V-V _{in} =0.5V, A-V _{in} =1.0V	
Output switching A-F	V _{15-F}	2.50	2.75	3.00	V	V-V _{in} =0.5V, A-V _{in} =1.5V	
Output switching V-R	V _{8-R}	2.50	2.75	3.00	V	V-V _{in} =0.5V, A-V _{in} =1.5V	
Output switching A-R	V _{15-R}	0.50	0.75	1.00	V	V-V _{in} =0.5V, A-V _{in} =1.5V	
Comparator level	V ₁₄	0.5	1.0	1.5	V	R=10kΩ, V _{in} =0.0V	
Hysteresis	H ₁₄	5	10	15	%	R=10kΩ, V _{in} =2.0V	
Mask time interval	T _{MASK}	60	120	180	μs	C=2200pF	
Switching voltage	V _{th}	1.0	2.0	3.0	V		

Fig.7

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●Electrical characteristic curves

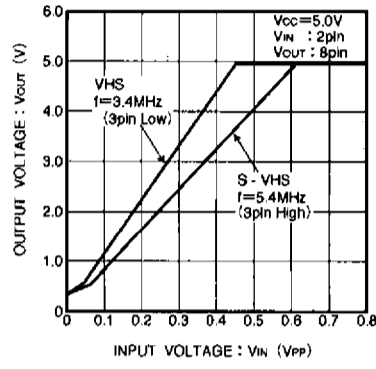


Fig. 2 Input voltage vs. output detector voltage characteristic

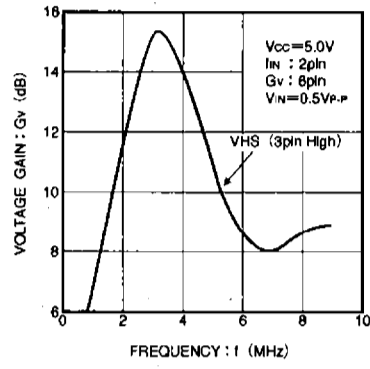


Fig. 3 Voltage gain vs. frequency characteristic (VHS)

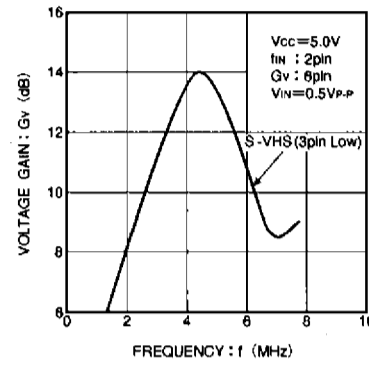


Fig. 4 Voltage gain vs. frequency characteristic (S-VHS)

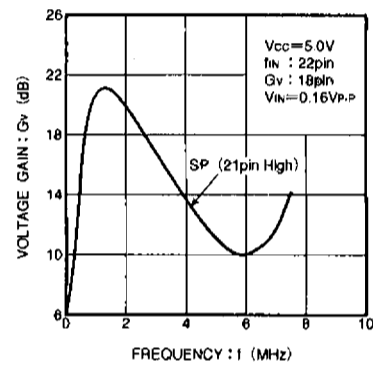


Fig. 5 Voltage gain vs. frequency characteristic (SP)

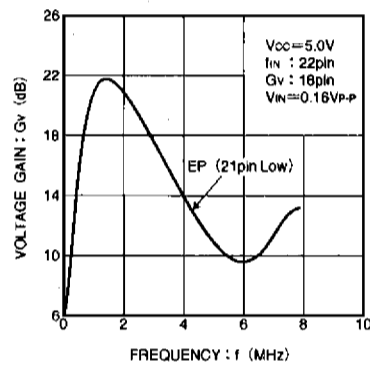


Fig. 6 Voltage gain vs. frequency characteristic (EP)

Auto tracking interface

VCR components

● Measurement circuit

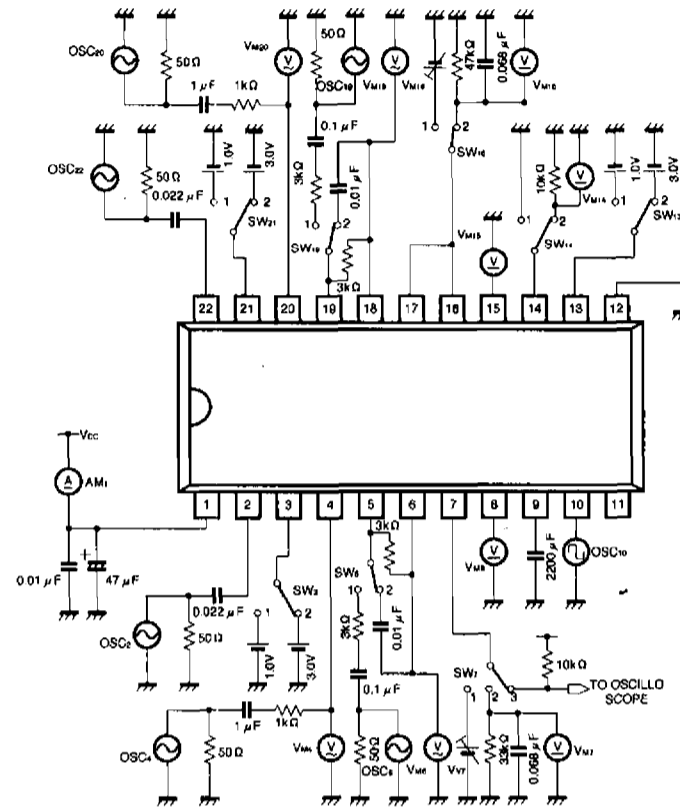


Fig.7

● Pin description

Pin No.	Name	Pin No.	Name
1	Vcc	12	GND
2	VIDEO FM IN	13	OUT CTL
3	VHS / S - VHS CTL	14	LEVEL CTL
4	V. SW	15	A. EMV OUT
5	V. IN-	16	A. EMV IN
6	V. OUT	17	A. DET
7	V. DET	18	A. OUT
8	V. EMV OUT	19	A. IN -
9	TIME ADJ	20	A. SW
10	D. FF IN	21	EP / SP CTL
11	NC	22	AUDIO FM IN

● Truth table

3,21 pin	4,20 pin
HIGH	OFF
LOW	ON

13 pin	Output selection
HIGH	Pin 16 input to pin 15 output/pin 7 input to pin 8 output
LOW	Pin 16 input to pin 8 output/pin 7 input to pin 15 output

● Application example

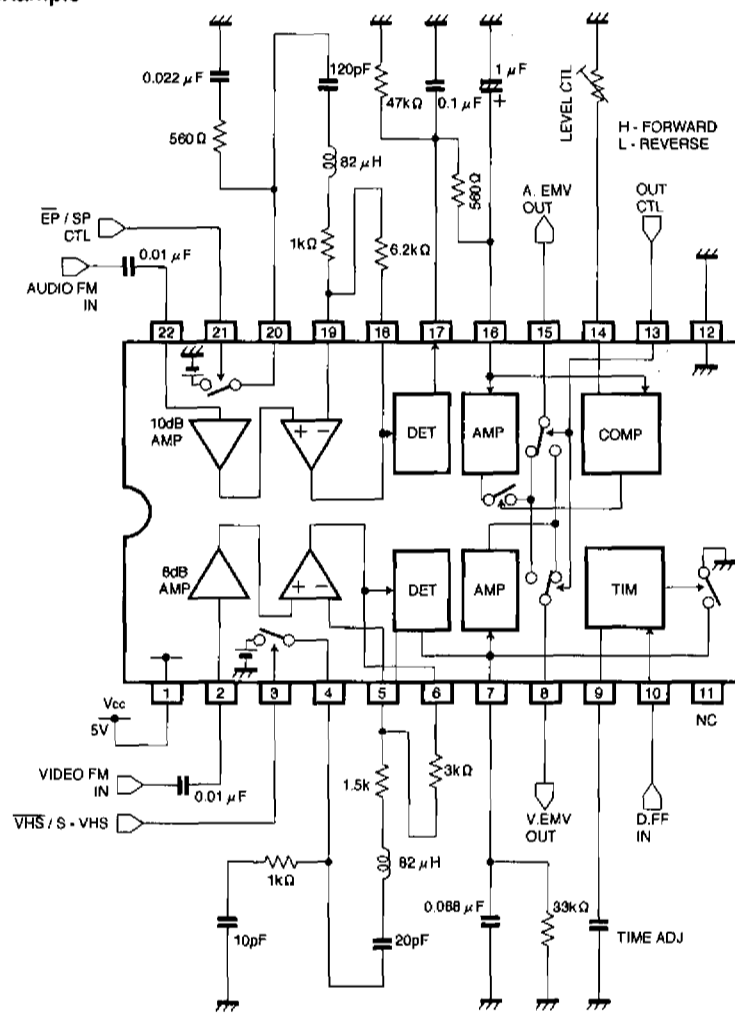
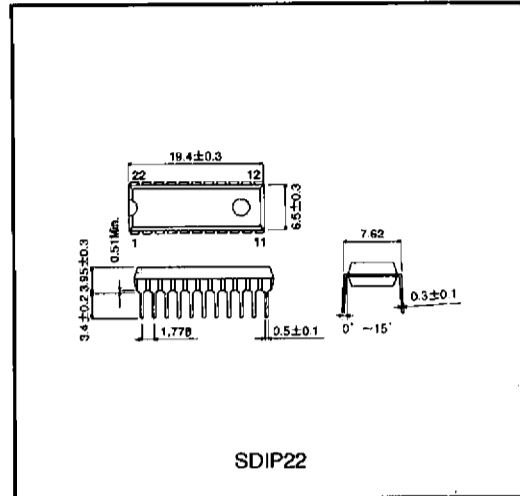


Fig 8

VCR components

Auto tracking interface

● External dimensions (Units: mm)



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