

# Video Amplifier Monolithic IC MM1002

## Outline

This IC is a video amplifier that can perform superimpose. It has a built-in  $75\Omega$  driver.

## Features

1. Built-in superimpose function
2. Built-in Y-C mix circuit
3. Vertical/horizontal sync signal output pin
4. Built-in clamp circuit (for Y signal only)
5.  $75\Omega$  driver built in
6. EVF driver built in
7. External pin (Pin 14) allows fine tuning of character level
8. Frequency response 5MHz
9. Power supply voltage 4.7V~5.3V

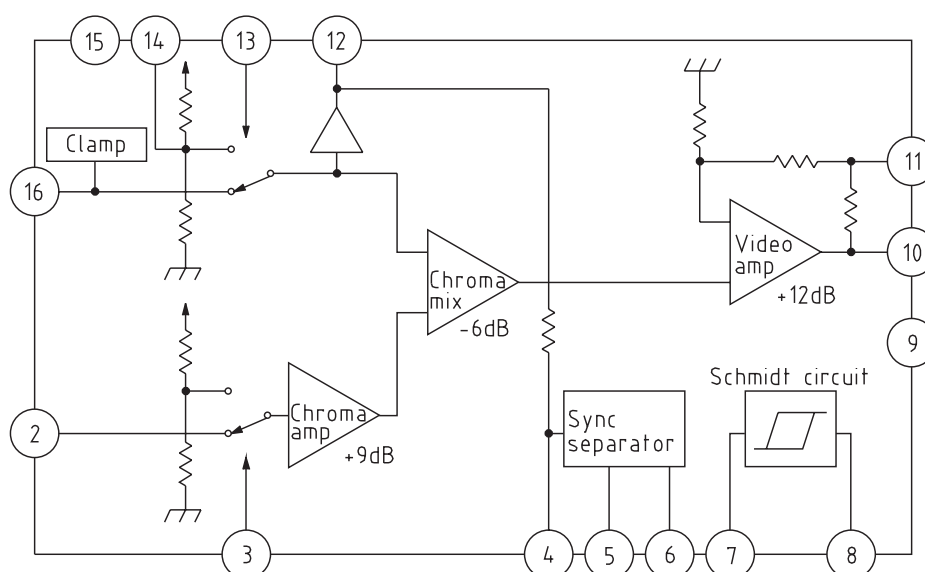
## Package

SOP-16A (MM1002F)

## Applications

1. TV
2. VCR
3. VCR with camera
4. Other video equipment

## Block Diagram



# Pin Description

Pin no.	Pin name	Internal equivalent circuit diagram	Pin no.	Pin name	Internal equivalent circuit diagram
1	NC		9	GND	
2	CHROMA IN		10	VIDEO OUT	
3	MIX		11	Anti-sag pin	
4	C1		12	EVF	
5	R		13	Character signal	
6	H-SYNC		14	Character signal level	
7	C2		15	Vcc	
8	V-SYNC		16	VIDEO IN	

## Absolute Maximum Ratings (Ta=25°C)

Item	Symbol	Ratings	Units
Storage temperature	T <sub>STG</sub>	-40~+125	°C
Operating temperature	T <sub>OPR</sub>	-20~+75	°C
Power supply voltage	V <sub>CC</sub>	7	V
Allowable loss	P <sub>d</sub>	350	mW

## Electrical Characteristics (Except where noted otherwise, Ta=25°C, V<sub>CC</sub>=5.0V, pulse level 0V, short between V<sub>CC</sub>-Id pin)

Item	Symbol	Measurement circuit	Measurement conditions	Min.	Typ.	Max.	Units
Operating power supply voltage	V <sub>CC</sub>	V <sub>CC</sub>		4.7	5.0	5.3	V
Consumption current	I <sub>d</sub>	I <sub>d</sub>			18.0	25.0	mA
EVF output							
Voltage gain	G <sub>u1</sub>	TP3	SG-1 sweep signal 1V <sub>P-P</sub> , 0.1MHz	-0.5	0.0	+0.5	dB
Differential gain	DG1	Buf	SG-1 staircase wave 1V <sub>P-P</sub> APL=10, 50, 90%, SW→1		1	3	%
Differential phase	DP1	Buf	SG-1 staircase signal 1V <sub>P-P</sub> APL=10, 50, 90%, SW→1		1	3	deg
Frequency characteristic	fc1	TP3	SG-1 sweep signal 1V <sub>P-P</sub> 5MHz/0.1MHz *1	-1	0	1	dB
Video amp output							
Voltage gain	G <sub>u2</sub>	TP4	SG-1 sweep wave 1V <sub>P-P</sub> , 0.1MHz	5.5	6.0	6.5	dB
Differential gain	DG2	Buf	SG-1 staircase wave 1V <sub>P-P</sub> APL=10, 50, 90%, SW→2		1	3	%
Differential phase	DP2	Buf	SG-1 staircase signal 1V <sub>P-P</sub> APL=10, 50, 90%, SW→2		1	3	deg
Frequency characteristic	fc2	TP4	SG-1 sweep signal 1V <sub>P-P</sub> 5MHz/0.1MHz *1	-1	0	1	dB
Character addition							
Character level	V <sub>CL</sub>	TP4	SG-1 staircase wave (no chroma signal) 1V <sub>P-P</sub> H <sub>D</sub> horizontal sync signal TP7 pulse level 5V	115	120	125	IRE
Input threshold voltage	V <sub>TH13</sub>	TP7	SG-1 staircase wave (no chroma signal) 1V <sub>P-P</sub> H <sub>D</sub> horizontal sync signal TP7 pulse level L→H *2	0.7	1.4	2.1	V
Chroma amp							
Voltage gain	G <sub>u3</sub>	TP4	SG-2 sine wave 0.1V <sub>P-P</sub> , 0.1MHz	13.5	15.0	16.5	dB
Frequency characteristic	fc3	TP4	SG-2 sine wave 0.1V <sub>P-P</sub> 5MHz/0.1MHz *1	-1	0	1	dB
Crosstalk	C	TP4	SG-2 sine wave 0.1V <sub>P-P</sub> , 4MHz TP8 pulse level 5V *3		-60	-40	dB
Input threshold voltage	V <sub>TH3</sub>	TP8	SG-2 sine wave 0.1V <sub>P-P</sub> , 4MHz TP8 pulse level L→H *4	0.7	1.4	2.1	V
Sync separation							
Sync separation level	V <sub>SEPA</sub>	TP1	SG-1 staircase wave (no chroma signal) 1V <sub>P-P</sub> SG-1 SYNC level max→min *5	55	110	165	mV
7PIN threshold voltage	V <sub>TH7H</sub>	TP9	TP9 DC voltage 0V→H *6	1.9	2.1	2.3	V
	V <sub>TH7L</sub>		TP9 DC voltage 5V→L *6	1.1	1.3	1.5	V
Horizontal sync output voltage	V <sub>OH6</sub>	TP10	SG-1 staircase wave (no chroma signal) 1V <sub>P-P</sub> *7	4.8	5.0		V
	V <sub>OL6</sub>				0.2	0.4	V
Vertical sync output voltage	V <sub>OH8</sub>	TP11	SG-1 staircase wave (no chroma signal) 1V <sub>P-P</sub> *8	4.8	5.0		V
	V <sub>OL8</sub>				0.2	0.4	V

Notes : \*1 Frequency response  $f_{c1}$ ,  $f_{c2}$ ,  $f_{c3}$

For the same conditions as the  $G_{u1}$  measurement, given video output for 0.1MHz as  $V_2$ , and for 5MHz as  $V_1$ ,  $f_{c1}$  is obtained as follows. The same applies for  $f_{c2}$  and  $f_{c3}$ .

$$f_{c1} = 20 \log \frac{V_2}{V_1} \text{ dB}$$

\*2 Character addition ..... input threshold voltage  $V_{TH13}$

For the same conditions as the  $V_{CL}$  measurement, adjust VR1 to raise pulse level gradually, and TP7 pulse level when a character signal is output on TP4 is  $V_{TH13}$ .

\*3 Chroma amp ..... crosstalk C

Given TP4 level when there is no pulse input as  $V_3$ , and the level when pulse input exists as  $V_4$ , C is obtained as follows.

$$C = 20 \log \frac{V_4}{V_3} \text{ dB}$$

\*4 Chroma amp ..... input threshold voltage  $V_{TH3}$

For the same conditions as C measurement, adjust VR2 to raise TP8 level from 0V. The TP8 level when TP4 level changes at pulse input is  $V_{TH3}$ .

\*5 Sync separation ..... sync separation level  $V_{SEPA}$

Input a 1V<sub>P-P</sub> staircase signal (no chroma signal) to SG-1, and gradually shrink the sync signal. TP1 sync level when TP10 horizontal sync signal starts to disappear is  $V_{SEPA}$ .

\*6 Sync separation ..... Pin 7 threshold voltage  $V_{TH7H}$ ,  $V_{TH7L}$

Impress external DC voltage on TP9 and raise gradually from 0V. TP9 level when TP11 level goes from high to low is  $V_{TH7H}$ . Lower gradually from 5V. TP9 level when TP11 level goes from low to high is  $V_{TH7L}$ .

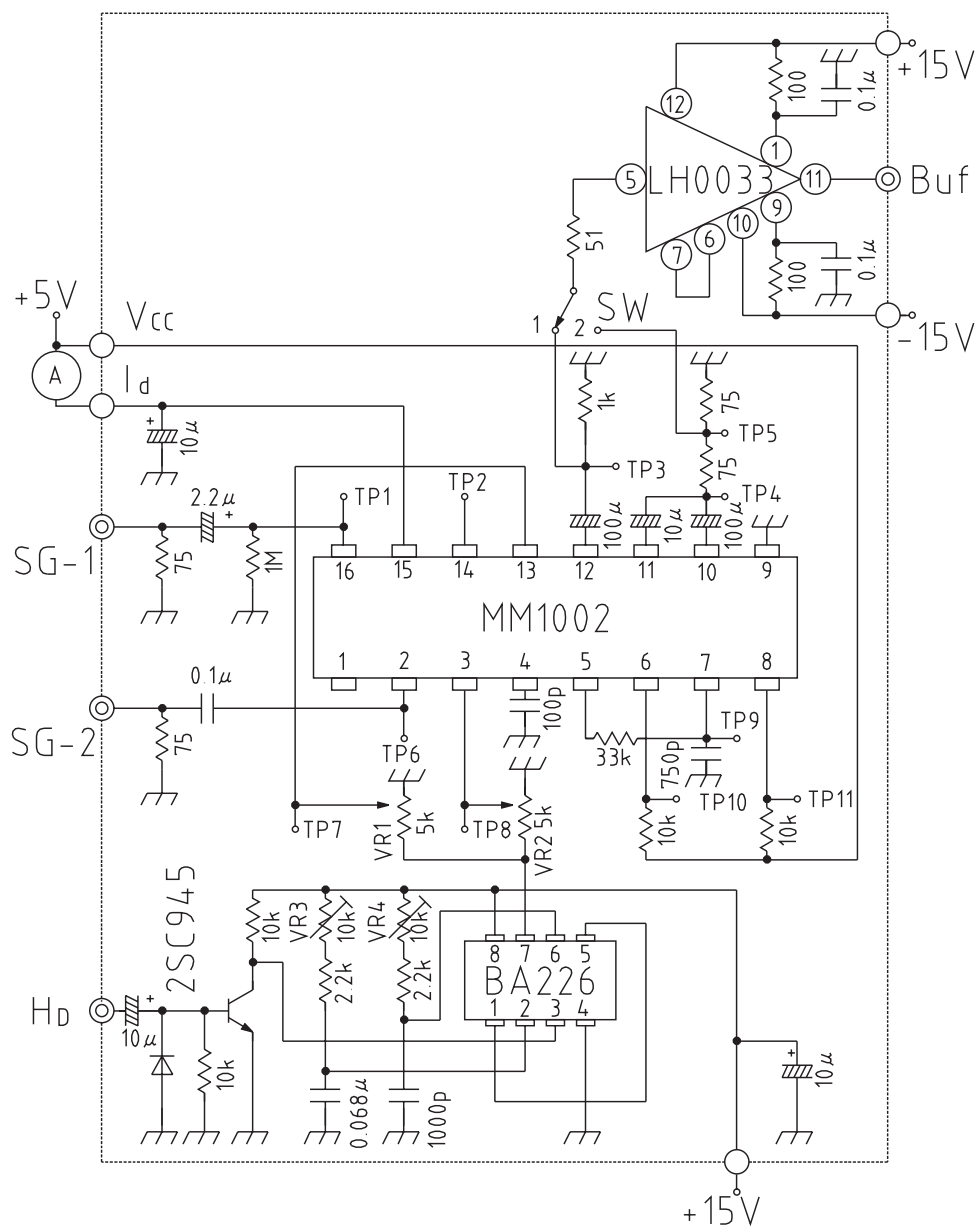
\*7 Sync separation ..... horizontal sync output voltage  $V_{OH6}$ ,  $V_{OL6}$

TP10 high level when a 1V<sub>P-P</sub> staircase signal (no chroma signal) is input to SG-1 is  $V_{OH6}$ , and low level is  $V_{OL6}$ .

\*8 Sync separation ..... vertical sync output voltage  $V_{OH8}$ ,  $V_{OL8}$

TP10 high level when a 1V<sub>P-P</sub> staircase signal (no chroma signal) is input to SG-1 is  $V_{OH8}$ , and low level is  $V_{OL8}$ .

## Measuring Circuit



# Application Circuits

