

# No-adjustment Sync Separator + Sync Detector Monolithic IC MM1067

## Outline

This IC is a no-adjustment sync separator + sync detector designed for use in VCR, TV and other video equipment.

## Features

1. Sync separator with AFC (ceramic resonator means no adjustment required)
2. Composite and sync output pins
3. Sync detection circuit (used for blue-back switching or tuner automatic channel selection, etc.)
4. Power supply voltage  $V_{CC}=5V$
5. Ceramic resonator can be selected for use in either PAL or NTSC

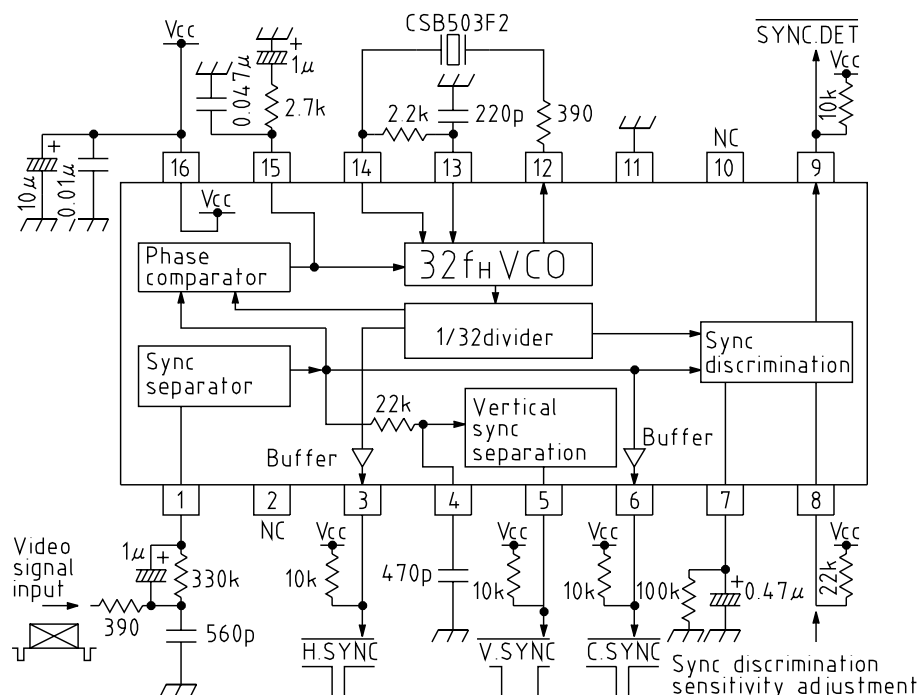
## Package

SOP-16A (MM1067XF)  
DIP-16A (MM1067XD)

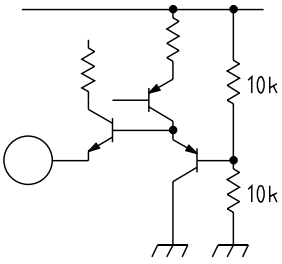
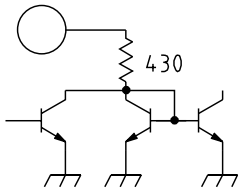
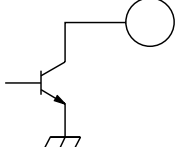
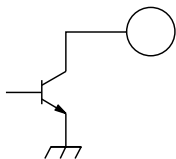
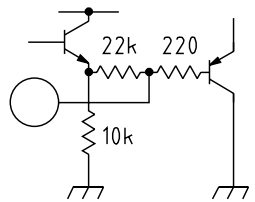
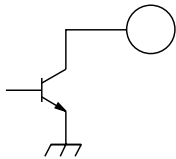
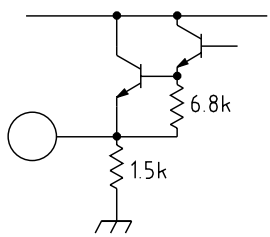
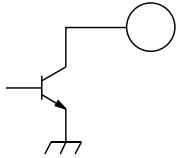
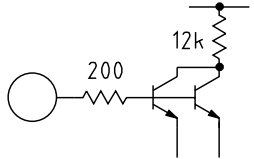
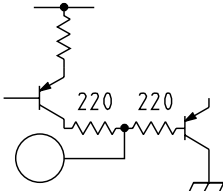
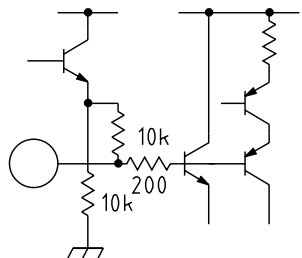
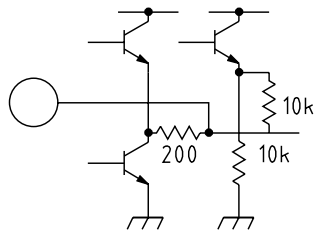
## Applications

1. TV
2. VCR
3. Other video equipment

## Block Diagram



## Pin Description

Pin no.	Pin name	Internal equivalent circuit diagram	Pin no.	Pin name	Internal equivalent circuit diagram
1	Video IN		8	GAIN	
2	NC		9	SYNC.DET	
3	H.SYNC		10	NC	
4	V.INT		11	GND	
5	V.SYNC		12	OSC-OUT	
6	C.SYNC		13	OSC-IN1	
7	CR		14	OSC-IN2	
			15	LPF	
			16	Vcc	

## 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> max	7	V
Allowable loss	P <sub>D</sub>	450 *1	mW

\* Package : DIP-16A

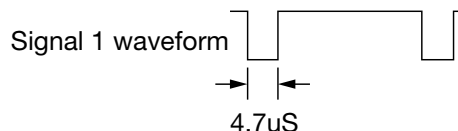
## Electrical Characteristics

(Except where noted otherwise, Ta=25°C, V<sub>CC</sub>=5.0V, X=CSB503F2, R=390 [OHM], C=3300pF, SW1=OFF)

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>			9.0	13.0	mA
Free-running frequency NTSC	f <sub>o1</sub>	TP1		15.534	15.734	15.934	kHz
Horizontal sync signal acquisition range NTSC	f <sub>CAP1</sub>	TP1	V <sub>IN</sub> : signal 1 *1 *2	300	500		Hz
Free-running frequency PAL	f <sub>o2</sub>	TP1	X=CSB500F40, R=200OHM C=4700pF	15.425	15.625	15.825	kHz
Horizontal sync signal acquisition range PAL	f <sub>CAP2</sub>	TP1	X=CSB500F40, R=200OHM, C=4700pF, V <sub>IN</sub> : signal 1 *1 *3	300	500		Hz
H. sync pulse width	tw1	TP1	V <sub>IN</sub> : signal 1, 15.734kHz *4	3.9	4.2	4.5	uS
H. sync delay time	td1	TP1	V <sub>IN</sub> : signal 1, 15.734kHz *4	0.7	1.2	1.7	uS
H. sync output voltage L	V <sub>L1</sub>	TP1	V <sub>IN</sub> : signal 1, 15.734kHz *4		0.2	0.4	V
H. sync output voltage H	V <sub>H1</sub>	TP1	V <sub>IN</sub> : signal 1, 15.734kHz *4	4.8	5.0		V
LPF pin DC level	V <sub>LPF</sub>	TP7	SW1 : ON	0.9	1.4	1.9	V
Sync separation level	V <sub>SEPA</sub>	V <sub>IN</sub>	V <sub>IN</sub> : staircase wave 1V <sub>P-P</sub> *5	20	50	80	mV
C. sync pulse width	tw2	TP4	V <sub>IN</sub> : staircase wave 1V <sub>P-P</sub> *6	4.0	4.5	5.0	uS
C. sync delay tim	td2	TP4	V <sub>IN</sub> : staircase wave 1V <sub>P-P</sub> *6	0.3	0.6	0.9	uS
C. sync output voltage L	V <sub>L2</sub>	TP4	V <sub>IN</sub> : staircase wave 1V <sub>P-P</sub> *6		0.2	0.4	V
C. sync output voltage H	V <sub>H2</sub>	TP4	V <sub>IN</sub> : staircase wave 1V <sub>P-P</sub> *6	4.8	5.0		V
V. sync pulse width	tw3	TP3	V <sub>IN</sub> : staircase wave 1V <sub>P-P</sub> *7	150	190	230	uS
V. sync delay time	td3	TP3	V <sub>IN</sub> : staircase wave 1V <sub>P-P</sub> *7	8.0	10.0	12.0	uS
V. sync output voltage L	V <sub>L3</sub>	TP3	V <sub>IN</sub> : staircase wave 1V <sub>P-P</sub> *7		0.2	0.4	V
V. sync output voltage H	V <sub>H3</sub>	TP3	V <sub>IN</sub> : staircase wave 1V <sub>P-P</sub> *7	4.8	5.0		V
V. sync switching voltage L	V <sub>THL3</sub>	TP2	TP2 : DC voltage, 5V→Low *8	1.5	1.8	2.1	V
V. sync switching voltage H	V <sub>THH3</sub>	TP2	TP2 : DC voltage, 0V→High *8	2.3	2.6	2.9	V
Sync discrimination output voltage L	V <sub>L4</sub>	TP6	V <sub>IN</sub> : staircase wave 1V <sub>P-P</sub>		0.2	0.4	V
Sync discrimination output voltage H	V <sub>H4</sub>	TP6	V <sub>IN</sub> : no input signal	4.8	5.0		V
Sync discrimination switching voltage L	V <sub>THL4</sub>	TP5	TP5 : DC voltage, 5V→Low *9	2.0	2.3	2.6	V
Sync discrimination switching voltage H	V <sub>THH4</sub>	TP5	TP5 : DC voltage, 0V→High *9	2.7	3.0	3.3	V

Notes :

\*1 Signal 1 : Rectangular waveform signal with 0.3V amplitude and pulse width 4.7uS



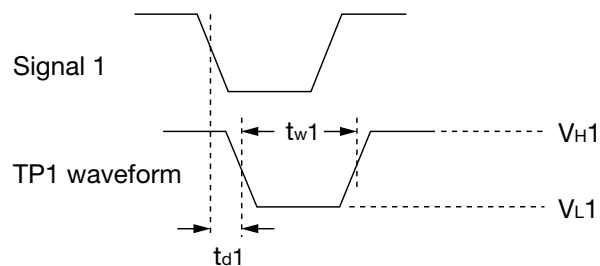
\*2 Measuring horizontal sync signal pull-in range for NTSC

With TP1 waveform not synchronized to signal 1, adjust signal 1 frequency toward 15.734kHz. The measurement value is the smaller of the synchronized frequency and the difference from 15.734.

\*3 Measuring horizontal sync signal pull-in range for PAL

With TP1 waveform not synchronized to signal 1, adjust signal 1 frequency toward 15.625kHz. The measurement value is the smaller of the synchronized frequency and the difference from 15.625.

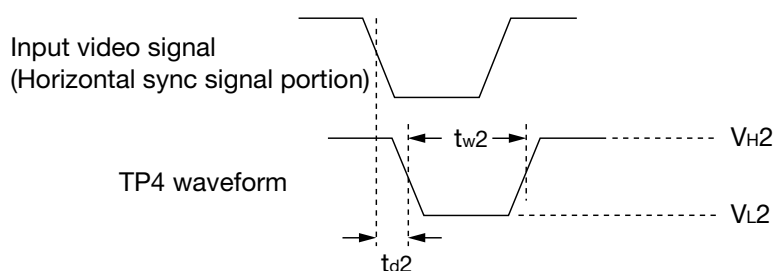
\*4 H. SYNC measurement



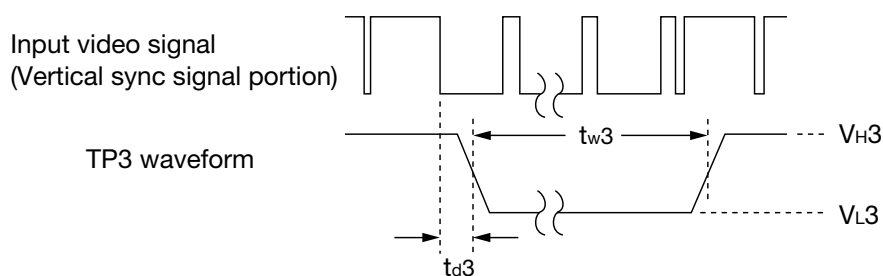
\*5 Measuring sync separation level

Gradually lower staircase wave signal sync tip level, and measure sync tip level when Pin 6 waveform starts to change.

\*6 C. SYNC measurement



\*7 V. SYNC measurement



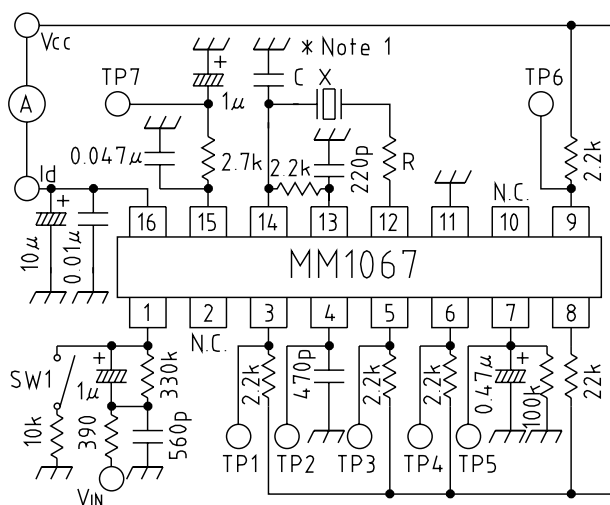
\*8 V. SYNC switching voltage measurement

Gradually change the DC voltage impressed on TP2, and measure TP2 voltage when TP3 output switches.

\*9 Sync discrimination switching voltage measurement

Gradually change the DC voltage impressed on TP5, and measure TP5 voltage when TP6 output switches.

## Measuring Circuit



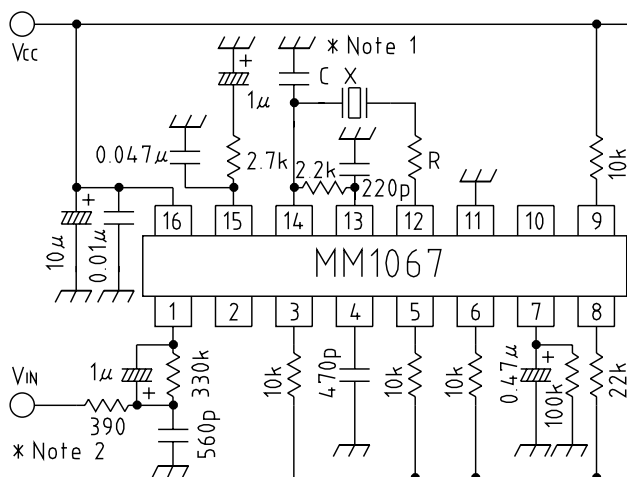
Note : \*1

	NTSC	PAL
X	CSB503F2	CSB500F40
R	390Ω	220Ω
C	3300pF	4700pF

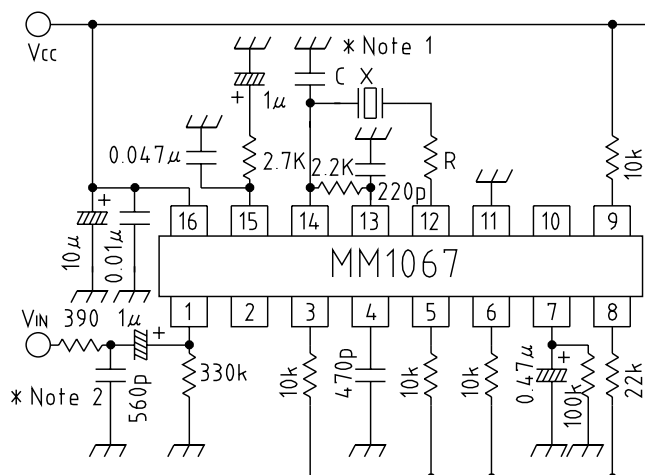
## Application Circuits

There is a momentary phase lag in the H. SYNC output vertical feedback interval. When using this IC for OSD timing, characters at the top of the screen may bend due to IC deviation. If this happens, change the resistance between Pins 13 and 14 as shown, and the bending will improve by several H from the top edge of the screen.

### Application Circuit 1



## ■ Application Circuit 2



Note 1: 1. \*1

	NTSC	PAL
X	CSB503F2	CSB500F40
R1	1.5kΩ	1.8kΩ
R2	390Ω	
C1	220pF	
C2	3300pF	

2. Resistors R1 and R2 should have precision of  $\pm 1\%$ .
3. Capacitors C1 and C2 should have precision of  $\pm 5\%$  and temperature characteristic of CH class.

Note 2 :

1. \*2 Input signal sync tip must be less than 1V for application circuit 1 Pin 1 external circuit.
2. The above 1. does not apply for application circuit 2 Pin 1 external circuit. Pin 1 is clamped at approximately 2.5V.