

# 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

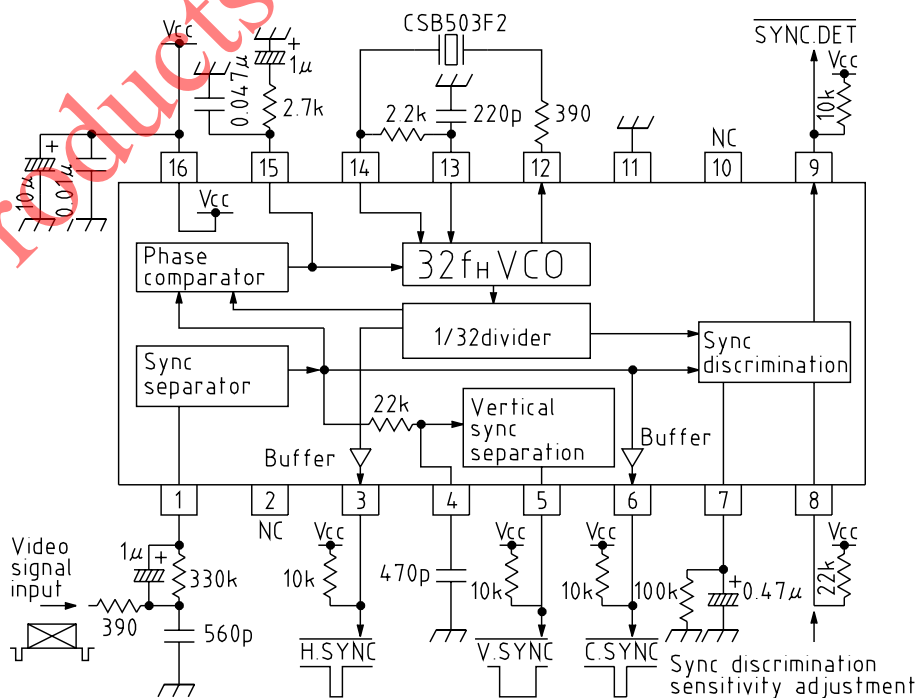
## Package

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

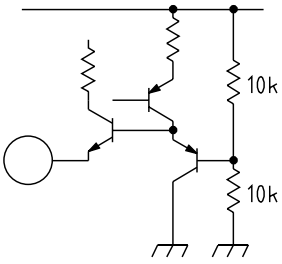
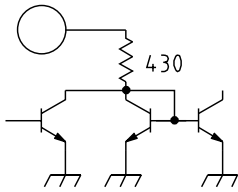
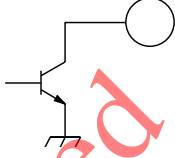
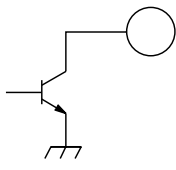
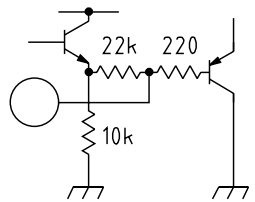
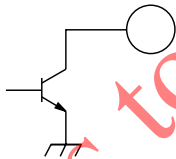
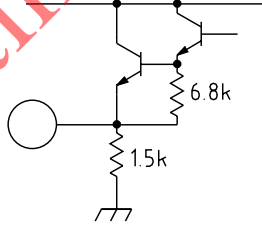
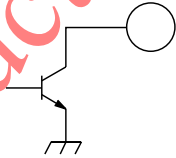
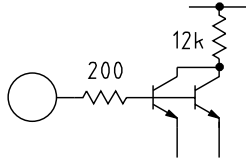
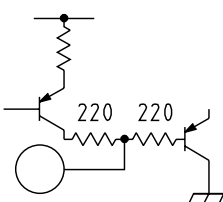
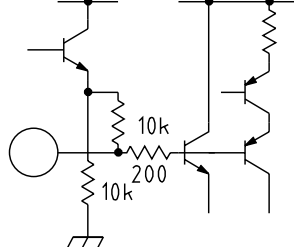
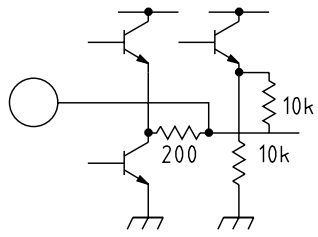
## Applications

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	

Products to be discontinued

**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

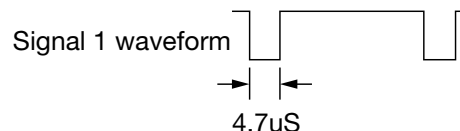
\* Package : DIP-16A

**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



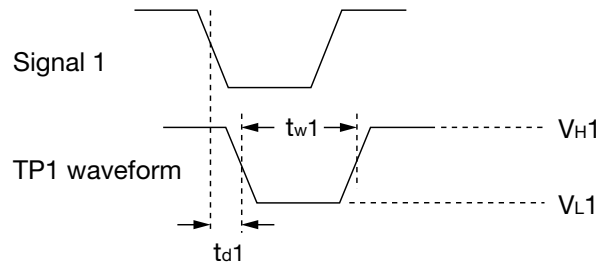
\*2 Measuring horizontal sync signal pull-in range for NTSC

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.

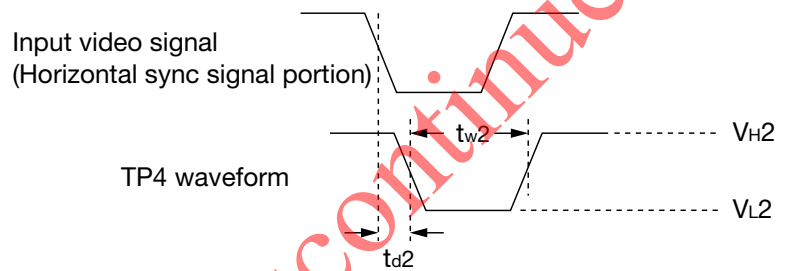
\*4 H. SYNC measurement



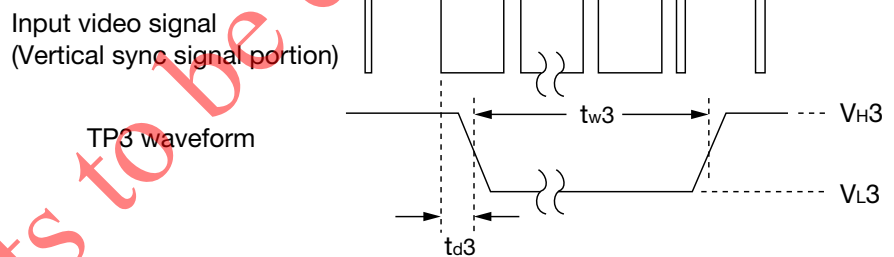
\*5 Measuring sync separation level

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

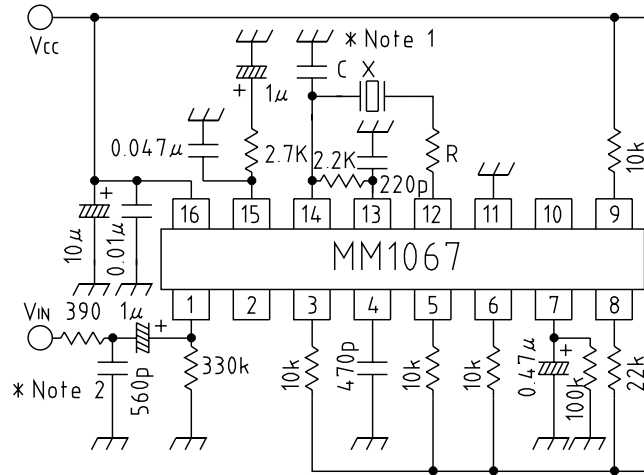
Gradually change the DC voltage impressed on TP2, and measure TP2 voltage when TP3 output switches.

\*9 Sync discrimination switching voltage measurement

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



■ Application Circuit 2



Note 1: 1. \*1

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

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.

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

Products to be discontinued