

## Baseband Delay Line (64 $\mu$ s)

### Description

The U3660M is an integrated baseband delay line circuit. It provides a delay of 64  $\mu$ s for the color difference signals,  $\pm(R-Y)$  and  $\pm(B-Y)$ , in multi-standard TVs.

### Features

- One line delay time, addition of delayed and non-delayed output signals
- Adjustment-free application, VCO without external components
- Handles negative or positive colour-difference input signals
- Clamping of ac-coupled input signals [ $\pm(R-Y)$  and  $\pm(B-Y)$ ]
- Line-locked by the sandcastle pulse
- No crosstalk between SECAM colour carriers (diaphoty)
- Comb filtering functions for NTSC colour-difference signals
- Correction of phase errors in the PAL system

### Block Diagram

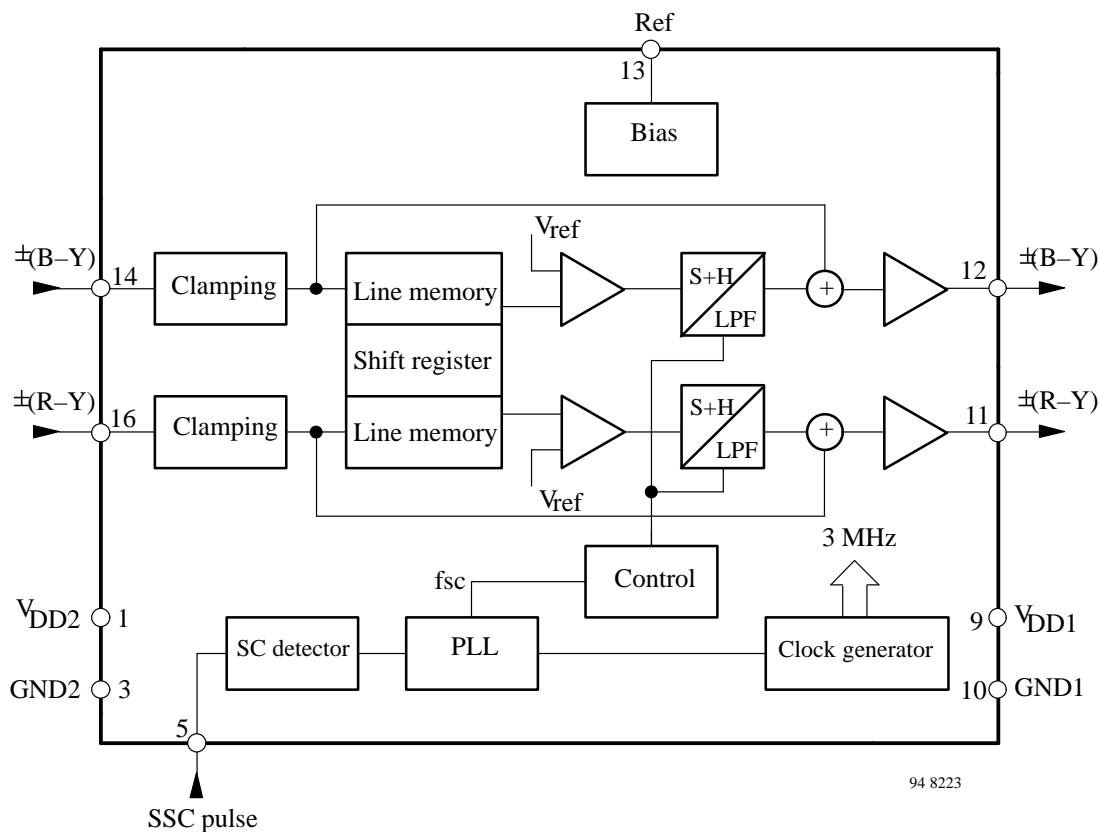
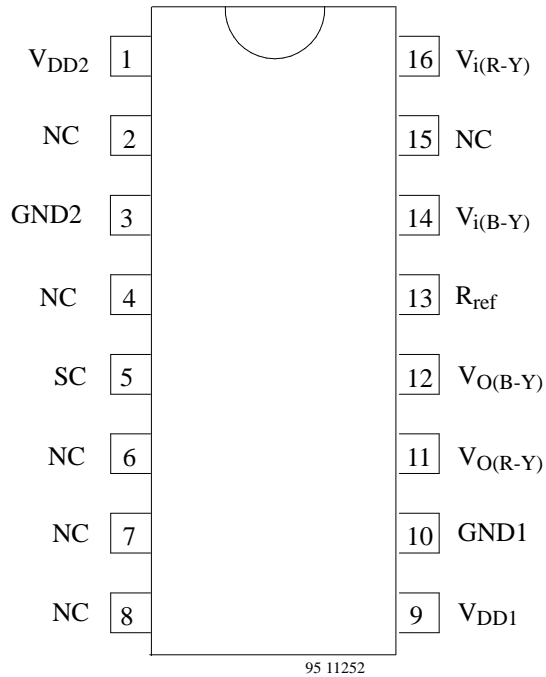


Figure 1. Block diagram

## Pin Description



Pin	Symbol	Function
1	V <sub>DD2</sub>	Supply voltage for digital part
2	NC	Not connected
3	GND2	Ground for digital part
4	NC	Not connected
5	SC	Sandcastle pulse input
6	NC	Not connected
7	NC	Not connected
8	NC	Not connected
9	V <sub>DD1</sub>	Supply voltage for analog part
10	GND1	Ground for analog part
11	V <sub>O(R-Y)</sub>	±(R-Y) output signal
12	V <sub>O(B-Y)</sub>	±(B-Y) output signal
13	R <sub>ref</sub>	Resistor for internal reference
14	V <sub>i(B-Y)</sub>	±(B-Y) input signal
15	NC	Not connected
16	V <sub>i(R-Y)</sub>	±(R-B) input signal

Figure 2. Connection diagram

## Absolute Maximum Ratings

Parameters	Symbol	Value	Unit
Supply voltage (Pin 9)	V <sub>DD1</sub>	-0.5 to +7	V
Supply voltage (Pin 1)	V <sub>DD2</sub>	-0.5 to +7	V
Voltage at Pins 5, 11, 12, 14 and 16	V <sub>n</sub>	-0.5 to V <sub>S</sub>	V
Output current, Pins 11 and 12	I <sub>out</sub>	20	mA
Max. power dissipation	P	1.1	W
Storage temperature range	T <sub>stg</sub>	-25 to +150	°C
Electrostatic protection* for input/output pins		±200	V

\* MIL standard 883D, method 3015.7 machine model (all power pins connected together).

## Operating Range

Parameters	Symbol	Value	Unit
Supply voltage range (Pins 1 and 9)	V <sub>S</sub>	4.5 to 6.0	V
Ambient temperature range	T <sub>amb</sub>	0 to +70	°C

## Thermal Resistance

Parameters	Symbol	Value	Unit
Junction ambient	R <sub>thJA</sub>	80	K/W

## Electrical Characteristics

$V_{DD} = 5.0\text{ V}$ ,  $T_{amb} = +25^{\circ}\text{C}$ , reference point Pin 3 and Pin 10 connected together, super-sandcastle frequency of 15.625 kHz; unless otherwise specified.

Parameters	Test Conditions / Pins	Symbol	Min.	Typ.	Max.	Unit
<b>DC-supply Pins 1 and 9</b>						
Supply voltage (analog part)	Pin 9	$V_{DD1}$	4.5	5.0	6.0	V
Supply voltage (digital part)	Pin 1	$V_{DD2}$	4.5	5.0	6.0	V
Supply current (analog part)	Pin 9	$I_{S1}$		3.5	8.0	mA
Supply current (digital part)	Pin 1	$I_{S2}$		1	2	mA
Power dissipation		P		30	60	mW
<b>Colour-difference input signals Pins 14 and 16</b>						
Input signal $\pm(\text{R-Y})$ PAL and NTSC $\pm(\text{B-Y})$ PAL and NTSC $\pm(\text{R-Y})$ SECAM $\pm(\text{B-Y})$ SECAM	(peak-to-peak value) Pin 16 Pin 14 Pin 16 Pin 14	$V_i$ $V_i$ $V_i$ $V_i$		0.525 0.665 1.05 1.33	1.0 1.0 2.0 2.0	V V V V
Input resistance	Pins 14 and 16	$R_{14, 16}$			40	k $\Omega$
Input capacitance	Pins 14 and 16	$C_{14, 16}$			10	pF
Input clamping voltage	non color input level during clamping, Pins 14 and 16	$V_{14, 16}$		1.45		V
<b>Colour-difference output signals Pins 11 and 12</b>						
Output signal $\pm(\text{R-Y})$ at Pin 11 $\pm(\text{B-Y})$ at Pin 12	(peak-to-peak value) all standards all standards	$V_O$ $V_O$		1.05 1.33		V V
Ratio of output amplitudes at equal input signals		$\frac{V_{11}}{V_{12}}$	-0.4	0	+0.4	dB
DC output voltage	Pins 11 and 12	$V_{11, 12}$		3.0		V
Output resistance	Pins 11 and 12	$R_{11, 12}$			400	$\Omega$
Gain for PAL and NTSC	ratio $V_O/V_i$	$G_v$	5.5	6.0	6.5	dB
Gain for SECAM	ratio $V_O/V_i$	$G_v$	-1.0	0	+1.0	dB
Ratio of output signals on Pins 11 and 12 for adjacent time samples at constant input signals	$V_i 14,16 = 1.33\text{ V}$ (peak-to-peak value) SECAM signals	$\frac{V_{(n)}}{V_{(n+1)}}$	-0.1		+0.1	dB
Noise voltage (RMS value, Pins 11 and 12)	$V_i 14,16 = 0$ $R_{Gen} < 300\ \Omega$ $f = 10\text{ kHz to }1\text{ MHz}$	$V_{noise}$			1.2	mV
Delay of delayed signals		$t_d$	63.94	64.0	64.06	$\mu\text{s}$
Delay of non-delayed signals		$t_d$		85		ns

Parameters	Test Conditions / Pins	Symbol	Min.	Typ.	Max.	Unit
Transient time of delayed signal at Pin 11 respectively Pin 12	300 ns transient of SECAM input signal, $C_{load} = 22 \text{ pF}$	$t_{tr}$		550		ns
Transient time of non-delayed signal at Pin 11 respectively Pin 12	300 ns transient of SECAM input signal, $C_{load} = 22 \text{ pF}$	$t_{tr}$		350		ns
<b>Sandcastle pulse input Pin 5</b>						
Sandcastle frequency		$f_{SC}$	14.0	15.625	17.0	kHz
Top pulse voltage	the leading edge of the burst-key pulse is used for timing	$V_5$	3		7	V
Internal slicing level		$V_{slice}$	$V_5 - 2.0$	$V_5 - 1.5$	$V_5 - 1.0$	V
Input current		$I_5$			10	$\mu\text{A}$
Input capacitance		$C_5$			10	pF

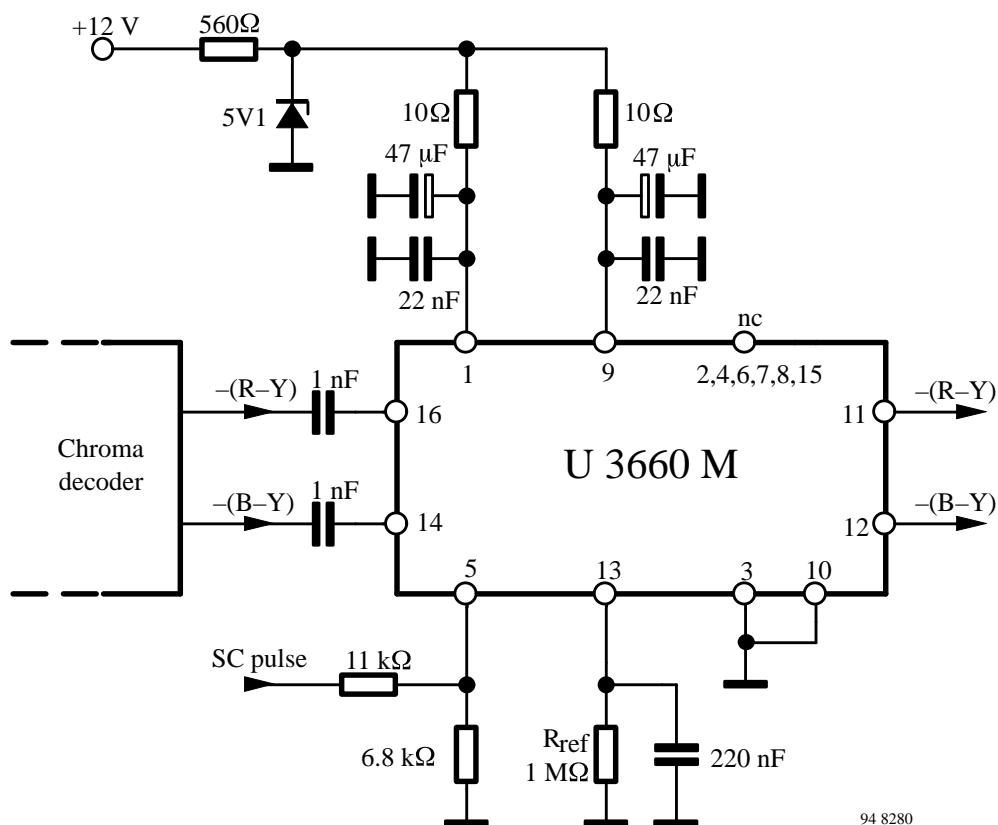


Figure 3. Typical application circuit

**Internal Pin Circuits**

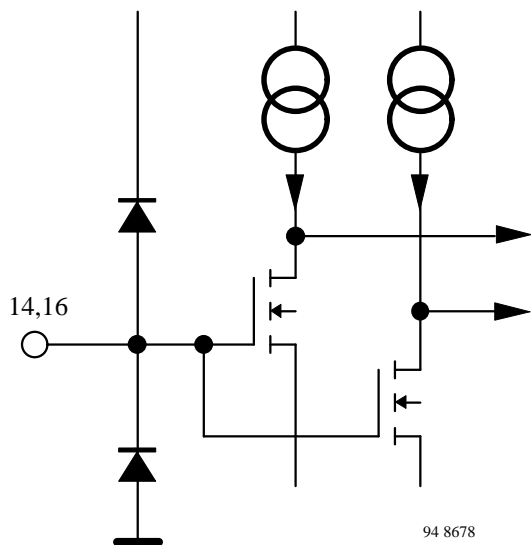


Figure 4. Colour difference signal inputs

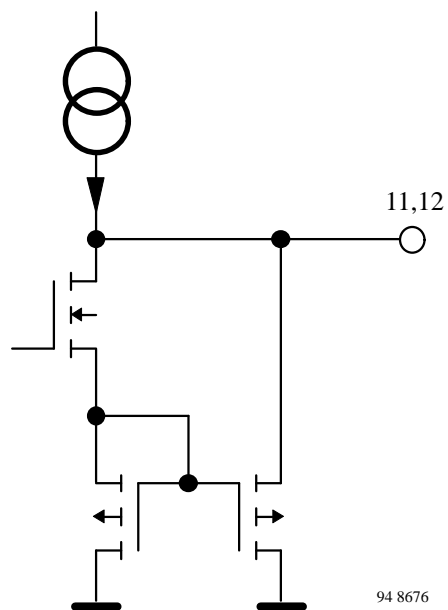


Figure 5. Colour difference signal outputs

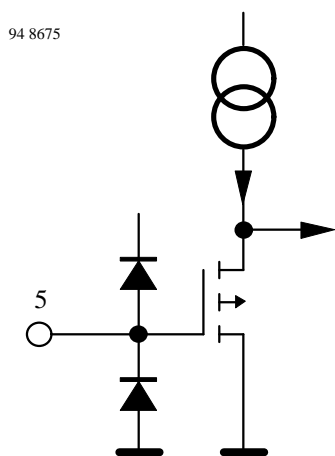


Figure 6. Sandcastle pulse input

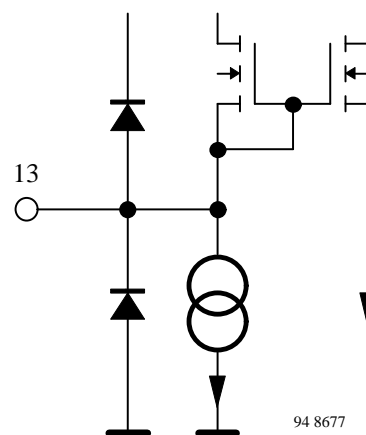
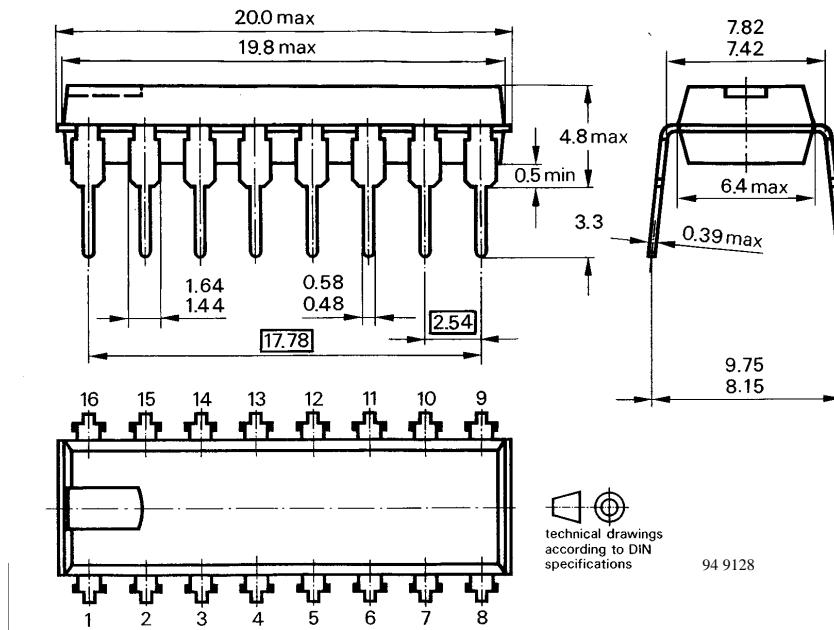


Figure 7. Internal reference voltage

## Dimensions in mm

Package: DIP16



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TEMIC TELEFUNKEN microelectronic GmbH, P.O.B. 3535, D-74025 Heilbronn, Germany  
Telephone: 49 (0)7131 67 2831, Fax number: 49 (0)7131 67 2423