Signetics

TDA4555/56
Multistandard Color Decoder

Product Specification

Linear Products

DESCRIPTION

The TDA4555 and TDA4556 are monolithic, integrated, multistandard color decoders for the PAL®, SECAM, NTSC 3.58MHz and NTSC 4.43MHz standards. The difference between the TDA4555 and the TDA4556 is the polarity of the color difference output signals (B-Y) and (R-Y).

FEATURES

Chrominance Part

- Gain-controlled chrominance amplifier for PAL, SECAM, and NTSC
- ACC rectifier circuits (PAL/NTSC, SECAM)
- Burst blanking (PAL) in front of 64μs glass delay line
- Chrominance output stage for driving the 64μs glass delay line (PAL, SECAM)
- Limiter stages for direct and delayed SECAM signal
- SECAM permutator

Demodulator Part

- Flyback blanking incorporated in the two synchronous demodulators (PAL, NTSC)
- PAL switch
- Internal PAL matrix
- Two quadrature demodulators with external reference-tuned circuits (SECAM)
- Internal filtering of residual carrier
- De-emphasis (SECAM)
- Insertion of reference voltages as achromatic value (SECAM) in the (B-Y) and (R-Y) color difference output stages (blanking)

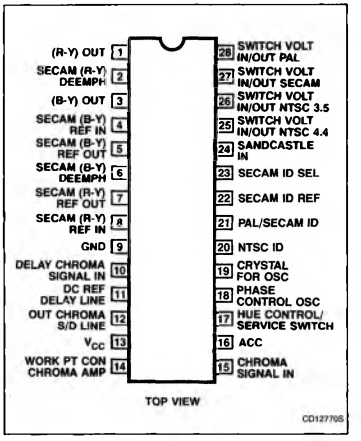
Identification Part

- Automatic standard recognition by sequential inquiry
- Delay for color-on and scanning-on
- Reliable SECAM identification by PAL priority circuit
- Forced switch-on of a standard
- Four switching voltages for chrominance filters, traps, and crystals
- Two identification circuits for PAL/SECAM (H/2) and NTSC
- PAL/SECAM flip-flop
- SECAM identification mode switch (horizontal, vertical, or combined horizontal and vertical)
- Crystal oscillator with divider stages and PLL circuitry (PAL, NTSC) for double color subcarrier frequency
- HUE control (NTSC)
- Service switch

APPLICATIONS

- Video monitors
- Video processing
- TV receivers

PIN CONFIGURATION



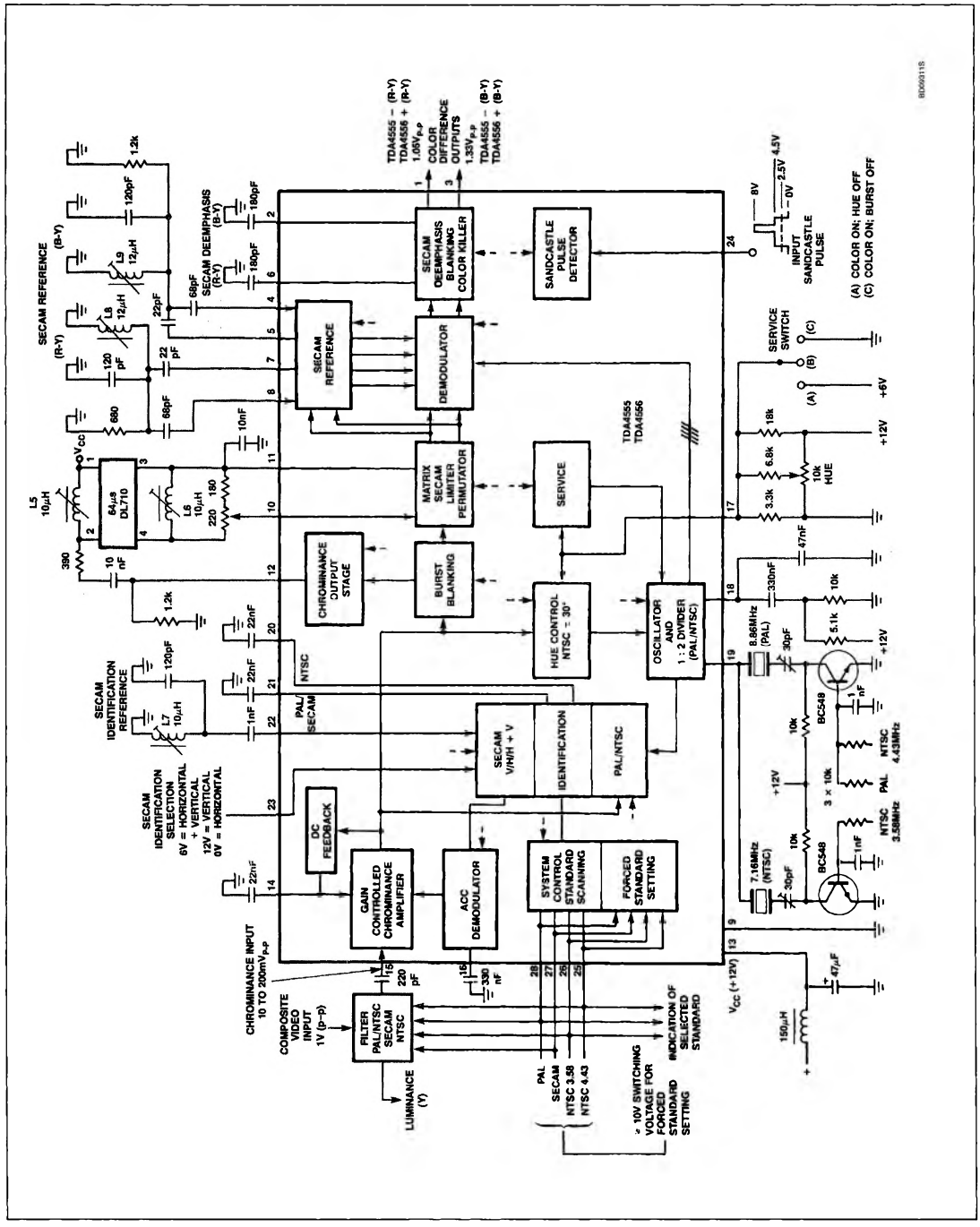
ORDERING INFORMATION

DESCRIPTION	TEMPERATURE RANGE	ORDER CODE
28-Pin Plastic DIP (SOT-117)	0 to +70°C	TDA4555N

PAL® is a registered trademark of Monolithic Memories, Inc.

Multistandard Color Decoder TDA4555/56

BLOCK DIAGRAM AND PERIPHERAL CIRCUITS



ABSOLUTE MAXIMUM RATINGS

SYMBOL	PARAMETER	RATING	UNIT
$V_{CC} = V_{13-9}$	Supply voltage (Pin 13)	13.2	V
V_{n-9}	Voltage range at Pins 10, 11, 17, 23, 24, 25, 26, 27, 28, to Pin 9 (ground)	0 to V_{CC}	V
I_{12}	Current at Pin 12	8	mA
I_{12M}	Peak value	15	mA
P_{TOT}	Total power dissipation	1.4	W
T_{STG}	Storage temperature range	−65 to +150	°C
T_A	Operating ambient temperature range	0 to +70	°C

DC AND AC ELECTRICAL CHARACTERISTICS

$V_{CC} = V_{13-9} = 12V$; $T_A = 25°C$; measured in Block Diagram, unless otherwise specified.

SYMBOL	PARAMETER	LIMITS			UNIT
		Min	Typ	Max	
Supply (Pin 13)					
$V_{CC} = V_{13-9}$	Supply voltage range	10.8		13.2	V
$I_{CC} = I_{13}$	Supply current		65		mA
Chrominance part					
	Chrominance input signal (Pin 15)				
$V_{15-9(P-P)}$	input voltage with 75% color bar signal (peak-to-peak value)	20	100	200	mV
$\lvert Z_{15-9} \rvert$	input impedance	2.3	3.3		kΩ
	Chrominance output signal (Pin 12)				
$V_{12-9(P-P)}$	output voltage (peak-to-peak value)		1.6		V
$\lvert Z_{12-9} \rvert$	output impedance (NPN emitter-follower)			20	Ω
V_{12-9}	DC output voltage		8.2		V
	Input for delayed signal (Pin 10)				
I_{10}	DC input current			10	μA
R_{10-9}	input resistance	10			kΩ
Demodulator part (PAL/NTSC)					
	Color difference output signals output voltage (proportional to V_{13-9}) (peak-to-peak value)				
	TDA4555				
$V_{1-9(P-P)}$	−(R-Y) signal (Pin 1)		1.05V ± 2dB		V
$V_{3-9(P-P)}$	−(B-Y) signal (Pin 3)		1.33V ± 2dB		V
	TDA4556				
$V_{1-9(P-P)}$	+(R-Y) signal (Pin 1)		1.05V ± 2dB		V
$V_{3-9(P-P)}$	+(B-Y) signal (Pin 3)		1.33V ± 2dB		V
$V_{1/3-9}$	Ratio of color difference output signals (R-Y)/(B-Y)		0.79 ± 10%		
$V_{1,\ 3-9(P-P)}$	Residual carrier (subcarrier frequency) (peak-to-peak value)			30	mV
$V_{1,\ 3-9(P-P)}$	Residual carrier (PAL only) (peak-to-peak value)		10		mV
$V_{1-9(P-P)}$	H/2 ripple at (R-Y) output (Pin 1) (peak-to-peak value) without input signal			10	mV
	DC output voltage NPN emitter-follower with				
$V_{1,\ 3-9}$	internal current source of 0.3mA		7.7		V
$\lvert Z_{1,\ 3-9} \rvert$	output impedance			150	Ω

DC AND AC ELECTRICAL CHARACTERISTICS (Continued) $V_{CC} = V_{13-9} = 12V$; $T_A = 25°C$; measured in Block Diagram, unless otherwise specified.

SYMBOL	PARAMETER	LIMITS			UNIT
		Min	Typ	Max	
Demodulator part (SECAM)					
	Color difference signals[1] output voltage (proportional to V_{13-9}) (peak-to-peak value)				
	TDA4555				
$V_{1-9(P-P)}$	−(R-Y) signal (Pin 1)		1.05		V
$V_{3-9(P-P)}$	−(B-Y) signal (Pin 3)		1.33		V
	TDA4556				
$V_{1-9(P-P)}$	+(R-Y) signal (Pin 1)		1.05		V
$V_{3-9(P-P)}$	+(B-Y) signal (Pin 3)		1.33		V
$V_{1/3-9}$	Ratio of color difference output signals (R-Y)/(B-Y)		0.79[2] ± 10%		
$V_{1,\ 3-9(P-P)}$	Residual carrier (4 to 5MHz) (peak-to-peak value)		20	30	mV
$V_{1,\ 3-9(P-P)}$	Residual carrier (8 to 10MHz) (peak-to-peak value)		20	30	mV
$V_{1,\ 3-9(P-P)}$	H/2 ripple at (R-Y) (B-Y) outputs (Pins 1 and 3) (peak-to-peak value) with f_O signals			20	mV
$V_{1,\ 3-9}$	DC output voltage		7.7		V
$\Delta V/\Delta T(R-Y)$	Shift of inserted levels relative to levels of demodulated		−0.55		mV/°C
$\Delta V/\Delta T(B-Y)$	f_O frequencies (IC only)		+0.25		mV/°C
HUE control (NTSC)/service switch					
	Phase shift of reference carrier				
$-\phi$	at $V_{17-9} = 2V$		30[3]		deg
ϕ	at $V_{17-9} = 3V$		0		deg
$+\phi$	at $V_{17-9} = 4V$		30[3]		deg
R_{17-9}	Input resistance		5		kΩ
Service position					
	Switching voltage (Pin 17)				
V_{17-9}	burst OFF; color ON (for oscillator adjustment)			0.5	V
V_{17-9}	Hue control OFF; color ON (for forced color ON)	6			V
Crystal oscillator (Pin 19)					
	For double color subcarrier frequency				
R_{19-9}	input resistance		350		Ω
Δf	lock-in-range referred to subcarrier frequency	± 400			Hz

DC AND AC ELECTRICAL CHARACTERISTICS (Continued) $V_{CC} = V_{13-9} = 12V$; $T_A = 25°C$; measured in Block Diagram, unless otherwise specified.

SYMBOL	PARAMETER	LIMITS			UNIT
		Min	Typ	Max	
Identification part					
	Switching voltages for chrominance filters and crystals at Pin 28 (PAL) at Pin 27 (SECAM) at Pin 26 (NTSC 3.58MHz) at Pin 25 (NTSC 4.43MHz)				
$V_{25, 26, 27, 28-9}$	Control voltage OFF state			0.5	V
	Control voltage ON state				
$V_{25, 26, 27, 28-9}$	during scanning; color OFF		2.45		V
$V_{25, 26, 27, 28-9}$	color ON		5.8		V
$-I_{25, 26, 27, 28-9}$	Output current			3	mA
	Voltage for forced switching ON				
V_{28-9}	PAL	9			V
V_{27-9}	SECAM	9			V
V_{26-9}	NTSC 3.58MHz	9			V
V_{25-9}	NTSC 4.43MHz	9			V
	Delay time for				
t_{DS}	restart of scanning	2 to 3 vertical periods			
t_{DC1}	color ON	2 to 3 vertical periods			
t_{DC2}	color OFF	0 to 1 vertical periods			
	SECAM identification (Pin 23)				
	Input voltage for				
V_{23-9}	horizontal identification (H)			2	V
V_{23-9}	vertical identification (V)	10			V
V_{23-9}	combined (H) and (V) identification		6[2]		V
	Sequence of standard inquiry PAL-SECAM-NTSC 3.58MHz NTSC 4.43MHz Reliable SECAM identification by PAL priority circuit				
t_S	Scanning time for each standard	4 vertical periods			
Sandcastle pulse detector[4]					
	Input voltage pulse levels (Pin 24)				
V_{24-9}	to separate vertical and horizontal blanking pulses	1.2		2.0	V
$V_{24-9(P-P)}$	required pulse amplitude	2.0		3.0	V
V_{24-9}	to separate horizontal blanking pulse	3.2		4.0	V
$V_{24-9(P-P)}$	required pulse amplitude	4.0		5.0	V
V_{24-9}	to separate burst gating pulse	6.5		7.7	V
$V_{24-9(P-P)}$	required pulse amplitude	7.7		V_{CC}	V
V_{24-9}	Input voltage during horizontal scanning			1.0	V
$-I_{24}$	Input current			100	μA

NOTES:

1. The signal amplitude of the color difference signals (R-Y) and (B-Y) is dependent on the characteristics of the external tuned circuits at Pins 7, 8 and 4, 5, respectively. Adjustment of the amplitude is achieved by varying the Q-factor of these tuned circuits. The resonant frequency must be adjusted such that the demodulated output frequency (f_O) provides the same output level as the internally inserted reference voltage (achromatic value).
2. Value measured without influence of external circuitry.
3. Relative to phase at $V_{17-9} = 3V$.
4. The sandcastle pulse is compared to three internal threshold levels, which are proportional to the supply voltage.

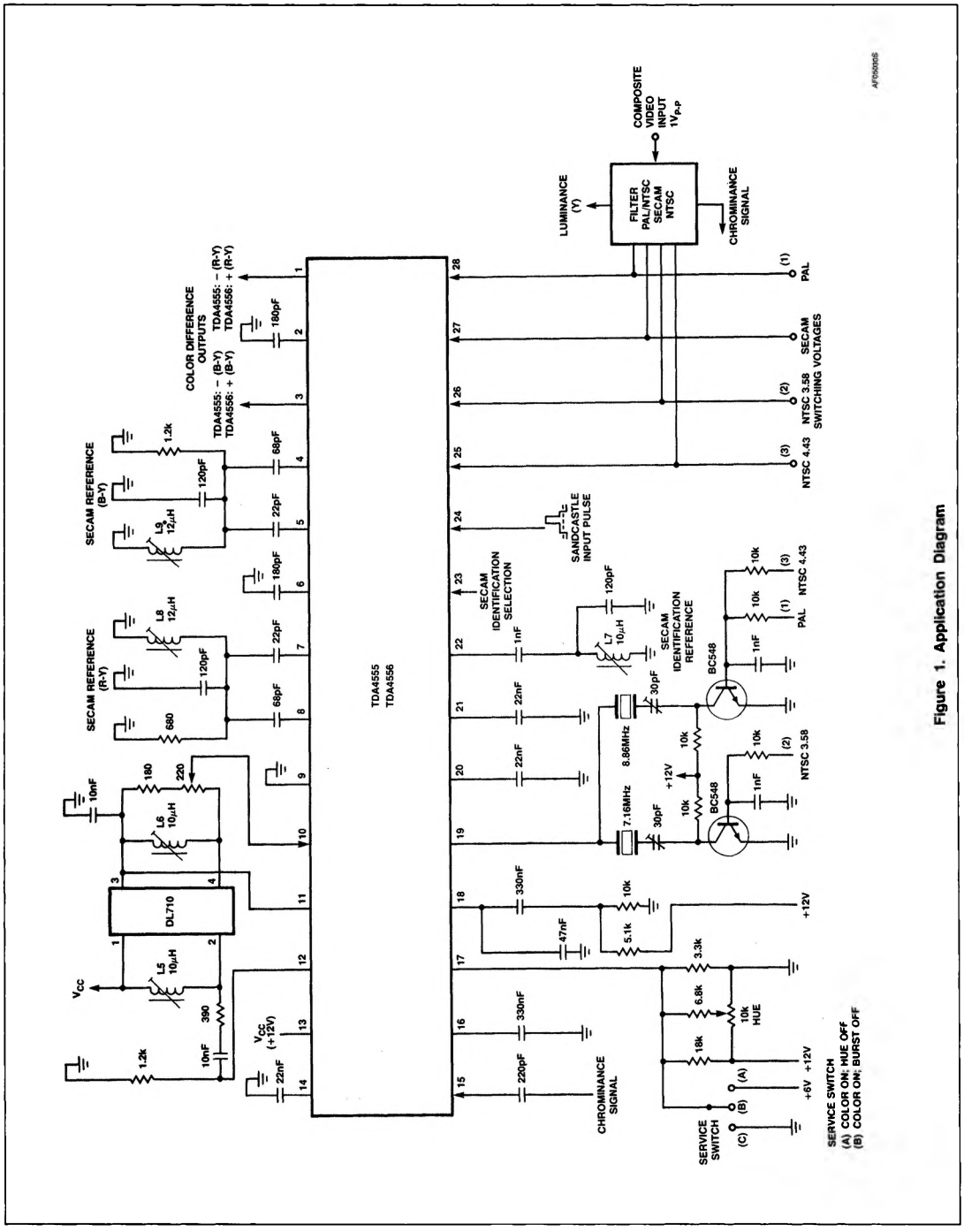


Figure 1. Application Diagram