

### 1 · Description

The ES71145S encoder converts an analog RGB signal to a composite video signal.

With its built-in circuit various pulses required for an encoder, composite video outputs are obtained just by inputting the composite sync and analog RGB signal.

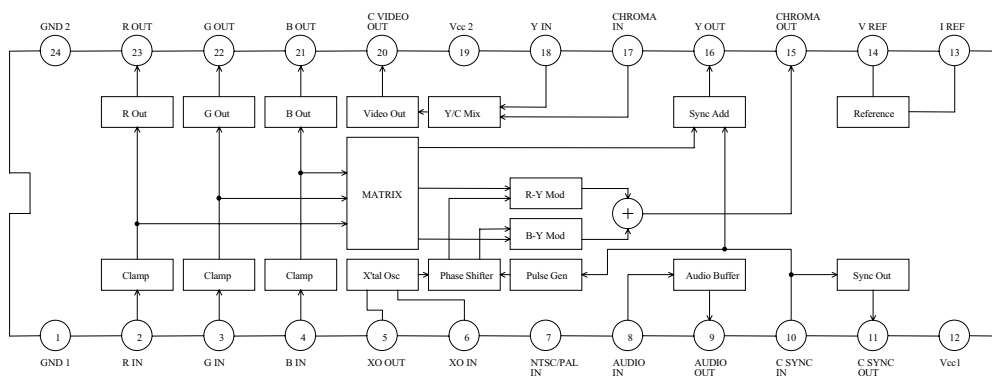
### 2 · Features

- Single power supply 5 V
- Low power consumption (110 mW) Compatible both with NTSC and PAL systems
- Built-in 75  $\Omega$  driver (RGB output, composite video output, composite sync output)
- Built-in oscillator for subcarrier
- External input of subcarrier is also possible
- Built-in audio buffer circuit
- 24 pin SOP package

### 3 · Application

- TV Game

### 4 · Function Block Diagram



### 5 · Pin Description

No.	Symbol	Description
1	GND 1	Gnd pin for circuits other than outputs of RGB and composite video.
2	R IN	Input pin for the analog RGB signal
3	G IN	
4	B IN	
5	XO OUT	For inner oscillation, a crystal oscillator is connected.
6	XO IN	For external oscillation, input to pin 6 XO IN through a coupling capacitor.
7	NTSC/PAL	Switching pin between NTSC and PAL mode. Vcc→NTSC. GND→PAL.
8	AUDIO IN	Input pin for the audio buffer circuit. The input impedance is about 25kΩ.
9	AUDIO OUT	Output pin for the audio buffer circuit.
10	C SYNC IN	Input pin for the composite sync signal. Input with the TTL level. L<0.8V, H>2.0V.
11	C SYNC OUT	Output pin for the composite sync signal. Capable of driving a 75Ω load direct.
12	Vcc 1	Power supply pin for circuits other than RGB and composite video output circuits.
13	Iref	Pin to determine the inner reference current. Connect to GND via a 27kΩ resistor.
14	Vref	Pin for the inner reference voltage. Connect to GND with 10uF.
15	C OUT	Chroma signal output pin. Connect a BPF between this pin and pin 17.
16	Y OUT	Y signal output pin. Connect a delay line between this pin and pin 18.
17	C IN	Input pin for the chroma signal without harmonic distortion after BPF.
18	Y IN	Input pin for the Y signal with delay after the delay line.
19	Vcc 2	Power supply pin for RGB and composite video output circuit.
20	CV OUT	Output pin for the Y/C MIX circuit. The composite signal is output. This output can drive a 75Ω load direct.
21	B OUT	Output pin for the analog RGB signal. Capable of driving a 75Ω load direct.
22	G OUT	
23	R OUT	
24	GND 2	GND pin for RGB and composite output circuit.

## 6 · Absolute Maximum Ratings

- Operating temperature 0°C to 75°C

## 7 · Electrical Characteristics

- Consumption Current

Item	Test Point	Min.	Typ.	Max.	Unit
Consumption current 1	I1	15.0	19.5	27.9	mA
Consumption current 2	I2	6.3	8.2	11.7	mA

- Composite Video Signal

Item	Test Point	Min.	Typ.	Max.	Unit
Sync level	C	0.175	0.24	0.34	Vpp
White level		0.64	0.78	0.82	Vpp
Red level		0.189	0.238	0.245	Vpp
Green level		0.378	0.461	0.482	Vpp
Blue level		0.072	0.087	0.092	Vpp
Red chroma ratio		2.84	3.16	3.48	
G chroma ratio		2.65	2.95	3.25	
Blue chroma ratio		1.91	2.14	2.37	
Red phase		94	104	114	deg
Green phase		231	241	251	deg
Blue phase		337	347	357	Deg
Burst level		33	40	45	IRE
Burst width		2.7	3.1	3.6	uS
Burst position		0.45	0.73	0.95	uS
Carrier Leakage		---	---	30	mV

- Buffer/Amplifier/Mixer

Item	Test Point	Min.	Typ.	Max.	Unit
RGB output	D E F	0.64	0.71	0.78	Vpp
RGB output bandwidth		5.0	---	---	MHz
Sync output	B	0.20	0.29	0.40	Vpp
Audio output gain	A	-1.0	0	1.0	dB
Audio output bandwidth		30	---	---	kHz
Mix gain	C	9	10	11	dB
Mix bandwidth		5.0	---	---	MHz

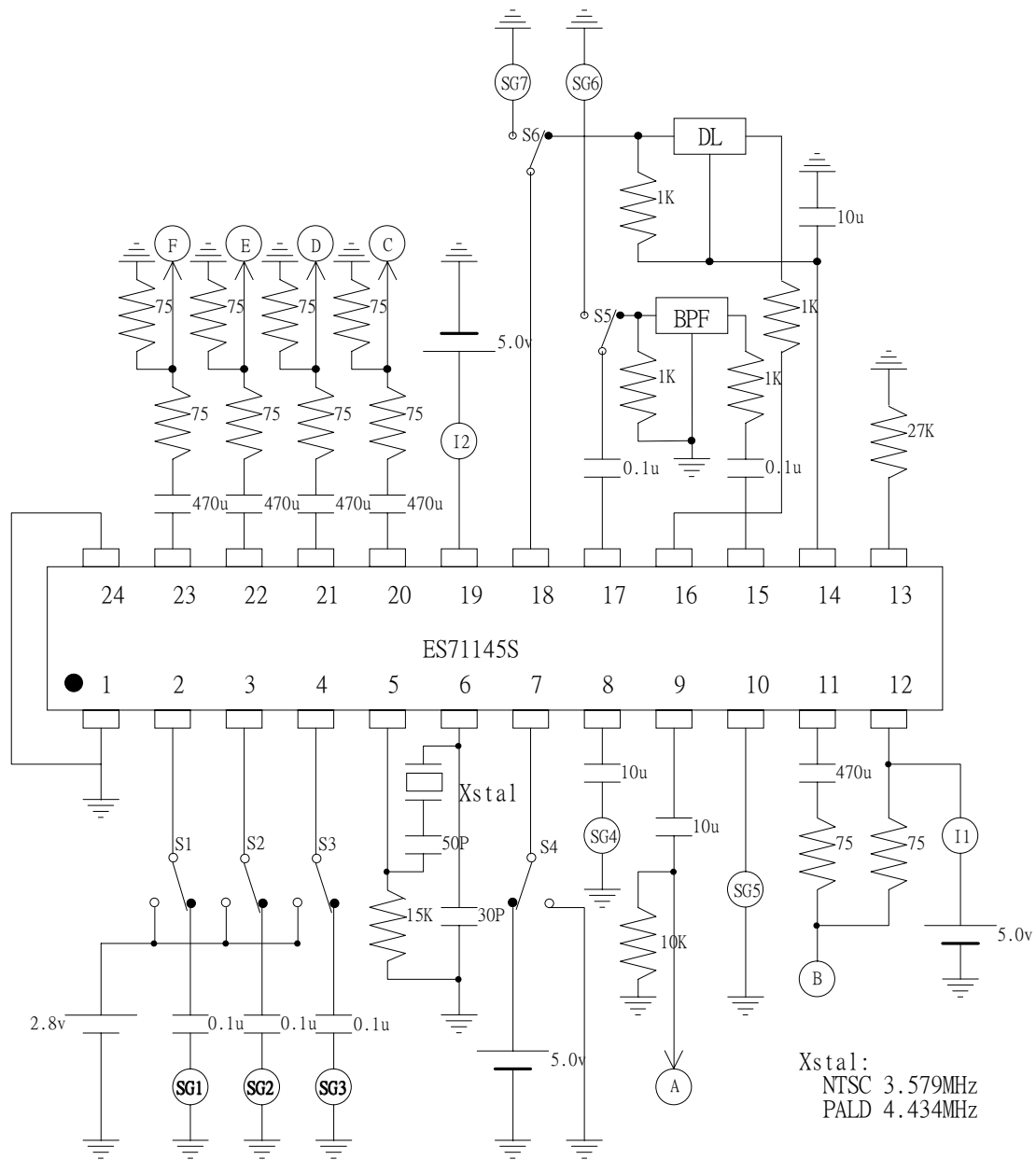
## • PAL characteristic

Item	Test Point	Min.	Typ.	Max.	Unit
Burst level ratio PAL/NTSC	C	0.9	1.0	1.1	
PAL burst phase +		125	135	145	deg
PAL burst phase -		215	225	235	deg

## 8 · Operation Mode

NTSC : Set 7<sup>th</sup> Pin as 0PAL : Set 7<sup>th</sup> Pin as 1

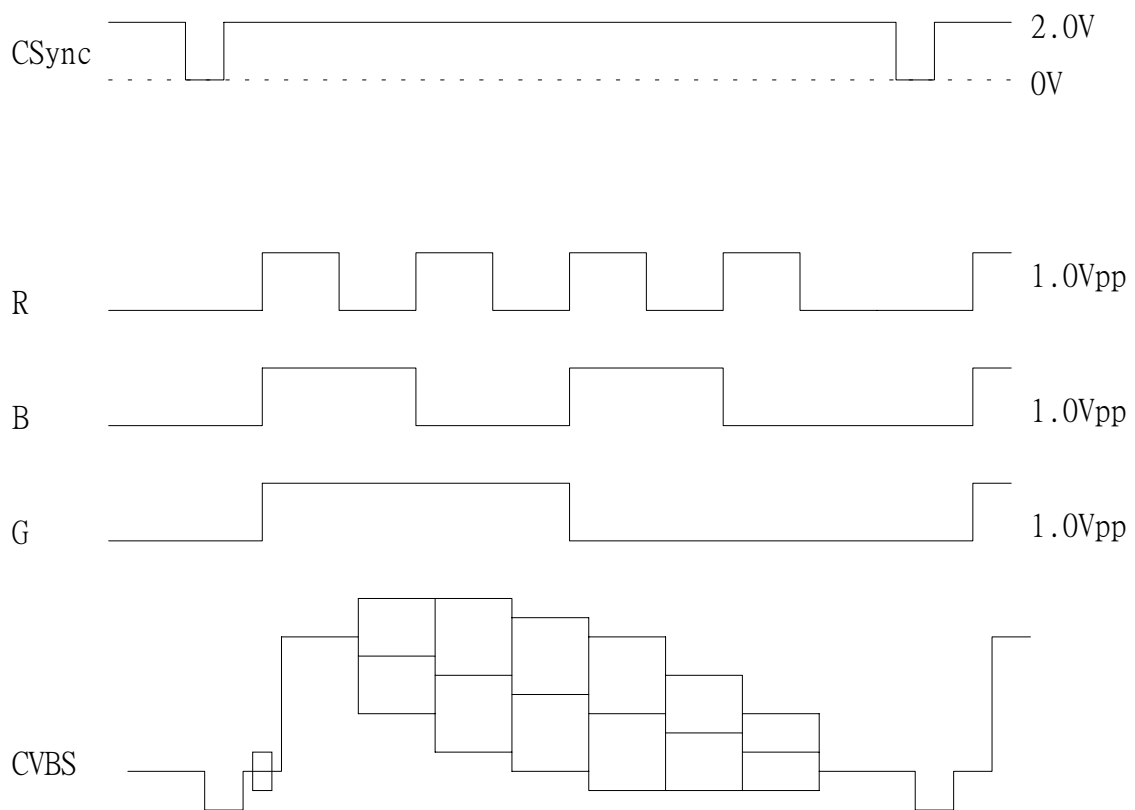
### 9 · Test Circuit



Note:

ES71145S is 300mil sop package.

Test Signal



CSync : NTSC/PAL Composited Sync Signal

R、G、B : Color Bar Signal Source (Blanking in Vertical Sync Region)

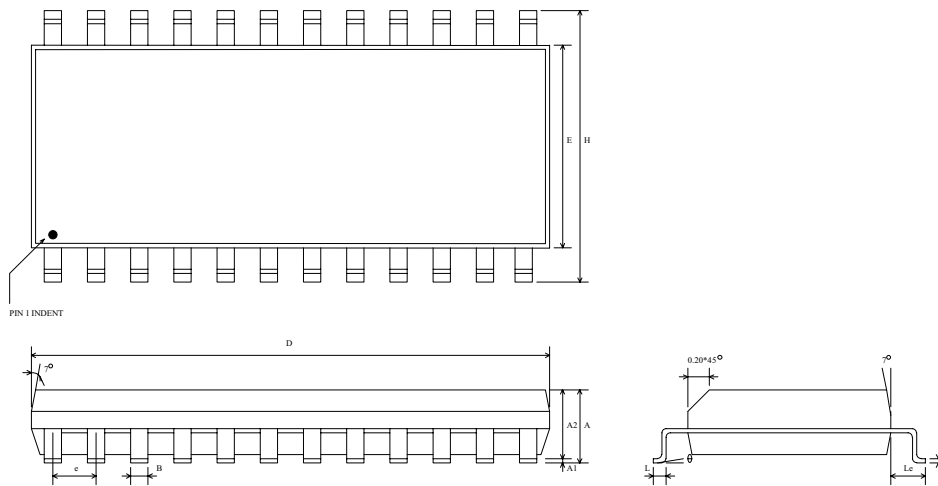
Measurement : Using Tek VM700 and Tek Digital

Oscilloscope

### 1 0 · Application Circuit

It is the same with test circuit.

### 1 1 · Package Outline (Unit: mm)



Package Name	Lead Treatment	Weight (g)	EIAJ Code No.	JEDEC Code No.		
24L+W/B	Solder Plastics	-----	-----	MS-013 AD		
SYMBOLS	Dimensions in Millimeters			Dimensions in Inches		
	MIN	NOM	MAX	MIN	NOM	MAX
A	2.35	2.49	2.65	0.092	0.098	0.105
A1	0.10	0.20	0.30	0.003	0.008	0.012
A2	2.20	2.28	2.36	0.087	0.090	0.093
B	0.35	0.40	0.50	0.014	0.016	0.020
C	0.22	0.25	0.33	0.009	0.010	0.013
D	15.20	15.40	15.49	0.590	0.606	0.610
E	7.39	7.50	7.60	0.290	0.295	0.299
e	-----	1.27	-----	-----	0.050	-----
H	10.00	10.35	10.65	0.393	0.407	0.420
L	0.40	-----	1.27	0.015	-----	0.050
Le	0.76	-----	-----	0.030	-----	-----
y	-----	-----	0.10	-----	-----	0.004
$\theta$	0°	-----	9°	0°	-----	9°