


MOTOROLA

Advance Information

COLOR TELEVISION RGB to PAL/NTSC ENCODER

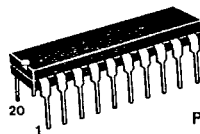
... an integrated circuit used to generate a composite TV signal from baseband red, blue, green and sync inputs. The MC1377 has color subcarrier oscillator, voltage controlled 90° phase shifter, two DSB suppressed carrier chroma modulators, RGB input matrices and blanking level clamps. It can be operated with very few external parts, but has the pinouts for a fully implemented, top quality composite signal. It is ideal for encoding signals from color cameras and graphics generators.

- Reference Oscillator Self-Contained Or Externally Driven
- Nominal 90° ±3.0° Axes Are Optionally Trimmable
- Simple PAL/NTSC Switch
- Luminance And Chroma Channels Can Accept Delay Line/Bandpass Elements Or Direct Connection
- Provides dc Reference To Permit Direct Drive To RF Modulator

MC1377

COLOR TELEVISION RGB to PAL/NTSC ENCODER

SILICON MONOLITHIC
INTEGRATED CIRCUIT



P SUFFIX
PLASTIC PACKAGE
CASE 738-03

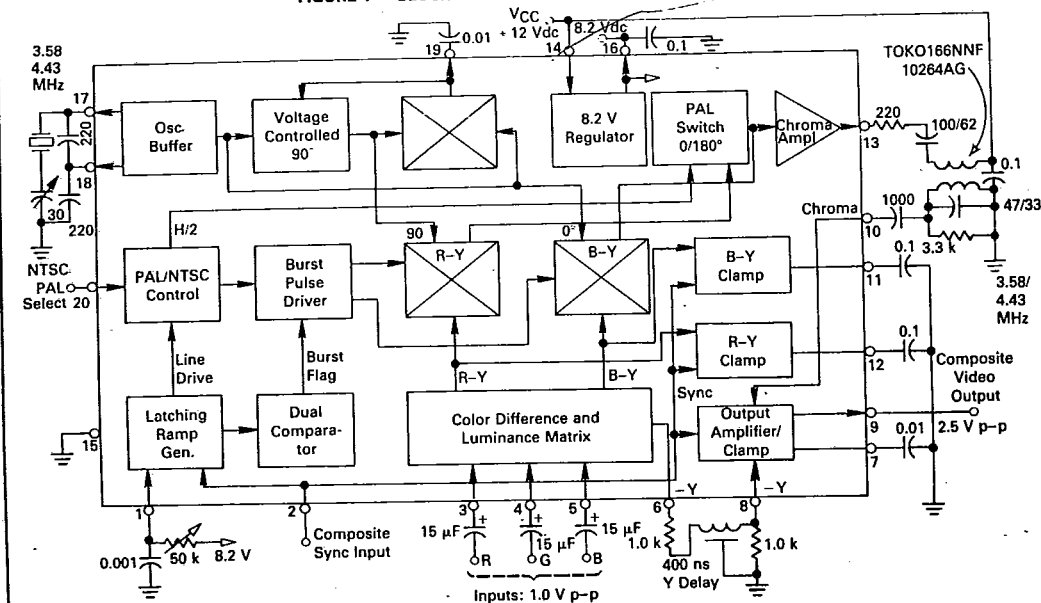
FN SUFFIX
PLASTIC PACKAGE
CASE 775-02
PLCC-20



ORDERING INFORMATION

Device	Temperature Range	Package
MC1377P MC1377FN	0-70°C	Plastic DIP PLCC-20

FIGURE 1 — BLOCK DIAGRAM AND APPLICATION CIRCUIT



This document contains information on a new product. Specifications and information herein are subject to change without notice.

MOTOROLA LINEAR/INTERFACE DEVICES

MC1377

MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Supply Voltage	VCC	15	Vdc
8.2 Vdc Regulator Output Current	I _{REG}	10	mAdc
Operating Temperature	T _{AMB}	0 to +70	°C
Storage Temperature	T _{stg}	-65 to +150	°C
Junction Temperature	T _{J(max)}	150	°C
Power Dissipation, package Derate above 25°C	P _D	1.25 10	W mW/°C

RECOMMENDED OPERATING CONDITIONS

Supply Voltage	12 ± 1.2	Vdc
Sync Tip Level	-0.5 to +1.0	Vdc
Sync, Blanking Level	+1.7 to +8.2	Vdc
Red, Green, Blue Inputs (Saturated)	1.0	V _{p-p}

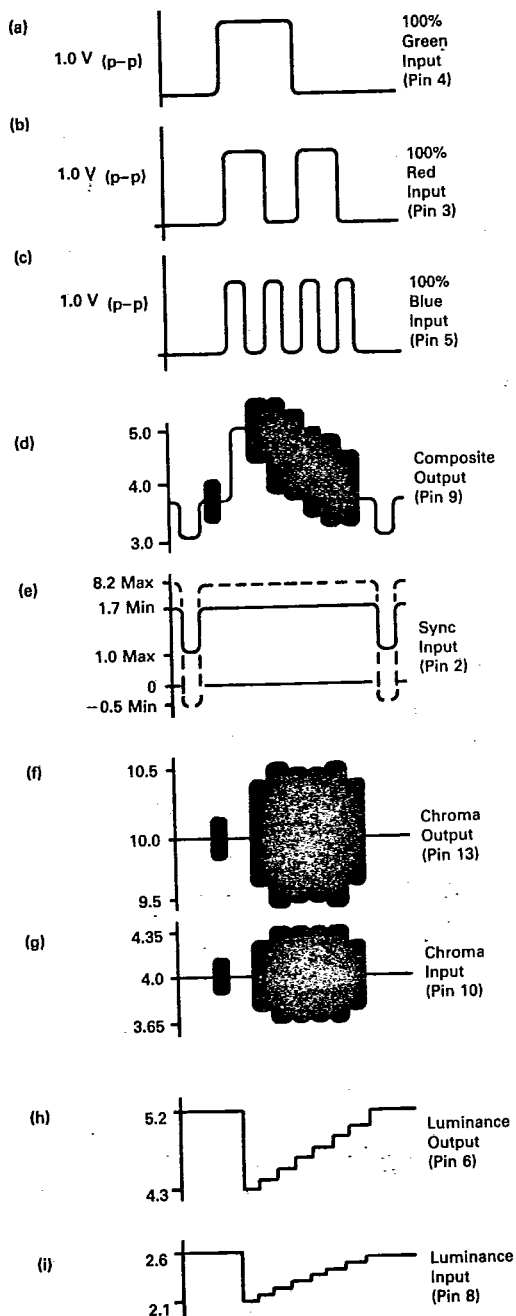
ELECTRICAL CHARACTERISTICS (VCC = 12 Vdc, T_A = 25°C, Circuit Of Figure 1 Unless Otherwise Noted.)

Characteristic	Pin No.	Min	Typ	Max	Unit
Supply Current	14	20	32	40	mAdc
Oscillator Amplitude	18	—	0.5	—	V _(p-p)
External Subcarrier Input (Oscillator Components Removed)	17	—	0.25	—	V _{RMS}
Subcarrier Input: Resistance	17	—	5.0	—	kΩ
Capacitance		—	2.0	—	pF
Modulation Angle (R-Y) to (B-Y)	—	85	90	95	Degrees
(R-Y) Angle Adjustment	19	—	0.25	—	Deg/μA
R, G, B Input For 100% Color Saturation	3, 4, 5	—	1.0	—	V _(p-p)
R, G, B Input: Resistance	3, 4, 5	—	10	—	kΩ
Capacitance		—	2.0	—	pF
Sync Threshold (See Figure 2e)	2	—	1.7	—	V
Sync Input Resistance (Input > 1.7 V)	2	—	10	—	kΩ
Chroma Output Level At 100% Saturation	13	—	1.0	—	V _(p-p)
Chroma Output Resistance	13	—	50	—	Ω
Chroma Input Level For 100% Saturation	10	—	0.7	—	V _(p-p)
Chroma Input: Resistance	10	—	10	—	kΩ
Capacitance		—	2.0	—	pF
Composite Output, 100% Saturation (See Figure 2d)	9	—	0.6	—	V _(p-p)
Sync		—	1.4	—	
Luminance		—	1.7	—	
Chroma Burst		—	0.6	—	
Output Impedance (See Note 1)	9	—	50	—	Ω
Luminance Bandwidth (3 dB), Less Delay Line	9	—	8.0	—	MHz
Subcarrier Leakage In Output	9	—	20	—	mV _(p-p)

Note 1: Output Impedance can be reduced to less than 10Ω by using a 150Ω output load from Pin 9 to ground. Power supply current will increase to about 60 mA.

See Application Note AN932 for further information.

MC1377

FIGURE 2 — SIGNAL VOLTAGES
(CIRCUIT VALUES OF FIGURE 1)

APPLICATION NOTES

R.G.B. Inputs should be set up to be 1.0 V p-p for fully saturated levels. This is not arbitrary, since sync and burst levels are internally fixed. The large (15 μ F) input capacitors of Figure 1 are needed for the 50/60 Hz vertical component.

Subcarrier Oscillator. The internal common-collector Colpitts can be free run or it can easily be pulled in by a lightly coupled signal from a "master" into Pin 17. Also, it can be disabled entirely and a 0.25 V_{RMS} signal driven into Pin 17.

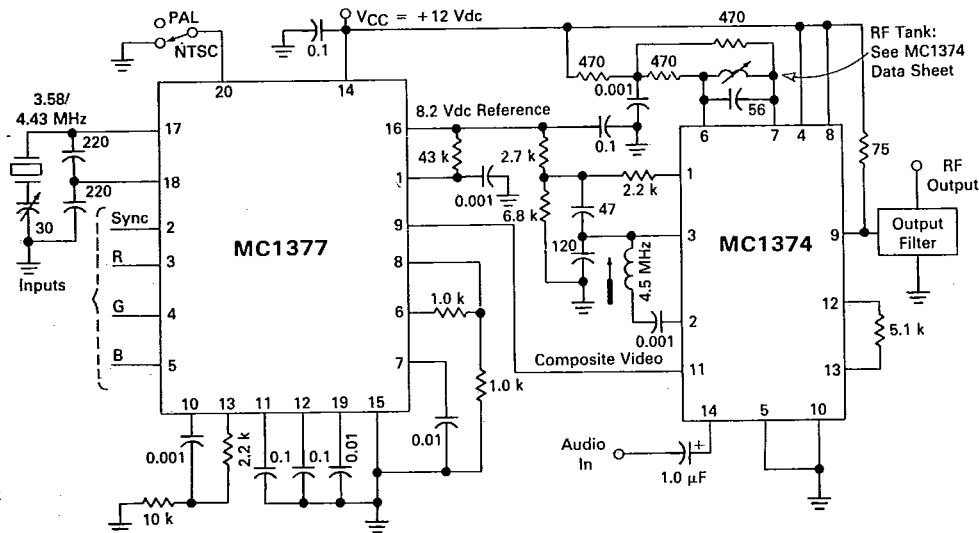
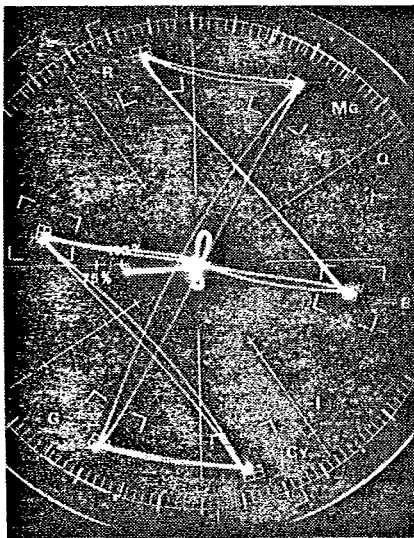
Modulator Phase Angles are quite accurately established internally. Taking (B-Y) as 0°, burst is at 180°, and the angle of (R-Y) is 90° \pm 3.0°. The (R-Y) angle can be "tweaked." For example, 470 k Ω from Pin 19 to ground will increase the (R-Y) to (B-Y) angle about 3.0°. Pulling Pin 19 up will decrease the angle.

Composite Output is dc referenced and can be direct coupled to an RF modulator as shown in Figure 3. In this case, the 8.2 V regulator output of the MC1377 is divided down to 5.8 V to provide the zero carrier reference to Pin 1 of the MC1374.

Burst Generation is provided by a sync triggered ramp on Pin 1 and two internal level sensors. Since the early part of this ramp is used, it is quite accurate. Fixed R-C values are feasible, as shown in Figure 3.

Sync Input can be varied over a wide latitude but nevertheless must be applied correctly. The typical ac coupled sync signal has very little positive value and will require a pull-up resistor to 8.2 Vdc at the input. The sync input is a 10 k Ω /10 k Ω divider in the base of a common emitter stage. For PAL operation, the correctly serrated vertical sync interval must be used, in order to continuously trigger the PAL flip-flop. "Block" vertical sync can be used for NTSC.

(R-Y)(B-Y)(-Y) signals are generated to NTSC values (\pm 5.0%) in the input matrices. They are dc clamped at black level by a sync driven clamp. Burst amplitude is internally fixed to correspond to sync level, allowing for 3.0 dB loss in the chroma bandpass filter. If the filter is not used, as shown in Figure 3, a resistor divider should be inserted between Pin 13 and Pin 10 to provide the proper chroma level. When the chroma bandpass is not used, the (-Y) delay line should also be removed, but the 1.0 k/1.0 k divider from Pin 6 to Pin 8 should be retained.

MC1377**FIGURE 3 — COUPLING THE MC1377 TO THE MC1374 RF MODULATOR****FIGURE 4 — VECTORSCOPE DISPLAY OF 100% SATURATED NTSC COLOR BARS****FIGURE 5 — 100% SATURATED PAL COLOR BARS ON NTSC VECTORSCOPE**