



ELECTRONICS, INC.  
 44 FARRAND STREET  
 BLOOMFIELD, NJ 07003  
 (973) 748-5089  
<http://www.nteinc.com>

## NTE1863 Integrated Circuit Single-Chip Signal Processor for Color TV

**Description:**

The NTE1863 is a single-chip integrated circuit in a 42-Lead DIP type package and incorporates a circuit to process all types of signals (VIF, SIF, video, chroma, deflection) for color TVs based on the NTSC system. In designing this device, its basic characteristics including synchronization performance are greatly improved, and taking into consideration its needed application in AV equipment such as VCRs, the necessity of adjustment is substantially reduced. A simple, compact color TV can be implemented by simply connecting a tuner, power supply, and output circuit to the NTE1863.

When using the NTE1863 in conjunction with vertical output-use IC NTE1855, only one connection (vertical timing pulse) is required, with no connection required for feedback, thus simplifying layout of printed circuit pattern.

**Features:**

- Small-sized Package
- Minimum Number of External Parts Required

**VIF-SIF**

- Excellent Buzz Beat Characteristics
- High-Gain VIF Amplifier Eliminating the need for a Preamplifier
- AGC Speed can be Increased
- Video/Audio Simultaneous Muting, or Audio-Only Muting Possible

**Video-Chroma**

- A Quadratic Differentiation Circuit allowing Soft Video Tone Operation is also Incorporated
- Adjustment-free Chroma Sync

**Deflection**

- Adjustment-free Horizontal, Vertical Sync
- Dual AFC System with Excellent Horizontal Noise Characteristics
- Vertical Sync Stabilizing Circuit which is Scarcely Affected by Motor Noise

**Absolute Maximum Ratings:** ( $T_A = +25^\circ\text{C}$  unless otherwise specified)

Supply Voltage, $V_{9\text{max}}$ , $V_{11\text{max}}$ .....	12V
Supply Current, $I_{20\text{max}}$ .....	16mA
Allowable Power Dissipation ( $T_A \leq +65^\circ\text{C}$ ), $P_{d\text{max}}$ .....	1.3W
Operating Temperature Range, $T_{\text{opr}}$ .....	$-10^\circ$ to $+65^\circ\text{C}$
Storage Temperature Range, $T_{\text{stg}}$ .....	$-55^\circ$ to $+125^\circ\text{C}$
Circuit Current,	
$I_{36\text{max}}$ .....	-6mA
$I_{4\text{max}}$ .....	-3mA
FBP Input Current (Peak Current),	
$I_{21\text{max}}$ .....	5mA
$I_{19\text{max}}$ .....	10mA

**Recommended Operating Conditions:** ( $T_A = +25^\circ\text{C}$  unless otherwise specified)

Supply Voltage, $V_9, V_{11}$ .....	9V
Supply Current, $I_{20}$ .....	13mA
Operating Voltage Range, $V_{9op}, V_{11op}$ .....	8V to 10V
Operating Current Range, $I_{20op}$ .....	10mA to 16mA

**Operating Characteristics:** ( $T_A = +25^\circ\text{C}$ ,  $V_{CC} = V_9 = V_{11} = 9\text{V}$ ,  $I_{CC} = I_{20} = 13\text{mA}$  unless otherwise specified)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
<b>Circuit Voltage, Current</b>						
Horizontal Supply Voltage	$V_{20}$	$V_{CC} = 9\text{V}, I_{CC} = 13\text{mA}$	7.3	7.8	8.3	V
Supply Current	$I_9 + I_{11}$	$V_{CC} = 9\text{V}, I_{CC} = 13\text{mA}$	67	93	124	mA
<b>VIF</b> ( $f_p = 58.75\text{MHz}$ )						
Video Detector DC Output Voltage	$V_{36}$	Quiescent	4.2	4.6	5.0	V
AFT Output Voltage	$V_{38}$	Quiescent	2.8	4.2	5.7	V
Maximum RF AGC Control Voltage	$V_{40H}$	CW = 85dB $\mu$ , RF AGC VR = min	7.6	8.0	8.3	V
Minimum RF AGC Control Voltage	$V_{40L}$	CW = 85dB $\mu$ , RF AGC VR = min	0	0.01	0.3	V
VIF Input Sensitivity	$V_i$	VIF input level at which video output is 0.8V $_{P-P}$ (40% MOD)	30	36	42	dB $\mu$
VIF AGC Control Range	GR	Maximum input ( $V_0 = 0.8V_{P-P}$ ) input sensitivity	62	70	-	dB
VIF Maximum Permissible Input	$V_{imax}$	VIF input level at which video output is +1dB	102	110	-	dB $\mu$
Video Detector Output	$V_{O36}$	$V_i = 80\text{dB}\mu$ , AM = 78% MOD	1.7	2.0	2.3	V $_{P-P}$
Differential Gain	DG	$V_i = 80\text{dB}\mu$ , 87.5% VIDEO MOD	-	3.0	10	%
Differential Phase	DP	$V_i = 80\text{dB}\mu$ , 87.5% VIDEO MOD	-	3.0	10	deg
Video S/N	S/N	$V_i = 80\text{dB}\mu$ , $\frac{\text{AM} = 78\% \text{ MOD}}{\text{CW}}$	47	53	-	dB
Sync-Tip Level	$V_{36TIP}$	CW = 80dB $\mu$	2.0	2.3	2.6	V
Video Frequency Characteristic	$f_C$	Frequency at which video output is down 3dB	5.0	7.0	-	MHz
VIF Intermodulation	$I_{920}$	V3.58MHz/V920kHz, $V_i = 80\text{dB}\mu$	28	35	-	dB
Maximum AFT Control Voltage	$V_{38H}$	CW = 80dB $\mu$ , frequency change	8.2	8.6	8.9	V
Minimum AFT Control Voltage	$V_{38L}$	CW = 80dB $\mu$ , frequency change	0.1	0.3	0.8	V
AFT Detector Sensitivity	Sf	CW = 80dB $\mu$ , frequency change	50	80	120	mV/kHz
AFT Switch Operation Start Voltage	$V_{AFTSW}$	Test with sweep signal	1.0	5.0	-	V
Black Noise Threshold Level	$V_{BTH}$	Test with sweep signal	1.2	1.5	1.8	V
White Noise Threshold Level	$V_{WTH}$	Test with sweep signal	4.9	5.3	5.7	V
<b>SIF AF</b> ( $f_s = 4.5\text{MHz}$ )						
Sound D Input Limiting Sensitivity	$V_{lim}$	SIF input level at which detection output is down 3dB	-	48	55	dB $\mu$
FM Detector Output Voltage	$V_{O1}$	$V_i = 100\text{dB}\mu$ , $\Delta f = \pm 25\text{kHz}$	380	550	750	mVrms
FM Detector Output Distortion	THD	$V_i = 100\text{dB}\mu$ , $\Delta f = \pm 25\text{kHz}$	-	0.4	1.0	%
AM Rejection	AMR	$V_i = 100\text{dB}\mu$ , $\frac{\text{FM: } \Delta f = \pm 25\text{k}}{\text{AM: } 30\%}$	40	53	-	dB
AF Amp Voltage Gain	$G_{AF}$	$V_i = 100\text{mVrms}$ , $f = 400\text{Hz}$	18	20	22	dB

**Operating Characteristics (Cont'd):** ( $T_A = +25^\circ\text{C}$ ,  $V_{CC} = V_9 = V_{11} = 9\text{V}$ ,  $I_{CC} = I_{20} = 13\text{mA}$  unless otherwise specified)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
<b>SIF AF (Cont'd)</b> ( $f_s = 4.5\text{MHz}$ )						
AF Maximum Output Voltage	$V_{04\text{max}}$	Output level at which AF amp output distortion is 10%	2.0	3.0	–	Vrms
AF Electronic Attenuator Range	$A_{TT}$	$V_i = 200\text{mVrms}$ , $f = 400\text{Hz}$	70	80	–	dB
<b>Video</b>						
Soft Video Tone Variable Range	$\Delta\text{Soft}$	$f = 2\text{MHz}$ , $100\text{mV}_{P-P}$ , video tone VR: $4\text{V} \rightarrow \text{0V}$	–6	–4	–2	dB
Sharp Video Tone Variable Range	$\Delta\text{Sharp}$	$f = 2\text{MHz}$ , $100\text{mV}_{P-P}$ , video tone VR: $4\text{V} \rightarrow \text{9V}$	8	11	14	dB
Video Voltage Gain	GV	$f = 100\text{kHz}$ , $100\text{mV}_{P-P}$ , contrast VR: $9\text{V}$ , video tone VR: $4\text{V}$	17	20	23	dB
Contrast Control Center	$C_{CEN}$	$f = 100\text{kHz}$ , $100\text{mV}_{P-P}$ , contrast VR: $6\text{V}$	0.45	0.57	0.69	$V_{P-P}$
Contrast Variable Range	$\Delta\text{CV}$	Contrast VR: $3\text{V} \rightarrow 9\text{V}$	19	21	23	dB
Bright Control	$B_{RH}$	Bright VR: $2\text{V}$	5.8	–	–	V
	$B_{RCEN}$	Bright VR: $4.5\text{V}$	2.6	3.1	3.6	V
	$B_{RL}$	Bright VR: $7\text{V}$	–	–	1.2	V
Frequency Response	$f_V$	Contrast VR: $6\text{V}$ , video tone VR: $4\text{V}$ , 3dB down	88	93	–	%
<b>Chroma</b>						
ACC Amplitude Characteristics	ACC1	+6dB	–3	0	+3	dB
	ACC2	–20dB	–7	–	+2	dB
ACC Phase Characteristics	ACCP1	+6dB	–3	0	+3	deg
	ACCP2	–20dB	–7	–	+7	deg
Killer Operating Point	EK		–51	–44	–37	dB
Color Control Minimum	ECmin	Color VR: $0\text{V}$ , Contrast VR: $9\text{V}$	–	–	30	$\text{mV}_{P-P}$
Color Residue Color Control Center	EC CEN	Color VR: $4.5\text{V}$ , Contrast VR: $6\text{V}$	1.6	2.4	3.2	$V_{P-P}$
Minimum Demodulator Output	ECmax	Color VR: $9\text{V}$ , Contrast VR: $9\text{V}$	4.0	5.0	–	$V_{P-P}$
Contrast Color Variable Range	$\Delta\text{CC}$	Color VR: $B-Y = 2.5\text{mV}_{P-P}$ , Contrast VR: $3\text{V} \rightarrow 9\text{V}$	17.5	19.0	20.5	dB
Tint Control Center	$T_{CEN}$	Tint VR: $4.5\text{V}$ , Color VR: $4.5\text{V}$ , Contrast VR: $6\text{V}$	–16	–4	+8	deg
Tint Variable Range	$\Delta\text{T}$	Tint VR: $0\text{V} \leftarrow 4.5\text{V} \rightarrow 9\text{V}$ , Color VR: $4.5\text{V}$ , Contrast VR: $6\text{V}$	$\pm 40$	–	–	deg
APC Pull-In Range	$\Delta f_{APC}$		$\pm 350$	–	–	Hz
Demodulator Output Ratio	R/B	Monochrome signal, Contrast VR: $6\text{V}$ , Color VR: $B-Y = 1V_{po}$	0.81	0.90	0.98	times
	G/B	Monochrome signal, Contrast VR: $6\text{V}$ , Color VR: $B-Y = 1V_{po}$	0.24	0.30	0.38	times

### Pin Connection Diagram

De-Emphasis	1	42	Video Det
Mute	2	41	Video Det
NFB	3	40	AGC Output
AF Out	4	39	Att Limiter
VIF SIF GND	5	38	APT Output
VIF Input	6	37	AFT
VIF Input	7	36	Video Output
RF AGC	8	35	Vertical Stop
VIF SIF V <sub>CC</sub>	9	34	Chroma VR
AGC Filter	10	33	Contrast
Video Chroma Sync Vertical V <sub>CC</sub>	11	32	Contrast
Killer Filter	12	31	Video Tone Input/VR
Tint	13	30	Clamp Filter
X'tal	14	29	Brightness Control
APC Filter	15	28	Video Chroma Jungle GND
R-Y Out	16	27	Vertical Output
G-Y Out	17	26	Sync Separator Input
B-Y Out	18	25	Horizontal V <sub>CC</sub>
-Y Out	19	24	Horizontal OSC
High +B	20	23	X-Ray Protect
FBP	21	22	Horizontal Output

