

SANYO

No.4265A

LA7672**Color TV Single-Chip Signal Processor
for NTSC Systems (PLL Detection)****Overview**

The LA7672 is a single-chip IC for color TVs based on the NTSC system with on-chip circuit for all VIF, SIF, video, chroma and deflection signal processing.

Features**[VIF]**

- PLL detection (high video and audio quality)
- High-gain VIF amplifier
- High speed AGC
- On-chip APC time constant switch

[SIF]

- Simultaneous sound IN/OUT
- Video/audio simultaneous muting, or audio-only muting possible

[Audio-visual switch]

- Internal/external audio-visual switch ($V_{CC} = 9V$)

Delay line	Video external, audio external	Switch rating
OFF	IN	6.9 to 9.0V
OFF	EXT	4.7 to 6.6V
ON	EXT	2.4 to 4.3V
ON	IN	0 to 2.1V

[OSD]

- RGB 3 input
- RGB linear up (–6dB input: 2 to 5V)
- Fast blanking (B input combined use)

[Chroma]

- On-chip ACC filter, On-chip killer filter, Killer-circuit hysteresis operation
- On-chip carrier filter

[Video]

- Black enhancement
- On-chip delay line
- Wide band width (9MHz): delay line short
- Dual rank on-chip differentiation circuit also available for soft also
- S input supported (VCR application)
- Variable DC transmission volume available (externally attached circuit adjustment)

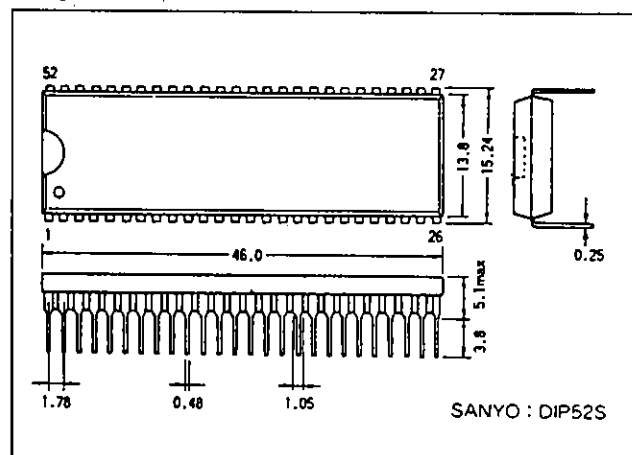
[Deflection]

- Adjustment-free horizontal, vertical synchronization
- Dual AFC system with excellent anti-noise characteristics
- External adjustment of vertical synchronization sensitivity
- Vertical size is constant with no-signal
- Highly stable image during playback of copy protected tapes (macro-vision tape)
- High stability against VCR skew distortion

Package Dimensions

(unit : mm)

3128



Maximum Ratings at Ta = 25° C

Maximum Supply Voltage	V11 max	11	V	unit
	V14 max	11	V	
Maximum Supply Current	I30max	16	mA	
Allowable Power dissipation	Pd max	1.35	W	Ta ≤ 60°C
Operating Temperature Range	Topr	-10 to +65	°C	
Storage Temperature Range	Tstg	-55 to +150	°C	
Circuit Current	I44	-6	mA	
	I6	-3	mA	
FBP Input Current	I22 max	5	mA	Peak current
	I21 max	10	mA	Peak current

Operating Conditions at Ta = 25° C

Recommended Supply Voltage	V11	9	V	unit
	V14	9	V	
Recommended Supply Current	I30	13	mA	
Operating Voltage Range	V11op	8 to 9.5	V	
	V14op	8 to 9.5	V	
Operating Current Range	I30op	10 to 16	mA	

Operating Characteristics at Ta = 25°C, VCC = V11 = V14 = 9 V, ICC = I30 = 13 mA**[Circuit Voltage and Current]**

Horizontal Supply Voltage	V30	VCC = 9V, ICC = 13mA	7.3	7.8	8.3	V
Supply Current	I11 + I4	VCC = 9V, ICC = 13mA, IF AGC 4V	102	120	138	mA

[VIF]

Quiescent Video Output Voltage	V44	Quiescent	4.3	4.7	5.1	V
Quiescent AFT Output Voltage	V47	Quiescent	3.1	4.7	6.1	V
Maximum RFAGC Voltage	V49H	CW = 85dBμ, RFAGCVR = min	7.6	8.0	8.3	V
Minimum RFAGC Voltage	V49L	CW = 85dBμ, RFAGCVR = max	0	0.01	0.3	V
Input Sensitivity	Vi	VIF input level for video output at 0.8Vp-p (40% mod).	33	39	45	dBμ
AGC Range	GR	Maximum input (V0 = 0.8Vp-p) - input sensitivity	54	62		dB
Maximum Permissible Input	Vi max	VIF input level for video output at +1dB	97	104		dBμ
Video Output Detection	VO44	Vi = 80dBμ, AM = 78% mod	1.7	2.0	2.3	Vp-p
Differential Gain	DG	Vi = 80dBμ, AM = 87.5%, video mod		3.0	10	%
Differential Phase	DP	Vi = 80dBμ, AM = 87.5%, video mod		1.0	10	deg
Video S/N	S/N	Vi = 80dBμ, 20 log $\frac{1.46 (Vp-p)}{\text{noise (Vrms)}}$	47	54		dB
Synchronization Signal Tip Level	V44 TIP	CW = 80dBμ	2.1	2.4	2.7	V
Frequency Characteristic	fC	Frequency at video output of -3dB	6.0	9.0		MHz
920 kHz VIF Intermodulation	I920	V3.58MHz/V920kHz, Vi = 80dBμ	35	42		dB
Maximum AFT Output Voltage	V47H	CW = 80dBμ, frequency change	8.3	8.7	9.0	V
Minimum AFT Output Voltage	V47L	CW = 80dBμ, frequency change	0.1	0.3	0.8	V
AFT Detection Sensitivity	Sf	CW = 80dBμ, frequency change	45	70	100	mV/kHz
AFT Switch Operation Start Voltage	VAFTSW	Measuring with sweep signal	0.5	1.0		V
Black Noise Threshold Level	VBTH	Measuring with sweep signal	1.1	1.4	1.7	V
APC Pull-in Range (U)2	fPU-2	CW = 80dBμ, fP = 53MHz to 64MHz	0.8	1.7		MHz
APC Pull-in Range (L)2	fPL-2	CW = 80dBμ, fP = 53MHz to 64MHz		-2	-1	MHz
VCO Maximum Variable Range	ΔfU	Quiescent	0.9	1.7		MHz
	ΔfL	Quiescent		-2	-1	MHz
VCO Control Sensitivity	β	Quiescent	1.5	3.0	5.5	kHz/mV

[Audio-visual Switches]

Video Output DC Voltage	V38	Quiescent	3.0	3.4	3.8	V
Internal Video Input Voltage	V42	Quiescent	4.4	4.8	5.2	V
External Video Input Voltage	V40	Quiescent	4.4	4.8	5.2	V
External Audio Input Voltage	V3	Quiescent	5.2	5.6	6.0	V

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			min	typ	max	unit
[SIF AF]						
SIF Limiting Voltage	$V_{i\lim}$	SIF output level for detection output at -3dB		40	47	dB μ
FM Detection Output Voltage	V_{O1}	$V_i = 100\text{dB}\mu$, $\Delta f = \pm 25\text{kHz}$	380	550	750	mVrms
FM Detection Output Distortion Ratio	THD	$V_i = 100\text{dB}\mu$, $\Delta f = \pm 25\text{kHz}$		0.4	1.0	%
AM Rejection	AMR	$V_i = 100\text{dB}\mu$, $\frac{\text{FM} : \Delta f = \pm 25\text{kHz}}{\text{AM} : 30\%}$	40	60		dB
AF Amplifier Voltage Gain	G_{AF}	$V_i = 100\text{mVrms}$, $f = 400\text{Hz}$	18	20	22	dB
AF Maximum Output Voltage	$V_{O6\max}$	Output level for AF amplifier output distortion at 10%	2.0	2.8		Vrms
AF Electronic Attenuator Range	ATT	$V_i = 200\text{mVrms}$, $f = 400\text{Hz}$	70	80		dB
[Video]						
Black Enhancement Threshold	B_{STH}	APL variable	40	50	60	IRE
Maximum Black Enhancement Gain	$B_{S\max}$	APL variable	-35	-27	-20	IRE
Soft Video Tone Variable Range	Δ_{Soft}	$f = 2\text{MHz}$, 100mVp-p video tone VR: 4V $\rightarrow$ 0V	-6	-4	-2	dB
Sharp Video Tone Variable Range	Δ_{Sharp}	$f = 2\text{MHz}$, 100mVp-p video tone VR: 4V $\rightarrow$ 9V, contrast VR: 6V	7	10	13	dB
Video Voltage Gain Audio-visual Switch 9V	GV_{9V}	$f = 100\text{kHz}$, 100mVp-p, contrast VR: 9V, video tone VR: 4V	15	18	21	dB
Video Voltage Gain Audio-visual Switch 0V	GV_{0V}	$f = 100\text{kHz}$, 100mVp-p, contrast VR: 0V, video tone VR: 4V	15	18	21	dB
Contrast Control Center	C_{CEN}	$f = 100\text{kHz}$, 100mVp-p, contrast VR: 6V	0.4	0.48	0.57	Vp-p
Contrast Variable Control Range	ΔC_V	Contrast VR: 3V $\rightarrow$ 9V	18	20	22	dB
Bright Control	B_{RH}	Bright VR: 1.5V	5.5	6.5	7.5	V
	B_{RCEN}	Bright VR: 4.5V	2.3	2.8	3.3	V
	B_{RL}	Bright VR: 7V		0.3	1.2	V
DL Off Frequency Characteristics	$f_V 9V$	Contrast VR: 6V, video tone VR: 4V, 3dB down	7	9		MHz
DL On Frequency Characteristics	$f_V 0V$	Contrast VR: 6V, video tone VR: 4V, 3dB down	2.5	3		MHz
DC Transmission	R_{DC}	Input: stair step signal, 500mVp-p	100	103	106	%
Delay Line Delay	T_{DL}	Input: white 100%	290	340	390	ns
[Chroma]						
ACC Amplitude Characteristics	A_{CC1}	+6dB	-3	0	+3	dB
	A_{CC2}	-20dB	-7		+2	dB
ACC Phase Characteristics	A_{CCP1}	+6dB	-3	0	+3	deg
	A_{CCP2}	-20dB	-7		+7	deg
Killer Operation Point	E_K		-35	-28	-21	dB
Color Control Color Residual	$E_C \min$	Color VR: 0V, contrast VR: 9V			30	mVp-p
Color Control Center	E_{CEN}	Color VR: 4.5V, contrast VR: 6V	1.2	1.8	2.4	Vp-p
Maximum Demodulation Output	$E_C \max$	Color VR: 9V, contrast VR: 9V	3.2	4.0		Vp-p
Color Contrast Variable Range	ΔC_C	Color VR: B - Y = 2.5Vp-p, contrast VR: 3V $\rightarrow$ 9V	17.5	19.5	21.5	dB
Tint Control Center	T_{CEN}	Tint VR: 4.5V, color VR: 4.5V, contrast VR: 6V	0	12	24	deg
Tint Variable Range	ΔT	Tint VR: 0V $\leftarrow$ 4.5V $\rightarrow$ 8V, color VR: 4.5V, contrast VR: 6V	± 40			deg
APC Pull-in Range	Δf_{APC}		± 300			Hz
Demodulator Output Ratio	R/B	Monochrome signal, contrast VR: 6V, color VR: B - Y = 1Vpo	0.81	0.90	0.98	
	G/B	Monochrome signal, contrast VR: 6V, color VR: B - Y = 1Vpo	0.24	0.30	0.38	
Demodulator Phase Angle	RB	Monochrome signal, contrast VR: 6V, color VR: B - Y = 1Vpo	97	105	113	deg
	GB	Monochrome signal, contrast VR: 6V, color VR: B - Y = 1Vpo	-130	-120	-110	deg
Demodulator Output DC Voltage	V_{C-Y}	Burst signal only, color VR: 0V	4.7	5.2	5.7	V
Demodulator Output DC Offset Voltage	ΔV_{C-Y}	Burst signal only, color VR: 0V	-200	0	+200	mV
Demodulator Output Residual Carrier	E car	Quiescent, killer off, color VR: 0V			0.03	Vp-p

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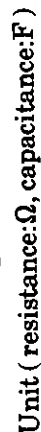
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[OSD]

			min	typ	max	unit
Blanking Pulse Threshold Level	TH _{BL}	C – IN: color bar, B – IN: variable	0.5	0.8	1.1	V
– Y Out DC Voltage (OSD mode)	V _Y	B – IN : 1.5V	2.5	2.8	3.1	V
RGB – In Threshold Level	TH _R	R – IN: variable, B – IN: 1.5V	1.9	2.2	2.5	V
	TH _G	G – IN: variable, B – IN: 1.5V				
	TH _B	B – IN, variable				
RGB – Y Out DC Voltage (3 V)	V _{R3V}	R, G, B – IN : 3V	5.2	5.5	5.8	V
	V _{G3V}					
	V _{B3V}					
RGB – Y Out DC Voltage (4 V)	V _{R4V}	R, G, B – IN : 4V	5.7	6.0	6.3	V
	V _{G4V}					
	V _{B4V}					
RGB – Y Out DC Voltage (5 V)	V _{R5V}	R, G, B – IN : 5V	6.2	6.5	6.8	V
	V _{G5V}					
	V _{B5V}					

[Deflection]

Synchronization Separator Input DC Level	V _{SDC}		6.0	6.3	6.6	V
Vertical Free-Running Period	T _{V free}		262	262.5	263	H
Maximum Vertical Synchronization Period	T _{V max}	Input: horizontal synchronization signal only	296.5	297	297.5	H
Minimum Vertical Synchronization Period	T _{V min}		224.5	225	225.5	H
Vertical Blanking Pulse Width	P _{W VBL}		20.25	20.5	20.75	H
Vertical Blanking Pulse Wave Height Value	P _{H VBL}		7.0	7.5		V
Vertical Output Pulse Width	P _{W VOUT}		8.25	8.5	8.75	H
Vertical Output Voltage	V _{OUT H}		5.7	6	6.3	V
	V _{OUT M}		4.2	4.5	4.8	V
	V _{OUT L}				0.3	V
Vertical External Trigger Load Resistance	R _{TR}		2.7	3.6		kΩ
Vertical Automatic Synchronization Stop Voltage	V _{SAS}			1.9	2.4	V
Vertical Output Pulse Start V _{CC} Voltage	S _{VV}				4	V
Horizontal Free-Running Frequency Deviation	Δf _H	Deviation from 15.734kHz	–90	30	150	Hz
Dependence of Horizontal Free-Running Frequency on V _{CC}	Δf _{H VCC}	V30 = 6.7V, reference value		2		Hz
Horizontal Pull-in Range	f _{H PULL}	Deviation from 15.734kHz	±400			Hz
Horizontal Output Pulse Width	P _{WH OUT}		21.8	23.8	25.8	μs
Horizontal Output Pulse Phase	H _{PF}		12			μs
	H _{PCEN}		3.4	4.4	5.4	μs
	H _{PR}				0	μs
Horizontal Output Pulse Start V _{CC} Voltage	S _{HV}			4.5	5.3	V
AFC II FBP Peak Voltage	F _{BPH}		4.1	4.6	5.1	V
Burst Gate Pulse Delay Time	T _{d BGP}		0.2	0.6	1.2	μs
Burst Gate Pulse Width	P _{W BGP}		2.7	3.7	4.7	μs
VCR SW Input Voltage	V _{CR}			1.3	2.0	V
X-ray Protector Circuit Operation Input Voltage	V _{HD}		0.64	0.74	0.84	V
Horizontal Synchronization Detection Threshold Level	H _{coin}		4.2	4.5	4.8	V



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