

**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)

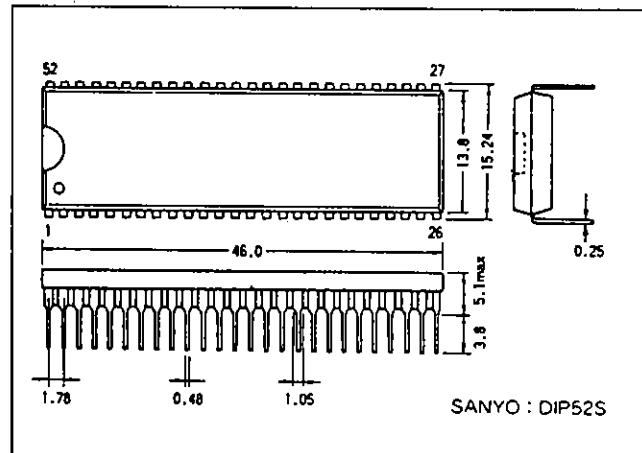
**[Deflection]**

- 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**

			unit
Maximum Supply Voltage	V11 max	11	V
	V14 max	11	V
Maximum Supply Current	I30max	16	mA
Allowable Power dissipation	Pd max	Ta ≤ 60°C	1.35 W
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	Peak current	5 mA
	I21 max	Peak current	10 mA

**Operating Conditions at Ta = 25° C**

			unit
Recommended Supply Voltage	V11	9	V
	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, V<sub>CC</sub> = V11 = V14 = 9 V, I<sub>CC</sub> = I30 = 13 mA****[Circuit Voltage and Current]**

			min	typ	max	unit
Horizontal Supply Voltage	V30	V <sub>CC</sub> = 9V, I <sub>CC</sub> = 13mA	7.3	7.8	8.3	V
Supply Current	I11 + 14	V <sub>CC</sub> = 9V, I <sub>CC</sub> = 13mA, I <sub>F</sub> 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 (V <sub>0</sub> = 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	V <sub>O44</sub>	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	f <sub>C</sub>	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	V <sub>AFTSW</sub>	Measuring with sweep signal	0.5	1.0		V
Black Noise Threshold Level	V <sub>BTH</sub>	Measuring with sweep signal	1.1	1.4	1.7	V
APC Pull-in Range (U)2	f <sub>PU-2</sub>	CW = 80dBμ, f <sub>p</sub> = 53MHz to 64MHz	0.8	1.7		MHz
APC Pull-in Range (L)2	f <sub>PL-2</sub>	CW = 80dBμ, f <sub>p</sub> = 53MHz to 64MHz		-2	-1	MHz
VCO Maximum Variable Range	Δf <sub>U</sub>	Quiescent	0.9	1.7		MHz
	Δf <sub>L</sub>	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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<b>[SIF AF]</b>						
SIF Limiting Voltage	$V_{i\ lim}$	SIF output level for detection output at -3dB		40	47	dB $\mu$
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	$V_i = 100\text{dB}\mu, \frac{FM : \Delta f = \pm 25\text{kHz}}{AM : 30\%}$	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
<b>[Video]</b>						
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	$\Delta_{Soft}$	$f = 2\text{MHz}, 100\text{mVp-p}$ video tone VR: 4V $\rightarrow$ 0V	-6	-4	-2	dB
Sharp Video Tone Variable Range	$\Delta_{Sharp}$	$f = 2\text{MHz}, 100\text{mVp-p}$ video tone VR: 4V $\rightarrow$ 9V, contrast VR: 6V	7	10	13	dB
Video Voltage Gain Audio-visual Switch 9V	$G_{V9V}$	$f = 100\text{kHz}, 100\text{mVp-p}$ , contrast VR: 9V, video tone VR: 4V	15	18	21	dB
Video Voltage Gain Audio-visual Switch 0V	$G_{V0V}$	$f = 100\text{kHz}, 100\text{mVp-p}$ , contrast VR: 0V, video tone VR: 4V	15	18	21	dB
Contrast Control Center	$C_{CEN}$	$f = 100\text{kHz}, 100\text{mVp-p}$ , contrast VR: 6V	0.4	0.48	0.57	Vp-p
Contrast Variable Control Range	$\Delta C_V$	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
<b>[Chroma]</b>						
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	$E_C\ CEN$	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	$\Delta C_C$	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	$\Delta T$	Tint VR: 0V $\leftarrow$ 4.5V $\rightarrow$ 8V, color VR: 4.5V, contrast VR: 6V	$\pm 40$			deg
APC Pull-in Range	$\Delta f_{APC}$		$\pm 300$			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	$\Delta V_{C-Y}$	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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<b>[OSD]</b>					
Blanking Pulse Threshold Level	TH <sub>BL</sub> C – IN: color bar, B – IN: variable	0.5	0.8	1.1	V
– Y Out DC Voltage (OSD mode)	V <sub>Y</sub> B – IN : 1.5V	2.5	2.8	3.1	V
RGB – In Threshold Level	TH <sub>R</sub> R – IN: variable, B – IN: 1.5V	1.9	2.2	2.5	V
	TH <sub>G</sub> G – IN: variable, B – IN: 1.5V				
	TH <sub>B</sub> B – IN, variable				
RGB – Y Out DC Voltage (3 V)	V <sub>R3V</sub> R, G, B – IN :3V	5.2	5.5	5.8	V
	V <sub>G3V</sub>				
	V <sub>B3V</sub>				
RGB – Y Out DC Voltage (4 V)	V <sub>R4V</sub> R, G, B – IN : 4V	5.7	6.0	6.3	V
	V <sub>G4V</sub>				
	V <sub>B4V</sub>				
RGB – Y Out DC Voltage (5 V)	V <sub>R5V</sub> R, G, B – IN : 5V	6.2	6.5	6.8	V
	V <sub>G5V</sub>				
	V <sub>B5V</sub>				
<b>[Deflection]</b>					
Synchronization Separator Input DC Level	V <sub>SDC</sub>	6.0	6.3	6.6	V
Vertical Free-Running Period	T <sub>V free</sub>	262	262.5	263	H
Maximum Vertical Synchronization Period	T <sub>V max</sub> Input: horizontal synchronization signal only	296.5	297	297.5	H
Minimum Vertical Synchronization Period	T <sub>V min</sub>	224.5	225	225.5	H
Vertical Blanking Pulse Width	P <sub>W VBL</sub>	20.25	20.5	20.75	H
Vertical Blanking Pulse Wave Height Value	P <sub>H VBL</sub>	7.0	7.5		V
Vertical Output Pulse Width	P <sub>W VOUT</sub>	8.25	8.5	8.75	H
Vertical Output Voltage	V <sub>OUTH</sub>	5.7	6	6.3	V
	V <sub>OUTM</sub>	4.2	4.5	4.8	V
	V <sub>OUTL</sub>			0.3	V
Vertical External Trigger Load Resistance	R <sub>TR</sub>	2.7	3.6		kΩ
Vertical Automatic Synchronization Stop Voltage	V <sub>SAS</sub>		1.9	2.4	V
Vertical Output Pulse Start V <sub>CC</sub> Voltage	S <sub>VV</sub>			4	V
Horizontal Free-Running Frequency Deviation	Δf <sub>H</sub> Deviation from 15.734kHz	–90	30	150	Hz
Dependence of Horizontal Free-Running Frequency on V <sub>CC</sub>	Δf <sub>H VCC</sub> V30 = 6.7V, reference value		2		Hz
Horizontal Pull-in Range	f <sub>H PULL</sub> Deviation from 15.734kHz	±400			Hz
Horizontal Output Pulse Width	P <sub>WH OUT</sub>	21.8	23.8	25.8	μs
Horizontal Output Pulse Phase	H <sub>PF</sub>	12			μs
	H <sub>PCEN</sub>	3.4	4.4	5.4	μs
	H <sub>PR</sub>			0	μs
Horizontal Output Pulse Start V <sub>CC</sub> Voltage	S <sub>HV</sub>		4.5	5.3	V
AFC II FBP Peak Voltage	F <sub>BPH</sub>	4.1	4.6	5.1	V
Burst Gate Pulse Delay Time	T <sub>d BGP</sub>	0.2	0.6	1.2	μs
Burst Gate Pulse Width	P <sub>W BGP</sub>	2.7	3.7	4.7	μs
VCR SW Input Voltage	V <sub>CR</sub>		1.3	2.0	V
X-ray Protector Circuit Operation Input Voltage	V <sub>HD</sub>	0.64	0.74	0.84	V
Horizontal Synchronization Detection Threshold Level	H <sub>COIN</sub>	4.2	4.5	4.8	V



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