

SANYO	No. 4361	LA7674
	Color TV Single-Chip Signal Processor for NTSC Systems (PLL Detection)	

Overview

The LA7674 improves upon the black-level, horizontal-jitter, switch-on drift performance of the single-chip LA7672 used to date. Also a single-chip IC, the LA7674 is for color TVs based on the NTSC (National Television System Committee) system with an on-chip circuit for all VIF, SIF, video, chroma and deflection signal processing.

Functions and 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 amplifier (-6dB input: 2V 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
- DC playback
- 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)

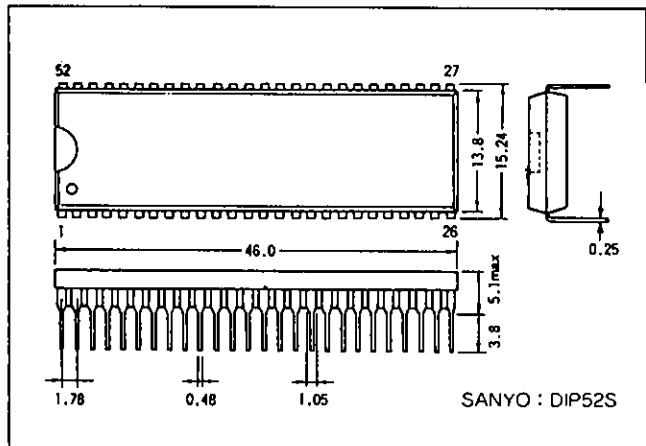
[Deflection]

- 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 etc.)
- High stability against VCR skew distortion

Package Dimensions

unit : mm

3128-DIP52S



Specifications

Absolute 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, VCC = V11 = V14 = 9 V, ICC = I30 = 13 mA

[Circuit Voltage and Current]

			min	typ	max	unit
Horizontal supply voltage	V30	VCC = 9V, ICC = 13mA	7.3	7.8	8.3	V
Supply current	I11 + 14	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	70	dB
Maximum permissible input	Vi max	VIF input level for video output at +1dB	97	104	111	dBμ
Video output detection	V044	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	61	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	12.0	MHz
920 kHz VIF intermodulation	I920	V3.58MHz/V920kHz, Vi = 80dBμ	35	42	49	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	1.5	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	4.0	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	4.0	MHz
	ΔfL	Quiescent	-4	-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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[SIF AF]							
SIF limiting voltage	$V_{i\text{ lim}}$	SIF output level for detection output at -3dB	33	40	47		dB μ
FM detection output voltage	V_{O1}	$V_i = 100\text{dB}\mu$, $\Delta f = \pm 25\text{kHz}$	440	550	670		mVrms
FM detection output distortion ratio	THD	$V_i = 100\text{dB}\mu$, $\Delta f = \pm 25\text{kHz}$	0	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	80		dB
AF amplifier voltage gain	G_{AF}	$V_i = 100\text{mVrms}$, $f = 400\text{Hz}$	18	20	22		dB
AF maximum output voltage	$V_{O6\text{ max}}$	Output level for AF amplifier output distortion at 10%	2.0	2.8	3.6		Vrms
AF electronic attenuator range	ATT	$V_i = 200\text{mVrms}$, $f = 400\text{Hz}$	70	80	100		dB
[Video]							
Black enhancement threshold	B_{STH}	APL variable	40	50	60		IRE
Maximum black enhancement gain	$BS\text{ max}$	APL variable	-35	-27	-20		IRE
Soft video tone variable range	ΔSoft	$f = 2\text{MHz}$, 100mVp-p video tone VR: 4V \rightarrow 0V	-6	-4	-2		dB
Sharp video tone variable range	ΔSharp	$f = 2\text{MHz}$, 100mVp-p video tone VR: 4V \rightarrow 9V, contrast VR: 6V	7	10	13		dB
Video voltage gain audio-visual Switch 9V	$GV9V$	$f = 100\text{kHz}$, 100mVp-p, contrast VR: 9V, video tone VR: 4V	15	18	21		dB
Video voltage gain audio-visual Switch 0V	$GV0V$	$f = 100\text{kHz}$, 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	$B R_H$	Bright VR: 2V	5.5	6.5	7.5		V
	$B R_{CEN}$	Bright VR: 4.5V	3.1	3.6	4.1		V
	$B R_L$	Bright VR: 7.5V		0.3	1.2		V
D.L. off frequency characteristics	$f_V\ 9V$	Contrast VR: 6V, video tone VR: 4V, 3dB down	7	9			MHz
D.L. on frequency characteristics	$f_V\ 0V$	Contrast VR: 6V, video tone VR: 4V, 3dB down	2.5	3	4		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	0	+2		dB
ACC phase characteristics	A_{CCP1}	+6dB	-3	0	+3		$^\circ$ C
	A_{CCP2}	-20dB	-7	0	+7		$^\circ$ C
Killer operation point	E_K		-35	-28	-21		dB
Color control color residual	$E_C\ \text{min}$	Color VR: 0V, contrast VR: 9V			50		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	$E_C\ \text{max}$	Color VR: 9V, contrast VR: 9V	3.2	4.0	4.8		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		$^\circ$ C
Tint variable range	ΔT	Tint VR: 0V \leftarrow 4.5V \rightarrow 8V, color VR: 4.5V, contrast VR: 6V	± 40	± 55	± 70		$^\circ$ C
APC pull-in range	Δf_{APC}		± 300	± 500			Hz
Demodulator output ratio	R/B	Monochrome signal, contrast VR: 6V, color VR: B - Y = 1Vp-p	0.81	0.90	0.98		
	G/B	Monochrome signal, contrast VR: 6V, color VR: B - Y = 1Vp-p	0.24	0.30	0.38		
Demodulator phase angle	RB	Monochrome signal, contrast VR: 6V, color VR: B - Y = 1Vp-p	97	105	113		DEG
	GB	Monochrome signal, contrast VR: 6V, color VR: B - Y = 1Vp-p	-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			0.05		Vp-p

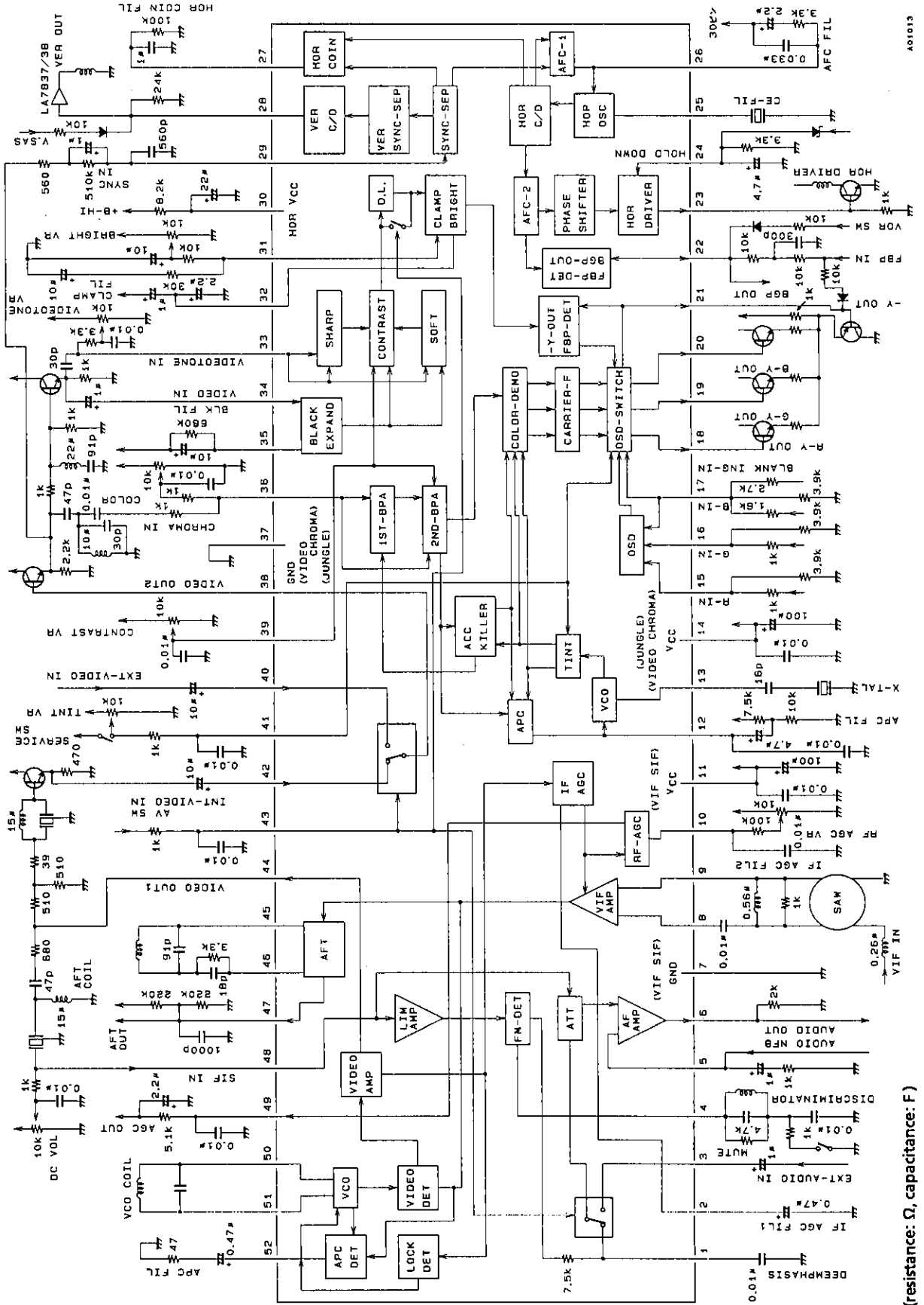
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			min	typ	max	unit
[OSD]						
Blanking pulse threshold level	TH _{BL}	C - IN: color bar, B - IN: variable	0.5	0.8	1.1	V
- Y out DC voltage (OSD mode)	V _{-Y}	B-IN : 1.5V	2.5	2.8	3.1	V
RGB - in threshold level	TH _R	R - IN: variable, B - IN: 1.5V	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	P _{H VBL}		7.0	7.5		V
Height value						
Vertical output pulse width	P _{W VOUT}		8.25	8.5	8.75	H
Vertical output voltage	V _{OUTH}		5.7	6	6.3	V
	V _{OUTM}		4.2	4.5	4.8	V
	V _{OUTL}			0.1	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}			3	4	V
Horizontal free-running frequency deviation	Δf _H	Deviation from 15.734kHz	-90	30	150	Hz
Horizontal pull-in range	f _{H PULL}	Deviation from 15.734kHz	±400	±550		Hz
Horizontal output pulse width	P _{WH OUT}		21.8	23.8	25.8	μs
Horizontal output pulse phase	H _{PF}		15	17	19	μs
	H _{PCEN}		3.4	4.4	5.4	μs
	H _{PR}		0	3	6	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	H _{COIN}		4.2	4.5	4.8	V
Threshold level						
Horizontal output current	H _{OUT}	I _{CC} = 13mA	3.8	4.7	5.5	mA

Application Circuit Example



Unit (resistance: Ω, capacitance: F)

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