

SANYO Semiconductors DATA SHEET

LA72670BM-

Monolithic Linear IC

US multiplex modulation for VCR HiFi Sound Signal Processor

Overview

The LA72670BM is a HiFi sound signal processor with a built-in US multiplex modulation for VCR.

Functions

- US multiplex modulation
- HiFi sound signal processor

Specifications

Maximum Ratings at Ta = 25°C

Parameter	Symbol	Conditions	Ratings	Unit
Maximum power supply voltage 1	$V_{\hbox{\footnotesize CC}}H$ max		9.6	٧
Maximum power supply voltage 2	V _{CC} L max		6	V
Always power supply voltage	V _{CC} A max		6	V
Allowable power dissipation	Pd max	Ta=70°C *	1300	mW
Operating ambient temperature	Topr		-10 to +70	°C
Storage ambient temperature	Tstg		-55 to +150	°C

^{*} On board: 114.3mm×76.1mm×1.6mm, glass epoxy board

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Operating Conditions at Ta = 25°C

Parameter	Symbol	Conditions	Ratings	Unit
Recommended operating	V _{CC} H		9	V
voltage 1				
Recommended operating	V _{CC} L		5	V
voltage 2				
Recommended always voltage	V _{CC} A		5	V
Allowable operating voltage 1	V _{CC} H op1		8.5 to 9.5	V
Allowable operating voltage 2	V _{CC} L op2		4.8 to 5.3	V
Allowable operating always	V _{CC} A op3		4.5 to 5.5	V
voltage				

$\textbf{Electrical Characteristics} \ at \ Ta = 25^{\circ}C, \ V_{CC}H=9V, \ V_{CC}L=5V, \ V_{CC}A=5V$

Parameter	Symbol	Conditions		Ratings		Unit
Parameter	Symbol	Conditions	min	typ	max	Unit
Current dissipation	I _{CC} R1	No signal, Inflow current at Pin 3/54		57	65	mA
REC&EE 9V		G1D8D7:00				
Current dissipation EE 5V	I _{CC} E1	No signal, Inflow current at Pin 15/32/36/46 G1D8D7:00		72	84	mA
Current dissipation REC	I _{CC} R2	No signal, Inflow current at Pin 15/32/36/46		100	115	mA
5V		G1D8D7:00, G1D4:1				
Current dissipation PB 9V	I _{CC} P1	No signal, Inflow current at Pin 3/54 G1D8D7:01		11	13	mA
Current dissipation PB 5V	I _{CC} P2	No signal, Inflow current at Pin 15/32/36/46 G1D8D7:01		85	97	mA
Current dissipation	I _{CC} AL	No signal, Inflow current at Pin 5,		1.6	2	mA
always power supply		Mute H at Pin 49				
[EE through] (LINE IN (EXT1,2,3)	to LINE OUT), EE	E mode, f=1kHz, L/R-ch				
Output level 1	V _O 1	V _{IN} =-28.2dBV, Gain1 (G3 D4:0)	-7.5	-9	-10.5	dBV
Output level 2	V _O 2	V _{IN} =-28.2dBV, Gain2 (G3 D4:1)	-6.5	-8	-9.5	dBV
Output distortion	THD	V _{IN} =-28.2dBV, Gain1, 2		0.05	0.15	%
Channel gain difference	ΔVO	V _{IN} =-28.2dBV, Gain1, 2	-1	0	1	dB
Maximum output level	V _O M	THD=1%, Gain1, 2	7	8.5		dBV
Output noise level	VNO	Rg=1kΩ, JIS-A filter, Gain1		-89	-85	dBV
Mute attenuation value	MU	V _{IN} =-18.2dBV		-91	-80	dB
Input switch cross-talk	СТ	V _{IN} =-18.2dBV		-75	-68	dB
[Normal output] (LINE IN(EXT1/2/3	B) to NORMAL OU	T(Pin 6)), EE mode, f=1kHz,G1D8D7:00	ı			I
Output level for Normal	V _O NOR	V _{IN} =-28.2dBV	-22	-21	-20	dBV
[BS through] (BS, IN to LINE OUT	Γ), f=1kHz, G2D6:	1	I			ı
Output level	V _O TH	V _{IN} =-21.2dBV, Gain1 (G3D4:0)	-10.5	-9	-7.5	dBV
[RFC output] (NORMAL IN to RF	C OUT), f=1kHz,	G2D3D4:10, G4D7:0	· I	L L		
Output level	V _O R	V _{IN} =-21.2dBV, G4D2:0	-11.0	-9.5	-8.0	dBV
Output distortion	THDR	V _{IN} =-21.2dBV, G4D2:0		0.05	0.2	%
ALC level (1)	V _O AR1	VIN=-11.2dBV, G4D2:0	-7.0	-5.5	-4.0	dBv
ALC distortion (1)	THDAR1	V _{IN} =-11.2dBV, G4D2:0		0.3	0.5	%
ALC level (2)	V _O AR2	V _{IN} = -11.2dBV, G4D2:1	-3.0	-1.5	0	dBv
ALC distortion (2)	THDAR2	V _{IN} = -11.2dBV, G4D2:1		0.3	0.5	%
[LINE AMP] (NORMAL IN to LINE	OUT), EE mode,	f=1kHz, Left channel and Right channel, G2D4D3	:10			1
Line amp gain	GVL	Gain1 mode, V _{IN} =-21dBV	11	12	13	dB
[REC system] (LINE IN to VCO O	UT), f=1kHz, G1D	4:1(REC_MODE), G1D3D2;O1(EXT1), G3D8;0(N	TSC), G4D5D	6;00		I
Free-running frequency L	f _O L	Input no signal	1.294	1.300	1.306	MHz
Free-running frequency R	f _O R	Input no signal	1.694	1.700	1.706	MHz
Standard frequency deviation L&R	DEV	V _{IN} =-28.2dBV	±46	±50	±54	kHz
Carrier output level Lch	VfoL	Non modulation	450	500	550	mVp-p
	1	-1	-			

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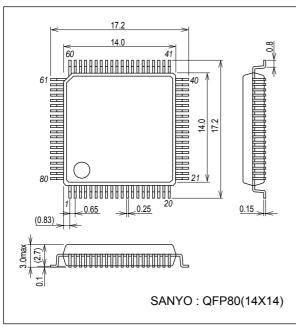
Parameter	Symbol	Conditions	T	Ratings		Unit
T dramotor	3,111001	CONTAILOR	min	typ	max	Onit
FM R/Lch MIX ratio 1	MIX1	Non modulation, VfoR/VfoL, P23:OV,P34.Measure, G3D7D6;01	7.1	7.6	8.1	dB
FM R/Lch MIX ratio 2	MIX2	Non modulation, VfoR/VfoL, P23:OV,P34.Measure,G3D7D6;00	8.1	8.6	9.1	dB
FM R/Lch MIX ratio 3	MIX3	Non modulation, VfoR/VfoL, P23:OV,P34.Measure, G3D7D6;10	9.1	9.6	10.1	dB
FM R/Lch MIX ratio 4	MIX4	Non modulation, VfoR/VfoL, P23:OV, P34.Measure, G3D7D6;11	10.1	10.6	11.1	dB
Carrier 2nd high frequency	2HD	Non modulation, To each basic frequency.		-48	-34	dB
Carrier 3rd high frequency	3HD	Non modulation, To each basic frequency.		-43	-34	dB
REC current	I _O R	P23:0V, Inflow current at P26, with current probe	34	37	40	mAp-p
Cross modulation distortion 0.4M component	CMDO4	P23:0V, Compare 0.4MHz with Rch Carrier Level		-48	-40	dB
modulation distortion 0.9M component	CMDO9	P23:0V, Compare 0.9MHz with Rch Carrier Level		-55	-40	dB
current ratio -1.5dB	I _O R-1.5dB	P23:0V G4D6D5:01(-1.5dB)	-2.3	-1.3	-0.3	dB
current ratio – 5.5dB	I _O R-5.5dB	P23:0V G4D6D5:10(-5.5dB)	-6.8	-5.8	-4.8	dB
MUTE attenuation value	I _O RMU	REC MUTE ON(Pin 17=H)			-40	dB
[FM modulation system] (PB FM	IN to LINE OUT), I	PB mode(G1D8D7;01), FM standard input=300mVp	o-p(R/Lch ratio	=1:1)		
Output level Lch	V _O PL	fc=1.3±50kHz, fm=1kHz,G=1	-11	-9	-7	dBV
Output level Rch	V _O PR	fc=1.7MHz±50kHz, fm=1kHz,G=1	-11	-9	-7	dBV
Output level difference	VDEM	fc=1.3MHz±50kHz, fm=1kHz fc=1.7MHz±50kHz, fm=1kHz Lch-Rch	-1.5	0	1.5	dB
Output distortion Lch	THDPL	fc=1.3MHz±50kHz, fm=1kHz,DIN		0.3	0.5	%
Output distortion Rch	THDPR	fc=1.7MHz±50kHz, fm=1kHz, DIN		0.3	0.5	%
[DO detector / HiFi detector] PB	mode(DO DET : fo	=1.3MHz / HiFi DET : fc=1.7MHz), G1D8D7:01		•		
DO detection level	DOC	The ratio with Standard input 300mVp-p		-26	-23	dB
DO detection hysteresis	DOCH		0.5	3	5	dB
HiFi recovery delay time	HIDEL	The delay time that is changed from NORMAL to HiFi.	110	125	140	ms
HiFi detection DC output 1	VTRS1	Pin 34 INPUT_Level=100mVp-p, 1.3MHz	2.1	2.6	3.1	V
HiFi detection DC output 2	VTRS2	Pin 34 INPUT_Level=300mVp-p, 1.3MHz	3.3	3.8	4.3	V
HiFi detection DC output 3	VTRS3	Pin 34 INPUT_Level=1Vp-p, 1.3MHz	4.3	4.8	5.3	V
NORMAL detection	NORDC	Pin 34 INPUT_Level=0mVp-p			0.4	V
DC output						
[Hold pulse occurrence] PB mod						
Hold pulse delay time	HPD	AUDIO HEAD PULSE IN	0.8	1.0	1.2	μs
Hold pulse width	HPW	AUDIO HEAD PULSE IN	7.0	8.3	9.5	μs
		MIX ratio 1:1)at Pin 31, Pin 17;2.5V, G1D8D7;01,				1
1.3MHz BPF monitor level	V13	G2D2D1;01	80	105	130	mVp-p
1.7MHz BPF monitor level	V17	G2D2D1;10	65	90	115	mVp-p
1.3MHz BPF frequency characteristics 1	L115N	Level difference between 1.15M/1.3MHz G2D2D1;01	-9	-3		dB
1.3MHz BPF frequency characteristics 2	L145N	Level difference between 1.45M/1.3MHz G2D2D1;01	-18	-8		dB
1.3MHz BPF	L155N	Level difference between 1.55M/1.3MHz		-27	-9	dB
frequency characteristics 3 1.7MHz BPF	R145N	G2D2D1;01 Level difference between 1.45M/1.7MHz		-18	-8	dB
frequency characteristics 1	K 145IN	G2D2D1;10		-18	-8	uB
1.7MHz BPF	R155N	Level difference between 1.55M/1.7MHz	-9	-3		dB
frequency characteristics 2		G2D2D1;10				
1.7MHz BPF	R185N	Level difference between 1.85M/1.7MHz	-12	-2		dB
frequency characteristics 3		G2D2D1;10				

Parameter	Symbol	Conditions	. 1	Ratings		Unit
	-		min	typ	max	
[Playback head amp system] (Pl	1	· · · · · · · · · · · · · · · · · · ·				
Voltage gain	GVP	V _{IN} =100μVp-p, f=1.5MHz, CH1&2	69	72	75	dB
Voltage gain difference CH1/CH2	ΔGVP		-2	0	2	dB
EP gain boost value	ΔGEP	V _{IN} =100μVp-p, f=1.5MHz	1	2	3.2	dB
Frequency characteristics	ΔfP	V _{IN} =100μVp-p, f=1.8M/1.0MHz, CH1&2	-3	-1	1	dB
Input conversion noise voltage	VNINP	The value(1 / GVP) of 1.1MHz LPF output level		1.7	2	μ V rms
Output DC offset	ΔV _O DC	CH1/CH2	-30	0	30	mV
[SIF system] (SIF IN to SIF OUT),	EE/REC mode					
Input level	V _I LIM	fc=4.5MHz	80	90	100	dΒμV
Output level	V _O SI	fc=4.5MHz±25kHz, fm=1kHz	420	530	660	mVp-p
Distortion	THDSI	MONO 1kHz 100% modulation		0.3	0.8	dB
S/N	SNSI	75μ De-emphasis	57	62		dB
[TV multiplex demodulation system	n] (BASE-BAND IN	to LINE OUT), EE/REC mode, L/Rch, LINE AMP	GAIN(1)			
Deviation of SIF input MONO: 30	0Hz 100%→±25kH	Z				
MONO output level	V _O MN	fm=1kHz, 100% modulation, Pre-em.ON	-8.5	-7	-5.5	dBV
Output L/R level difference	$\Delta V_{O}MN$	fm=1kHz, 100% modulation, Pre-em.ON	-1.5	0	1.5	dB
MONO distortion	THDM	fm=1kHz, 100% modulation, Pre-em.ON		0.15	0.6	%
MONO frequency characteristics 1	FCM1	fm=8kHz, 30% modulation, Pre-em.ON	-2	0	2	dB
MONO S/N	SNM	S=V _O MN, N=0% modulation, 15kHz LPF+JIS-A	57	62		dB
STEREO output level	V _O ST	fm=1kHz, 100% modulation, 15kHzLPF	-9	-7	-5	dBV
STEREO distortion	THDS	fm=1kHz, 100% modulation, 15kHz LPF		1.0	2.5	%
STEREO S/N	SNS	S=V _O ST, N=0% modulation, 15kHz LPF+JIS-A	50			dB
STEREO separation	STSE1	f=300Hz(R/L), 30%modulation, 15kHz LPF	20	25		dB
STEREO separation2	STSE2	f=3kHz(R/L), 30%modulation, 15kHz LPF	20	25		dB
Input Pilot level1 for STEREO detection	V _{IN} SD	Pilot(fH)=15.73kHz, 100%=110 mVp-p		40		%
Input Pilot level1 hysteresis for STEREO detection	HYST	Pilot(fH)=15.73kHz, 0dB=V _{IN} SD		3		dB
Stereo VCO free-running	FSTVCO	No signal, the monitor output of Pin 51 is	60.0	63	66.8	kHz
frequency SAP output level	V _O SA	measured. fm=1kHz, 100% modulation, 15kHz LPF	-10	-7	-4	dBV
SAP distortion	THDSA	fm=1kHz, 100% modulation, 15kHz LPF	-10	1.5	3.5	%
SAP S/N	SNSA	2nd+3rd harmonic distortion, 15kHz LPF S=VoSA, 100% modulation,	55	65		dB
SAP detection input level	V _{IN} SA	15kHz LPF+JIS-A SAP Carrier=5fH, 0dB=300 mVp-p	-26	-20	-15	dB
SAP detection input level SAP detection hysterisis	HYSA	SAP Carrier=5iH, 0db=300 mvp-p	-20	3	-10	dB
MODE output MONO	LEDMO	MONO:f=1kHz, 0% modulation	+	1.0	1.3	V
MODE output MONO	LEDMO	SAP:Carrier	1.7	2.0	2.3	V
•						V
MODE output STEREO	LEDST	STEREO:Pilot	2.7	3.0	3.3	
MODE output ST+SAP	LEDSS	STEREO:Pilot, SAP:Carrier	3.5	3.8	4.2	V
[Control hold voltage]	1/01					١,,
CLOCK Low voltage	VCL		0		1	V
CLOCK High voltage	VCH		2.5		V _{CC} 2	V
DATA Low voltage	VDL		0		1	V
DATA High voltage	VDH		2.5		V _{CC} 2	V
MUTE ON voltage	MON		3.0		V _{CC} 2	V
MUTE OFF voltage	MOFF		0		1.0	V
REC MUTE ON voltage	RMON		3.0		V _{CC} 2	V
REC MUTE OFF voltage	RMOFF		0		1.0	V

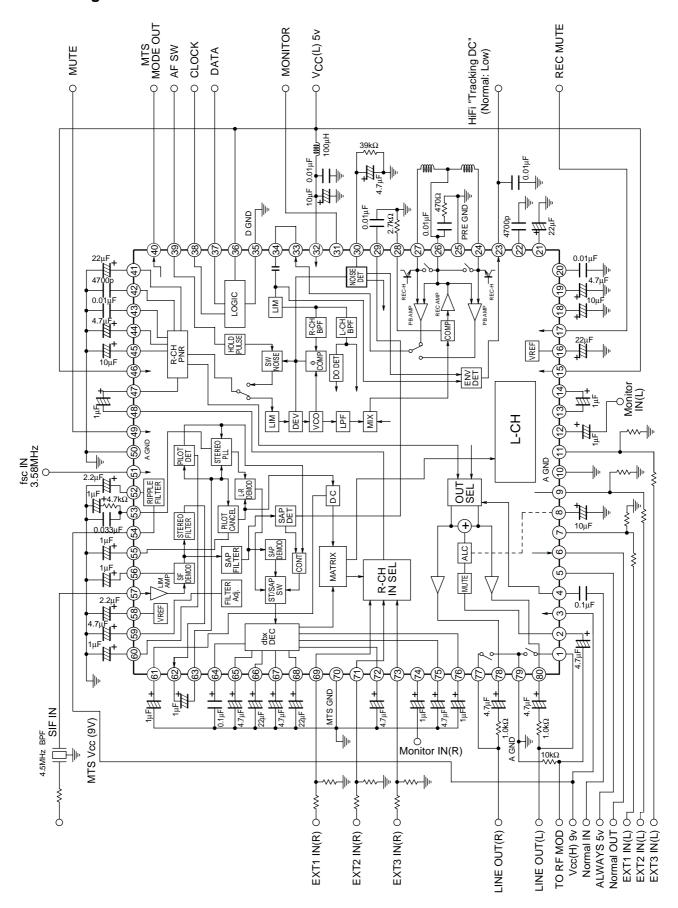
Package Dimensions

unit: mm (typ)

5255



Block Diagram



Pin Description

	Description			
Pin No.	Pin Function Name	DC voltage	Function	Equivalent circuit
No.	Line Mute terminal(L)	AC level	When the power supply V _{CC} is on, the	+
77	Line Mute terminal(R)		switch of Pin 77 and Pin 1 is turned to ON to reduce the line out noise. In this case, it is necessary to apply 5 fixed DC to Pin 5.	Pin77 Pin1 ○ \$10Ω
				/ ////
2	Output terminal for RF modulator	DC; 4.2V	Output terminal for RF modulator. ALC level can be settled to -1dBV and -5dBV by serial control.	MUTE 10kΩ
		AC; -9.5dBV		300kΩ
3	V _{CC} 9V		Power supply of Line Out.	
5	ALWAYS VCC		Power supply for the noise elimination mute control when power is on.	
15	V _{CC} 5V(Lch)		5V power supply of Lch.	
32	V _{CC} 5V		5V power supply of HEAD AMP.	
36	Power supply for Logic		Power supply for Logic.	
46	V _{CC} 5V(Rch)		5V power supply of Rch.	
54	9V power supply for MTS		9V power supply of MTS.	
4	NORMAL input terminal	DC; 2.5V	NORMAL IC output signal is entered and output to Line Out through output changeover. G4D7/ <u>0:0dB</u> 1:3dB	500Ω
		AC; -21.2dBV		CY Wost Vref
6	NORMAL output terminal	DC; 2.5V	This is connected to input of NORMAL AUDIO IC.	200Ω
		AC; -21.2dBv		Solution A
7 9 11 69	Audio input terminal EXT1_IN(L) EXT2_IN(L) EXT3_IN(L) EXT1_IN(R)	DC; 0V	Audio input terminal.	A South
71 73	EXT2_IN(R) EXT3_IN(R)	AC; -28.2dBV		500Ω WCW WCW WCW WCW WCW WCW WCW WCW WCW WC

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Pin No.	Pin Function Name	DC voltage AC level	Function	Equivalent circuit
8	ALC detection terminal for RF converter	DC;	This is ALC detector terminal for RF converter and always ready for operation.	150Ω 2kΩ 40kΩ
10 25 35 50 70 79	L-GND HEADAMP-GND LOGIC-GND R-GND MTS-GND AUDIO-GND			
74	BS monitor input terminal(L) BS monitor input terminal(R)	DC ; 2.5V AC; -21.2dBv	BS monitor input terminal	200Ω Vref W
48	Input changeover switch output(L) Input changeover switch output(L)	DC; 2.2V AC; -21.2dBv	PB/REC switch output to transform REC and PB signals into DC through a coupling capacitor.	Δηση Αμού Αμού Αμού Αμού Αμού Αμού Αμού Αμού
14	HiFi input terminal(L) HiFi input terminal(R)	DC; 2.5V AC; -21.2dBv	HiFi input terminal after passing through a coupling capacitor.	Vref REC:ON White Recion Recion Recion Recion
16	1/2 V _{CC} terminal	DC; 2.5V	$1/2\ V_{CC}$ terminal. Serially-set reset is made with the external capacitance C and internal resistance R (15k Ω) at rise of power supply. The reset time t is expressed as follows: t = -CRIn(0.2)	100kΩ 10

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Pin No.	Pin Function Name	DC voltage AC level	Function	Equivalent circuit
17	REC mute terminal	DC; Unsettled	Two levels control terminal. Hi; 3.0V to Vcc Low; 0V to 1.5V Hi: Pin 26 signal at REC is OFF(Mute).	1κΩ 1κΩ 100κΩ
18	NR waiting DET terminal(L) NR waiting DET terminal(R)	DC;	Terminal for waiting detector. The recommended external capacity is 10μF.	500Ω 500Ω W 500Ω Significant states of the states of th
19	NR waiting filter terminal1(L)	DC; 2.5V	(Pin 19,Pin 44)between GND;4.7μF	# ##
44	NR waiting filter terminal1(R)		(Pin 20,Pin 43)between GND;0.01μF	22kΩ Pin19,44
20	NR waiting filter terminal2(L) NR waiting filter	AC;		2.4kΩ Pin20,43
	terminal2(R)			\$ H H H
21	CCA reference terminal(L)	DC; 2.5V	By connecting 22μF between Pin 21, Pin 41 and GND, 4700pF between Pin 22, Pin 42 and GND, form the NR emphasis.	
22	NR emphasis terminal(L)	Pin41		30kΩ10kΩ 39kΩ 12kΩ Pin22,42
42	NR emphasis terminal(R)	AC;		Pin21,41
41	CCA reference terminal(R)			
23	HiFi/Nor selecting terminal (PB) (2)Monitor control terminal at Pin 34 (EE)	DC ;Nor at 0.1V ;HiFi at TRACKING DC AC:	In PB mode, Pin 23 becomes "TRACKING_DC" when inputting HiFi audio signal and becomes "L" when inputting Normal signal. In EE mode, this is used as the terminal for monitor control of Pin 34. Low(0 to 0.8V); VCO MIX Middle(1.4V to 3.6V); Lch VCO High(4.2V to V _{CC}); Rch VCO	500Ω 5kΩ 5kΩ 5kΩ

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Pin	Pin Function Name	DC voltage	Function	Equivalent circuit
No.		AC level		4
27	HEAD AMP input terminal (Hch) HEAD AMP input terminal (Lch)	DC PB; 2.0V REC; 4.1V	It becomes HEAD AMP input in PB mode. Hch is Pin24, and Lch is Pin 27. And, it becomes supply source of REC current in REC mode.	PB-ONO PB
26	REC CURRENT AMP output terminal	DC; 4.1V	CURRENT AMP output in REC mode. Common input terminal in PB mode.	₩ ⁴
		AC; 2.1Vp-p		REC-ON—RE
28	CURRENT AMP ADJUST terminal	AC:1.3Vp-p (L/R_MIX)	Terminal for adjusting the recording current.	13 2.7 KΩ
29	SAP detection terminal	DC;	Filter terminal in the SPA detector circuit.	3 2.5ν 3 1κΩ 1κΩ 3 1κΩ 1κΩ
30	HiFi/NORMAL detection terminal	DC: Nor; 2.5V or more HiFi; 2.2V or less	This terminal is for detecting demodulation noise and output which has passed through the primary HPF(fc=140kHz).	Pin30 200Ω 200Ω 200Ω 200Ω 200Ω 200Ω 200Ω 20

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Pin	Pin Function Name	DC voltage	Function	Equivalent circuit
No.	Fill I unction Name	AC level	i unction	Equivalent circuit
31	Monitor terminal	DC; 2.5V	FM MIX output(Low), Lch VCO(middle), Rch	+ + +
		AC;	VCO(High) can be monitored by controlling	
		800mVp-p	Pin 23 in REC mode.	 *
		(L/R MIX)	HOLD and DO pulses can be monitored by	500Ω
			Pin 17 in PB mode. BPF of Lch and Rch can be monitored by serial control	
			in PB mode (Pin 17 = 2.5V).	
			(
				\vdash
				30kΩ500Ω W•W
				%
				, — — — — — — — — — — — — — — — — — — —
	DD 444D 4 4	50.051/	0.4.4.4.1.5.1.5.1.5.1.5.1.5.1.5.1.5.1.5.1	777 777
33	PB AMP output	DC; 2.5V AC;	Output of HEAD AMP in PB mode.	
		100mVp-p to		-
		600mVp-p		100Ω
				100Ω W O
				₹ 350µA
				,,, °° ,,,
34	PB FM input terminal	DC; OPEN	Input pin of FM in PB mode.	Vṛef
		AC;		- Îg
		100mVp-p to		20k
		600mVp-p (L/R MIX)		★ 30pF
		, ,		O + + +
				30pF G
				A Andread
				2.5V Vref 777
27	Carial data innut		Ui + 2 5 // to 5 //	///
37	Serial data input terminal		Hi; 3.5V to 5V Low; 0V to 1.5V	DI4
		5V	,	
				500Ω
				ON at ACK
		0 0		A PT at ACK
				क्त क्ता क्ता
38	CLK input terminal		Hi ; 3.5V to 5V	
		5V	Low; 0V to 1.5V	S Joseph
				5000
				500Ω W
		☐ ☐ OV		
				777 777
				111 111

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Pin No.	Pin Function Name	DC voltage AC level	Function	Equivalent circuit
39	AF SW pulse input terminal	50Hz/60Hz 5V 0V	Input terminal of AF SW pulse. Hi ; 3.5V to 5V Low; 0V to 1.5V	2kΩ W C3 W TI W TI
40	MTS MODE OUT	DC;	Detection result output for M.T.S. signal. STEREO+SAP: 3.8V STEREO: 3.0V MONO+SAP: 2.0V MONO: 1.0V	200Ω And 2001 And 20
49	MUTE control terminal	DC;	Mute control terminal. Mute_ON: 3.0V to Vcc2 Mute_OFF: 0.0V to 1.0V	\$\frac{45\kappa_{\text{50k\text{0}}}}{\frac{45\kappa_{\text{0}}}{\text{50k\text{0}}}} \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\
51	FSC IN		Input terminal for FSC (3.58MHz). Recommended operating input level : 150 to 350mVp-p	10kΩ 30pF 1kΩ 30pF 1kΩ 30pF
52	PCREGBGP	DC;	Power supply terminal of M.T.S. block. This power supply does not operate in PB mode.	71.2V

	ued from preceding page.	l	T	
Pin No.	Pin Function Name	DC voltage AC level	Function	Equivalent circuit
53	STEREO PLL FILTER	DC; 3.8V	LPF terminal for STEREO PLL.	40kΩ 40kΩ 1kΩ 1kΩ 1kΩ 1kΩ 1kΩ 1kΩ 1kΩ 1
55	PILOT CANCELLER FILTER	DC; 3.8V	Control terminal of cancel signal for PILOT CANCELLER. DC voltage at this terminal is changed depending on amplitude of pilot signal, and controlled automatically to be small the pilot signal.	1kΩ 1kΩ 1kΩ 1kΩ 1kΩ 1kΩ 1kΩ 1kΩ
56	FM FILTER		Filter terminal for making stable DC voltage of FM detection output in SIF part. Normally, use a condenser of $1\mu F$. Increase the capacity value with concerning frequency characteristics of low. This terminal becomes composite signal input terminal of MTS by changing to 5V at Pin 57.	1k\(\Omega\)
57	SIF INPUT		Input terminal for SIF. The input impedance is about $1k\Omega$. Take care about pattern layout of the input circuit, because of causing buzz-beat and buzz by leaking noise signal into the input terminal. (The noise signal depending on sound is particularly video signal and chroma signal and so on. VIF carrier becomes noise signal.) Composite signal of MTS can be input by adding 5V to this terminal directly. (For test)	-V _{CC} 5V -1kΩ -1kQ -
58	REG FILT	DC; 4.5V	Filter terminal of reference voltage source.	to SIF 1kΩ block to MTS block

Contin	ued from preceding page.		1	
Pin	Pin Function Name	DC voltage	Function	Equivalent circuit
No.	Fin Function Name	AC level	Function	⊑quivalent circuit
59	FILTER AUTO ADJ	DC; 3.8V	Loop filter terminal of PLL for automatic adjusting.	40kΩ 1kΩ W 2.5V W M M M M M M M M M M M M M M M M M M
60	PILOT DET FILTER	DC; 3.8V	Detection terminal for PILOT detection circuit.	40kΩ 1kΩ 1kΩ 160kΩ
61 76	PC_DC_MO PC_OUT_DBX	DC; 3.3V	Absorbing the DC offset of signal line by external capacity.	33.5kΩ 33.5kΩ 15kΩ Viig Wiig Wiig Wiig Wiig Wiig
62	PCDCOUT	DC; 3.8V	Absorbing the DC offset of signal line by external capacity.	1000Ω W W W W W W W W W W W W W W W W W W W
63	PCDCIN	DC; 3.8V	Absorbing the DC offset of signal line by external capacity.	2000Ω W W W W W W W W W W W W W W W W W W

	ued from preceding page.	DC veltara		
Pin No.	Pin Function Name	DC voltage	Function	Equivalent circuit
64	PCDBXIN	AC level DC; 2.6V	Absorbing the DC offset of signal line by external capacity.	450kΩ 450kΩ 200Ω Vilog Vi
65	MAIN V/I CONVERT	DC; 3.8V	Converting the voltage of signal into its current by external capacity.	
67	SPE DET V/I CONVERT			
72	WID DEP V/I CONVERT			5kΩ W
66	SPECTRAL DET	DC;	Connecting terminal of smooth capacity of detection circuit for effective value.	
68	WIDE BAND DET			Δησου 25μη
75	PCDCOSPE	DC;	Absorbing the DC offset of signal line by external capacity.	300kΩ 4 ying 7///

Continued from preceding page.

Pin	Pin Function Name	DC voltage	Function	Equivalent circuit
No.	Fill I unction Name	AC level	i unction	Equivalent circuit
78	Line Out(R) terminal	DC; 4.15V		
80	Line Out(L) terminal			-W - O O O O O O O O O O O O O O O O O O
				100kΩ

Input selecting switch mode table (Switch output signal)

Sub address		0		T		2	HiFi(80Pin	HiFi(78Pin)	NORMAL OUT	Reference	
Data byte	D8	D7	D3	D2	D8	D7	Lch Output	Rch Output	(6Pin)		
1	0	0	0	0	0	0	TU L	TU R	TU L+TU R		
2	0	0	0	1	0	0	EXT1 L	EXT1 R	EXT1 L+EXT1 R		
3	0	0	1	0	0	0	EXT2 L	EXT2 R	EXT2 L+EXT2 R		
4	0	0	1	1	0	0	EXT3 L	EXT3 R	EXT3 L+EXT3 R		
5	0	0	0	0	0	1	TUL	TU R	TUL		
6	0	0	0	1	0	1	EXT1 L	EXT1 R	EXT1 L		
7	0	0	1	0	0	1	EXT2 L	EXT2 R	EXT2 L		
8	0	0	1	1	0	1	EXT3 L	EXT3 R	EXT3 L		
9	0	0	0	0	1	0	TUL	TU R	TU R		
10	0	0	0	1	1	0	EXT1 L	EXT1 R	TU R		
11	0	0	1	0	1	0	EXT2 L	EXT2 R	TU R		
12	0	0	1	1	1	0	EXT3 L	EXT3 R	TU R		
13	0	1	0	0	0	0	PB L	PB R	TU L+TU R		
14	0	1	0	1	0	0	PB L	PB R	EXT1 L+EXT1 R		
15	0	1	1	0	0	0	PB L	PB R	EXT2 L+EXT2 R		
16	0	1	1	1	0	1	PB L	PB R	EXT3 L		
17	0	1	0	0	0	1	PB L	PB R	TU L		
18	0	1	0	1	0	1	PB L	PB R	EXT1 L		
19	0	1	1	0	0	1	PB L	PB R	EXT2 L		
20	0	1	1	1	0	1	PB L	PB R	EXT3 L		
21	0	1	0	0	1	0	PB L	PB R	TU R		
22	0	1	0	1	1	0	PB L	PB R	-		
23	0	1	1	0	1	0	PB L	PB R	-		
24	0	1	1	1	1	0	PB L	PB R	-		
25	1	0	*	*	*	*	PB L	PB R	PB L+PB R	Audio-dubbing correspond	

NOTE: * is option.(1 or 0)

(US) MULTIPLEX SERIAL MODE

		SERIAL SETTING					
SIGNAL		SUB ADDRESS		(HiFi ir	Mode)	MODE-OUT	
SIGNAL	D8	D7	D6	Tuner Lch	Tuner Rch	MODE	(Pin51)
	ST/SAP	L+R/SAP	Forced MONO	(Pin13)	(Pin48)	WODE	
	1	0	0	SAP	SAP	SAP	
STEREO+SAP	0	*	0	L	R	STEREO	TYP 3.8V
STEREU+SAP	1	1	0	L+R	SAP	MULTI	117 3.60
	*	*	1	L+R	L+R	MONO	
STEREO	*	*	0	L	R	STEREO	TYP 3.0V
STEREO	*	*	1	L+R	L+R	MONO	1119 3.00
	1	0	0	SAP	SAP	SAP	
MONOLEAD	1	1	0	L+R	SAP	MULTI	TVD 2 0V
MONO+SAP	0	*	0	L+R	L+R	MONO	TYP 2.0V
	*	*	1	L+R	L+R	MONO	
MONO	*	*	*	L+R	L+R	MONO	TYP 1.0V

Output selecting switch mode table

Output selecting switch mode table											
Sub address	0 3	0 2		1	1	Line out	Line out	RF MOD OUT	Through	Through Monitor	
Data byte	D3	D6	D4	D3	D2	D1	Lch	Rch	THE MICE CO.	Monitor	RF MOD SW
1	*	0	0	0	0	0	HiFi L	HiFi R	HiFi L+HiFi R	OFF	OFF
2	*	0	0	0	0	1	HiFi L	HiFi L	HiFi L	OFF	OFF
3	*	0	0	0	1	0	HiFi R	HiFi R	HiFi R	OFF	OFF
4	*	0	0	1	0	0	MIX L	MIX R	MIXL+MIXR	OFF	OFF
5	*	0	0	1	0	1	MIX L	MIX L	MIX L	OFF	OFF
6	*	0	0	1	1	0	MIX R	MIX R	MIX R	OFF	OFF
7	*	0	1	0	0	0	NORMAL	NORMAL	NORMAL	OFF	OFF
8	*	0	1	0	0	1	NORMAL	NORMAL	NORMAL	OFF	OFF
9	*	0	1	0	1	0	NORMAL	NORMAL	NORMAL	OFF	OFF
10	0	1	*	*	0	0	BS L	BS R	BS L+BS R	BS	ON
11	0	1	*	*	0	1	BS L	BS L	BS L	BS	ON
12	0	1	*	*	1	0	BS R	BS R	BS R	BS	ON
13	1	1	0	0	0	0	BS L	BS R	HiFi L+HiFi R	BS	OFF
14	1	1	0	0	0	1	BS L	BS R	HiFi L	BS	OFF
15	1	1	0	0	1	0	BS L	BS R	HiFi R	BS	OFF

^{1. *} is option.(1 or 0)

Through_Monitor SW Table

	G2D6	G3D3	G1D1	G2D4D3	LINE(L)	LINE(R)	RFC_OUT
EE_MODE	1	0	-	00	Monitor(L)	Monitor(R)	Monitor_MIX
	1	1	-	00	Monitor(L)	Monitor(R)	INSEL_MIX
	0	1	-	00	INSEL(L)	INSEL(R)	INSEL_MIX
	0	0	-	00	INSEL(L)	INSEL(R)	INSEL_MIX
PB_MODE	1	0	-	00	Monitor(L)	Monitor(R)	Monitor_MIX
	1	1	-	00	Monitor(L)	Monitor(R)	PB_MIX
HiFi_Tape	0	1	-	00	PB(L)	PB(R)	PB_MIX
	0	0	-	00	PB(L)	PB(R)	PB_MIX
PB_MODE	1	0	0	00	Nor	Nor	Nor
	1	1	0	00	Monitor(L)	Monitor(R)	Nor
Nor_Tape	0	1	0	00	Nor	Nor	Nor
	0	0	0	00	Nor	Nor	Nor
	1	0	1	00	Monitor(L)	Monitor(R)	Monitor_MIX

Note: When output Monitor to RFC_OUT at Nor_Tape replayed (G2D6:1,G3D3:0), Set G1D1(HiFi auto Distinction) to 1 and select G2D4D3:00 (HiFi).

^{2.} MIX L=HiFi L+NORMAL, MIX R=HiFi R+NORMAL

Serial data specification ($I^2C\ BUS\ communication$)

	Data byte (Underline is initial setting.)									
Address	MSB							LSB		
	D8	D7	D6	D5	D4	D3	D2	D1		
(0 1)	EE/PB/ Audio-dubbing		LINE OUT	Fixed 0	REC/EE	Input source	e selection	Auto HiFi DET		
00000001	<u>00:EE</u>		MUTE		٥.٢٢	00.71	INED	0:ON		
		<u>EE</u> PB	0:OFF		<u>0:EE</u> 1:REC	-	<u>00:TUNER</u> 01:EXT1			
		-dubbing	1: ON		1.KLO	10:E		1:OFF		
		J. T. J.				11:E				
(0 2)	Normal Input r	node selection	Trough Monitor	Fixed 0	Output mod	l de selection	Output chan	nel selection		
00000010	001.0	- 14D/	BS							
	·	R MIX Lch	0:OFF			<u>HiFi</u> MIX	· · · · · · · · · · · · · · · · · · ·	EREO		
		U(R)	1:ON		-		01:L-ch 10:R-ch			
	10.1	O(IV)	1.014		(HiFi+NOR) 10:NORMAL		16.11.6.1			
(0 3)	VCO carrier	carrier REC FM MIX		DO	LINE OUT	Through monitor	HiFi DET	HiFi DET		
00000011	(MHz)			ON/OFF	Signal level	RFC SW	selection	selection		
		00:9dB								
	00:1.3/1.7	·	8dB	<u>0:ON</u>	0:-9dBv	0:ON	0:TYP	0:TYP		
	01:1.4/1.8		0dB 1dB	1:OFF	1:-8dBv	1:OFF	1:+10%	1:-10%		
			T							
(0 4)	SAP_Gain	NORMAL	REC current L	evel selection	NORMAL	fsc	RF MOD ALC	Fixed 0		
00000100	<u>0:0dB</u> 1:2dB	INPUT Gain	00:0	NdP	OUT MUTE	(MHz)	level			
	1.205	<u>0:0dB</u>		1.5dB	0:OFF	0:3.58	<u>0:-5dBv</u>			
		1:3dB		55dB	1:ON	1:4.43	1:-1dBv			
(0 5)	ST/SAP	SAP/(L+R)	Forced MONO	MTS	EP/SP	Fixed 0	Fixed 0	Fixed 0*1		
00000101				MUTE						
	<u>0:ST</u>	0:SAP	0:OFF	0:OFF	0:SP					
	1:SAP	1:L+R	1:ON	1:ON	1:EP					
00000110			<u> </u>	Use in investigat	I ting the shipment	1		<u>l</u>		
00000111					ting the shipment					

Note 1: When FSTVCO is measured, D1 in address 00000101 is set to 1.

Note 2: Address 00000110 and 00000111 are used in investigating the shipment, please send "0" data to all bits at refreshing. the data.)

I²C BUS serial interface specification

(1) DATA TRANSFER MANUAL

This IC adopts control method(IIC-BUS) with serial data, and controlled by two terminals which called SCL(serial clock) and SDA (serial data). At first, set up the condition of starting data transfer*1, and after that, input 8 bit data to SDA terminal with synchronized SCL terminal clock. The order of transferring is first, MSB (the Most Scale of Bit), and save the order. The 9th bit takes ACK (ACKnowledge) period, during SCL terminal takes "H", this IC pull down the SDA terminal. After transferred the necessary data, two terminals lead to set up and of data transfer stop condition*2, thus the transfer comes to close.

As a part of transfer data write down to internal memory (V latch system), internal control doesn't change just after the transfer.

- *1 Defined by SCL rise down SDA during 'H' period.
- *2 Defined by SCL rise up SDA during 'H' period.

(2) TRANSFER DATA FORMAT

After transfer start condition, transfers slave address(1110100*) to SDA terminal, next, sub address(0000****), control data* 3 , then, stop condition(See figure 1). And this LSI have a auto address increment function, then, next of slave address transfer, transfer sub address(n)* 4 , group (n) data, after that, group (n+1) and so on.

Data works with all of the bit, transfer the stop condition before stop 8bit transfer, and to stop transfer, it will be canceled only the data of group.

- *3 There are 1 to 5 groups.
- *4 Pointed date by sub address becomes group No. of next control data.

Fig.1 DATA STRUCTURE "WRITE" mode

START	Slave	R/W ACK	Sub Address(n) ACK	Control data(n) ACK	control data(n+1) ACK	 STOP condition
Condition	Address	<u>L</u> *5				

^{*5} It is called R/W bit.

data-1 means data for group-1, data-2 means data for group-2.

(3) INITIALIZE

This LSI is initialized for circuit protection.

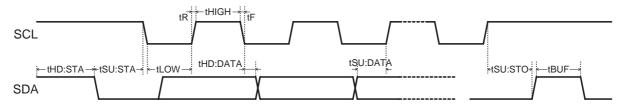
The initialization period is decided Pin 16 capacity value by internal impedance $15k\Omega$, and shown with $t = -CR \times Ln(0.2)$. Data cannot be accepted for this period.

t = 530ms at $C = 22\mu F$. In this case, Please transmit data in consideration of the uneven after about 700ms.

(4) SERIAL INPUT SIGNAL FORMAT

Parameter	Symbol	min	max	unit
LOW level input voltage	VIL	-0.5	1.5	V
HIGH level input voltage	VIH	3.0	5.5	V
LOW level output current	IOL	-	3.0	mA
SCL clock frequency	fSCL	0	100	kHz
Set-up time for a repeated START condition	tSU:STA	4.7		μS
Hold time START condition. After this period, the first clock pulse is generated	tHD:STA	4.0		μS
LOW period of the SCL clock	tLOW	4.7		μS
Rise time of both SDA and SDL signals	tR	0	1.0	μS
HIGH period of the SCL clock	tHIGH	4.0	-	μ\$
Fall time of both SDA and SDL signals	tF	0	1.0	μ\$
Data hold time:	tHD:DAT	0	-	μS
Data set-up time	tSU:DAT	250	-	ns
Set-up time for STOP condition	tSU:STO	4.0	-	μ\$
BUS free time between a STOP and START condition	tBUF	4.7	-	μ\$

(5) Definition of timing



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