CXA1791M/N

RF Amplifier for CD Players

Description

The CXA1791M/N is an IC developed for compact disc players. This IC incorporates an APC circuit and amplifiers for 3-spot optical pick-up output, focus error, and tracking error.

Features

- · Low power consumption (40mW at ±2.5V).
- · Supports the RF amplifier at double speed.
- · APC circuit.
- Operates at dual ±5V power supply or single +5V power supply.
- The gains for APC circuit and each amplifier are interchangeable with these of the CXA1571.

Absolute Maximum Ratings

 Supply voltage 	Vcc-VEE	12	V
 Operating temperature 	Topr	-20 to +85	Ç
 Storage temperature 	Tstg	-65 to +150	°C
 Allowable power dissipation 	PD (SOP)	600 n	ηW
	(SSOF	r) 375 n	nW

Operating Conditions

Supply voltage Vcc-VEE 3.0 to 11.0 V

CXA1791M CXA1791N 20 pin SOP (Plastic) 20 pin SSOP (Plastic)

Functions

- · RF amplifier
- · Focus error amplifier
- · Tracking error amplifier
- · APC circuit

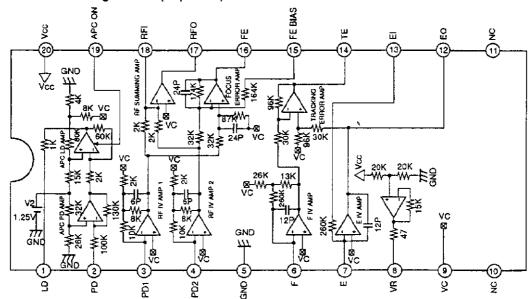
Applications

Compact disc players

Structure

Bipolar silicon monolithic IC

Block Diagram and Pin Configuration (Top View)



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Pin Description

Pin No.	Symbol	1/0	Equivalent circuit	Description
1	LD	0	1 + K	APC amplifier output.
2	PD	l	2 100K	APC amplifier input.
3 4	PD1 PD2	! }	3 4 100 µ	Inversion input for RF I-V amplifiers. Connect these pins to the photodiode A+C and B+D pins respectively. Input the current.
6 7	FE	 	12P 260K 7	Inversion input for F and E I-V amplifiers. Connect these pins to the photodiode F and E respectively. Input the current.

Pin No.	Symbol	I/O	Equivalent circuit	Description
8	VR	0	8 143 ₹ 143 ₹	(Vcc+Vee)/2 DC voltage output.
9	vc	I		Center voltage input for VC. Connect this pin to GND for dual ±5V power supply; to VR pin for single 5V power supply.
12	EO	0	96К W 12Р 10 µ	Monitoring output for I-V amplifier E.
13	EI		250K W	Gain adjustment for I-V amplifier E.

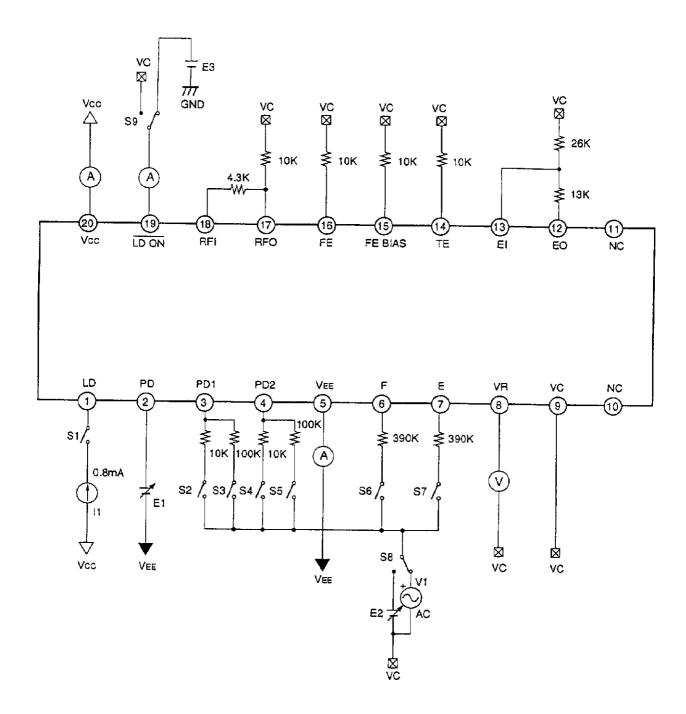
Pin No.	Symbol	1/0	Equivalent circuit	Description
14	TE	0	96K W	Tracking error amplifier output. Outputs the E-F signal.
15	FE-BIAS		32K 164K 24P 174K 10 µ	Bias adjustment for inverted side of focus error amplifier.
16	FΕ	0	16 24P W 174K	Focus error amplifier output.
17	RFO	0	17	RF amplifier output.

Pin No.	Symbol	1/0	Equivalent circuit	Description
18	RFI	l	2K WH 2K WH 200 μ 18	Inverted side input of RF amplifier. RF amplifier gain is determined by the resistor connected between this pin and RFO pin.
19	LD-ON	1	19 40K ¥ 8K W W	APC amplifier ON/OFF switching. ON for GND; OFF for Vcc

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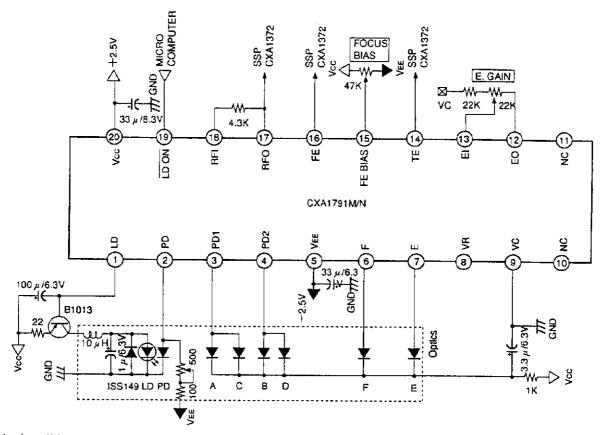
ect	rica	Electrical Characteristics													+1	±2.5V power supply (Vcc=2.5V, Vee=-2.5V, VC=GND)	cc=2.5V	', Vee=-	2.5V, V(=GND)
Measure- ment		Measurement	Chambo			SW	ပြ	SW Conditions	ons			Bia	Bias conditions	Suc	Measure-	Ğ	3	ļ ļ		11
ું ફ		item	oyiii Do	-	2	က	4	5 6	_	80	6	딥	E2	E3	point	waverorm and measurement method	<u></u>	.yp.	Max.	
,	Ç	Current	၁၁			_						Vacob			20	Vcc=2.5V, VEE=-2.5V,	ı	8.0	12.0	4
2	ರ	comsumption	33			<u> </u>	<u> </u>		<u> </u>			20000			ည	TVC=0V The followings are the	-12.0	-8.0	1	<u> </u>
က		Offset voltage 1	V17-1				\vdash	_	ļ			20			12	same as above conditions.	-20	0	50	Λm
4	əitil	Voltage gain	V17-2		Ť	0	۲	0	<u> </u>	0	<u> </u>					V ₁ =2kHz, 400mVpp	5.1	8.1	11.1	gg
5	ame	Frequency response	FV17-2		Ť	0	\mathcal{C}	0	<u> </u>	0						V1=3MHz, 400mVpa, ratio to V172	က	1	I	æ
9	3 4 8	Maximum output amplitude H	V17-3		0				ļ				0.6V				1.7		I	>
7		Maximum output amplitude L	V17-4			Ť	0			<u> </u>			-0.6V		-	•	1		-1.3	>
8		Offset voltage	V16-1												16		-120	0	120	λm
6	19i	Voltage gain 1	V16-2		~	0				0						V/14L1- 2000-1/20	7.0	10.0	13.0	쁑
9	tilqr	Voltage gain 2	V16-3				<u> </u>	0		0	<u> </u>					עקטווועאן אַבטווועף אָן	7.0	10.0	13.0	æ
=	_ gu	Voltage gain difference	V16-4											-		V17-4=V17-2-V17-3	-3.0	0	3.0	용
12	F	Maximum output amplitude H	V16-5			<u> </u>	0						Λε'0				2.0	1	i	>
5		Maximum output amplitude L.	V16-6		0								νε.ο		-		1	ı	-2.0	>
14		Offset voltage 1	V14-1												14		09-	0	20	m/
15	19i	Voltage gain 1	V14-2					0		0						Vi-14H- 200m)/cm	7.0	10.0	13.0	8
16	tilqn	Voltage gain 2	V14-3						0	0						אין=וארוב, אסטווועקען	0.7	10.0	13.0	8
4	_ su	Voltage gain difference	V14-4													V1-4=V15-2-V15-3	-3.0	0	3.0	æ
8	<u> </u>	Maximum output amplitude H	V14-5					의					2.0V				2.0	ļ	ı	>
19		Maximum output amplitude L	V14-6						0			*	2.0V		-		1	1	-2.0	>
20		Output voltage 1	V1-1								0	69mV		0.5V	1		1	-1.6	-0.9	>
2	; ;	Output voltage 2	V1-2								0	123mV					-1.2	0.1	1.4	>
22	J4A	Output voltage 3	V ₁₋₃								0	177mV		>			8.0	2.1	ı	>
23	· 	Output voltage 4	V.4			\dashv					0	00		4.5V			2.1	2.3	ı	>
24		Output voltage 5	V ₁₋₅	0							0	00		0.5V	-	I1=0.8mA		1	0	>
25	19fn9Q 19fligms	Output voltage 1	V8-1								<u> </u>				8	Vcc=2.5V VEE=-2.5V VC=0V	-100	0	100	λm
						1				1										

Electrical Characteristics Measurement Circuit

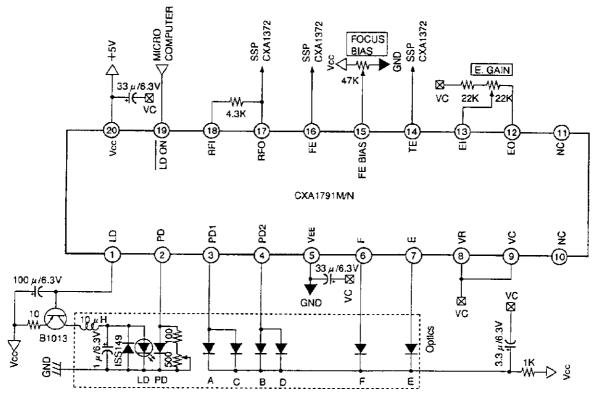


Application Circuit

• For dual ±2.5V power supply



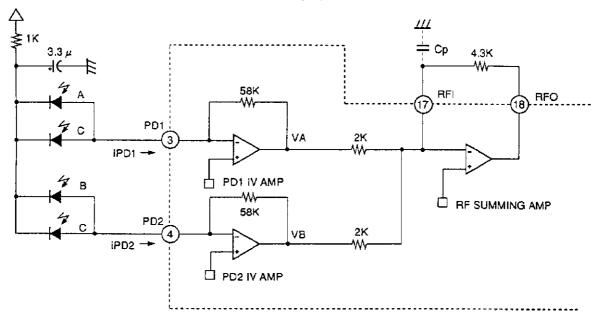
• For single +5V power supply



Description of Functions

RF Amplifier

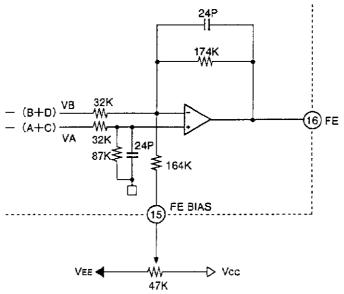
The photodiode current input to input pins (PD1, PD2) is I-V converted at the $58k\Omega$ equivalent resistors, respectively. Then, it is added at the RF summing amplifier and I-V converted output voltage of photodiode (A+B+C+D) is output to RFO pin. This pin can check the eye-pattern.



The frequency response of RF output signal can be equalized by adding the capacitor (Cp) to RFI pin. The low frequency component of RFO output voltage is as follows: $V_{RFO}=2.15 \times (V_{A}+V_{B})$ =124.7k $\Omega \times (iPD1+iPD2)$

Focus Error Amplifier

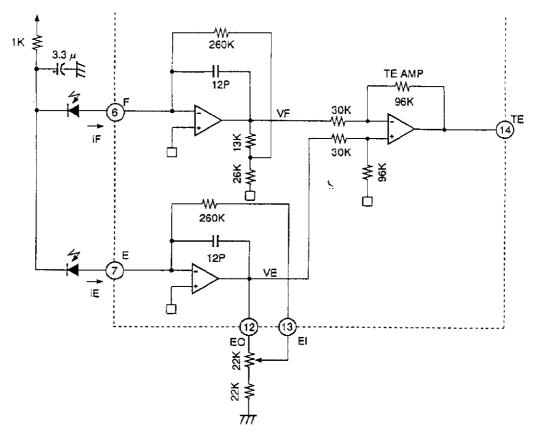
The difference between RF I-V amplifier outputs VA and VB is obtained, and the I-V converted voltage of photodiode (A+B-C-D) is output.



FE output voltage (low frequency component) is as follows: VFE=5.4 x (VA-VB) = (iPD2-iPD1) x 315k Ω

Tracking Error Amplifier

The photodiode current input to E and F pins is I-V converted at F IV amplifier.

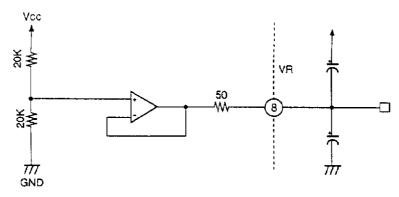


VE and VF difference is obtained at the tracking error amplifier.

VFE =(VE-VF) x 3.2
=(iF-iE) x 1290k
$$\Omega$$

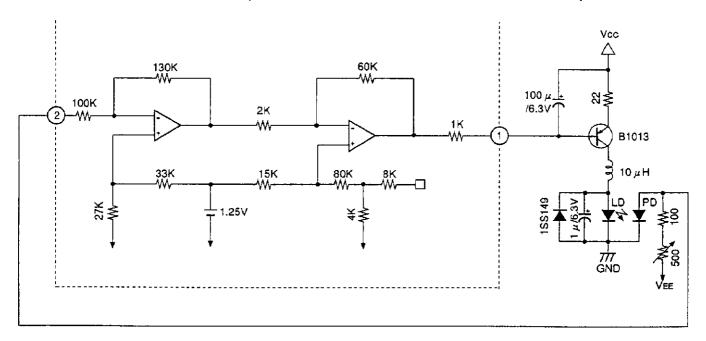
Center Voltage Generation Circuit

The center voltage, used for this IC at single power supply, is supplied. The output impedance is approximately 50Ω .



APC Circuit

When driving a constant current, the optical power output by the laser diode possesses large negative temperature characteristics. Therefore, the current must be controlled with the monitor photodiode to ensure the output remains constant. When LD ON pin is connected to GND, APC is ON; connected to Vcc, it is OFF.



Notes on Operation

1. Power supply

The CXA1791 can be used at dual power supply or single power supply. The connection of power supply for each case is as follows:

	Vcc	VEE	VR	vc
Dual power supply	+power supply	-power supply	OPEN	GND
Single power supply	Power supply	GND	VC	VR

2. RF amplifier

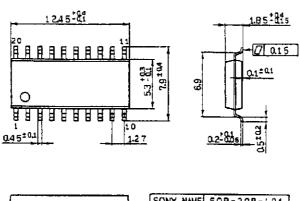
Wiring for PD1 and PD2 input pins should be as short as possible because they are high-impedance. RF band narrows through the capacitance between RFO and RFI.

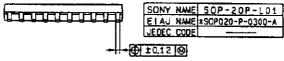
Package Outline

Unit: mm

CXA1791M

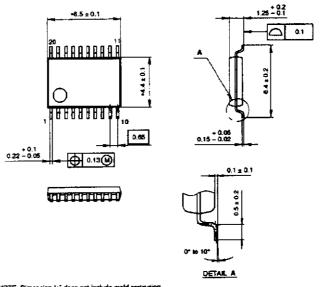
20pin SOP (Plastic) 300mil 0.3g





20PIN SSOP (PLASTIC)

CXA1791N



NOTE: Dimension "+" does not include mold protrusion.

		PACKAGE MATERIAL	EPOXY RESIN
SONA CODE	55OP-20P-L01	LEAD TREATMENT	SOLDER / PALLADIUM PLATING
EIAJ COOE	SSOP020-P-0044	LEAD MATERIAL	42/COPPER ALLOY
JEDEC CODE		PACKAGE MASS	0.1g

NOTE: PALLADIUM PLATING

This product uses S-PdPPF (Sony Spec.-Palladium Pre-Plated Lead Frame).

PACKAGE STRUCTURE

This datasheet has been downloaded from:

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Datasheets for electronic components.