HA12088ANT, HA12090NT, HA12091AMP

T-77-21

Dolby™ B-C Type Noise Reduction System

Description

The HA12088ANT/HA12090NT/HA12091AMP silicon monolithic bipolar integrated circuit provides dual channel Dolby B-C Type noise reduction within one package. ('Dolby' is a trademark of Dolby Laboratories Licensing Corporation).

The HA12088ANT/HA12090NT/HA12091AMP reduces the level of background noise produced during recording and playback of audio signals on magnetic tape.

The HA12088ANT/HA12090NT/HA12091AMP is available only to licensees of Dolby Laboratories Licensing Corporation.
Licensing and application information may be obtained from Dolby Laboratories Licensing Corporation.

Functions

- Dual Dolby B-C Type NR processors
- Programmable line out level
- MPX filter drive circuit

Features

- Few external components required
- Two package types (DP-42SA, MP-44)
- Wide supply voltage range: 7.5 V to 16 V

HA12088NT, HA12090NT



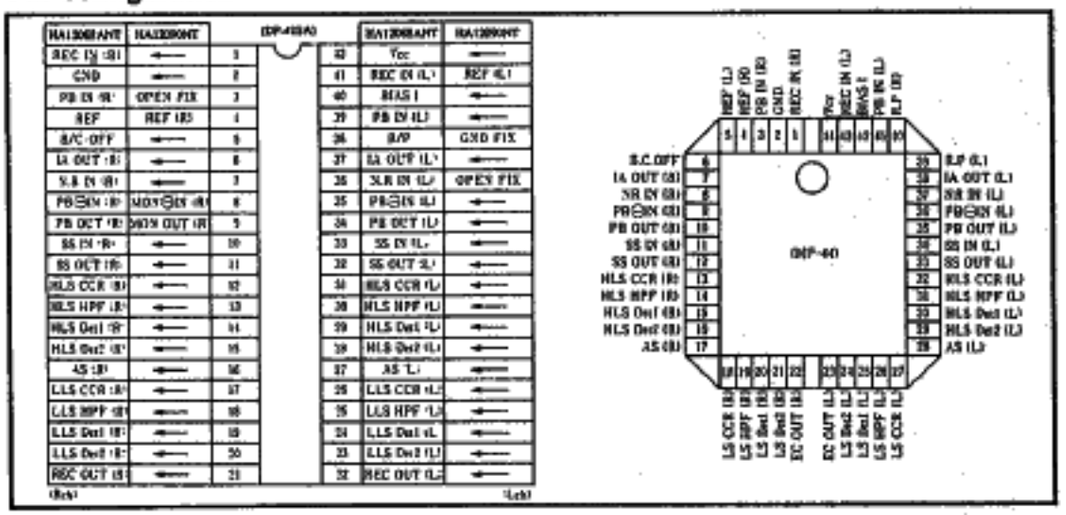
(DP-42SA)

HA12091MP

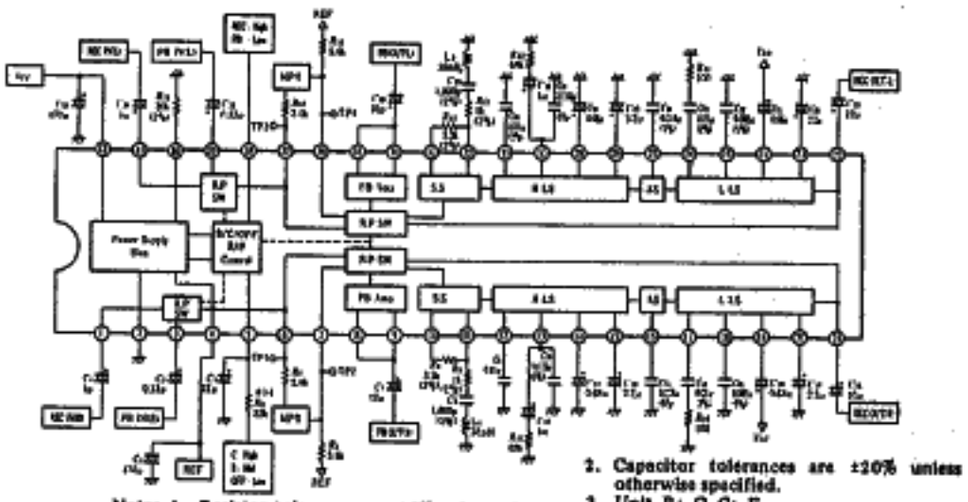


(MP-44)

Pin Configuration



Block Diagrams



Notes 1. Resistor tolerances are ±5% unless otherwise specified.
2. Capacitor tolerances are ±20% unless otherwise specified.
3. Unit R: Ω C: F
4. 22k at 10V to 16V, 12k at 7.5V to 16V.

Figure 1 HA12088ANT Block Diagram with External Components (Normal Use)

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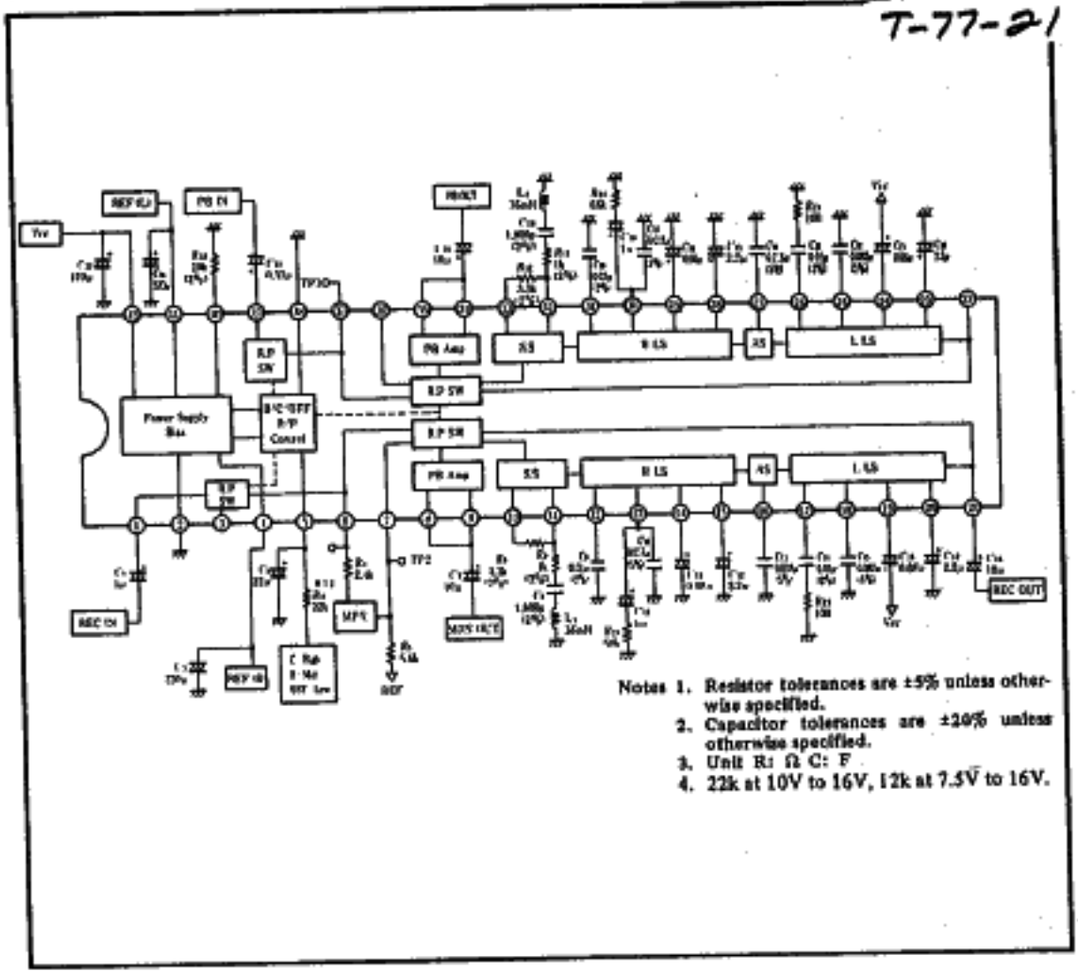


Figure 2 HA12090NT Block Diagram with External Components

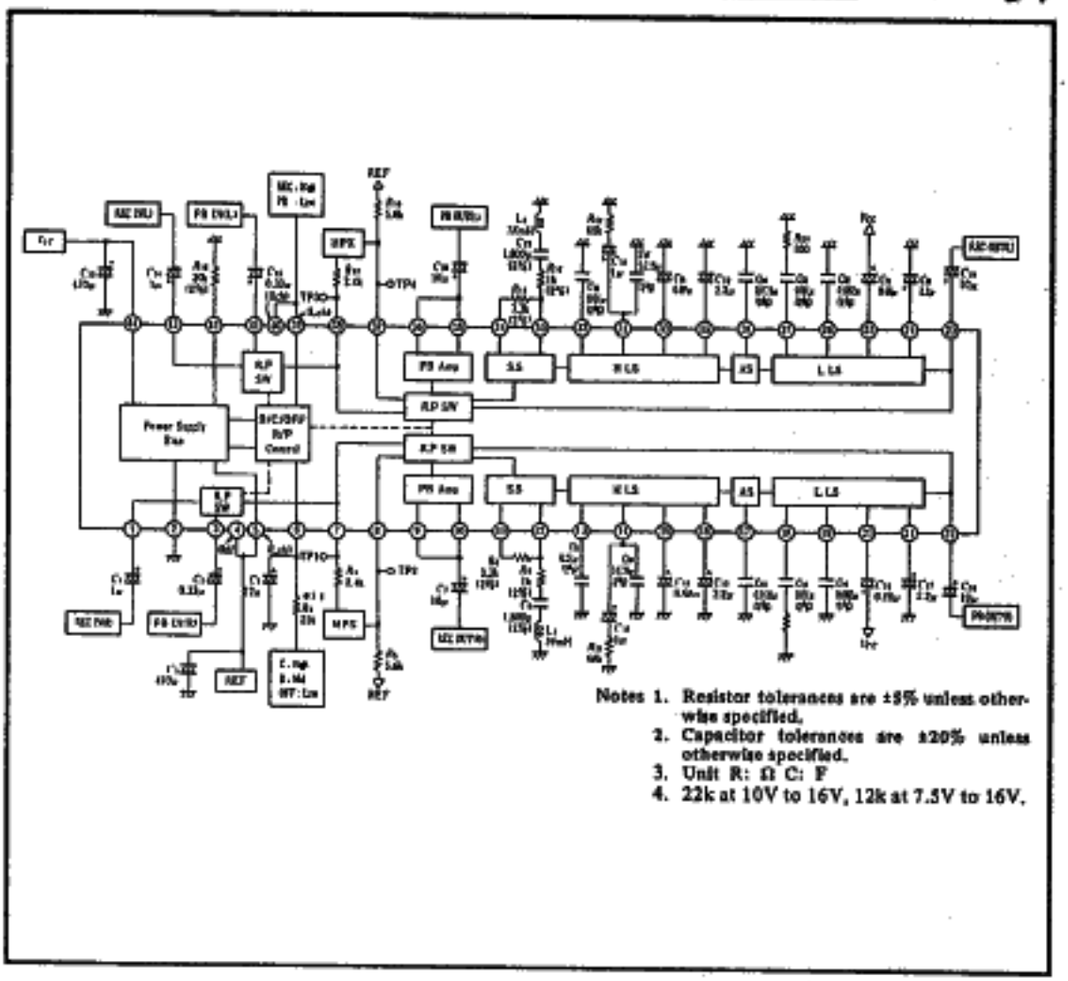
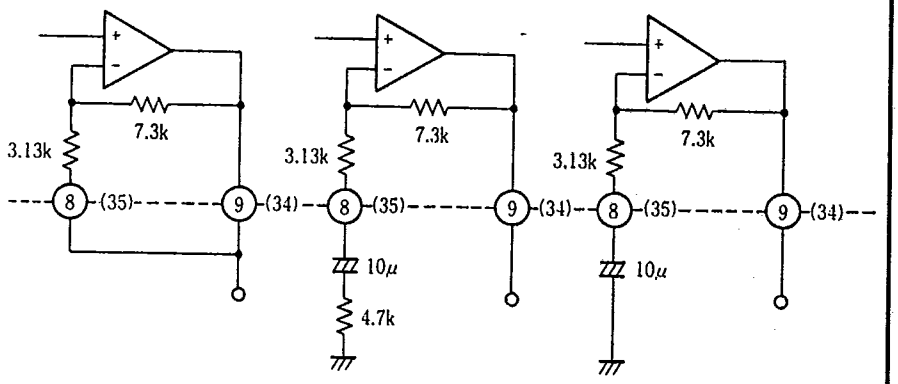


Figure 3 HA12091AMP Block Diagram with External Components

Table 1 HA12088ANT/HA12090NT/HA12091AMP Functions T-77-21

Functions	HA12088ANT	HA12090NT	HA12091AMP
Applications	For normal use	For 3 head-type use	For normal and 3 head-type use
Package	DP-42S	DP-42S	MP-44
Channels	2-ch	L-ch PB FIX R-ch Rec FIX	2-ch
Encode/decode switch	L-ch common R-ch	L-ch PB FIX R-ch Rec FIX	L-ch separate R-ch
Reference	L-ch common R-ch	L-ch separate R-ch	L-ch separate R-ch
B NR/C NR/NR off switch	L-ch common R-ch	L-ch common R-ch	L-ch common R-ch
Input (Rec/PB) switch	L-ch common R-ch	L-ch PB FIX R-ch Rec FIX	L-ch separate R-ch
MPX drive	Built-in	Built-in	Built-in
Programmable output (see note)	Built-in	Built-in	Built-in

Note: The circuit shown in the block diagram gives a reference output level of 300 mV. By using the circuit configurations shown in figure 4, it is possible to select a higher line of output levels.



Output level (approximate)	300 mV	580 mV	1 V
Operating voltage	7.5–16 V	9.5–16 V	15–16 V

Figure 4 Circuit Configuration Diagrams

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Absolute Maximum Ratings (Ta = 25°C, unless otherwise specified)

Item		Symbol	Rating	Unit
Supply voltage		$V_{CC(max)}$	16	V
Lead temperature (10 s soldering)		T_l	260	°C
Power dissipation	(DP-42S)	P_T	1111	mW
($T_a \leq 70$°C)	(MP-44) (see note)		940	
Operating temperature		T_{opr}	−20 to +70	°C
Storage temperature		T_{stg}	−55 to +125	°C

Note: On a 40 mm square ceramic board

Electrical Characteristics

Ta = 25°C, V_{CC} = 14 V, unless otherwise specified
Dolby level = 300 mV_{rms} at TP (Rec: TP2, TP4, PB: TP1, TP3)

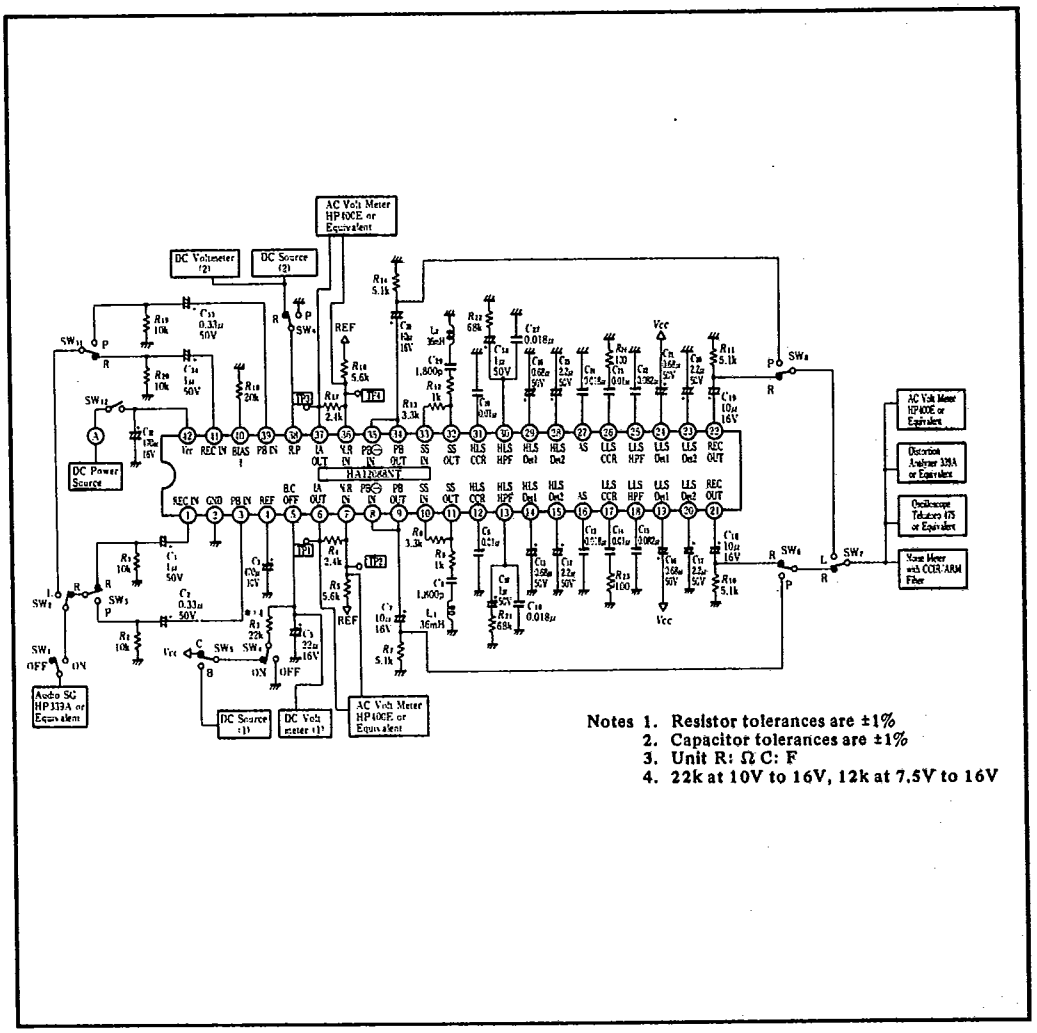
						Test Conditions			
Item	Symbol	Min	Typ	Max	Unit	R/P	NR	f(Hz)	other
Operating voltage	V_{opr}	7.5	—	16	V	—	—	—	
Quiescent current	I_{CC}	—	22	—	mA	R	off	—	No signal
Input amp gain	G_V(IA Rec)	—	18.6	—	dB	R	off	1 k	
	G_V(IA PB)	—	20.0	—		P	off	1 k	
B-type NR encode boost	B-ENC-2K	2.8	4.3	5.8		R	B	2 k	V_{in} = −20 dB
	B-ENC-5K	1.7	3.2	4.7		R	B	5 k	V_{in} = −20 dB
C-type NR encode boost	C-ENC-1K(1)	3.9	5.9	7.9		R	C	1 k	V_{in} = −20 dB
	C-ENC-1K(2)	18.1	19.6	21.6		R	C	1 k	V_{in} = −60 dB
	C-ENC-700	9.8	11.8	13.8		R	C	700	V_{in} = −30 dB
B-type NR decode cut	B-DEC-2K	−5.8	−4.3	−2.8		P	B	2 k	V_{out} = −20 dB
	B-DEC-5K	−4.7	−3.2	−1.7		P	B	5 k	V_{out} = −20 dB
C-type NR decode cut	C-DEC-1K(1)	−7.9	−5.9	−3.9		P	C	1 k	V_{out} = −20 dB
	C-DEC-1K(2)	−21.6	−19.6	−18.1		P	C	1 k	V_{out} = −60 dB
Signal handling	$V_{O(max)}$	12	13	—		R	off	1 k	THD = 1%, V_{CC} = 7.5 V
Signal-to-noise ratio at encode (C-type)	S/N(ENC)	61	65	—		R	C	—	R_g = 10 kΩ, CCIR/ARM

Electrical Characteristics (cont)

Item	Symbol	Min	Typ	Max	Unit	Test Conditions R/P	NR	f(Hz)	other
Total harmonic distortion	THD (off)	—	0.03	0.15	%	R	off	1 k	V_{in} = 0 dB
	THD(C)	—	0.09	0.3		R	CF	1 k	V_{in} = 0 dB
NR off frequency response	Off-FR	—	–0.4	—	dB	R	off	20 k	V_{in} = 0 dB
Crosstalk between Rec-PB	CT(R ⇒ P)	—	72	—		P	off	1 k	V_{in} = 0 dB
	CT(P ⇒ R)	—	80	—		R	off	1 k	V_{in} = 0 dB
Crosstalk between channels	CT(L ⇔ R)	—	70	—		R	off	1 k	V_{in} = 0 dB
Control voltage for Rec-PB	V_{cont}(Rec)	6.7	—	7.3	V	—	—	—	—
	V_{cont}(PB)	0	—	1.0					
Control voltage for B-C and NR OFF	V_{cont}(C)	9.0	—	14					
	V_{cont}(B)	6.0	—	6.8					
	V_{cont}(Off)	0.5	—	4.0					
Ripple rejection ratio	R.R.R.	—	32	—	dB	R	C	100	—

HA12088ANT Test Circuit

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Notes 1. Resistor tolerances are ±1%
2. Capacitor tolerances are ±1%
3. Unit R: Ω C: F
4. 22k at 10V to 16V, 12k at 7.5V to 16V

Figure 5 HA12088ANT Test Circuit

Typical Performance Curves

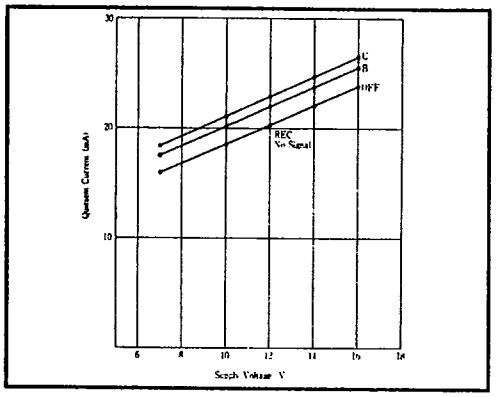


Figure 6 Quiescent Current vs Supply Voltage

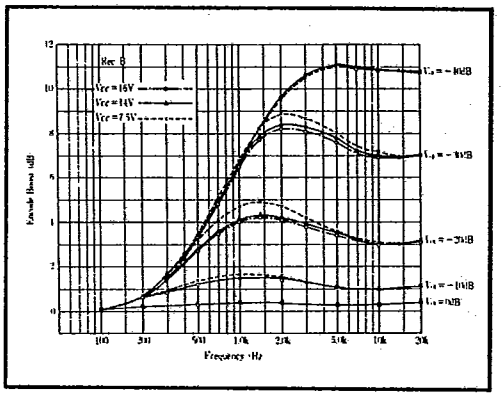


Figure 7 B-Type NR Encode Boost vs Frequency

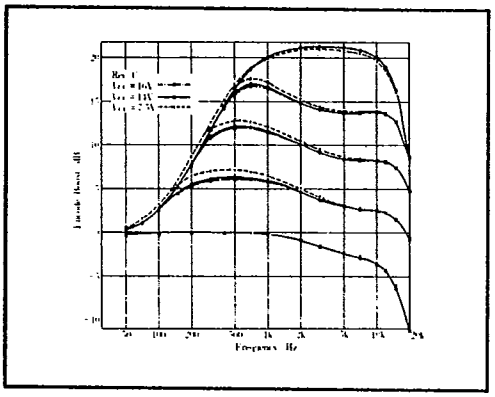


Figure 8 C-Type NR Encode Boost vs Frequency

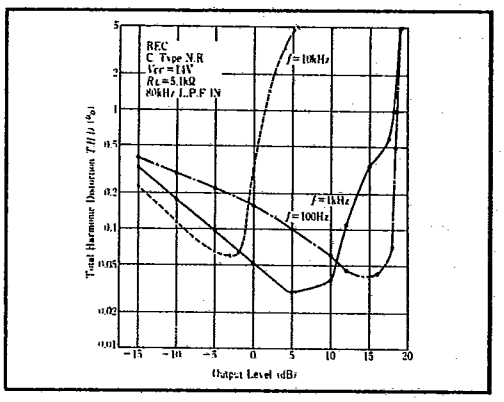


Figure 9 REC (Recording) C-Type NR Total Harmonic Distortion vs Output Level

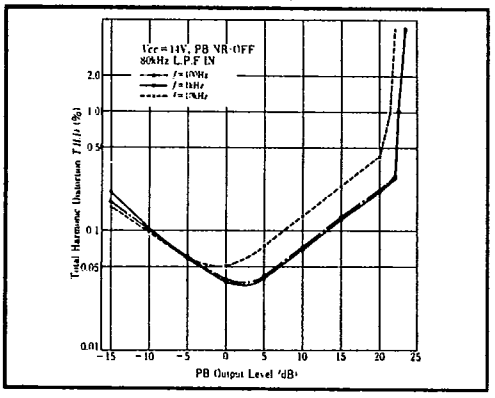


Figure 10 REC NR Off Total Harmonic Distortion vs Output Level

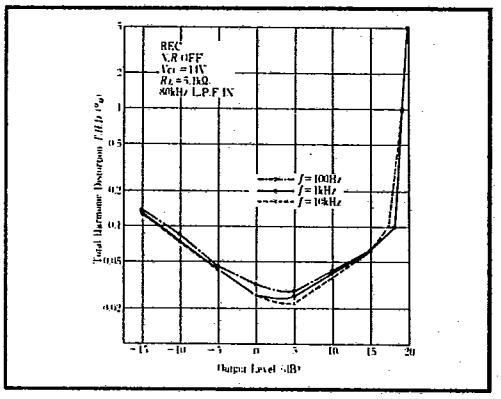


Figure 11 PB (Playback) NR Off Total Harmonic Distortion vs Output Level

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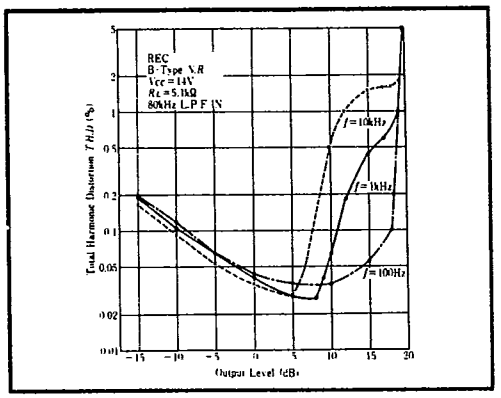


Figure 12 REC B-Type NR Total Harmonic Distortion vs Output Level

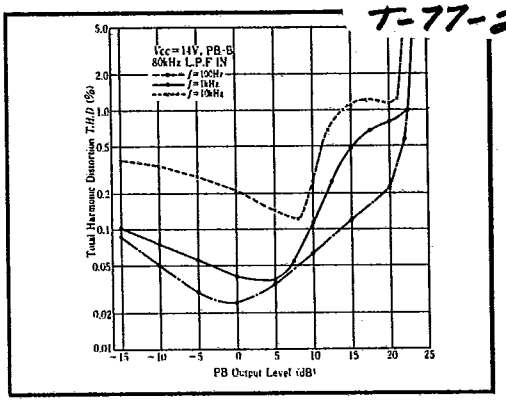


Figure 13 PB B-Type NR Total Harmonic Distortion vs Output Level

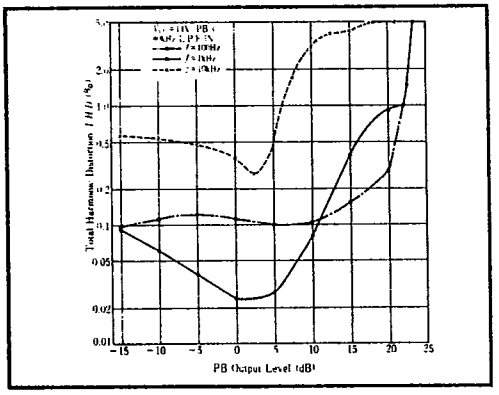


Figure 14 PB C-Type NR Total Harmonic Distortion vs Output Level

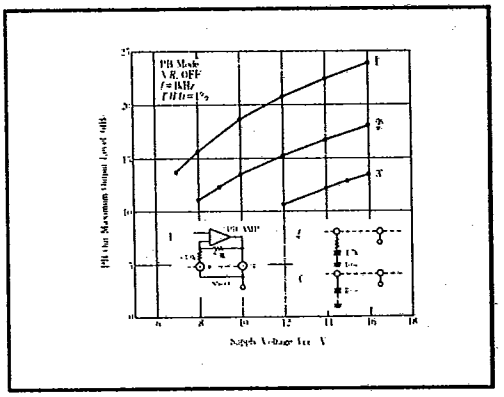


Figure 15 PB Out Maximum Output Level vs Supply Voltage for Variable Output Level

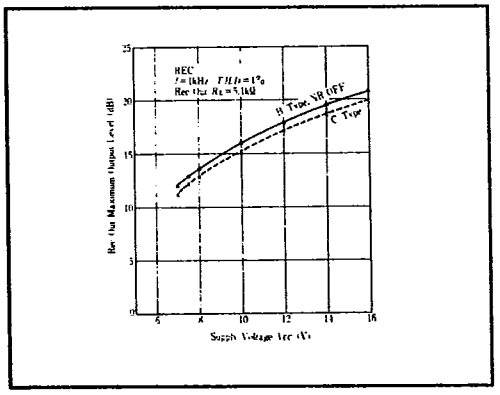


Figure 16 REC Out Maximum Output Level vs Supply Voltage

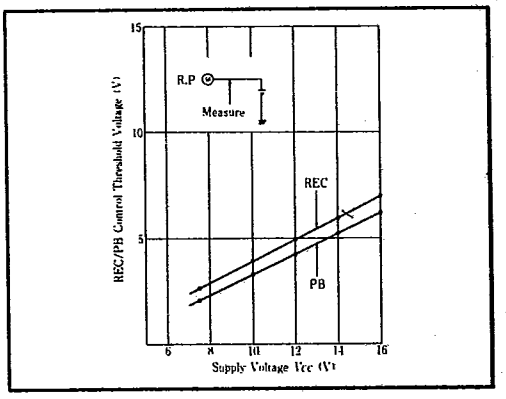


Figure 17 REC/PB Control Threshold Voltage vs Supply Voltage

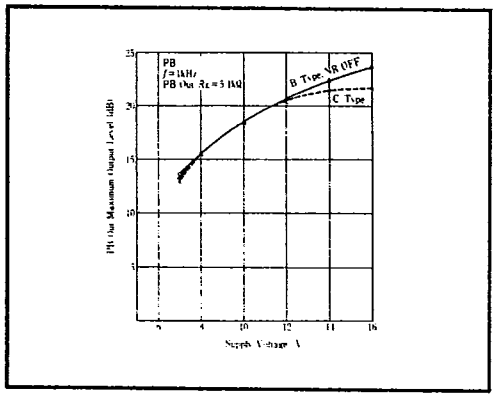


Figure 18 PB Out Maximum Output Level vs Supply Voltage

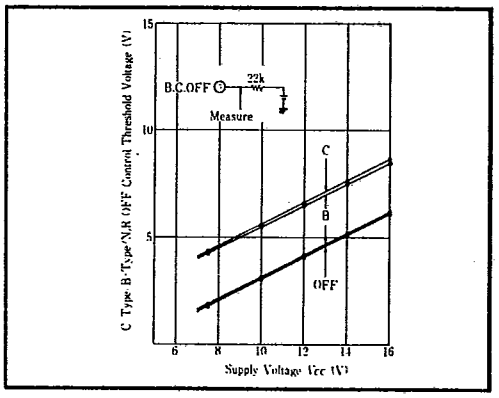


Figure 19 NR Off/B-Type/C-Type Control Threshold Voltage vs Supply Voltage