

SERVICE MANUAL SAMPLE



SVEN[®]

IH00-1R

CONTENTS

1. Safety precautions.....	2
2. Specifications	3
4. Connecting to equipment.....	4
5. Trouble shooting guide.....	5
6. Connecting guide.....	6/8
7. Ic voltage chart iv.....	9/22

1. SAFETY PRECAUTIONS

PRECAUTIONS:

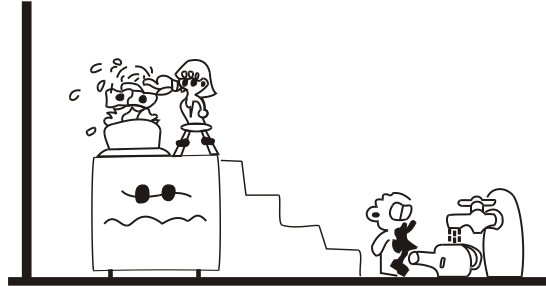
1. **Power supply:** This speaker can only use the type of power supply as specified in the instruction manual or marked on the master speaker.
2. **Power line protection:** Make sure to avoid power line being trampled, pulled or squeezed by heavy objects. In particular, be sure to hold the plug when pulling the power line from the socket. Never pull on the power line. Besides, keep the power line away from hot objects.



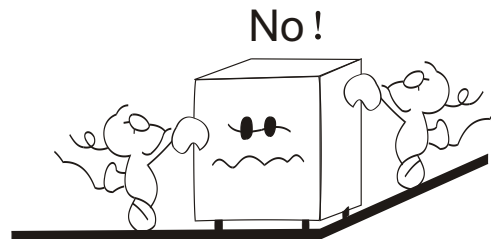
3. **Cord polarity:** The speaker cord must be correctly connected as per marking on the function panel. "+" and "-" Must have correct polarity so maximize the inherent quality of the speaker. Otherwise, normal function and output will be affected.

4. **Ventilation:** This speaker has good adaptability to the environment, but pay attention to the environmental ventilation during long periods of work.

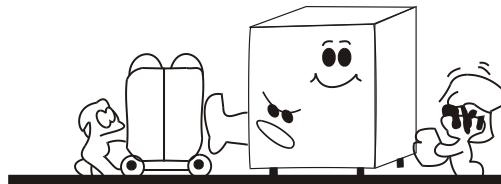
5. **Water and moisture:** Keep the sound box away from rain, water spray, water splash and wet environment, such as bath, kitchen, water basin, washing basin, damp basement, swimming pool, etc.



6. **Removing cabinet:** In case of speaker failure or problems due to improper use, don't dismantle the unit to repair or check by yourself. Please turn off the power and use after checked by specialists to avoid causing personal accident.



7. **Appearance cleaning:** Don't use volatile solutions to clean the speaker to avoid damaging the appearance.



8. **Please cut off the power:** If you don't use the sound system for a long time, please remove the cable wire or disconnect the power to ensure the speaker safety and household safety.

2. SPECIFICATIONS

TECHNICAL SPECIFICATION:

OUTPUT POWER SUB-WOOFER..... 35 (RMS) (THD $\leq$ 0.7%)

FRONT..... 18W+18W (RMS) (THD $\leq$ 0.7%)

CENTER..... 18W (RMS) (THD $\leq$ 0.7%)

SURROUND..... 18W+18W (RMS) (THD $\leq$ 0.7%)

SUB WOOFER IMPEDANCE..... 8 (OHM)

FRONT/CENTER/SURROUND..... 4 (OHM)

SEPARATION..... $\geq$ 40dB

S/N RATIO..... $\geq$ 80dB

DIMENSION

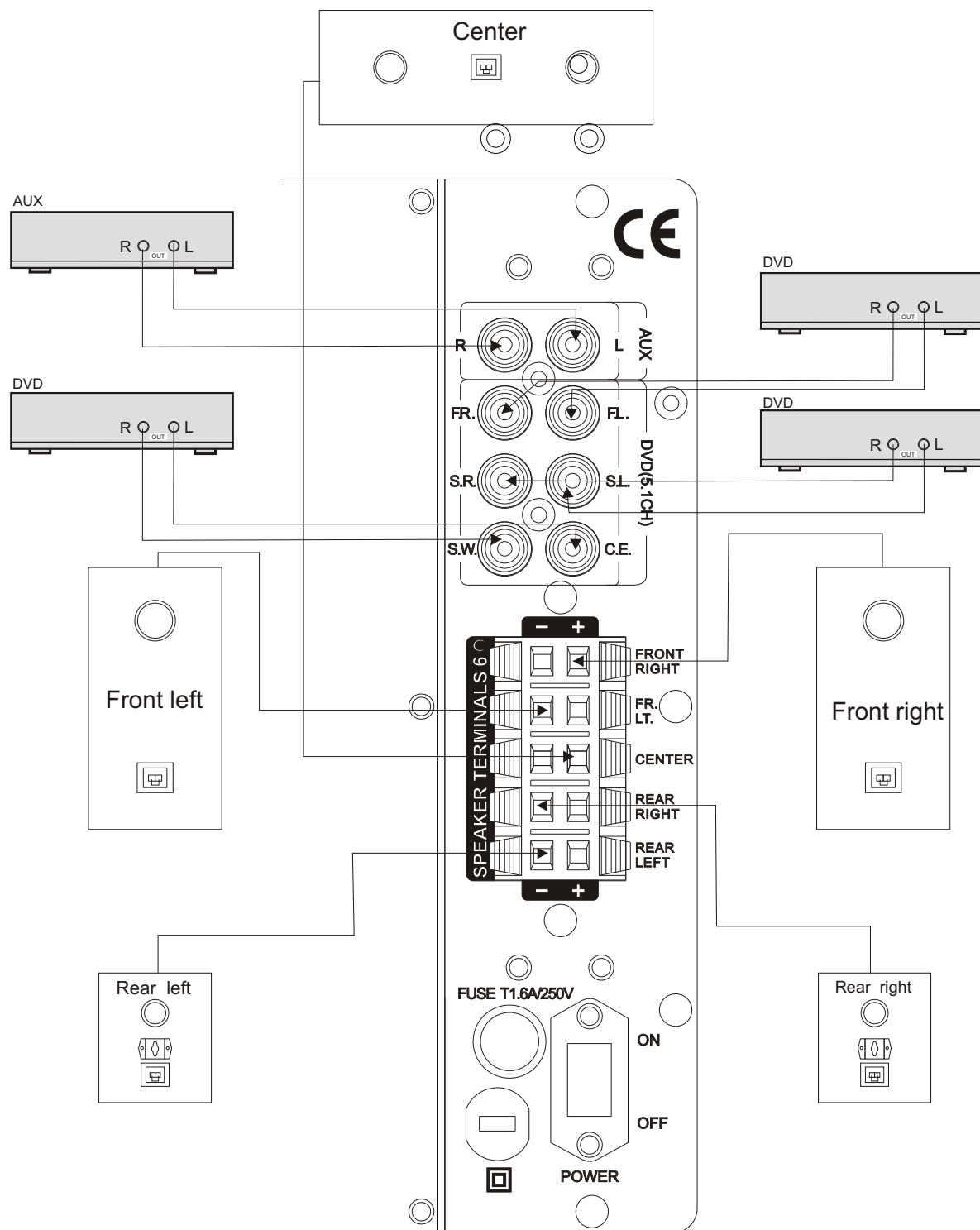
SUB WOOFER..... L200*W320*H400mm

FRONT..... L168*W220*H155mm

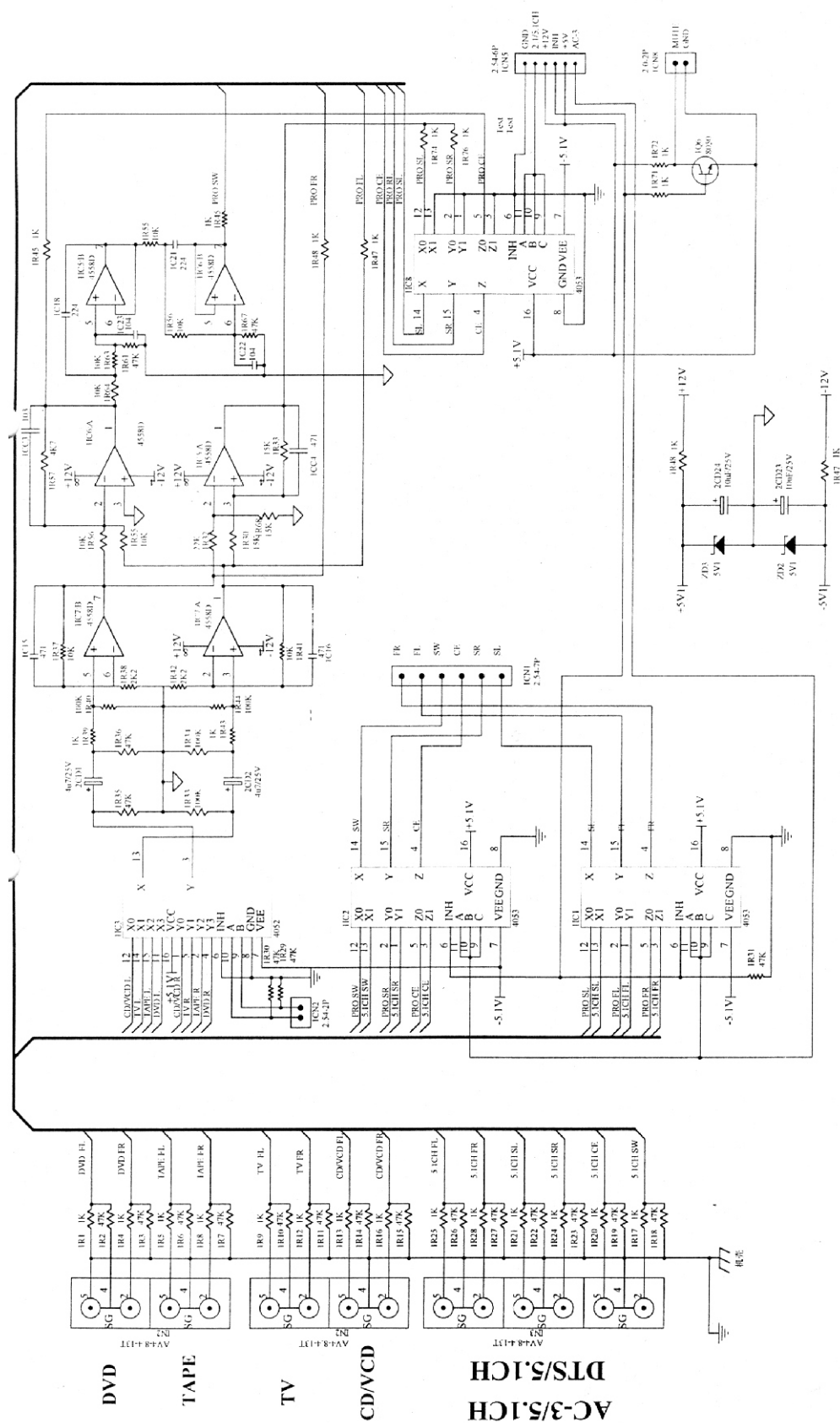
CENTER..... L400*W150*H140mm

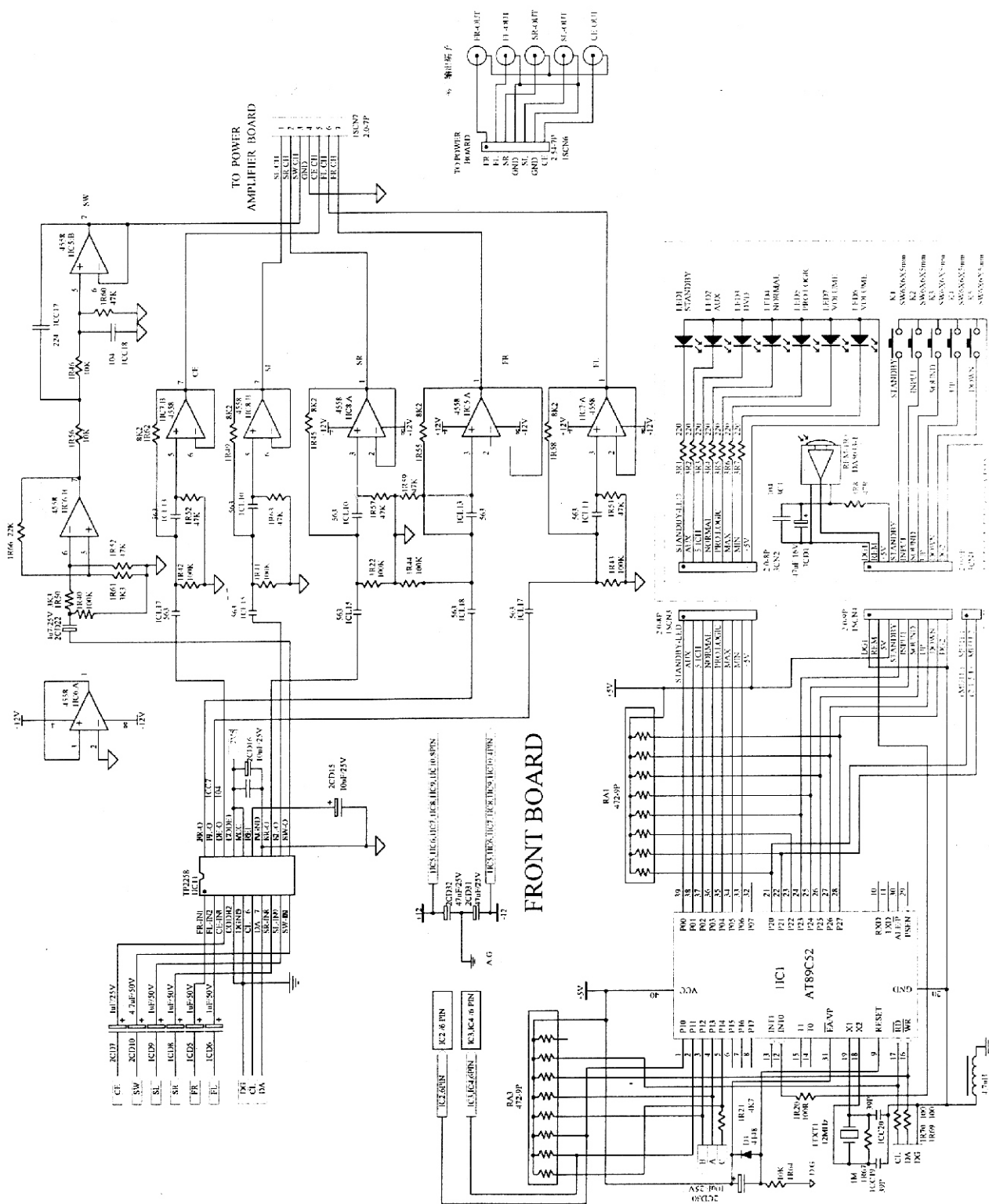
SURROUND..... L1500*W150*H180mm

4. CONNECTING TO EQUIPMENT



5. TROUBLESHOOTING GUIDE







DATA SHEET

For a complete data sheet, please also download:

- The IC04 LOCMOS HE4000B Logic Family Specifications HEF, HEC
- The IC04 LOCMOS HE4000B Logic Package Outlines/Information HEF, HEC

HEF4053B

MSI

Triple 2-channel analogue multiplexer/demultiplexer

Product specification
File under Integrated Circuits, IC04

January 1995

Triple 2-channel analogue multiplexer/demultiplexer

HEF4053B
MSI

DESCRIPTION

The HEF4053B is a triple 2-channel analogue multiplexer/demultiplexer with a common enable input ($\bar{E}$). Each multiplexer/demultiplexer has two independent inputs/outputs (Y_0 and Y_1), a common input/output (Z), and select inputs (S_1). Each also contains two-bidirectional analogue switches, each with one side connected to an independent input/output (Y_0 and Y_1) and the other side connected to a common input/output (Z).

With $\bar{E}$ LOW, one of the two switches is selected (low impedance ON-state) by S_1 . With $\bar{E}$ HIGH, all switches are in the high impedance OFF-state, independent of S_A to S_C .

V_{DD} and V_{SS} are the supply voltage connections for the digital control inputs (S_A to S_C and $\bar{E}$).

The V_{DD} to V_{SS} range is 3 to 15 V. The analogue inputs/outputs (Y_0 , Y_1 and Z) can swing between V_{DD} as a positive limit and V_{EE} as a negative limit. $V_{DD}-V_{EE}$ may not exceed 15 V.

For operation as a digital multiplexer/demultiplexer, V_{EE} is connected to V_{SS} (typically ground).

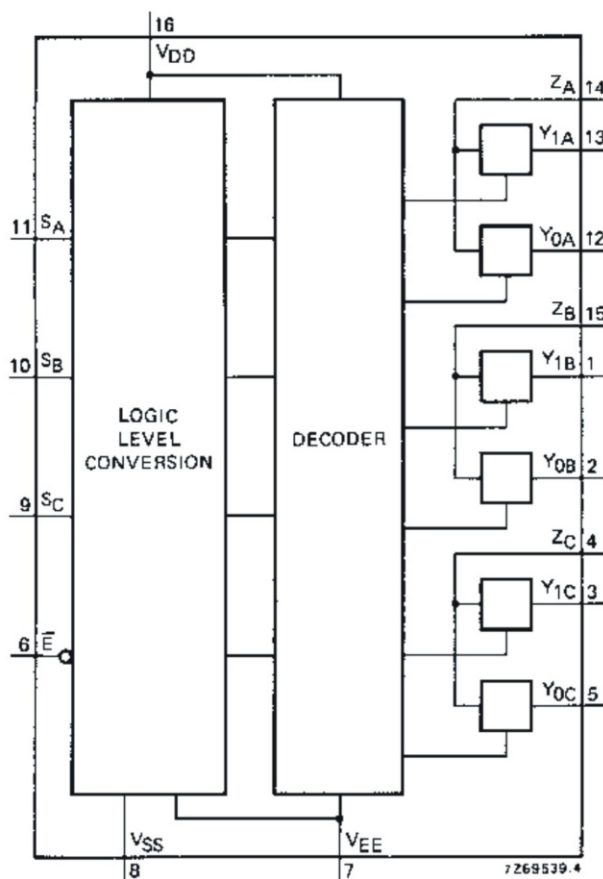


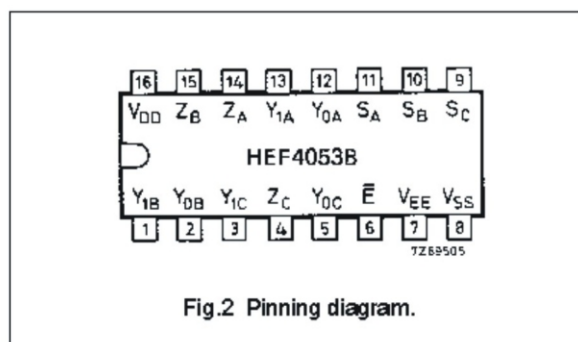
Fig.1 Functional diagram.

FAMILY DATA, I_{DD} LIMITS category MSI

See Family Specifications

Triple 2-channel analogue multiplexer/demultiplexer

HEF4053B MSI



HEF4053BP(N): 16-lead DIL; plastic
(SOT38-1)

HEF4053BD(F): 16-lead DIL; ceramic (cerdip)
(SOT74)

HEF4053BT(D): 16-lead SO; plastic
(SOT109-1)

(): Package Designator North America

PINNING

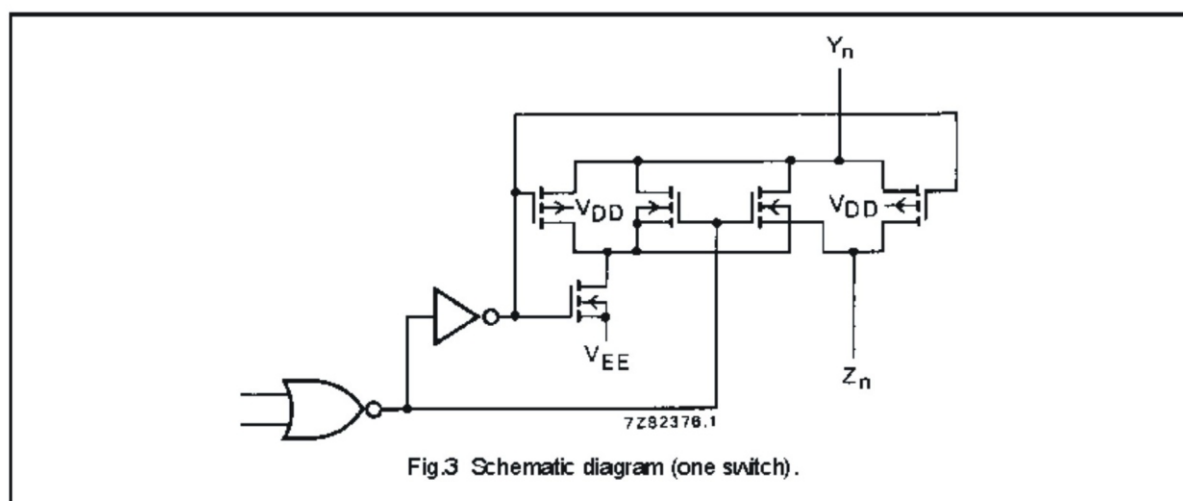
Y_{0A} to Y_{0C}	independent inputs/outputs
Y_{1A} to Y_{1C}	independent inputs/outputs
S_A to S_C	select inputs
$\bar{E}$	enable input (active LOW)
Z_A to Z_C	common inputs/outputs

FUNCTION TABLE

INPUTS		CHANNEL ON
$\bar{E}$	S_n	
L	L	$Y_{0n}-Z_n$
L	H	$Y_{1n}-Z_n$
H	X	none

Notes

- H = HIGH state (the more positive voltage)
L = LOW state (the less positive voltage)
X = state is immaterial



RATINGS

Limiting values in accordance with the Absolute Maximum System (IEC 134)

Supply voltage (with reference to V_{DD}) V_{EE} -18 to +0,5 V

Notes

- To avoid drawing V_{DD} current out of terminal Z, when switch current flows into terminals Y, the voltage drop across the bidirectional switch must not exceed 0,4 V. If the switch current flows into terminal Z, no V_{DD} current will flow out of terminals Y, in this case there is no limit for the voltage drop across the switch, but the voltages at Y and Z may not exceed V_{DD} or V_{EE} .

LM1875

20W Audio Power Amplifier

General Description

The LM1875 is a monolithic power amplifier offering very low distortion and high quality performance for consumer audio applications.

The LM1875 delivers 20 watts into a 4 Ω or 8 Ω load on $\pm$ 25V supplies. Using an 8 Ω load and $\pm$ 30V supplies, over 30 watts of power may be delivered. The amplifier is designed to operate with a minimum of external components. Device overload protection consists of both internal current limit and thermal shutdown.

The LM1875 design takes advantage of advanced circuit techniques and processing to achieve extremely low distortion levels even at high output power levels. Other outstanding features include high gain, fast slew rate and a wide power bandwidth, large output voltage swing, high current capability, and a very wide supply range. The amplifier is internally compensated and stable for gains of 10 or greater.

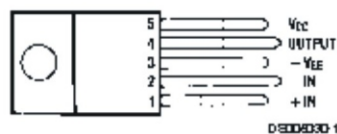
Features

- Up to 30 watts output power
- A_{VO} typically 90 dB
- Low distortion 0.018% 1 kHz 20W
- Wide power bandwidth: 70 kHz
- Protection for AC and DC short circuits to ground
- Thermal protection with pause circuit
- High current capability: 4A
- Wide supply range 16V-60V
- Internal output protection diodes
- 94 dB ripple rejection
- Plastic power package TO-220

Applications

- High performance audio systems
- Bridge amplifiers
- Stereo phonographs
- Servo amplifiers
- Instrument systems

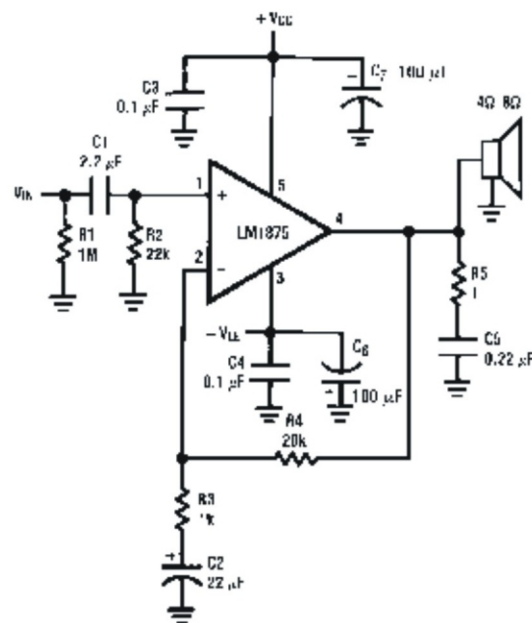
Connection Diagram



Front View

Package	Ordering Info	NSC Package Number
For Straight Leads	LM1875T SL108949	TO5A
For Stagger Bend	LM1875T LBO3	TO5D
For 90° Stagger Bend	LM1875T LBO5	TO5E
For 90° Stagger Bend	LM1875T LBO2	TA05B

Typical Applications



Absolute Maximum Ratings (Note 1)

Supply Vdrtage	60V
Input Vdrtage	$-V_{EE}$ to V_{CC}
Storage Temperature	-65°C to $+150^{\circ}\text{C}$
Junction Temperature	150°C

Lead Temperature	(Soldering, 10 seconds)
θ_{JC}	3°C
θ_{JA}	73°C

250°C
3°C
73°C

Electrical Characteristics

$V_{CC}=+25\text{V}$, $-V_{EE}=-25\text{V}$, $T_{\text{AMBIENT}}=25^{\circ}\text{C}$, $R_L=8\Omega$, $A_V=20$ (26 dB), $f_o=1\text{ kHz}$, unless otherwise specified.

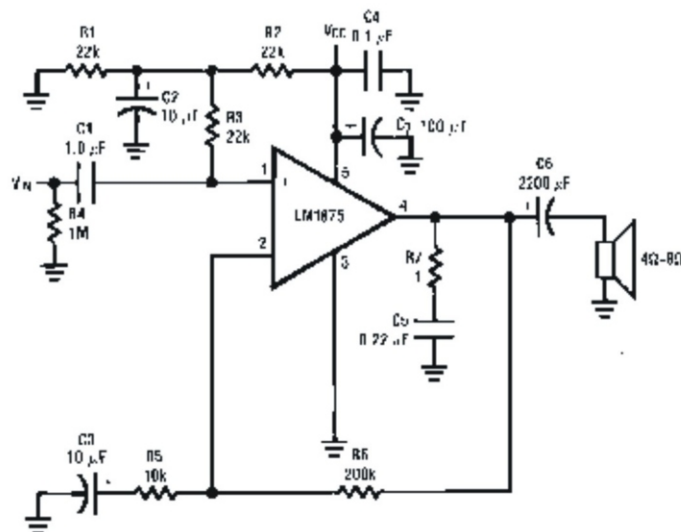
Parameter	Conditions	Typical	Tested Limits	Units
Supply Current	$P_{OUT}=0\text{W}$	70	100	mA
Output Power (Note 2)	THD=1%	25		W
THD (Note 2)	$P_{OUT}=20\text{W}$, $f_o=1\text{ kHz}$	0.015		%
	$P_{OUT}=20\text{W}$, $f_o=20\text{ kHz}$	0.05	0.4	%
	$P_{OUT}=20\text{W}$, $R_L=4\Omega$, $f_o=1\text{ kHz}$	0.022		%
	$P_{OUT}=20\text{W}$, $R_L=4\Omega$, $f_o=20\text{ kHz}$	0.07	0.6	%
Offset Voltage		± 1	± 15	mV
Input Bias Current		± 0.2	± 2	μA
Input Offset Current		0	± 0.5	μA
Gain-Bandwidth Product	$f_o=20\text{ kHz}$	55		MHz
Open Loop Gain	DC	90		dB
PSRR	V_{CC} , 1 kHz, 1 Vrms	95	52	dB
	V_{EE} , 1 kHz, 1 Vrms	83	52	dB
Max Slew Rate	20W, 8 Ω , 70 kHz BW	8		V/ μs
Current Limit	$V_{OUT} = V_{SUPPLY} - 10\text{V}$	4	3	A
Equivalent Input Noise Vdrtage	$R_s=600\Omega$, CCIR	3		μVrms

Note 1: "Absolute Maximum Ratings" indicate limits beyond which damage to the device may occur. Operating Ratings indicate conditions for which the device is functional, but do not guarantee specific performance limits.

Note 2: Assumes the use of a heat sink having a thermal resistance of 1°C/W and no insulator with an ambient temperature of 25°C . Because the output limiting circuitry has a negative temperature coefficient, the maximum output power delivered to a 4Ω load may be slightly reduced when the tab temperature exceeds 55°C .

Typical Applications

Typical Single Supply Operation



0-500000-9

18W Hi-Fi AMPLIFIER AND 35W DRIVER

DESCRIPTION

The UTC2030A is a monolithic IC in Pentawatt package intended for use as low frequency class AB amplifier.

With $V_{smax}=44V$ it is particularly suited for more reliable applications without regulated supply and for 35W driver circuits using lowest complementary pairs.

The UTC2030A provides high output current and has very low harmonic and cross-over distortion.

Further the device incorporates a short circuit protection system comprising an arrangement for automatically limiting the dissipated power to as to keep the working point of the output transistors within their safe operating area. A conventional thermal system is also included.

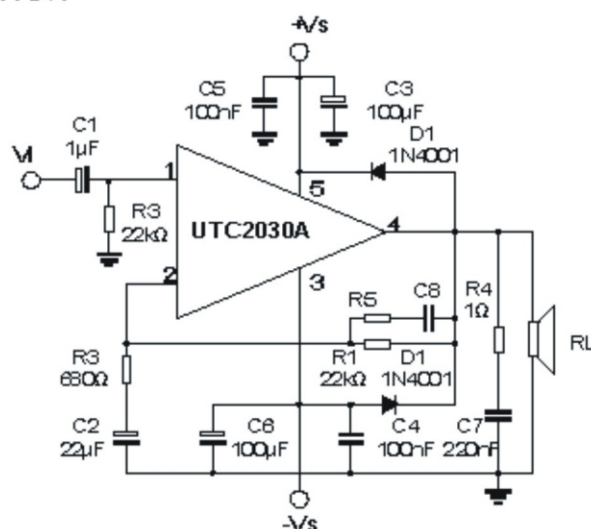


TO-220B

ABSOLUTE MAXIMUM RATINGS($T_a=25^{\circ}C$)

CHARACTERISTICS	SYMBOL	VALUE	UNITS
Supply Voltage	V_s	± 22	V
Input Voltage	V_i	V_s	V
Differential input voltage	V_{di}	± 15	V
Peak output current(internally limited)	I_o	3.5	A
Total power dissipation at $T_{case}=90^{\circ}C$	P_{tot}	20	W
Storage temperature	T_{stg}	$-40 \sim +150$	$^{\circ}C$
Junction temperature	T_j	$-40 \sim +150$	$^{\circ}C$

TYPICAL APPLICATION



PIN CONNECTION

- 1 Non inverting input
- 2 Inverting input
- 3 $-V_s$
- 4 Output
- 5 $+V_s$

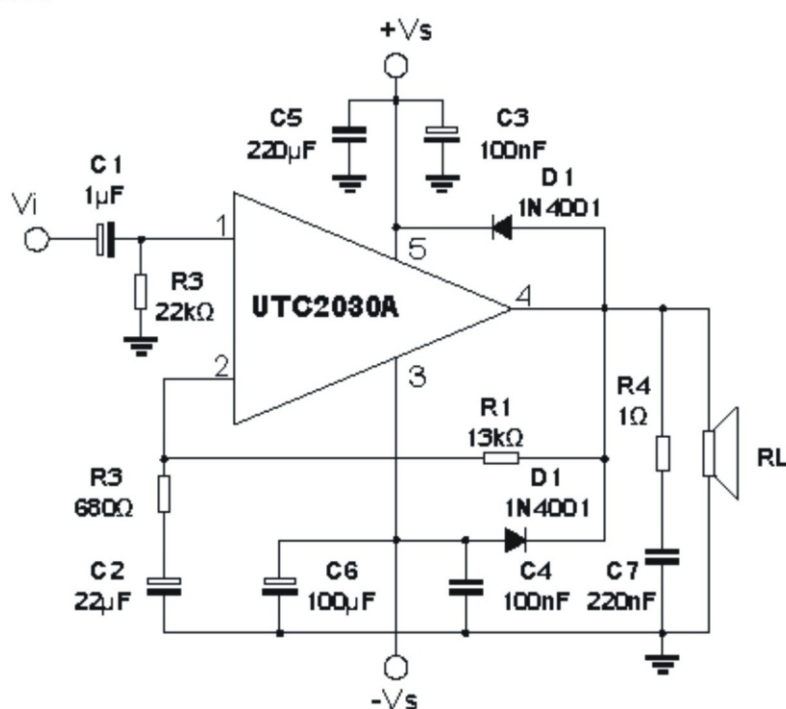
ELECTRICAL CHARACTERISTICS(Refer to the test circuit, $V_s=\pm 10V$, $T_a=25^\circ C$)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Supply Voltage	V_s		± 6		± 22	V
Quiescent drain current	I_d			50	80	mA
Input bias current	I_b	$V_s=\pm 22V$		0.2	2	μA
Input offset voltage	V_{os}			± 2	± 20	mV
Input offset current	I_{os}			± 20	± 200	nA
Output power	P_o	$d=0.5\%$, $G_v=26dB$ $f=40$ to $5kHz$ $R_L=8\Omega$	15	18		W
		$R_L=4\Omega$	10	12		W
		$V_s=\pm 19V$, $R_L=4\Omega$	13	16		W
Power bandwidth	BW	$P_o=15W$, $R_L=4\Omega$		100		kHz
Slew rate	SR			8		V/ μsec
Open loop voltage gain	G_{vo}	$f=1kHz$		80		dB
Closed loop voltage gain	G_{vc}		25.5	26	26.5	dB
Total Harmonic distortion	d	$P_o=0.1$ to $14W$, $R_L=4\Omega$ $f=40$ to $15kHz$		0.08		%
		$P_o=0.1$ to $14W$, $R_L=4\Omega$ $f=1kHz$		0.03		%
Total Harmonic distortion	d	$P_o=0.1$ to $9W$, $R_L=8\Omega$ $f=40$ to $15kHz$		0.05		%
Second order CCIF intermodulation distortion	d_2	$P_o=4W$, $R_L=4\Omega$ $f_2-f_1=1kHz$		0.03		%
Third order CCIF intermodulation distortion	d_3	$f_2=14kHz$, $f_1=15kHz$		0.08		%
Input noise voltage		B=curve A		2		μV
Input noise current		B= 22Hz to 22kHz		3	10	μV
Signal to Noise ratio	S/N	$R_L=4\Omega$, $R_g=10k\Omega$, B=curve A				
		$P_o=15W$		106		dB
		$P_o=1W$		94		dB

(continued)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Input Resistance (pin 1)		open loop, $f=1\text{kHz}$	0.5	5		$M\Omega$
Supply Voltage rejection		$R_L=4\Omega$, $G_v=26\text{dB}$ $R_g=22\Omega$, $f=1\text{kHz}$		54		dB
Thermal Shut-down junction temperature				145		$^{\circ}\text{C}$

TEST CIRCUITS



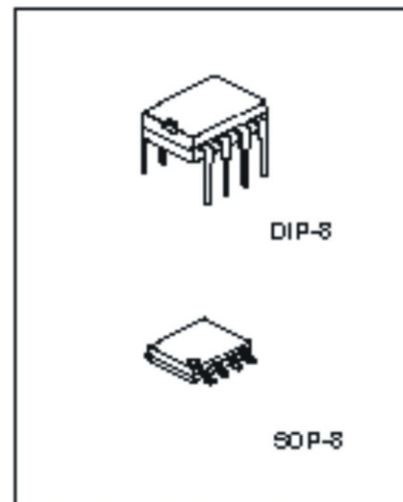
DUAL OPERATIONAL AMPLIFIER

DESCRIPTION

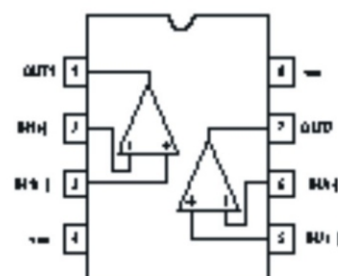
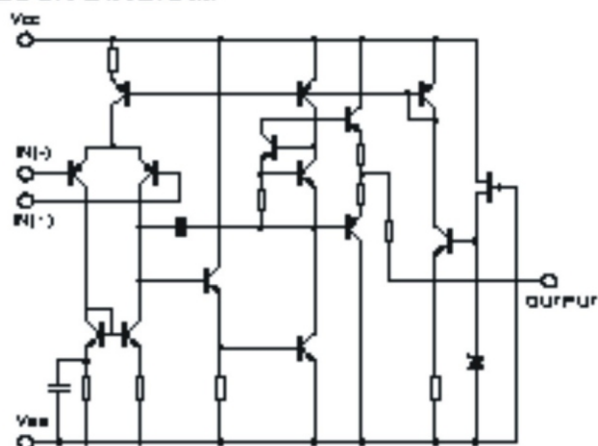
The UTC4558 is a monolithic integrated circuit designed for dual operational amplifier.

FEATURES

- *No frequency compensation required
- *No latch-up
- *Large common mode and differential voltage range
- *Parameter tracking over temperature range
- *Gain and phase match between amplifiers
- *Internally frequency compensated
- *Low noise input transistors



BLOCK DIAGRAM



ABSOLUTE MAXIMUM RATINGS

Characteristic	Symbol	Value	Unit
Supply Voltage	Vcc	±22	V
Differential Input voltage	V _{IDIFF}	±18	V
Power Dissipation	P _D	100	mW
Input Voltage	V _I	±15	V
Operating Temperature	T _{OM}	0~+70	°C
Storage Temperature	T _{STG}	-65~+150	°C

ELECTRICAL CHARACTERISTICS($T_a=25^{\circ}\text{C}$, $V_{CC}=15\text{V}$, $V_{EE}=-15\text{V}$)

Characteristic	Symbol	Test Condition	Min	Typ.	Max	Unit
Supply Current	I_{CC}			3.5	5.8	mA
Input offset voltage	V_{IO}	$R_i < 10\text{k}\Omega$		2	6	mV
Input offset current	I_{IO}			5	200	nA
Input bias current	I_{BIS}			30	500	nA
Large signal voltage gain	G_v	$V_O(\text{p-p})=10\text{V}$, $R_L < 2\text{k}\Omega$	20	200		V/mV
Common Mode Input Voltage Range	V_{Icm}		± 12	± 13		V
Common Mode Rejection Ratio	CMRR	$R_i < 10\text{k}\Omega$	70	90		dB
Supply Voltage Rejection Ratio	PSRR	$R_i < 10\text{k}\Omega$	76	90		dB
Output Voltage swing	$V_O(\text{p-p})$	$R_L > 10\text{k}\Omega$		± 12	± 14	V
Power Consumption	P_C			70	170	mW
Slew Rate	SR	$V_I=10\text{V}$, $R_L > 2\text{k}\Omega$, $C_L < 100\text{pF}$	1.2			V/ μs
Rise Time	T_{RS}	$V_I=20\text{mV}$, $R_L > 2\text{k}\Omega$, $C_L < 100\text{pF}$		0.3		μs
Over shoot	OS	$V_I=20\text{mV}$, $R_L > 2\text{k}\Omega$, $C_L < 100\text{pF}$		15		%

TYPICAL PERFORMANCE CHARACTERISTICS

Fig.1 Positive output voltage swing vs load

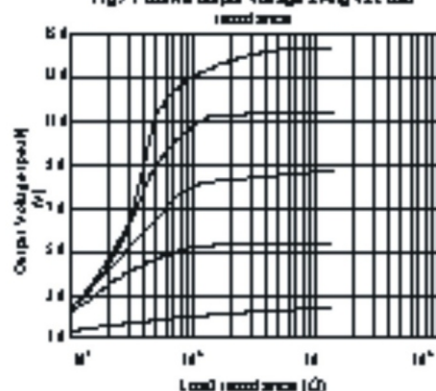


Fig.2 Positive output voltage swing vs Load resistance

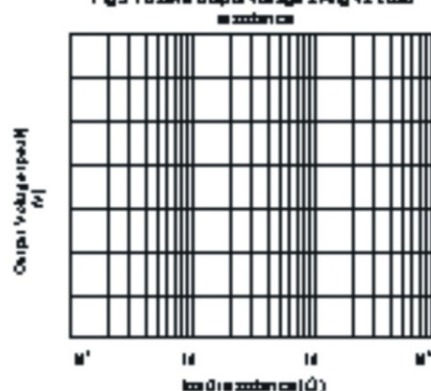
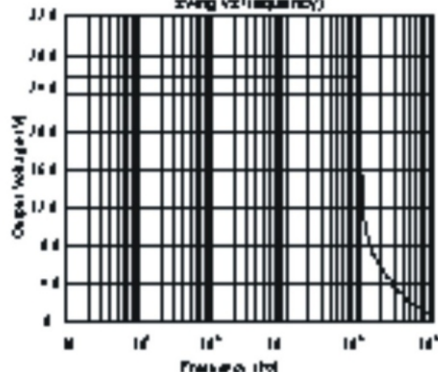


Fig.3 Power Consumption (large signal) vs frequency





6-Channel Electronic Volume Controller IC

Preliminary

PT2258

DESCRIPTION

PT2258 is a 6-Channel Electronic Volume Controller IC utilizing CMOS Technology specially designed for the new generation of AV Multi-Channel Audio System. PT2258 provides an I²C Control Interface, an attenuation range of 0 to -79 dB at 1 dB/step, low noise, high channel separation. Housed in 20-pin, DIP or SO Package, PT2258's pin assignments and application circuit are optimized for easy PCB Layout and cost saving advantages.

FEATURES

- CMOS Technology
- Low Power Consumption
- Least External Components
- Attenuation Range: 0 to -79 dB at 1dB/step
- Operating Voltage: 5 to 9 V
- Low Noise, S/N Ratio>100dB (A-weighting)
- High Channel Separation
- I²C Bus Control Interface
- Selectable Address
- 6-Channel Outputs
- Available in 20-pin, DIP or SO Package

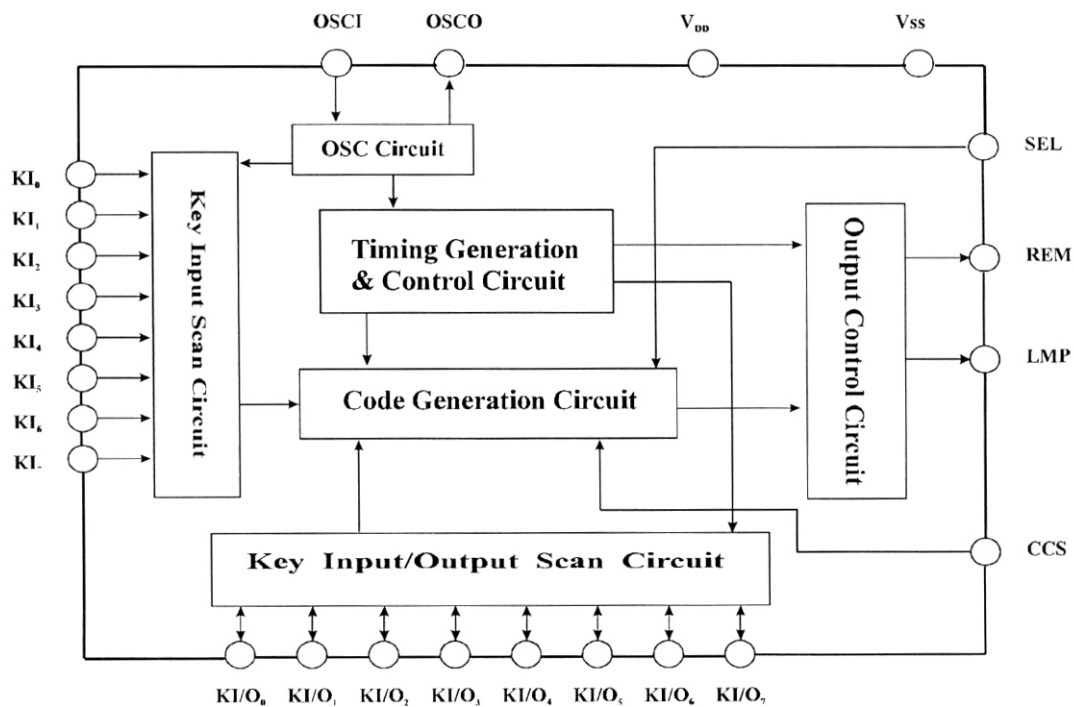
APPLICATIONS

- AV Surround Audio Equipment
- Car Audio
- Mini Compo
- Computer Multi-Media Speaker
- Other Audio Equipments

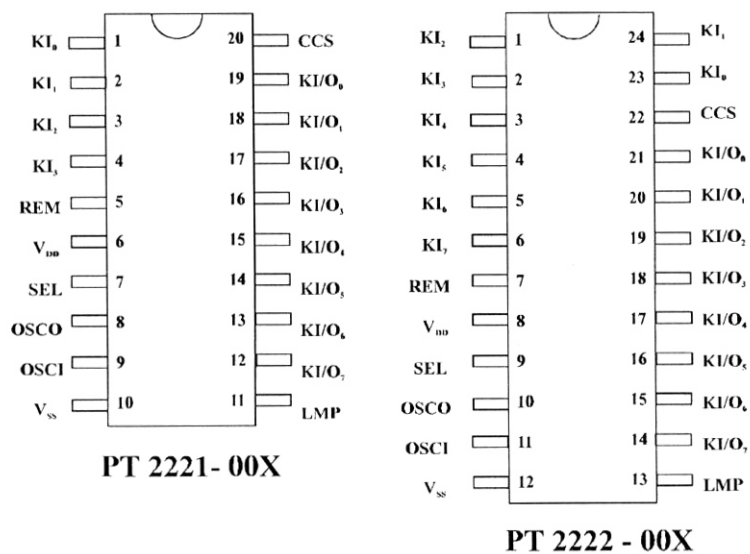
Infrared Remote Control Transmitter

PT2221/2

BLOCK DIAGRAM



PIN CONFIGURATION



**PIN DESCRIPTION**

Pin Name	I/O	Description	Pin No.
IN1	I	Channel Input No. 1. Connect a Capacitor to Audio Source	1
IN2	I	Channel Input No. 2 Connect a Capacitor to Audio Source	2
IN3	I	Channel Input No. 3 Connect a Capacitor to Audio Source	3
CODE2	-	Refer to Address Code Section	4
DGND	-	Digital Ground	5
SCL	I	I ² C Clock Input	6
SDA	I	I ² C Data Input	7
IN4	I	Channel Input No. 4 Connect a Capacitor to Audio Source	8
IN5	I	Channel Input No. 5 Connect a Capacitor to Audio Source	9
IN6	I	Channel Input No. 6 Connect a Capacitor to Audio Source	10
OUT6	O	Channel Output No. 6 Connect a Capacitor to the Next Stage	11
OUT5	O	Channel Output No. 5 Connect a Capacitor to the Next Stage	12
OUT4	O	Channel Output No. 4 Connect a Capacitor to the Next Stage	13
GND	-	Ground	14
REF	-	Reference Voltage= 1/2 Vcc Connect a Capacitor to the Ground	15
VCC	-	Power Supply Input	16
CODE1	-	Refer to the Address Code Section	17
OUT3	O	Channel Output No. 3 Connect a Capacitor to the Next Stage	18
OUT2	O	Channel Output No. 2 Connect a Capacitor to the Next Stage	19
OUT1	O	Channel Output No. 1 Connect a Capacitor to the Next Stage	20



Infrared Remote Control Transmitter

PT2221/2

DESCRIPTION

The PT2221 and PT2222 are remote control transmitters utilizing CMOS Technology specially designed for use on infrared remote control applications. They are pin-to-pin compatible with NEC μ PD6121 and μ PD6122 respectively. PT2221 is packaged in 20 pins SO and capable of controlling 32 functions and 3 double keys. PT2222, on the other hand, is housed in 24 pins SO and capable of controlling 64 function keys and 3 double keys. PT2221/2 may be paired with PT2225 to construct a powerful remote control system.

FEATURES

- ☐ CMOS Technology
- ☐ Low Power Consumption ($V_{DD}=2.0 \sim 5.5V$)
- ☐ Pin-to-Pin Compatible with μ PD6121/ μ PD6122
- ☐ Using SEL pin, PT2221 can support 64+6 function codes
- ☐ Using SEL pin, PT2222 can support 128 + 6 function codes
- ☐ Customer Code can be selected (please contact PTC for details)

APPLICATIONS

- ☐ Audio Equipment
- ☐ Television (TV)
- ☐ Cable TV Tuner
- ☐ Video Cassette Recorder (VCR)
- ☐ Cassette Deck
- ☐ Air Conditioner
- ☐ Video Compact Disk (VCD)
- ☐ DVD ROM/Player
- ☐ Moniputer / Multi-Media Personal Computer System



Infrared Remote Control Transmitter

PT2221/2

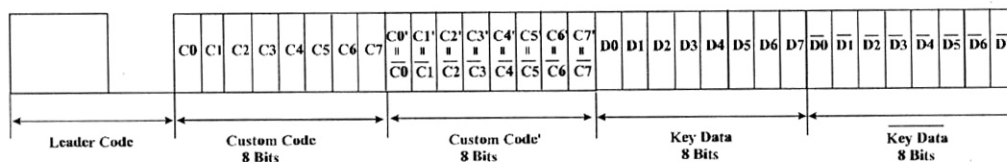
PIN DESCRIPTION

Pin Name	I/O	Description	Pin Number	
			20 Pins	24 Pins
Vss	-	Power Supply	10	12
KI ₀ ~ KI ₃	I	Key Input Pin Nos. 0 ~ 3	1 ~ 4	23, 24, 1, 2
KI ₄ ~ KI ₇	I	Key Input Pin Nos. 4 ~ 7	-	3 ~ 6
REM	O	Data Output Pin	5	7
V _{DD}	-	Power Supply	6	8
SEL	I	Select Pin	7	9
OSCO	O	Oscillator Pin	8	10
OSCI	I	Oscillator Pin	9	11
CCS	I	Custom Code Scan Input Pin	20	22
LMP	-	Output LED Indicator	11	13
KI/O ₀ ~ KI/O ₇	I/O	Key Input/Output Pin Nos. 0 ~ 7	19 ~ 12	21 ~ 14

Functional Description

Transmission Code

The transmission code consists of a leader code, 16-bits custom codes, and 8- bits data codes. The inverse code of the data code is also sent simultaneously. The following diagram shows this one frame construction.



The leader codes consist of a 9 ms carrier waveform followed by a 4.5 ms OFF waveform. It is used as the leader for the following code. Thus, when reception is configured by a microcomputer, the time relationship between the reception detection and other processes can be managed efficiently. The code uses the PPM (Pulse Position Modulation) Method, with "1" and "0" differentiated by the time between pulses. Each code consists of 8 bits, and simultaneous transmission of the inverse code allows configuration of a system with an extremely low error rate.