

**SANYO**

No.2003B

**LC8910 Series**

Remote Control LSI

**Overview**

The LC8910 series are LSIs designed for transmit/receive use in remote control system applications. The adoption of a statistical processing circuit entirely original with Sanyo enhances noise-resisting capability greatly.

**Applications**

- HA (home automation) use :  
Air-conditioning equipment, lighting equipment, solar system, radio equipment, home appliances
- Crime preventing monitor system, disaster preventing monitor system :  
Smoke detector, gas detector, fire detector, burglarproof system, electronic key
- Communication system :  
Radio pager, remote data collecting system

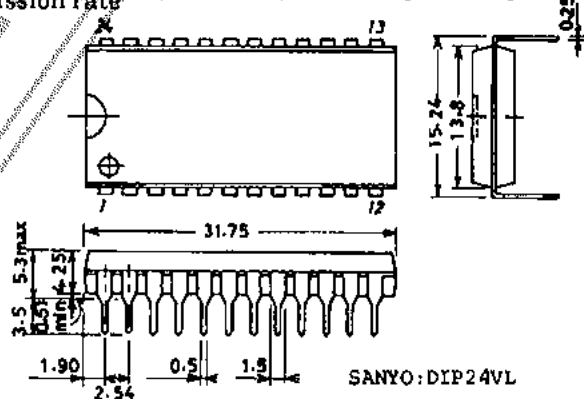
Type No.	Application	Unique Address Length (bits)*	Data Length (bits)	Package
LC8910	Controller	0	20 max	DIP24
LC8912	Terminal	8	4	DIP28
LC8913	Terminal	12	8	DIP40

\*: Unique address designates individually assigned network addresses.

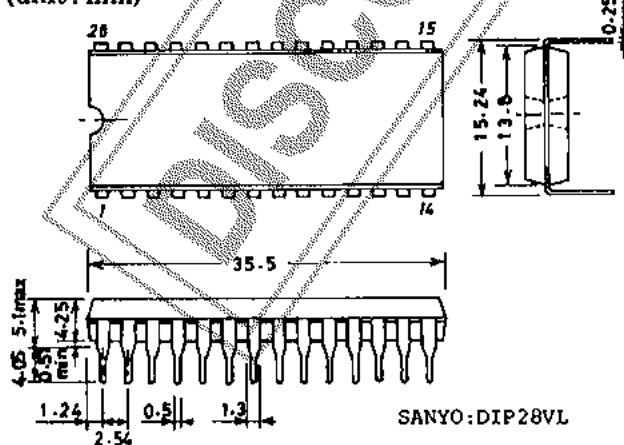
**Features**

- LSIs designed for transmit/receive use
- Transmission line access control : Master polling and CSMA/CD
- Biphase data transmission codes and variable transmission rate
- Modulation : Base band/AM (by on-chip modulation/demodulation circuit)
- Statistical processing circuit adopted to enhance noise-resisting capability greatly
- The LC8910 is capable of interfacing to any microcomputer.
- The LC8912, 8913 require a minimum number of external parts to make up a system.
- Answerback function and broadcast communication function
- CMOS process for low power dissipation

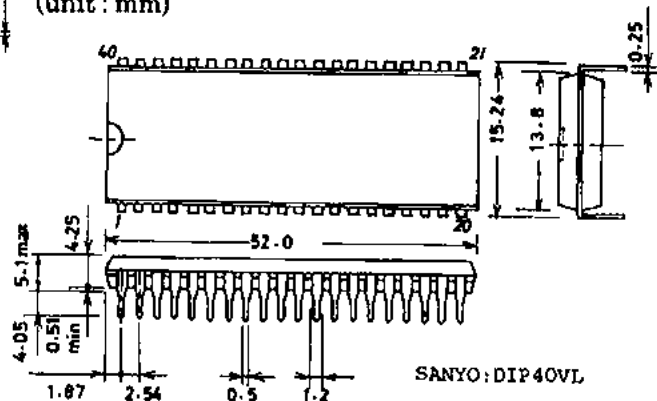
Package Dimensions 3068A [LC8910]  
(unit : mm)



Package Dimensions 3069A [LC8912]  
(unit : mm)



Package Dimensions 3077 [LC8913]  
(unit : mm)



**SANYO Electric Co., Ltd. Semiconductor Business Headquarters**  
TOKYO OFFICE Tokyo Bldg., 1-10, 1 Chome, Ueno, Taito ku, TOKYO, 110 JAPAN

# LC8910 Series

## Specifications

- Transmission mode : Half-duplex transmission
- Transmission line access control : CSMA/CD
- Modulation : Base band/AM
- Code : Biphase code
- Transmission rate : 15kb/s to 10b/s
- Error detection : Bit rule error  
CKSM error  
Overrun error  
Underrun error  
Transmission error by collision detection
- Answerback : Output data/input data
- Broadcast communication : General broadcast/group broadcast
- Supply voltage : Single 5V
- Power dissipation : 15mW typ

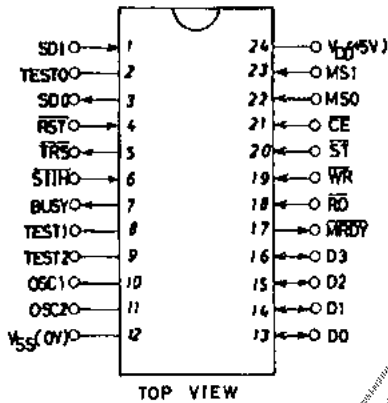
## Signal Format

PR	ID	DC	ADRS	DATA	CKSM
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PR : Preamble	12/32 bits
ID : Control code	4 bits
DC : Data count	4 bits
ADRS : Address	0 to 12 bits
DATA : Data	0 to 20 bits
CKSM : Checksum	4 bits

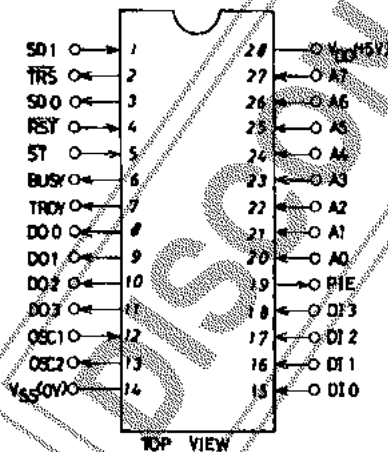
## Pin Description

### 1) LC8910



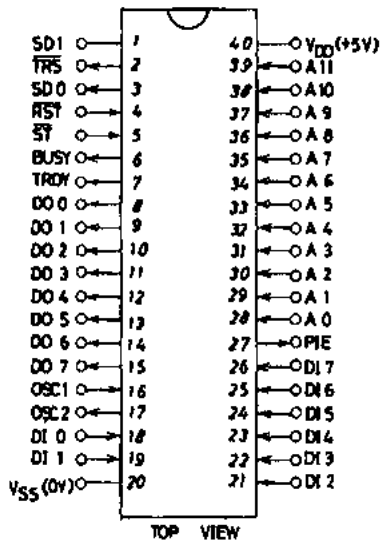
- SDI : Receive signal input
- SDO : Transmit signal output
- RST : Reset input
- TRS : Transmit mode output
- STIH : Receive disable signal input
- BUSY : Busy signal output
- TEST0 to 2 : Test input
- OSC1, 2 : Clock pins
- D0 to 3 : Data input/output
- MRDY : Reception completed signal output
- ST : Start input
- RD : Read input
- WR : Write input
- CE : Chip enable input
- MS0, 1 : Mode select signal input

### 2) LC8912



- SDI : Receive signal input
- TRS : Transmit mode output
- SDO : Transmit signal output
- RST : Reset input
- ST : Start input
- BUSY : Busy signal output
- TRDY : Terminal ready
- DO0 to 3 : Data output
- OSC1, 2 : Clock pins
- DI0 to 3 : Data input
- PIE : Parameter/address select signal output
- A0 to 7 : Address/parameter input

3) LC8913



- SDI : Receive signal input
- TR $\bar{S}$  : Transmit mode output
- SDO : Transmit signal output
- R $\bar{S}\bar{T}$  : Reset input
- ST : Start input
- BUSY : Busy signal output
- TRDY : Terminal ready
- DO0 to 7 : Data output
- OSC1, 2 : Clock pins
- DI0 to 7 : Data output
- PIE : Parameter/address select signal output
- A0 to 11 : Address/parameter input

**Absolute Maximum Ratings at  $T_a = 25^\circ\text{C}$ ,  $V_{SS} = 0\text{V}$**

Parameter	Symbol	Range	unit
Maximum Supply Voltage	$V_{DD\ max}$	-0.3 to +7.0	V
Input Voltage	$V_I, V_O$	-0.3 to $V_{DD} + 0.3$	V
Storage Temperature	$T_{opr}$	-55 to +125	$^\circ\text{C}$
Operating Temperature	$T_{opg}$	-30 to +70	$^\circ\text{C}$

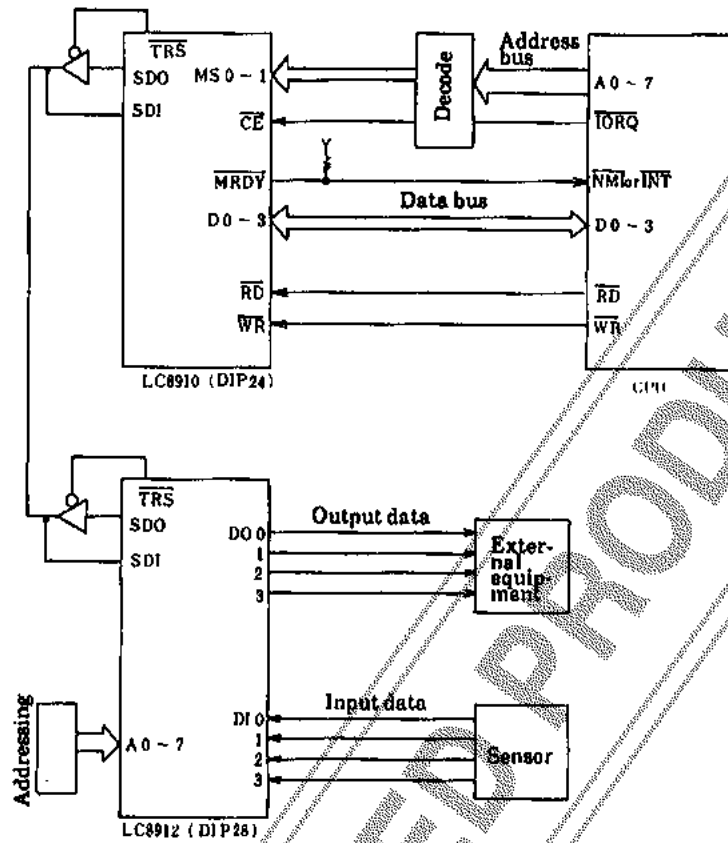
**Allowable Operating Conditions at  $T_a = -30$  to  $+70^\circ\text{C}$**

Parameter	Symbol	min	typ	max	unit
Supply Voltage	$V_{DD}$	4.5	5.0	5.5	V
Input Voltage Range	$V_{IN}$	0		$V_{DD}$	V

**Electrical Characteristics at  $V_{DD} = 4.5$  to  $5.5\text{V}$ ,  $T_a = -30$  to  $+70^\circ\text{C}$**

Parameter	Symbol	Condition	min	typ	max	unit
'H'-Level Input Voltage	$V_{IH1}$	Schmitt trigger	2.5			V
	$V_{IH2}$		2.2			V
	$V_{IH3}$	RST pin			$V_{DD} - 0.9$	V
'L'-Level Input Voltage	$V_{IL1}$	Schmitt trigger			0.6	V
	$V_{IL2}$				0.8	V
	$V_{IL3}$	RST pin			0.6	V
'H'-Level Output Voltage	$V_{OH}$	$I_{OH} = -0.4\text{mA}$	2.4			V
'L'-Level Output Voltage	$V_{OL}$	$I_{OL} = 2\text{mA}$			0.4	V
Input Leakage Current	$I_L$	$V_I = V_{SS}, V_{DD}$	-25		25	$\mu\text{A}$
Output Leakage Current	$I_{OZ}$	Output pin : 'H' impedance	-100		100	$\mu\text{A}$
OSC Amp 'H'-Level Input Voltage	$V_{IHOSC}$		0.8			$V_{DD}$
OSC Amp 'L'-Level Input	$V_{ILOSC}$				0.2	$V_{DD}$

Sample Application Circuit



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