

PREPARED BY: <i>J. Kasehara</i>	DATE: 20 FEB. 1992	SHARP ELECTRONIC COMPONENTS GROUP SHARP CORPORATION SPECIFICATION	SPEC No. EC04213
APPROVED BY: <i>A. Tokuda</i>	DATE: 26 FEB. 1992		FILE No.
			ISSUE 26 FEB. 1992
			PAGE
			REPRESENTATIVE DIVISION ☐ I.C. DIV. ☐ SEMICONDUCTOR APPLICATION DIV. ☐ DISPLAY DIV. ☒ ELECTRONIC COMPONENTS DIV. ☐

DEVICE SPECIFICATION FOR

INFRARED DATA COMMUNICATION UNIT

MODEL No. RY5AT01

☐ CUSTOMER'S APPROVAL

DATE _____

BY _____

PRESENTED BY *M. Yamachi*

MIYOSHI YAMAUCHI
GENERAL MANAGER
ENGINEERING DEPARTMENT 1
ELECTRONIC COMPONENTS DIVISION
ELECTRONIC COMPONENTS (ELECTRONIC) GROUP



1. Applied range

This specification applied to the outline and the property of infrared transmitting unit.

2. Adapted range

the infrared receiving unit is communication unit for infrared communication system of next signal formula.

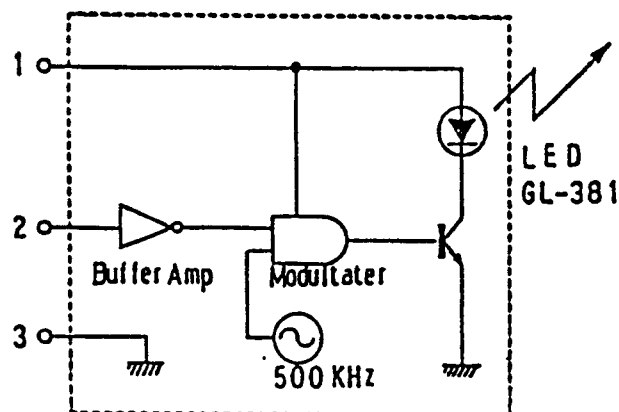
<Applied signal formula>

- Carrier : the infrared rays whose peak value of wavelength is about 900 to 1050 nm.
- Sub carrier : 500 kHz (450kHz ~ 550kHz)
- Modulated formula : ASK (Amplitude Shift Keying) formula
 - Pulse modulation — The pulse row for data code modulated by AM formula.
 - First modulation — The amplitude of Sub carrier is modulated by the pulse row.
 - Second modulation — The amplitude of the infrared rays is modulated Sub carrier whose amplitude was became first modulation.

3. Composition

This unit is composed of LED converting infrared signal and oscillator, buffer-amplifier, oscillator (500kHz), modulator circuit, driver circuit of LED.

<Block diagram>



4. Absolute Maximum Ratings (Ta=+25)

Item	Symbol	Rated Value	Unit	Remark
Supply voltage	Vcc max	+6.0	V	
Output terminal voltage	V _o / V _{out}	Vcc (10.0)	V	
Storage temperature	Tstg	-20~+85	°C	

5. Recommended Operating Conditions

- If the power line noise is large, use an external low-pass filter (LPF) near the neck of this communication unit terminal.
- Operating temperature (Topr) -10~+70°C.

6. Electrical/Optical Characteristics

6-1 Rated Value (Ta=+25°C, Vcc=+5V)

Item	Symbol	Conditions	Rated Value			
			min	typ.	max.	Unit
Operating voltage	Vcc		4.7	5.0	5.3	V
Consuming current	Icc	No-signal input			100	μA
		data duty 50%		50		mA
		data duty 100%		100		mA
Main carrier wave length	λ		900		1.050	nm
Sub carrier frequency	SOC			500		KHz
Transmission distance	L	θ=0°		1.0		m
	L1	θ=13°		0.7		m
Input signal voltage	Vol	CMOS pull down resistance (100KΩ)	3.0	5.0		V

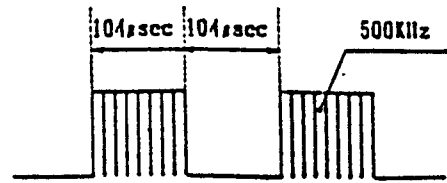
※1 : The specified signal is transmitted using a standard transmitter.

6 - 2 Measurement Conditions

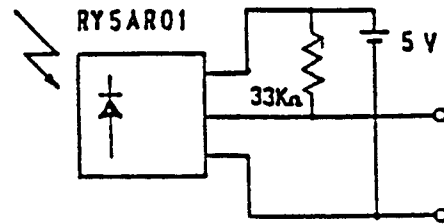
(1) Standard transmitter specification

- Using a standard receiver

(RY5AR01)



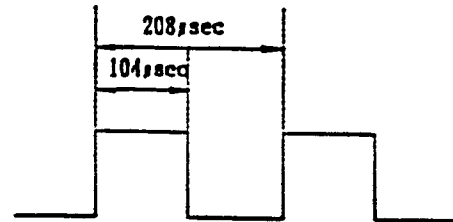
Standard receiver circuit



(2) Input waveform specification

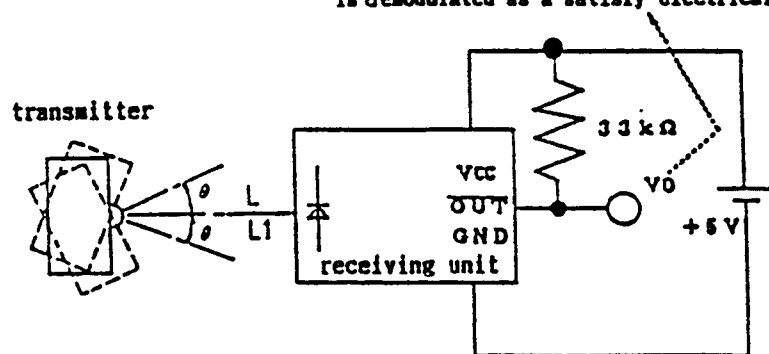
- Transmitter input waveform

(pulse row : 4.8KHz)



(3) Measurement conditions

V_o : Confirmation by oscilloscope(Transmitter waveform is demodulated as a satisfy electrical property)



L, L_1 : Receiving distance

θ : Angle for light receiving surface(horizontal/vertical)

Note: Measurement by single receiver unit

6 - 3 Hints regarding property

(1) Transmissible distance

This unit satisfy the property of 6-1 item under the measurement conditions of 6-2 item, and transmissible distance depend on signal code format, transmitted unit radiation spectrum transmitted radiation power and background optical environment.

If the radiation power is four times one, the receivable distance become two times, because the optical power coming to receiver unit and transmitted unit.

(2) Hints from the viewpoint of designing for infrared communication system <Decoder program>

Because only receiving unit can't cope with prevention of error, decoder program is a important element.

Please make program after taking property of above-mentioned receiving unit into consideration accordingly.

<Optical conditions>

Please use light-receiving window of instrument whose pervious rate of infrared signal is good.

If we particularly use BPF(900~1050nm), it grow more strong for outscattering light.

Please limit light-receiving angle so as not to hit the photodiode.

7. Operating Precautions

(1) If the photodiode light-receiving surface is contaminated with dust or dirt, the sensitivity may degrade.

If contaminated, remove dust or dirt using a soft waste cloth with special care not to damage the surface.

If solvent is required, use methyl alcohol or ethyl alcohol, being careful that no solvent intrudes into the light receiver.

Take care when wiping off because the stamp may be erased.

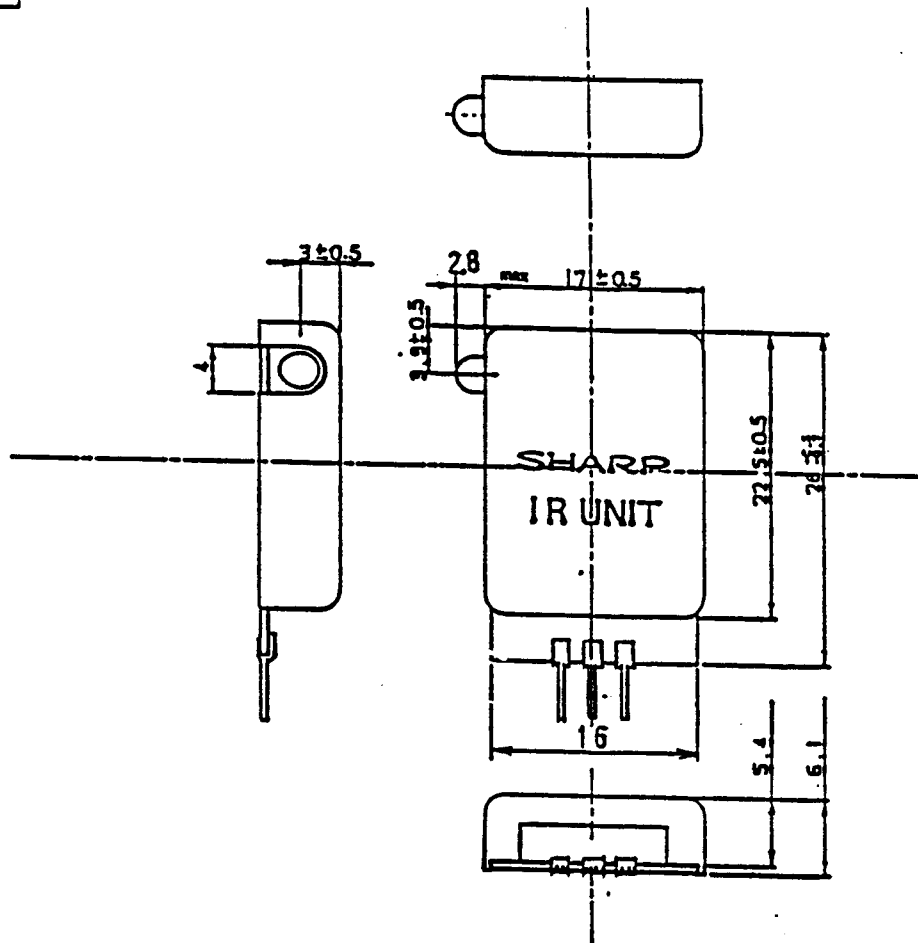
(2) Avoid operating the light receiver in conditions of dew condensation.

(3) The shielding case cover somewhat for the electromagnetic electrostatic noises from using machine of external and internal, but noises may be generated power because of noises entering by the light-receiving window. The shielding effect is raised by sticking wire on light-receiving window.

(4) Infrared communication system don't perform signal communication certainly on account of influence of outscattering light.

This light-receiving unit is used as home machine, and isn't used the use of danger for body as power control, security, and medical instruments, for example.

SHARP



$S = 2/1$

Arrangement of
terminal

- 1: +Vcc
- 2: INPUT
- 3: GND