Conclusion

- The EIA "Command Set" is inadequate - it will burden Consumers
- Without The "IR Pass Through", the consumer will be disadvantaged
- Participation by "other affected industries" (§42) requires it
- "IR Pass Through" is practical & cheap
- **Only needed on "cable ready"**
- Objections we've heard are not valid

SHARP

INFRARED LIGHT DETECTING UNIT FOR REMOTE CONTROL

GP1U90X series

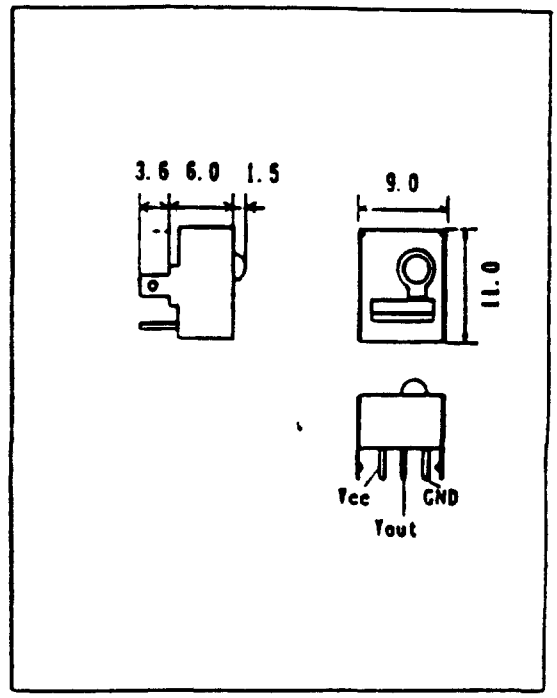
■ GENERAL DESCRIPTION

SHARP's GP1U90X series are super-compact and high performance infrared light detecting units for remote control.

■ FEATURES

- Super-compact package (Mounting area: Approx.1/2 of GP1U58X in volume)
- Enforced resistance to optical noise from inverter-controlled fluorescent lamp (2 times higer than conventional model)
- Unnecessary capacitor and resistance for power supply filter because they are built in an IC
- Built-in voltage regulator circuit
- Various BPF (Band Pass Filter) frequencies matching with user's needs

■ OUTLINE DIMENSIONS (Unit: mm)



■ APPLICATIONS

- TVs
- VCRs
- Camcorders
- Components stereos

■ Absolute Maximum Ratings (Ta = 25°C)

Parameter	Symbol	Ratings	Unit
Operating supply voltage	V_{CC}	0 to 6.3	V
*1 Operating temperature	T_{opr}	−10 to +70	°C
Storage temperature	T_{stg}	−20 to +70	°C
*2 Soldering temperature	T_{sol}	260	°C

*1 No dew formation
*2 For 5 seconds

■ Recommended Operating Conditions

Parameter	Symbol	Value	Unit
Operating supply voltage	V_{CC}	4.7 to 5.3	V

■ Electrical Characteristics

(Ta = 25°C, V_{CC} = 4.5V)

Parameter	Symbol	Conditions	MIN	TYP	MAX	Unit
Dissipation current	I_{CC}	No input light	-	-	5.0	mA
High level output voltage	V_{OH}	* 1	V_{CC} − 0.5			V
Low level output voltage	V_{OL}	* 1			0.15	V
High level pulse width	t_1	* 1	100		800	μs
Low level pulse width	t_2	* 1	100	-	800	μs
B. P. F center frequency	f_0	-	-	* * 40	—	kHz

* 1 The burst wave as shown in the following figure shall be transmitted by the transmitter shown in Fig. 1.

* * Diversified models with a different B. P. F. frequency, as shown in a separate table, are also available

■ Model Line-up

Model No.	B. P. F. frequency	Unit
GP1U90X	40	kHz
*	36	
GP1U901X	38	
GP1U902X	36.7	
*	32.75	
*	41.7	
*	48	
GP1U907X	56.8	
*	39	
*	35	

* Also available on request

■ Specifications are subject to change without notice.

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ELECTRONIC COMPONENTS GROUP

SHARP CORPORATION

SPECIFICATION

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PAGE 9 Pages

REPRESENTATIVE DIVISION

- ☐ PHOTOVOLTAICS DIV.
- ☒ OPTO-ELECTRONIC DEVICES DIV.
- ☐ ELECTRONIC COMPONENTS DIV.
- ☐
- ☐

DEVICE SPECIFICATION FOR

Infrared Light Detecting Unit
for Remote Control

MODEL No. GP1U90X SERIES

1. This specification sheets include the contents under the copyright of Sharp Corporation ("Sharp"). Please keep them with reasonable care as important information. Please don't reproduce or cause anyone reproduce them without Sharp's consent.

2. Please obey the instructions mentioned below for actual use of this device.

(1) This device is designed for general electronic equipment. Main uses of this device are as follows;

[· OA equipment · Telecommunication equipment (Terminal) · AV equipment · Home appliance, etc.]

(2) Please take proper steps in order to maintain reliability and safety, in case this device is used for the uses mentioned below which require high reliability.

[· Unit concerning control and safety of a vehicle (air plane, train, automobile etc.) · Gas leak detection breaker · Traffic signal · Fire box and burglar alarm box · Other safety equipment, etc.]

(3) Please don't use for the uses mentioned below which require extremely high reliability

[· Space equipment · Telecommunication equipment (Trunk) · Nuclear control equipment · Medical equipment (relating to any fatal element), etc.]

☐ CUSTOMER'S APPROVAL

DATE

BY

PRESENTED BY K. Sakamoto

K. Sakamoto
Department General Manager of
Engineering Dept., II
Opto-Electronic Devices Div.
ELECOM Group
SHARP CORPORATION

6

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1. Application

This specifications applies to the model marked "○" in the following models of infrared light detecting unit for remote control.

The model list of GP1U90X series

Application	Model No.	B.P.F. center frequency (TYP)
	GP1U90X	40 kHz
	GP1U901X	38 kHz
	GP1U902X	36.7 kHz
	GP1U907X	56.8 kHz

Main application : TV set, VTR, Radio cassette recorder, Stereo

2. Outline

Refer to the attached sheet, Page 7.

3. Ratings and characteristics

Refer to the attached sheet, Page 3 ~ 6.

4. Reliability

Refer to the attached sheet, Page 8.

5. Incoming inspection

Refer to the attached sheet, Page 9.

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6. Supplement

1) This infrared light detecting unit for remote control satisfies each performance requirements in para 3.5, in the standard optical system in Fig. 2.

2) This product is built-in photodiode.

7. Notes

1) If GP1U90X series is used in wireless remote controllers, please use in accordance with the transmission scheme and the signal format recommended in "Guidance to prevent home appliances with infrared remote control from malfunctions" issued by Japan Association of Electrical Home Appliances (AEHA) in July 1987.
There is a possibility that mulfunction may be caused under some conditions, if the different transmission scheme and signal format from the AEHA's is used. (Ex. signal format without leader signal, or bit structure of smaller duty ratio ($T_H/(T_H+T_L)$), etc)

2) Please use a light emitting unit (remote control transmitter) taking into consideration such factors as the performances, characteristics and operating condition of the light emitting element and the characteristics of this light detecting unit.

3) If the surface of detector is smeared with dust or dirt, it may cause faulty operation. Caution shall be taken to avoid this. And do not touch the detector surface. If the surface was smeared, wipe it clean with soft cloth. If any solvent is needed, Methyl alcohol, Ethyl alcohol, or Isopropyl alcohol should be used. Please don't carry out washing. Because, after washing the remainder in solvent or flux in this device cause mulfunction. Marking on this device is defuced by washing.

4) The shield case shall be grounded on the PWB pattern.
(There are two cases that shield case and GND pin continue in the shield case, or doesn't continue in it.)

5) It shall not be applied the terminals and case with unnecessary stress.

6) Please don't push the detecting side (photodiode) from external.

7) In order to prevent static destruction of integrated circuit, human body and soldering iron, etc. shall be grounded.

8) The holes and the slits on the light detecting unit shall not be used as the other purpose to maintain its performance.

8. Others

Any doubt as to this specification shall be determined in good faith upon mutual consultatin of the both parties.

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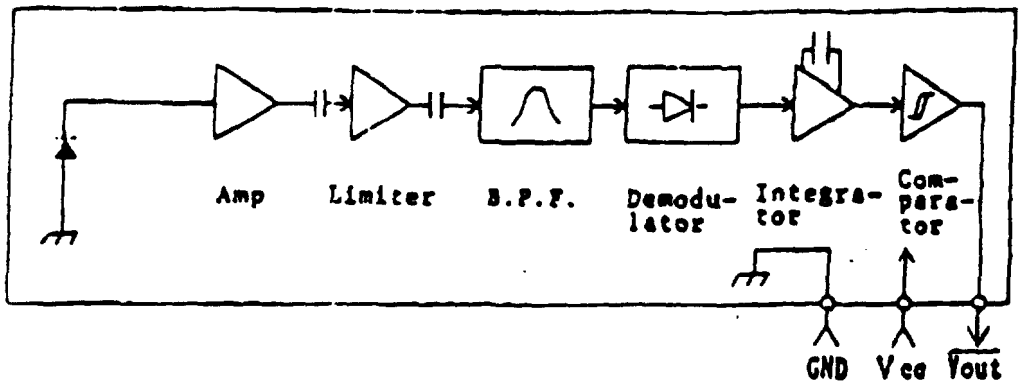
3. Ratings and characteristics

3.1 Schematic



3.2 Absolute maximum ratings

Parameter	Symbol	Rating	Unit
Supply voltage	Vcc	0 ~ 6.3	V
Operating temperature	Topr	-10 ~ +70 *1	°C
Storage temperature	Tstg	-20 ~ +70	°C
Soldering temperature	Tsol	260 (Soldering time: 5sec.) *2	°C

*1) No dew formation
*2) Thichness : 1.6mm at PWB mounting

3.3 Recommended operating conditions

Parameter	Symbol	Operating condition	Unit
Supply voltage	Vcc	4.7 ~ 5.3	V

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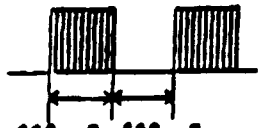
3.4 Electrical characteristics

(Unspecified Ta=25°C, Vcc=+5V)

Parameter	Symbol	MIN.	TYP.	MAX.	Unit	Remark
Current dissipation	I_{CC}	-	-	5.0	mA	No input light
High level output voltage	V_{OH}	Vcc-0.5	-	-	V	*3
Low level output voltage	V_{OL}	-	-	0.45	V	*3
High level pulse width	T_1	400	-	800	μs	*3
Low leve pulse width	T_2	400	-	800	μs	*3
B.P.F. center frequency	fo	-	*4	-	kHz	

*3) The burst wave as shown in the figure on the right shall be transmitted by the transmitter shown in Fig. 1. However, the carrier freqency of transmitter is same as *4.



f_0 = *4 kHz Duty 50%

*4) B.P.F. center frequency : fo of each model is shown in the list below.

Model name	B.P.F. center freqiency (kHz)
GP1U90X	40
GP1U901X	38
GP1U902X	36.7
GP1U907X	56.8

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3.5 Performance

The output signal of this light detecting unit shall satisfy the following requirements with the transmitter shown in Fig. 1 used in the standard optical system in Fig. 2.

3.5.1 Characteristics of linear reception distance

The output signal shall satisfy the electrical characteristic requirements in para 3.4 at L=0.2 ∿ 8m, (*5) Ea < 10lx, ϕ=0° in Fig. 2.

3.5.2 Characteristics of sensitivity angle reception distance

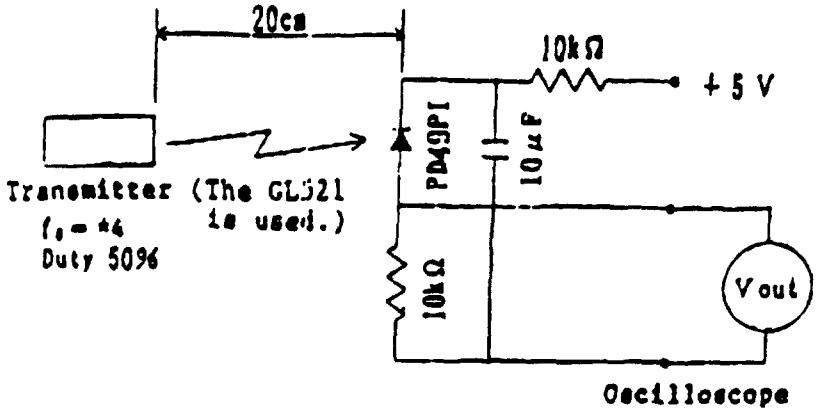
The output signal shall satisfy the electrical characteristic requirements in para. 3.4 at L=0.2 ∿ 6m, (*5) Ea < 10lx, $\phi \leq 30°$ in Fig. 2

3.5.3 Characteristics of anti-outer peripheral light reception distance

The output signal shall satisfy the electrical characteristic requirements in para 3.4 at L=0.2 ∿ 4m, (*6) Ea ≤ 300lx, ϕ=0° in Fig. 2.

*5) It refers to detector face illuminance.

*6) Outer peripheral light source: CIE standard light source A shall be used and placed at 45° from the perpendicular axis at the detector face center.



In the figure above, the transmitter shall be set as the output Vout will be 40mVpp. Note that the PD49PI in this application is the one with short-circuit current Isc=2.6μA measured at Ev=100lx. (Ev is the illuminance by CIE standard light source A (tungsten lamp)).

fig. 1 Transmitter

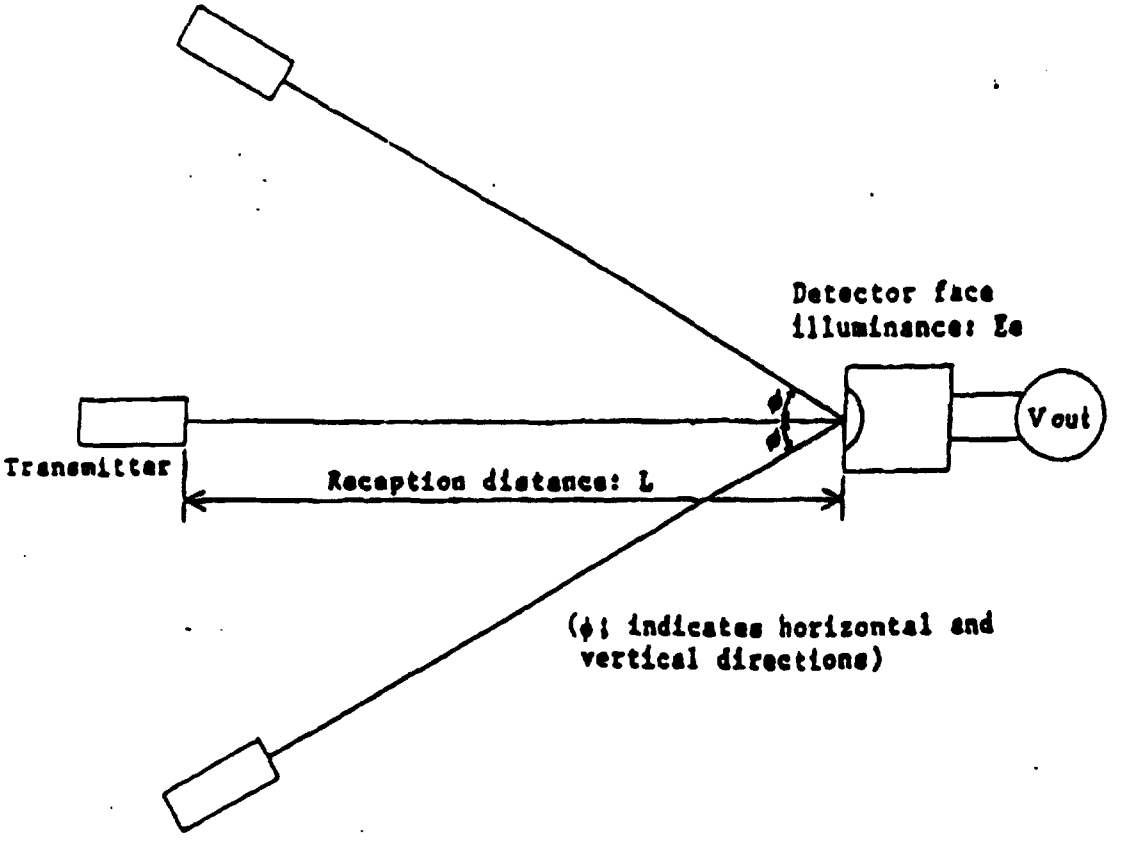
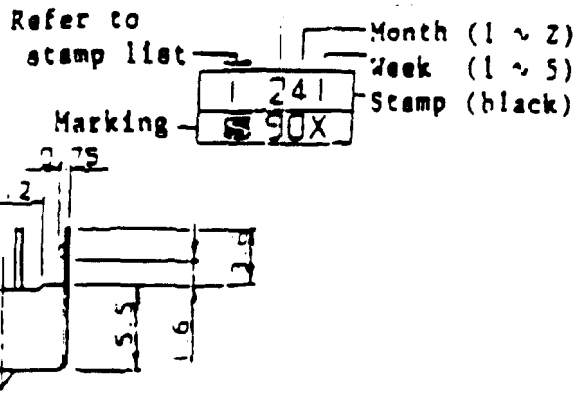
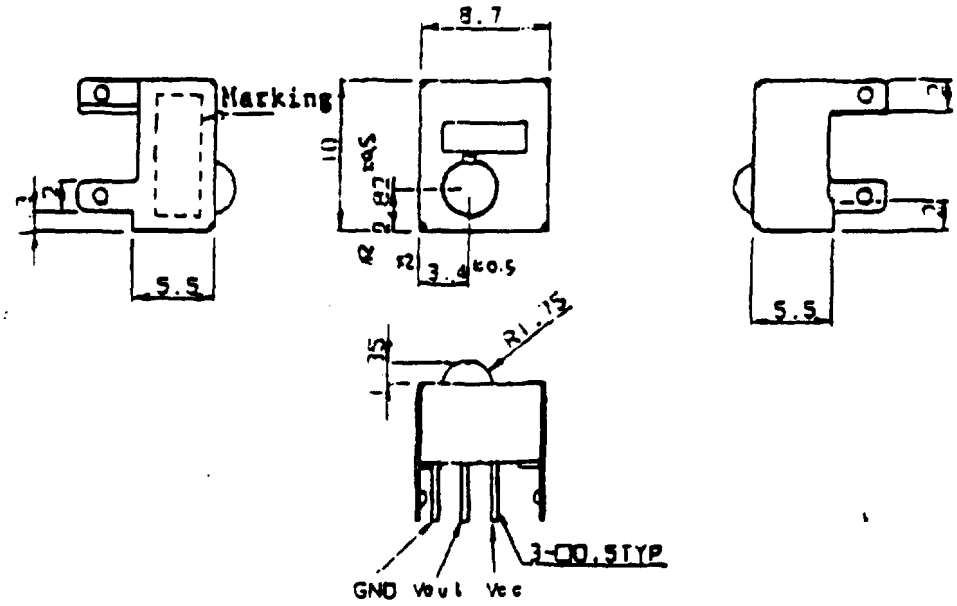


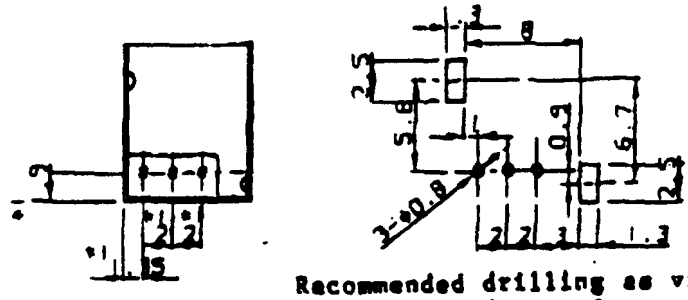
Fig. 2 Standard optical system

Stamp list

Model No.	Stamp
GP1U90X	Without
GP1U901X	1
GP1U902X	2
GP1U907X	7







Recommended drilling as viewed from the soldering face

Note

1) *1 is center in light detection of connector.
2) Unspecified tolerance : ±0.3
3) Case material : Fe (Finish: Solder plating)
4) Weight : Approx. 1.0g
5) Thickness : 0.25TYP.
6) *2 : Center of light detector

名称 NAME	GP1U90X series Outline Dimensions	
尺度 SCALE		単位 UNIT
2/1		1 = 1/100
図番	S00980980	

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4. Reliability

The reliability of products shall be satisfied with items listed below.

Confidence level : 90%
LTPD : 10%/20%

Test items	Test conditions	Judgement Criteria	Samples (n) / Defective(C)
Terminal strength (Tension)	Weight: 500g 30 sec./each terminal	Performance test requirements and criteria given in para 3.5 should be satisfied.	n=11, C=0
Terminal strength (Bending)	Weight: 250g 0° → -90° → -0° 2 times/each terminal		n=11, C=0
Shock	Acceleration: 100G, 6ms, 3 directions/3 times		n=11, C=0
Variable frequency vibration	Frequency range: 10 ∿ 55Hz/sweep 1 min. Overall amplitude: 1.5mm X,Y,Z/2h. each		n=11, C=0
* High temp. and high humidity storage	Ta=40°C, 90%RH, t=240h		n=22, C=0
* High temp. storage	Ta=70°C, t=240h		n=22, C=0
* Low temp. storage	Ta=-20°C t=240h		n=22, C=0
* Temperature cycling	1 cycle -20°C ∿ +70°C (30min) (30min) 20 cycle test		n=22, C=0
* Operation life (high temp.)	Ta=70°C, Vcc=5V t=240h		n=22, C=0
Soldering heat	260±5°C 5 sec. (Thichness : 1.6mm at PWB mounting)		n=11, C=0

In the test * mark above, the sample to be tested shall be left at normal temperature and humidity for 2 hours after it is taken out of the stat. (No dew point)

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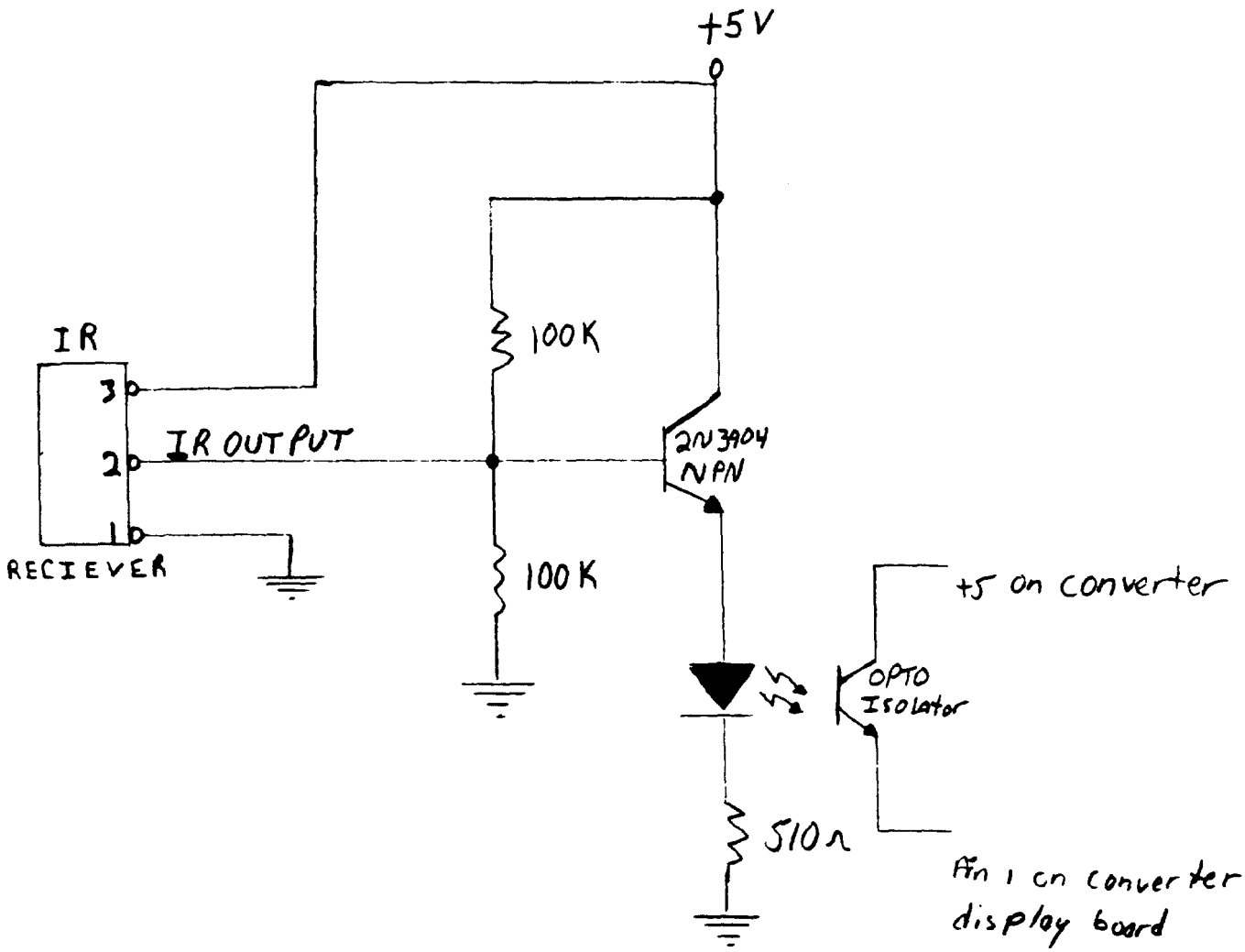
5. Incoming inspection

(1) Inspection lot

Inspection shall be carried out per each delivery lot.

(2) Inspection method

A single sampling plan, normal inspection level II based on MIL-STD-105D shall be applied.

Classification of Defects		Inspection Items	AQL(%)
Major defect	1	Electrical characteristic defect of V_{OH}, V_{OL}, T_1 and T_2 in 3.4.	0.4
	2	Distance between signal terminal and shield case (0.2mm or more) (Except for GND terminal)	
	3	It shoud have no remarkable stains and cracks that give any influence of electrical characteristic on light detecting face.	
Minor defect	1	Transformation of shield case (Satisfying outline dimensions of item 2)	1.5
	2	Stamp (It should be possible to read stamp of item 2. Stamp should be indicated at fixed position.)	

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