IS1U60/IS1U60L

Sensors with 1-Package Design of Remote Control Detecting Functions owing to OPIC

■ Features

1. 1-package design owing to adoption of OPIC
2. Compact
   (Volume : About 1/8 compared with **GP1U58X**)
3. B.P.F. (Band Pass Frequency) : (TYP. 38kHz)
4. Aspherical lens

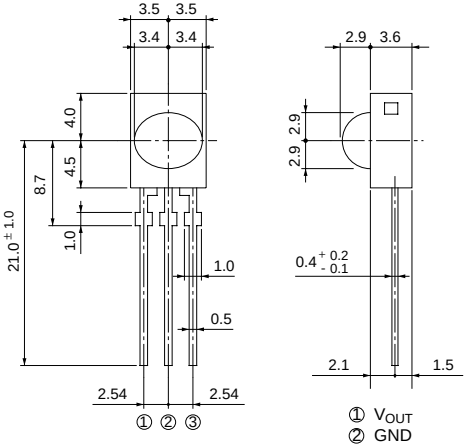
■ Applications

1. Audio equipment
2. Cameras

■ Outline Dimensions

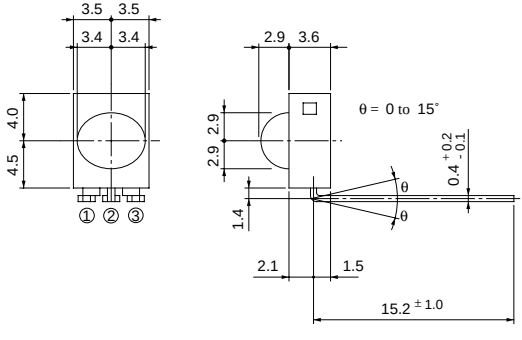
(Unit : mm)

IS1U60



* Tolerance : ± 0.2

IS1U60L



* Tolerance : ± 0.2

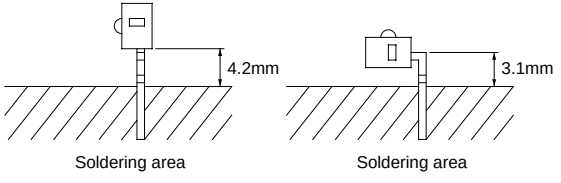
* "OPIC" (Optical IC) is a trademark of the SHARP Corporation.
An OPIC consists of a light-detecting element and signal-processing circuit integrated onto a single chip.

■ Absolute Maximum Ratings

(Ta=25˚C)

Parameter	Symbol	Rating	Unit
Supply voltage	V_{CC}	0 to 6.0	V
*1Operating temperature	T_{opr}	- 10 to + 60	˚C
Storage temperature	T_{stg}	- 20 to + 70	˚C
*2Soldering temperature	T_{sol}	260	˚C

*1 No dew condensation is allowed.
*2 For 5 seconds



■ Recommended Operating Conditions

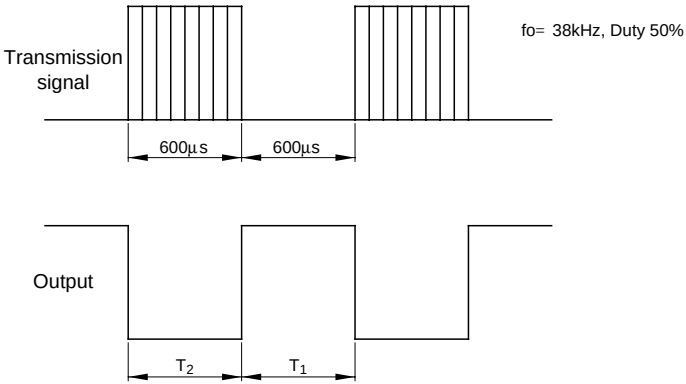
Parameter	Symbol	Recommended operating conditions	Unit
Operating supply voltage	V_{CC}	4.7 to 5.3	V

■ Electrical Characteristics

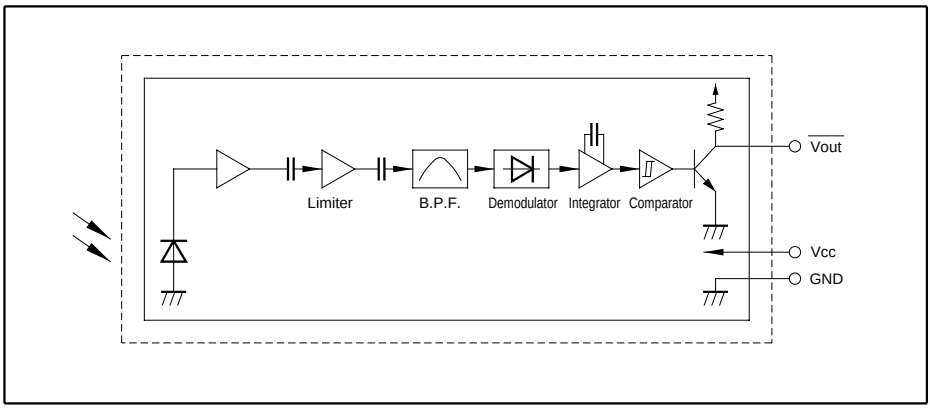
(Ta=25˚C, V_{CC} =+5V)

Parameter	Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Dissipation current	I_{CC}	No input light	-	2.8	4.5	mA
High level output voltage	V_{OH}	*3, Output terminal OPEN	V_{CC}- 0.2	-	-	V
Low level output voltage	V_{OL}	*3, *4	-	0.45	0.6	V
High level pulse width	T_1	*3	400	-	800	μs
Low level pulse width	T_2		400	-	800	μs
B.P.F. center frequency	f_O		-	38	-	kHz
Linear ultimate distance	L	ϕ , θ = 0˚, E_e < 10 lx	5.0	-	-	m
Linear ultimate distance	L_1	ϕ = ± 30˚ (θ = 0˚) θ = ± 15˚ (ϕ = 0˚) E_e < 10 lx	3.0	-	-	m

*3 The burst wave as shown in the following figure shall be transmitted.
*4 Pull-up resistance : 2.2kΩ
*5 By SHARP transmitter



■ Internal Block Diagram



■ Performance

Using the transmitter shown in Fig. 1, the output signal of the light detecting unit is good enough to meet the following items in the standard optical system in Fig. 2.

(1) Linear reception distance characteristics

When L=0.2 to 5 m, Ee < 10 lx (*4) and ϕ =0° in Fig. 2, the output signal shall meet the electrical characteristics in the attached list.

(2) Sensitivity angle reception distance characteristics

When L=0.2 to 3 m, Ee < 10 lx (*4) and ϕ<= 30 ° in the direction X and θ =0° in the direction Y in Fig. 2, the output signal shall meet the electrical characteristics in the attached list Further, the electrical characteristics shall be met when L=0.2 to 5 m, Ee < 10 lx (*4) and ϕ =0° in the direction X and θ<= 15° in the direction Y.

*4 It refers to detector face illuminance.

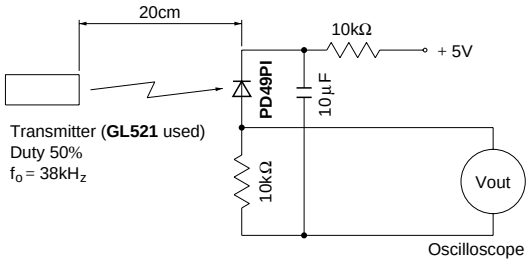


Fig. 1 Transmitter

In the above figure, the transmitter should be set so that the output Vout can be $40mV_{P-P}$.

However, the **PD49PI** to be used here should be of the short-circuit current I_{SC}=2.6μA at Ev=100 lx.

(Ev is an illuminance by CIE standard light source A (tungsten lamp).)

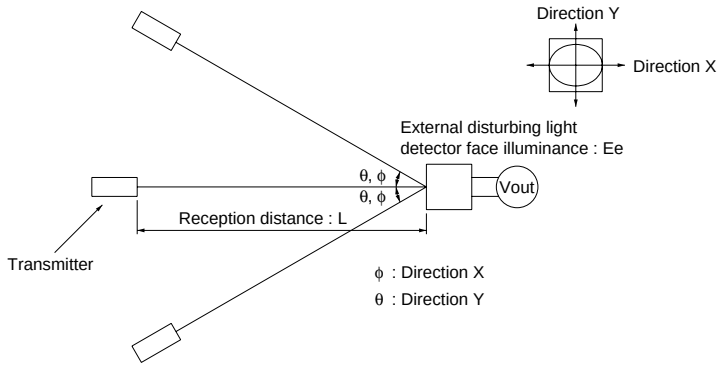


Fig. 2 Standard optical system

Fig. 1 B.P.F. Frequency Characteristics (TYP.)

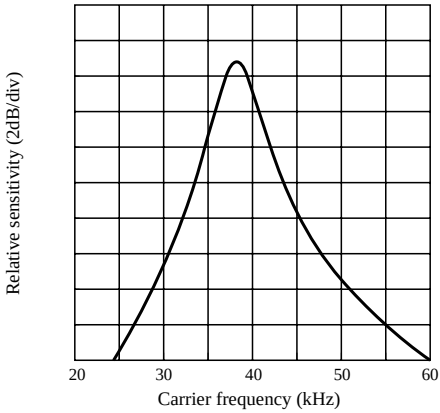


Fig. 2 Sensitivity Angle (Direction X) Characteristics (TYP.) for Reference

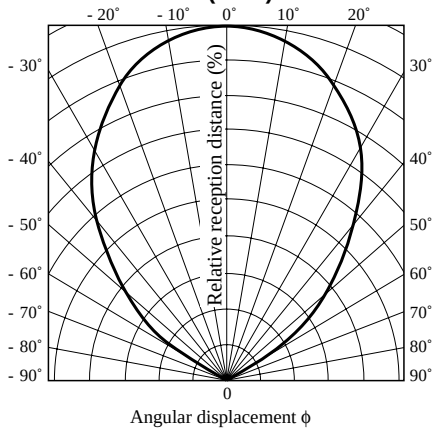


Fig. 3 Sensitivity Angle (Direction Y) Characteristics (TYP.) for Reference

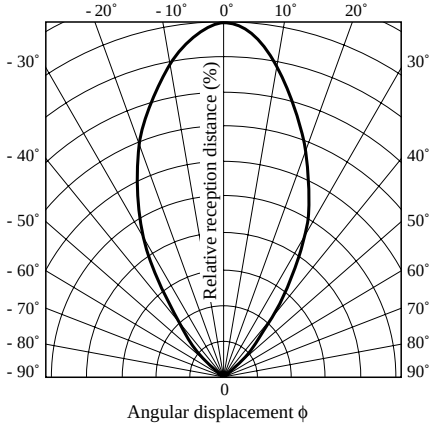


Fig. 4 Relative Reception Distance vs. Ambient Temperature (TYP.) for Reference

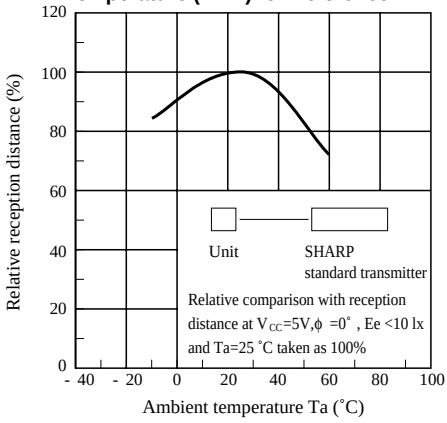
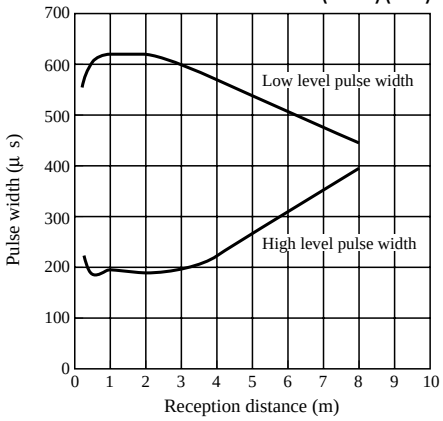
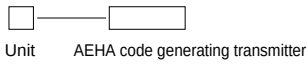


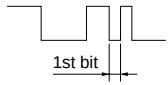
Fig. 5 AEHA (Japan Association of Electrical Home Appliances) Code Pulse Width Characteristics (1st Bit) (TYP.) for Reference



(Conditions)

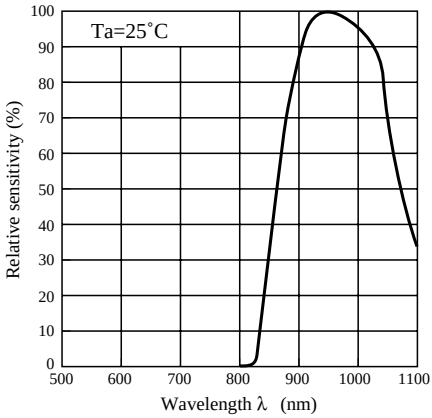


V_{CC}=5V, Ta=RT, ϕ =0˚, Ee < 10 lx



T= 430 μ s

Fig. 6 Spectral Sensitivity for Reference



■ Precautions for Operation

(1) Use the light emitting unit (remote control transmitter), in consideration of performance, characteristics, operating conditions of light emitting device and the characteristics of the light detecting unit.

(2) Pay attention to a malfunction of the light detecting unit when the surface is stained with dust and refuse.
Care must be taken not to touch the light detector surface.

• Conduct cleaning as follows.

(3) Cleaning

Solvent dip cleaning : Solvent temperature of 45 ˚C max., dipping time : Within 3 minutes

Ultrasonic cleaning : Elements are affected differently depending on the size of cleaning bath, ultrasonic output, time, size of PWB and mounting method of elements.
Conduct trial cleaning on actual operating conditions in advance to make sure that no problem results.

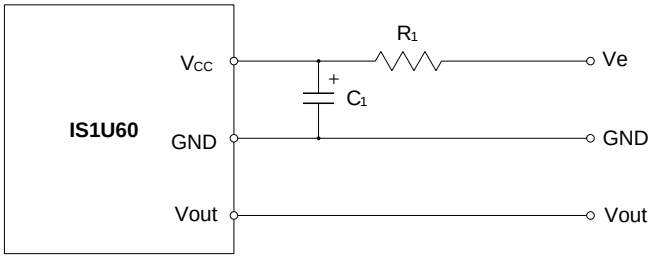
• Use the following solvents only.

Solvents : Ethyl alcohol, methyl alcohol or isopropyl alcohol

(4) To avoid the electrostatic breakdown of IC, handle the unit under the condition of grounding with human body, soldering iron, etc.

(5) Do not apply unnecessary force to the terminal.

(6) Example of recommended external circuit (mount outer mounting parts near the sensor as much as possible.)



(Circuit constant)
R_1 = 47Ω ± 5%
C_1 = 47µF

LAMPIRAN A

FOTO ALAT

FOTO ALAT KESELURUHAN

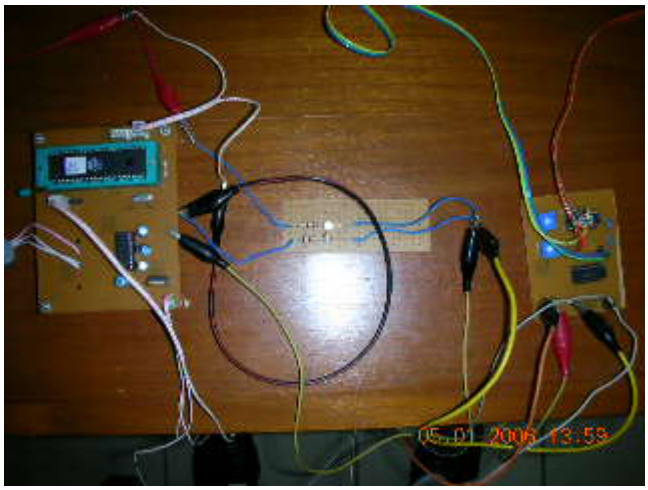
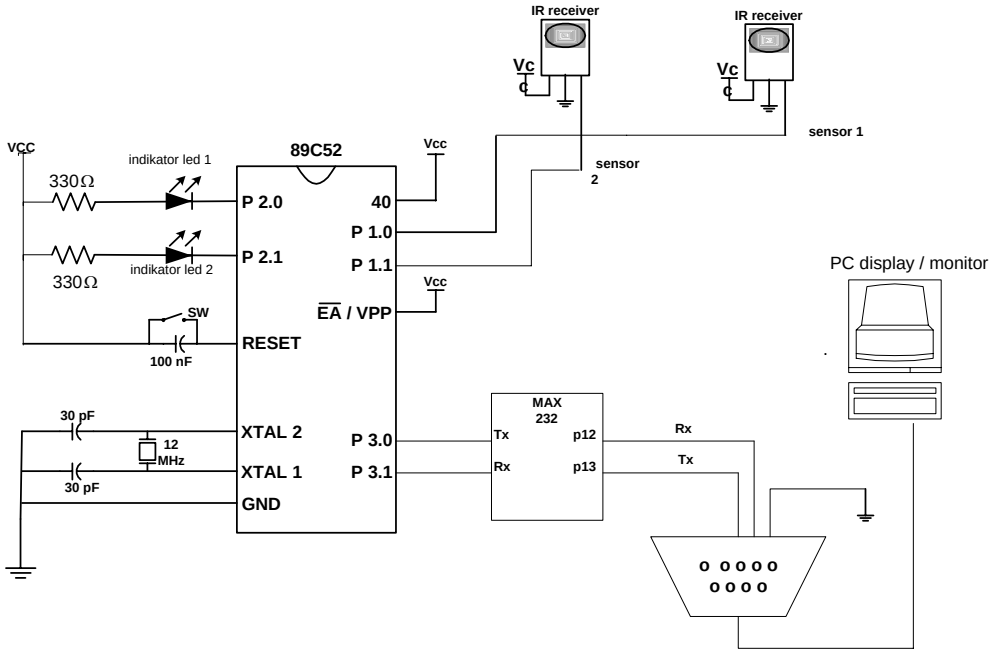


FOTO RANGKAIAN ALAT

LAMPIRAN B
SKEMATIK RANGKAIAN



LAMPIRAN C

PERANGKAT LUNAK MIKROKONTROLER

```
org 0h
 main: mov p2,#0ffh
       mov p2,#00h
       mov p1,#00h
       mov tmod,#01h
       mov r2,#20
       mov r0,#00
       mov r1,#00
       mov r3,#00
       mov r4,#00
       clr tf0
       clr tr0
       mov th0,#00h
       mov tl0,#00h
       mov a,#00
       mov dptr,#0000h
       mov b,#0h

 ambil:  mov a,p1
         mov p2,a
         cjne a,#03h,ambil

tekan:  jnb p1.3,tekan

cari:  jb p1.0 ,dua
       sjmp cari

 dua:  mov th0,#76
       mov tl0,#028
 ta1:  mov r2,#20
hit1:  clr tf0
       setb tr0
  tu1: jnb tf0,tu1
       jnb  p1.0,stop1
       djnz r2,hit1
       inc r3
       sjmp ta1

 stop1: mov 012h,r3
        mov 013h,r2
        sjmp satu

 satu:
 ta:    mov r2,#20
 hit:   clr tf0
  tu:   jnb tf0,tu
        jb p1.1,stop
        djnz r2,hit
        inc r3
```

```
        sjmp ta


stop: jnb p1.1,stop
      clr tr0
      mov a,#20
      subb a,r2
      mov r2,a
      mov a,#10
      mov b,r2
      mul ab
      mov b,#20
      div ab
      cjne a,#05,b1
      sjmp biasa
 b1:  cjne a,#04,b2
      sjmp biasa
 b2:  cjne a,#03,b3
      sjmp biasa
 b3:  cjne a,#02,b4
      sjmp biasa
 b4:  cjne a,#01,b5
      sjmp biasa
 b5:  cjne a,#00,bulat
      sjmp biasa

 biasa: mov r2,013h
        mov a,#20
        subb a,r2
        mov b,#20
        div ab
   cjne a,#05,bb1
      sjmp bbiasa
 bb1:  cjne a,#04,bb2
      sjmp bbiasa
 bb2:  cjne a,#03,bb3
      sjmp bbiasa
 bb3:  cjne a,#02,bb4
      sjmp bbiasa
 bb4:  cjne a,#01,bb5
      sjmp bbiasa
 bb5:  cjne a,#00,bbulat
       sjmp bbiasa
bbiasa:
        mov a,r3
        clr tf0
        sjmp hitung1
bbulat: inc r3
        mov a,r3
        clr tf0
        sjmp hitung1

  bulat: inc r3
        mov r2,013h
        mov a,#20
        subb a,r2
```

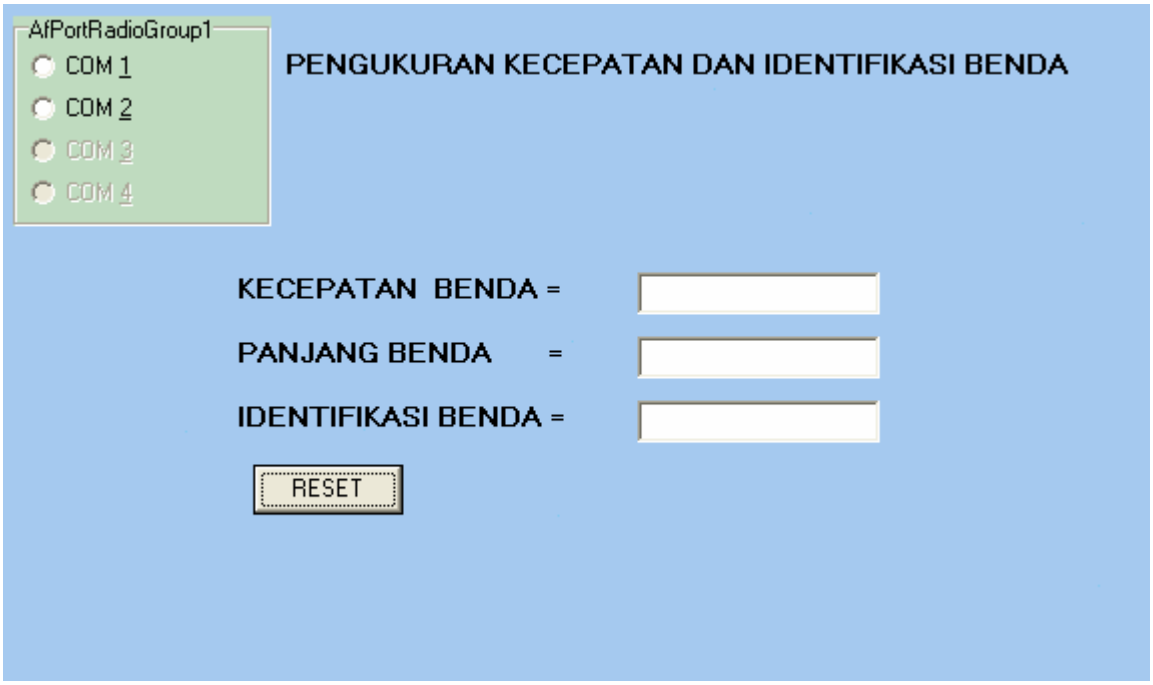
```
        mov b,#20
        div ab

 cjne a,#05,bbb1
      sjmp bbbiasa
 bbb1:  cjne a,#04,bbb2
      sjmp bbbiasa
 bbb2:  cjne a,#03,bbb3
      sjmp bbbiasa
 bbb3:  cjne a,#02,bbb4
      sjmp bbbiasa
 bbb4:  cjne a,#01,bbb5
      sjmp bbbiasa
 bbb5:  cjne a,#00,bbbulat
       sjmp bbbiasa

bbbiasa: mov a,r3
         clr tf0
         sjmp hitung1

bbbulat: inc r3
         mov a,r3
         clr tf0
         sjmp hitung1

hitung1: mov b,a
         mov a,#100
         div ab
         mov 014h,a
         mov a,#10
         mul ab
         mov b,r3
         div ab
         mov 015h,a
         mov a,013h
         mov b,020
         subb a,b
         mov b,#020
         div ab

      cjne a,#05,c1
      sjmp biasa2
 c1:  cjne a,#04,c2
      sjmp biasa2
 c2:  cjne a,#03,c3
      sjmp biasa2
 c3:  cjne a,#02,c4
      sjmp biasa2
 c4:  cjne a,#01,c5
      sjmp biasa2
 c5:  cjne a,#00,bulat2
      sjmp biasa2

 bulat2: mov r3,012h
        inc r3
        sjmp hitung2
```

```
biasa2:
       mov r3,012h
       sjmp hitung2


 hitung2: mov b,014h
          mov a,r3
          mul ab
          mov 016h,a
          mov 017h,b
          mov b,015
          mov a,r3
          mul ab
          mov b,#010
          div ab
          mov a,017h
          add a,b
          mov 017h,a
          call time
          mov a,#00h
          mov a,014h
          call outchr
          nop
          call delay
          mov a,#00h
          mov a,015h
          call outchr
          call delay
          mov a,#00h
          mov a,016h
          call outchr
          call delay
          mov a,#00h
          mov a,017h
          call outchr




 akhir:   call delay
           ljmp main


 time:
      mov tmod,#20h
      mov TH1,#0f4h
      setb TR1
      mov scon,#52h
      ret


outchr:
          jnb ti,outchr
          mov sbuf,a
```

```
          clr ti
          ret


delay:
       mov r0,#39h
 dly0:   mov r1,#39h
 dly1:   mov r4,#39h
 dly2:   djnz r2,dly2
         djnz r1,dly1
         djnz r0,dly0
         ret
```

LAMPIRAN D

TAMPILAN PADA LAYAR KOMPUTER



LAMPIRAN E

PROGRAM C++ UNTUK TAMPILAN PADA LAYAR KOMPUTER

```
#include <bios.h>
#include <conio.h>
#include <dos.h>
#include <stdio.h>

#define com2 0x02f8
void main( )
{       char k ; int c; char u;
                int inisialisasi (void)
{               int gdriver = DETECT, gmode, errorcode;
                initgraph(&gdriver, &gmode, "");
                errorcode = graphresult( );
                if (errorcode != grok)  }
                inisialisasi ( );
setcolor(13) ;
 line(50, 100, 600, 100) :
 outtextxy(233, 110, "menu") ;
 setcolor(9);
 outtextxy(85, 130, "PENGUKUR KECEPATAN");
 setcolor(3);
 outtextxy(200, 140, "tekan 1 untuk mengukur kecepatan");
 outtextxy(200, 150, "tekan 2 untuk mengukur panjang & identifikasi");
 outtextxy(200, 160, "tekan 3 untuk reset");
 setcolor(8);
 outtextxy(200, 170, "tekan 4 untuk exit");
 line(50, 200, 600, 200) ;
 ok = getch( ) ;          }
 a=0;b=0;
 switch(ok) { case '1' :V
              case '2' :L
              case '3' :reset
              case '4' :exit
closegraph ( );
        clrscr( );
              clrscr ( );
V:{     outportb(com2+1, 0);
        outportb(com2+3, 0x81);
```

```
        outportb(com2, 0x31);
        outportb(com2+1, 0X01);
        outportb(com2+3, 0x03);
        outportb(com2+2, 0x0c7);
        outportb(com2+4, 0x0B);
        do
        {
        c = inportb(com2+5) ;
        if (c&1)  {  k = inportb(com2) ;printf("%d", k);}
        if (kbhit( )){ u = getch( ) ;  }
        }
        while(u!=27);
        if(d<5){printf(" hasil = motor")};
        if(d=10){printf(" hasil = mobil)};
        if(d>10){printf(" hasil = truk")};
        printf("hasil kecepatan = ");
        printf("\n selesai");
        getch ( );
  }
reset:  {outportb(com2+3, 0x00);
}
exit:   { exit(0)};
}
```