



unit Selektor;

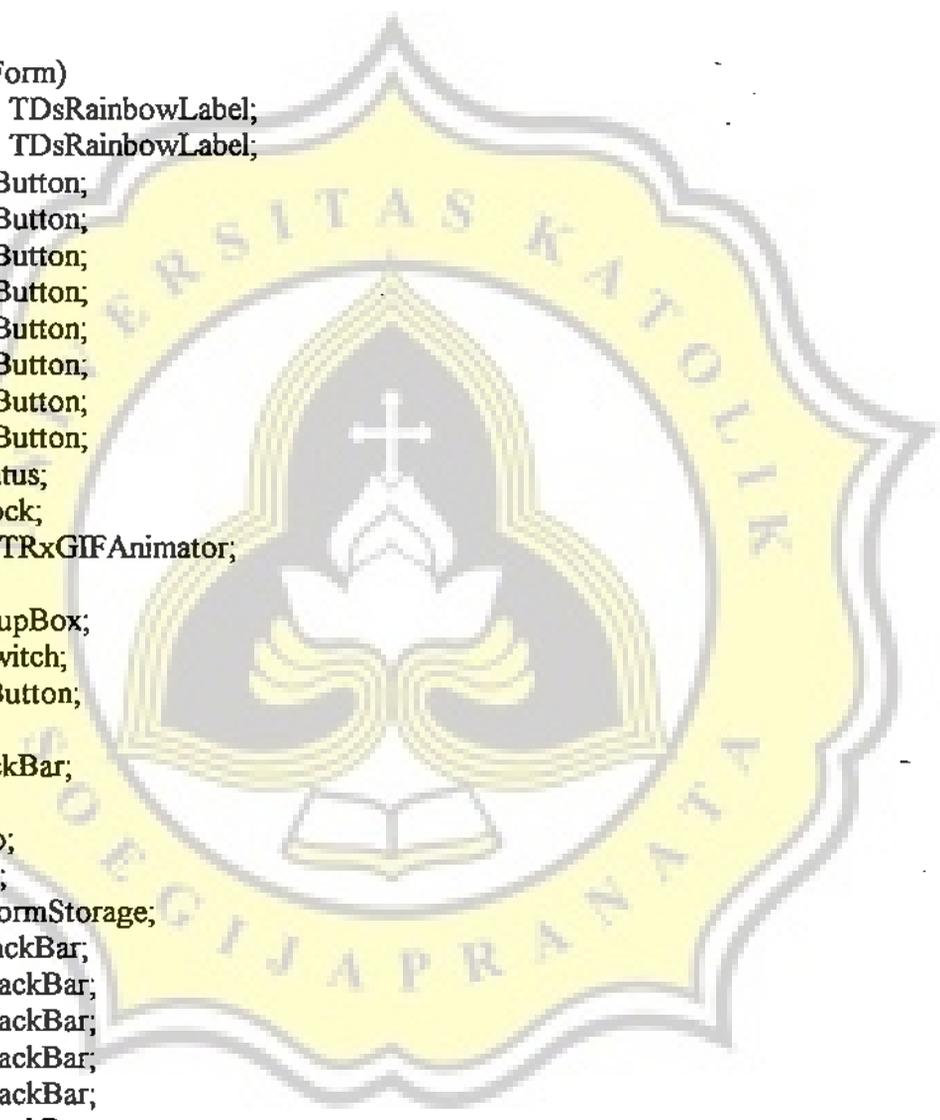
interface

uses

Windows, Messages, SysUtils, Classes, Graphics, Controls, Forms, Dialogs,
RXSwitch, RXClock, ExtCtrls, DsFancyButton, StdCtrls,
DsRainbowLabel, Animate, GIFCtrl, RXSlider, DsGradLabel, TimerLst,
ComCtrls, Gauges, DsRadio, Placemnt;

type

TFUtama = class(TForm)
DsRainbowLabel1: TDsRainbowLabel;
DsRainbowLabel2: TDsRainbowLabel;
audio1: TDsFancyButton;
audio2: TDsFancyButton;
audio3: TDsFancyButton;
audio4: TDsFancyButton;
audio5: TDsFancyButton;
audio6: TDsFancyButton;
audio7: TDsFancyButton;
audio8: TDsFancyButton;
DsStatus1: TDsStatus;
RxClock1: TRxClock;
RxGIFAnimator1: TRxGIFAnimator;
Image1: TImage;
GroupBox1: TGroupBox;
RxSwitch1: TRxSwitch;
keluar: TDsFancyButton;
Timer1: TTimer;
vol_kontrol: TTrackBar;
Gauge1: TGauge;
selektor: TDsRadio;
volume: TDsRadio;
FormStorage1: TFormStorage;
vol_kontrol2: TTrackBar;
Vol_kontrol3: TTrackBar;
Vol_kontrol4: TTrackBar;
Vol_kontrol5: TTrackBar;
Vol_kontrol6: TTrackBar;
Vol_kontrol7: TTrackBar;
Vol_kontrol8: TTrackBar;
RxGIFAnimator2: TRxGIFAnimator;
DsFancyButton1: TDsFancyButton;
function Inport(alamat : word) : byte;
procedure Outport(alamat : word; dat : byte);
Procedure Delay(Lama:LongInt);
procedure keluarClick(Sender: TObject);
procedure RxSwitch1On(Sender: TObject);
procedure FormCreate(Sender: TObject);



```
procedure RxSwitch1Off(Sender: TObject);
procedure Timer1Timer(Sender: TObject);
procedure interval(Lama:Longint);
procedure audio1Click(Sender: TObject);
procedure vol_kontrolChange(Sender: TObject);
procedure selektorClick(Sender: TObject);
procedure volumeClick(Sender: TObject);
procedure audio2Click(Sender: TObject);
procedure TrackBar1Change(Sender: TObject);
procedure audio3Click(Sender: TObject);
procedure audio4Click(Sender: TObject);
procedure audio5Click(Sender: TObject);
procedure audio6Click(Sender: TObject);
procedure audio7Click(Sender: TObject);
procedure audio8Click(Sender: TObject);
procedure vol_kontrol2Change(Sender: TObject);
procedure Vol_kontrol3Change(Sender: TObject);
procedure Vol_kontrol4Change(Sender: TObject);
procedure Vol_kontrol5Change(Sender: TObject);
procedure Vol_kontrol6Change(Sender: TObject);
procedure Vol_kontrol7Change(Sender: TObject);
procedure Vol_kontrol8Change(Sender: TObject);
procedure DsFancyButton1Click(Sender: TObject);
```

```
private
  { Private declarations }
public
  { Public declarations }
end;
```

```
var
  FUtama: TFUtama;
  dataA : byte;
  dataB : byte;
  stop : boolean;
```

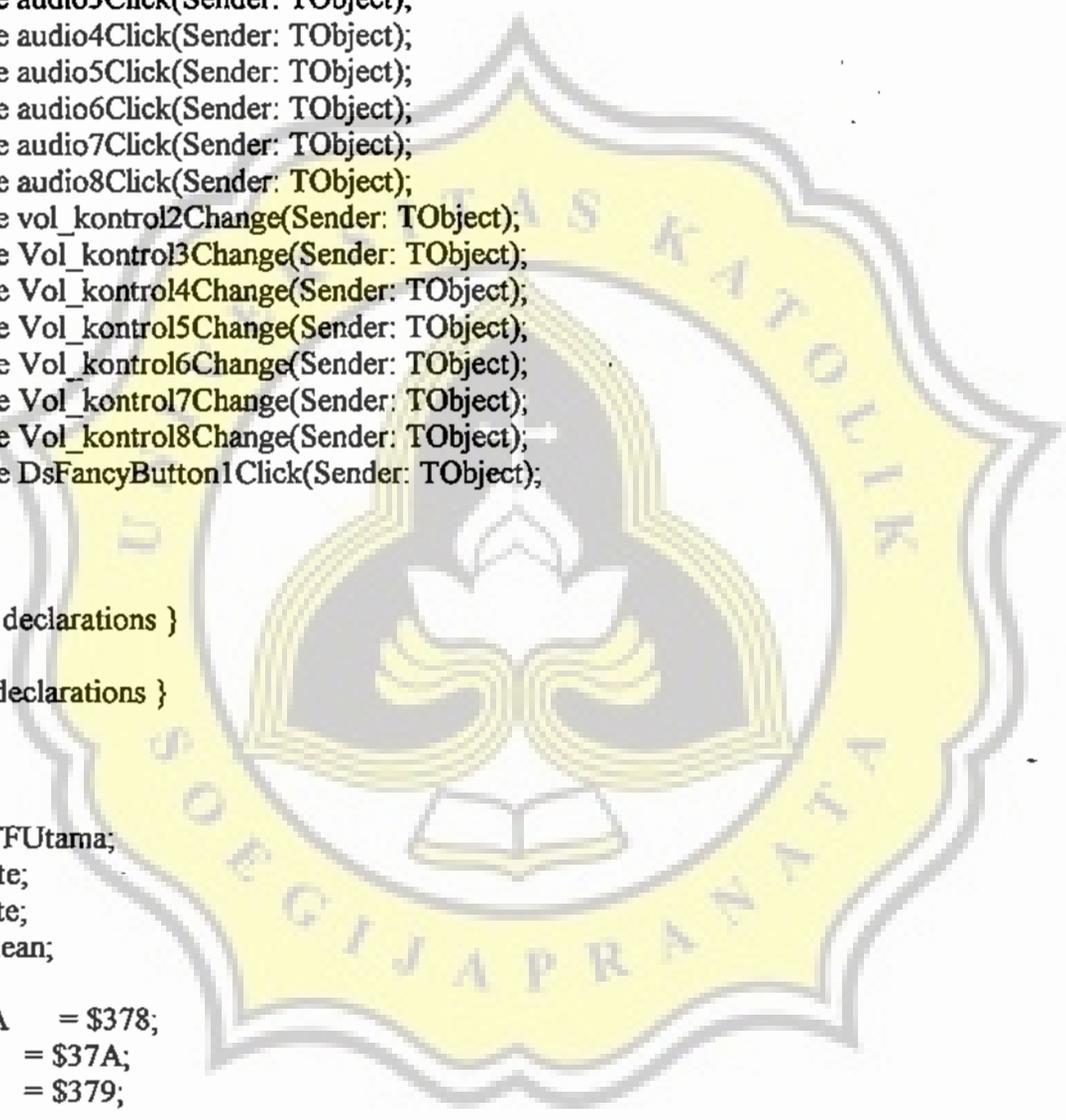
```
Const PortA   = $378;
      PortB   = $37A;
      PortC   = $379;
```

```
implementation
```

```
uses Confirm;
```

```
{ $R *.DFM }
```

```
function TFUtama.Inport(alamat : word) : byte;
var data : byte;
begin
```



```
asm
  mov dx,alamat
  in al,dx
  mov data,al
end;
inport := data;
end;
```

```
procedure TFUtama.Outport(alamat : word; dat : byte);
begin
  asm
    mov dx,alamat
    mov al,dx
    out dx,al
  end;
end;
```

```
procedure TFUtama.keluarClick(Sender: TObject);
begin
  stop:=true;
  Application.terminate;
end;
```

```
procedure TFUtama.RxSwitch1On(Sender: TObject);
begin
  audio1.Enabled:=true;
  audio2.Enabled:=true;
  audio3.Enabled:=true;
  audio4.Enabled:=true;
  audio5.Enabled:=true;
  audio6.Enabled:=true;
  audio7.Enabled:=true;
  audio8.Enabled:=true;
  vol_kontrol.Enabled:=false;
  vol_kontrol2.Enabled:=false;
  vol_kontrol3.Enabled:=false;
  vol_kontrol4.Enabled:=false;
  vol_kontrol5.Enabled:=false;
  vol_kontrol6.Enabled:=false;
  vol_kontrol7.Enabled:=false;
  vol_kontrol8.Enabled:=false;
  selektor.enabled:=false;
  volume.enabled:=true;
  keluar.Enabled:=false;
  outport(porta,$00);
  vol_kontrol.Show;
  vol_kontrol2.Hide;
  vol_kontrol3.Hide;
  vol_kontrol4.Hide;
  vol_kontrol5.Hide;
```

```
vol_kontrol6.Hide;  
vol_kontrol7.Hide;  
vol_kontrol8.Hide;  
end;
```

```
procedure TFUtama.FormCreate(Sender: TObject);
```

```
begin
```

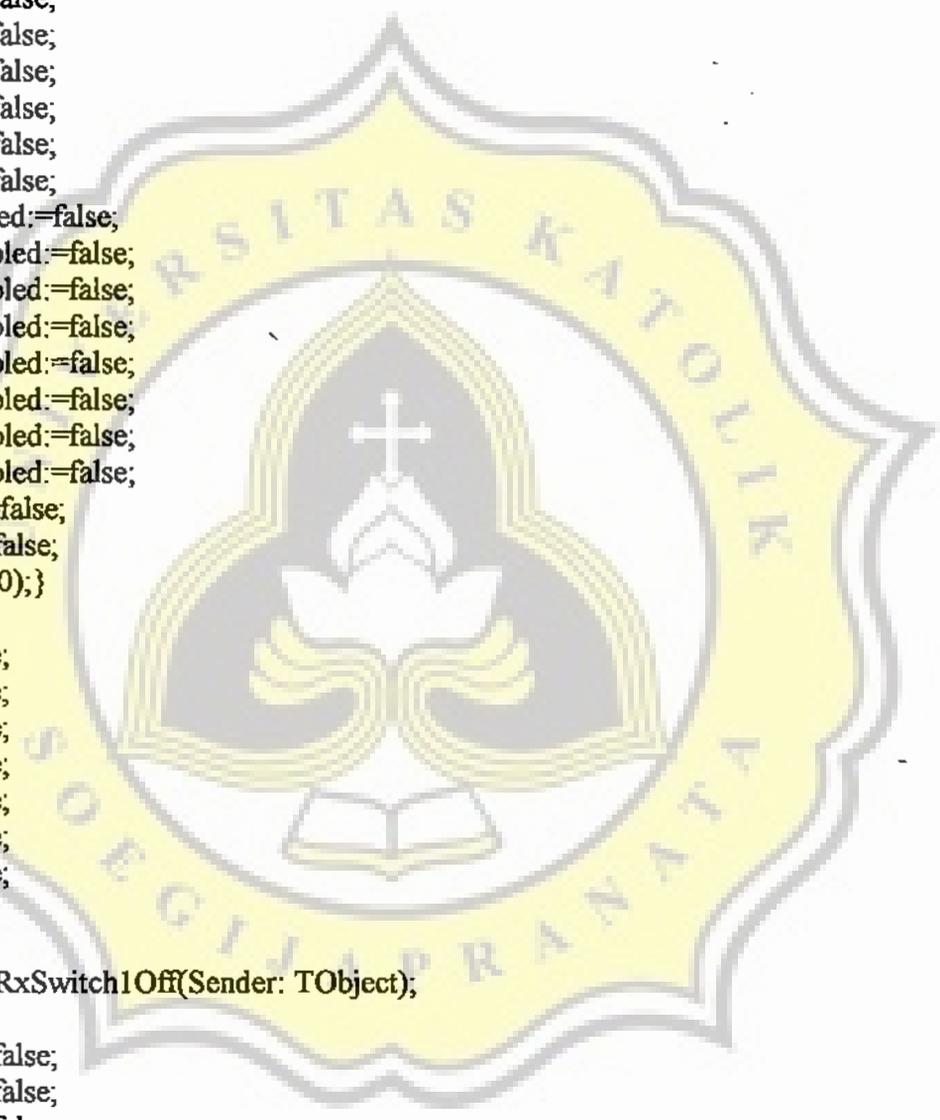
```
  audio1.Enabled:=false;  
  audio2.Enabled:=false;  
  audio3.Enabled:=false;  
  audio4.Enabled:=false;  
  audio5.Enabled:=false;  
  audio6.Enabled:=false;  
  audio7.Enabled:=false;  
  audio8.Enabled:=false;  
  vol_kontrol.Enabled:=false;  
  vol_kontrol2.Enabled:=false;  
  vol_kontrol3.Enabled:=false;  
  vol_kontrol4.Enabled:=false;  
  vol_kontrol5.Enabled:=false;  
  vol_kontrol6.Enabled:=false;  
  vol_kontrol7.Enabled:=false;  
  vol_kontrol8.Enabled:=false;  
  selektor.enabled:=false;  
  volume.enabled:=false;  
  {output(porta,$00);}  
  vol_kontrol.hide;  
  vol_kontrol2.Hide;  
  vol_kontrol3.Hide;  
  vol_kontrol4.Hide;  
  vol_kontrol5.Hide;  
  vol_kontrol6.Hide;  
  vol_kontrol7.Hide;  
  vol_kontrol8.Hide;
```

```
end;
```

```
procedure TFUtama.RxSwitch1Off(Sender: TObject);
```

```
begin
```

```
  audio1.Enabled:=false;  
  audio2.Enabled:=false;  
  audio3.Enabled:=false;  
  audio4.Enabled:=false;  
  audio5.Enabled:=false;  
  audio6.Enabled:=false;  
  audio7.Enabled:=false;  
  audio8.Enabled:=false;  
  vol_kontrol.Enabled:=false;  
  vol_kontrol2.Enabled:=false;  
  vol_kontrol3.Enabled:=false;  
  vol_kontrol4.Enabled:=false;
```



```
vol_kontrol5.Enabled:=false;  
vol_kontrol6.Enabled:=false;  
vol_kontrol7.Enabled:=false;  
vol_kontrol8.Enabled:=false;  
volume.Enabled:=false;  
selektor.Enabled:=false;  
keluar.Enabled:=true;
```

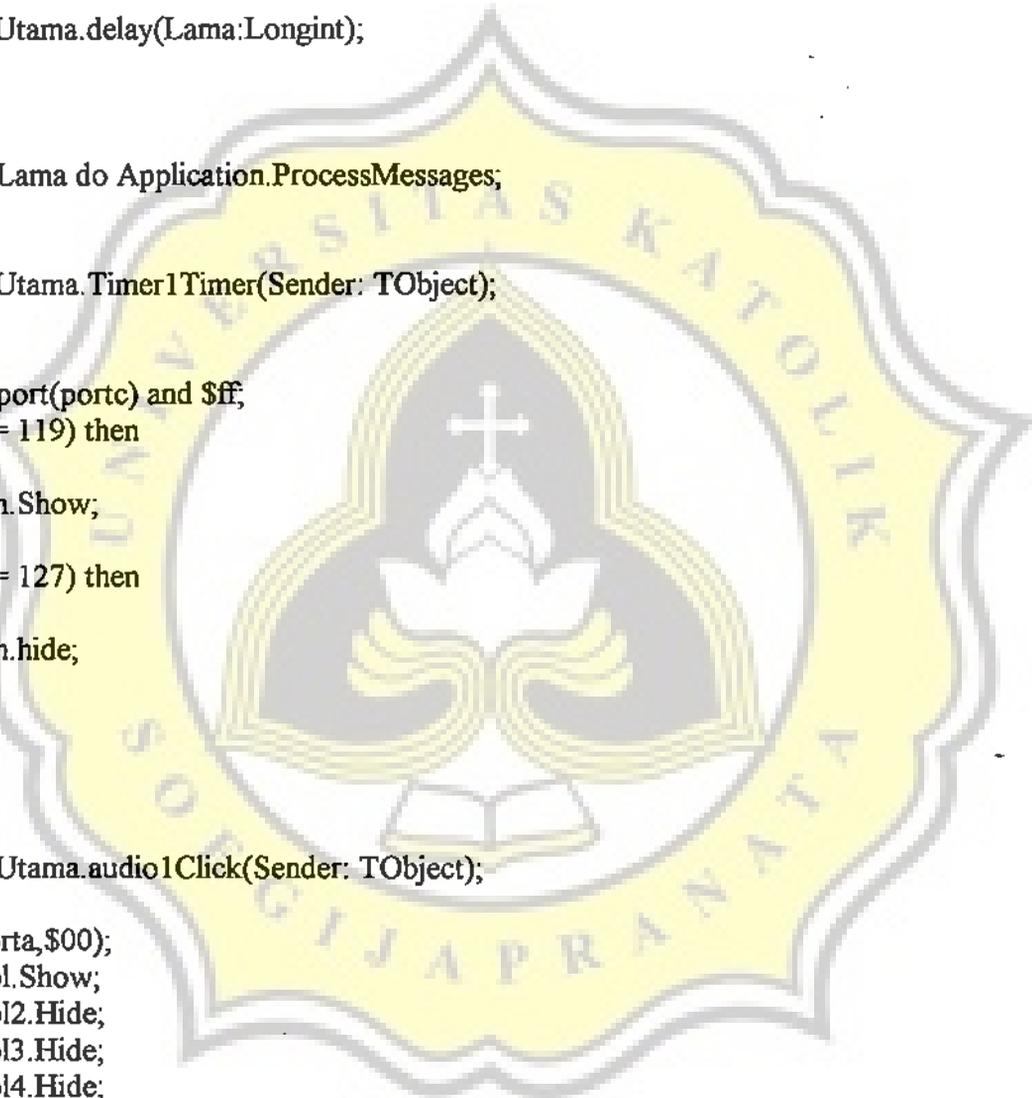
```
end;
```

```
procedure TFUtama.delay(Lama:Longint);  
var  
  tr:longint;  
begin  
  For tr:=0 to Lama do Application.ProcessMessages;  
end;
```

```
procedure TFUtama.Timer1Timer(Sender: TObject);  
begin  
  repeat  
    dataA:=inport(portc) and $ff;  
    if (dataA = 119) then  
      begin  
        FConfirm.Show;  
      end;  
    if (dataA = 127) then  
      begin  
        FConfirm.hide;  
      end;  
    delay(50);  
  until stop;  
end;
```

```
procedure TFUtama.audio1Click(Sender: TObject);  
begin  
  output(porta,$00);  
  vol_kontrol.Show;  
  vol_kontrol2.Hide;  
  vol_kontrol3.Hide;  
  vol_kontrol4.Hide;  
  vol_kontrol5.Hide;  
  vol_kontrol6.Hide;  
  vol_kontrol7.Hide;  
  vol_kontrol8.Hide;  
end;
```

```
procedure TFUtama.vol_kontrolChange(Sender: TObject);  
begin  
  if Vol_kontrol.Position = 0 then  
    begin
```



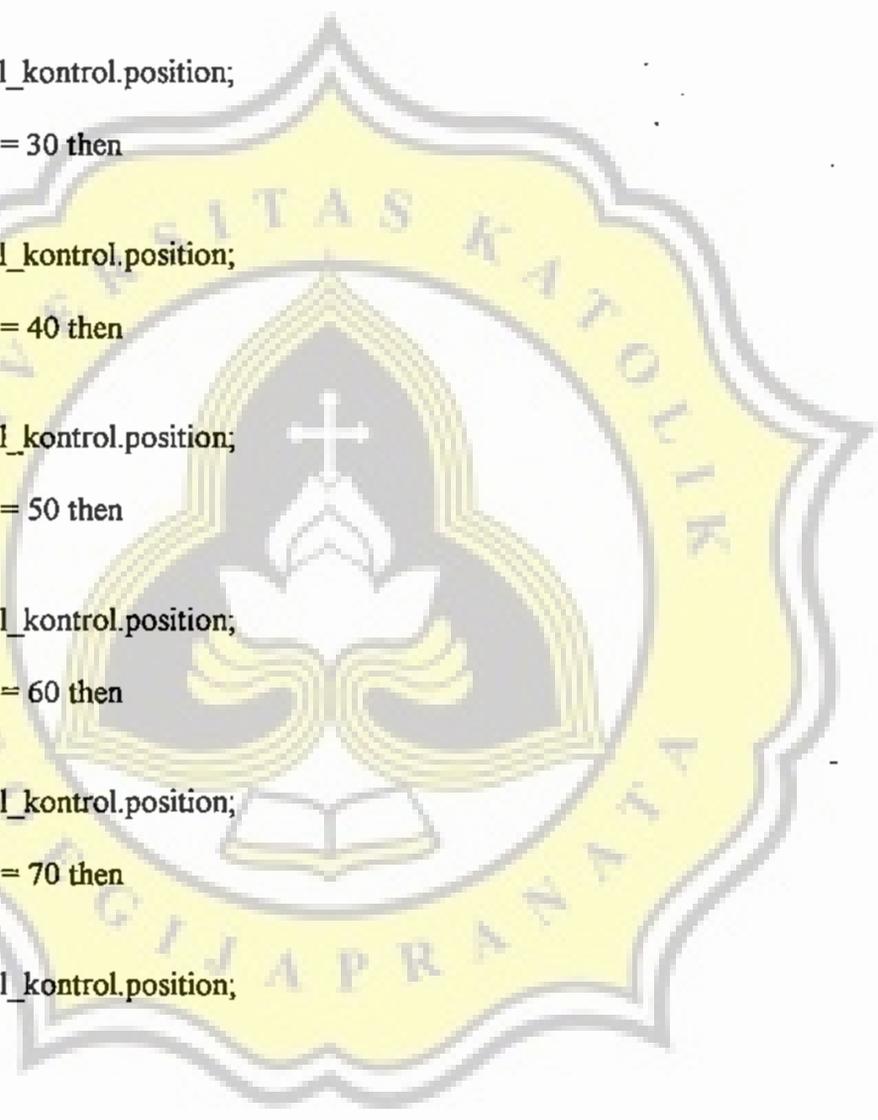
```

    outport(porta,$00);
    gauge1.progress:=Vol_kontrol.position;
end;
if Vol_kontrol.Position = 10 then
begin
    outport(porta,$01);
    gauge1.progress:=Vol_kontrol.position;
end;
if Vol_kontrol.Position = 20 then
begin
    outport(porta,$02);
    gauge1.progress:=Vol_kontrol.position;
end;
if Vol_kontrol.Position = 30 then
begin
    outport(porta,$03);
    gauge1.progress:=Vol_kontrol.position;
end;
if Vol_kontrol.Position = 40 then
begin
    outport(porta,$04);
    gauge1.progress:=Vol_kontrol.position;
end;
if Vol_kontrol.Position = 50 then
begin
    outport(porta,$05);
    gauge1.progress:=Vol_kontrol.position;
end;
if Vol_kontrol.Position = 60 then
begin
    outport(porta,$06);
    gauge1.progress:=Vol_kontrol.position;
end;
if Vol_kontrol.Position = 70 then
begin
    outport(porta,$07);
    gauge1.progress:=Vol_kontrol.position;
end;

end;

procedure TFUtama.selektorClick(Sender: TObject);
begin
    audio1.Enabled:=true;
    audio2.Enabled:=true;
    audio3.Enabled:=true;
    audio4.Enabled:=true;
    audio5.Enabled:=true;
    audio6.Enabled:=true;
    audio7.Enabled:=true;

```



```
audio8.Enabled:=true;
vol_kontrol.Enabled:=false;
vol_kontrol2.Enabled:=false;
vol_kontrol3.Enabled:=false;
vol_kontrol4.Enabled:=false;
vol_kontrol5.Enabled:=false;
vol_kontrol6.Enabled:=false;
vol_kontrol7.Enabled:=false;
vol_kontrol8.Enabled:=false;
volume.Enabled:=true;
selektor.Enabled:=false;
outport(portb,$00);
```

end;

```
procedure TFUutama.volumeClick(Sender: TObject);
```

```
begin
```

```
audio1.Enabled:=false;
audio2.Enabled:=false;
audio3.Enabled:=false;
audio4.Enabled:=false;
audio5.Enabled:=false;
audio6.Enabled:=false;
audio7.Enabled:=false;
audio8.Enabled:=false;
vol_kontrol.Enabled:=true;
vol_kontrol2.Enabled:=true;
vol_kontrol3.Enabled:=true;
vol_kontrol4.Enabled:=true;
vol_kontrol5.Enabled:=true;
vol_kontrol6.Enabled:=true;
vol_kontrol7.Enabled:=true;
vol_kontrol8.Enabled:=true;
volume.Enabled:=false;
selektor.Enabled:=true;
outport(portb,$01);
```

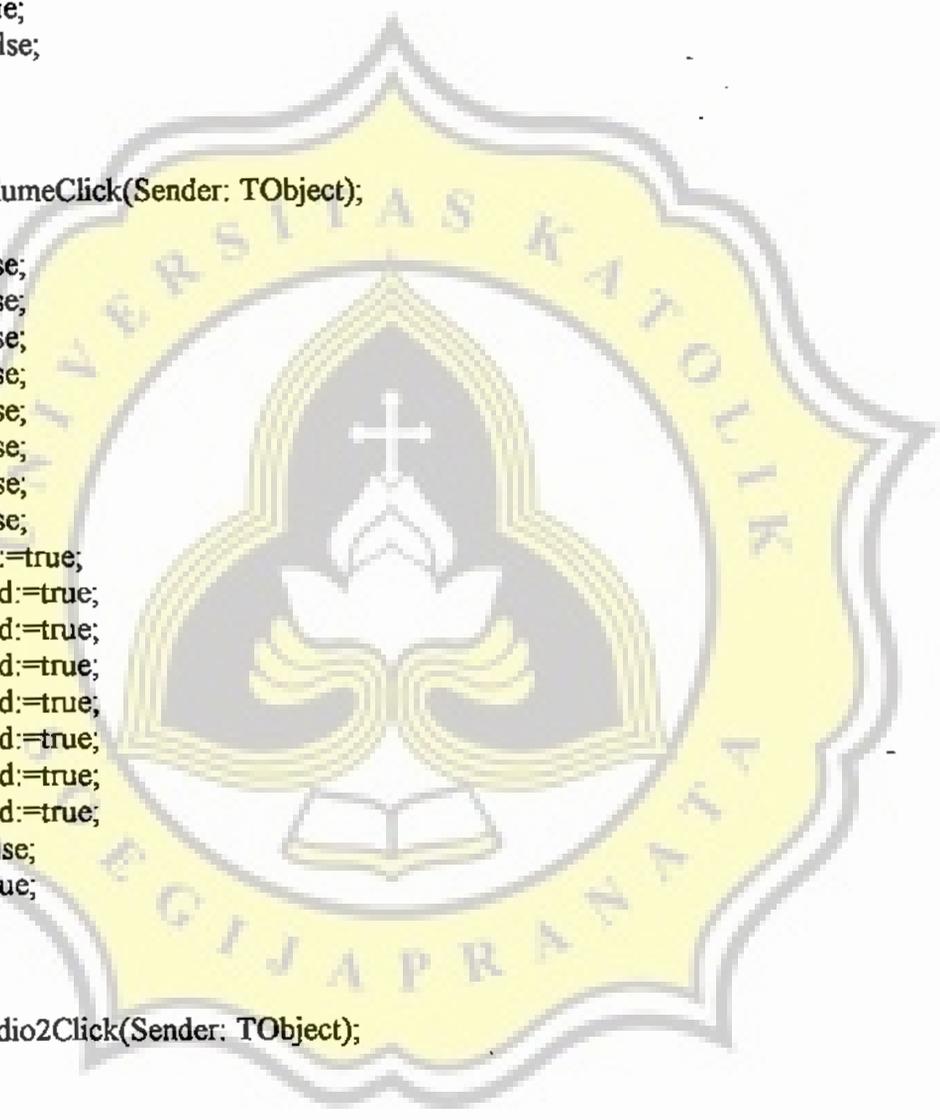
end;

```
procedure TFUutama.audio2Click(Sender: TObject);
```

```
begin
```

```
outport(porta,$01);
vol_kontrol.Hide;
vol_kontrol2.Show;
vol_kontrol3.Hide;
vol_kontrol4.Hide;
vol_kontrol5.Hide;
vol_kontrol6.Hide;
vol_kontrol7.Hide;
vol_kontrol8.Hide;
```

end;

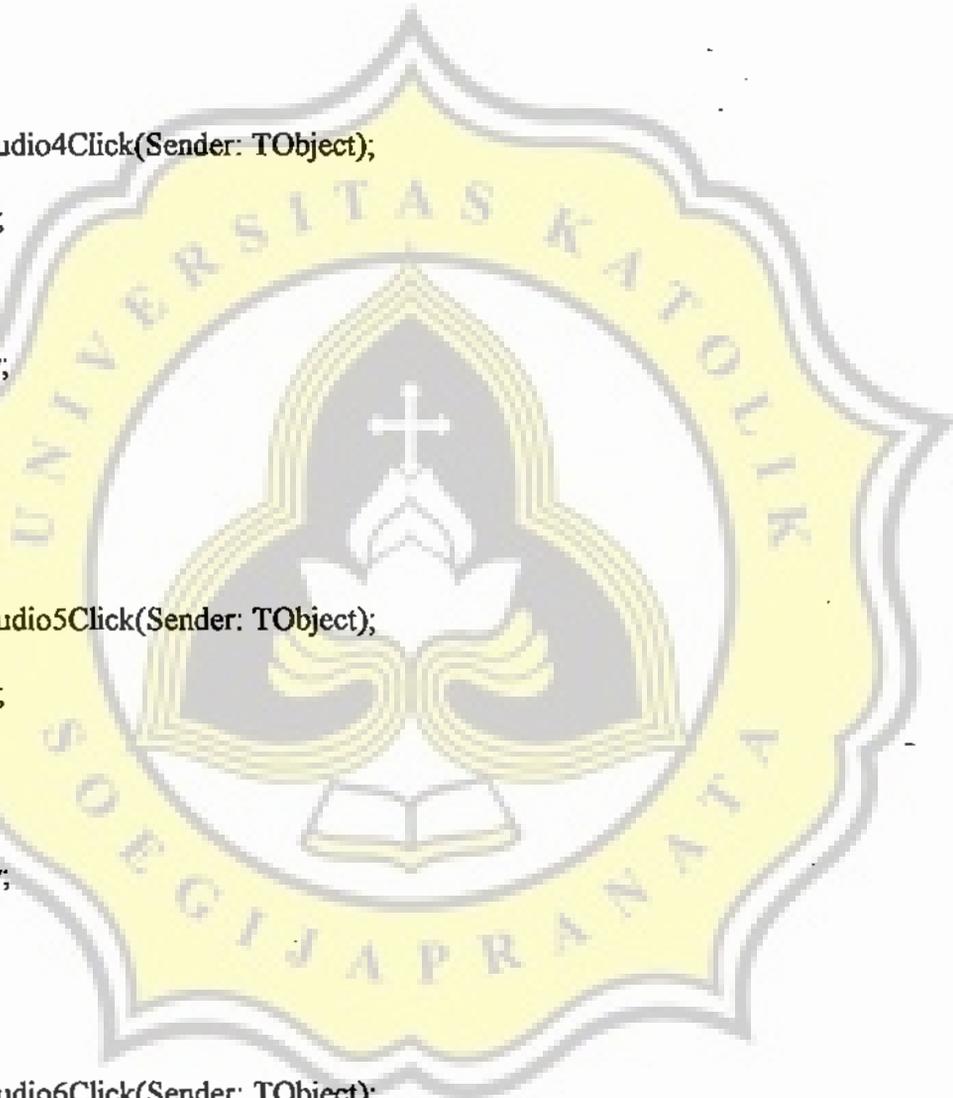


```
procedure TFUtama.audio3Click(Sender: TObject);
begin
  outport(porta,$02);
  vol_kontrol.Hide;
  vol_kontrol2.Hide;
  vol_kontrol3.Show;
  vol_kontrol4.Hide;
  vol_kontrol5.Hide;
  vol_kontrol6.Hide;
  vol_kontrol7.Hide;
  vol_kontrol8.Hide;
end;
```

```
procedure TFUtama.audio4Click(Sender: TObject);
begin
  outport(porta,$03);
  vol_kontrol.Hide;
  vol_kontrol2.Hide;
  vol_kontrol3.Hide;
  vol_kontrol4.Show;
  vol_kontrol5.Hide;
  vol_kontrol6.Hide;
  vol_kontrol7.Hide;
  vol_kontrol8.Hide;
end;
```

```
procedure TFUtama.audio5Click(Sender: TObject);
begin
  outport(porta,$04);
  vol_kontrol.Hide;
  vol_kontrol2.Hide;
  vol_kontrol3.Hide;
  vol_kontrol4.Hide;
  vol_kontrol5.Show;
  vol_kontrol6.Hide;
  vol_kontrol7.Hide;
  vol_kontrol8.Hide;
end;
```

```
procedure TFUtama.audio6Click(Sender: TObject);
begin
  outport(porta,$05);
  vol_kontrol.Hide;
  vol_kontrol2.Hide;
  vol_kontrol3.Hide;
  vol_kontrol4.Hide;
  vol_kontrol5.Hide;
  vol_kontrol6.Show;
  vol_kontrol7.Hide;
  vol_kontrol8.Hide;
```



end;

```
procedure TFUtama.audio7Click(Sender: TObject);
```

```
begin
```

```
  outport(porta,$06);
```

```
  vol_kontrol.Hide;
```

```
  vol_kontrol2.Hide;
```

```
  vol_kontrol3.Hide;
```

```
  vol_kontrol4.Hide;
```

```
  vol_kontrol5.Hide;
```

```
  vol_kontrol6.Hide;
```

```
  vol_kontrol7.Show;
```

```
  vol_kontrol8.Hide;
```

```
end;
```

```
procedure TFUtama.audio8Click(Sender: TObject);
```

```
begin
```

```
  outport(porta,$01);
```

```
  vol_kontrol.Hide;
```

```
  vol_kontrol2.Hide;
```

```
  vol_kontrol3.Hide;
```

```
  vol_kontrol4.Hide;
```

```
  vol_kontrol5.Hide;
```

```
  vol_kontrol6.Hide;
```

```
  vol_kontrol7.Hide;
```

```
  vol_kontrol8.Show;
```

```
end;
```

```
procedure TFUtama.vol_kontrol2Change(Sender: TObject);
```

```
begin
```

```
  if Vol_kontrol2.Position = 0 then
```

```
  begin
```

```
    outport(porta,$00);
```

```
    gauge1.progress:=Vol_kontrol2.position;
```

```
  end;
```

```
  if Vol_kontrol2.Position = 10 then
```

```
  begin
```

```
    outport(porta,$01);
```

```
    gauge1.progress:=Vol_kontrol2.position;
```

```
  end;
```

```
  if Vol_kontrol2.Position = 20 then
```

```
  begin
```

```
    outport(porta,$02);
```

```
    gauge1.progress:=Vol_kontrol2.position;
```

```
  end;
```

```
  if Vol_kontrol2.Position = 30 then
```

```
  begin
```

```
    outport(porta,$03);
```

```
    gauge1.progress:=Vol_kontrol2.position;
```

```
  end;
```

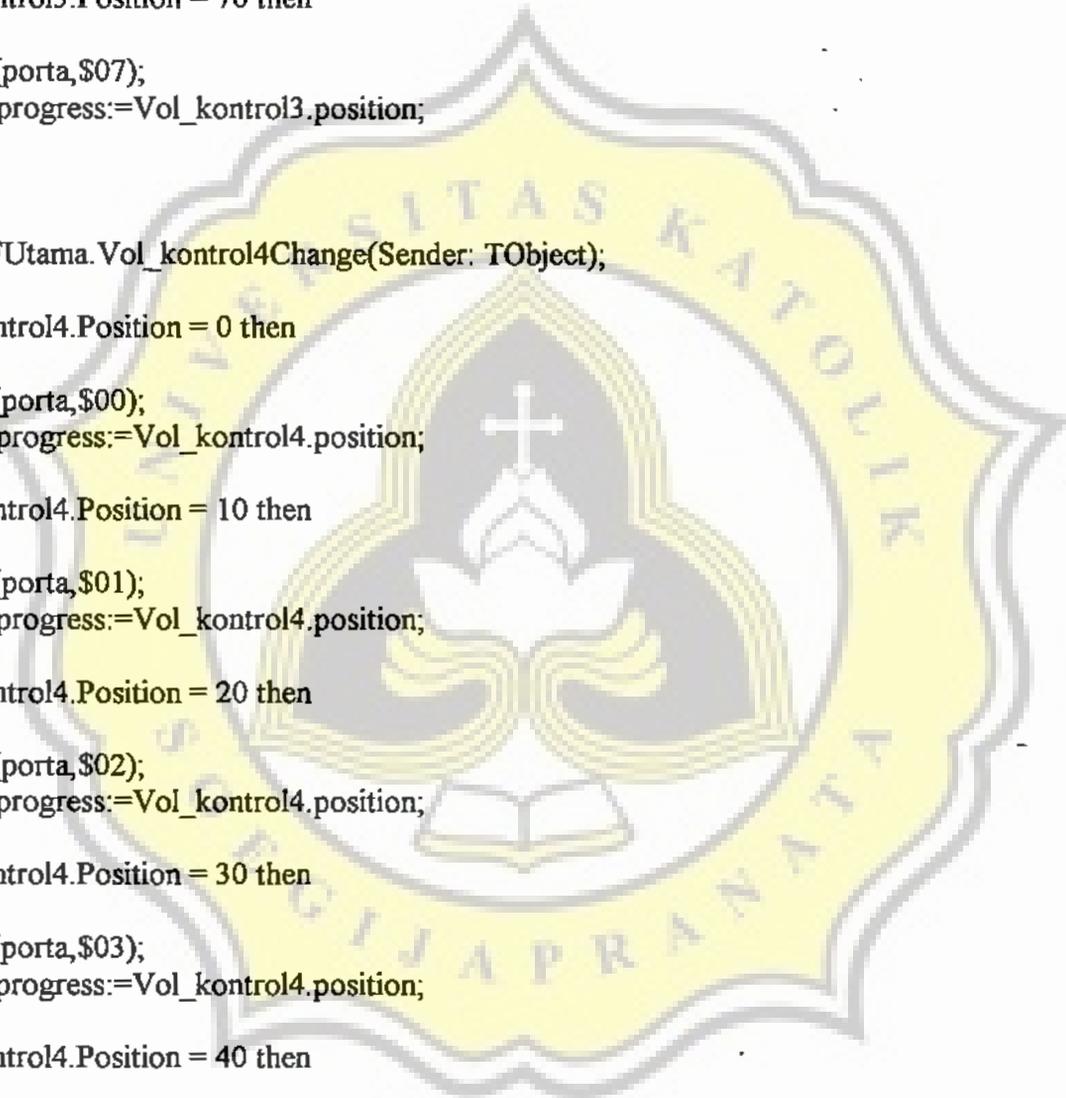
```
if Vol_kontrol2.Position = 40 then
begin
  outport(porta,$04);
  gauge1.progress:=Vol_kontrol2.position;
end;
if Vol_kontrol2.Position = 50 then
begin
  outport(porta,$05);
  gauge1.progress:=Vol_kontrol2.position;
end;
if Vol_kontrol2.Position = 60 then
begin
  outport(porta,$06);
  gauge1.progress:=Vol_kontrol2.position;
end;
if Vol_kontrol2.Position = 70 then
begin
  outport(porta,$07);
  gauge1.progress:=Vol_kontrol2.position;
end;
end;

procedure TFUutama.Vol_kontrol3Change(Sender: TObject);
begin
  if Vol_kontrol3.Position = 0 then
  begin
    outport(porta,$00);
    gauge1.progress:=Vol_kontrol3.position;
  end;
  if Vol_kontrol3.Position = 10 then
  begin
    outport(porta,$01);
    gauge1.progress:=Vol_kontrol3.position;
  end;
  if Vol_kontrol3.Position = 20 then
  begin
    outport(porta,$02);
    gauge1.progress:=Vol_kontrol3.position;
  end;
  if Vol_kontrol3.Position = 30 then
  begin
    outport(porta,$03);
    gauge1.progress:=Vol_kontrol3.position;
  end;
  if Vol_kontrol3.Position = 40 then
  begin
    outport(porta,$04);
    gauge1.progress:=Vol_kontrol3.position;
  end;
  if Vol_kontrol3.Position = 50 then
```



```
begin
  outport(porta,$05);
  gauge1.progress:=Vol_kontrol3.position;
end;
if Vol_kontrol3.Position = 60 then
begin
  outport(porta,$06);
  gauge1.progress:=Vol_kontrol3.position;
end;
if Vol_kontrol3.Position = 70 then
begin
  outport(porta,$07);
  gauge1.progress:=Vol_kontrol3.position;
end;
end;

procedure TFUutama.Vol_kontrol4Change(Sender: TObject);
begin
  if Vol_kontrol4.Position = 0 then
  begin
    outport(porta,$00);
    gauge1.progress:=Vol_kontrol4.position;
  end;
  if Vol_kontrol4.Position = 10 then
  begin
    outport(porta,$01);
    gauge1.progress:=Vol_kontrol4.position;
  end;
  if Vol_kontrol4.Position = 20 then
  begin
    outport(porta,$02);
    gauge1.progress:=Vol_kontrol4.position;
  end;
  if Vol_kontrol4.Position = 30 then
  begin
    outport(porta,$03);
    gauge1.progress:=Vol_kontrol4.position;
  end;
  if Vol_kontrol4.Position = 40 then
  begin
    outport(porta,$04);
    gauge1.progress:=Vol_kontrol4.position;
  end;
  if Vol_kontrol4.Position = 50 then
  begin
    outport(porta,$05);
    gauge1.progress:=Vol_kontrol4.position;
  end;
  if Vol_kontrol4.Position = 60 then
  begin
```



```
    outport(porta,$06);
    gauge1.progress:=Vol_kontrol4.position;
end;
if Vol_kontrol4.Position = 70 then
begin
    outport(porta,$07);
    gauge1.progress:=Vol_kontrol4.position;
end;
end;
```

```
procedure TFUtama.Vol_kontrol5Change(Sender: TObject);
begin
    if Vol_kontrol5.Position = 0 then
    begin
        outport(porta,$00);
        gauge1.progress:=Vol_kontrol5.position;
    end;
    if Vol_kontrol5.Position = 10 then
    begin
        outport(porta,$01);
        gauge1.progress:=Vol_kontrol5.position;
    end;
    if Vol_kontrol5.Position = 20 then
    begin
        outport(porta,$02);
        gauge1.progress:=Vol_kontrol5.position;
    end;
    if Vol_kontrol5.Position = 30 then
    begin
        outport(porta,$03);
        gauge1.progress:=Vol_kontrol5.position;
    end;
    if Vol_kontrol5.Position = 40 then
    begin
        outport(porta,$04);
        gauge1.progress:=Vol_kontrol5.position;
    end;
    if Vol_kontrol5.Position = 50 then
    begin
        outport(porta,$05);
        gauge1.progress:=Vol_kontrol5.position;
    end;
    if Vol_kontrol5.Position = 60 then
    begin
        outport(porta,$06);
        gauge1.progress:=Vol_kontrol5.position;
    end;
    if Vol_kontrol5.Position = 70 then
    begin
        outport(porta,$07);
```



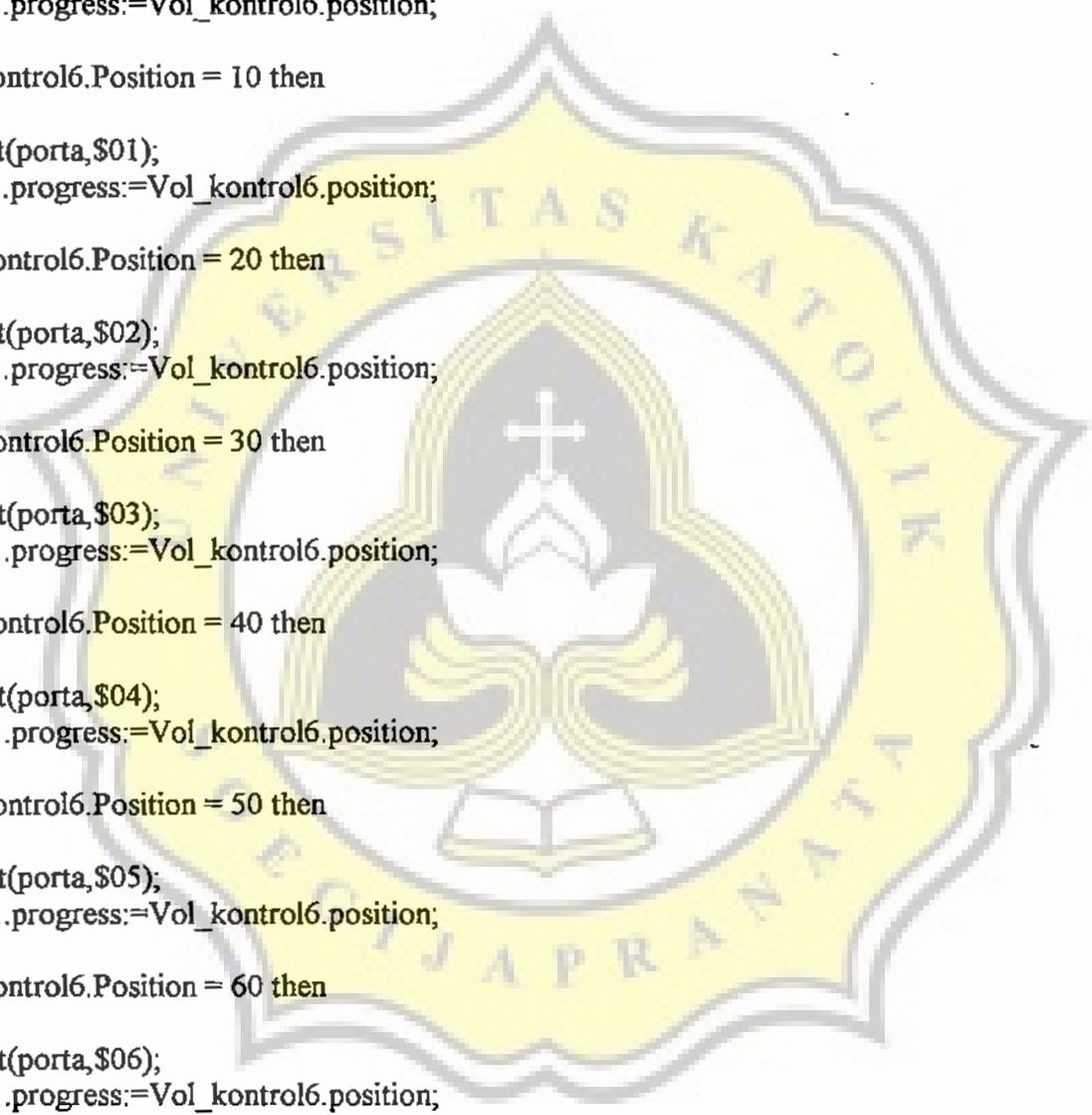
```
    gauge1.progress:=Vol_kontrol5.position;  
end;  
end;
```

```
procedure TFUtama.Vol_kontrol6Change(Sender: TObject);
```

```
begin  
    if Vol_kontrol6.Position = 0 then  
        begin  
            outport(porta,$00);  
            gauge1.progress:=Vol_kontrol6.position;  
        end;  
    if Vol_kontrol6.Position = 10 then  
        begin  
            outport(porta,$01);  
            gauge1.progress:=Vol_kontrol6.position;  
        end;  
    if Vol_kontrol6.Position = 20 then  
        begin  
            outport(porta,$02);  
            gauge1.progress:=Vol_kontrol6.position;  
        end;  
    if Vol_kontrol6.Position = 30 then  
        begin  
            outport(porta,$03);  
            gauge1.progress:=Vol_kontrol6.position;  
        end;  
    if Vol_kontrol6.Position = 40 then  
        begin  
            outport(porta,$04);  
            gauge1.progress:=Vol_kontrol6.position;  
        end;  
    if Vol_kontrol6.Position = 50 then  
        begin  
            outport(porta,$05);  
            gauge1.progress:=Vol_kontrol6.position;  
        end;  
    if Vol_kontrol6.Position = 60 then  
        begin  
            outport(porta,$06);  
            gauge1.progress:=Vol_kontrol6.position;  
        end;  
    if Vol_kontrol6.Position = 70 then  
        begin  
            outport(porta,$07);  
            gauge1.progress:=Vol_kontrol6.position;  
        end;  
end;  
end;
```

```
procedure TFUtama.Vol_kontrol7Change(Sender: TObject);
```

```
begin
```



```

if Vol_kontrol7.Position = 0 then
begin
  outport(porta,$00);
  gauge1.progress:=Vol_kontrol7.position;
end;
if Vol_kontrol7.Position = 10 then
begin
  outport(porta,$01);
  gauge1.progress:=Vol_kontrol7.position;
end;
if Vol_kontrol7.Position = 20 then
begin
  outport(porta,$02);
  gauge1.progress:=Vol_kontrol7.position;
end;
if Vol_kontrol7.Position = 30 then
begin
  outport(porta,$03);
  gauge1.progress:=Vol_kontrol7.position;
end;
if Vol_kontrol7.Position = 40 then
begin
  outport(porta,$04);
  gauge1.progress:=Vol_kontrol7.position;
end;
if Vol_kontrol7.Position = 50 then
begin
  outport(porta,$05);
  gauge1.progress:=Vol_kontrol7.position;
end;
if Vol_kontrol7.Position = 60 then
begin
  outport(porta,$06);
  gauge1.progress:=Vol_kontrol7.position;
end;
if Vol_kontrol7.Position = 70 then
begin
  outport(porta,$07);
  gauge1.progress:=Vol_kontrol7.position;
end;
end;

```

```

procedure TFUtama.Vol_kontrol8Change(Sender: TObject);
begin
  if Vol_kontrol8.Position = 0 then
  begin
    outport(porta,$00);
    gauge1.progress:=Vol_kontrol8.position;
  end;
  if Vol_kontrol8.Position = 10 then

```

```
begin
  outport(porta,$01);
  gauge1.progress:=Vol_kontrol8.position;
end;
if Vol_kontrol8.Position = 20 then
begin
  outport(porta,$02);
  gauge1.progress:=Vol_kontrol8.position;
end;
if Vol_kontrol8.Position = 30 then
begin
  outport(porta,$03);
  gauge1.progress:=Vol_kontrol8.position;
end;
if Vol_kontrol8.Position = 40 then
begin
  outport(porta,$04);
  gauge1.progress:=Vol_kontrol8.position;
end;
if Vol_kontrol8.Position = 50 then
begin
  outport(porta,$05);
  gauge1.progress:=Vol_kontrol8.position;
end;
if Vol_kontrol8.Position = 60 then
begin
  outport(porta,$06);
  gauge1.progress:=Vol_kontrol8.position;
end;
if Vol_kontrol8.Position = 70 then
begin
  outport(porta,$07);
  gauge1.progress:=Vol_kontrol8.position;
end;
end;

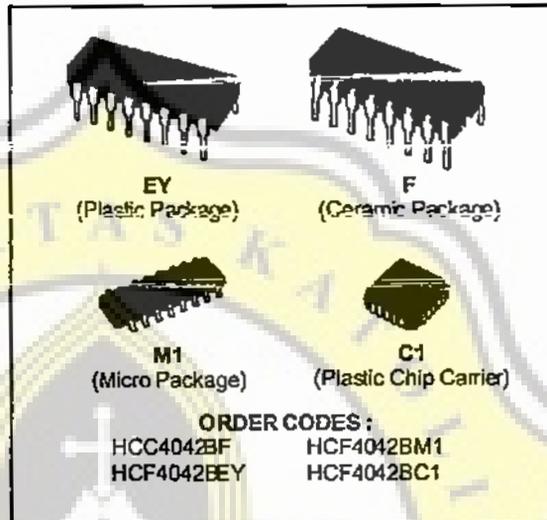
procedure TFUtama.DsFancyButton1Click(Sender: TObject);
begin
  Vol_kontrol.Position := 0;
  Vol_kontrol2.Position := 0;
  Vol_kontrol3.Position := 0;
  Vol_kontrol4.Position := 0;
  Vol_kontrol5.Position := 0;
  Vol_kontrol6.Position := 0;
  Vol_kontrol7.Position := 0;
  Vol_kontrol8.Position := 0;
  outport(porta,$00);
  gauge1.progress := 0;
end;
```

end.



QUAD CLOCKED "D" LATCH

- CLOCK POLARITY CONTROL
- Q AND \bar{Q} OUTPUTS
- COMMON CLOCK
- LOW POWER TTL COMPATIBLE
- STANDARDIZED SYMMETRICAL OUTPUT CHARACTERISTICS
- QUIESCENT CURRENT SPECIFIED TO 20V FOR HCC DEVICE
- 5V, 10V, AND 15V PARAMETRIC RATINGS
- INPUT CURRENT OF 100nA AT 18V AND 25°C FOR HCC DEVICE
- 100% TESTED FOR QUIESCENT CURRENT
- MEETS ALL REQUIREMENTS OF JEDEC TENTATIVE STANDARD N° 13A, "STANDARD SPECIFICATIONS FOR DESCRIPTION OF "B" SERIES CMOS DEVICES"

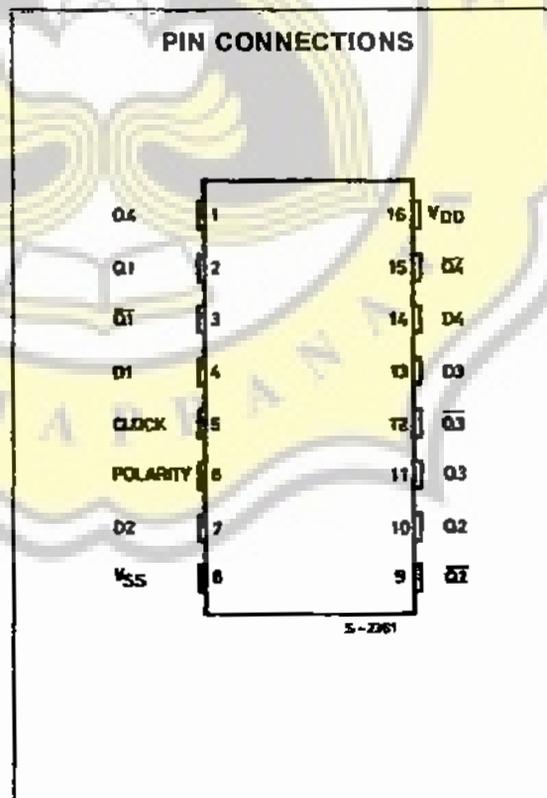


DESCRIPTION

The **HCC4042B** (extended temperature range) and **HCF4042B** (intermediate temperature range) are monolithic integrated circuit, available in 16-lead dual in-line plastic or ceramic package and plastic micro package.

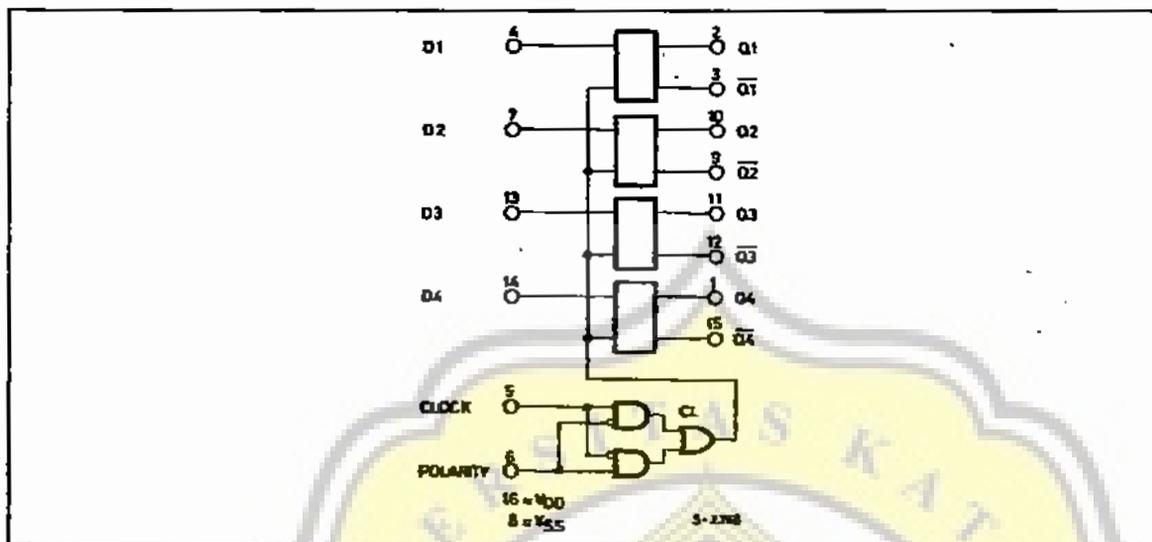
The **HCC/HCF4042B** types contain four latch circuits, each strobed by a common clock. Complementary buffered outputs are available from each circuit. The impedance of the n- and p-channel output devices is balanced and all outputs are electrically identical.

Information present at the data input is transferred to outputs Q and \bar{Q} during the CLOCK level which is programmed by the POLARITY input. For POLARITY = 0 the transfer occurs during the 0 CLOCK level and for POLARITY = 1 the transfer occurs during the 1 CLOCK level. The outputs follow the data input providing the CLOCK and POLARITY levels defined above are present. When a CLOCK transition occurs (positive for POLARITY = 0 and negative for POLARITY = 1) the information present at the input during the CLOCK transition is retained at the outputs until an opposite CLOCK transition occurs.



HCC/HCF4042B

FUNCTIONAL DIAGRAM



ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Value	Unit
V_{DD}^*	Supply Voltage : HCC Types HCF Types	- 0.5 to + 20 - 0.5 to + 18	V
V_I	Input Voltage	- 0.5 to $V_{DD} + 0.5$	V
I_I	DC Input Current (any one input)	± 10	mA
P_{tot}	Total Power Dissipation (per package)	200	mW
	Dissipation per Output Transistor for T_{op} = Full Package-temperature Range	100	mW
T_{op}	Operating Temperature : HCC Types HCF Types	- 55 to + 125	$^{\circ}C$
		- 40 to + 85	$^{\circ}C$
T_{stg}	Storage Temperature	- 65 to + 150	$^{\circ}C$

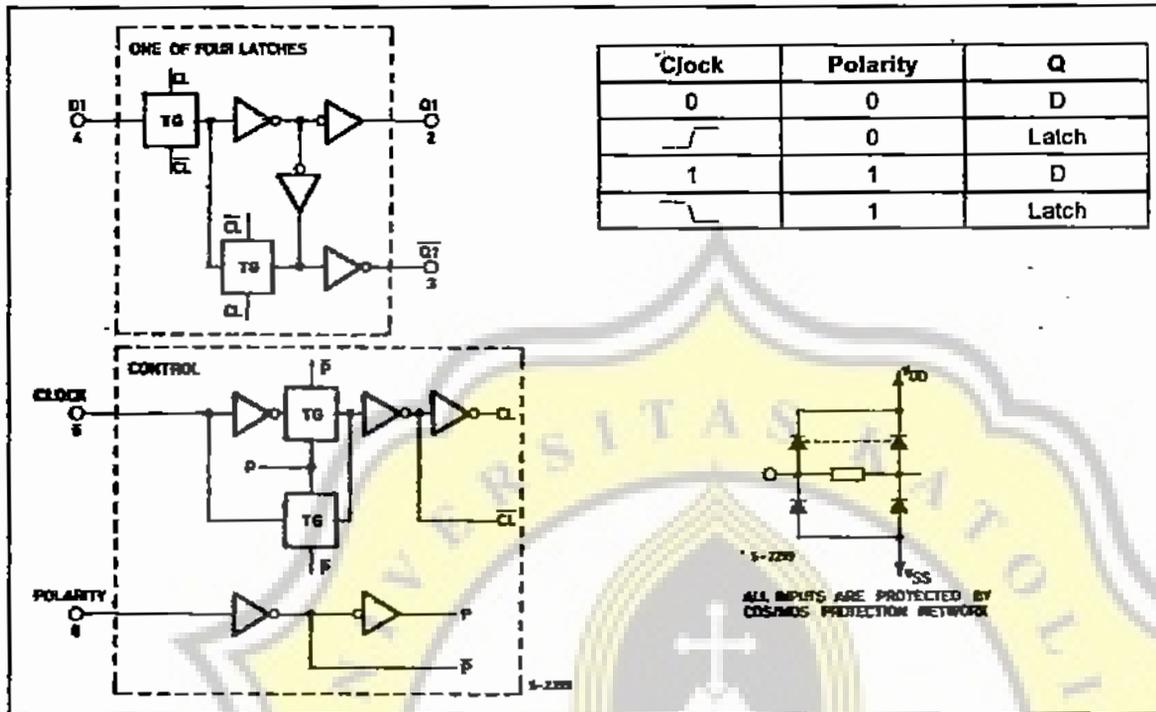
Stresses above those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. This is a stress rating only and functional operation of the device at these or any other conditions above those indicated in the operational sections of this specification is not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

* All voltage values are referred to V_{SS} pin voltage.

RECOMMENDED OPERATING CONDITIONS

Symbol	Parameter	Value	Unit
V_{DD}	Supply Voltage : HCC Types HCF Types	3 to 18	V
		3 to 15	V
V_I	Input Voltage	0 to V_{DD}	V
T_{op}	Operating Temperature : HCC Types HCF Types	- 55 to + 125	$^{\circ}C$
		- 40 to + 85	$^{\circ}C$

LOGIC BLOCK DIAGRAM AND TRUTH TABLE



STATIC ELECTRICAL CHARACTERISTICS (over recommended operating conditions)

Symbol	Parameter	Test Conditions				Value						Unit		
		V _i (V)	V _o (V)	I _o (μ A)	V _{DD} (V)	T _{Low} *		25°C			T _{High} *			
						Min.	Max.	Min.	Typ.	Max.	Min.		Max.	
I _L	Quiescent Current	HCC Types	0/5			5		1		0.02	1		30	μ A
			0/10			10		2		0.02	2		60	
			0/15			15		4		0.02	4		120	
			0/20			20		20		0.04	20		600	
		HCF Types	0/5			5		4		0.02	4		30	
			0/10			10		8		0.02	8		60	
			0/15			15		16		0.02	16		120	
V _{OH}	Output High Voltage	0/5		< 1	5	4.95		4.95			4.95		V	
		0/10		< 1	10	9.95		9.95			9.95			
		0/15		< 1	15	14.95		14.95			14.95			
V _{OL}	Output Low Voltage	5/0		< 1	5		0.05			0.05		0.05	V	
		10/0		< 1	10		0.05			0.05		0.05		
		15/0		< 1	15		0.05			0.05		0.05		
V _{IH}	Input High Voltage		0.5/4.5	< 1	5	3.5		3.5			3.5		V	
			1/9	< 1	10	7		7			7			
			1.5/13.5	< 1	15	11		11			11			

* T_{Low} = -55°C for HCC device ; -40°C for HCF device.
 * T_{High} = +125°C for HCC device ; +85°C for HCF device.
 The Noise Margin for both "1" and "0" level is : 1V min. with V_{DD} = 5V, 2V min. with V_{DD} = 10V, 2.5V min. with V_{DD} = 15V.

HCC/HCF4042B

STATIC ELECTRICAL CHARACTERISTICS (continued)

Symbol	Parameter	Test Conditions				Value						Unit	
		V _I (V)	V _O (V)	I _O (μ A)	V _{DD} (V)	T _{Low} *		25°C			T _{High} *		
						Min.	Max.	Min.	Typ.	Max.	Min.		Max.
V _{IL}	Input Low Voltage		4.5/0.5	< 1	5		1.5			1.5		1.5	V
			9/1	< 1	10		3			3		3	
			13.5/1.5	< 1	15		4			4		4	
I _{OH}	Output Drive Current	HCC Types	0/5	2.5		5	-2		-1.6	-3.2		-1.15	mA
			0/5	4.6		5	-0.64		-0.51	-1		-0.36	
			0/10	9.5		10	-1.6		-1.3	-2.6		-0.9	
		HCF Types	0/5	2.5		5	-1.53		-1.36	-3.2		-1.1	
			0/5	4.6		5	-0.52		-0.44	-1		-0.36	
			0/10	9.5		10	-1.3		-1.1	-2.6		-0.9	
			0/15	13.5		15	-3.6		-3.0	-6.8		-2.4	
I _{OL}	Output Sink Current	HCC Types	0/5	0.4		5	0.64		0.51	1		0.36	mA
			0/10	0.5		10	1.6		1.3	2.6		0.9	
			0/15	1.5		15	4.2		3.4	6.8		2.4	
		HCF Types	0/5	0.4		5	0.52		0.44	1		0.36	
			0/10	0.5		10	1.3		1.1	2.6		0.9	
			0/15	1.5		15	3.6		3.0	6.8		2.4	
I _{HI} , I _{LI}	Input leakage Current	HCC Types	0/18	Any Input	18		± 0.1		$\pm 10^{-5}$	± 0.1		± 1	μ A
		HCF Types	0/15		15		± 0.3		$\pm 10^{-5}$	± 0.3		± 1	
C _I	Input Capacitance		Any Input						5	7.5		pF	

* T_{Low} = -55°C for HCC device ; -40°C for HCF device.
 * T_{High} = +125°C for HCC device ; +85°C for HCF device.
 The Noise Margin for both "1" and "0" level is : 1V min. with V_{DD} = 5V, 2V min. with V_{DD} = 10V, 2.5V min. with V_{DD} = 15V.

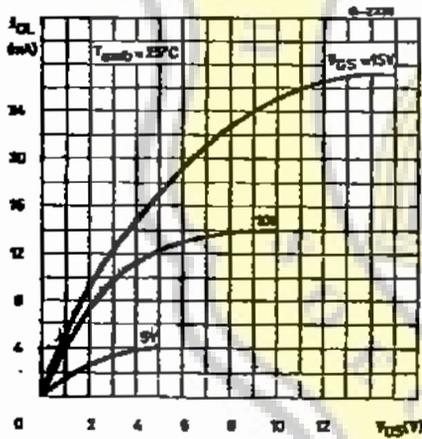
DYNAMIC ELECTRICAL CHARACTERISTICS (T_{amb} = 25°C, C_L = 50pF, R_L = 200k Ω , typical temperature coefficient for all V_{DD} values is 0.3%/°C, all input rise and fall times = 20ns)

Symbol	Parameter	Test Conditions		Value			Unit
			V _{DD} (V)	Min.	Typ.	Max.	
t _{PLH} , t _{PHL}	Propagation Delay Time	Data in to Q	5	110	220	ns	
			10	55	110		
			15	40	80		
			Data in to \bar{Q}	5	150		300
				10	75		150
				15	50		100
		Clock to Q	5	225	450		
			10	100	200		
			15	80	160		
		Clock to \bar{Q}	5	250	500		
			10	115	230		
			15	90	180		

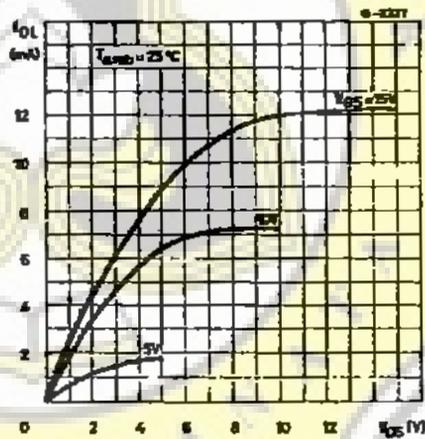
DYNAMIC ELECTRICAL CHARACTERISTICS (continued)

Symbol	Parameter	Test Conditions	Value			Unit	
			V _{DD} (V)	Min.	Typ.		Max.
t _{THL} , t _{TLH}	Transition Time		5		100	200	ns
			10		50	100	
			15		40	80	
t _w	Clock Pulse Width		5	200	100		ns
			10	100	50		
			15	60	30		
t _{setup}	Setup Time		5	50	0		ns
			10	30	0		
			15	25	0		
t _{hold}	Hold Time		5	120	60		ns
			10	60	30		
			15	50	25		
t _r , t _f	Clock Input Rise or Fall Time		5	Not Rise or Fall Time Sensitive		μs	
			10				
			15				

Typical Output Low (sink) Current Characteristics.

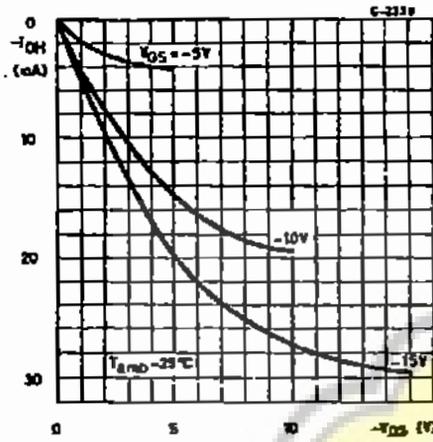


Minimum Output Low (sink) Current Characteristics.

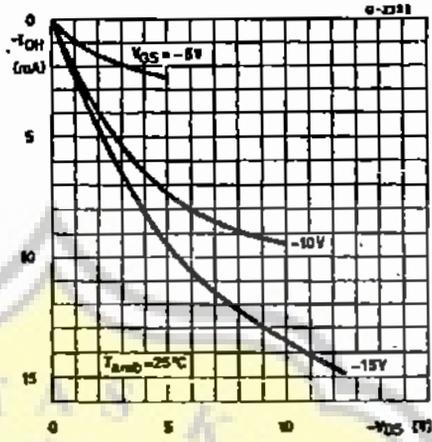


HCC/HCF402B

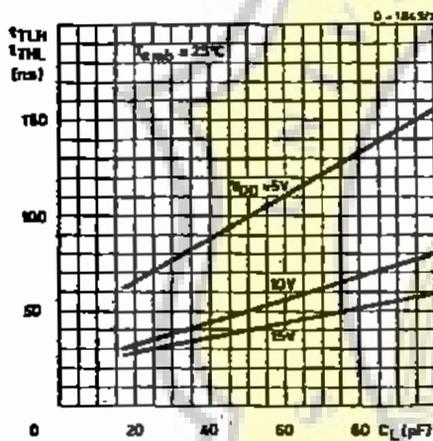
Typical Output High (source) Current Characteristics.



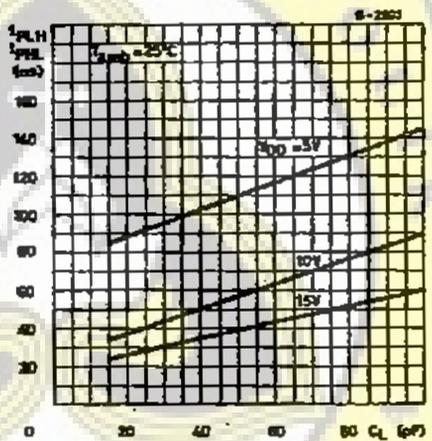
Minimum Output High (source) Current Characteristics.



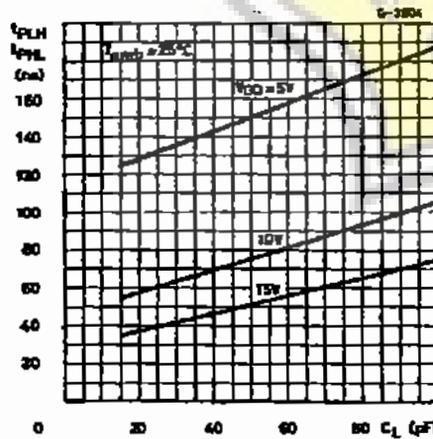
Typical Transition Time vs. Load Capacitance.



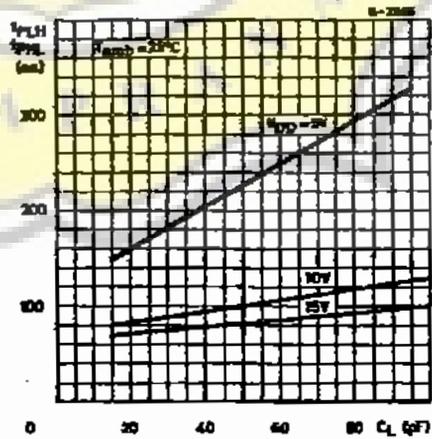
Typical Propagation Delay Time vs. Load Capacitance (data to Q).



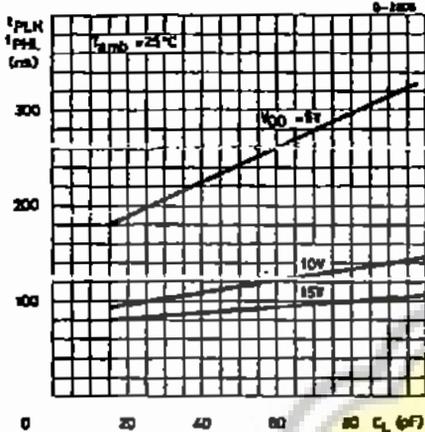
Typical Propagation Delay Time vs. Load Capacitance (data to Q).



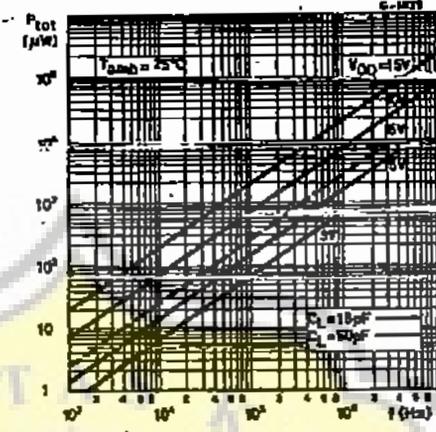
Typical Propagation Delay Time vs. Load Capacitance (clock to Q).



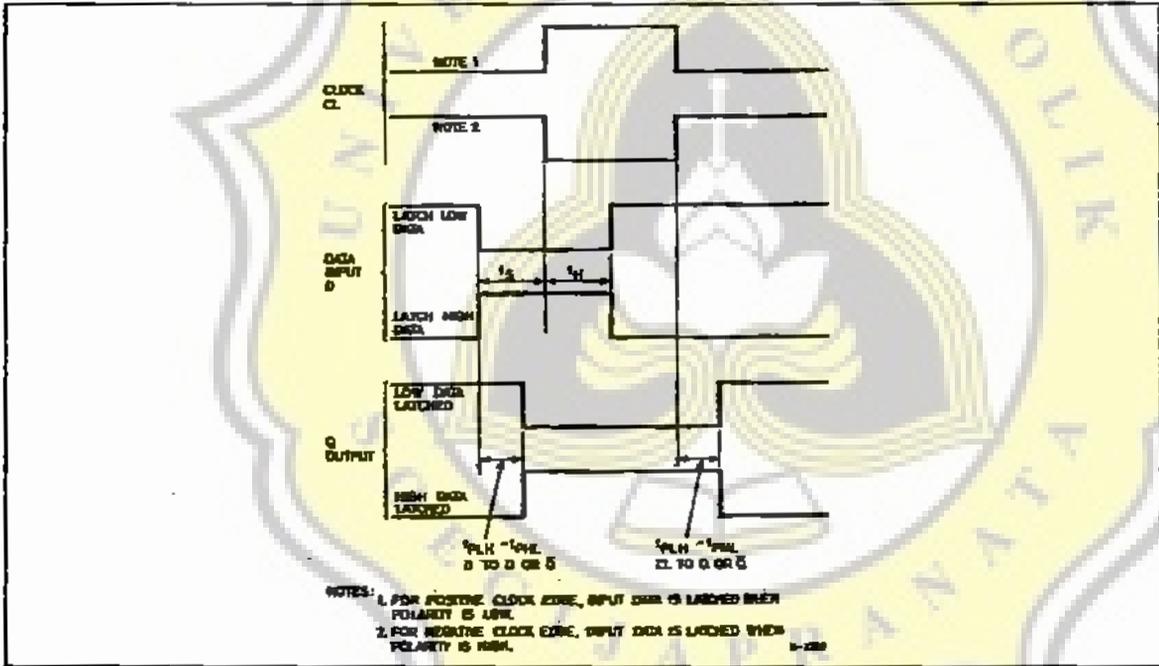
Typical Propagation Delay Time vs. Load Capacitance (clock to Q).



Typical Power Dissipation/device vs. Frequency.

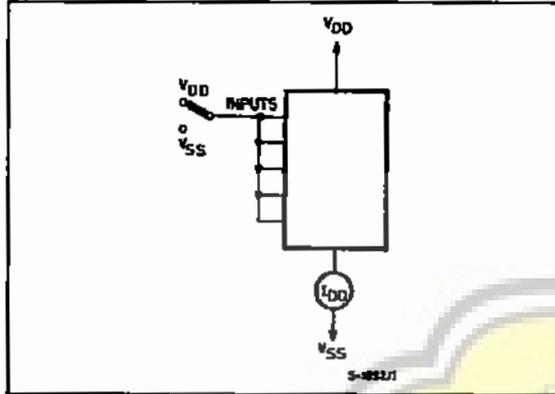


Dynamic Test Parameters.

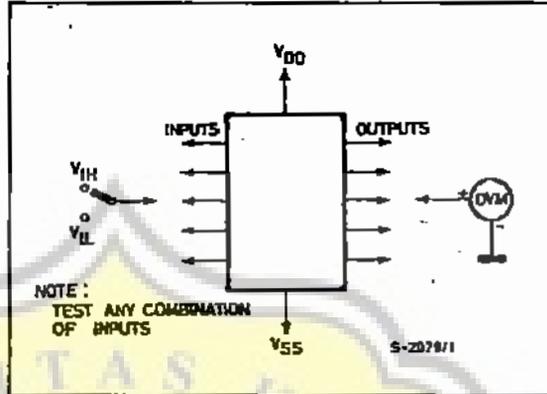


TEST CIRCUITS

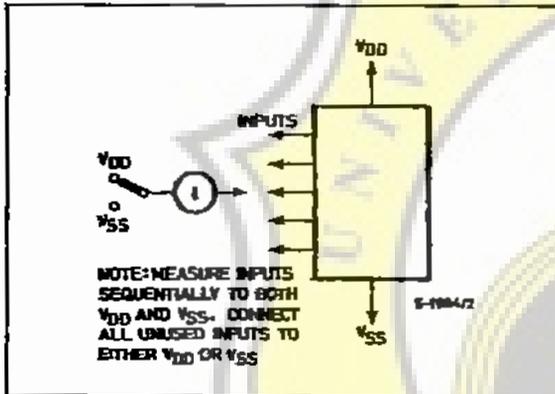
Quiescent Device Current



Noise Immunity



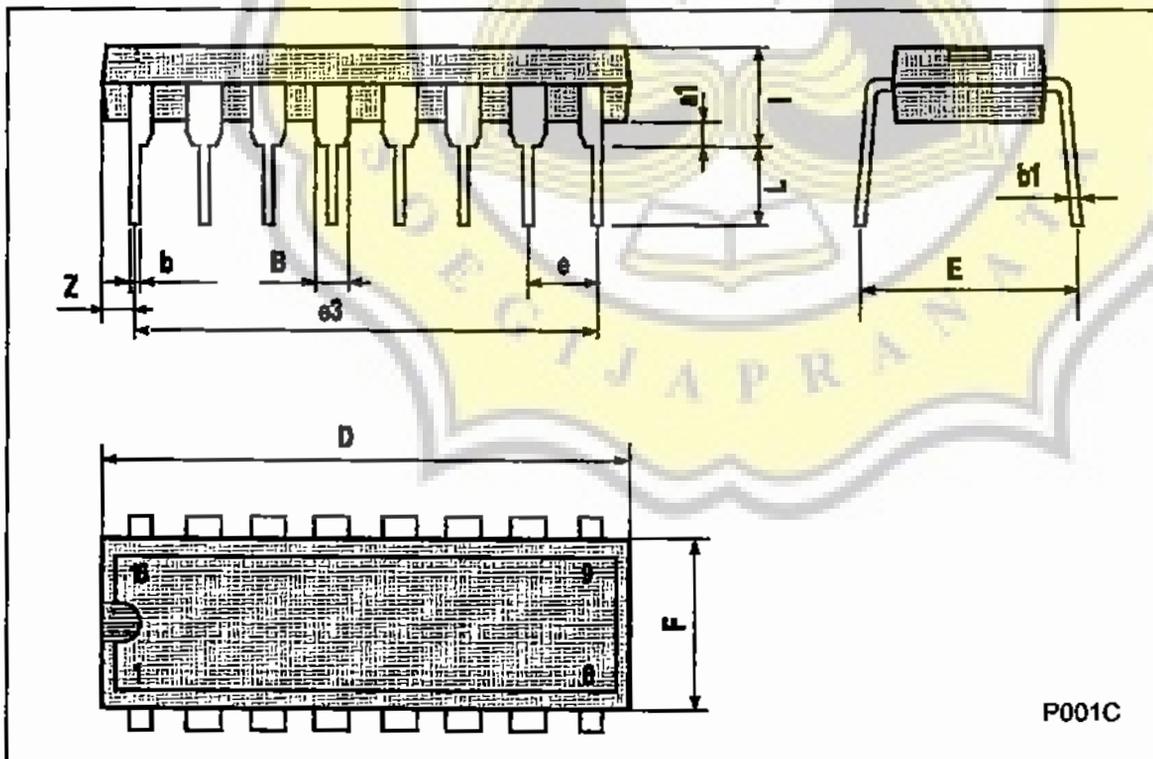
Input Leakage Current



NOTE: MEASURE INPUTS SEQUENTIALLY TO BOTH VDD AND VSS. CONNECT ALL UNUSED INPUTS TO EITHER VDD OR VSS

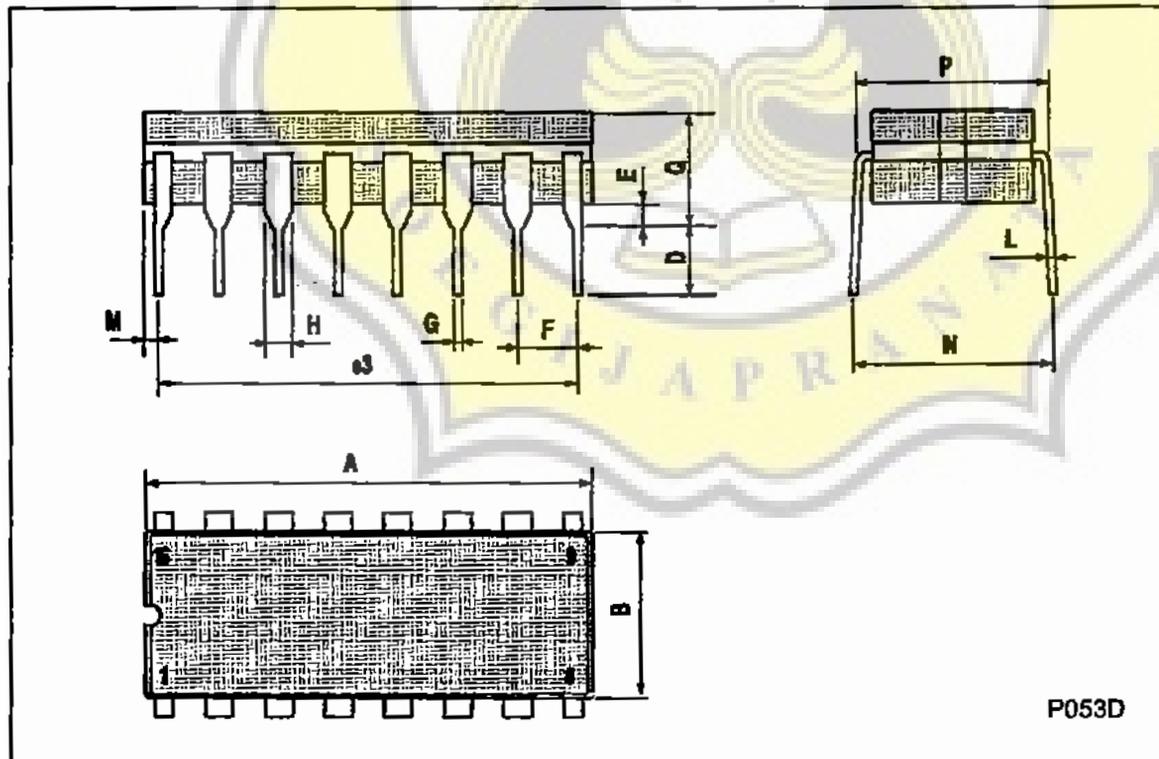
Plastic DIP16 (0.25) MECHANICAL DATA

DIM.	mm			inch		
	MIN.	TYP.	MAX.	MIN.	TYP.	MAX.
a1	0.51			0.020		
B	0.77		1.65	0.030		0.065
b		0.5			0.020	
b1		0.25			0.010	
D			20			0.787
E		8.5			0.335	
e		2.54			0.100	
e3		17.78			0.700	
F			7.1			0.280
l			5.1			0.201
L		3.3			0.130	
Z			1.27			0.050



Ceramic DIP16/1 MECHANICAL DATA

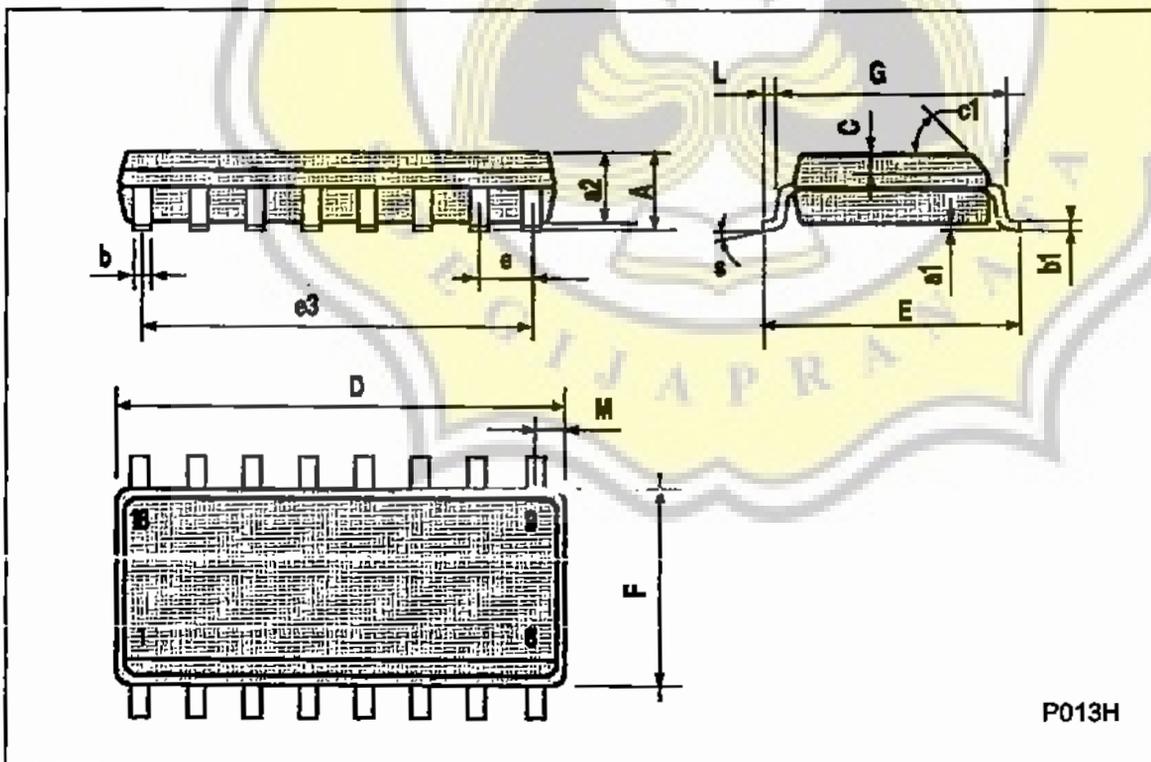
DIM.	mm			inch		
	MIN.	TYP.	MAX.	MIN.	TYP.	MAX.
A			20			0.787
B			7			0.276
D		3.3			0.130	
E	0.38			0.015		
e3		17.78			0.700	
F	2.29		2.79	0.090		0.110
G	0.4		0.55	0.016		0.022
H	1.17		1.52	0.046		0.060
L	0.22		0.31	0.009		0.012
M	0.51		1.27	0.020		0.050
N			10.3			0.406
P	7.8		8.05	0.307		0.317
Q			5.08			0.200



P053D

SO16 (Narrow) MECHANICAL DATA

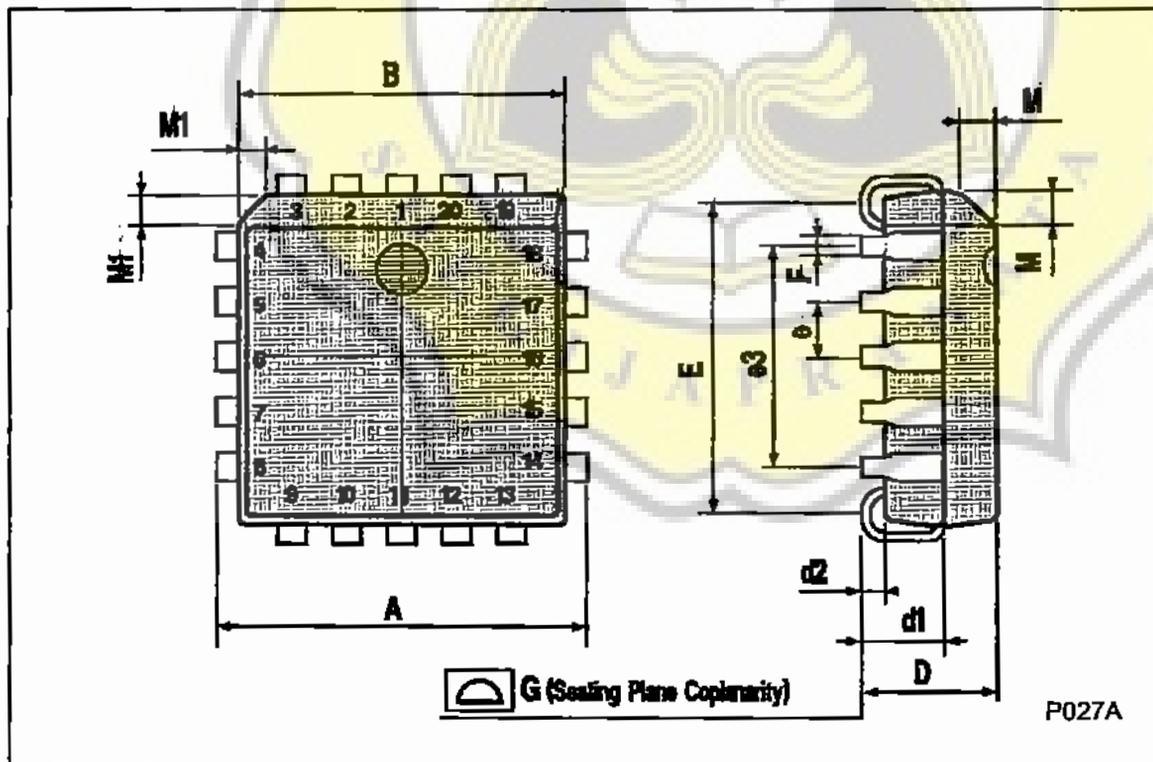
DIM.	mm			inch		
	MIN.	TYP.	MAX.	MIN.	TYP.	MAX.
A			1.75			0.068
a1	0.1		0.2	0.004		0.007
a2			1.65			0.064
b	0.35		0.46	0.013		0.018
b1	0.19		0.25	0.007		0.010
C		0.5			0.019	
c1	45° (typ.)					
D	9.8		10	0.385		0.393
E	5.8		6.2	0.228		0.244
e		1.27			0.050	
e3		8.89			0.350	
F	3.8		4.0	0.149		0.157
G	4.6		5.3	0.181		0.208
L	0.5		1.27	0.019		0.050
M			0.62			0.024
S	8° (max.)					



P013H

PLCC20 MECHANICAL DATA

DIM.	mm			inch		
	MIN.	TYP.	MAX.	MIN.	TYP.	MAX.
A	9.78		10.03	0.385		0.395
B	8.89		9.04	0.350		0.356
D	4.2		4.57	0.165		0.180
d1		2.54			0.100	
d2		0.56			0.022	
E	7.37		8.38	0.290		0.330
e		1.27			0.050	
e3		5.08			0.200	
F		0.38			0.015	
G			0.101			0.004
M		1.27			0.050	
M1		1.14			0.045	





Information furnished is believed to be accurate and reliable. However, SGS-THOMSON Microelectronics assumes no responsibility for the consequences of use of such information nor for any infringement of patents or other rights of third parties which may result from its use. No license is granted by implication or otherwise under any patent or patent rights of SGS-THOMSON Microelectronics. Specifications mentioned in this publication are subject to change without notice. This publication supersedes and replaces all information previously supplied. SGS-THOMSON Microelectronics products are not authorized for use as critical components in life support devices or systems without express written approval of SGS-THOMSON Microelectronics.

© 1994 SGS-THOMSON Microelectronics - All Rights Reserved

SGS-THOMSON Microelectronics GROUP OF COMPANIES

Australia - Brazil - France - Germany - Hong Kong - Italy - Japan - Korea - Malaysia - Malta - Morocco - The Netherlands - Singapore - Spain - Sweden - Switzerland - Taiwan - Thailand - United Kingdom - U.S.A

Analog Multiplexers/Demultiplexers

The MC14051B, MC14052B, and MC14053B analog multiplexers are digitally-controlled analog switches. The MC14051B effectively implements an SP8T solid state switch, the MC14052B a DP4T, and the MC14053B a Triple SPDT. All three devices feature low ON impedance and very low OFF leakage current. Control of analog signals up to the complete supply voltage range can be achieved.

- Triple Diode Protection on Control Inputs
- Switch Function is Break Before Make
- Supply Voltage Range = 3.0 Vdc to 18 Vdc
- Analog Voltage Range ($V_{DD} - V_{EE}$) = 3.0 to 18 V
Note: V_{EE} must be $\leq V_{SS}$
- Linearized Transfer Characteristics
- Low-noise - 12 nV/√Cycle, $f \geq 1.0$ kHz Typical
- Pin-for-Pin Replacement for CD4051, CD4052, and CD4053
- For 4PDT Switch, See MC14551B
- For Lower R_{ON} , Use the HC4051, HC4052, or HC4053 High-Speed CMOS Devices

MAXIMUM RATINGS*

Symbol	Parameter	Value	Unit
V_{DD}	DC Supply Voltage (Referenced to V_{EE} , $V_{SS} \geq V_{EE}$)	-0.5 to +18.0	V
V_{in} , V_{out}	Input or Output Voltage (DC or Transient) (Referenced to V_{SS} for Control Inputs and V_{EE} for Switch I/O)	-0.5 to $V_{DD} + 0.5$	V
I_{in}	Input Current (DC or Transient), per Control Pin	± 10	mA
I_{sw}	Switch Through Current	± 25	mA
P_D	Power Dissipation, per Package†	500	mW
T_{stg}	Storage Temperature	-65 to +150	°C
T_L	Lead Temperature (8-Second Soldering)	260	°C

* Maximum Ratings are those values beyond which damage to the device may occur.
† Temperature Derating: "P" and "D/DW" Packages: -7.0 mW/°C From 65°C To 125°C
Ceramic "L" Packages: -12 mW/°C From 100°C To 125°C

MC14051B MC14052B MC14053B



L SUFFIX
CERAMIC
CASE 620



P SUFFIX
PLASTIC
CASE 648



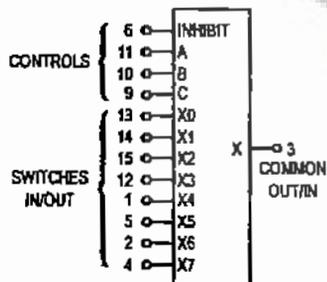
D SUFFIX
SOIC
CASE 751B

ORDERING INFORMATION

MC14XXXBCP Plastic
MC14XXXBCL Ceramic
MC14XXXBD SOIC

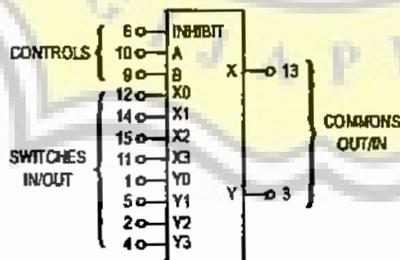
$T_A = -55^\circ$ to 125°C for all packages.

MC14051B
8-Channel Analog Multiplexer/Demultiplexer



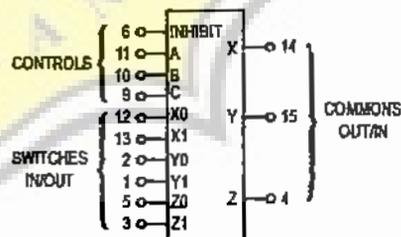
V_{DD} = PIN 16
 V_{SS} = PIN 8
 V_{EE} = PIN 7

MC14052B
Dual 4-Channel Analog Multiplexer/Demultiplexer



V_{DD} = PIN 16
 V_{SS} = PIN 8
 V_{EE} = PIN 7

MC14053B
Triple 2-Channel Analog Multiplexer/Demultiplexer



V_{DD} = PIN 16
 V_{SS} = PIN 8
 V_{EE} = PIN 7

Note: Control Inputs referenced to V_{cc} . Analog Inputs and Outputs reference to V_{cc} . V_{cc} must be $< V_{ee}$.

ELECTRICAL CHARACTERISTICS

Characteristic	Symbol	V _{DD}	Test Conditions	-55°C		25°C			125°C		Unit
				Min	Max	Min	Typ #	Max	Min	Max	

SUPPLY REQUIREMENTS (Voltages Referenced to V_{EE})

Power Supply Voltage Range	V _{DD}	—	V _{DD} - 3.0 ≥ V _{SS} ≥ V _{EE}	3.0	18	3.0	—	18	3.0	18	V
Quiescent Current Per Package	I _{DD}	5.0 10 15	Control Inputs: V _{in} = V _{SS} or V _{DD} . Switch I/O: V _{EE} ≤ V _{I/O} ≤ V _{DD} , and ΔV _{switch} ≤ 500 mV**	— — —	5.0 10 20	— — —	0.005 0.010 0.015	5.0 10 20	— — —	150 300 600	μA
Total Supply Current (Dynamic Plus Quiescent, Per Package)	I _{D(AV)}	5.0 10 15	T _A = 25°C only (The channel component, (V _{in} - V _{out})/R _{on} , is not included.)	Typical		(0.07 μA/kHz) f + I _{DD} (0.20 μA/kHz) f + I _{DD} (0.36 μA/kHz) f + I _{DD}					μA

CONTROL INPUTS — INHIBIT, A, B, C (Voltages Referenced to V_{SS})

Low-Level Input Voltage	V _{IL}	5.0 10 15	R _{on} = per spec, I _{off} = per spec	— — —	1.5 3.0 4.0	— — —	2.25 4.50 6.75	1.5 3.0 4.0	— — —	1.5 3.0 4.0	V
High-Level Input Voltage	V _{IH}	5.0 10 15	R _{on} = per spec, I _{off} = per spec	3.5 7.0 11	— — —	3.5 7.0 11	2.75 5.50 8.25	— — —	3.5 7.0 11	— — —	V
Input Leakage Current	I _{in}	15	V _{in} = 0 or V _{DD}	—	±0.1	—	±0.00001	±0.1	—	1.0	μA
Input Capacitance	C _{in}	—		—	—	—	5.0	7.5	—	—	pF

SWITCHES IN/OUT AND COMMONS OUT/IN — X, Y, Z (Voltages Referenced to V_{EE})

Recommended Peak-to-Peak Voltage Into or Out of the Switch	V _{I/O}	—	Channel On or Off	0	V _{DD}	0	—	V _{DD}	0	V _{DD}	V _{PP}
Recommended Static or Dynamic Voltage Across the Switch** (Figure 5)	ΔV _{switch}	—	Channel On	0	600	0	—	600	0	300	mV
Output Offset Voltage	V _{OO}	—	V _{in} = 0 V, No Load	—	—	—	10	—	—	—	μV
ON Resistance	R _{on}	5.0 10 15	ΔV _{switch} ≤ 500 mV**, V _{in} = V _{IL} or V _{IH} (Control), and V _{in} = 0 to V _{DD} (Switch)	— — —	800 400 220	— — —	250 120 80	1050 500 280	— — —	1200 520 300	Ω
ΔON Resistance Between Any Two Channels in the Same Package	ΔR _{on}	5.0 10 15		— — —	70 50 45	— — —	25 10 10	70 50 45	— — —	135 95 65	Ω
Off-Channel Leakage Current (Figure 10)	I _{off}	15	V _{in} = V _{IL} or V _{IH} (Control) Channel to Channel or Any One Channel	—	±100	—	±0.05	±100	—	±1000	nA
Capacitance, Switch I/O	C _{I/O}	—	Inhibit = V _{DD}	—	—	—	10	—	—	—	pF
Capacitance, Common O/I	C _{O/I}	—	Inhibit = V _{DD} (MC14051B) (MC14052B) (MC14053B)	— — —	— — —	— — —	60 32 17	— — —	— — —	— — —	pF
Capacitance, Feedthrough (Channel Off)	C _{I/O}	—	Pins Not Adjacent Pins Adjacent	— —	— —	— —	0.15 0.47	— —	— —	— —	pF

#Data labeled "Typ" is not to be used for design purposes, but is intended as an indication of the IC's potential performance.

*For voltage drops across the switch (ΔV_{switch}) > 600 mV (> 300 mV at high temperature), excessive V_{DD} current may be drawn, i.e. the current out of the switch may contain both V_{DD} and switch input components. The reliability of the device will be unaffected unless the Maximum Ratings are exceeded. (See first page of this data sheet.)

ELECTRICAL CHARACTERISTICS* ($C_L = 50 \text{ pF}$, $T_A = 25^\circ\text{C}$) ($V_{EE} \leq V_{SS}$ unless otherwise indicated)

Characteristic	Symbol	$V_{DD} - V_{EE}$ Vdc	Typ # All Types	Max	Unit
Propagation Delay Times (Figure 6) Switch Input to Switch Output ($R_L = 10 \text{ k}\Omega$)	t_{PLH} , t_{PHL}				ns
MC14051 t_{PLH} , $t_{PHL} = (0.17 \text{ ns/pF}) C_L + 26.5 \text{ ns}$ t_{PLH} , $t_{PHL} = (0.08 \text{ ns/pF}) C_L + 11 \text{ ns}$ t_{PLH} , $t_{PHL} = (0.06 \text{ ns/pF}) C_L + 9.0 \text{ ns}$		5.0 10 15	35 15 12	90 40 30	
MC14052 t_{PLH} , $t_{PHL} = (0.17 \text{ ns/pF}) C_L + 21.5 \text{ ns}$ t_{PLH} , $t_{PHL} = (0.08 \text{ ns/pF}) C_L + 8.0 \text{ ns}$ t_{PLH} , $t_{PHL} = (0.06 \text{ ns/pF}) C_L + 7.0 \text{ ns}$		5.0 10 15	30 12 10	75 30 25	ns
MC14053 t_{PLH} , $t_{PHL} = (0.17 \text{ ns/pF}) C_L + 16.5 \text{ ns}$ t_{PLH} , $t_{PHL} = (0.08 \text{ ns/pF}) C_L + 4.0 \text{ ns}$ t_{PLH} , $t_{PHL} = (0.06 \text{ ns/pF}) C_L + 3.0 \text{ ns}$		5.0 10 15	25 8.0 6.0	65 20 15	ns
Inhibit to Output ($R_L = 10 \text{ k}\Omega$, $V_{EE} = V_{SS}$) Output "1" or "0" to High Impedance, or High Impedance to "1" or "0" Level	t_{PHZ} , t_{PLZ} , t_{PZH} , t_{PZL}				ns
MC14051B		5.0 10 15	350 170 140	700 340 280	
MC14052B		5.0 10 15	300 155 125	600 310 250	ns
MC14053B		5.0 10 15	275 140 110	550 280 220	ns
Control Input to Output ($R_L = 10 \text{ k}\Omega$, $V_{EE} = V_{SS}$)	t_{PLH} , t_{PHL}				ns
MC14051B		5.0 10 15	360 160 120	720 320 240	
MC14052B		5.0 10 15	325 130 90	650 260 180	ns
MC14053B		5.0 10 15	300 120 80	600 240 160	ns
Second Harmonic Distortion ($R_L = 10 \text{ k}\Omega$, $f = 1 \text{ kHz}$) $V_{in} = 5 \text{ V}_{pp}$	—	10	0.07	—	%
Bandwidth (Figure 7) ($R_L = 1 \text{ k}\Omega$, $V_{in} = 1/2 (V_{DD} - V_{EE})$ p-p, $C_L = 50 \text{ pF}$ $20 \text{ Log } (V_{out}/V_{in}) = -3 \text{ dB}$)	BW	10	17	—	MHz
Off Channel Feedthrough Attenuation (Figure 7) $R_L = 1 \text{ k}\Omega$, $V_{in} = 1/2 (V_{DD} - V_{EE})$ p-p $f_{in} = 4.5 \text{ MHz}$ — MC14051B $f_{in} = 30 \text{ MHz}$ — MC14052B $f_{in} = 55 \text{ MHz}$ — MC14053B	—	10	-50	—	dB
Channel Separation (Figure 8) ($R_L = 1 \text{ k}\Omega$, $V_{in} = 1/2 (V_{DD} - V_{EE})$ p-p, $f_{in} = 3.0 \text{ MHz}$)	—	10	-50	—	dB
Crosstalk, Control Input to Common O/I (Figure 9) ($R_1 = 1 \text{ k}\Omega$, $R_L = 10 \text{ k}\Omega$ Control $t_{TLH} = t_{THL} = 20 \text{ ns}$, Inhibit = V_{SS})	—	10	75	—	mV

* The formulas given are for the typical characteristics only at 25°C .

#Data labelled "Typ" is not to be used for design purposes but is intended as an indication of the IC's potential performance.

This device contains protection circuitry to guard against damage due to high static voltages or electric fields. However, precautions must be taken to avoid applications of any voltage higher than maximum rated voltages to this high-impedance circuit. For proper operation, V_{in} and V_{out} should be constrained to the range $V_{SS} \leq (V_{in} \text{ or } V_{out}) \leq V_{DD}$. Unused inputs must always be tied to an appropriate logic voltage level (e.g., either V_{SS} , V_{EE} , or V_{DD}). Unused outputs must be left open.

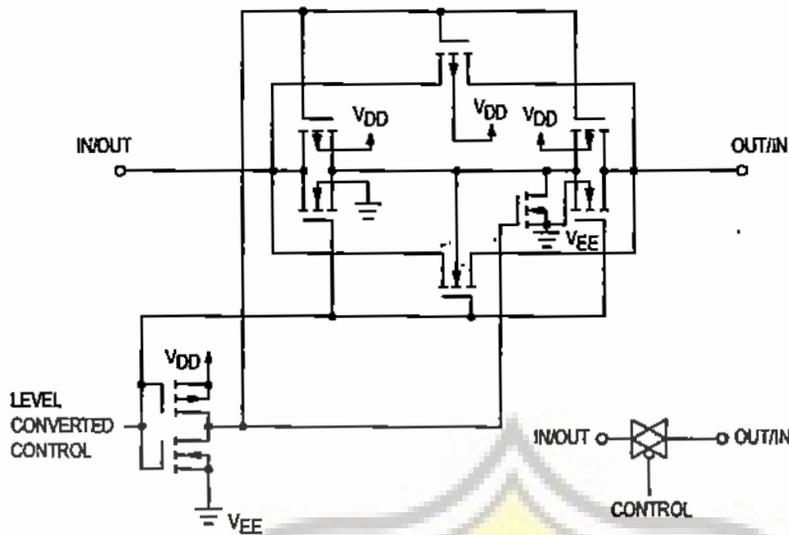


Figure 1. Switch Circuit Schematic

TRUTH TABLE

Control inputs		ON Switches				
Inhibit	Select			MC14051B	MC14052B	MC14053B
	C*	B	A			
0	0	0	0	X0	Y0 X0	Z0 Y0 X0
0	0	0	1	X1	Y1 X1	Z0 Y0 X1
0	0	1	0	X2	Y2 X2	Z0 Y1 X0
0	0	1	1	X3	Y3 X3	Z0 Y1 X1
0	1	0	0	X4		Z1 Y0 X0
0	1	0	1	X5		Z1 Y0 X1
0	1	1	0	X6		Z1 Y1 X0
0	1	1	1	X7		Z1 Y1 X1
1	x	x	x	None	None	None

* Not applicable for MC14052
x = Don't Care

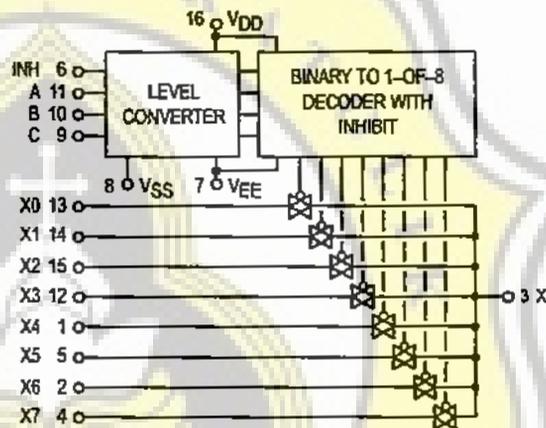


Figure 2. MC14051B Functional Diagram

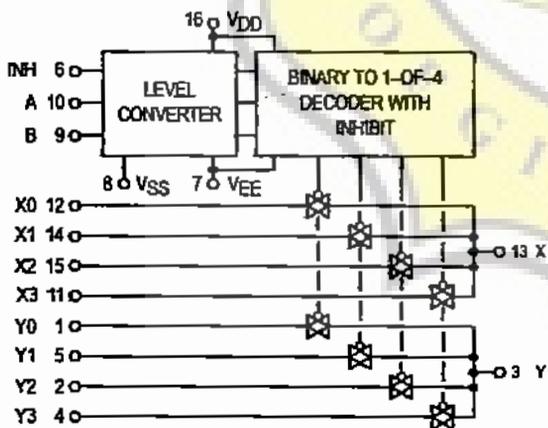


Figure 3. MC14052B Functional Diagram

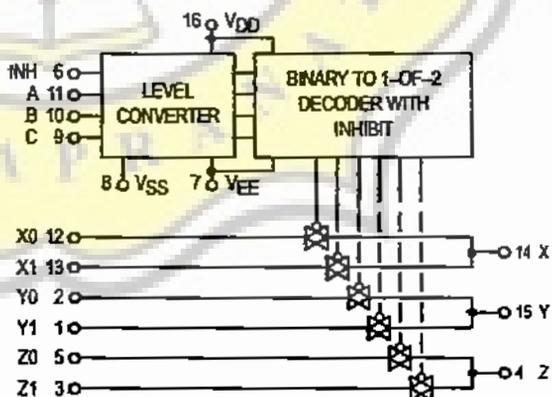


Figure 4. MC14053B Functional Diagram

TEST CIRCUITS

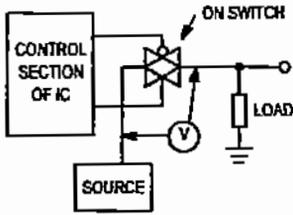


Figure 5. ΔV Across Switch

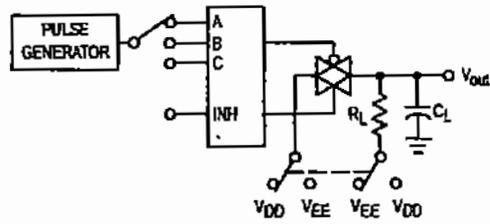


Figure 6. Propagation Delay Times, Control and Inhibit to Output

A, B, and C inputs used to turn ON or OFF the switch under test.

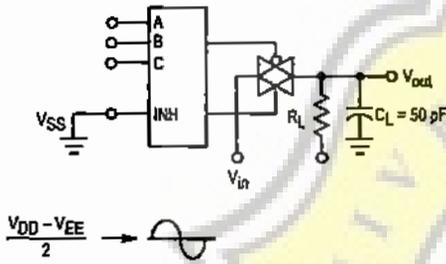


Figure 7. Bandwidth and Off-Channel Feedthrough Attenuation

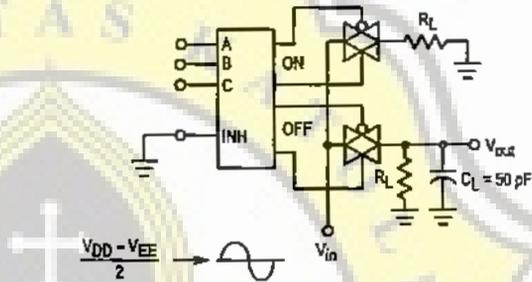


Figure 8. Channel Separation (Adjacent Channels Used For Setup)

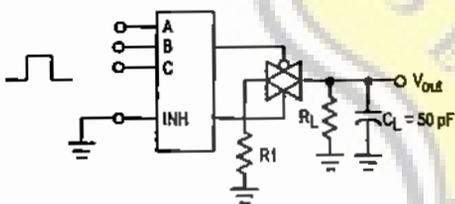


Figure 9. Crosstalk, Control Input to Common O/I

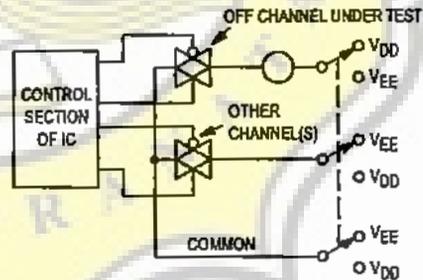


Figure 10. Off Channel Leakage

NOTE: See also Figures 7 and 8 on Page 6-51.

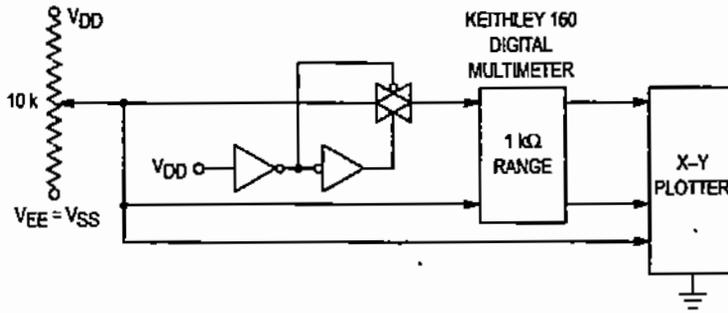


Figure 11. Channel Resistance (R_{ON}) Test Circuit

TYPICAL RESISTANCE CHARACTERISTICS

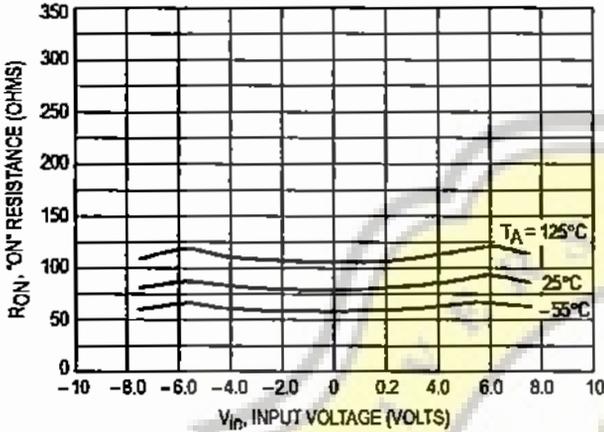


Figure 12. $V_{DD} = 7.5\text{ V}$, $V_{EE} = -7.5\text{ V}$

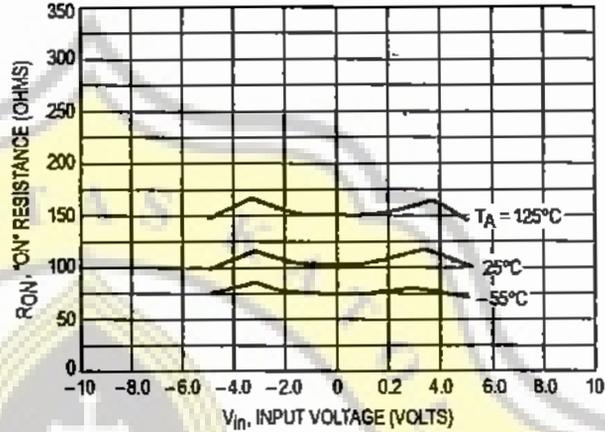


Figure 13. $V_{DD} = 5.0\text{ V}$, $V_{EE} = -5.0\text{ V}$

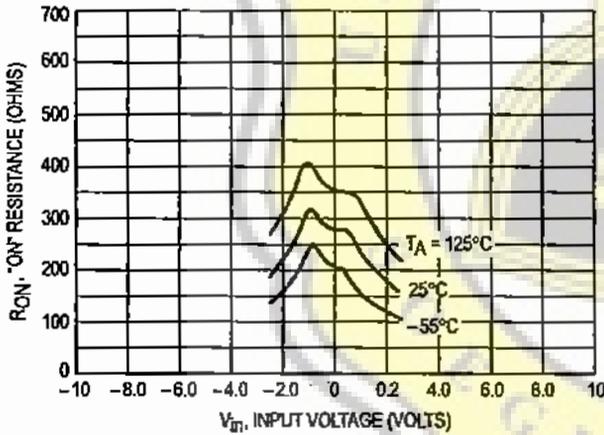


Figure 14. $V_{DD} = 2.5\text{ V}$, $V_{EE} = -2.5\text{ V}$

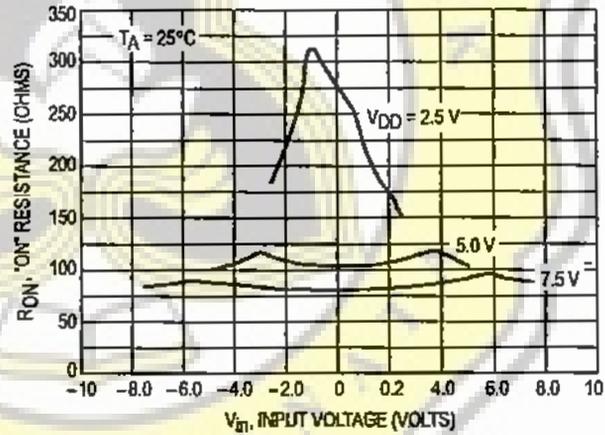


Figure 15. Comparison at 25°C , $V_{DD} = -V_{EE}$

PIN ASSIGNMENT

MC14051B			
X4	1	16	V_{DD}
X6	2	15	X2
X	3	14	X1
X7	4	13	X0
X5	5	12	X3
INH	6	11	A
V_{EE}	7	10	B
V_{SS}	8	9	C

MC14052B			
Y0	1	16	V_{DD}
Y2	2	15	X2
Y	3	14	X1
Y3	4	13	X
Y1	5	12	X0
INH	6	11	X3
V_{EE}	7	10	A
V_{SS}	8	9	B

MC14053B			
Y1	1	16	V_{DD}
Y0	2	15	Y
Z1	3	14	X
Z	4	13	X1
Z0	5	12	X0
INH	6	11	A
V_{EE}	7	10	B
V_{SS}	8	9	C

APPLICATIONS INFORMATION

Figure A illustrates use of the on-chip level converter detailed in Figures 2, 3, and 4. The 0-to-5 V Digital Control signal is used to directly control a 9 V_{p-p} analog signal.

The digital control logic levels are determined by V_{DD} and V_{SS}. The V_{DD} voltage is the logic high voltage; the V_{SS} voltage is logic low. For the example, V_{DD} = +5 V = logic high at the control inputs; V_{SS} = GND = 0 V = logic low.

The maximum analog signal level is determined by V_{DD} and V_{EE}. The V_{DD} voltage determines the maximum recommended peak above V_{SS}. The V_{EE} voltage determines the maximum swing below V_{SS}. For the example, V_{DD} - V_{SS} = 5 V maximum swing above V_{SS}; V_{SS} - V_{EE} = 5 V maximum swing below V_{SS}. The example shows a ±4.5 V signal which allows a 1/2 volt margin at each peak. If voltage transients

above V_{DD} and/or below V_{EE} are anticipated on the analog channels, external diodes (D_x) are recommended as shown in Figure B. These diodes should be small signal types able to absorb the maximum anticipated current surges during clipping.

The *absolute* maximum potential difference between V_{DD} and V_{EE} is 18.0 V. Most parameters are specified up to 15 V which is the *recommended* maximum difference between V_{DD} and V_{EE}.

Balanced supplies are not required. However, V_{SS} must be greater than or equal to V_{EE}. For example, V_{DD} = +10 V, V_{SS} = +5 V, and V_{EE} = -3 V is acceptable. See the Table below.

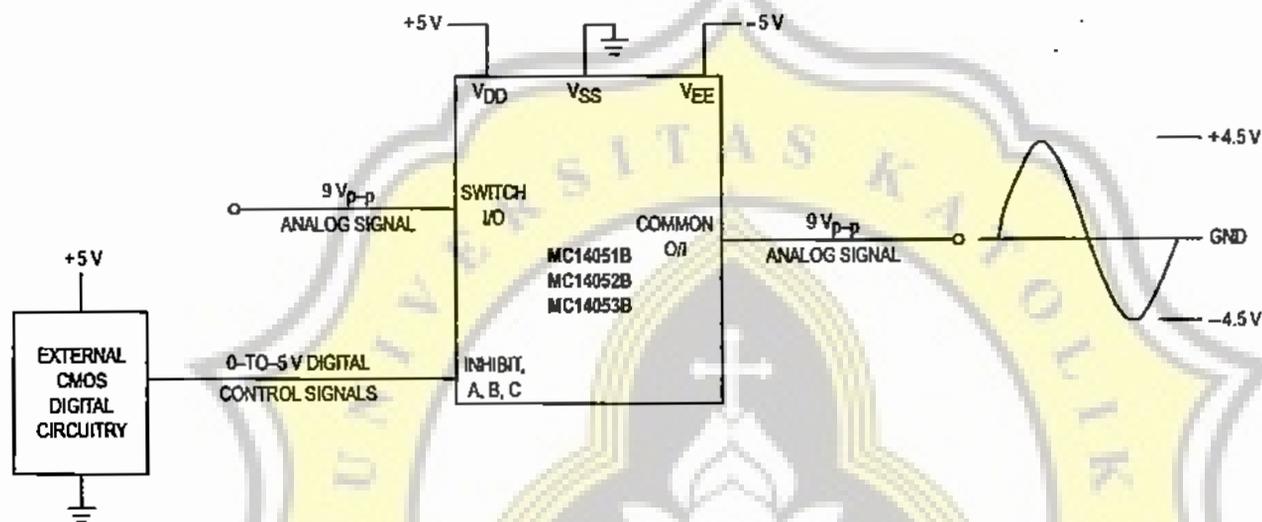


Figure A. Application Example

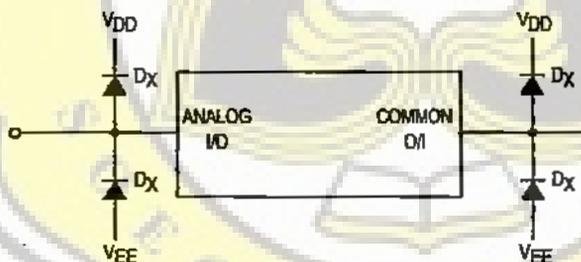


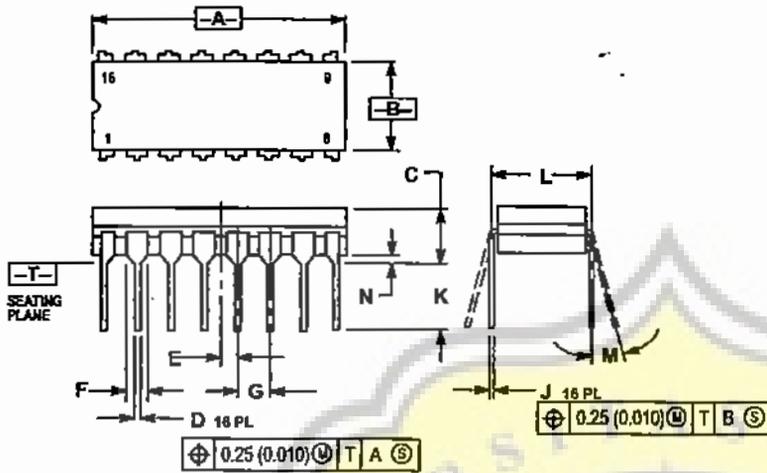
Figure B. External Germanium or Schottky Clipping Diodes

POSSIBLE SUPPLY CONNECTIONS

V _{DD} In Volts	V _{SS} In Volts	V _{EE} In Volts	Control Inputs Logic High/Logic Low In Volts	Maximum Analog Signal Range In Volts
+8	0	-8	+8/0	+8 to -8 = 16 V _{p-p}
+5	0	-12	+5/0	+5 to -12 = 17 V _{p-p}
+5	0	0	+5/0	+5 to 0 = 5 V _{p-p}
+5	0	-5	+5/0	+5 to -5 = 10 V _{p-p}
+10	+5	-5	+10/+5	+10 to -5 = 15 V _{p-p}

OUTLINE DIMENSIONS

L SUFFIX CERAMIC DIP PACKAGE CASE 620-10 ISSUE V

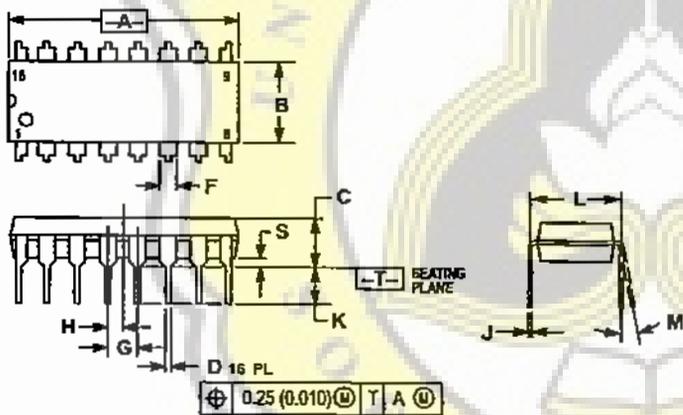


NOTES:

1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.
3. DIMENSION L TO CENTER OF LEAD WHEN FORMED PARALLEL.
4. DIMENSION F MAY NARROW TO 0.75 (0.030) WHERE THE LEAD ENTERS THE CERAMIC BODY.

DIM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	0.750	0.785	19.05	19.93
B	0.240	0.295	6.10	7.49
C	—	0.200	—	5.08
D	0.015	0.020	0.39	0.50
E	0.050 BSC		1.27 BSC	
F	0.055	0.065	1.40	1.65
G	0.100 BSC		2.54 BSC	
H	0.008	0.015	0.21	0.38
K	0.125	0.170	3.18	4.31
L	0.300 BSC		7.62 BSC	
M	0°	15°	0°	15°
N	0.020	0.040	0.51	1.01

P SUFFIX PLASTIC DIP PACKAGE CASE 648-08 ISSUE R



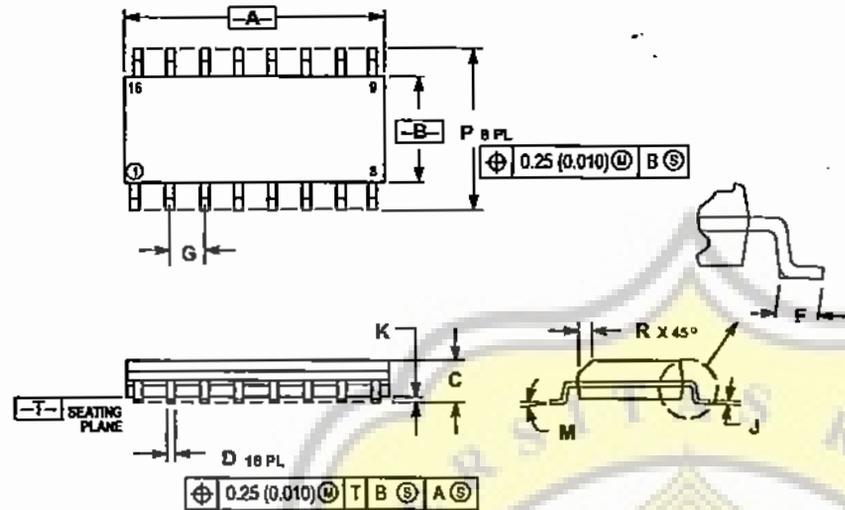
NOTES:

1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.
3. DIMENSION L TO CENTER OF LEADS WHEN FORMED PARALLEL.
4. DIMENSION B DOES NOT INCLUDE MOLD FLASH.
5. ROUNDED CORNERS OPTIONAL.

DIM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	0.740	0.770	18.80	19.55
B	0.250	0.270	6.35	6.85
C	0.145	0.175	3.69	4.44
D	0.015	0.021	0.39	0.53
F	0.040	0.70	1.02	1.77
G	0.100 BSC		2.54 BSC	
H	0.050 BSC		1.27 BSC	
J	0.006	0.015	0.21	0.38
K	0.110	0.130	2.80	3.30
L	0.295	0.305	7.50	7.74
M	0°	10°	0°	10°
S	0.020	0.040	0.51	1.01

OUTLINE DIMENSIONS

D SUFFIX PLASTIC SOIC PACKAGE CASE 751B-05 ISSUE J



NOTES:

1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: MILLIMETER.
3. DIMENSIONS A AND B DO NOT INCLUDE MOLD PROTRUSION.
4. MAXIMUM MOLD PROTRUSION 0.15 (0.006) PER SIDE.
5. DIMENSION D DOES NOT INCLUDE DAMBAR PROTRUSION. ALLOWABLE DAMBAR PROTRUSION SHALL BE 0.127 (0.005) TOTAL IN EXCESS OF THE D DIMENSION AT MAXIMUM MATERIAL CONDITION.

DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	9.80	10.00	0.386	0.393
B	3.80	4.00	0.150	0.157
C	1.35	1.75	0.054	0.068
D	0.35	0.49	0.014	0.019
F	0.40	1.25	0.016	0.049
Q	1.27 BSC		0.050 BSC	
J	0.19	0.25	0.008	0.009
K	0.10	0.25	0.004	0.009
M	0°	7°	0°	7°
P	5.80	6.20	0.229	0.244
R	0.25	0.50	0.010	0.019

Motorola reserves the right to make changes without further notice to any products herein. Motorola makes no warranty, representation or guarantee regarding the suitability of its products for any particular purpose, nor does Motorola assume any liability arising out of the application or use of any product or circuit, and specifically disclaims any and all liability, including without limitation consequential or incidental damages. "Typical" parameters which may be provided in Motorola data sheets and/or specifications can and do vary in different applications and actual performance may vary over time. All operating parameters, including "Typicals" must be validated for each customer application by customer's technical experts. Motorola does not convey any license under its patent rights nor the rights of others. Motorola products are not designed, intended, or authorized for use as components in systems intended for surgical implant into the body, or other applications intended to support or sustain life, or for any other application in which the failure of the Motorola product could create a situation where personal injury or death may occur. Should Buyer purchase or use Motorola products for any such unintended or unauthorized application, Buyer shall indemnify and hold Motorola and its officers, employees, subsidiaries, affiliates, and distributors harmless against all claims, costs, damages, and expenses, and reasonable attorney fees arising out of, directly or indirectly, any claim of personal injury or death associated with such unintended or unauthorized use, even if such claim alleges that Motorola was negligent regarding the design or manufacture of the part. Motorola and μ are registered trademarks of Motorola, Inc. Motorola, Inc. is an Equal Opportunity/Affirmative Action Employer.

How to reach us:

USA/EUROPE/Locations Not Listed: Motorola Literature Distribution;
P.O. Box 20912; Phoenix, Arizona 85036. 1-800-441-2447 or 602-303-5454

JAPAN: Nippon Motorola Ltd.; Tatsumi-SPD-JLDC, 6F Seibu-Butsuryu-Center,
3-14-2 Tatsumi Koto-Ku, Tokyo 135, Japan. 03-81-3521-8315

MFAX: RMFAX0@email.sps.mot.com - TOUCHTONE 602-244-6609
INTERNET: <http://Design-NET.com>

ASIA/PACIFIC: Motorola Semiconductors H.K. Ltd.; 8B Tai Ping Industrial Park,
51 Ting Kok Road, Tai Po, N.T., Hong Kong. 852-26629296



MC14051B/D

