

LAMPIRAN B

❖ *Listing Program*

LAMPIRAN B

; PROGRAM PENGUSIR TIKUS
; BY KENNEDY SUMARLIE

; Program Tampilan LCD

; =====

; VARIABLE:

| | | |
|------------|-----|------|
| outp | equ | p3.0 |
| command | equ | 31h |
| character | equ | 32h |
| D_BIN | equ | 33h |
| ASCH | equ | 34h |
| ASCL | equ | 35h |
| L_DL0 | equ | 36h |
| L_DL1 | equ | 37h |
| L_DL2 | equ | 38h |
| S_DL0 | equ | 39h |
| S_DL1 | equ | 3Ah |
| S_DL2 | equ | 3Bh |
| key | equ | 3Dh |
| datakey | equ | 3Eh |
| RS | equ | P0.4 |
| EN | equ | P0.6 |
| LCD | equ | P0 |
| period | equ | 41h |
| datakey1 | equ | 42h |
| datakey2 | equ | 43h |
| freq_bawah | equ | 44h |
| freq_atas | equ | 45h |
| temp1 | equ | 46h |
| temp2 | equ | 47h |

; =====

; PROGRAM UTAMA

; =====

org 00h ; alamat awal 00
ljmp main_prog

org 100h ; alamat program

; -----

; subrutin line 1

; -----

line1: mov command,#80h
lcall send_command
mov r7,#10h

next1:
mov a,#0h
movc a,@a+dptr
mov character,a
lcall send_character
inc dptr
djnz r7,next1
ret

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```
; -----  
; subrutin line 2  
; -----
```

```
line2:  
    mov    command,#0C0h  
    lcall  send_command  
    mov    r7,#10h
```

```
next2:  
    mov    a,#0h  
    movc  a,@a+dptr  
    mov    character,a  
    lcall  send_character  
    inc   dptr  
    djnz  r7,next2  
    ret
```

```
; -----  
; subrutin scan keypad  
; -----
```

```
scankey:  
  
    mov    p2,#0FFh           ; semua high  
    clr   P2.7                ; baris 1  
    JB    P2.3,KEY1          ; kolom 1, baris 1  
    mov   key,#'1'  
    mov   datakey,#1  
    ret
```

```
KEY1:  
    JB    P2.2,KEY2          ; kolom 2, baris 1  
    mov   key,#'2'  
    mov   datakey,#2  
    ret
```

```
KEY2:  
    JB    P2.1,KEYA          ; kolom 3, baris 1  
    mov   key,#'3'  
    mov   datakey,#3  
    ret
```

```
KEYA:  
    JB    P2.0,KEY3          ; kolom 4, baris 1  
    mov   key,#'A'  
    mov   datakey,#0  
    ret
```

```
KEY3:  
    mov   P2,#0ffh  
    clr   p2.6                ; baris 2  
    JB    P2.3,KEY4          ; kolom 1, baris 2  
    mov   key,#'4'
```

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```
    mov  datakey,#4
    ret

KEY4:
    JB   P2.2,KEY5           ; kolom 2, baris 2
    mov  key,#'5'
    mov  datakey,#5
    ret

KEY5:
    JB   P2.1,KEYB           ; kolom 3, baris 2
    mov  key,#'6'
    mov  datakey,#6
    ret

KEYB:
    JB   P2.0,KEY6           ; kolom 4, baris 2
    mov  key,#'B'
    mov  datakey,#0
    ret

KEY6:
    MOV  P2,#0FFh
    clr  p2.5                 ; baris 3
    JB   P2.3,KEY7           ; kolom 1, baris 3
    mov  key,#'7'
    mov  datakey,#7
    ret

KEY7:
    JB   P2.2,KEY8           ; kolom 2, baris 3
    mov  key,#'8'
    mov  datakey,#8
    ret

KEY8:
    JB   P2.1,KEYC           ; kolom 3, baris 3
    mov  key,#'9'
    mov  datakey,#9
    ret

KEYC:
    JB   P2.0,KEY9           ; kolom 4, baris 3
    mov  key,#'C'
    mov  datakey,#0
    ret

KEY9:
    mov  P2,#0FFh
    clr  p2.4                 ; baris 4
    JB   P2.3,KEY10          ; kolom 1, baris 4
    mov  key,#'*'
    mov  datakey,#0
    ret
```

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KEY10:

```
JB    P2.2,KEY11           ; kolom 2, baris 4
mov   key,#'0'
mov   datakey,#0
ret
```

KEY11:

```
JB    P2.1,KEYD           ; kolom 3, baris 4
mov   key,##'
mov   datakey,#0h
ret
```

KEYD:

```
JB    P2.0,dela          ; kolom 4, baris 4
mov   key,#'D'
mov   datakey,#0h
ret
```

dela:

```
call  delay_50_ms
ajmp  scankey
```

```
;-----
; Subrutin inisialisasi LCD
;-----
```

init_LCD:

```
LCALL SDLY
LCALL SDLY
MOV   LCD,#02H           ; Set mode operasi LCD 4 bit

setb  EN
mov   S_DL0,#00h        ; Delay power on LCD
MOV   S_DL1,#4h
lcall SDLY
clr   EN

mov   command,#28h      ; Set mode LCD 16 karakter 2 baris
lcall send_command
lcall sdly
mov   command,#08h      ; Turn off LCD
lcall send_command
lcall sdly
mov   command,#0Ch      ; Turn on LCD
lcall send_command
lcall sdly
mov   command,#06h      ; Increment address mode
lcall send_command
lcall sdly
ret
```

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```
; -----  
; subrutin kirim perintah ke LCD  
; -----
```

```
send_command:  
    mov    LCD,#00H  
    clr    RS  
    mov    a,command  
    anl    a,#0f0h  
    swap  a  
    mov    LCD,a  
    setb  EN  
    mov    S_DL1,#1h  
    lcall SDLY  
    clr    EN  
    mov    a,command  
    anl    a,#0fh  
    mov    LCD,A  
    setb  EN  
    mov    S_DL1,#1h  
    lcall SDLY  
    clr    EN  
    ret
```

```
; -----  
; subrutin kirim karakter ke LCD  
; -----
```

```
send_character:  
    mov    LCD,#00H  
    mov    a,character  
    anl    a,#0F0h  
    swap  a  
    mov    LCD,a  
    setb  RS  
    setb  EN  
    mov    S_DL1,#1h  
    lcall SDLY  
    clr    EN  
    mov    a,character  
    anl    a,#0fh  
    mov    LCD,a  
    setb  RS  
    setb  EN  
    mov    S_DL1,#1h  
    lcall SDLY  
    clr    EN  
    ret
```

```
; -----  
  
SDLY:  
    djnz  S_DL0,SDLY  
    djnz  S_DL1,SDLY  
    ret
```

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; -----DELAY DARI KEYPAD -----

periode:

```
mov  A,period
cjne A,#05h,cekperiode2      ; 0,5 detik (maksudnya interval)
call delay_05_s
ret
```

cekperiode2:

```
cjne A,#10h,cekperiode3      ; 1,0 detik
call delay_1_s
ret
```

cekperiode3:

```
cjne A,#15h,cekperiode4
call delay_1_s
call delay_05_S
ret
```

cekperiode4:

```
cjne A,#20h,cekperiode5
call delay_1_s
call delay_1_s
ret
```

cekperiode5:

```
cjne A,#25h,cekperiode6
call delay_1_s
call delay_1_s
call delay_05_S
ret
```

cekperiode6:

```
cjne A,#30h,cekperiode7
call delay_1_s
call delay_1_s
call delay_1_S
ret
```

cekperiode7:

```
cjne A,#35h,cekperiode8
call delay_1_s
call delay_1_s
call delay_1_S
call delay_05_s
ret
```

cekperiode8:

```
cjne A,#40h,cekperiode9
call delay_1_s
call delay_1_s
call delay_1_S
call delay_1_s
ret
```

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```
cekperioda9:
    cjne A,#45h,cekperioda10
    call delay_1_s
    call delay_1_s
    call delay_1_S
    call delay_1_s
    call delay_05_s
    ret
```

```
cekperioda10:
    cjne A,#50h,quit
    call delay_1_s
    call delay_1_s
    call delay_1_S
    call delay_1_s
    call delay_1_s
    ret
```

```
quit:
    call delay_1_s
    ret
```

```
;-----;
;   BIN TO ASCII SUBROUTIN
;-----;
```

```
BIN2ASC:
    MOV   A,D_BIN
    ANL   A,#0FH
    ADD   A,#0F6H
    JNC   NOADJL
    ADD   A,#07H
```

```
NOADJL:
    ADD   A,#3AH
    MOV   ASCL,A
    MOV   A,D_BIN
    SWAP A
    ANL   A,#0FH
    ADD   A,#0F6H
    JNC   NOADJL2
    ADD   A,#07H
```

```
NOADJL2:
    ADD   A,#3AH
    MOV   ASCH,A
    RET
```

```
;-----;
; DELAY 50 milisecond
;-----;
```

```
delay_50_ms:
    mov   R5,#50
count_50_ms:
    mov   R6,#02H
finish_50_ms:
    mov   R7,#0FFH
```


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```
; MULAI PROGRAM
; =====
main_prog:
; =====

    lcall delay_1_s
    lcall init_lcd
    mov   freq_bawah,#20h
    mov   freq_atas,#42h
    mov   period,#20h

ulang:

    mov   dptr,#pesan1
    acall line1
    mov   dptr,#pesan2
    acall line2
    lcall delay_1_s
    lcall delaY_1_s
    lcall delay_1_s
    mov   dptr,#blank
    acall line1
    mov   dptr,#blank
    acall line2

    mov   dptr,#pesan3
    acall line1
    mov   dptr,#pesan4
    acall line2
    lcall delay_1_s
    lcall delaY_1_s
    lcall delay_1_s

    mov   dptr,#blank
    acall line1
    mov   dptr,#blank
    acall line2

; -----

loop:
    mov   dptr,#menu1
    acall line1
    mov   dptr,#menu2
    acall line2
    call  scankey
    mov   a,key

    cjne  A,#'3',cek_1
    mov   dptr,#berhenti
    call  line1
    mov   dptr,#berhenti2
    call  line2
    sjmp  $          ; BERHENTI
```

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```
; =====  
  
cek_1:  
    cjne  A,#1',cek_akt  
    sjmp  set_freq  
  
cek_akt:  
    ljmp  cek_aktif  
; -----  
  
set_freq:  
    mov   dptr,#set1 ; freq bawah  
    acall line1  
    mov   dptr,#blank  
    call  line2  
    call  delay_1_s  
  
tekan_ulang:  
    call  scankey  
    mov   temp1,datakey  
    mov   character,key  
    mov   command,#08Ah  
    lcall send_command  
    lcall send_character  
    call  delay_05_s  
    call  scankey  
    mov   temp2,datakey  
    mov   character,key  
    lcall send_character  
    mov   a,temp1  
    swap a  
    add  a,temp2  
    mov  freq_bawah,a  
    mov  a,freq_bawah  
  
cekb20:  
    cjne  A,#20h,cekb22  
    mov   freq_bawah,#20h  
    ljmp  frqats  
  
cekb22:  
    cjne  A,#22h,cekb24  
    mov   freq_bawah,#22h  
    ljmp  frqats  
  
cekb24:  
    cjne  A,#24h,cekb26  
    mov   freq_bawah,#24h  
    ljmp  frqats  
  
cekb26:  
    cjne  A,#26h,cekb29  
    mov   freq_bawah,#26h  
    ljmp  frqats
```

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```
cekb29:
    cjne  A,#29h,cekb31
    mov   freq_bawah,#29h
    ljmp  frqats

cekb31:
    cjne  A,#31h,cekb33
    mov   freq_bawah,#31h
    ljmp  frqats

cekb33:
    cjne  A,#33h,cekb36
    mov   freq_bawah,#33h
    ljmp  frqats

cekb36:
    cjne  A,#36h,cekb42
    mov   freq_bawah,#36h
    ljmp  frqats

cekb42:
    cjne  A,#42h,set_freq
    mov   freq_bawah,#42h
    ljmp  frqats

frqats:
    mov   dptr,#set2 ; freq atas
    acall line2
    call  delay_1_s

tekan_ulang2:
    call  scankey
    mov   temp1,datakey
    mov   character,key
    mov   command,#0CAh
    lcall send_command
    lcall send_character
    call  delay_05_s
    call  scankey
    mov   temp2,datakey
    mov   character,key
    lcall send_character
    mov   a,temp1
    swap a
    add  a,temp2
    mov  freq_atas,a

cekb20a:
    cjne  A,#20h,cekb22a
    mov   freq_atas,#20h
    ljmp  frqats2

cekb22a:
    cjne  A,#22h,cekb24a
    mov   freq_atas,#22h
```

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```
    ljmp    frqats2

cekb24a:
    cjne   A,#24h,cekb26a
    mov    freq_atas,#24h
    ljmp   frqats2

cekb26a:
    cjne   A,#26h,cekb29a
    mov    freq_atas,#26h
    ljmp   frqats2

cekb29a:
    cjne   A,#29h,cekb31a
    mov    freq_atas,#29h
    ljmp   frqats2

cekb31a:
    cjne   A,#31h,cekb33a
    mov    freq_atas,#31h
    ljmp   frqats2

cekb33a:
    cjne   A,#33h,cekb36a
    mov    freq_atas,#33h
    ljmp   frqats2

cekb36a:
    cjne   A,#36h,cekb42a
    mov    freq_atas,#36h
    ljmp   frqats2

cekb42a:
    cjne   A,#42h,frqats
    mov    freq_atas,#42h

frqats2:
    call   delay_1_s
    mov    dptr,#set3    ; interval: ... detik
    acall  line1
    mov    dptr,#blank
    acall  line2

baca_tombol:

    call   scankey
    mov    a,datakey
    cjne   A,#0h,cek11
    sjmp   data_ok1

cek11:
    cjne   A,#1h,cek12
    sjmp   data_ok1
```

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```
cek12:
    cjne  A,#2h,cek13
    sjmp  data_ok1

cek13:
    cjne  A,#3h,cek14
    sjmp  data_ok1
cek14:
    cjne  A,#4h,cek15
    sjmp  data_ok1
cek15:
    cjne  A,#5h,baca_tombol

data_ok1:
    mov   datakey1,datakey
    mov   character,key
    mov   command,#089h      ; LCD baris 1 kolom ke 9
    lcall send_command
    lcall send_character
    mov   character,#','      ; memunculkan koma
    lcall send_character
    lcall delay_1_s

ulangi:
    call  scankey
    mov   datakey2,datakey
    mov   a,datakey2
    cjne  A,#0h,cek5
    sjmp  data_ok

cek5:
    cjne  A,#5,ulangi

data_ok:
    mov   A,datakey1
    swap A
    add   A,datakey2
    mov   period,A
    mov   character,key
    lcall send_character
    lcall delay_1_s
    lcall delay_1_s
    ljmp  loop

; -----

cek_aktif:
    cjne  A,'#2',loop1A      ; aktifkan tweeter
    mov   dptr,#menu2a      ; rangkaian aktif
    acall line1
    mov   dptr,#out         ; freq .... KHz
    acall line2
    sjmp  repeat
```

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```
loop1A:
    ljmp  loop

;-----
; Rangkaian aktif
;-----
repeat:
    mov  a,freq_bawah
    cjne a,#20h,cek22
    ljmp mulai_di_20Khz

cek22:
    cjne a,#22h,cek24
    ljmp mulai_di_22Khz

cek24:
    cjne a,#24h,cek26
    ljmp mulai_di_24Khz

cek26:
    cjne a,#26h,cek29
    ljmp mulai_di_26Khz

cek29:
    cjne a,#29h,cek31
    ljmp mulai_di_29Khz

cek31:
    cjne a,#31h,cek33
    ljmp mulai_di_31Khz

cek33:
    cjne a,#33h,cek36
    ljmp mulai_di_33Khz

cek36:
    cjne a,#36h,mul42
    ljmp mulai_di_36Khz

mul42:
    ljmp mulai_di_42Khz

;-----
mulai_di_20Khz:
    mov  p2,#0FFh
    clr  p2.4

F20Khz:
    mov  command,#0C8h
    lcall send_command
    mov  character,#'2'
    call send_character
    mov  character,#'0'
    call send_character
```

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```

                                jb      p2.1,start20
                                ljmp    stop

start20:

                                mov     r0,#12
ul20:                            mov     r1,#100
ul120:                           mov     r2,#100
pulsa_continue20:

                                djnz   R2,pulsa_square20
                                djnz   r1,ul120
                                djnz   r0,ul20
                                call    perioda          ; delay

                                mov     a,freq_atas
                                cjne   a,#20h,F22Khz
                                ljmp   repeat          ; mulai_di_20Khz

; .....

pulsa_square20:

                                mov     r3,#9
                                call    freq_hi
                                mov     r3,#8
                                call    freq_lo
                                ajmp   pulsa_continue20

; -----
mulai_di_22Khz:

                                mov     P2,#0FFh

F22Khz:

                                clr     P2.4
                                mov     command,#0C8h
                                lcall   send_command
                                mov     character,#'2'
                                call    send_character
                                mov     character,#'2'
                                call    send_character
                                jb      p2.1,start22      ; cek tombol '#'
                                ljmp    stop

start22:

                                mov     r0,#12
ul22:                            mov     r1,#100
ul122:                           mov     r2,#100
pulsa_continue22:

                                djnz   R2,pulsa_square22
                                djnz   r1,ul122
                                djnz   r0,ul22
                                call    perioda

; .....
```


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```

                                mov  a,freq_atas
                                cjne a,#22h,F24Khz
                                ljmp repeat          ; mulai_di_22Khz

pulsa_square22:
                                mov  r3,#8
                                call  freq_hi
                                mov  r3,#7
                                call  freq_lo
                                ajmp  pulsa_continue22

; -----
mulai_di_24Khz:
F24Khz:
                                mov  command,#0C8h
                                lcall send_command
                                mov  character,#'2'
                                call  send_character
                                mov  character,#'4'
                                call  send_character
                                jb   p2.1,start24
                                ljmp  stop

start24:

                                mov  r0,#12
                                mov  r1,#100
                                mov  r2,#100

                                djnz  R2,pulsa_square24
                                djnz  r1,ul124
                                djnz  r0,ul124
                                call  perioda

                                mov  a,freq_atas
                                cjne a,#24h,F26Khz
                                ljmp repeat          ; mulai_di_24Khz

pulsa_square24:
                                mov  r3,#7
                                call  freq_hi
                                mov  r3,#6
                                call  freq_lo
                                ajmp  pulsa_continue24 ;

; -----
mulai_di_26Khz:
F26Khz:
                                mov  command,#0C8h
                                lcall send_command
                                mov  character,#'2'
                                call  send_character
                                mov  character,#'6'
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```

                                call    send_character
                                jb      p2.1,start26
                                ljmp    stop

start26:

                                mov     r0,#12
                                mov     r1,#100
                                mov     r2,#100
                                djnz    R2,pulsa_square26
                                djnz    r1,ul126
                                djnz    r0,ul26
                                call    perioda

                                mov     a,freq_atas
                                cjne    a,#26h,F29Khz
                                ljmp    repeat           ; mulai_di_26Khz

; .....

pulsa_square26:

                                mov     r3,#6
                                call    freq_hi
                                mov     r3,#5
                                call    freq_lo
                                ajmp    pulsa_continue26

; //////////////////////////////////////

mulai_di_29Khz:
F29Khz:

                                mov     command,#0C8h
                                lcall   send_command
                                mov     character,#'2'
                                call    send_character
                                mov     character,#'9'
                                call    send_character
                                jb      p2.1,start29
                                ljmp    stop

start29:

                                mov     r0,#12
                                mov     r1,#100
                                mov     r2,#100
                                djnz    R2,pulsa_square29
                                djnz    r1,ul129
                                djnz    r0,ul29
                                call    perioda

; .....

                                mov     a,freq_atas
                                cjne    a,#29h,F31Khz
```

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```
                                ljmp  repeat                ; mulai_di_29Khz

; .....

pulsa_square29:

                                mov   r3,#5
                                call  freq_hi
                                mov   r3,#4
                                call  freq_lo
                                ajmp  pulsa_continue29

; -----
mulai_di_31Khz:
F31Khz:

                                mov   command,#0C8h
                                lcall send_command
                                mov   character,#'3'
                                call  send_character
                                mov   character,#'1'
                                call  send_character
                                jb    p2.1,start31
                                ljmp  stop

start31:

                                mov   r0,#12
                                mov   r1,#100
                                mov   r2,#100

                                djnz  R2,pulsa_square31
                                djnz  r1,ul131
                                djnz  r0,ul31
                                call  perioda

                                mov   a,freq_atas
                                cjne  a,#31h,F33Khz
                                ljmp  repeat                ; mulai_di_31Khz

; .....

pulsa_square31:

                                mov   r3,#4
                                call  freq_hi
                                mov   r3,#4
                                call  freq_lo

                                ajmp  pulsa_continue31 ;

; //////////////////////////////////////

mulai_di_33Khz:
F33Khz:

                                mov   command,#0C8h
                                lcall send_command
                                mov   character,#'3'
```

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```

                                call    send_character
                                mov     character,#'3'
                                call    send_character

                                jb     p2.1,start33
                                ljmp   stop

start33:

                                mov     r0,#12
ul33:                            mov     r1,#100
ul133:                           mov     r2,#100
pulsa_continue33:

                                djnz   R2,pulsa_square33
                                djnz   r1,ul133
                                djnz   r0,ul33
                                call    perioda

                                mov     a,freq_atas
                                cjne   a,#33h,F36Khz
                                ljmp   repeat                ; mulai_di_33Khz

; .....

pulsa_square33:

                                mov     r3,#4
                                call    freq_hi
                                mov     r3,#3
                                call    freq_lo
                                ajmp   pulsa_continue33

; //////////////////////////////////////
; -----
mulai_di_36Khz:
F36Khz:

                                mov     command,#0C8h
                                lcall   send_command
                                mov     character,#'3'
                                call    send_character
                                mov     character,#'6'
                                call    send_character

                                jb     p2.1,start36
                                ljmp   stop

start36:

                                mov     r0,#12
ul36:                            mov     r1,#100
ul136:                           mov     r2,#100
pulsa_continue36:

                                djnz   R2,pulsa_square36
                                djnz   r1,ul136
```

LAMPIRAN B

```

                                djnz    r0,u136
                                call    perioda

                                mov    a,freq_atas
                                cjne   a,#36h,F42Khz
                                ljmp   repeat          ; mulai_di_36Khz

; .....

                                ljmp   mulai_di_42Khz ;

pulsa_square36:

                                mov    r3,#3
                                call   freq_hi
                                mov    r3,#3
                                call   freq_lo

                                ajmp   pulsa_continue36 ;

; //////////////////////////////////////

mulai_di_42Khz:
F42Khz:

                                mov    command,#0C8h
                                lcall  send_command
                                mov    character,#'4'
                                call   send_character
                                mov    character,#'2'
                                call   send_character

                                jb     p2.1,start42
                                ljmp   stop

start42:

                                mov    r0,#12 ;
                                mov    r1,#100
                                mov    r2,#100

                                djnz   R2,pulsa_square42
                                djnz   r1,u1142
                                djnz   r0,u142
                                call   perioda
                                ljmp   repeat          ; mulai_di_42Khz

pulsa_square42:

                                mov    r3,#2
                                call   freq_hi
                                mov    r3,#2
                                call   freq_lo
                                ajmp   pulsa_continue42 ;

; //////////////////////////////////////
; Terus looping sampai tombol # ditekan
stop:
                                setb  P3.0
```

LAMPIRAN B

```
        mov  dptr,#menu3a          ; rangkaian off
        acall line1
        mov  dptr,#blank
        acall line2
        lcall delay_1_s
        lcall delay_1_s
loopl:
        ljmp  loop
; =====
pesan1:  db  '  FREQ. GENERATOR  '
pesan2:  db  '      20 - 42 Khz    '
pesan3:  db  'KENNEDY SUMARLIE'
pesan4:  db  '      NRP:0322021  '
blank:   db  '                    '
menu1:   db  '  MENU : 1->SETT  '
menu2:   db  '  2->AKTIF 3->END  '
set1:    db  '  Freq. bwh:  KHz  '
set2:    db  '  Freq atas:  KHz  '
set3:    db  '  Interval:  dtk   '
menu2a:  db  'RANGKAIAN AKTIF  '
menu3a:  db  'RANGKAIAN OFF  '
freq:    db  '      Freq :  KHz  '
berhenti: db  '  B E R H E N T I  '
berhenti2: db  '  TERIMAKASIH  '
out:     db  '      FREQ :  KHz  '
end
```