LAMPIRAN

```
$MOD51                      ; model seri mikrokontrol 51
    ORG     0000H           ; alamat mulai program
    AJMP    START           ; lompat absolut ke START

    ORG 0023H               ; alamat Interupsi Serial Terima/Kirim RI/TI
    AJMP    Serial_on       ; lompat absolut ke Serial_on

    ORG 0100H               ; lompat absolut ke 100h
START:  MOV SP, #30H        ; isi Stack Pointer dengan nilai 30h
        MOV R4, #30H        ; isi Stack Pointer dengan nilai 30h
        ACALL   INITSER     ; lompat absolut ke initserial

                            ;
Serial_on:  PUSH PSW
            PUSH ACC
            JNB RI,$        ; menunggu data serial masuk
            MOV A,SBUF
            CLR RI          ; clear bit Receiver Interupt
            CLR EA          ; clear bit Enable Interupt
            CJNE A,#'w',KR45    ;
            ACALL   MAJU20
            ACALL   X_Serial
            RETI            ; kembali ke interpsi

KR45:   CJNE    A,#'m',KR90 ; bandingkan dengan 'm', tidak sama lompat kr
KR90
        ACALL   KIRI45      ; jika sama laksanakan lakukan KIRI45
        ACALL   X_Serial    ; Kirim Informasi ke PC

KR90:   CJNE    A,#'i',KN45
        ACALL   KIRI90
        ACALL   X_Serial

KN45:   CJNE    A,#'t',KN90
        ACALL   KANAN45
        ACALL   X_Serial

KN90:   CJNE    A,#'r',MD
        ACALL   KANAN90
        ACALL   X_Serial

MD:     CJNE    A,#'f',STOP
        ACALL   MUNDUR20
        ACALL   X_Serial

STOP:   CJNE    A,#'s',EXIT
        ACALL   BREAK
        ACALL   BREAK
        ACALL   X_Serial

EXIT:   MOV     SBUF,A
        POP     ACC
```

```
          POP     PSW
          RETI


MAJU20:   SETB    P0.1
          SETB    P0.6
          CLR     P0.0
          CLR     P0.7
          MOV     P2,#11000011B
          ACALL   DELAY
          ACALL   DELAY
          ACALL   BREAK

KIRI45:   MOV     P2,#11001111B
          SETB    P0.1
          CLR     P0.6
          CLR     P0.0
          CLR     P0.7
          ACALL   DELAY
          ACALL   BREAK

KANAN45:  MOV     P2,#11110011B
          CLR     P0.1
          SETB    P0.6
          CLR     P0.0
          CLR     P0.7
          ACALL   DELAY
          ACALL   BREAK

KIRI90:   MOV     P2,#00001111B
          SETB    P0.1
          CLR     P0.6
          CLR     P0.0
          SETB    P0.7
          ACALL   DELAY
          ACALL   BREAK

KANAN90:  MOV     P2,#11110000B
          CLR     P0.1
          SETB    P0.6
          SETB    P0.0
          CLR     P0.7
          ACALL   DELAY
          ACALL   BREAK

MUNDUR20: MOV     P2,#00111100B
          CLR     P0.1
          CLR     P0.6
          SETB    P0.0
          SETB    P0.7
          ACALL   DELAY
          ACALL   DELAY
```

```
                    ACALL   BREAK

               BREAK:  CLR P0.1
                       CLR P0.0
                       CLR P0.6
                       CLR P0.7
                       MOV     P2,#11111111B
                       ACALL   DELAY


                                       ; routine tunda waktu
               DELAY:  MOV R5, #04H    ; Isi nilai Register ke-5 dengan 04h
               DEL1:   MOV R6, #0FFH   ; Isi nilai Register ke-6 dengan 0ffh atau 254
               DEL2:   MOV R7, #0FFH   ; Isi nilai Register ke-7 dengan 0ffh atau 254
                   DJNZ    R7, $       ; kurangi 1 register ke-7
                   DJNZ    R6, DEL2    ; kurangi 1 register ke-6, bila hasil belum sama
dengan 0 maka lompat ke DEL2
                   DJNZ    R5, DEL1    ; kurangi 1 register ke-5, bila hasil belum sama
dengan 0 maka lompat ke DEL1
                   RET                 ; kembali ke alamat setelah ACALL DELAY

               INITSER:                ; routine Inisialisasi Serial
                   MOV SCON, #50H      ; serial port mode bit 1 & Receiver Enable
                   MOV TMOD, #20H      ; Timer 1 mode 2; 8-bit auto-reload
                   MOV TL1, #0FDH      ; Timer Low, nilai akan berhitung sampai #0FFH
                   MOV TH1, #0FDH      ; Timer High Reset, Nilai = #0FDH
                   SETB    TR1         ; Timer 1 RUN
                   MOV PCON, #00H      ; hidupkan power control
                   MOV IE, #90H        ; Enable Serial Port Interrupt
                   SETB ES
                   RET                 ; kembali ke alamat setelah ACALL INITSER


               X_Serial:   MOV SBUF, A ; pindahkan isi accumulator k buffer port serial
                           JNB TI, $   ; jeda hingga bit RI diatur
                           CLR TI      ; clear Transmit Interupsi
                           SETB    EA  ; Set bit Enable Interupt
                           RETI        ; kembali ke interpsi


                    END
```

```
SKRIPSI
                    PAGE 1

                                        1
$MOD51                                          ; model seri mikrokontrol 51
                0000                    2           ORG     0000H                   ;
alamat mulai program
                0000 2100               3           AJMP    START                   ;
lompat absolut ke START
                                        4
                0023                    5           ORG
0023H                           ; alamat Interupsi Serial Terima/Kirim RI/TI


                0023 2107               6           AJMP    Serial_on               ;
lompat absolut ke Serial_on
                                        7
                0100                    8           ORG
0100H                           ; lompat absolut ke 100h
                0100 758130             9     START: MOV    SP, #30H                ; isi
Stack Pointer dengan nilai 30h
                0103 7C30               10                  MOV     R4,
#30H                ; isi Stack Pointer dengan nilai 30h
                0105 31C7               11                  ACALL   INITSER         ;
lompat absolut ke initserial
                                        12


13                                                           ;
                0107 C0D0               14    Serial_on:    PUSH PSW
                0109 C0E0               15                  PUSH ACC
                010B 3098FD             16                  JNB
RI,$            ; menunggu data serial masuk
                010E E599               17                  MOV A,SBUF
                0110 C298               18                  CLR
RI                      ; clear bit Receiver Interupt
                0112 C2AF               19                  CLR
EA                      ; clear bit Enable Interupt
                0114 B47705             20                  CJNE
A,#'w',KR45         ;
                0117 314F               21                  ACALL   MAJU20
                0119 31DE               22                  ACALL   X_Serial
                011B 32                 23
RETI                    ; kembali ke interpsi
                                        24
                011C B46D04             25    KR45:   CJNE    A,#'m',KR90     ; bandingkan
dengan 'm', tidak sama lompat kr KR90
                011F 3160               26                  ACALL   KIRI45          ;
jika sama laksanakan lakukan KIRI45
                0121 31DE               27                  ACALL   X_Serial        ;
Kirim Informasi ke PC
                                        28
```

```
0123 B46C04          29    KR90:   CJNE    A,#'l',KN45
0126 317E            30                    ACALL   KIRI90
0128 31DE            31                    ACALL   X_Serial
                     32
012A B47404          33    KN45:   CJNE    A,#'t',KN90
012D 316F            34                    ACALL   KANAN45
012F 31DE            35                    ACALL   X_Serial
                     36
0131 B47204          37    KN90:   CJNE    A,#'r',MD
0134 318D            38                    ACALL   KANAN90
0136 31DE            39                    ACALL   X_Serial
                     40
0138 B46604          41    MD:             CJNE    A,#'f',STOP
013B 319C            42                    ACALL   MUNDUR20
013D 31DE            43                    ACALL   X_Serial
                     44
013F B47306          45    STOP:   CJNE    A,#'s',EXIT
0142 31AD            46                    ACALL   BREAK
0144 31AD            47                    ACALL   BREAK
0146 31DE            48                    ACALL   X_Serial
                     49
0148 F599            50    EXIT:   MOV             SBUF,A
014A D0E0            51                    POP             ACC
014C D0D0            52                    POP             PSW
014E 32              53                    RETI
                     54
                     55
014F D281            56    MAJU20: SETB    P0.1
0151 D286            57                    SETB    P0.6

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0153 C280            58                    CLR             P0.0
0155 C287            59                    CLR             P0.7
0157 75A0C3          60                    MOV             P2,#11000011B
015A 31BA            61                    ACALL   DELAY
015C 31BA            62                    ACALL   DELAY
015E 31AD            63                    ACALL   BREAK
                     64
0160 75A0CF          65    KIRI45: MOV             P2,#11001111B
0163 D281            66                    SETB    P0.1
0165 C286            67                    CLR             P0.6
0167 C280            68                    CLR             P0.0
0169 C287            69                    CLR             P0.7
016B 31BA            70                    ACALL   DELAY
016D 31AD            71                    ACALL   BREAK
                     72
016F 75A0F3          73    KANAN45:MOV             P2,#11110011B
0172 C281            74                    CLR             P0.1
0174 D286            75                    SETB    P0.6
0176 C280            76                    CLR             P0.0
```

```
                0178 C287              77                      CLR             P0.7
                017A 31BA              78                      ACALL   DELAY
                017C 31AD              79                      ACALL   BREAK
                                       80
                017E 75A00F            81      KIRI90: MOV             P2,#00001111B
                0181 D281              82                      SETB    P0.1
                0183 C286              83                      CLR             P0.6
                0185 C280              84                      CLR             P0.0
                0187 D287              85                      SETB    P0.7
                0189 31BA              86                      ACALL   DELAY
                018B 31AD              87                      ACALL   BREAK
                                       88
                018D 75A0F0            89      KANAN90:MOV             P2,#11110000B
                0190 C281              90                      CLR             P0.1
                0192 D286              91                      SETB    P0.6
                0194 D280              92                      SETB    P0.0
                0196 C287              93                      CLR             P0.7
                0198 31BA              94                      ACALL   DELAY
                019A 31AD              95                      ACALL   BREAK
                                       96
                019C 75A03C            97      MUNDUR20:MOV    P2,#00111100B
                019F C281              98                      CLR             P0.1
                01A1 C286              99                      CLR             P0.6
                01A3 D280             100                      SETB    P0.0
                01A5 D287             101                      SETB    P0.7
                01A7 31BA             102                      ACALL   DELAY
                01A9 31BA             103                      ACALL   DELAY
                01AB 31AD             104                      ACALL   BREAK
                                      105
                01AD C281             106      BREAK:  CLR     P0.1
                01AF C280             107                      CLR     P0.0
                01B1 C286             108                      CLR     P0.6
                01B3 C287             109                      CLR     P0.7
                01B5 75A0FF           110                      MOV             P2,#11111111B
                01B8 31BA             111                      ACALL   DELAY
                                      112
                                      113

114                                                   ; routine tunda waktu
                01BA 7D04             115      DELAY:  MOV     R5, #04H        ; Isi nilai
Register ke-5 dengan 04h

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                PAGE 3

                01BC 7EFF             116      DEL1:   MOV     R6, #0FFH       ; Isi nilai
Register ke-6 dengan 0ffh atau 254
                01BE 7FFF             117      DEL2:   MOV     R7, #0FFH       ; Isi nilai
Register ke-7 dengan 0ffh atau 254
                01C0 DFFE             118              DJNZ    R7, $           ; kurangi 1
register ke-7
                01C2 DEFA             119              DJNZ    R6, DEL2        ; kurangi 1
```

```
register ke-6, bila hasil belum sama dengan 0 ma

       ka lompat ke DEL2
                01C4 DDF6           120             DJNZ    R5, DEL1        ; kurangi 1
register ke-5, bila hasil belum sama dengan 0 ma

       ka lompat ke DEL1
                01C6 22             121
RET                                    ; kembali ke alamat setelah ACALL DELAY
                                    122
                01C7                123    INITSER:                                 ;
routine Inisialisasi Serial
                01C7 759850         124             MOV     SCON, #50H              ;
serial port mode bit 1 & Receiver Enable
                01CA 758920         125             MOV     TMOD, #20H              ;
Timer 1 mode 2; 8-bit auto-reload
                01CD 758BFD         126             MOV     TL1, #0FDH              ;
Timer Low, nilai akan berhitung sampai #0FFH
                01D0 758DFD         127             MOV     TH1, #0FDH              ;
Timer High Reset, Nilai = #0FDH
                01D3 D28E           128             SETB    TR1                     ;
Timer 1 RUN
                01D5 758700         129             MOV     PCON, #00H              ;
hidupkan power control
                01D8 75A890         130             MOV     IE, #90H                ;
Enable Serial Port Interrupt
                01DB D2AC           131             SETB ES
                01DD 22             132
RET                                    ; kembali ke alamat setelah ACALL INITSER
                                    133
                                    134
                01DE F599           135    X_Serial:        MOV     SBUF, A ; pindahkan
isi accumulator k buffer port serial
                01E0 3099FD         136                     JNB     TI, $   ;
jeda hingga bit RI diatur
                01E3 C299           137                     CLR
TI              ; clear Transmit Interupsi
                01E5 D2AF           138                     SETB    EA      ; Set
bit Enable Interupt
                01E7 32             139                     RETI            ;
kembali ke interpsi
                                    140
                                    141
                                    142                 END

                VERSION 1.2h ASSEMBLY COMPLETE, 0 ERRORS FOUND

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                ACC. . . . . . . . . . . . . . . .  D ADDR  00E0H  PREDEFINED
                BREAK. . . . . . . . . . . . . . .  C ADDR  01ADH
```

```
DEL1 . . . . . C ADDR  01BCH
DEL2 . . . . . C ADDR  01BEH
DELAY. . . . . C ADDR  01BAH
EA . . . . . B ADDR  00AFH  PREDEFINED
ES . . . . . B ADDR  00ACH  PREDEFINED
EXIT . . . . . C ADDR  0148H
IE . . . . . D ADDR  00A8H  PREDEFINED
INITSER. . . . . C ADDR  01C7H
KANAN45. . . . . C ADDR  016FH
KANAN90. . . . . C ADDR  018DH
KIRI45 . . . . . C ADDR  0160H
KIRI90 . . . . . C ADDR  017EH
KN45 . . . . . C ADDR  012AH
KN90 . . . . . C ADDR  0131H
KR45 . . . . . C ADDR  011CH
KR90 . . . . . C ADDR  0123H
MAJU20 . . . . . C ADDR  014FH
MD . . . . . C ADDR  0138H
MUNDUR20 . . . . . C ADDR  019CH
P0 . . . . . D ADDR  0080H  PREDEFINED
P2 . . . . . D ADDR  00A0H  PREDEFINED
PCON . . . . . D ADDR  0087H  PREDEFINED
PSW. . . . . D ADDR  00D0H  PREDEFINED
RI . . . . . B ADDR  0098H  PREDEFINED
SBUF . . . . . D ADDR  0099H  PREDEFINED
SCON . . . . . D ADDR  0098H  PREDEFINED
SERIAL_ON. . . . . C ADDR  0107H
SP . . . . . D ADDR  0081H  PREDEFINED
START. . . . . C ADDR  0100H
STOP . . . . . C ADDR  013FH
TH1. . . . . D ADDR  008DH  PREDEFINED
TI . . . . . B ADDR  0099H  PREDEFINED
TL1. . . . . D ADDR  008BH  PREDEFINED
TMOD . . . . . D ADDR  0089H  PREDEFINED
TR1. . . . . B ADDR  008EH  PREDEFINED
X_SERIAL . . . . . C ADDR  01DEH
```

```
:020000002100DD
:020023002107B3
:100100007581307C3031C7C0D0C0E03098FDE599B2
:10011000C298C2AFB47705314F31DE32B46D0431CD
:100120006031DEB46C04317E31DEB47404316F3181
:10013000DEB47204318D31DEB46604319C31DEB43C
:1001400073063 1AD31AD31DEF599D0E0D0D032D289
:1001500081D286C280C28775A0C331BA31BA31ADAF
:1001600075A0CFD281C286C280C28731BA31AD7547
:10017000A0F3C281D286C280C28731BA31AD75A0E8
:100180000FD281C286C280D28731BA31AD75A0F05C
:10019000C281D286D280C28731BA31AD75A03CC24D
:1001A00081C286D280D28731BA31BA31ADC281C222
:1001B00080C286C28775A0FF31BA7D047EFF7FFFB3
:1001C000DFFEDEFADDF622759850758920758BFD0D
:1001D000758DFDD28E75870075A890D2AC22F599E9
:0801E0003099FDC299D2AF3243
:00000001FF
```

```
Dim i As Integer
Dim huruf As String
Private Sub clear()
Text1.Text = ""
Text2.Text = ""
End Sub
Private Sub Command1_Click()
huruf = "m"
Text1.Text = Text1.Text + huruf
End Sub

Private Sub Command2_Click()
huruf = "l"
Text1.Text = Text1.Text + huruf
End Sub

Private Sub Command3_Click()
huruf = "w"
Text1.Text = Text1.Text + huruf
End Sub

Private Sub Command4_Click()
huruf = "t"
Text1.Text = Text1.Text + huruf
End Sub

Private Sub Command5_Click()
huruf = "r"
Text1.Text = Text1.Text + huruf
End Sub

Private Sub Command6_Click()
'MSComm1.Output = Text1.Text

End Sub

Private Sub Command7_Click()
clear
Text1.SetFocus
End Sub

Private Sub Command8_Click()
End
End Sub

Private Sub Command9_Click()
huruf = "s"
Text1.Text = Text1.Text + huruf
End Sub

Private Sub Form_Load()
MSComm1.CommPort = 1
MSComm1.Settings = "9600,N,8,1"
MSComm1.InputLen = 0
'MSComm1.PortOpen = True
clear
End Sub

Private Sub Form_KeyPress(KeyAscii As Integer)
MSComm1.Output = KeyAscii
Text1.Text = KeyAscii
End Sub

Private Sub MSComm1_OnComm()
    If (MSComm1.CommEvent = comEvReceive) Then
        Text2.Text = MSComm1.Input
    End If
End Sub

Private Sub Form_Unload(Cancel As Integer)
```

```
'MSComm1.PortOpen = False
End Sub
```