

da/mo/80 hh:mm:ss

.MAIN. - Output to the RS232 ports on the DSC 3/4

1-1 RS232

```

0001          3 version =      1
0001          4 revision=     1
          5          .pabs
          6          .phex
          7
          8 ;              Program: RS232
          9 ;              This program checks for port input, reads the
10 ; character, and echoes it to all three RS232 ports in-
11 ; cluding the console. This character continues to be
12 ; echoed to all three ports until another character is
13 ; input. Then, that character becomes the echoed char-
14 ; acter. The program will continue indefinitely.
15 ; The program is self-starting. It defaults to
16 ; the character 'A' (ascii 41h) if no character has
17 ; been entered on the command line.
18 ; Ports 0, 2, and 3 are set to RS232, 9600 baud
19 ; ports. This is necessary because certain versions
20 ; of DSC 3/4 BIOS initialize the ports differently.
21 ;              D.Stein 10/10/80
22
0100          23          .loc    100h      ; beginning of TPA
0100 31 0231   24          lxi    sp,stack ; start with a fresh stack
0103 C3 0110   25          jmp    START
          26
0000          27 WBOOT    =      00h      ; BIOS entry point
0001          28 WBaddr   =      01h      ; address of BIOS entry point
0080          29 comline  =      80h      ; command line length
000D          30 cr       =      0Dh      ; ascii carriage return
000A          31 lf       =      0Ah      ; ascii line feed
0106 00       32 echoCHR:.byte 00h      ; byte that is echoed to ports
          33
          34 ; Port addresses for RS232 output,status.
0028          35 port0    =      28h      ; port 0 (console) address
002A          36 p0stat   =      2Ah      ; port 2 status address
0029          37 port1    =      29h      ; port 1 address
002B          38 p1stat   =      2Bh      ; port 1 status address
0020          39 port2    =      20h      ; port 2 address
0022          40 p2stat   =      22h      ; port 2 status address
0021          41 port3    =      21h      ; port 3 address
0023          42 p3stat   =      23h      ; port 3 status address
0002          43 TxRDY   =          2      ; Tx status code
0000          44 RxRDY   =          0      ; Rx status code
          45
          46 ; Counter-timer-chip channel addresses (for baud rates)
0030          47 CTC0     =      30h      ; CTC channel 0 ( for port 0 )
0031          48 CTC1     =      31h      ; CTC channel 1 ( for port 1 )
0032          49 CTC2     =      32h      ; CTC channel 2 ( for ports 2,3 )
          50
          51 ; Strings to initialize an SIO port to an RS232 port.
0107 18       52 RS232:  .byte 18h      ; channel reset
0108 144C     53          .byte 14h,01001100b ; *16 clock, 2 stop bits
010A 03C1     54          .byte 3,11000001b  ; receive enable
010C 05EA     55          .byte 5,11101010b ; transmit enable
010E 1104     56          .byte 11h,00000100b ; no interrupts

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1-2 RS232

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0009          57 RS232# ==      .-RS232      ; length of the string
          58
0110          59 START:
          60 ; Print the initial message
0110 21 01FF   61      lxi      H,LOGmsg ; print version msg
0113 CD 01DB   62      call    prtmsg
          63
          64 ; Read the command line for the chr to echo
0116 21 0080   65      lxi      H,comline
0119 7E       66      mov     A,M      ; how long is com line?
011A FE02     67      cpi     2       ; just 1 chr or less?
011C 380C     68      jrc    default ; Yes, use chr 'A'
011E 23       69      ..1:   inx     H
011F 7E       70      mov     A,M      ; Read the com line chr
0120 FE20     71      cpi     '/'
0122 28FA     72      jrz    ..1     ; skip ascii blanks
0124 32 0106   73      sta     echoCHR
0127 C3 0132   74      jmp    SETPORTS
          75
012A          76 default:
012A 3E41     77      mvi     A,'A'    ; set default chr in A
012C 32 0106   78      sta     echoCHR ; save as chr to echo
012F C3 0132   79      jmp    SETPORTS
          80
          81 ; Set ports 0, 1, 2, & 3 to RS232, 9600 baud ports.
0132          82 SETPORTS:
          83
          84 ; Port 0
          85 ;      mvi     A,45h
          86 ;      out    CTC0
          87 ;      mvi     A,13    ; 13 = 2Mhz/(16*baudrate)
          88 ;      out    CTC0    ; set port 0 to 9600 baud
          89 ;      lxi     H,RS232
          90 ;      lxi     B,RS232%

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da/mo/80 hh:mm:ss

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1-3 RS232

```

0158 EDB3      111          outir          ; make port 3 an rs232 port
              112
              113 ;-----
              114 ; BEGINNING OF OUTPUT LOOP
              115 ;-----
              116 ; The echo character is now loaded into 'echoCHR'.
              117 ; The chr will be output, and a check for a new
              118 ; character to be echoed will be made.  If a char-
              119 ; acter is ready, and is greater than or equal to
              120 ; an ascii blank (20h), it will become the new echo
              121 ; character.  This is performed on all 4 ports.
              122
015A          123 PORTOUT:
              124 ; Check port 0 status.  Send echoCHR.
              125 ; Receive new echoCHR if Recv is console chr is ready.
015A 3A 0106   126          lda          echoCHR
015D CD 01F6   127          call         CONOUT ; output echoCHR to console
0160 CD 01E6   128          call         constat ; console chr ready?
0163 0F       129          rrc
0164 300C     130          jrnc          ..3
0166 CD 01EE   131          call         CONIN  ; read the chr
0169 E67F     132          ani          7Fh
016B FE20     133          cpi          '/'
016D 3803     134          jrc          ..3 ; ignore all non-printing chrs
016F 32 0106  135          sta          echoCHR ; save chr as new echoCHR
              136 ; Check port 1 status.  Send echoCHR if Trans ready.
              137 ; Receive new echoCHR if Recv is ready.
0172 DB2B     138          ..3:   in          p1stat
0174 E604     139          ani          1<TxRDY ; is chr ready to be output?
0176 2805     140          jrz          ..4
0178 3A 0106  141          lda          echoCHR
017B D329     142          out          port1 ; output the echo chr
017D DB2B     143          ..4:   in          p1stat
017F E601     144          ani          1<RxRDY ; is chr ready to be read?
0181 280B     145          jrz          ..5
0183 DB29     146          in          port1 ; input the echo chr
0185 E67F     147          ani          7Fh ; mask high order bit
0187 FE20     148          cpi          '/' ; ascii printing chr?
0189 3803     149          jrc          ..5 ; ignore non printing chrs
018B 32 0106  150          sta          echoCHR ; save chr as new echo chr
              151
              152 ; Check port 2 status.  Send echoCHR if Trans ready.
              153 ; Receive new echoCHR if Recv is ready.
018E DB22     154          ..5:   in          p2stat
0190 E604     155          ani          1<TxRDY ; is chr ready to be output?
0192 2805     156          jrz          ..6
0194 3A 0106  157          lda          echoCHR
0197 D320     158          out          port2 ; output the echo chr
0199 DB22     159          ..6:   in          p2stat
019B E601     160          ani          1<RxRDY ; is chr ready to be read?
019D 280B     161          jrz          ..7
019F DB20     162          in          port2 ; input the echo chr
01A1 E67F     163          ani          7Fh ; mask high order bit
01A3 FE20     164          cpi          '/' ; ascii printing chr?

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da/mo/80 hh:mm:ss

.MAIN. - Output to the RS232 ports on the DSC 3/4

1-4 RS232

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01A5 3803      165          jrc      ..7      ; ignore non printing chrs
01A7 32 0106   166          sta      echoCHR ; save chr as new echo chr
                                167
                                168 ; Check port 3 status. Send echoCHR if Trans ready.
                                169 ; Receive new echoCHR if Recv is ready.
01AA DB23      170      ..7:   in       p3stat
01AC E604      171          ani      1<TxRDY ; is chr ready to be output?
01AE 2805      172          jrz      ..8
01B0 3A 0106   173          lda      echoCHR
01B3 D321      174          out     port3  ; output the echo chr
01B5 DB23      175      ..8:   in       p3stat
01B7 E601      176          ani      1<RxRDY ; is chr ready to be read?
01B9 280B      177          jrz      loopend
01BB DB21      178          in       port3  ; input the echo chr
01BD E67F      179          ani      7Fh    ; mask high order bit
01BF FE20      180          cpi      ' '    ; ascii printing chr?
01C1 3803      181          jrc      loopend ; ignore non printing chrs
01C3 32 0106   182          sta      echoCHR ; save chr as new echo chr
                                183
                                184 ; Loop back to PORTOUT...forever.
01C6          185      loopend:
01C6 CD 01CC   186          call    delay  ; wait a 1/10th of a second
01C9 C3 015A   187          jmp     PORTOUT
                                188
                                189 ;-----
                                190 ; END OF OUTPUT LOOP
                                191 ;-----
                                192
                                193 ;-----
01C4          194 ; Subroutine: delay
                                195 ; Ress in:      none
                                196 ; Ress out:     none
                                197 ; Destroyed:
                                198 ; Provide a 1/10 of a second delay before returning.
01CC          199      delay:
01CC 21 1000   200          lxi      H,1000h      ; start HL at 1000h
01CF 2B       201      ..1:   dcx      H              ; decrement HL
01D0 7D       202          mov     A,L
01D1 FE00     203          cpi      0
01D3 20FA     204          jrnz    ..1
01D5 7C       205          mov     A,H
01D6 FE00     206          cpi      0
01D8 20F5     207          jrnz    ..1
01DA C9       208          ret

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1-5 RS232

```

211 ;-----
212 ; UTILITY I/O SUBROUTINES
213 ;-----
214
215 ;-----
216 ; Subroutine: prtmsg
217 ; Regs in:      HL=addr of string
218 ; Regs out:     none
219 ; Destroyed:   A,C,HL
220 ; Print a message to the console
01DB 221 prtmsg:
01DB 7E 222     mov     A,M
01DC B7 223     ora     A
01DD C8 224     rz           ; return on null chr
01DE E5 225     push    H
01DF CD 01F6 226     call   CONOUT
01E2 E1 227     pop     H
01E3 23 228     inx    H           ; set next chr addr
01E4 18F5 229     jmp    prtmsg
230
231 ;-----
232 ; Subroutine: constat
233 ; Regs in:     none
234 ; Regs out:    A
235 ; Destroyed:  and and/or all registers
236 ; Check the console status. Set LSB of A if chr ready.
01E6 237 constat:
01E6 11 0003 238     lxi    D,03h
01E9 2A 0001 239     lhld  WBaddr
01EC 19 240     dad   D
01ED E9 241     pchl
242 ;-----
243 ; Subroutine: CONIN
244 ; Regs in:     none
245 ; Regs out:    A=chr read
246 ; Destroyed:  C
247 ; Read a character from the console.
01EE 248 CONIN:
01EE 11 0006 249     lxi    D,06h
01F1 2A 0001 250     lhld  WBaddr
01F4 19 251     dad   D
01F5 E9 252     pchl
253 ;-----
254 ; Subroutine: CONOUT
255 ; Regs in:     A=chr to print
256 ; Regs out:    none
257 ; Destroyed:  C
258 ; Print a character to the console.
01F6 259 CONOUT:
01F6 4F 260     mov    C,A
01F7 11 0009 261     lxi    D,09h
01FA 2A 0001 262     lhld  WBaddr
01FD 19 263     dad   D
01FE E9 264     pchl

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1-6 RS232

```

                265 ;-----
                266 ; Messages
                267
01FF 0D0A525332 268 LOGmsg: .ascii [cr][lf]'RS232 VER '
020B 312E      269          .byte  version+'0',',',
020D 3031      270          .byte  revision/10+'0',revision@10+'0'
020F 0D0A2000 271          .asciz  [cr][lf]' '
                272
0213          273          .blkb  30
0231          274 stack:
                275          .end
```

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1-7 +++++ Symbol Table +++++

COMLIN	0080	CONIN	01EE	CONOUT	01F6	CONSTA	01E6
CR	000D	CTCO	0030	CTC1	0031	CTC2	0032
DEFAULT	012A	DELAY	01CC	ECHOCH	0106	LF	000A
LOGMSG	01FF	LOOPEN	01C6	POSTAT	002A	P1STAT	002B
P2STAT	0022	P3STAT	0023	PORT0	0028	PORT1	0029
PORT2	0020	PORT3	0021	PORTOU	015A	PRTMSG	01DB
REVISI	0001	RS232	0107	RS232#	0009	RXRDY	0000
SETPOR	0132	STACK	0231	START	0110	TXRDY	0002
VERSIO	0001	WBADDR	0001	WBOOT	0000	.BLNK.	0000:03 X
.DATA.	0000" X	.PRG.	0000' X				