```
*MCSASM V2.0 ..... PAGE 0001

LINE # LOC      CODE       LINE

 0005  0200                        .PAGE
 0010  0200                        .OPT GENERATE
 0015  0200                ;*****************************************************
 0020  0200                ;     M C S   BERLIN
 0025  0200                ;   BETRIEBSSYSTEM  M O N A  4  FUER ALPHA / BETA
 0030  0200                ;   VERSION MIT USERRESTART UND AUTO-SPEED
 0035  0200                ;*****************************************************
 0040  0200                ;  AUSDRUCK : 6.11.79
 0045  0200                ; 1.10.79
 0050  0200                ; ZEROPAGE ADRESSEN DES BETRIEBSSYSTEMS
 0055  0200                        *=$E3
 0060  00E3                TPFLG   *=*+1
 0065  00E4                ;
 0070  00E4                FREI    *=*+1
 0075  00E5                ZEIT    *=*+1
 0080  00E6                SPDFLG  *=*+1
 0085  00E7                AKKU    *=*+1
 0090  00E8                STPOIN  *=*+1
 0095  00E9                STATUS  *=*+1
 0100  00EA                XSAVE   *=*+1
 0105  00EB                YSAVE   *=*+1
 0110  00EC                Z1      *=*+1
 0115  00ED                Z2      *=*+1
 0120  00EE                DSPART  *=*+1
 0125  00EF                ADL     *=*+1
 0130  00F0                ADH     *=*+1
 0135  00F1                INL     *=*+1
 0140  00F2                INH     *=*+1
 0145  00F3                IBUF    *=*+1
 0150  00F4                OBUF    *=*+1
 0155  00F5                CHECKL  *=*+1
 0160  00F6                CHECKH  *=*+1
 0165  00F7                ADRL    *=*+1
 0170  00F8                ADRH    *=*+1
 0175  00F9                MNEM1   *=*+1
 0180  00FA                FRE01   *=*+1
 0185  00FB                MNEM2   *=*+1
 0190  00FC                FRE02   *=*+1
 0195  00FD                MNEM3   *=*+1
 0200  00FE                COPO    *=*+1
 0205  00FF                PUNKT   *=*+1
 0210  0100
 0215  0100                ;ADRESSEN FUER V24-SCHNITSTELLE:
 0220  0100                        *=$F500
 0225  F500                V24IN   *=*+1
 0230  F501                RSCTRL  *=*+1 RESTART CONTROL
 0235  F502                V24OUT  *=*+1
 0240  F503
 0245  F503                ;ADRESSEN FUER PIA 6532:
 0250  F503                        *=$F600
 0255  F600                PA      *=*+1
 0260  F601                PADD    *=*+1
 0265  F602                PB      *=*+1
 0270  F603                PBDD    *=*+3
 0275  F606                TREAD   *=*+1
 0280  F607                VORBEI  *=*+13
 0285  F614                T1      *=*+2
 0290  F616                T64     *=*+1
 0295  F617                T1024   *=*+1
 0300  F618                OFFSET =$F500
```

```
LINE # LOC     CODE       LINE

 0305  F618               IRQH   =$F7FF
 0310  F618               IRQL   =$F7FE
 0315  F618               NMIH   =$F7FD
 0320  F618               NMIL   =$F7FA
 0325  F618               TAHIGH =$F7F9
 0330  F618               TALOW  =$F7F8
 0335  F618               TASTE  =$F7F7
 0340  F618               BAUDH  =$F7F6
 0345  F618               BAUDL  =$F7F5
 0350  F618               ID     =$F7F4
 0355  F618               ENDEH  =$F7F3
 0360  F618               ENDEL  =$F7F2
 0365  F618               STRTH  =$F7F1
 0370  F618               STRTL  =$F7F0
 0375  F618               ECHO   =$F7EF
 0380  F618               RSUSER =$7FFE
 0385  F618               ; BEGIN
 0390  F618                      *=$F800
 0395  F800  6C FA F7            JMP (NMIL)
 0400  F803  6C FE F7            JMP (IRQL)
 0405  F806  20 41       TABD    .BYTE ' ANOM'
 0405  F808  4E 4F 4D
 0410  F80B  00          TAB1    .BYTE $00,$00,$00,$00,$0D,$0A,$00
 0410  F80C  00
 0410  F80D  00
 0410  F80E  00
 0410  F80F  00
 0410  F810  0A
 0410  F811  00
 0415  F812  3F          TAB2    .BYTE $3F,$06,$5B,$4F,$66,$6D,$7D,$07
 0415  F813  06
 0415  F814  5B
 0415  F815  4F
 0415  F816  66
 0415  F817  6D
 0415  F818  7D
 0415  F819  07
 0420  F81A  7F                  .BYTE $7F,$6F,$77,$7C,$39,$5E,$79,$71
 0420  F81B  6F
 0420  F81C  77
 0420  F81D  7C
 0420  F81E  39
 0420  F81F  5E
 0420  F820  79
 0420  F821  71
 0425  F822  A2 FF       RESTRT  LDX #$FF
 0430  F824  9A                  TXS
 0435  F825  2C 01 F5            BIT PSCTRL
 0440  F828  30 03               BMI RSMONA
 0445  F82A  6C FE 7F            JMP (RSUSER)
 0450  F82D  86 E8       RSMONA  STX STPOIN
 0455  F82F  E8                  INX
 0460  F830  86 E9               STX STATUS
 0465  F832  86 E6               STX SPDFLG      ;SPEED UNCERTAIN!
 0470  F834  A9 06               LDA #6
 0475  F836  85 FA               STA FRE@1
 0480  F838  A9 09               LDA #9
 0485  F83A  85 FC               STA FRE@2
 0490  F83C  A2 F9               LDX #$F9
 0495  F83E  8E F9 F7            STX TAHIGH      ; TASTE=$FF FOR ROM
 0500  F841  CA                  DEX
```

```
LINE #  LOC   CODE       LINE

 0505  F842  8E FB F7          STX NMIH
 0510  F845  8E FF F7          STX IR@H
 0515  F848  A9 52             LDA #$52
 0520  F84A  8D FA F7          STA NMIL          ; VEKTOREN ZEIGEN AUF STOP
 0525  F84D  8D FE F7          STA IR@L
 0530  F850  D0 16             BNE STP
 0535  F852  85 E7       STOP  STA AKKU          ; STOP EINGANG ACCU RETTEN
 0540  F854  68                PLA
 0545  F855  85 E9             STA STATUS
 0550  F857  68                PLA
 0555  F858  85 EF             STA ADL           ; RETTEN DER BENUTZER-ADRESSE
 0560  F85A  85 F7             STA ADRL
 0565  F85C  68                PLA
 0570  F85D  85 F0             STA ADH
 0575  F85F  85 F8             STA ADRH
 0580  F861  86 EA             STX XSAVE
 0585  F863  84 EB             STY YSAVE
 0590  F865  BA                TSX
 0595  F866  86 E8             STX STP01N
 0600  F868  A9 FF       STP   LDA #$FF          ;PORT INITIALISIEREN
 0605  F86A  8D 02 F5          STA V24OUT
 0610  F86D  EA                .BYTE $EA,$EA,$EA
 0615  F86E  EA
 0620  F86F  EA
 0625  F870  A9 00             LDA #0
 0630  F872  8D EF F7          STA ECHO
 0635  F875  EA                .BYTE $EA,$EA,$EA
 0640  F876  EA
 0645  F877  EA
 0650  F878  48                PHA
 0655  F879  28                PLP
 0660  F87A  4C 07 F9          JMP TTY           ;TASTATUR NICHT ANGESCHLOSSEN !
 0665  F87D
 0670  F87D
 0675  F87D
 0680  F87D  50 1A             BVC DISP
 0685  F87F  85 E5       SLOWST STA ZEIT
 0690  F881  2C 00 F6          BIT PA            ; TTY-BETRIEB?
 0695  F884  70 05             BVS SLOW1
 0700  F886  20 5B FA          JSR ZEILE         ; EINE ZEILE DRUCKEN
 0705  F889  D0 09             BNE SLOWGO
 0710  F88B  20 D6 FA    SLOW1 JSR DISPLY
 0715  F88E  EA                NOP
 0720  F88F  EA                NOP
 0725  F890  C6 E5             DEC ZEIT
 0730  F892  D0 F7             BNE SLOW1
 0735  F894  2C 02 F6    SLOWGO BIT PB
 0740  F897  70 58             BVS GO
 0745  F899  A9 C0       DISP  LDA #%11000000    ; Z=1:HEXA  , V=1:ADR
 0750  F89B  85 EE             STA DSPART
 0755  F89D  85 E5             STA ZEIT
 0760  F89F  E6 E5       TZ    INC ZEIT
 0765  F8A1  4C 07 F9    DTCYC JMP TTY           ; DISPLAY-ZYCLUS
 0770  F8A4  50 61             BVC TTY
 0775  F8A6  20 D6 FA          JSR DISPLY
 0780  F8A9  20 4C FB          JSR TASTEN
 0785  F8AC  C9 19             CMP #$19          ;WENN ZERO=0 KEINE TASTE
 0790  F8AE  D0 04             BNE NOCH
 0795  F8B0  A9 0A             LDA #10           ;ENTPRELLZEIT
 0800  F8B2  85 E5             STA ZEIT
 0805  F8B4  C6 E5       NOCH  DEC ZEIT          ; TASTE NOCH GEDRUECKT
```

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LINE # LOC   CODE       LINE

 0790  F8B6  30 E7              BMI TZ
 0795  F8B8  D0 E7              BNE DTCYC
 0800  F8BA  C9 10              CMP #16
 0805  F8BC  10 25              BPL FUNK        ; FUNKTIONSTASTE
 0810  F8BE  0A                 ASL A
 0815  F8BF  0A                 ASL A
 0820  F8C0  0A                 ASL A
 0825  F8C1  0A                 ASL A
 0830  F8C2  8D F7 F7           STA TASTE
 0835  F8C5  A2 04              LDX #4
 0840  F8C7  A0 00              LDY #0
 0845  F8C9  24 EE        ART   BIT DSPART
 0850  F8CB  70 0E              BVS ADRES
 0855  F8CD  B1 F7        DATA  LDA (ADRL),Y
 0860  F8CF  0E F7 F7           ASL TASTE
 0865  F8D2  2A                 ROL A
 0870  F8D3  91 F7              STA (ADRL),Y
 0875  F8D5  CA            DATA1 DEX
 0880  F8D6  D0 F1              BNE ART
 0885  F8D8  4C A1 F8      CYCEND JMP DTCYC
 0890  F8DB  0A            ADRES ASL A
 0895  F8DC  26 F7              ROL ADRL
 0900  F8DE  26 F8              ROL ADRH
 0905  F8E0  4C D5 F8           JMP DATA1
 0910  F8E3  C9 18        FUNK  CMP #F15        ;TASTE GO
 0915  F8E5  F0 0D              BEQ GO
 0920  F8E7  0A                 ASL A
 0925  F8E8  29 0F              AND #$0F        ;MASKIERUNG HIGH
 0930  F8EA  18                 CLC
 0935  F8EB  69 94              ADC #TSATZ-OFFSET  ;OFFSET-MONA TASTEN
 0940  F8ED  8D F8 F7           STA TALOW
 0945  F8F0  38                 SEC
 0950  F8F1  6C F8 F7           JMP (TALOW)
 0955  F8F4                 ;
 0960  F8F4  A6 E8        GO    LDX STPOIN      ; HOLE STACKPOINTER DES BENUTZER-
 0965  F8F6                 ;                    REGISTER
 0970  F8F6  9A                 TXS
 0975  F8F7  A5 F8              LDA ADRH
 0980  F8F9  48                 PHA
 0985  F8FA  A5 F7              LDA ADRL
 0990  F8FC  48                 PHA
 0995  F8FD  A5 E9              LDA STATUS
 1000  F8FF  48                 PHA
 1005  F900  A6 EA              LDX XSAVE
 1010  F902  A4 EB              LDY YSAVE
 1015  F904  A5 E7              LDA ACCU
 1020  F906  40                 RTI             ; SPRUNG ZUM BENUTZER-PROGRAM
 1025  F907                 ;
 1030  F907  A5 E6        TTY   LDA SPUFLG
 1035  F909  D0 DA              BNE TTYOK
 1040  F90B  20 B0 FF           JSR SPUCTL
 1045  F90E  A9 FF              LDA #$FF
 1050  F910  85 E6              STA SPUFLG
 1055  F912  EA                 NOP
 1060  F913  EA                 NOP
 1065  F914  EA                 NOP
 1070  F915  A9 00        TTYOK LDA #0
 1075  F917  85 E3              STA TPFLG
 1080  F919  2C EF F7           BIT ECHO
 1085  F91C  30 0D              BMI TT;O
 1090  F91E  A0 08        MONA  LDY #11
```

```
LINE # LOC      CODE      LINE

 1095  F920  BD 06 F8    MONA1  LDA TABO,X
 1100  F923  20 86 FA           JSR TTYOUT
 1105  F926  CA                 DEX
 1110  F927  10 F7              BPL MONA1
 1115  F929  30 0D              BMI MONA2
 1120  F92B  EA           TTYO  .BYTE $EA,$EA,$EA
 1130  F92C  EA
 1120  F92D  EA
 1125  F92E  EA                 .BYTE $EA,$EA
 1129  F92F  EA
 1130  F930  2C EF F7           BIT ECHO
 1135  F933  30 06              BMI TTY1
 1140  F935  20 4F FA           JSR CARRET
 1145  F938  20 5E FA    MONA2  JSR ZEILEO
 1150  F93B  A9 00        TTY1  LDA #0
 1155  F93D  85 F1              STA INL           ;LOESCHEN INPUT
 1160  F93F  85 F2              STA INH
 1165  F941  20 F1 F9    TTY2  JSR ASCIIN        ;CHARACTER ERWARTEN
 1170  F944  EA                 .BYTE $EA,$EA,$EA,$EA,$EA
 1170  F945  EA
 1170  F946  EA
 1170  F947  EA
 1170  F948  EA
 1175  F949  C9 2E              CMP #'.           ;ZELLE AENDERN
 1180  F94B  F0 37              BEQ NEUDAT
 1185  F94D  C9 0D              CMP #$0D          ; RETURN-= NEUE ADRESSE
 1190  F94F  F0 79              BEQ TDOWN
 1195  F951  C9 0A              CMP #$0A          ;LINEF.=VORIGE ADRESSE
 1200  F953  F0 34              BEQ TUP
 1205  F955  C9 7F              CMP #$7F          ;RUBOUT=SYSTEMMELDUNG
 1210  F957  F0 45              BEQ MONA
 1215  F959  C9 20              CMP #$20          ;LEERTASTE=NEUE ADRESSE
 1220  F95B  F0 1C              BEQ ADR
 1225  F95D  C9 47              CMP #'G           ;DUMMY
 1230  F95F  F0 93              BEQ GO            ;DUMMY
 1235  F961  C9 47              CMP #'G           ;GO
 1240  F963  F0 8F              BEQ GO
 1245  F965  C9 4C              CMP #'L           ;LADEN LOCHSTREIFEN
 1250  F967  F0 0A              BEQ GLADEN
 1255  F969  C9 51              CMP #'Q           ;STANZEN LOCHSTREIFEN
 1260  F96B  F0 09              BEQ GDUMP
 1265  F96D  20 20 FA           JSR HEXA
 1270  F970  4C 41 F9           JMP TTY2
 1275  F973  4C F9 F8    GLADEN JMP LADEN
 1280  F976  4C 70 F8    GDUMP  JMP DUMP
 1285  F979                     ;
 1290  F979  A5 F1        ADR   LDA INL
 1295  F97B  85 F7              STA ADRL
 1300  F97D  A5 F2              LDA INH
 1305  F97F  85 F8              STA ADRH
 1310  F981  4C 2B F9           JMP TTYO
 1315  F984                     ;
 1320  F984  A0 00        NEUDAT LDY #0
 1325  F986  A5 F1              LDA INL
 1330  F988  91 F7              STA (ADRL),Y
 1335  F98A  20 55 FC    TDOWN  JSR INCADR
 1340  F98D  B0 9C              BCS TTYO
 1345  F98F  20 50 FC    TUP    JSR DECADR
 1350  F992  B0 97              BCS TTYO
 1355  F994                     ;
 1360  F994  F0 F4        TSAT2  BEQ TDOWN
```

```
LINE #  LOC   CODE       LINE

 1365  F996  B0 F7           BCS TUP
 1370  F998  B0 0A           BCS TMNEMO
 1375  F99A  B0 0E           BCS TPROGC
 1380  F99C  B0 1A           BCS TAKKU
 1385  F99E  B0 14           BCS TSTATU
 1390  F9A0  B0 26           BCS TADRES
 1395  F9A2  B0 1E           BCS TDATA
 1400  F9A4                 ;
 1405  F9A4  A9 00        TMNEMO LDA #%00000000  ;DATA/MNEMONIC
 1410  F9A6  85 EE            STA DSPART
 1415  F9A8  B0 E8            BCS R3
 1420  F9AA  A5 EF        TPROGC LDA ADL
 1425  F9AC  85 F7            STA ADRL
 1430  F9AE  A5 F0            LDA ADH
 1435  F9B0  85 F8            STA ADRH
 1440  F9B2  B0 DE            BCS R3
 1445  F9B4  A9 E9        TSTATU LDA #STATUS
 1450  F9B6  B0 02            BCS STORE
 1455  F9B8  A9 E7        TAKKU  LDA #AKKU
 1460  F9BA  85 F7        STORE  STA ADRL
 1465  F9BC  A9 00            LDA #0
 1470  F9BE  85 F8            STA ADRH
 1475  F9C0  B0 D0            BCS R3
 1480  F9C2  A9 80        TDATA  LDA #%10000000  ;DATA/HEXA
 1485  F9C4  85 EE            STA DSPART
 1490  F9C6  B0 CA            BCS R3
 1495  F9C8  A9 40        TADRES LDA #%01000000  ;ADRESSE/XA
 1500  F9CA  05 EE            ORA DSPART
 1505  F9CC  85 EE            STA DSPART
 1510  F9CE  B0 C2            BCS R3
 1515  F9D0                 ;
 1520  F9D0  48           HPAUSE PHA
 1525  F9D1  AD F6 F7            LDA BAUDH
 1530  F9D4  4A                 LSR A
 1535  F9D5  4C DC F9            JMP PAUSE0
 1540  F9D8  48           PAUSE  PHA
 1545  F9D9  AD F6 F7            LDA BAUDH
 1550  F9DC  8D 16 F6      PAUSE0 STA T64
 1555  F9DF  2C 07 F6      PAUSE1 BIT VORBEI
 1560  F9E2  10 FB               BPL PAUSE1
 1565  F9E4  AD F5 F7            LDA BAUDL
 1570  F9E7  8D 14 F6            STA T1
 1575  F9EA  2C 07 F6      PAUSE2 BIT VORBEI
 1580  F9ED  10 FB               BPL PAUSE2
 1585  F9EF  68                 PLA
 1590  F9F0  60                 RTS
 1595  F9F1                 ;
 1600  F9F1  8A           ASCIIN TXA
 1605  F9F2  48                 PHA
 1610  F9F3  2C 00 F5      ASC0   BIT V24IN       ;WURDE KEIN STARTBIT ?
 1615  F9F6  30 FB               BMI ASC0
 1620  F9F8  20 D0 F9            JSR HPAUSE       ;0.5 BIT WARTEZEIT
 1625  F9FB  A9 00               LDA #00
 1630  F9FD  8D D2 F5            STA V24OUT       ;STARTBIT ECHO
 1635  FA00  20 D8 F9            JSR PAUSE        ;1 BIT WARTEZEIT
 1640  FA03  A0 07               LDY #7           ;FUER 7 ASCII ZEICHEN
 1645  FA05  2C 00 F5      ASC1   BIT V24IN
 1650  FA08  30 05               BMI ASC2
 1655  FA0A  A2 00               LDX #0
 1660  FA0C  18                 CLC
 1665  FA0D  90 03               BCC ASC3
```

```
LINE #  LOC   CODE       LINE

 1670  FA0F  38          ASC2   SEC
 1675  FA10  A2 FF              LDX #$FF
 1680  FA12  66 F3       ASC3   ROR IBUF
 1685  FA14  8E 02 F5           STX V24OUT       ;ECHO
 1690  FA17  20 D8 F9           JSR PAUSE
 1695  FA1A  88                 DEY
 1700  FA1B  D0 E8              BNE ASC1
 1705  FA1D  46 F3              LSR IBUF
 1710  FA1F  20 D8 F9           JSR PAUSE        ;0.5 BIT GESCHENKT
 1715  FA22  A2 FF              LDX #$FF
 1720  FA24  8E 02 F5           STX V24OUT
 1725  FA27  68                 PLA
 1730  FA28  AA                 TAX
 1735  FA29  A5 F3              LDA IBUF
 1740  FA2B  60                 RTS
 1745  FA2C  EA                 NOP
 1750  FA2D                    ;
 1755  FA2D  C9 30       HEXA   CMP #'0          ;KLEINER ALS ASCII "0" ?
 1760  FA2F  30 1D              BMI R2
 1765  FA31  C9 47              CMP #'G          ;GROESSER ALS ASCII "F" ?
 1770  FA33  10 19              BPL R2
 1775  FA35  C9 41              CMP #'A          ;ALPHA-ZEICHEN ?
 1780  FA37  30 03              BMI ZAHL
 1785  FA39  18                 CLC
 1790  FA3A  69 09              ADC #9
 1795  FA3C  0A          ZAHL   ASL A
 1800  FA3D  0A                 ASL A
 1805  FA3E  0A                 ASL A
 1810  FA3F  0A                 ASL A
 1815  FA40  A0 04              LDY #4
 1820  FA42  2A          TRANS  ROL A
 1825  FA43  26 F1              ROL INL
 1830  FA45  26 F2              ROL INH
 1835  FA47  88                 DEY
 1840  FA48  D0 F8              BNE TRANS
 1845  FA4A  A5 F1              LDA INL
 1850  FA4C  A0 00              LDY #0
 1855  FA4E  60          R2     RTS
 1860  FA4F                    ;
 1865  FA4F  A2 06       CARRET LDX #6
 1870  FA51  BD 0B F8    CARET1 LDA TAB1,X
 1875  FA54  20 86 FA           JSR TTYOUT
 1880  FA57  CA                 DEX
 1885  FA58  D0 F7              BNE CARET1
 1890  FA5A  60                 RTS
 1895  FA5B                    ;
 1900  FA5B  20 4F FA    ZEILE  JSR CARRET
 1905  FA5E  A2 03       ZEILE0 LDX #3
 1910  FA60  20 D2 FB           JSR PRTSQ2
 1915  FA63  20 84 FA           JSR SPACE
 1920  FA66  A0 00              LDY #0
 1925  FA68  B1 F7              LDA (ADRL),Y
 1930  FA6A  20 B2 FA           JSR OUTBT
 1935  FA6D  20 84 FA           JSR SPACE
 1940  FA70  20 92 F0           JSR MNEMON
 1945  FA73  A2 00              LDX #0
 1950  FA75  B5 F9       ZEILE1 LDA MNEM1,X
 1955  FA77  20 86 FA           JSR TTYOUT
 1960  FA7A  E8                 INX
 1965  FA7B  E8                 INX
 1970  FA7C  E0 06              CPX #6
```

```
LINE #  LOC   CODE       LINE

 1975  FA7E  D0 F5          BNE ZEILE1
 1980  FA80  20 84 FA       JSR SPACE
 1985  FA83  60             RTS
 1990  FA84                ;
 1995  FA84  A9 20       SPACE  LDA #$20
 2000  FA86  A0 FF       TTYOUT LDY #$FF
 2005  FA88  8C 02 F5          STY V24OUT
 2010  FA8B  20 D8 F9          JSR PAUSE       ;EVENTUELL 11.BIT
 2015  FA8E  C8                INY
 2020  FA8F  EA                .BYTE $EA,$EA
 2020  FA90  EA
 2025  FA91  8C 02 F5          STY V24OUT
 2030  FA94  A0 08             LDY #8
 2035  FA96  20 D8 F9    ASC01  JSR PAUSE
 2040  FA99  4A                LSR A
 2045  FA9A  2E 02 F5          ROL V24OUT
 2050  FA9D  88                DEY
 2055  FA9E  D0 F6             BNE ASC01
 2060  FAA0  A9 FF             LDA #$FF
 2065  FAA2  EA                .BYTE $EA,$EA,$EA
 2065  FAA3  EA
 2065  FAA4  EA
 2070  FAA5  8D 02 F5          STA V24OUT
 2075  FAA8  20 D8 F9          JSR PAUSE       ;PARITAETSBIT
 2080  FAAB  20 D8 F9          JSR PAUSE
 2085  FAAE  60                RTS
 2090  FAAF                ;
 2095  FAAF  20 EB FB    OUTBYT JSR CHECK
 2100  FAB2  48          OUTBT  PHA
 2105  FAB3  4A                LSR A
 2110  FAB4  4A                LSR A
 2115  FAB5  4A                LSR A
 2120  FAB6  4A                LSR A
 2125  FAB7  20 BF FA          JSR HEXOUT
 2130  FABA  68                PLA
 2135  FABB  20 BF FA          JSR HEXOUT
 2140  FABE  60                RTS
 2145  FABF                ;
 2150  FABF  29 0F       HEXOUT AND #$0F        ;NUR LOWER BYTE
 2155  FAC1  C9 0A             CMP #$0A        ;ALPHA-ZEICHEN
 2160  FAC3  18                CLC
 2165  FAC4  30 02             BMI NUMM
 2170  FAC6  69 07             ADC #7
 2175  FAC8  69 30       NUMM  ADC #$30
 2180  FACA  24 E3             BIT TPFLG       ;TAPEAUSG.=FF;TTYAUSG.=00
 2185  FACC  30 04             BMI TAPE
 2190  FACE  20 86 FA          JSR TTYOUT
 2195  FAD1  60                RTS
 2200  FAD2  20 96 FE    TAPE  JSR TAPOUT
 2205  FAD5  60                RTS
 2210  FAD6                ;
 2215  FAD6  A2 00       DISPLY LDX #0
 2220  FAD8  86 FF             STX PUNKT       ;PUNKT LOESCHEN FUER LSD
 2225  FADA  A2 29             LDX #$29
 2230  FADC  24 EE             BIT DSPART
 2235  FADE  50 02             BVC DSP1
 2240  FAE0  C6 FF             DEC PUNKT       ;AUF FF I.E.MINUS
 2245  FAE2  A5 F8       DSP1  LDA ADRH
 2250  FAE4  20 1B FB          JSR LLICHT
 2255  FAE7  20 21 FB          JSR RLICHT
 2260  FAEA  A5 F7             LDA ADRL
```

```
LINE # LOC     CODE       LINE

 2265  FAEC  20 1B FB            JSR LLICHT
 2270  FAEF  20 21 FB            JSR RLICHT
 2275  FAF2  E8                  INX
 2280  FAF3  E8                  INX
 2285  FAF4  A0 00               LDY #0
 2290  FAF6  84 FF               STY PUNKT          ;PUNKT LOESCHEN
 2295  FAF8  B1 F7               LDA (ADRL),Y
 2300  FAFA  24 EE               BIT DSPART
 2305  FAFC  70 02               BVS DSP2
 2310  FAFE  C6 FF               DEC PUNKT          ;PUNKT LOESCHEN
 2315  FB00  24 EE      DSP2     BIT DSPART
 2320  FB02  10 0A               BPL MNDSP
 2325  FB04  20 1B FB            JSR LLICHT
 2330  FB07  20 21 FB            JSR RLICHT
 2335  FB0A  24 EE               BIT DSPART
 2340  FB0C  30 0C               BMI R5
 2345  FB0E  20 92 FD     MNDSP  JSR MNEMON
 2350  FB11  B5 C6       DSP3   LDA $C6,X
 2355  FB13  20 27 FB            JSR MLICHT
 2360  FB16  E0 39               CPX #$39
 2365  FB18  D0 F7               BNE DSP3
 2370  FB1A  60          R5     RTS
 2375  FB1B               ;
 2380  FB1B  85 F4       LLICHT STA OBUF           ;LINKES HALBBYTE DES A NACH
 2385  FB1D  4A                  LSR A              ;          DISPLAY LAUT X
 2390  FB1E  4A                  LSR A
 2395  FB1F  4A                  LSR A
 2400  FB20  4A                  LSR A
 2405  FB21  29 0F       RLICHT AND #$0F
 2410  FB23  A8                  TAY
 2415  FB24  B9,12 F8             LDA TAB2,Y         ;SIEBENSEGM.-TAB. HOLEN
 2420  FB27  24 FF       MLICHT BIT PUNKT
 2425  FB29  10 02               BPL LICHT1
 2430  FB2B  09 80               ORA #%10000000
 2435  FB2D  8D 00 F6     LICHT1 STA PA
 2440  FB30  A0 FF               LDY #$FF
 2445  FB32  8C 01 F6            STY PADD
 2450  FB35  8E 02 F6            STX PB             ;LICHT AN
 2455  FB38  E8                  INX
 2460  FB39  E8                  INX
 2465  FB3A  A0 96               LDY #150
 2470  FB3C  88          WARTEN DEY
 2475  FB3D  D0 FD               BNE WARTEN
 2480  FB3F  A9 3F               LDA #%3F
 2485  FB41  8D 02 F6            STA PB             ;LICHT AUS
 2490  FB44  A9 00               LDA #0
 2495  FB46  8D 01 F6            STA PADD           ;PA WIEDER EINGANG
 2500  FB49  A5 F4               LDA OBUF
 2505  FB4B  60                  RTS
 2510  FB4C               ;
 2515  FB4C  A2 27       TASTEN LDX #$27
 2520  FB4E  8E 02 F6     REIHE  STX PB
 2525  FB51  AD 00 F6            LDA PA             ;SPALTE?
 2530  FB54  49 FF               EOR #$FF           ;INVERTIEREN
 2535  FB56  D0 09               BNE TASTO
 2540  FB58  CA                  DEX
 2545  FB59  CA                  DEX
 2550  FB5A  E0 1F               CPX #$1F
 2555  FB5C  D0 F0               BNE REIHE
 2560  FB5E  A9 19               LDA #$19
 2565  FB60  60                  RTS
```

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LINE #  LOC   CODE       LINE

 2570  FB61  A0 00     TASTO  LDY #0
 2575  FB63  0A        TAST1  ASL A            ;Y WIRD SPALTENWERT
 2580  FB64  B0 03             BCS WERT
 2585  FB66  C8               INY
 2590  FB67  10 FA             BPL TAST1       ;IMMMER
 2595  FB69  8A        WERT   TXA
 2600  FB6A  29 0F             AND #$0F        ;MASKIERUNG DES TAPE-BITS
 2605  FB6C  4A               LSR A             ;ZEILENWERT/2
 2610  FB6D  AA               TAX
 2615  FB6E  98               TYA
 2620  FB6F  CA        ADB    DEX
 2625  FB70  30 05             BMI R6
 2630  FB72  18               CLC
 2635  FB73  69 08             ADC #8          ;PLUS 8 FUER NAECHSTE REIHE
 2640  FB75  D0 F8             BNE ADB
 2645  FB77  A2 3F     R6      LDX #$3F
 2650  FB79  8E 02 F6          STX PB
 2655  FB7C  60               RTS
 2660  FB7D                   ;
 2665  FB7D  A9 00     DUMP   LDA #0
 2670  FB7F  85 F1             STA INL
 2675  FB81  85 F2             STA INH
 2680  FB83  20 E3 FB  DUMP0  JSR CHKCLR
 2685  FB86  20 4F FA  DUMP1  JSR CARRET
 2690  FB89  A9 3B             LDA #':         ;
 2695  FB8B  20 86 FA          JSR TTYOUT
 2700  FB8E  A5 F7             LDA ADRL
 2705  FB90  CD F2 F7          CMP ENDEL
 2710  FB93  A5 F8             LDA ADRH
 2715  FB95  ED F3 F7          SBC ENDEH
 2720  FB98  90 13             BCC DUMP3
 2725  FB9A  A5 F1             LDA INL         ;ZAHL DER BLOECKE
 2730  FB9C  85 F7             STA ADRL
 2735  FB9E  A5 F2             LDA INH
 2740  FBA0  85 F8             STA ADRH
 2745  FBA2  A9 00             LDA #0          ;LETZTES RECORD
 2750  FBA4  20 CD FB          JSR PRTSEQ      ;MIT 0 IN STARTSEQUENZ GEHEN
 2755  FBA7  20 D8 FB          JSR CHKPRT
 2760  FBAA  4C A1 F8          JMP OTCYC       ;ZURUECK ZUM HAUPTPROG.
 2765  FBAD  A9 18     DUMP3  LDA #$18        ;FUER 24 BYTES
 2770  FBAF  20 CD FB          JSR PRTSEQ
 2775  FBB2  A2 18             LDX #$18
 2780  FBB4  A0 00     DUMP4  LDY #0
 2785  FBB6  B1 F7             LDA (ADRL),Y
 2790  FBB8  20 AF FA          JSR OUTBYT
 2795  FBBB  20 55 FC          JSR INCADR
 2800  FBBE  CA               DEX
 2805  FBBF  D0 F3             BNE DUMP4       ;NOCH NICHT 16 BYTES
 2810  FBC1  20 D8 FB          JSR CHKPRT
 2815  FBC4  E6 F1             INC INL
 2820  FBC6  D0 02             BNE DUMP6
 2825  FBC8  E6 F2             INC INH
 2830  FBCA  4C 83 FB  DUMP6  JMP DUMP0
 2835  FBCD                   ;
 2840  FBCD  A2 03     PRTSEQ LDX #3          ;ACCU STANZEN (=18 ODER =00)
 2845  FBCF  20 AF FA  PRTSQ1 JSR OUTBYT
 2850  FBD2  B5 F5     PRTSQ2 LDA ADRH-3,X
 2855  FBD4  CA               DEX
 2860  FBD5  D0 F8             BNE PRTSQ1
 2865  FBD7  60               RTS
 2870  FBD8                   ;
```

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LINE # LOC      CODE      LINE

 2875  FBD8  A5 F6       CHKPRT LDA CHECKH
 2880  FBDA  20 B2 FA           JSR OUTBT
 2885  FBDD  A5 F5              LDA CHECKL
 2890  FBDF  20 B2 FA           JSR OUTBT
 2895  FBE2  60                 RTS
 2900  FBE3                    ;
 2905  FBE3  D8                CHKCLR CLD
 2910  FBE4  A9 00              LDA #0
 2915  FBE6  85 F5              STA CHECKL
 2920  FBE8  85 F6              STA CHECKH
 2925  FBEA  60                 RTS
 2930  FBEB                    ;
 2935  FBEB  48                CHECK  PHA
 2940  FBEC  18                 CLC
 2945  FBED  65 F5              ADC CHECKL
 2950  FBEF  85 F5              STA CHECKL
 2955  FBF1  A5 F6              LDA CHECKH
 2960  FBF3  69 00              ADC #0            ;CARRY ?
 2965  FBF5  85 F6              STA CHECKH
 2970  FBF7  68                 PLA
 2975  FBF8  60                 RTS
 2980  FBF9                    ;
 2985  FBF9  20 E3 FB    LADEN  JSR CHKCLR
 2990  FBFC  20 F1 F9    LADEN1 JSR ASCIIN
 2995  FBFF  C9 3B              CMP #';           ; ;WARTEN AUF SEMIKOLON
 3000  FC01  D0 F9              BNE LADEN1
 3005  FC03  20 48 FC           JSR HEXIN
 3010  FC06  20 EB FB           JSR CHECK
 3015  FC09  AA                 TAX               ;ZAHL DER BYTES
 3020  FC0A  20 48 FC           JSR HEXIN
 3025  FC0D  85 F8              STA ADRH
 3030  FC0F  20 EB FB           JSR CHECK
 3035  FC12  20 48 FC           JSR HEXIN
 3040  FC15  85 F7              STA ADRL
 3045  FC17  20 EB FB           JSR CHECK
 3050  FC1A  8A                 TXA
 3055  FC1B  F0 DC              BEQ LADEN
 3060  FC1D  20 48 FC    LADEN2 JSR HEXIN
 3065  FC20  D0 22              BNE ERROR
 3070  FC22  91 F7              STA (ADRL),Y
 3075  FC24  20 EB FB           JSR CHECK
 3080  FC27  20 55 FC           JSR INCADR
 3085  FC2A  CA                 DEX
 3090  FC2B  D0 F0              BNE LADEN2
 3095  FC2D  E8                 INX
 3100  FC2E  20 48 FC    LADEN3 JSR HEXIN
 3105  FC31  C5 F6              CMP CHECKH
 3110  FC33  D0 0F              BNE ERROR
 3115  FC35  20 48 FC           JSR HEXIN
 3120  FC38  C5 F5              CMP CHECKL
 3125  FC3A  D0 08              BNE ERROR
 3130  FC3C  8A                 TXA
 3135  FC3D  D0 BA              BNE LADEN
 3140  FC3F  A2 0B              LDX #11
 3145  FC41  4C 20 F9    LADEN4 JMP MONA1
 3150  FC44  A2 0C        ERROR  LDX #12
 3155  FC46  D0 F9              BNE LADEN4
 3160  FC48                    ;
 3165  FC48  20 F1 F9    HEXIN  JSR ASCIIN
 3170  FC4B  20 2D FA           JSR HEXA
 3175  FC4E  20 F1 F9           JSR ASCIIN
```

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LINE # LOC     CODE      LINE

 3180  FC51  20 2D FA           JSR HEXA
 3185  FC54  60                 RTS
 3190  FC55                ;
 3195  FC55  E6 F7         INCADR INC ADRL
 3200  FC57  D0 02               BNE R8
 3205  FC59  E6 F8               INC ADRH
 3210  FC5B  38           R8      SEC
 3215  FC5C  60                 RTS
 3220  FC5D  38           DECADR SEC
 3225  FC5E  A5 F7               LDA ADRL
 3230  FC60  E9 01               SBC #1
 3235  FC62  85 F7               STA ADRL
 3240  FC64  B0 02               BCS R9
 3245  FC66  C6 F8               DEC ADRH
 3250  FC68  38           R9      SEC
 3255  FC69  60                 RTS
 3260  FC6A                ;         TEIL 2 : MNEMONIC + DATENBAND
 3265  FC6A                ;
 3270  FC6A  69           CODE    .BYTE $69,$6D,$65,$61,$71,$75,$7D,$79
 3270  FC6B  6D
 3270  FC6C  65
 3270  FC6D  61
 3270  FC6E  71
 3270  FC6F  75
 3270  FC70  7D
 3270  FC71  79
 3275  FC72  1F 4D               .WORD $4D1F      ;ADC
 3280  FC74  29                 .BYTE $29,$2D,$25,$21,$31,$35,$3D,$39
 3280  FC75  2D
 3280  FC76  25
 3280  FC77  21
 3280  FC78  31
 3280  FC79  35
 3280  FC7A  3D
 3280  FC7B  39
 3285  FC7C  1F 8F               .WORD $8F1F      ;AND
 3290  FC7E  0E                 .BYTE $0E,$06,$0A,$16,$1E
 3290  FC7F  06
 3290  FC80  0A
 3290  FC81  16
 3290  FC82  1E
 3295  FC83  1F 09               .WORD $091F      ;ASL
 3300  FC85  90                 .BYTE $90
 3305  FC86  FF 48               .WORD $48FF      ; BCL
 3310  FC88  B0                 .BYTE $B0
 3315  FC89  FF 41               .WORD $41FF      ; BCS
 3320  FC8B  F0                 .BYTE $F0
 3325  FC8C  FF F7               .WORD $F7FF      ; BEQ
 3330  FC8E  2C                 .BYTE $2C,$24
 3330  FC8F  24
 3335  FC90  FF 88               .WORD $88FF      ; BIT
 3340  FC92  30                 .BYTE $30
 3345  FC93  FF DE               .WORD $DEFF      ; BMI
 3350  FC95  D0                 .BYTE $D0
 3355  FC96  FF E0               .WORD $E0FF      ; BNE
 3360  FC98  10                 .BYTE $10
 3365  FC99  FF 96               .WORD $96FF      ; BPL
 3370  FC9B  50                 .BYTE $50
 3375  FC9C  FF 21               .WORD $21FF      ; BVC
 3380  FC9E  70                 .BYTE $70
 3385  FC9F  FF 23               .WORD $23FF      ; BVS
```

```
LINE # LOC    CODE      LINE

3390  FCA1  18                .BYTE $18
3395  FCA2  0F B7             .WORD $B70F     ; CLC
3400  FCA4  D8                .BYTE $D8
3405  FCA5  0F BD             .WORD $BD0F     ; CLD
3410  FCA7  58                .BYTE $58
3415  FCA8  0F BB             .WORD $BB0F     ; CLI
3420  FCAA  B8                .BYTE $B8
3425  FCAB  0F B5             .WORD $B50F     ; CLV
3430  FCAD  C9                .BYTE $C9,$CD,$C5,$C1,$D1,$D5,$DD,$D9
3430  FCAE  CD
3430  FCAF  C5
3430  FCB0  C1
3430  FCB1  D1
3430  FCB2  D5
3430  FCB3  DD
3430  FCB4  D9
3435  FCB5  0F 8F             .WORD $8F0F     ; CMP
3440  FCB7  E0                .BYTE $E0,$EC,$E4
3440  FCB8  EC
3440  FCB9  E4
3445  FCBA  0F 4B             .WORD $4B0F     ; CPX
3450  FCBC  C0                .BYTE $C0,$CC,$C4
3450  FCBD  CC
3450  FCBE  C4
3455  FCBF  0F 48             .WORD $480F     ; CPY
3460  FCC1  CE                .BYTE $CE,$C6,$D6,$DE
3460  FCC2  C6
3460  FCC3  D6
3460  FCC4  DE
3465  FCC5  6F 48             .WORD $486F     ;DEC
3470  FCC7  CA                .BYTE $CA
3475  FCC8  6F 45             .WORD $456F     ; DEX
3480  FCCA  88                .BYTE $88
3485  FCCB  6F 42             .WORD $426F     ; DEY
3490  FCCD  49                .BYTE $49,$4D,$45,$41,$51,$55,$50,$59
3490  FCCE  4D
3490  FCCF  45
3490  FCD0  41
3490  FCD1  51
3490  FCD2  55
3490  FCD3  50
3490  FCD4  59
3495  FCD5  BF B4             .WORD $B4BF     ; EOR
3500  FCD7  EE                .BYTE $EE,$E6,$F6,$FE
3500  FCD8  E6
3500  FCD9  F6
3500  FCDA  FE
3505  FCDB  4F 59             .WORD $594F     ; INC
3510  FCDD  E8                .BYTE $E8
3515  FCDE  4F 56             .WORD $564F     ; INX
3520  FCE0  C8                .BYTE $C8
3525  FCE1  4F 53             .WORD $534F     ; INY
3530  FCE3  4C                .BYTE $4C,$6C
3530  FCE4  6C
3535  FCE5  7F 1F             .WORD $1F7F     ; JMP
3540  FCE7  20                .BYTE $20
3545  FCE8  7F E5             .WORD $E57F     ; JSR
3550  FCEA  A9                .BYTE $A9,$AD,$A5,$A1,$B1,$B5,$BD,$B9
3550  FCEB  AD
3550  FCEC  A5
3550  FCED  A1
```

```
LINE # LOC     CODE      LINE

  3550  FCEE  B1
  3550  FCEF  B5
  3550  FCF0  BD
  3550  FCF1  B9
  3555  FCF2  CF DE              .WORD $DECF      ; LDA
  3560  FCF4  A2                .BYTE $A2,$AE,$A6,$BE
  3560  FCF5  AE
  3560  FCF6  A6
  3560  FCF7  BE
  3565  FCF8  CF DA              .WORD $DACF      ; LDX
  3570  FCFA  A0                .BYTE $A0,$AC,$A4,$B4,$BC
  3570  FCFB  AC
  3570  FCFC  A4
  3570  FCFD  B4
  3570  FCFE  BC
  3575  FCFF  CF D7              .WORD $D7CF      ; LDY
  3580  FD01  4E                .BYTE $4E,$46,$4A,$56,$5E
  3580  FD02  46
  3580  FD03  4A
  3580  FD04  56
  3580  FD05  5E
  3585  FD06  CF 95              .WORD $95CF      ; LSR
  3590  FD08  09                .BYTE $09,$0D,$05,$01,$11,$15,$1D,$19
  3590  FD09  0D
  3590  FD0A  05
  3590  FD0B  01
  3590  FD0C  11
  3590  FD0D  15
  3590  FD0E  1D
  3590  FD0F  19
  3595  FD10  3F 4C              .WORD $4C3F      ; ORA
  3600  FD12  48                .BYTE $48
  3605  FD13  5F A4              .WORD $A45F      ; PHA
  3610  FD15  08                .BYTE $08
  3615  FD16  5F A8              .WORD $A85F      ; PHP
  3620  FD18  68                .BYTE $68
  3625  FD19  5F 68              .WORD $685F      ; PLA
  3630  FD1B  28                .BYTE $28
  3635  FD1C  5F 6C              .WORD $6C5F      ; PLP
  3640  FD1E  2E                .BYTE $2E,$26,$2A,$36,$3E
  3640  FD1F  26
  3640  FD20  2A
  3640  FD21  36
  3640  FD22  3E
  3645  FD23  8F E8              .WORD $E88F      ; ROL
  3650  FD25  6A                .BYTE $6A,$66,$76,$6E,$7E
  3650  FD26  66
  3650  FD27  76
  3650  FD28  6E
  3650  FD29  7E
  3655  FD2A  8F E4              .WORD $E48F      ; ROR
  3660  FD2C  40                .BYTE $40
  3665  FD2D  8F 4A              .WORD $4A8F      ; RTI
  3670  FD2F  60                .BYTE $60
  3675  FD30  8F 48              .WORD $488F      ; RTS
  3680  FD32  E9                .BYTE $E9,$ED,$E5,$E1,$F1,$F5,$FD,$F9
  3680  FD33  ED
  3680  FD34  E5
  3680  FD35  E1
  3680  FD36  F1
  3680  FD37  F5
```

```
LINE # LOC     CODE      LINE

 3680  FD38  FD
 3680  FD39  F9
 3685  FD3A  2F C4              .WORD $C42F      ; SBC
 3690  FD3C  38                 .BYTE $38
 3695  FD3D  2F 88              .WORD $882F      ; SEC
 3700  FD3F  F8                 .BYTE $F8
 3705  FD40  2F 8E              .WORD $8E2F      ; SED
 3710  FD42  78                 .BYTE $78
 3715  FD43  2F 8C              .WORD $8C2F      ; SEI
 3720  FD45  8D                 .BYTE $8D,$85,$81,$91,$95,$9D,$99
 3720  FD46  85
 3720  FD47  81
 3720  FD48  91
 3720  FD49  95
 3720  FD4A  9D
 3720  FD4B  99
 3725  FD4C  2F A7              .WORD $A72F      ; STA
 3730  FD4E  8E                 .BYTE $8E,$86,$96
 3730  FD4F  86
 3730  FD50  96
 3735  FD51  2F A3              .WORD $A32F      ; STX
 3740  FD53  8C                 .BYTE $8C,$84,$94
 3740  FD54  84
 3740  FD55  94
 3745  FD56  2F A0              .WORD $A02F      ; STY
 3750  FD58  AA                 .BYTE $AA
 3755  FD59  DF 7F              .WORD $7FDF      ; TAX
 3760  FD5B  A8                 .BYTE $A8
 3765  FD5C  DF 7C              .WORD $7CDF      ; TAY
 3770  FD5E  BA                 .BYTE $BA
 3775  FD5F  DF 8E              .WORD $8EDF      ; TSX
 3780  FD61  8A                 .BYTE $8A
 3785  FD62  DF 33              .WORD $33DF      ; TXA
 3790  FD64  9A                 .BYTE $9A
 3795  FD65  DF 34              .WORD $34DF      ; TXS
 3800  FD67  98                 .BYTE $98
 3805  FD68  DF 06              .WORD $06DF      ; TYA
 3810  FD6A  43          ASCII  .BYTE $43,$41,$53,$4F,$49,$5D,$44,$4A,$52,$4D
 3810  FD6B  41
 3810  FD6C  53
 3810  FD6D  4F
 3810  FD6E  49
 3810  FD6F  5D
 3810  FD70  44
 3810  FD71  4A
 3810  FD72  52
 3810  FD73  4D
 3815  FD74  4E                 .BYTE $4E,$45,$4C,$54,$59,$42,$48,$58,$56,$51
 3815  FD75  45
 3815  FD76  4C
 3815  FD77  54
 3815  FD78  59
 3815  FD79  42
 3815  FD7A  48
 3815  FD7B  58
 3815  FD7C  56
 3815  FD7D  51
 3820  FD7E  39          SIEBEN .BYTE $39,$77,$6D,$3F,$06,$73,$5E,$1E,$50,$37
 3820  FD7F  77
 3820  FD80  6D
 3820  FD81  3F
```

```
LINE # LOC      CODE      LINE

 3820  FD82  06
 3820  FD83  73
 3820  FD84  5E
 3820  FD85  1E
 3820  FD86  50
 3820  FD87  37
 3825  FD88  54                .BYTE $54,$79,$38,$78,$6E,$7C,$76,$14,$6A,$67
 3825  FD89  79
 3825  FD8A  38
 3825  FD8B  78
 3825  FD8C  6E
 3825  FD8D  7C
 3825  FD8E  76
 3825  FD8F  14
 3825  FD90  6A
 3825  FD91  67
 3830  FD92  8A          MNEMON TXA
 3835  FD93  48                 PHA
 3840  FD94  98                 TYA
 3845  FD95  48                 PHA
 3850  FD96  A2 00              LDX #0
 3855  FD98  BD 6A FC     MNEMO1 LDA CODE,X
 3860  FD9B  09 F0              ORA #$F0
 3865  FD9D  C9 FF              CMP #$FF
 3870  FD9F  D0 04              BNE NOMN
 3875  FDA1  E8                 INX
 3880  FDA2  E8                 INX
 3885  FDA3  F0 6C              BEQ DATEN
 3890  FDA5  BD 6A FC     NOMN   LDA CODE,X
 3895  FDA8  E8                 INX
 3900  FDA9  A0 00              LDY #0
 3905  FDAB  D1 F7              CMP (ADRL),Y
 3910  FDAD  D0 E9              BNE MNEMO1
 3915  FDAF  BD 6A FC     SMN    LDA CODE,X
 3920  FDB2  09 F0              ORA #$F0
 3925  FDB4  C9 FF              CMP #$FF
 3930  FDB6  F0 03              BEQ MNF
 3935  FDB8  E8                 INX
 3940  FDB9  D0 F4              BNE SMN
 3945  FDBB  A9 14        MNF   LDA #20
 3950  FDBD  85 EC              STA Z1
 3955  FDBF  BD 6A FC           LDA CODE,X
 3960  FDC2  18                 CLC
 3965  FDC3  4A                 LSR A
 3970  FDC4  4A                 LSR A
 3975  FDC5  4A                 LSR A
 3980  FDC6  4A                 LSR A
 3985  FDC7  18                 CLC
 3990  FDC8  EA                 .BYTE $EA,$EA
 3990  FDC9  EA
 3995  FDCA  90 05              BCC SSEG
 4000  FDCC  06 EC              ASL Z1
 4005  FDCE  18                 CLC
 4010  FDCF  69 14              ADC #20
 4015  FDD1  A8            SSEG  TAY
 4020  FDD2  85 FE              STA COPO
 4025  FDD4  B9 6A FD           LDA ASCII,Y
 4030  FDD7  85 F9              STA MNEM1
 4035  FDD9  E8                 INX
 4040  FDDA  BD 6A FC           LDA CODE,X
 4045  FDDD  4A                 LSR A
```

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LINE # LOC     CODE       LINE

 4050  FDDE  4A                 LSR A
 4055  FDDF  4A                 LSR A
 4060  FDE0  4A                 LSR A
 4065  FDE1  18                 CLC
 4070  FDE2  65 FE              ADC COPO
 4075  FDE4  69 01              ADC #1
 4080  FDE6  C5 EC              CMP Z1
 4085  FDE8  30 03              BMI CO1
 4090  FDEA  38                 SEC
 4095  FDEB  E9 14              SBC #20
 4100  FDED  A3           CO1   TAY
 4105  FDEE  85 FE              STA COPO
 4110  FDF0  B9 6A FD           LDA ASCII,Y
 4115  FDF3  85 FB              STA MNEM2
 4120  FDF5  BD 6A FC           LDA CODE,X
 4125  FDF8  29 DF              AND #$DF
 4130  FDFA  18                 CLC
 4135  FDFB  65 FE              ADC COPO
 4140  FDFD  69 01              ADC #1
 4145  FDFF  C5 EC              CMP Z1
 4150  FE01  30 03              BMI CO2
 4155  FE03  38                 SEC
 4160  FE04  E9 14              SBC #20
 4165  FE06  A8           CO2   TAY
 4170  FE07  B9 6A FD           LDA ASCII,Y
 4175  FE0A  85 FD              STA MNEM3
 4180  FE0C  68           CO3   PLA
 4185  FE0D  A8                 TAY
 4190  FE0E  68                 PLA
 4195  FE0F  AA                 TAX
 4200  FE10  60                 RTS
 4205  FE11  A9 40        DATEN LDA #$4D
 4210  FE13  85 F9              STA MNEM1
 4215  FE15  85 FB              STA MNEM2
 4220  FE17  85 FD              STA MNEM3
 4225  FE19  D0 F1              BNE CO3
 4230  FE1B              ;               OPT LIST
 4235  FE1B              ;DATENBANDAUFZEICHNUNG
 4240  FE1B              ;STARTADRESSE NACH STRTH,STRTL
 4245  FE1B              ;STOPADRESSE NACH ENDEH,ENDEL
 4250  FE1B              ;IDENTIFIKATIONS-NR. NACH ID
 4255  FE1B  20 E2 FB    TAUFZ  JSR CHKCLR
 4260  FE1E  A9 39              LDA #$39        ; EINSCHALTEN DES BANDMOTORS 1
 4265  FE20  8D 02 F6           STA PB
 4270  FE23  85 F4              STA OBUF
 4275  FE25  A2 0F              LDX #$0F        ; BANDVORLAUF
 4280  FE27  A9 FF        VORLF LDA #$FF        ; 16 MAL
 4285  FE29  85 E3              STA TPFLG
 4290  FE2B  8D 17 F6           STA T1024       ;1024*256 ZYCLEN
 4295  FE2E  2C 07 F6    VORLF1 BIT VORBEI      ; =CA. 4SEC.
 4300  FE31  10 FB              BPL VORLF1
 4305  FE33  CA                 DEX
 4310  FE34  D0 F1              BNE VORLF
 4315  FE36  A2 64              LDX #100        ; 100 SYNCH.-ZEICHEN
 4320  FE38  A9 16              LDA #$16
 4325  FE3A  20 B7 F9           JSR XOUT
 4330  FE3D  A9 2A              LDA #'*
 4335  FE3F  20 96 FE           JSR TAPOUT
 4340  FE42  AD F4 F7           LDA ID
 4345  FE45  20 [illegible]     JSR OUTBT
 4350  FE48  A0 [illegible]      LDA STRTL
```

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LINE # LOC      CODE       LINE

 4355  FE4B  85 F7           STA ADRL
 4360  FE4D  20 AF FA        JSR OUTBYT
 4365  FE50  AD F1 F7        LDA STRTH
 4370  FE53  85 F8           STA ADRH
 4375  FE55  20 AF FA        JSR OUTBYT
 4380  FE58  A0 00     INFO  LDY #0
 4385  FE5A  B1 F7           LDA (ADRL),Y
 4390  FE5C  20 AF FA        JSR OUTBYT
 4395  FE5F  20 55 FC        JSR INCADR
 4400  FE62  A5 F7           LDA ADRL
 4405  FE64  CD F2 F7        CMP ENDEL
 4410  FE67  A5 F8           LDA ADRH
 4415  FE69  ED F3 F7        SBC ENDEH
 4420  FE6C  90 EA           BCC INFO
 4425  FE6E  A9 2F           LDA #'/
 4430  FE70  20 96 FE        JSR TAPOUT
 4435  FE73  A5 F5           LDA CHECKL
 4440  FE75  20 B2 FA        JSR OUTBT
 4445  FE78  A5 F6           LDA CHECKH
 4450  FE7A  20 B2 FA        JSR OUTBT
 4455  FE7D  A9 04           LDA #4          ; END-OF-TAPE
 4460  FE7F  A2 02           LDX #2
 4465  FE81  20 87 FE        JSR XOUT
 4470  FE84  4C 38 FF        JMP R10
 4475  FE87  86 EC     XOUT  STX Z1          ; HILFSREGISTER Z
 4480  FE89  48        XOUT1 PHA
 4485  FE8A  20 96 FE        JSR TAPOUT
 4490  FE8D  68              PLA
 4495  FE8E  C6 EC           DEC Z1
 4500  FE90  D0 F7           BNE XOUT1
 4505  FE92  60              RTS
 4510  FE93                  ;
 4515  FE93  C4     TAB4   .BYTE $C4,$00,$7F  ; 3600HZ/2400HZ
 4515  FE94  00
 4515  FE95  7F
 4520  FE96                  ;
 4525  FE96  A0 07  TAPOUT LDY #7
 4530  FE98  84 E5           STY ZEIT
 4535  FE9A  A0 02  DREI    LDY #2
 4540  FE9C  84 ED           STY Z2
 4545  FE9E  B6 FA  TON     LDX FREQ1,Y
 4550  FEA0  48              PHA
 4555  FEA1  2C 07 F6  TON1  BIT VORBEI
 4560  FEA4  10 FB           BPL TON1
 4565  FEA6  B9 93 FE        LDA TAB4,Y
 4570  FEA9  8D 14 F6        STA T1
 4575  FEAC  A5 F4           LDA OBUF
 4580  FEAE  49 20           EOR #$20
 4585  FEB0  8D 02 F6        STA PB
 4590  FEB3  85 F4           STA OBUF
 4595  FEB5  CA              DEX
 4600  FEB6  D0 E9           BNE TON1
 4605  FEB8  68              PLA
 4610  FEB9  C6 ED           DEC Z2
 4615  FEBB  F0 05           BEQ TON2
 4620  FEBD  30 07           BMI TON3
 4625  FEBF  4A              LSR A
 4630  FEC0  90 DC           BCC TON
 4635  FEC2  A0 00  TON2    LDY #0
 4640  FEC4  F0 D8           BEQ TON
 4645  FEC6  C6 E5  TON3    DEC ZEIT
```

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LINE # LOC      CODE      LINE

 4650  FEC8  10 DD             BPL DREI
 4655  FECA  60                RTS
 4660  FECB                   ;
 4665  FECB                   ;                        DATENBAND LESEN
 4670  FECB  A9 3B      TPREAD LDA #$3B
 4675  FECD  8D 02 F6          STA PB
 4680  FED0  20 E3 FB          JSR CHKCLR
 4685  FED3  20 69 FF    SYN   JSR RDBIT        ; SYNCHRONISIEREN
 4690  FED6  46 F2              LSR INH
 4695  FED8  05 F2              ORA INH
 4700  FEDA  85 F2              STA INH
 4705  FEDC  C9 16      TEST    CMP #$16         ; SYNCH-ZEICHEN ?
 4710  FEDE  D0 F3              BNE SYN
 4715  FEE0  20 55 FF           JSR RDCHT
 4720  FEE3  C6 F2              DEC INH
 4725  FEE5  10 F5              BPL TEST
 4730  FEE7  C9 2A              CMP #'*
 4735  FEE9  D0 F1              BNE TEST
 4740  FEEB  20 48 FF           JSR RDBYT        ; AUF GEHTS
 4745  FEEE  C0 F4 F7           CMP ID           ;DAS MUSS ID SEIN
 4750  FEF1  F0 05              BEQ IDOK
 4755  FEF3  AD F4 F7           LDA ID
 4760  FEF6  D0 0B              BNE SYN
 4765  FEF8  A2 FE      IDOK    LDX #$FE
 4770  FEFA  20 48 FF    ADDR    JSR RDBYT
 4775  FEFD  95 F9              STA ADRH+1,X
 4780  FEFF  95 F1              STA ADH+1,X
 4785  FF01  20 EB FB           JSR CHECK
 4790  FF04  E8                 INX
 4795  FF05  30 F3              BMI ADDR
 4800  FF07  A2 02      BYTE    LDX #2
 4805  FF09  20 55 FF    DUBL    JSR RDCHT
 4810  FF0C  C9 2F              CMP #$2F         ;END ?
 4815  FF0E  F0 12              BEQ WIND
 4820  FF10  20 20 FA           JSR HEXA
 4825  FF13  D0 2B              BNE ER
 4830  FF15  CA                 DEX
 4835  FF16  D0 F1              BNE DUBL
 4840  FF18  91 F7             STA (ADRL),Y
 4845  FF1A  20 EB FB           JSR CHECK
 4850  FF1D  20 55 FC           JSR INCADR
 4855  FF20  B0 E5              BCS BYTE
 4860  FF22  20 48 FF    WIND    JSR RDBYT
 4865  FF25  C5 F5              CMP CHECKL
 4870  FF27  D0 17              BNE ER
 4875  FF29  20 48 FF           JSR RDBYT
 4880  FF2C  C5 F6              CMP CHECKH
 4885  FF2E  D0 10              BNE ER
 4890  FF30  A5 EF              LDA ADL
 4895  FF32  85 F7              STA ADRL
 4900  FF34  A5 F0              LDA ADH
 4905  FF36  85 F8              STA ADRH
 4910  FF38  A9 3F      R10     LDA #$3F
 4915  FF3A  8D 02 F6           STA PB
 4920  FF3D  60                 RTS
 4925  FF3E  EA                 .BYTE $EA,$EA
 4925  FF3F  EA
 4930  FF40  A9 FF      ER      LDA #$FF
 4935  FF42  85 F8              STA ADRH
 4940  FF44  85 F7              STA ADRL
 4945  FF46  D0 F0              BNE R10
```

```
LINE #  LOC     CODE        LINE

 4950   FF48                ;
 4955   FF48  20 55 FF      RDBYT   JSR RDCHT
 4960   FF4B  20 2D FA              JSR HEXA
 4965   FF4E  20 55 FF              JSR RDCHT
 4970   FF51  20 2D FA              JSR HEXA
 4975   FF54  60                    RTS
 4980   FF55  86 EC         RDCHT   STX Z1
 4985   FF57  A2 08                 LDX #8
 4990   FF59  20 69 FF      RDCHT1  JSR RDBIT
 4995   FF5C  2A                    ROL A
 5000   FF5D  66 F3                 ROR IBUF
 5005   FF5F  CA                    DEX
 5010   FF60  D0 F7                 BNE RDCHT1
 5015   FF62  A5 F3                 LDA IBUF
 5020   FF64  2A                    ROL A
 5025   FF65  4A                    LSR A               ; PARITAET GELOESCHT
 5030   FF66  A6 EC                 LDX Z1
 5035   FF68  60                    RTS
 5040   FF69                ;
 5045   FF69  2C 02 F6      RDBIT   BIT PB
 5050   FF6C  30 FB                 BMI RDBIT
 5055   FF6E  A0 06 F6              LDA TREAD
 5060   FF71  A0 FF                 LDY #$FF
 5065   FF73  8C 16 F6              STY T64
 5070   FF76  A0 30                 LDY #$30
 5075   FF78  88            P1      DEY
 5080   FF79  D0 FD                 BNE P1
 5085   FF7B  2C 02 F6      P2      BIT PB
 5090   FF7E  10 FB                 BPL P2
 5095   FF80  38                    SEC
 5100   FF81  ED 06 F6              SBC TREAD
 5105   FF84  A0 FF                 LDY #$FF
 5110   FF86  8C 16 F6              STY T64
 5115   FF89  A0 30                 LDY #$30
 5120   FF8B  88            P4      DEY
 5125   FF8C  D0 FD                 BNE P4
 5130   FF8E  49 FF                 EOR #$FF
 5135   FF90  29 80                 AND #$80
 5140   FF92  60                    RTS
 5145   FF93                ;
 5150   FF93  A9 3F         PLLTST  LDA #$3F
 5155   FF95  8D 02 F6      PLL1    STA PB
 5160   FF98  85 F4                 STA OBUF
 5165   FF9A  A2 8D                 LDX #141
 5170   FF9C  8E 14 F6              STX T1
 5175   FF9F  2C 07 F6      PLL2    BIT VORBEI
 5180   FFA2  10 FB                 BPL PLL2
 5185   FFA4  A5 F4                 LDA OBUF
 5190   FFA6  49 20                 EOR #$20
 5195   FFA8  D0 EB                 BNE PLL1
 5200   FFAA                ;
 5205   FFAA  04            TAB5    .BYTE $04,$0C,$59,$04,$4C,$01
 5205   FFAB  0C
 5205   FFAC  59
 5205   FFAD  04
 5205   FFAE  4C
 5205   FFAF  01
 5210   FFB0  A9 FF         SPDCTL  LDA #$FF
 5215   FFB2  2C 00 F5              BIT V24IN
 5220   FFB5  EA                    .BYTE $EA,$EA
 5220   FFB6  EA
```

```
LINE # LOC     CODE       LINE

 5225  FFB7  30 F7             BMI SPDCTL
 5230  FFB9  8D 16 F6          STA T64
 5235  FFBC  2C 00 F5    SPD1  BIT V24IN
 5240  FFBF  10 FB             BPL SPD1
 5245  FFC1  A2 00             LDX #0
 5250  FFC3  8E F5 F7          STX BAUDL
 5255  FFC6  8A                TXA
 5260  FFC7  18                CLC
 5265  FFC8  ED 06 F6          SBC TREAD
 5270  FFCB  C9 16             CMP #$16
 5275  FFCD  10 16             BPL LADE1
 5280  FFCF  C9 0A             CMP #$0A
 5285  FFD1  10 08             BPL LADE
 5290  FFD3  E8                INX
 5295  FFD4  E8                INX
 5300  FFD5  C9 05             CMP #5
 5305  FFD7  10 02             BPL LADE
 5310  FFD9  E8                INX
 5315  FFDA  E8                INX
 5320  FFDB  BD AA FF    LADE  LDA TAB5,X
 5325  FFDE  8D F5 F7          STA BAUDL
 5330  FFE1  E8                INX
 5335  FFE2  BD AA FF          LDA TAB5,X
 5340  FFE5  8D F6 F7    LADE1 STA BAUDH
 5345  FFE8  60          RETN  RTS
 5350  FFE9                ;
 5355  FFE9  20 CB FE    RTAPE JSR TPREAD
 5360  FFEC  4C A1 F8    RRR   JMP DTCYC
 5365  FFEF  20 1B FE    WTAPE JSR TAUFZ
 5370  FFF2  D0 F8             BNE RRR
 5375  FFF4  EA                .BYTE $EA,$EA,$EA,$EA,$EA,$EA
 5375  FFF5  EA
 5375  FFF6  EA
 5375  FFF7  EA
 5375  FFF8  EA
 5375  FFF9  EA
 5380  FFFA  00 F8             .WORD $F800
 5385  FFFC  22 F8             .WORD $F822
 5390  FFFE  03 F8             .WORD $F803
 5395  0000                   .END


ERRORS = 0000


SYMBOL TABLE

 TPFLG   00E3    FREI    00E4    ZEIT    00E5    SPDFLG  00E6
 AKKU    00E7    STPOIN  00E8    STATUS  00E9    XSAVE   00EA
 YSAVE   00EB    Z1      00EC    Z2      00ED    DSPART  00EE
 ADL     00EF    ADH     00F0    INL     00F1    INH     00F2
 IBUF    00F3    OBUF    00F4    CHECKL  00F5    CHECKH  00F6
 ADRL    00F7    ADRH    00F8    MNEM1   00F9    FREQ1   00FA
 MNEM2   00FB    FREQ2   00FC    MNEM3   00FD    COPO    00FE
 PUNKT   00FF    V24IN   F500    RSCTRL  F501    V24OUT  F502
 PA      F600    PADD    F601    PB      F602    PBDD    F603
 TREAD   F606    VORBEI  F607    T1      F614    T64     F616
 T1024   F617    OFFSET  F90D    IRQH    F7FF    IRQL    F7FE
```

ENDEH	F7F3	ENDEL	F7F2	STRTH	F7F1	STRTL	F7F0
ECHO	F7EF	RSUSER	7FFE	TAB0	F806	TAB1	F80B
TAB2	F812	RESTRT	F822	RSMONA	F82D	STOP	F852
STP	F868	SLOWST	F87F	SLOW1	F88B	SLOWGO	F894
DISP	F899	TZ	F89F	DTCYC	F8A1	NOCH	F8B4
ART	F8C9	DATA	F8CD	DATA1	F8D5	CYCEND	F8D8
ADRES	F8DB	FUNK	F8E3	GO	F8F4	TTY	F907
TTYOK	F915	MONA	F91E	MONA1	F920	TTYO	F92B
MONA2	F938	TTY1	F93B	TTY2	F941	GLADEN	F973
GDUMP	F976	ADR	F979	NEUDAT	F984	TDOWN	F98A
TUP	F98F	R3	F992	TSATZ	F994	TMNEMO	F9A4
TPROGC	F9AA	TSTATU	F9B4	TAKKU	F9B8	STORE	F9BA
TDATA	F9C2	TADRES	F9C8	HPAUSE	F9D0	PAUSE	F9D8
PAUSE0	F9DC	PAUSE1	F9DF	PAUSE2	F9EA	ASCIIN	F9F1
ASC0	F9F3	ASC1	FA05	ASC2	FA0F	ASC3	FA12
HEXA	FA2D	ZAHL	FA3C	TRANS	FA42	R2	FA4E
CARRET	FA4F	CARET1	FA51	ZEILE	FA5B	ZEILE0	FA5E
ZEILE1	FA75	SPACE	FA84	TTYOUT	FA86	ASC01	FA96
OUTBYT	FAAF	OUTBT	FAB2	HEXOUT	FABF	NUMM	FAC8
TAPE	FAD2	DISPLY	FAD6	DSP1	FAE2	DSP2	FB00
MNDSP	FB0E	DSP3	FB11	R5	FB1A	LLICHT	FB1B
RLICHT	FB21	MLICHT	FB27	LICHT1	FB2D	WARTEN	FB3C
TASTEN	FB4C	REIHE	FB4E	TASTO	FB61	TAST1	FB63
WERT	FB69	AD8	FB6F	R6	FB77	DUMP	FB7D
JUMP0	FB83	DUMP1	FB86	DUMP3	FBAD	DUMP4	FBB4
DUMP6	FBCA	PRTSEQ	FBCD	PRTSQ1	FBCF	PRTSQ2	FBD2
CHKPRT	FBD8	CHKCLR	FBE3	CHECK	FBEB	LADEN	FBF9
LADEN1	FBFC	LADEN2	FC1D	LADEN3	FC2E	LADEN4	FC41
ERROR	FC44	HEXIN	FC48	INCADR	FC55	R8	FC5B
DECADR	FC5D	R9	FC68	CODE	FC6A	ASCII	FD6A
SIEBSG	FD7E	MNEMON	FD92	MNEMO1	FD98	NOMN	FDA5
SMN	FDAF	MNF	FDBB	SSEG	FDD1	C01	FDED
C02	FE06	C03	FE0C	DATEN	FE11	TAUFZ	FE1B
VORLF	FE27	VORLF1	FE2E	INFO	FE58	XOUT	FE87
XOUT1	FE89	TAB4	FE93	TAPOUT	FE96	DRE1	FE9A
TON	FE9E	TON1	FEA1	TON2	FEC2	TON3	FEC6
TPREAD	FECB	SYN	FED3	TEST	FEDC	IDOK	FEF8
ADDR	FEFA	BYTE	FF07	DUBL	FF09	WIND	FF22
R10	FF36	ER	FF40	RDBYT	FF48	RDCHT	FF55
RDCHT1	FF59	RDBIT	FF69	P1	FF78	P2	FF7B
P4	FF8B	PLLTST	FF93	PLL1	FF95	PLL2	FF9F
TAB5	FFAA	SPDCTL	FFB0	SPD1	FFBC	LADE	FFDB
LADE1	FFE5	RETN	FFE8	RTAPE	FFE9	RRR	FFEC
WTAPE	FFEF						

END OF ASSEMBLY