

Junior paperware 1

*1 ESS507N (PM/PME) modificaties

*2 ESS511 source listings

*3 ESS511 hex dump



1NL

JUNIOR PAPERWARE 1

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1

*1 ESS 507N (PM/PME) modificaties

Deze omvatten:

- a. (PM) Binair rekenen vóór de sprong naar de STEP-ingang
- b. (PM) Hex dump stopt bij een opgegeven laatste adres \$FFFF
- c. (PME) Warme CEND-start: opgegeven BEGAD en ENDAAD worden verwerkt; foutmelding "NO 77" indien geen pseudo-opcode aanwezig in het geheugenbereik BEGAD t/m ENDAAD-1; daarna terug naar PM
- d. (PME) Nieuwe toetsfunctie V: terug naar PM
- e. (PME) Nieuwe toetsfunctie W: vanuit PME naar warme CEND-start; is zeer handig bij het herdefiniëren van CEND en/of ENDAAD na de foutmelding "FULL"
- f. (PME) Nieuwe toetsfunctie G: start het programma met startadres BEGAD en I/O volgens standaard-monitor
- g. (PME) Nieuwe toetsfunctie R: start het programma met startadres BEGAD en I/O volgens PM

De te wijzigen EPROM-lokaties treft men aan in de nu volgende gedeelten van de listings van PM en PME (inklusief regelnummers).

N.B. De EPROM-wijzigingen vallen niet onder de ESS!!

```
0046: 102F A9 FA          LDAIM PMBINA CLD PATCH
0048: 1034 A9 17          LDAIM PMBINA /256
0212: 118B A0 00          MATK  LDYIM $00
0213: 118D B1 FA          LDAIY POINTL FETCH DATA
0214: 118F 20 8F 12      JSR   PRBYT  PRINT DATA
0215: 1192 20 F3 11      JSR   PRSP   PRINT SPACE
0216: 1195 A0 01          LDYIM $01
0217: 1197 B9 65 1A      MATM  LDAY  PARBL
0218: 119A D9 FA 00      CMPY  POINTL
0219: 119D D0 09          BNE   MATL   BRANCH IF DATA POINTER
0220:                   DOES NOT EQUAL
0221: 119F 88             DEY    SECOND ENTERED, I.E.
0222: 11A0 10 F5          BPL   MATM  LAST HEX DUMP ADDRESS
0223: 11A2 20 E8 11      JSR   CRLF  START ON A FRESH LINE
0224: 11A5 4C 5F 10      JMP   LABJUN "JUNIOR"
0225: 11A8                   MATL

0097: 1500 20 6D 16      EDITC JSR   INITAD ENTER/DEFINE PARAMETERS
0098: 1503 30 1B          BMI   EDTCA CONTINUE AT EDTCA
0099: 1505 C9 47          GKEY  CMPIM 'G
0100: 1507 D0 08          BNE   RKEY  BRANCH IF NO G KEY
0101: 1509 A9 1E          LDAIM $1E
0102: 150B 8D 83 1A      STA   PBDD  RESTORE STANDARD I/O
0103: 150E 6C E2 00      XCUTE JMI   BEGADL START PROGRAM AT BEGAD
0104: 1511 C9 52          RKEY  CMPIM 'R
0105: 1513 D0 04          BNE   KEYW  BRANCH IF NO R KEY
0106: 1515 F0 F7          BEQ   XCUTE START PROGRAM
0107: 1517 EA          NOP
0108: 1518 EA          NOP
```

0108a:	1519	C9	57		KEYW	CMPIM	'W	
0108b:	151B	DO	3B			BNE	LIST	BRANCH IF NO W KEY
0108c:	151D	4C	C5	17		JMP	SEACND	WARM CEND ENTRY
0109:	1520	18			EDTCA	CLC		REDIFINE CEND;
0110:	1521	A5	E2			LDAZ	BEGADL	CEND POINTS AT THE
0111:	1523	69	01			ADCIM	\$01	FREE FILE MEMORY
0112:	1525	85	E8			STAZ	CENDL	LOCATION WITH THE
0113:	1527	A5	E3			LDAZ	BEGADH	LOWEST ADDRESS
0114:	1529	69	00			ADCIM	\$00	
0115:	152B	85	E9			STAZ	CENDH	
0116:	152D							
0143:	154D	DO	B6			BNE	GKEY	BRANCH IF NO K KEY
0274:	1638	DO	51			BNE	ESCAPE	BRANCH IF NO X KEY
0312:	1667	20	6D	16	SEMIW	JSR	INITAD	ENTER/DEFINE PARAMETERS
0313:	166A	4C	33	15		JMP	BRK	GO TO PME MAIN PROGRAM
0314:	166D	20	68	12	INITAD	JSR	RESIN	RESET INPUT BUFFERS
0315:	1670	20	3E	17		JSR	MESSA	"BEGAD,ENDAD: " (Y=001)
0316:	1673	20	87	13		JSR	INPAR	ENTER TWO ADDRESSES
0317:	1676	30	F5			BMI	INITAD	REPEAT IF NOT PROPERLY DONE
0318:	1678	A2	03			LDXIM	\$03	
0319:	167A	BD	63	1A	INTA	LDAX	PARAL	PARA=BEGAD=CURAD
0320:	167D	95	E2			STAX	BEGADL	PARB=ENDAD=CEND
0321:	167F	95	E6			STAX	CURADL	
0322:	1681	CA				DEX		NEXT ADDRESS BYTE
0323:	1682	10	F6			BPL	INTA	IF ANY
0324:	1684	60				RTS		N FLAG IS SET
0325:	1685	EA				NOP		NOTE: AFTER THE COLD START
0326:	1686	EA				NOP		ENTRY AND POSSIBLY AFTER
0327:	1687	EA				NOP		THE WARM CEND START ENTRY
0328:	1688	EA				NOP		CEND WILL BE REDEFINED
0329:	1689	EA				NOP		
0330:	168A	EA				NOP		
0331:	168B	C9	56		ESCAPE	CMPIM	'V	
0331a:	168D	DO	BE			BNE	INPUT	BRANCH IF NO V KEY
0331b:	168F	4C	5F	10		JMP	LABJUN	BACK TO PM ("JUNIOR")
0343:	1692				DECURA			
0591:	17C5	20	6D	16	SEACND	JSR	INITAD	ENTER/DEFINE PARAMETERS
0592:	17C8	A0	00		SCNDA	LDYIM	\$00	
0593:	17CA	B1	E6			LDAIY	CURADL	FETCH OPCODE
0594:	17CC	C9	77			CMPIM	\$77	
0595:	17CE	F0	16			BEQ	SCNDB	BRANCH IF EOF FOUND
0596:	17D0	20	60	1E		JSR	LENACC	GET INSTRUCTION LENGTH
0597:	17D3	20	F8	1E		JSR	NEXT	COMPARE NEXT OPCODE
0598:	17D6	30	F0			BMI	SCNDA	IF ANY
0599:	17D8	A0	90			LDYIM	\$90	
0600:	17DA	20	3E	17		JSR	MESSA	"NO 77"
0601:	17DD	4C	5F	10		JMP	LABJUN	BACK TO PM ("JUNIOR")
0602:	17E0	4E				'N		EXTENSION OF
0603:	17E1	4F				'0		TXT LOOK UP TABLE
0603a:	17E2	20				'		(TXT: \$1750)
0603b:	17E3	37				'7		
0603c:	17E4	37				'7		
0603d:	17E5	03				\$03		EOT
0604:	17E6				SCNDB			REDEFINE CEND


```

0057: F802 B1 10          LDAIY INSPNT
0058: F804 85 12          STA  OPCODE AND SAVE IT
0059: F806 29 0F          ANDIM $0F  GET RIGHT NIBBLE
0060: F808 85 13          STA  RNIB  AND SAVE IT
0061: F80A A5 12          LDA  OPCODE
0062: F80C 4A             LSRA
0063: F80D 4A             LSRA
0064: F80E 4A             LSRA
0065: F80F 4A             LSRA
0066: F810 85 14          STA  LNIB  GET LEFT NIBBLE
0067: F812 4A             LSRA      IS LEFT NIBBLE EVEN OR ODD?
0068: F813 90 1E          BCC  DISB
0069: F815 A9 01          LDAIM $01  SET E/O FLAG
0070:
0071: F817 85 15          DISA STA  EOLNIB SAVE THE FLAG
0072: F819 A2 04          LDXIM $04
0073: F81B A5 13          LDA  RNIB
0074:
0075: F81D DD 00 FB  VAL.OP  CMPX  NVALA  IS COLUMN VALID?
0076: F820 F0 15          BEQ  ERRA  NOT VALID
0077: F822 CA             DEX
0078: F823 10 F8          BPL  VAL.OP
0079: F825 A2 19          LDXIM $19
0080: F827 A5 12          LDA  OPCODE
0081:
0082: F829 DD 85 FB  VAL.OPA  CMPX  NVALB  VALID OP CODE IN ANY COLUMN
0083: F82C F0 0F          BEQ  ERROR
0084: F82E CA             DEX
0085: F82F 10 F8          BPL  VAL.OPA
0086: F831 30 2A          BMI  COL.I
0087:
0088: F833 A9 00          DISB LDAIM $00  RESET E/O FLAG
0089: F835 F0 E0          BEQ  DISA
0090:
0091: F837 A5 12          ERRA LDA  OPCODE
0092: F839 C9 A2          CMPIM $A2  LDXIM IS VALID
0093: F83B F0 0E          BEQ  LDXIM
0094:
0095: F83D A2 01          ERROR LDXIM $01  INVALID OPCODES:
0096: F83F 86 20          STX  ERRFLG  INSTRUCTION LENGTH
0097: F841 86 16          STX  LENGTH  ONE
0098: F843 A2 08          LDXIM $08  000 IN MCTAB
0099: F845 20 12 FC          JSR  MCFA
0100: F848 4C 81 F3          JMP  CENTRM
0101:
0102:
0103: F84B A2 02          LDXIM LDXIM $02  LENGTH = 2
0104: F84D 86 16          STX  LENGTH
0105: F84F A2 61          LDXIM $61  NOT RELEVANT
0106: F851 86 21          STX  ML  NOT RELEVANT
0107: F853 A2 30          LDXIM $30  NOT RELEVANT
0108: F855 86 22          STX  MR  NOT RELEVANT
0109: F857 20 FF FB          JSR  MBFORM  LNIB=A;INDEX=φ5!
0110: F85A 4C 0B F9          JMP  IMX  PRINT OPERAND
0111:
0112: F85D A2 01          COL.I LDXIM $01

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0113: F85F E4 13          CPX  RNIB  RNIB = 01?
0114: F861 D0 43          BNE  ZPZPX
0115:
0116:          *** INDY-INDX ***
0117:
0118: F863 E8              INX          LENGTH = 2
0119: F864 86 16           STX  LENGTH
0120: F866 20 ED FB       JSR  MAFORM OUTPUT MNEMONIC
0121: F869 A5 15           LDA  EOLNIB E=INDX, O=INDY
0122: F86B FD 22           BEQ  INDX
0123:
0124: F86D 20 F2 FA  INDY JSR  PRINT
0125: F870 28              =  '('
0126: F871 24              =  '$
0127: F872 03              =  $03
0128: F873 A0 01           LDYIM $01
0129: F875 B1 10           LDAIY INSPNT FETCH OPERAND
0130: F877 20 D8 FB       JSR  PRBYT
0131: F87A 20 F2 FA       JSR  PRINT
0132: F87D 29              =  ')'
0133: F87E 2C              =  ','
0134: F87F 59              =  'Y
0135: F880 03              =  $03
0136:
0137: F881 18          CENTRM CLC          ADJUST INSTRUCTION POINTER
0138: F882 A5 10           LDA  INSPNT
0139: F884 65 16           ADC  LENGTH
0140: F886 85 10           STA  INSPNT
0141: F888 A5 11           LDA  INSPNT +01
0142: F88A 69 00           ADCIM $00
0143: F88C 85 11           STA  INSPNT +01
0144: F88E 60              RTS
0145:
0146:          *** INDX ***
0147:
0148: F88F 20 F2 FA  INDX JSR  PRINT
0149: F892 28              =  '('
0150: F893 24              =  '$
0151: F894 03              =  $03
0152: F895 A0 01           LDYIM $01
0153: F897 B1 10           LDAIY INSPNT FETCH OPERAND
0154: F899 20 D8 FB       JSR  PRBYT
0155: F89C 20 F2 FA       JSR  PRINT
0156: F89F 2C              =  ','
0157: F8A0 58              =  'X
0158: F8A1 29              =  ')'
0159: F8A2 03              =  $03
0160: F8A3 4C 81 F8       JMP  CENTRM
0161:
0162:          *** ZPZPX ***
0163:
0164: F8A6 A2 05          ZPZPX LDXIM $05
0165: F8A8 E4 13          CPX  RNIB  RNIB = 05?
0166: F8AA D0 2F          BNE  IMABSY
0167: F8AC A2 02          LDXIM $02
0168: F8AE 86 16          STX  LENGTH LENGTH = 2

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0169: F8B0 20 ED FB      JSR   MAFORM
0170: F8B3 A5 15      LDA   EOLNIB E = ZP, 0 = ZPX
0171: F8B5 F0 15      BEQ   ZP
0172:
0173: F8B7 20 F2 FA      ZPX   JSR   PRINT
0174: F8BA 24           =    '$
0175: F8BB 03           =    $03
0176: F8BC A0 01      LDYIM $01
0177: F8BE B1 10      LDAIY INSPNT FETCH OPERAND
0178: F8C0 20 D8 FB      JSR   PRBYT
0179: F8C3 20 F2 FA      JSR   PRINT
0180: F8C6 2C           =    '
0181: F8C7 58           =    'X
0182: F8C8 03           =    $03
0183: F8C9 4C 81 F8      JMP   CENTRM
0184:
0185: F8CC 20 F2 FA      ZP     JSR   PRINT
0186: F8CF 24           =    '$
0187: F8D0 03           =    $03
0188: F8D1 A0 01      LDYIM $01
0189: F8D3 B1 10      LDAIY INSPNT FETCH OPERAND
0190: F8D5 20 D8 FB      JSR   PRBYT
0191: F8D8 4C 81 F8      JMP   CENTRM
0192:
0193:
0194:
0195: F8DB A2 09      *** IMABSY ***
0196: F8DD E4 13      IMABSY LDXIM $09
0197: F8DF D0 3A      CPX   RNIB   RNIB = 09?
0198: F8E1 A5 15      BNE   ABSABX
0199: F8E3 F0 1F      LDA   EOLNIB
0200:
0201: F8E5 A2 03      BEQ   IM     E = IM, 0 = ABSY
0202: F8E7 86 16      ABSY   LDXIM $03
0203: F8E9 20 ED FB      STX   LENGTH LENGTH = 3
0204: F8EC 20 F2 FA      ABSYS  JSR   MAFORM OUTPUT MNEMONIC
0205: F8EF 24           =    '$
0206: F8F0 03           =    $03
0207: F8F1 A0 02      LDYIM $02   2 OPERANDS
0208:
0209: F8F3 B1 10      AYA   LDAIY INSPNT
0210: F8F5 20 D8 FB      JSR   PRBYT
0211: F8F8 88           DEY
0212: F8F9 D0 F8      BNE   AYA
0213: F8FB 20 F2 FA      JSR   PRINT
0214: F8FE 2C           =    '
0215: F8FF 59           =    'Y
0216: F900 03           =    $03
0217: F901 4C 81 F8      JMP   CENTRM
0218:
0219: F904 A2 02      IM     LDXIM $02
0220: F906 86 16      STX   LENGTH LENGTH = 2
0221: F908 20 ED FB      JSR   MAFORM
0222: F90B 20 F2 FA      IMX   JSR   PRINT
0223: F90E 23           =    '#
0224: F90F 24           =    '$

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0225: F910 03          =      $03
0226: F911 A0 01      LDYIM $01
0227: F913 B1 10      LDAIY INSPNT  FETCH OPERAND
0228: F915 20 D8 FB   JSR  PRBYT
0229: F918 4C 81 F8   JMP  CENTRM
0230:
0231:
0232:                *** ABSABX ***
0233:
0234: F91B A2 0D      ABSABX LDXIM $0D
0235: F91D E4 13      CPX  RNIB  RNIB = 0D?
0236: F91F D0 35      BNE  SFTROT
0237: F921 A2 03      LDXIM $03  LENGTH = 3
0238: F923 86 16      STX  LENGTH
0239: F925 20 ED FB   JSR  MAFORM  OUTPUT MNEMONIC
0240: F928 A5 15      LDA  EOLNIB
0241: F92A F0 18      BEQ  ABS    E = ABS, 0 = ABSX
0242:
0243: F92C 20 F2 FA   ABSX JSR  PRINT
0244: F92F 24          =    '$
0245: F930 03          =    $03
0246: F931 A0 02      LDYIM $02  2 OPERANDS
0247:
0248: F933 B1 10      AXA  LDAIY INSPNT
0249: F935 20 D8 FB   JSR  PRBYT
0250: F938 88          DEY
0251: F939 D0 F8      BNE  AXA
0252: F93B 20 F2 FA   JSR  PRINT
0253: F93E 2C          =    '
0254: F93F 58          =    'X
0255: F940 03          =    $03
0256: F941 4C 81 F8   JMP  CENTRM
0257:
0258: F944 20 F2 FA   ABS  JSR  PRINT
0259: F947 24          =    '$
0260: F948 03          =    $03
0261: F949 A0 02      LDYIM $02  2 OPERANDS
0262:
0263: F94B B1 10      ABA  LDAIY INSPNT
0264: F94D 20 D8 FB   JSR  PRBYT
0265: F950 88          DEY
0266: F951 D0 F8      BNE  ABA
0267: F953 4C 81 F8   JMP  CENTRM
0268:
0269:                *** SFTROT ***
0270:
0271: F956 A2 06      SFTROT LDXIM $06
0272: F958 E4 13      CPX  RNIB  RNIB = 06?
0273: F95A D0 32      BNE  SRCNT
0274: F95C A2 02      LDXIM $02  LENGTH = 2
0275: F95E 86 16      STX  LENGTH
0276: F960 20 FF FB   JSR  MBFORM  OUTPUT MNEMONIC
0277: F963 A2 09      LDXIM $09
0278: F965 E4 14      CPX  LNIB  ZPY INSTRUCTIONS?
0279: F967 F0 10      BEQ  ZPY
0280: F969 A2 0B      LDXIM $0B

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0281: F96B E4 14          CPX   LNIB
0282: F96D F0 0A          BEQ   ZPY
0283: F96F A5 15          LDA   EOLNIB
0284: F971 F0 03          BEQ   SRA      E = ZP, 0 = ZPX
0285: F973 4C B7 F8      JMP   ZPX
0286:
0287: F976 4C CC F8      SRA   JMP   ZP
0288:
0289: F979 20 F2 FA      ZPY   JSR   PRINT
0290: F97C 24              =    '$
0291: F97D 03              =    $03
0292: F97E A0 01          LDYIM $01
0293: F980 B1 10          LDAIY INSPNT
0294: F982 20 D8 FB      JSR   PRBYT
0295: F985 20 F2 FA      JSR   PRINT
0296: F988 2C              =    '
0297: F989 59              =    'Y
0298: F98A 03              =    $03
0299: F98B 4C 81 F8      JMP   CENTRM
0300:
0301:                      *** SRCONT ***
0302:
0303: F98E A2 0E          SRCONT LDXIM $0E
0304: F990 E4 13          CPX   RNIB      RNIB = 0E?
0305: F992 D0 1A          BNE   COLNUL
0306: F994 A2 03          LDXIM $03      LENGTH = 3
0307: F996 86 16          STX   LENGTH
0308: F998 20 FF FB      JSR   MBFORM  OUTPUT MNEMONIC
0309: F99B A2 0B          LDXIM $0B
0310: F99D E4 14          CPX   LNIB      ABSY INSTRUCTION
0311: F99F F0 0A          BEQ   SRCB      ABSY
0312: F9A1 A5 15          LDA   EOLNIB
0313: F9A3 F0 03          BEQ   SRCA      E = ABS, 0 = ABSX
0314: F9A5 4C 2C F9      JMP   ABSX
0315:
0316: F9A8 4C 44 F9      SRCA   JMP   ABS
0317:
0318: F9AB 4C EC F8      SRCB   JMP   ABSYS
0319:
0320:                      *** COLNUL ***
0321:
0322: F9AE A2 00          COLNUL LDXIM $00
0323: F9B0 E4 13          CPX   RNIB      RNIB = 0
0324: F9B2 D0 7A          BNE   COLFOR
0325: F9B4 A5 12          LDA   OPCODE
0326: F9B6 C9 00          CMPIM $00      BRK INSTR.?
0327: F9B8 F0 26          BEQ   COLNUB
0328: F9BA C9 40          CMPIM $40      RTI INSTR.?
0329: F9BC F0 22          BEQ   COLNUB
0330: F9BE C9 60          CMPIM $60      RTS INSTR.?
0331: F9C0 F0 1E          BEQ   COLNUB
0332: F9C2 C9 20          CMPIM $20      JSR INSTR.?
0333: F9C4 F0 10          BEQ   COLNUA
0334: F9C6 29 1F          ANDIM $1F
0335: F9C8 C9 10          CMPIM $10      ANY BRANCH INSTR.?
0336: F9CA F0 1E          BEQ   OFFSET  IF YES, COMPUTE OFFSET

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0337:
0338: F9CC A2 02      OTHER LDXIM $02      LENGTH = 2
0339: F9CE 86 16      STX      LENGTH
0340: F9D0 20 10 FC    JSR      MCFORM
0341: F9D3 4C 08 F9    JMP      IMX
0342:
0343: F9D6 A2 03      COLNUA LDXIM $03
0344: F9D8 86 16      STX      LENGTH LENGTH = 3
0345: F9DA 20 10 FC    JSR      MCFORM
0346: F9DD 4C 44 F9    JMP      ABS      ABSOLUTE ADDRESSING
0347:
0348: F9E0 A2 01      COLNUB LDXIM $01      LENGTH = 1
0349: F9E2 86 16      STX      LENGTH
0350: F9E4 20 10 FC    JSR      MCFORM OUTPUT MNEMONIC
0351: F9E7 4C 81 F8    JMP      CENTRM
0352:
0353: F9EA A2 02      OFFSET LDXIM $02      LENGTH = 2
0354: F9EC 36 16      STX      LENGTH
0355: F9EE 20 10 FC    JSR      MCFORM
0356: F9F1 A0 01      LDYIM $01
0357: F9F3 B1 10      LDAIY INSPNT FETCH OFFSET
0358: F9F5 10 17      BPL      POSOFF PLUS/MINUS BRANCH
0359: F9F7 20 13 FB    JSR      ADJ      ACCU IS NOT USED: "INSPNT +1"
0360: F9FA 49 FF      EORIM $FF      COMPLEMENT
0361: F9FC 85 19      STA      TEMP
0362: F9FE 33      SEC
0363: F9FF A5 17      LDA      ADDR
0364: FA01 E5 19      SBC      TEMP
0365: FA03 B5 17      STA      ADDR
0366: FA05 A5 18      LDA      ADDR      +01 STORE DESTINATION IN ADDR
0367: FA07 E9 00      SBCIM $00
0368: FA09 85 18      STA      ADDR      +01
0369: FA0B 4C 1C FA    JMP      POA
0370:
0371: FA0E 20 13 FB    POSOFF JSR      ADJ
0372: FA11 38      SEC      "INSPTR +2"
0373: FA12 65 17      ADC      ADDR
0374: FA14 85 17      STA      ADDR
0375: FA16 A9 00      LDAIM $00
0376: FA18 65 18      ADC      ADDR      +01
0377: FA1A 85 18      STA      ADDR      +01
0378:
0379: FA1C 20 F2 FA    POA     JSR      PRINT
0380: FA1F 24      =      '$
0381: FA20 03      =      '$03
0382: FA21 A2 01      LDXIM $01
0383:
0384: FA23 B5 17      POB     LDAX   ADDR
0385: FA25 20 0B FB    JSR      PRBYT  OUTPUT DESTINATION ADDR
0386: FA28 CA      DEX
0387: FA29 10 F8      BPL      POB
0388: FA2B 4C B1 F8    JMP      CENTRM
0389:
0390:      *** COLFOR ***
0391:
0392: FA2E A2 04      COLFOR LDXIM $04

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0393: FA30 E4 13          CPX  RNIB  RNIB = 04?
0394: FA32 D0 11          BNE  COLCW
0395: FA34 A2 02          LDXIM $02  LENGTH = 2
0396: FA36 86 16          STX  LENGTH
0397: FA38 20 1F FC      JSR  MDFORM OUTPUT MNEMONIC
0398: FA3B A5 15          LDA  EOLNIB
0399: FA3D FD 03          BEQ  COLFRA E = ZP, 0 = ZPX
0400: FA3F 4C B7 F8      JMP  ZPX
0401:
0402: FA42 4C CC F8      COLFRA JMP  ZP
0403:
0404: FA45 A2 0C          COLCW LDXIM $0C
0405: FA47 E4 13          CPX  RNIB  RNIB = 0C?
0406: FA49 D0 2F          BNE  COL0A
0407: FA4B A2 03          LDXIM $03
0408: FA4D 86 16          STX  LENGTH LENGTH = 3
0409: FA4F 20 1F FC      JSR  MDFORM OUTPUT MNEMONIC
0410: FA52 A5 12          LDA  OPCODE
0411: FA54 C9 6C          CMPIM $6C  JMP (IND) INSTRUCTION
0412: FA56 FD 0A          BEQ  IND
0413: FA58 C9 BC          CMPIM $BC  LDY,X INSTRUCTION?
0414: FA5A FD 03          BEQ  SPELDY
0415: FA5C 4C 44 F9      JMP  ABS  ELSE ABS ADDRESSING
0416:
0417: FA5F 4C 2C F9      SPELDY JMP  ABSX
0418:
0419: FA62 20 F2 FA      IND  JSR  PRINT
0420: FA65 28          =  '('
0421: FA66 24          =  '$'
0422: FA67 03          =  '$03
0423: FA68 A0 02          LDYIM $02
0424:
0425: FA6A B1 10          INDA  LDAIY INSPNT
0426: FA6C 20 D8 FB      JSR  PRBYT  OUTPUT INDIRECT OPERAND
0427: FA6F 88          DEY
0428: FA70 D0 F8          BNE  INDA
0429: FA72 20 F2 FA      JSR  PRINT
0430: FA75 29          =  ')'
0431: FA76 03          =  '$03
0432: FA77 4C 81 F8      JMP  CENTRM
0433:
0434:          *** COL0A ***
0435:
0436: FA7A A2 0A          COL0A LDXIM $0A
0437: FA7C E4 13          CPX  RNIB
0438: FA7E D0 1C          BNE  IMPLD  ONLY IMPLIED ADDRESSING IS NOW POSSIBLE
0439: FA80 A2 01          LDXIM $01
0440: FA82 86 16          STX  LENGTH LENGTH = 1
0441: FA84 A6 14          LDX  LNIB
0442: FA86 E0 07          CPXIM $07  CHECK FOR ACCU ADDRESSING
0443: FA88 90 06          BCC  ACCU
0444: FA8A 20 30 FC      JSR  MEFORM
0445: FA8D 4C 81 F8      JMP  CENTRM
0446:
0447: FA90 20 30 FC      ACCU JSR  MEFORM
0448: FA93 20 F2 FA      JSR  PRINT

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0449: FA96 20          =      '
0450: FA97 41          =      'A
0451: FA98 03          =      $03
0452: FA99 4C 31 F8   JMP      CENTRM
0453:
0454: FA9C A2 01       IMPLD  LDXIM $01
0455: FA9E 86 16       STX      LENGTH
0456: FAA0 20 3F FC     JSR      MFFORM OUTPUT MNEMONIC
0457: FAA3 4C 81 F8     JMP      CENTRM
0458:
0459:
0460:
0461: *****
0462: SUBROUTINES OF THE DISASSEMBLER
0463: *****
0464:
0465: *** XSPACE ***
0466:
0467: FAA6 20 D8 FB     XSPACE JSR      PRSP      OUTPUT X SPACES
0468: FAA9 CA           DEX
0469: FAAA D0 FA       BNE      XSPACE
0470: FAAC 60           RTS
0471:
0472: *** PRBYTES ***
0473:
0474: FAAD 20 D8 FB     PRBYTES JSR      PRBYT     OUTPUT THE BYTE IN A
0475: FAB0 4C DB FB     JMP      PRSP      AND ADD A SPACE
0476:
0477: *** OBJECT ***
0478:
0479: FAB3 20 CF FB     OBJECT JSR      CRLF      OUTPUT OBJECT CODE
0480: FAB6 A5 11       LDA      INSPNT +01 OUTPUT ADDR. OF THE
0481: FAB8 20 D8 FB     JSR      PRBYT     CURRENT OP CODE
0482: FABB A5 10       LDA      INSPNT
0483: FABD 20 AD FA     JSR      PRBYTES
0484: FAC0 AD 00       LDYIM $00
0485: FAC2 A2 0F       LDXIM $0F      15 COLUMN OBJECT FIELD
0486:
0487: FAC4 B1 13       OBJ      LDAIY INSPNT PRINT OP CODE AND OPERAND
0488: FAC6 20 AD FA     JSR      PRBYTES AS A FUNCTION OF LENGTH
0489: FAC9 CA           DEX
0490: FACA CA           DEX
0491: FACB CA           DEX      MINUS 1 BYTE AND 1 SPACE
0492: FACC C8           INY
0493: FACD C4 16       CPY      LENGTH OBJECT FINISHED?
0494: FACF D0 F3       BNE      OBJ
0495: FAD1 20 A6 FA     JSR      XSPACE FILLUP WITH SPACES
0496: FAD4 60           RTS
0497:
0498: *** OBJMNE ***
0499:
0500: FAD5 20 B3 FA     OBJMNE JSR      OBJECT   PRINT A FORMATTED OBJECT CODE
0501:
0502: FAD8 A2 03       PRMNES LDXIM $03      AND THE CORRESPONDING MNEMONICS
0503:
0504: FADA AD 05       MNEMON LDYIM $05

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0505: FADC A9 D0          LDAIM $00      5 SHIFTS PER CHARACTER, RESET A
0506:
0507: FADE 06 22          MNEA  ASI  MR      ENCODE MNEMONIC INTO A
0508: FAEO 26 21          ROL  ML
0509: FAE2 2A             ROLA
0510: FAE3 88             DEY
0511: FAE4 D0 F8          BNE  MNEA
0512: FAE6 09 40          ORAIM $40      RESTORE ASCII CODE
0513: FAES 20 D2 FB      JSR  PRCHA     PRINT MNEMONIC CHARACTER
0514: FAEB CA             DEX
0515: FAEC D0 EC          BNE  MNEMON 3 MNEMONIC CHAR. PRINTED
0516: FAEF 20 D8 FB      JSR  PRSP
0517: FAF1 60             RTS
0518:
0519:                      *** PRINT ***
0520:
0521: FAF2 68             PRINT PLA      PULL RETURN ADDRESS FROM STACK
0522: FAF3 85 23          STA  MEPNT     AND SAVE IT
0523: FAF5 68             PLA
0524: FAF6 85 24          STA  MEPNT     +01
0525:
0526: FAF8 E6 23          PRTA  INC  MEPNT
0527: FAFA D0 02          BNE  PRTB
0528: FAFC E6 24          INC  MEPNT     +01
0529:
0530: FAFE A0 00          PRTB  LDYIM $00  FETCH CHARACTER AND
0531: FB00 31 23          LDAIY MEPNT    PRINT IT
0532: FB02 C9 03          CMPIM $03     EOT?
0533: FB04 F0 06          BEQ  PRTC
0534: FB06 20 D2 FB      JSR  PRCHA
0535: FB09 4C F8 FA      JMP  PRTA
0536:
0537: FB0C A5 24          PRTC  LDA  MEPNT +01 PUSH RETURN ADDRESS ON
0538: FB0E 48             PHA          STACK AND RETURN
0539: FB0F A5 23          LDA  MEPNT
0540: FB11 48             PHA
0541: FB12 60             RTS
0542:
0543:                      *** ADJ ***
0544:
0545: FB13 A6 10          ADJ  LDX  INSPNT ADJUST FOR REL. BRANCH
0546: FB15 A4 11          LDY  INSPNT +01
0547: FB17 E8             INX
0548: FB18 D0 01          BNE  ADJA
0549: FB1A C8             INY
0550:
0551: FB1B 86 17          ADJA  STX  ADDR
0552: FB1D 84 18          STY  ADDR     +01 ACCU IS NOT CHANGED!
0553: FB1F 60             RTS
0554:
0555:
0556:                      *****
0557:                      COMPRESSED MNEMONICS
0558:                      *****
0559:
0560:

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0561: FB20 7C	MALTAB =	\$7C	ORA	<i>ML PART</i>
0562: FB21 0B	=	\$0B	AND	<i>COLUMNS 1,5,9,D</i>
0563: FB22 2B	=	\$2B	EOR	
0564: FB23 09	=	\$09	ADC	
0565: FB24 9D	=	\$9D	STA	
0566: FB25 61	=	\$61	LDA	
0567: FB26 1B	=	\$1B	CMP	
0568: FB27 98	=	\$98	SBC	
0569:				
0570: FB28 82	MARTAB =	\$82	ORA	<i>MR PART</i>
0571: FB29 88	=	\$88	AND	<i>COLUMNS 1,5,9,D</i>
0572: FB2A E4	=	\$E4	EOR	
0573: FB2B 06	=	\$06	ADC	
0574: FB2C 02	=	\$02	STA	
0575: FB2D 02	=	\$02	LDA	
0576: FB2E 60	=	\$60	CMP	
0577: FB2F 86	=	\$86	SBC	
0578:				
0579: FB30 0C	MBLTAB =	\$0C	ASL	<i>ML PART</i>
0580: FB31 93	=	\$93	ROL	<i>COLUMNS 6,E,2(LDX# ONLY)</i>
0581: FB32 64	=	\$64	LSR	
0582: FB33 93	=	\$93	ROR	
0583: FB34 9D	=	\$9D	STX	
0584: FB35 61	=	\$61	LDX	<i>(INCLUDING LDXIM)</i>
0585: FB36 21	=	\$21	DEC	
0586: FB37 4B	=	\$4B	INC	
0587:				
0588: FB38 08	MBRTAB =	\$08	ASL	<i>MR PART</i>
0589: FB39 08	=	\$08	ROL	<i>COLUMNS 6,E,2(LDX# ONLY)</i>
0590: FB3A E4	=	\$E4	LSR	
0591: FB3B E4	=	\$E4	ROR	
0592: FB3C 30	=	\$30	STX	
0593: FB3D 30	=	\$30	LDX	<i>(INCLUDING LDXIM)</i>
0594: FB3E 46	=	\$46	DEC	
0595: FB3F 86	=	\$86	INC	
0596:				
0597: FB40 14	MCLTAB =	\$14	BRK	<i>ML PART</i>
0598: FB41 14	=	\$14	BPL	<i>COLUMN 0</i>
0599: FB42 54	=	\$54	JSR	<i>AND INVALID</i>
0600: FB43 13	=	\$13	BMI	<i>OPCODE</i>
0601: FB44 95	=	\$95	RTI	
0602: FB45 15	=	\$15	BVC	
0603: FB46 95	=	\$95	RTS	
0604: FB47 15	=	\$15	BVS	
0605: FB48 00	=	\$00	000	<i>NO VALID OPCODE</i>
0606: FB49 10	=	\$10	BCC	
0607: FB4A 61	=	\$61	LDY	
0608: FB4B 10	=	\$10	BCS	
0609: FB4C 1C	=	\$1C	CPY	
0610: FB4D 13	=	\$13	BNE	
0611: FB4E 1C	=	\$1C	CPX	
0612: FB4F 11	=	\$11	BEQ	
0613:				
0614: FB50 96	MCRTAB =	\$96	BRK	<i>MR PART</i>
0615: FB51 18	=	\$18	BPL	<i>COLUMN 0</i>
0616: FB52 E4	=	\$E4	JSR	<i>AND INVALID</i>
				<i>OPCODE</i>

0617:	FB53	52	=	\$52	BMI	
0618:	FB54	12	=	\$12	RTI	
0619:	FB55	86	=	\$86	BVC	
0620:	FB56	26	=	\$26	RTS	
0621:	FB57	A6	=	\$A6	BVS	
0622:	FB58	00	=	\$00	000	NO VALID OPCODE
0623:	FB59	C6	=	\$C6	BCC	
0624:	FB5A	32	=	\$32	LDY	
0625:	FB5B	E6	=	\$E6	BCS	
0626:	FB5C	32	=	\$32	CPY	
0627:	FB5D	8A	=	\$8A	BNE	
0628:	FB5E	30	=	\$30	CPX	
0629:	FB5F	62	=	\$62	BEQ	
0630:						
0631:	FB60	FF	MDLTAB =	\$FF	NOT USED	
0632:	FB61	12	=	\$12	BIT	ML PART
0633:	FB62	53	=	\$53	JMP	COLUMN 4,C
0634:	FB63	53	=	\$53	JMP	
0635:	FB64	9D	=	\$9D	STY	
0636:	FB65	61	=	\$61	LDY	
0637:	FB65	1C	=	\$1C	CPY	
0638:	FB67	1C	=	\$1C	CPX	
0639:						
0640:	FB68	FE	MDRTAB =	\$FE	NOT USED	
0641:	FB69	68	=	\$68	BIT	MR PART
0642:	FB6A	60	=	\$60	JMP	COLUMN 4,C
0643:	FB6B	50	=	\$60	JMP	
0644:	FB6C	32	=	\$32	STY	
0645:	FB6D	32	=	\$32	LDY	
0646:	FB6E	32	=	\$32	CPY	
0647:	FB6F	30	=	\$30	CPX	
0648:						
0649:	FB70	0C	MELTAB =	\$0C	ASL	ML PART
0650:	FB71	FF	=	\$FF	NOT USED	COLUMN A
0651:	FB72	93	=	\$93	ROL	
0652:	FB73	FF	=	\$FF	NOT USED	
0653:	FB74	64	=	\$64	LSR	
0654:	FB75	FF	=	\$FF	NOT USED	
0655:	FB76	93	=	\$93	ROR	
0656:	FB77	FF	=	\$FF	NOT USED	
0657:	FB78	A6	=	\$A6	TXA	
0658:	FB79	A6	=	\$A6	TXS	
0659:	FB7A	A0	=	\$A0	TAX	
0660:	FB7B	A4	=	\$A4	TSX	
0661:	FB7C	21	=	\$21	DEX	
0662:	FB7D	FF	=	\$FF	NOT USED	
0663:	FB7E	73	=	\$73	NOP	
0664:	FB7F	FF	=	\$FF	NOT USED	
0665:						
0666:	FB80	D8	MERTAB =	\$D8	ASL	MR PART
0667:	FB81	FE	=	\$FE	NOT USED	COLUMN A
0668:	FB82	D8	=	\$D8	ROL	
0669:	FB83	FE	=	\$FE	NOT USED	
0670:	FB84	E4	=	\$E4	LSR	
0671:	FB85	FE	=	\$FE	NOT USED	
0672:	FB86	E4	=	\$E4	ROR	

0673:	FB87	FE	=	\$FE	NOT USED
0674:	FB88	02	=	\$02	TXA
0675:	FB89	26	=	\$26	TXS
0676:	FB8A	70	=	\$70	TAX
0677:	FB8B	F0	=	\$F0	TSX
0678:	FB8C	70	=	\$70	DEX
0679:	FB8D	FE	=	\$FE	NOT USED
0680:	FB8E	E0	=	\$E0	NOP
0681:	FB8F	FE	=	\$FE	NOT USED
0682:					
0683:	FB90	82	MFLTAB =	\$82	PHP ML PART
0684:	FB91	1B	=	\$1B	CLC COLUMN 8
0685:	FB92	83	=	\$83	PLP
0686:	FB93	99	=	\$99	SEC
0687:	FB94	82	=	\$82	PHA
0688:	FB95	1B	=	\$1B	CLI
0689:	FB96	83	=	\$83	PLA
0690:	FB97	99	=	\$99	SEI
0691:	FB98	21	=	\$21	DEY
0692:	FB99	A6	=	\$A6	TYA
0693:	FB9A	A0	=	\$A0	TAY
0694:	FB9B	1B	=	\$1B	CLV
0695:	FB9C	4B	=	\$4B	INY
0696:	FB9D	1B	=	\$1B	CLD
0697:	FB9E	4B	=	\$4B	INX
0698:	FB9F	99	=	\$99	SED
0699:					
0700:	FBA0	20	MFRTAB =	\$20	PHP MR PART
0701:	FBA1	06	=	\$06	CLC COLUMN 8
0702:	FBA2	20	=	\$20	PLP
0703:	FBA3	46	=	\$46	SEC
0704:	FBA4	02	=	\$02	PHA
0705:	FBA5	12	=	\$12	CLI
0706:	FBA6	02	=	\$02	PLA
0707:	FBA7	52	=	\$52	SEI
0708:	FBA8	72	=	\$72	DEY
0709:	FBA9	42	=	\$42	TYA
0710:	FBAA	72	=	\$72	TAY
0711:	FBAB	2C	=	\$2C	CLV
0712:	FBAC	B2	=	\$B2	INY
0713:	FBAD	08	=	\$08	CLD
0714:	FBAE	B0	=	\$B0	INX
0715:	FBAF	48	=	\$48	SED
0716:					
0717:	FBB0	02	NVALA =	\$02	COLUMN 2 NO
0718:	FBB1	03	=	\$03	COLUMN 3 VALID
0719:	FBB2	07	=	\$07	COLUMN 7 OPCODES
0720:	FBB3	0B	=	\$0B	COLUMN 3
0721:	FBB4	0F	=	\$0F	COLUMN F
0722:					
0723:	FBB5	80	NVALB =	\$80	ALL "BLANKS"
0724:	FBB6	04	=	\$04	(INVALID OPCODES)
0725:	FBB7	14	=	\$14	IN COLUMNS
0726:	FBB8	34	=	\$34	0, 4, 8, A, C AND E
0727:	FBB9	44	=	\$44	
0728:	FBBA	54	=	\$54	


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0729: FB8B 64      =      $64
0730: FB8C 74      =      $74
0731: FB8D 04      =      $D4
0732: FB8E F4      =      $F4
0733: FB8F 89      =      $89
0734: FB90 1A      =      $1A
0735: FB91 3A      =      $3A
0736: FB92 5A      =      $5A
0737: FB93 7A      =      $7A
0738: FB94 DA      =      $DA
0739: FB95 FA      =      $FA
0740: FB96 0C      =      $0C
0741: FB97 1C      =      $1C
0742: FB98 3C      =      $3C
0743: FB99 5C      =      $5C
0744: FB9A 7C      =      $7C
0745: FB9B 9C      =      $9C
0746: FB9C 0C      =      $0C
0747: FB9D FC      =      $FC
0748: FB9E 9E      =      $9E
0749:
0750:
0751:
0752:
0753:
0754:
0755:
0756: FB9F 4C E8 11  CRIF  JMP  $11E8
0757: FBA0 4C 34 13  PRCHA JMP  $1334  OUTPUT SUBROUTINE
0758: FBA1 4C AE 12  RECCHA JMP  $12AE  INPUT SUBROUTINE
0759: FBA2 4C 8F 12  PRBYT JMP  $128F  OUTPUT THE BYTE IN A
0760: FBA3 4C F3 11  PRSP  JMP  $11F3  OUTPUT A SPACE
0761: FBA4 4C 87 13  INPAR  JMP  $1387  INPUT 2 PARAMETERS
0762: FBA5 4C 68 12  RESIN  JMP  $1268  RESET BUFFERS
0763: FBA6 4C 13 12  INCPNT JMP  $1213  INCREMENT A POINTER
0764: FBA7 4C 9B 12  PRNIBL JMP  $129B  OUTPUT A NIBBLE
0765: FBA8 4C 5F 10  USR    JMP  $105F  USER EXIT
0766:
0767:
0768:
0769:
0770:
0771:
0772: FBA9 A5 14      MAFORM LDA  LNIB
0773: FBAA 4A          LSRA          DIVIDE INDEX BY 2
0774: FBAB AA          TAX
0775: FBAC BD 20 FB    LDAX  MALTAB  FETCH COMPRESSED MNEMONICS
0776: FBAD 85 21          STA  ML
0777: FBAE BD 28 FB    LDAX  MARTAB
0778: FBAF 85 22          STA  MR
0779:
0780: FB80 20 D5 FA    MNEMOC JSR  OBJMNE  OUTPUT OBJECT AND MNEMONIC
0781: FB81 60          RTS
0782:
0783: FB8F A5 14      MBFORM LDA  LNIB  DIVIDE INDEX BY 2
0784: FC01 4A          LSRA

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0785: FC02 AA          TAX
0786: FC03 BD 30 FB   LDAX  MBLTAB
0787: FC06 85 21     STA  ML
0788: FC08 BD 38 FB   LDAX  MBRTAB  FETCH COMPRESSED MNEMONIC
0789: FC0B 85 22     STA  MR
0790: FC0D 4C FB FB   JMP  MNEMOC
0791:
0792: FC10 A6 14     MCFORM LDX  LNIB
0793:
0794: FC12 BD 40 FB   MCFA  LDAX  MCLTAB  FETCH COMPR. MNEMONIC
0795: FC15 85 21     STA  ML
0796: FC17 BD 50 FB   LDAX  MCRTAB
0797: FC1A 85 22     STA  MR
0798: FC1C 4C FB FB   JMP  MNEMOC
0799:
0800: FC1F A5 14     MDFORM LDA  LNIB
0801: FC21 4A          LSRA          DIVIDE INDEX BY 2
0802: FC22 AA          TAX
0803: FC23 BD 60 FB   LDAX  MDLTAB  FETCH COMPRESSED MNEMONIC
0804: FC26 85 21     STA  ML
0805: FC28 BD 68 FB   LDAX  MDRTAB
0806: FC2B 85 22     STA  MR
0807: FC2D 4C FB FB   JMP  MNEMOC
0808:
0809: FC30 A6 14     MEFORM LDX  LNIB
0810: FC32 BD 70 FB   LDAX  MELTAB  FETCH COMPRESSED MNEMONIC
0811: FC35 85 21     STA  ML
0812: FC37 BD 80 FB   LDAX  MERTAB
0813: FC3A 85 22     STA  MR
0814: FC3C 4C FB FB   JMP  MNEMOC
0815:
0816: FC3F A6 14     MFFORM LDX  LNIB
0817: FC41 BD 90 FB   LDAX  MFLTAB  FETCH COMPRESSED MNEMONIC
0818: FC44 85 21     STA  ML
0819: FC46 BD A0 FB   LDAX  MFRTAB
0820: FC49 85 22     STA  MR
0821: FC4B 4C FB FB   JMP  MNEMOC
0822:
0823:
0824:
0825:
0826: *****
0827: MONITOR OF THE DISASSEMBLER
0828: *****
0829:
0830: L: DISASSEMBLE FROM/TO
0831: P: DISASSEMBLE 16 LINES (WINDOW)
0832:   : SPACE BAR = DISASSEMBLE 1 LINE
0833: D: START DISASSEMBLER
0834: H: PRINT A HEXDUMP
0835: A: PRINT AN ASCII DUMP
0836: R: RELEASE THIS MONITOR
0837:
0838:
0839: FC4E A9 7E     DISMON LDAIM DISMA  LOAD BRK VECTOR
0840: FC5D A2 FC     LDXIM DISMA  /256

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0841: FC52 8D 7C 1A      STA  BRKT
0842: FC55 8E 7D 1A      STX  BRKT  +01
0843: FC58 20 F2 FA      JSR  PRINT
0844: FC5B 0D              =    $OD   CRLF
0845: FC5C 0A              =    $OA
0846: FC5D 56              =    'V
0847: FC5E 41              =    'A
0848: FC5F 4C              =    'L
0849: FC60 49              =    'I
0850: FC61 44              =    'D
0851: FC62 20              =    '
0852: FC63 43              =    'C
0853: FC64 4F              =    'O
0854: FC65 4D              =    'M
0855: FC66 4D              =    'M
0856: FC67 41              =    'A
0857: FC68 4E              =    'N
0858: FC69 44              =    'D
0859: FC6A 53              =    'S
0860: FC6B 3A              =    ':'
0861: FC6C 2D              =    '
0862: FC6D 41              =    'A
0863: FC6E 2D              =    '
0864: FC6F 44              =    'D
0865: FC70 2D              =    '
0866: FC71 48              =    'H
0867: FC72 2D              =    '
0868: FC73 4C              =    'L
0869: FC74 2D              =    '
0870: FC75 5D              =    'P
0871: FC76 2D              =    '
0872: FC77 52              =    'R
0873: FC78 2D              =    '
0874: FC79 53              =    'S
0875: FC7A 5D              =    'P
0876: FC7B 0D              =    $OD
0877: FC7C 0A              =    $OA
0878: FC7D 03              =    $O3
0879:
0880: FC7E 2D CF FB  DLSMA JSR  CRLF
0881:
0882: FC81 2D D5 FB  DISMB JSR  RECCHA WAIT FOR A KEY STROKE
0883: FC84 C9 44              CMPIM 'D   D-COMMAND?
0884: FC86 0D 3B              BNE  DISMD
0885: FC88 2D F2 FA      JSR  PRINT
0886: FC8B 0D              =    $OD
0887: FC8C 0A              =    $OA
0888: FC8D 44              =    'D
0889: FC8E 49              =    'I
0890: FC8F 53              =    'S
0891: FC90 41              =    'A
0892: FC91 53              =    'S
0893: FC92 53              =    'S
0894: FC93 45              =    'E
0895: FC94 4D              =    'M
0896: FC95 42              =    'B

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0897: FC96 4C      = 'L
0898: FC97 45      = 'E
0899: FC98 3A      = ';'
0900: FC99 20      = '
0901: FC9A 03      = $03
0902: FC9B 20 E1 FB JSR  RESIN  RESET INPUT BUFFER
0903: FC9E 20 DE FB JSR  INPAR  GET PARAMETERS
0904: FCA1 30 DB    BMI  DISMA  VALID CHARACTER?
0905: FCA3 20 C5 FD JSR  CHCK   1ST PAR < 2ND PAR?
0906: FCA6 90 D6    BCC  DISMA
0907:
0908: FCAB AD 63 1A DISMC LDA  PARA
0909: FCAB AE 64 1A LDX  PARA  +01
0910: FCAE 85 10    STA  INSPNT SET UP INSTRUCTION POINTER
0911: FCBD 86 11    STX  INSPNT +01
0912: FCB2 20 F2 FA JSR  PRINT
0913: FCB5 0D      = $0D
0914: FCB6 0A      = $0A
0915: FCB7 4C      = 'L
0916: FCB8 2C      = '
0917: FCB9 50      = 'P
0918: FCBA 2C      = '
0919: FCBB 53      = 'S
0920: FCBC 50      = 'P
0921: FCBD 20      = '
0922: FCBE 3F      = '?'
0923: FCBF 03      = $03
0924: FCCD 4C 7E FC JMP  DISMA
0925:
0926: FCC3 C9 50    DISMD CMPIM 'P      P COMMAND?
0927: FCC5 D0 20    BNE  DISMF
0928: FCC7 A9 0F    LDAIM $0F    SET LINECOUNTER AND PAGE MODE
0929: FCC9 85 25    STA  PMODE
0930: FCCB 85 26    STA  CNT
0931:
0932: FCCD 38      DISME SEC
0933: FCCD AD 55 1A LDA  PARB   INSPNT < PARB?
0934: FCD1 E5 10    SBC  INSPNT
0935: FCD3 AD 66 1A LDA  PARB   +01
0936: FCD6 E5 11    SBC  INSPNT +01
0937: FCD8 90 A7    BCC  DISMB
0938: FCDA 20 00 F8 JSR  DISASM  DISASSEMBLE THE CURR. INSTR.
0939: FCDD A5 25    LDA  PMODE  CHECK PAGE MODE
0940: FCDF FD EC    BEQ  DISME
0941: FCE1 C6 26    DEC  CNT
0942: FCE3 D0 E8    BNE  DISME  15 LINES?
0943: FCE5 FD 9A    BEQ  DISMB
0944:
0945: FCE7 C9 4C    DISMF CMPIM 'L      L COMMAND?
0946: FCE9 D0 06    BNE  DISMG
0947: FCEB A7 00    LDAIM $00
0948: FCED 85 25    STA  PMODE  RESET PAGE MODE
0949: FCEF FD DC    BEQ  DISME
0950:
0951: FCF1 C9 20    DISMG CMPIM '      SPACE BAR?
0952: FCF3 D0 D8    BNE  DISMH

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0953: FCF5 A9 01          LDAIM $01
0954: FCF7 85 25          STA PMODE  DISASSEMBLE 1 INSTRUCTION
0955: FCF9 85 26          STA CNT
0956: FCFB D0 D0          BNE DISME
0957:
0958: FCFD C9 48          DISMH CMPIM 'H      H COMMAND?
0959: FCFF D0 1F          BNE DISMQV
0960: FD01 A9 01          LDAIM $01
0961: FD03 85 27          STA HEXFLG SET HEXFLAG
0962: FD05 20 F2 FA          JSR PRINT
0963: FD08 0D              = $0D
0964: FD09 0A              = $0A
0965: FD0A 48              = 'H
0966: FD0B 45              = 'E
0967: FD0C 58              = 'X
0968: FD0D 20              = '
0969: FD0E 44              = 'D
0970: FD0F 55              = 'U
0971: FD10 4D              = 'M
0972: FD11 50              = 'P
0973: FD12 3A              = ':'
0974: FD13 20              = '
0975: FD14 03              = $03
0976:
0977: FD15 20 E1 FB          DISMR JSR RESIN
0978: FD18 20 DE FB          JSR INPAR
0979: FD1B 10 06          BPL DISMK  VALID INPUT?
0980:
0981: FD1D 4C 7E FC          DISMI JMP DISMA
0982:
0983: FD20 4C A5 FD          DISMQV JMP DISMQ
0984:
0985:
0986: FD23 20 C5 FD          DISMK JSR CHCK
0987: FD26 90 F5              BCC DISMI
0988: FD28 20 CF FB          JSR CRLF
0989: FD2B 20 CF FB          JSR CRLF
0990: FD2E A2 06          LDXIM $06
0991: FD30 20 A6 FA          JSR XSPACE
0992: FD33 A3 07          DYSI $00
0993:
0994: FD35 98              DISI TYA          PRINT HEADER
0995: FD36 20 E7 FB          JSR PRNIBL OUTPUT A NIBBLE
0996: FD39 A2 02          LDXIM $02
0997: FD3B 20 A6 FA          JSR XSPACE
0998: FD3E C8              INY
0999: FD3F C0 10          CPYIM $10      16 COLUMNS?
1000: FD41 D0 F2          BNE DISML
1001: FD43 AD 63 1A          LDA PARA
1002: FD46 85 FA          STA POINT SET DUMP POINTER
1003: FD48 AD 64 1A          LDA PARA +01
1004: FD4B 85 FB          STA POINT +01
1005: FD4D 20 CF FB          JSR CRLF
1006:
1007: FD50 20 CF FB          DISMP JSR CRLF
1008: FD53 A2 10          LDXIM $10

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1009: FD55 86 26          STX   CNT
1010: FD57 A5 FB          LDA   POINT +01
1011: FD59 20 D8 FB      JSR   PRBYT
1012: FD5C A5 FA          LDA   POINT
1013: FD5E 20 D8 FB      JSR   PRBYT  OUTPUT CURRENT ADDRESS
1014: FD61 20 F2 FA      JSR   PRINT
1015: FD64 3A            =    ' :
1016: FD65 20            =    '
1017: FD66 03            =    $03
1018:
1019: FD57 AD 65 1A  DISMN LDA   PARB
1020: FD6A 38            SEC
1021: FD6B E5 FA          SBC   POINT
1022: FD6D AD 66 1A      LDA   PARB +01
1023: FD70 E5 FB          SBC   POINT +01
1024: FD72 B0 03         BCS   DISMO  HEX DUMP FINISHED?
1025: FD74 4C 7E FC      JMP   DISMA
1026:
1027: FD77 AD 00          DISMO LDYIM $00
1028: FD79 B1 FA          LDAIY POINT
1029: FD7B A6 27         LDX   HEXFLG
1030: FD7D F0 0F         BEQ   DISMT  IS HEX FLAG SET?
1031: FD7F 20 93 FB      JSR   PRBYT
1032:
1033: FD82 20 DB FB  DISMU JSR   PRSP
1034: FD85 20 E4 FB      JSR   INCPNT
1035: FD88 C6 26         DEC   CNT
1036: FD8A D0 DB         BNE   DISMN  16 COLUMNS PRINTED?
1037: FD8C F0 C2         BEQ   DISMP
1038:
1039: FD8E C9 20          DISMT CMPIM $20  ASCII FILTER
1040: FD90 90 0F         BCC   DISMV
1041: FD92 C9 7F         CMPIM $7F
1042: FD94 B0 0B         BCS   DISMV
1043: FD96 20 D2 FB      JSR   PRCHA  OUTPUT ASCII
1044: FD99 A2 01         LDXIM $01
1045:
1046: FD9B 20 A6 FA  DISMW JSR   XSPACE
1047: FD9E 4C 82 FD      JMP   DISMU
1048:
1049: FDA1 A2 02          DISMV LDXIM $02
1050: FDA3 D0 F6         BNE   DISMW
1051:
1052: FDA5 C9 41          DISMQ CMPIM 'A    A COMMAND?
1053: FDA7 D0 2A         BNE   RELEAS
1054: FDA9 A9 00         LDAIM $00
1055: FDAB 85 27         STA   HEXFLG
1056: FDAD 20 F2 FA      JSR   PRINT
1057: FDB0 0D            =    $0D
1058: FDB1 0A            =    $0A
1059: FDB2 41            =    'A
1060: FDB3 53            =    'S
1061: FDB4 43            =    'C
1062: FDB5 49            =    'I
1063: FDB6 49            =    'I
1064: FDB7 20            =    '

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1065: FDB8 44          =      'D
1066: FDB9 55          =      'U
1067: FDBA 4D          =      'M
1068: FDBB 50          =      'P
1069: FDBC 3A          =      ':
1070: FDBD 20          =      '
1071: FDBE 03          =      $03
1072: FDBF 4C 15 FD    JMP     DISMR
1073:
1074: FDC2 4C 7E FC    DISMS   JMP     DISMA
1075:
1076: FDC5 AD 65 1A    CHCK    LDA     PARB     PARA < PARB?
1077: FDC8 38          SEC
1078: FDC9 ED 63 1A    SBC     PARA
1079: FDCC AD 66 1A    LDA     PARB     +01
1080: FDCF ED 64 1A    SBC     PARA     +01
1081: FDD2 60          RTS
1082:
1083:
1084: FDD3 C9 52        RELEAS CMPIM 'R      R COMMAND?
1085: FDD5 D0 EB          BNE     DISMS
1086: FDD7 4C EA FB      JMP     USR      USER SELECTABLE ADDR.
1087:
1088:
1089:                    *****
1090:                    END OF PROGRAM
1091:                    *****
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23NL/UK/G/F

SYMBOL TABLE 3000 3342

ABA	F94B	ABSABX	F91B	ABSX	F92C	ABSY	F8E5
ABSYS	F8EC	ABS	F944	ACCU	FA90	ADDR	0017
ADJA	FB1B	ADJ	FB13	AXA	F933	AYA	F8F3
BRKT	1A7C	CENTRM	F881	CHCK	FDC5	CNT	0026
COLCW	FA45	COLFOR	FA2E	COLFRA	FA42	COLI	F85D
COLNUA	F9D6	COLNUB	F9E0	COLNUL	F9AE	COLOA	FA7A
CRLF	FBCF	DISA	F817	DISASM	F800	DISB	F833
DISMA	FC7E	DISMB	FC81	DISMC	FCAB	DISMD	FCC3
DISME	FCCD	DISMF	FCE7	DISMG	FCF1	DISMH	FCFD
DISMI	FD1D	DISMK	FD23	DISML	FD35	DISMN	FD67
DISMO	FD77	DISMON	FC4E	DISMP	FD50	DISMQ	FDA5
DISMQV	FD20	DISMR	FD15	DISMS	FDC2	DISMT	FD8E
DISMU	FD82	DISMV	FDA1	DISMW	FD9B	EOLNIB	0015
ERRA	F837	ERRFLG	0020	ERROR	F83D	HEXFLG	0027
IM	F904	IMABSY	F8DB	IMPLD	FA9C	IMX	F90B
INCPNT	FBE4	INDA	FA6A	INDX	F88F	INDY	F86D
IND	FA62	INPAR	FBDE	INSPNT	0010	LDXIM	F84B
LENGTH	0016	LNIB	0014	MAFORM	FBED	MALTAB	FB20
MARTAB	FB28	MBFORM	FBFF	MBLTAB	FB30	MBRTAB	FB38
MCFA	FC12	MCFORM	FC10	MCLTAB	FB40	MCRTAB	FB50
MDFORM	FC1F	MDLTAB	FB60	MDRTAB	FB68	MEFORM	FC30
MELTAB	FB70	MEPNT	0023	MERTAB	FB80	MFFORM	FC3F
MFLTAB	FB90	MFRTAB	FBA0	ML	0021	MNEA	FADE
MNEMOC	FBFB	MNEMON	FADA	MR	0022	NVALA	FB80
NVALB	FBB5	OBJECT	FA83	OBJMNE	FAD5	OBJ	FAC4
OFFSET	F9EA	OPCODE	0012	OTHER	F9CC	PARA	1A63
PARB	1A65	PMODE	0025	POA	FA1C	POB	FA23
POINT	00FA	POSOFF	FA0E	PRBYT	FB08	PRBYTS	FAAD
PRCHA	FB02	PRINT	FAF2	PRMNES	FAD8	PRNIBL	FBE7
PRSP	FBDB	PRTA	FAF8	PRTB	FAFE	PRTC	FBOC
RECCHA	FB05	RELEAS	FDD3	RESIN	FBE1	RNIB	0013
SFTROT	F956	SPELDY	FA5F	SRA	F976	SRCA	F9A8
SRCB	F9AB	SRCONT	F98E	TEMP	0019	USR	FBEA
VALOP	F81D	VALOPA	F829	XSPACE	FAA6	ZP	F8CC
ZPX	F8B7	ZPY	F979	ZPZPX	F8A6		

*****ONE*****

ORG \$FDDA

EPROM PROGRAMMING UTILITIES

WRITTEN BY G.H.NACHBAR

DATE: 26 JANUARY 1982

POINTERS AND TEMPS IN PAGE ZERO

CMPMOD	*	\$0028	COMPARE FLAG
SORSAL	*	\$00E2	FIRST SOURCE ADDRESS LOW
SORSAH	*	\$00E3	FIRST SOURCE ADDRESS HIGH
SOREAL	*	\$00E4	LAST SOURCE ADDRESS LOW
SOREAH	*	\$00E5	LAST SOURCE ADDRESS HIGH
CURADL	*	\$00E6	SOURCE POINTER LOW
CURADH	*	\$00E7	SOURCE POINTER HIGH
DESSAL	*	\$00E8	FIRST DESTINATION ADDRESS LOW
DESSAH	*	\$00E9	FIRST DESTINATION ADDRESS HIGH
DIFL	*	\$00EA	(DESSA MINUS SORSA) LOW
DIFH	*	\$00EB	(DESSA MINUS SORSA) HIGH
BYTES	*	\$00F6	INSTRUCTION LENGTH BUFFER
POINTL	*	\$00FA	DESTINATION POINTER LOW
POINTH	*	\$00FB	DESTINATION POINTER HIGH

POINTERS AND TEMPS IN PAGE 1A

PARAL	*	\$1A63	FIRST ADDRESS LOW
PARAH	*	\$1A64	FIRST ADDRESS HIGH
PARBL	*	\$1A65	SECOND ADDRESS LOW
PARBH	*	\$1A66	SECOND ADDRESS HIGH
NMIL	*	\$1A7A	NMI VECTOR LOW
NMIH	*	\$1A7B	NMI VECTOR HIGH

ADDRESSES IN STANDARD EPROM

BEGIN	*	\$1ED3	INITIALIZE SOURCE POINTER
OPLEN	*	\$1E5C	GET INSTRUCTION LENGTH

ADDRESSES IN PM/PME EPROM

IPB	*	\$13A2	ENTER ONE ADDRESS
INCPNT	*	\$1213	INCREMENT POINT
PRBUFS	*	\$11F8	PRINT DATA SPECIFIED BY POINT

*****TWO*****

ADDRESSES ELSEWHERE IN DISASSEM/EPRUTL EPROM

USR * \$FBEA JUMP TO PM
INPAR * \$FBDE ENTER TWO ADDRESSES
RESIN * \$FBE1 RESET INPUT BUFFERS
PRINT * \$FAF2 PRINT DATA STRING FOLLOWING JSR PRINT
CRLF * \$FBCF FRESH LINE
RECCHA * \$FBD5 WAIT FOR AN ASCII CHARACTER
CHCK * \$FDC5 COMPARE THE TWO INPAR ADDRESSES

KEY ROUTINES

*1 P KEY

ENTER SORSA, SOREA AND DESSA

*2 M KEY

DATA WITH AN ADDRESS WITHIN THE SOURCE DATABLOCK IS COPIED INTO LOCATIONS FROM DESSA ONWARDS (SEE NOTE)

*3 B KEY

BACK TO PM

*4 V KEY

COMPARE DESTINATION DATA WITH SOURCE DATA. IF NOT EQUAL: PRINT DESTINATION DATA WITH ADDRESS (SEE NOTE)

*5 F KEY

EPROM CHECK: IF DESTINATION DATA IS NOT \$FF, PRINT IT WITH ADDRESS (SEE NOTE)

*6 R KEY

ALL OPERANDS OF THREE BYTE INSTRUCTIONS WITH SORSA<=OPERAND=< SOREA ARE CHANGED ACCORDING TO THE NEW DESTINATION OF THE SOURCE DATA BLOCK (SEE NOTE)

*7 NMI/ST KEY (STANDARD KEYBOARD)

PRINT PARAMETERS

NOTE: THE DIFFERENCE BETWEEN CURAD AND SORSA ALWAYS EQUALS THE DIFFERENCE BETWEEN POINT AND DESSA

MAIN ROUTINE OF THE EPROM PROGRAMMING SOFTWARE

FDDA A9 BF EPRUTL LDAIM PRMTRS SPECIFY NMI VECTOR
FDDC AO FF LDYIM PRMTRS/256

FDDE 8D	7A 1A	STA	NMIL	
FDE1 8C	7B 1A	STY	NMIH	
FDE4 20	F2 FA	JSR	PRINT	INITIAL BLURP
FDE7 0D		\$OD		
FDE8 0A		\$OA		
FDE9 45		'E		
FDEA 50		'P		
FDEB 52		'R		
FDEC 4F		'O		
FDED 4D		'M		
FDEE 20		'		
FDEF 50		'P		
FDE0 52		'R		
FDF1 4F		'O		
FDF2 47		'G		
FDF3 52		'R		
FDF4 41		'A		
FDF5 4D		'M		
FDF6 4D		'M		
FDF7 49		'I		
FDF8 4E		'N		
FDF9 47		'G		
FDEA 20		'		
FDFB 55		'U		
FDFC 54		'T		
FDFD 49		'I		
FDFE 4C		'L		
FDF0 49		'I		
FDE0 54		'T		
FDE1 49		'I		
FDE2 45		'E		
FDE3 53		'S		
FDE4 0D		\$OD		
FDE5 0A		\$OA		
FDE6 56		'V		
FDE7 41		'A		
FDE8 4C		'L		
FDE9 49		'I		
FDEA 44		'D		
FDEB 20		'		
FDEC 43		'C		
FDED 4F		'O		
FDEE 4D		'M		
FDEF 4D		'M		
FDE0 41		'A		
FDE1 4E		'N		
FDE2 44		'D		
FDE3 53		'S		
FDE4 3A		' :		
FDE5 20		'		
FDE6 50		'P		
FDE7 2C		'		
FDE8 4D		'M		
FDE9 2C		'		
FDEA 42		'B		
FDEB 2C		'		
FDE0 56		'V		
FDE1 2C		'		
FDE2 46		'F		
FDE3 2C		'		
FDE4 52		'R		
FDE5 03		\$O3		

*****FOUR*****

FE22	20	CF	FB	EPRA	JSR	CRLF	START ON A FRESH LINE
FE25	20	D5	FB		JSR	RECCHA	WAIT FOR A DEPRESSED KEY
FE28	C9	50			CMPIM	'P	
FE2A	D0	7A			BNE	EPRD	BRANCH IF NO P KEY
FE2C	20	F2	FA	EPRB	JSR	PRINT	SOURCE MESSAGE
FE2F	0D				\$OD		
FE30	0A				\$OA		
FE31	46				'F		
FE32	49				'I		
FE33	52				'R		
FE34	53				'S		
FE35	54				'T		
FE36	2C				'		
FE37	4C				'L		
FE38	41				'A		
FE39	53				'S		
FE3A	54				'T		
FE3B	20				'		
FE3C	53				'S		
FE3D	4F				'O		
FE3E	55				'U		
FE3F	52				'R		
FE40	43				'C		
FE41	45				'E		
FE42	20				'		
FE43	41				'A		
FE44	44				'D		
FE45	44				'D		
FE46	52				'R		
FE47	45				'E		
FE48	53				'S		
FE49	53				'S		
FE4A	3A				':		
FE4B	20				'		
FE4C	20				'		
FE4D	03				\$O3		E07
FE4E	20	E1	FB		JSR	RESIN	RESET INPUT BUFFERS
FE51	20	DE	FB		JSR	INPAR	ENTER TWO ADDRESSES
FE54	30	D6			BMI	EPRB	REPEAT IF NOT DONE PROPERLY
FE56	20	C5	FD		JSR	CHCK	
FE59	90	D1			BCC	EPRB	REPEAT IF LAST FIRST ADDRESS
FE5B	AD	63	1A		LDA	PARAL	
FE5E	AC	64	1A		LDY	PARAH	
FE61	85	E2			STAZ	SORSAL	
FE63	84	E3			STYZ	SORSAH	SORSA=FIRST ADDRESS ENTERED
FE65	AD	65	1A		LDA	PARBL	
FE68	AC	66	1A		LDY	PARBH	
FE6B	85	E4			STAZ	SOREAL	
FE6D	84	E5			STYZ	SOREAH	SOREA=SECOND ADDR. ENTERED
FE6F	20	F2	FA	EPRC	JSR	PRINT	SOURCE MESSAGE
FE72	0D				\$OD		
FE73	0A				\$OA		
FE74	46				'F		
FE75	49				'I		
FE76	52				'R		
FE77	53				'S		
FE78	54				'T		
FE79	20				'		
FE7A	44				'D		
FE7B	45				'E		

*****FIVE*****

FE7C	53			'S		
FE7D	54			'T		
FE7E	49			'I		
FE7F	4F			'N		
FE80	41			'A		
FE81	54			'T		
FE82	49			'I		
FE83	4F			'O		
FE84	4E			'N		
FE85	20			'		
FE86	41			'A		
FE87	44			'D		
FE88	44			'D		
FE89	52			'R		
FE8A	45			'E		
FE8B	53			'S		
FE8C	53			'S		
FE8D	3A			':		
FE8E	20			'		
FE8F	20			'		
FE90	03			\$03		EOT
FE91	20	E1	FB	JSR	RESIN	RESET INPUT BUFFERS
FE94	20	A2	13	JSR	IPB	ENTER ONE ADDRESS
FE97	30	D6		BMI	EPRC	REPEAT IF NOT PROPERLY DONE
FE99	AD	65	1A	LDA	PARBL	
FE9C	AC	66	1A	LDY	PARBH	
FE9F	85	E8		STAZ	DESSAL	
FEA1	84	E9		STYZ	DESSAH	DESSA=ADDRESS ENTERED
FEA3	4C	22	FE	JMP	EPRA	READY FOR NEW USER ACTION
FEA6	C9	4D	EPRD	CMPIM	'M	
FEA8	DO	2B		BNE	EPRE	BRANCH IF NO M KEY
FEAA	20	D3	1E	JSR	BEGIN	CURAD=SORSA
FEAD	20	8C	FF	JSR	FIRST	POINT=DESSA
FEBO	A0	00	EPRO	LDYIM	\$00	
FEB2	B1	E6		LDAIY	CURADL	FETCH SOURCE DATA
FEB4	91	FA		STAIY	POINTL	MOVE IT TO DESTINATION
FEB6	20	13	12	JSR	INCPNT	ADJUST DESTINATION POINTER
FEB9	A9	01		LDAIM	\$01	
FEBB	85	F6		STAZ	BYTES	
FEBD	20	A3	FF	JSR	NXT	ADJUST SOURCE POINTER
FECO	80	FF		BCS	EPRO	NEXT DATA, IF ANY
FEC2	20	F2	FA	JSR	PRINT	FINAL MESSAGE
FEC5	0D			\$0D		
FEC6	0A			\$0A		
FEC7	44			'D		
FEC8	41			'A		
FEC9	54			'T		
FECA	41			'A		
FECB	20			'		
FEC C	4D			'M		
FECD	4F			'O		
FECE	56			'V		
FECF	45			'E		
FEDO	44			'D		
FED1	03			\$03		EOT
FED2	4C	22	FE	JMP	EPRA	READY FOR NEW USER ACTION
FED5	C9	42	EPRE	CMPIM	'B	
FED7	DO	03		BNE	EPRE	BRANCH IF NO B KEY

*****SIX*****

FED9	4C	EA	FB		JMP	USR	BACK TO PM ("JUNIOR")
FEDC	C9	56		EPRF	CMPIM	'V	
FEDE	DO	3B			BNE	EPRG	BRANCH IF NO V KEY
FEE0	A9	00			LDAIM	\$00	GET CMPMOD
FEE2	85	28			STAZ	CMPMOD	RESET CMPMOD
FEE4	20	D3	1E	EPRH	JSR	BEGIN	CURAD=SORSA
FEE7	20	8C	FF		JSR	FIRST	POINT=DESSA
FEEA	A0	00		EPRK	LDYIM	\$00	
FEEC	A5	28			LDAZ	CMPMOD	
FEEE	DO	35			BNE	EPRL	BRANCH IF CMPMOD IS SET
FEFO	B1	E6			LDAIY	CURADL	FETCH SOURCE DATA
FEF2	D1	FA			CMPIY	POINTL	COMPARE IT WITH DEST. DATA
FEF4	F0	03		EPRM	BEQ	EPRN	IF EQUAL:NEXT DATA COMPARE
FEF6	20	F8	11		JSR	PRBUFS	PRINT UNEQUAL DEST. DATA
FEF9	20	13	12	EPRN	JSR	INCPNT	ADJUST DESTINATION POINTER
FEFC	A9	01			LDAIM	\$01	
FEFE	85	F6			STAZ	BYTES	
FF00	20	A3	FF		JSR	NXT	ADJUST SOURCE POINTER
FF03	B0	E5			BCS	EPRK	NEXT DATA,IF ANY
FF05	20	F2	FA		JSR	PRINT	FINAL MESSAGE
FF08	OD				\$0D		
FF09	OA				\$0A		
FF0A	44				'D		
FF0B	41				'A		
FF0C	54				'T		
FF0D	41				'A		
FF0E	20				'		
FF0F	43				'C		
FF10	4F				'O		
FF11	4D				'M		
FF12	50				'P		
FF13	41				'A		
FF14	52				'R		
FF15	45				'E		
FF16	44				'D		
FF17	03				\$03		EOT
FF18	4C	22	FE		JMP	EPRA	READY FOR NEW USER ACTION
FF1B	C9	46		EPRG	CMPIM	'F	
FF1D	DO	OD			BNE	EPRI	BRANCH IF NO F KEY
FF1F	A9	01			LDAIM	\$01	
FF21	85	28			STAZ	CMPMOD	SET CMPMOD
FF23	DO	BF			BNE	EPRH	GO TO COMPARE ROUTINE
FF25	B1	FA		EPRL	LDAIY	POINTL	FETCH DESTINATION DATA
FF27	C9	FF			CMPIM	\$FF	AND COMPARE IT WITH \$FF
FF29	4C	F4	FE		JMP	EPRM	BACK TO COMPARE ROUTINE
FF2C	C9	52		EPRI	CMPIM	'R	
FF2E	DO	59			BNE	EPRJ	BRANCH IF NO R KEY
FF30	20	D3	1E		JSR	BEGIN	CURAD=SORSA
FF33	20	8C	FF		JSR	FIRST	POINT=DESSA
FF36	20	95	FF		JSR	DIFAD	DIF IS DESSA MINUS SORSA
FF39	20	5C	1E	TEST	JSR	OPLN	GET INSTRUCTION LENGTH
FF3C	CO	03			CPYIM	\$03	
FF3E	DO	2D			BNE	NXTINS	BRANCH IF NO 3 BYTE INSTRUCTION
FF40	88				DEY		
FF41	88				DEY		
FF42	B1	E6			LDAIY	CURADL	FETCH ADL
FF44	38				SEC		

*****SEVEN*****

FF45	E5	E2		SBCZ	SORSAL	ADL MINUS SORSAL
FF47	C8			INY		
FF48	B1	E6		LDAIY	CURADL	FETCH ADH
FF4A	E5	E3		SBCZ	SORSAH	ADH MINUS SORSAH MINUS C
FF4C	90	1F		BCC	NXTINS	BRANCH IF OPERAND < SORSA
FF4E	88			DEY		
FF4F	A5	E4		LDAZ	SOREAL	FETCH LAST SOURCE ADDRESS LOW
FF51	F1	E6		SBCIY	CURADL	SOREAL MINUS ADL
FF53	C8			INY		
FF54	A5	E5		LDAZ	SOREAH	FETCH LAST SOURCE ADDRESS HIGH
FF56	F1	E6		SBCIY	CURADL	SOREAH MINUS ADH MINUS C
FF58	90	13		BCC	NXTINS	BRANCH IF OPERAND > SOREA
FF5A	18			CLC		
FF5B	88			DEY		
FF5C	B1	E6		LDAIY	CURADL	FETCH OLD ADL
FF5E	65	EA		ADCZ	DIFL	AND ADD DIFL TO IT
FF60	91	E6		STAIY	CURADL	REPLACE ADL (SOURCE DATA BLOCK)
FF62	91	FA		STAIY	POINTL	REPLACE ADL (DEST. DATA BLOCK)
FF64	C8			INY		
FF65	B1	E6		LDAIY	CURADL	FETCH OLD ADH
FF67	65	EB		ADCZ	DIFH	ADD DIFH AND C TO IT
FF69	91	E6		STAIY	CURADL	REPLACE ADH (SOURCE DATA BLOCK)
FF6B	91	FA		STAIY	POINTL	REPLACE ADH (DEST. DATA BLOCK)
FF6D	A4	F6	NXTINS	LDYZ	BYTES	
FF6F	20	13	12	NXTIN	JSR	INCPNT
FF72	88			DEY		ADJUST DESTINATION POINTER
FF73	DO	FA		BNE	NXTIN	
FF75	20	A3	FF	JSR	NXT	ADJUST SOURCE POINTER
FF78	B0	BF		BCS	TEST	NEXT INSTRUCTION, IF ANY
FF7A	20	F2	FA	JSR	PRINT	FINAL MESSAGE
FF7D	OD			\$OD		
FF7E	OA			\$OA		
FF7F	52			'R		
FF80	45			'E		
FF81	4C			'L		
FF82	4F			'O		
FF83	43			'C		
FF84	41			'A		
FF85	54			'T		
FF86	45			'E		
FF87	44			'D		
FF88	03			\$03		EOT
FF89	4C	22	FE	EPRJ	JMP	EPRA
						READY FOR NEW USER ACTION

 SUBROUTINES OF THE EPROM PROGRAMMING SOFTWARE

FF8C	A5	E8	FIRST	LDAZ	DESSAL	INITIALIZE DESTINATION POINTER
FF8E	A4	E9		LDYZ	DESSAH	
FF90	85	FA		STAZ	POINTL	
FF92	84	FB		STYZ	POINTH	DESTINATION POINTER=DESSA
FF94	60			RTS		

*****EIGHT*****

SUBROUTINE DIFAD

THE 16 BIT NUMBER (DIFH,DIFL) EQUALS THE DIFFERENCE BETWEEN (DESSAH,DESSAL) AND (SORSAH,SORSAL). IT IS USED IN THE R KEY ROUTINE

FF95 38	DIFAD	SEC	
FF96 A5 E8		LDAZ	DESSAL
FF98 E5 E2		SBCZ	SORSAL
FF9A 85 EA		STAZ	DIFL
FF9C A5 E9		LDAZ	DESSAH
FF9E E5 E3		SBCZ	SORSAH
FFA0 85 EB		STAZ	DIFH
FFA2 60		RTS	

DIF=DESSA MINUS SORSA

SUBROUTINE NXT

THE SOURCE POINTER CURAD IS INCREASED BY THE CONTENTS OF BYTES. THE CONTENTS OF BYTES IS EITHER AN INSTRUCTION LENGTH (R KEY ROUTINE) OR \$01 (M,V AND F KEY ROUTINE). SUBSEQUENTLY THE CARRY FLAG WILL BE SET OR RESET, DEPENDING ON THE NEW POSITION (CONTENTS) OF CURAD.

AFTER RTS THE CARRY FLAG WILL BE

*SET (C=1;B=0) IF NEW CURAD IS SMALLER THAN OR EQUALS SOREA;

*RESET (C=0;B=1) IF NEW CURAD IS GREATER THAN SOREA,

OR IF THE 65K MEMORY BORDER (\$FFFF) IS CROSSED AT THE COMPUTATION OF THE NEW CURAD. THE LATTER OCCURS IF THE OLD CURADH IS \$FF AND IF THE OLD CURADL IS \$FF (M,V AND F KEY ROUTINE) OR \$FE OR \$FD (R KEY ROUTINE)

FFA3 18	NXT	CLC	
FFA4 A5 E6		LDAZ	CURADL
FFA6 65 F6		ADCZ	BYTES
FFA8 85 E6		STAZ	CURADL
FFAA A5 E7		LDAZ	CURADH
FFAC 69 00		ADCIM	\$00
FFAE 85 E7		STAZ	CURADH
FFB0 B0 0A		BCS	NXTB
FFB2 38		SEC	
FFB3 A5 E4		LDAZ	SOREAL
FFB5 E5 E6		SBCZ	CURADL
FFB7 A5 E5		LDAZ	SOREAH
FFB9 E5 E7		SBCZ	CURADH
FFBB 60	NXTA	RTS	
FFBC 18	NXTB	CLC	
FFBD 90 FC		BCC	NXTA

CURAD INCREASED BY (BYTES)
BRANCH IF \$FFFF IS CROSSED
CARRY
DEPENDS
ON
SOREA MINUS CURAD
OR
ON CROSSING \$FFFF,
THE MEMORY BOUNDARY.

NOTE: WHY ALL THE FUSS ABOUT CROSSING \$FFFF? WELL, IF WE SKIP THE BCS NXTB, THE FOLLOWING CURAD TEST WILL BE INVALID, BECAUSE, IF SOREA IS \$FFFF, THE NEW CURAD WILL BE SMALLER THAN SOREA. IT IS LIKE MAKING A TRIP AROUND THE WORLD WHICH WILL LAST FOREVER, BECAUSE WE DIDN'T NOTICE THE FACT THAT WE HAVE BEEN PASSING OUR DEPARTING POINT!

*****NINE*****

NMI/ST KEY ROUTINE PRMTRS

PRINT "XXXX< =AD=< YYYY TO > =ZZZZ"
 XXXX: FIRST SOURCE ADDRESS
 YYYY: LAST SOURCE ADDRESS
 ZZZZ: FIRST DESTINATION ADDRESS

A GRAPHICAL SUMMARY OF THE MOST RECENT ADDRESS PARAMETERS

FFBF 68	PRMTRS	PLA	
FFCO 68		PLA	
FFC1 68		PLA	RESTORE STACK POINTER
FFC2 20 CF FB		JSR	CRLF START ON A FRESH LINE
FFC5 A5 E3		LDAZ	SORSAH
FFC7 20 D8 FB		JSR	PRBYT PRINT SORSAH
FFCA A5 E2		LDAZ	SORSAL
FFCC 20 D8 FB		JSR	PRBYT PRINT SORSAL
FFCF 20 F2 FA		JSR	PRINT SOURCE MESSAGE
FFD2 3C		'<	
FFD3 3D		'='	
FFD4 41		'A	
FFD5 44		'D	
FFD6 3D		'='	
FFD7 3C		'<	
FFD8 03		\$03	EOT(END OF ASCII STRING)
FFD9 A5 E5		LDAZ	SOREAH
FFDB 20 D8 FB		JSR	PRBYT PRINT SOREAH
FFDE A5 E4		LDAZ	SOREAL
FFE0 20 D8 FB		JSR	PRBYT PRINT SOREAL
FFE3 20 F2 FA		JSR	PRINT DESTINATION MESSAGE
FFE6 20		'	
FFE7 54		'T	
FFE8 4F		'O	
FFE9 20		'	
FFEA 3E		'>	
FFEB 3D		'='	
FFEC 03		\$03	EOT(END OF ASCII STRING)
FFED A5 E9		LDAZ	DESSAH
FFF0 20 D8 FB		JSR	PRBYT PRINT DESSAH
FFF2 A5 E8		LDAZ	DESSAL
FFF4 20 D8 FB		JSR	PRBYT PRINT DESSAL
FFF7 4C 22 FE		JMP	EPRA READY FOR NEW USER ACTION

SYSTEM VECTORS

FFFA 2F	\$2F	ADL OF JMI (NMI JUMP VECTOR)
FFFB 1F	\$1F	ADH OF JMI (NMI JUMP VECTOR)
FFFC 1D	\$1D	ADL OF RESET (ST. EPROM)
FFFD 1C	\$1C	ADH OF RESET (ST. EPROM)
FFFE 32	\$32	ADL OF JMI (IRQ JUMP VECTOR)
FFFF 1F	\$1F	ADH OF JMI (IRQ JUMP VECTOR)

HEXDUMP: F800,FFFF

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
F800:	A0	00	B1	10	85	12	29	0F	85	13	A5	12	4A	4A	4A	4A
F810:	85	14	4A	90	1E	A9	01	85	15	A2	04	A5	13	DD	B0	FB
F820:	F0	15	CA	10	F8	A2	19	A5	12	DD	B5	FB	F0	0F	CA	10
F830:	F8	30	2A	A9	00	F0	E0	A5	12	C9	A2	F0	0E	A2	01	86
F840:	20	86	16	A2	08	20	12	FC	4C	81	F8	A2	02	86	16	A2
F850:	61	86	21	A2	30	86	22	20	FF	FB	4C	0B	F9	A2	01	E4
F860:	13	D0	43	E8	86	16	20	ED	FB	A5	15	F0	22	20	F2	FA
F870:	28	24	03	A0	01	B1	10	20	D8	FB	20	F2	FA	29	2C	59
F880:	03	18	A5	10	65	16	85	10	A5	11	69	00	85	11	60	20
F890:	F2	FA	28	24	03	A0	01	B1	10	20	D8	FB	20	F2	FA	2C
F8A0:	58	29	03	4C	81	F8	A2	05	E4	13	D0	2F	A2	02	86	16
F8B0:	20	ED	FB	A5	15	F0	15	20	F2	FA	24	03	A0	01	B1	10
F8C0:	20	D8	FB	20	F2	FA	2C	58	03	4C	81	F8	20	F2	FA	24
F8D0:	03	A0	01	B1	10	20	D8	FB	4C	81	F8	A2	09	E4	13	D0
F8E0:	3A	A5	15	F0	1F	A2	03	86	16	20	ED	FB	20	F2	FA	24
F8F0:	03	A0	02	B1	10	20	D8	FB	88	03	F8	20	F2	FA	2C	59
F900:	03	4C	81	F8	A2	02	86	16	20	ED	FB	20	F2	FA	23	24
F910:	03	A0	01	B1	10	20	D8	FB	4C	81	F8	A2	0D	E4	13	D0
F920:	35	A2	03	86	16	20	ED	FB	A5	15	F0	18	20	F2	FA	24
F930:	03	A0	02	B1	10	20	D8	FB	88	00	F8	20	F2	FA	2C	58
F940:	03	4C	81	F8	20	F2	FA	24	03	A0	02	B1	10	20	D8	FB
F950:	88	D0	F8	4C	81	F8	A2	06	E4	13	D0	32	A2	02	86	16
F960:	20	FF	FB	A2	09	E4	14	F0	10	A2	0B	E4	14	F0	0A	A5
F970:	15	F0	03	4C	B7	F8	4C	CC	F8	20	F2	FA	24	03	A0	01
F980:	B1	10	20	D8	FB	20	F2	FA	2C	59	03	4C	81	F8	A2	0E
F990:	E4	13	D0	1A	A2	03	86	16	20	FF	FB	A2	0B	E4	14	F0
F9A0:	0A	A5	15	F0	03	4C	2C	F9	4C	44	F9	4C	EC	F8	A2	00
F9B0:	E4	13	D0	7A	A5	12	C9	00	F0	26	C9	40	F0	22	C9	60
F9C0:	F0	1E	C9	20	F0	10	29	1F	C9	10	F0	1E	A2	02	86	16
F9D0:	20	10	FC	4C	0B	F9	A2	03	86	16	20	10	FC	4C	44	F9
F9E0:	A2	01	86	16	20	10	FC	4C	81	F8	A2	02	86	16	20	10
F9F0:	FC	A0	01	B1	10	10	17	20	13	FB	49	FF	85	19	38	A5
FA00:	17	E5	19	85	17	A5	18	E9	00	85	18	4C	1C	FA	20	13
FA10:	FB	38	65	17	85	17	A9	00	65	18	85	18	20	F2	FA	24
FA20:	03	A2	01	B5	17	20	D8	FB	CA	10	F8	4C	81	F8	A2	04
FA30:	E4	13	D0	11	A2	02	86	16	20	1F	FC	A5	15	F0	03	4C
FA40:	B7	F8	4C	CC	F8	A2	0C	E4	13	D0	2F	A2	03	86	16	20
FA50:	1F	FC	A5	12	C9	6C	F0	0A	C9	BC	F0	03	4C	44	F9	4C
FA60:	2C	F9	20	F2	FA	28	24	03	A0	02	B1	10	20	D8	FB	88
FA70:	D0	F8	20	F2	FA	29	03	4C	81	F8	A2	0A	E4	13	D0	1C
FA80:	A2	01	86	16	A6	14	E0	07	90	06	20	30	FC	4C	81	F8
FA90:	20	30	FC	20	F2	FA	20	41	03	4C	81	F8	A2	01	86	16
FAA0:	20	3F	FC	4C	81	F8	20	DB	FB	CA	D0	FA	60	20	D8	FB
FAB0:	4C	DB	FB	20	CF	FB	A5	11	20	D8	FB	A5	10	20	AD	FA
FAC0:	A0	00	A2	0F	B1	10	20	AD	FA	CA	CA	CA	C8	C4	16	D0
FAD0:	F3	20	A6	FA	60	20	B3	FA	A2	03	A0	05	A9	00	06	22
FAE0:	26	21	2A	88	D0	F8	09	40	20	D2	FB	CA	D0	EC	20	DB
FAF0:	FB	60	68	85	23	68	85	24	E6	23	D0	02	E6	24	A0	00
FB00:	B1	23	C9	03	F0	06	20	D2	FB	4C	F8	FA	A5	24	48	A5
FB10:	23	48	60	A6	10	A4	11	E8	D0	01	C8	86	17	84	18	60
FB20:	7C	0B	2B	09	9D	61	1B	98	82	88	E4	06	02	02	60	86
FB30:	0C	93	64	93	9D	61	21	4B	D8	D8	E4	E4	30	30	46	86
FB40:	14	14	54	13	95	15	95	15	00	10	61	10	1C	13	1C	11
FB50:	96	18	E4	52	12	86	26	A6	00	C6	32	E6	32	8A	30	62
FB60:	FF	12	53	53	9D	61	1C	1C	FE	68	60	60	32	32	32	30
FB70:	0C	FF	93	FF	64	FF	93	FF	A6	A6	A0	A4	21	FF	73	FF
FB80:	D8	FE	D8	FE	E4	FE	E4	FE	02	26	70	F0	70	FE	E0	FE
FB90:	82	13	33	99	82	1B	83	99	21	A6	A0	1B	43	13	4B	99
FBA0:	20	06	20	46	02	12	02	52	72	42	72	2C	B2	08	B0	48
FBB0:	02	03	07	0B	0F	80	04	14	34	44	54	64	74	D4	F4	89
FBC0:	1A	3A	5A	7A	DA	FA	0C	1C	3C	5C	7C	9C	DC	FC	9E	4C
FBD0:	E8	11	4C	34	13	4C	AE	12	4C	8F	12	4C	F3	11	4C	87
FBE0:	13	4C	68	12	4C	13	12	4C	9B	12	4C	5F	10	A5	14	4A
FBF0:	AA	BD	20	FB	85	21	BD	28	FB	85	22	20	D5	FA	60	A5

HEXDUMP: F800,FFFF

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
FC00:	14	4A	AA	BD	30	FB	85	21	BD	38	FB	85	22	4C	FB	FB
FC10:	A6	14	BD	40	FB	85	21	BD	50	FB	85	22	4C	FB	FB	A5
FC20:	14	4A	AA	BD	60	FB	85	21	BD	68	FB	85	22	4C	FB	FB
FC30:	A6	14	BD	70	FB	85	21	BD	80	FB	85	22	4C	FB	FB	A6
FC40:	14	BD	90	FB	85	21	BD	A0	FB	85	22	4C	FB	FB	A9	7E
FC50:	A2	FC	8D	7C	1A	8E	7D	1A	20	F2	FA	0D	0A	56	41	4C
FC60:	49	44	20	43	4F	4D	4D	41	4E	44	53	3A	20	41	20	44
FC70:	20	48	20	4C	20	50	20	52	20	53	50	0D	0A	03	20	CF
FC80:	FB	20	D5	FB	C9	44	D0	3B	20	F2	FA	0D	0A	44	49	53
FC90:	41	53	53	45	4D	42	4C	45	3A	20	03	20	E1	FB	20	DE
FCAD:	FB	30	DB	20	C5	FD	90	D6	AD	63	1A	AE	64	1A	85	10
FCB0:	86	11	20	F2	FA	0D	0A	4C	2C	50	2C	53	50	20	3F	03
FCC0:	4C	7E	FC	C9	50	D0	20	A9	0F	85	25	85	26	38	AD	65
FCD0:	1A	E5	10	AD	66	1A	E5	11	90	A7	20	00	F8	A5	25	FD
FCE0:	EC	C6	26	D0	E8	FD	9A	C9	4C	D0	06	A9	00	85	25	FD
FCF0:	DC	C9	20	D0	08	A9	01	85	25	85	26	D0	D0	C9	48	D0
FD00:	1F	A9	01	85	27	20	F2	FA	0D	0A	48	45	58	20	44	55
FD10:	4D	50	3A	20	03	20	E1	FB	20	DE	FB	10	06	4C	7E	FC
FD20:	4C	A5	FD	20	C5	FD	90	F5	20	CF	FB	20	CF	FB	A2	06
FD30:	20	A6	FA	A0	00	98	20	E7	FB	A2	02	20	A6	FA	C8	C0
FD40:	10	D0	F2	AD	63	1A	85	FA	AD	64	1A	85	FB	20	CF	FB
FD50:	20	CF	FB	A2	10	86	26	A5	FB	20	D8	FB	A5	FA	20	D8
FD60:	FB	20	F2	FA	3A	20	03	AD	65	1A	38	E5	FA	AD	66	1A
FD70:	E5	FB	B0	03	4C	7E	FC	A0	00	B1	FA	A6	27	FD	0F	20
FD80:	D8	FB	20	DB	FB	20	E4	FB	C6	26	D0	DB	FD	C2	C9	20
FD90:	90	0F	C9	7F	B0	0B	20	D2	FB	A2	01	20	A6	FA	4C	82
FDA0:	FD	A2	02	D0	F6	C9	41	D0	2A	A9	00	85	27	20	F2	FA
FDB0:	0D	0A	41	53	43	49	49	20	44	55	4D	50	3A	20	03	4C
FDC0:	15	FD	4C	7E	FC	AD	65	1A	38	ED	63	1A	AD	66	1A	ED
FDD0:	64	1A	60	C9	52	D0	EB	4C	EA	FB	A9	BF	A0	FF	8D	7A
FDE0:	1A	8C	7B	1A	20	F2	FA	0D	0A	45	50	52	4F	4D	20	50
PDF0:	52	4F	47	52	41	4D	4D	49	4E	47	20	55	54	49	4C	49
FE00:	54	49	45	53	0D	0A	56	41	4C	49	44	20	43	4F	4D	4D
FE10:	41	4E	44	53	3A	20	50	2C	4D	2C	42	2C	56	2C	46	2C
FE20:	52	03	20	CF	FB	20	D5	FB	C9	50	D0	7A	20	F2	FA	0D
FE30:	0A	46	49	52	53	54	2C	4C	41	53	54	20	53	4F	55	52
FE40:	43	45	20	41	44	44	52	45	53	53	3A	20	20	03	20	E1
FE50:	FB	20	DE	FB	30	D6	20	C5	FD	90	D1	AD	63	1A	AC	64
FE60:	1A	85	E2	84	E3	AD	65	1A	AC	66	1A	85	E4	84	E5	20
FE70:	F2	FA	0D	0A	46	49	52	53	54	20	44	45	53	54	49	4E
FE80:	41	54	49	4F	4E	20	41	44	44	52	45	53	53	3A	20	20
FE90:	03	20	E1	FB	20	A2	13	30	D6	AD	65	1A	AC	66	1A	85
FEA0:	E8	84	E9	4C	22	FE	C9	4D	D0	2B	20	D3	1E	20	8C	FF
FEB0:	AD	00	B1	E6	91	FA	20	13	12	A9	01	85	F6	20	A3	FF
FEC0:	80	EE	20	F2	FA	0D	0A	44	41	54	41	20	4D	4F	56	45
FED0:	44	03	4C	22	FE	C9	42	D0	03	4C	EA	FB	C9	56	D0	3B
FEE0:	A9	00	85	28	20	D3	1E	20	8C	FF	A0	00	A5	28	D0	35
FEF0:	B1	E6	D1	FA	FD	03	20	F8	11	20	13	12	A9	01	85	F6
FF00:	20	A3	FF	B0	E5	20	F2	FA	0D	0A	44	41	54	41	20	43
FF10:	4F	4D	50	41	52	45	44	03	4C	22	FE	C9	46	D0	D0	A9
FF20:	01	85	28	D0	BF	B1	FA	C9	FF	4C	F4	FE	C9	52	D0	59
FF30:	20	D3	1E	20	8C	FF	20	95	FF	20	5C	1E	C0	03	D0	2D
FF40:	88	88	B1	E6	38	E5	E2	C8	B1	E6	E5	E3	90	1F	88	A5
FF50:	E4	F1	E6	C8	A5	E5	F1	E6	90	13	18	88	B1	E6	65	EA
FF60:	91	E6	91	FA	C8	B1	E6	65	EB	91	E6	91	FA	A4	F6	20
FF70:	13	12	88	D0	FA	20	A3	FF	B0	BF	20	F2	FA	0D	0A	52
FF80:	45	4C	4F	43	41	54	45	44	03	4C	22	FE	A5	E8	A4	E9
FF90:	85	FA	84	FB	60	38	A5	E8	E5	E2	85	EA	A5	E9	E5	E3
FFA0:	85	EB	60	18	A5	E6	65	F6	85	E6	A5	E7	69	D0	85	E7
FFB0:	B0	0A	38	A5	E4	E5	E6	A5	E5	E5	E7	60	18	90	FC	68
FFC0:	68	68	20	CF	FB	A5	E3	20	D8	FB	A5	E2	20	D8	FB	20
FFD0:	F2	FA	3C	3D	41	44	3D	3C	03	A5	E5	20	D8	FB	A5	E4
FFE0:	20	D8	FB	20	F2	FA	20	54	4F	20	3E	3D	03	A5	E9	20
FFF0:	D8	FB	A5	E8	20	D8	FB	4C	22	FE	2F	1F	1D	1C	32	1F