

ESSENTIAL DATA DUPLICATOR

4

SOURCE CODE LISTING

UTILICO MICROWARE

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** ** **

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*** ** **

INTRODUCTION

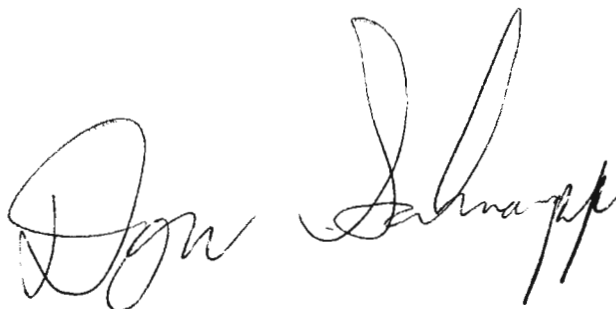
Written by Donald Anthony Schnapp using an apple IIe computer, Essential Data Duplicator 4 is a powerful computer program for allowing the user to make back up copies of his "copy-protected" software. The 6502 assembler which was used to enter EDD 4 is named "BIG MAC", which is similar to the "MERLIN" assembler written by Glen Bredon (available from Roger Wagner Publishing Inc.).

The main purpose of us providing this listing, is to let you see the "insides" of a sophisticated 6502 computer program for educational purposes. Buried in this listing are subroutines for managing routines, text output routines, hi-resolution graphic output routines, multiply and divide routines, interfacing disk drives routines, plus many more. Perhaps our routines will give you ideas for creating your own.

The section on the PLUS card explains how it works and how to interface it with your own 6502 programs.

Since every "batch" of EDD disks are programmed differently, this listing may not be an exact listing of an EDD disk which you may own. For reference purposes, this source code listing was printed out from the batch of EDD 4 disks recorded on April 23, 1986.

** ** **

A handwritten signature in cursive script, reading "Don Schnapp". The signature is written in black ink and is positioned in the lower right quadrant of the page.

PLUS CARD TECHNICAL INFORMATION
AND SOFTWARE INTERFACING

The purpose of the PLUS card is to read the bits of data coming from the disk drive and to make them available to computer software. This is done by first taking eight bits of data from the raw bit stream coming from the disk drive, combining them to form a raw disk byte, at which time a flag is set. Software detects the flag, reads the raw disk byte, at which time the flag is cleared. And the whole process is repeated until all the information is gathered. Using this process, every bit of data coming from the raw bit stream can be accurately read into the computer's memory.

The PLUS card has two valid memory locations in which software can access. They are \$C080,X and \$C081,X where "X" equals the slot number times \$10. For example, if the PLUS card has been installed in slot #5, "X" would need to equal "\$50" or if slot #7 was used, "X" would need to equal "\$70".

A description of EDD PLUS card memory locations are as follows:

\$C080,X contains the 8 bit raw disk byte.
(only valid if READY FLAG is minus)

\$C081,X contains the READY FLAG.

Here is a sample routine, which takes one byte from the disk drive (note: drive must already be ON, in the read mode, and the read/write head must be located on the track which needs to be read):

```
.
.
CHKREADY LDX  #$50          ;Slot number of PLUS card.
          LDA  $C081,X      ;See if READY FLAG is set.
          BPL  CHKREADY    ;No, go back & check again.
          LDA  $C080,X      ;Yes, take the byte.
.
.
```

To go one step further, here is a routine which takes \$2000 bytes from the disk drive and stores them in memory locations from \$6000 through \$7FFF (note: disk drive must already be set up as before):

```
.
.
          LDY  #$60          ;Set up memory
          STY  $1           ;pointers to start
          LDY  #$0          ;storing at address $6000.
          STY  $0           ;
CHKREADY LDX  #$50          ;Slot number of PLUS card.
          LDA  $C081,X      ;See if READY FLAG is set.
          BPL  CHKREADY    ;No, go back & check again.
          LDA  $C080,X      ;Yes, take the byte.
          STA  ($0),Y       ;Store the byte in memory.
```

```

    INY                ;Move pointer to point
    BNE  CHKREADY     ;at next memory byte.
    INC  $1           ;If not at mem $8000 yet,
    BPL  CHKREADY     ;go back and do again.
    .
    .

```

The first example below, is what a raw bit stream looks like when a "normal" timing gap containing \$FF disk bytes with 2 timing bits attached is read by the disk drive. Below this, is what the disk bytes look like after they pass through a "standard" apple drive controller which "strips off" all the timing bits. Lastly, is what the raw disk bytes look like after they pass through the PLUS card (from the raw bit stream), which keeps all bits intact:

```

    Raw bit stream coming from disk drive:
    11111111001111111100111111110011111111001111111100111111110011111111

```

```

    Raw disk bytes read using the apple drive controller:
    FF      FF      FF      FF      FF      FF
    11111111 11111111 11111111 11111111 11111111 11111111

```

```

    Raw disk bytes read using the PLUS card:
    FF      3F      CF      F3      FC      FF
    11111111 00111111 11001111 11110011 11111100 11111111

```

Since raw disk bytes read using the PLUS card are not usually very useful in their "raw" format, you will often need to create a routine which separates the data bytes from the timing bits. The routine which EDD uses to read the disk and separate the timing bits is called "DCCDUMP", and is contained in the "DRIVE ROUTINES" listing.

Although it is usually not very useful, it is, of course, possible to read in a whole buffer full of raw disk bytes, and then write them out without ever decoding or analyzing them.

ADDITIONAL PLUS CARD PROGRAMMING INFORMATION:

When writing programs for use with the PLUS card, keep in mind that one raw disk byte will be ready approximately every 32 cycles (one bit in 4 cycles equals 8 bits in 32 cycles). If your routine doesn't read the raw disk byte shortly after the READY flag is set, you will miss it. KEEP YOUR LOOPS SHORT!

The book named "Beneath Apple DOS" has all of the detailed information needed for accessing the disk drive through the drive controller.

** ** **

ESSENTIAL DATA DUPLICATOR 4 MEMORY ALLOCATION _____

\$0000 - \$00FF = ZERO PAGE VARIABLES
\$0100 - \$01FF = STACK POINTER
\$0200 - \$03FF = MISC. POINTERS/VALUES
\$0400 - \$07FF = EDD LOADER
\$0800 - \$0BFF = TEXT DISPLAY SCREEN
\$0C00 - \$17C2 = MAIN EDD ROUTINES
\$17C3 - \$1CFF = CHANGE PARAMETERS & BACK UP A DISK MODULE
\$1D00 - \$20FF = SCAN DISK & CERTIFY A DISK OPTIONS MODULE
\$2100 - \$25FF = DRIVE SPEED & DRIVE EXAMINE OPTIONS MODULE
\$2600 - \$2C29 = ANALYZE A DISK MODULE
\$2C2A - \$2FFF = CONTROL MODULE
\$3000 - \$3FFF = TEXT TABLES & ADDRESSES
\$4000 - \$77FF = RAW DISK BYTE BUFFER
\$7800 - \$AFFF = TIMING BIT BUFFER
\$B000 - \$BOFF = PREANALYZE ROUTINE BUFFER
\$B100 - \$B1FF = PREWRITE ROUTINE BUFFER
\$B200 - \$B2FF = PROGRAM VARIABLE STORAGE BUFFER
\$B300 - \$B3FF = PARAMETER BUFFER
\$B400 - \$B4FF = PARAMETER BUFFER (reserved)
\$B500 - \$B6FF = EXPANSION SPACE
\$B700 - \$BFFF = DISK DRIVE ROUTINES MODULE

** ** **


```

1 *****
2 * ESSENTIAL DATA DUPLICATOR
3 * VERSION 4.2 STANDARD/PLUS
4 * 6502 ASSEMBLY SOURCE CODE
5 * COPYRIGHT (C) 1986
6 * ALL RIGHTS RESERVED
7 * UTILICO MICROWARE
8 * DONALD ANTHONY SCHNAPP
9 * PRINTED APRIL 23, 1986
10 *****
11
12 *****
13 * MAIN ROUTINE MODUAL *
14 *****
15
16 -----*
17 * MEMORY ALLOCATIONS *
18 -----*
19 ZPAGE      =      $0000      :-$00FF
20 EDD4       =      $0C00      :-$1BFF
21 CERTDISK  =      $1000
22 SCANDISK  =      $1D03
23 CHECKMEM  =      $1F0C
24 DRVEXAM   =      $2100
25 DRVSPEED  =      $2103
26 ANALYZE   =      $2600
27 CONTROL   =      $2C2A
28 TXTABLE   =      $3000      :-$3FFF
29 PREANLZ   =      $B000      :-$B0FF
30 CONTRLP   =      $B100      :-$B1FF
31 VAR        =      $B200      :-$B2FF
32 PARMS     =      $B300      :-$B3FF
33 PARMSET   =      $B400      :-$B4FF
34 DRVR      =      $B700      :-$BFFF
35
36 -----*
37 * ZERO PAGE USAGE *
38 -----*
39 W1L        =      ZPAGE+$0
40 W1H        =      ZPAGE+$1
41 W2L        =      ZPAGE+$2
42 W2H        =      ZPAGE+$3
43 W3L        =      ZPAGE+$4
44 W3H        =      ZPAGE+$5
45 W4L        =      ZPAGE+$6
46 W4H        =      ZPAGE+$7
47 W5L        =      ZPAGE+$8
48 W5H        =      ZPAGE+$9
49 SCVP       =      ZPAGE+$A
50 SCHP       =      ZPAGE+$B
51 SAL        =      ZPAGE+$C
52 SAH        =      ZPAGE+$D
53 WZPAGE1    =      ZPAGE+$E
54 WZPAGE2    =      ZPAGE+$F
55 CSLT       =      ZPAGE+$10
56 CDRV       =      ZPAGE+$11
57 CTRK       =      ZPAGE+$12
58 CWRK       =      ZPAGE+$13
59 DCF        =      ZPAGE+$14
60 HXF        =      ZPAGE+$15
61 HXL        =      ZPAGE+$16
62 HHX        =      ZPAGE+$17
63 HDCF       =      ZPAGE+$18
64 HHXL       =      ZPAGE+$19
65 HHXH       =      ZPAGE+$1A
66 LDCF       =      ZPAGE+$1B
67 LHXL       =      ZPAGE+$1C
68 LHXH       =      ZPAGE+$1D
69 VMODE      =      ZPAGE+$20
70
71 -----*
72 * VARIABLES *
73 -----*
74 LTS        =      VAR+$00
75 LTC        =      VAR+$30
76 LTP        =      VAR+$3E
77 LTEX       =      VAR+$48
78 LTEXA      =      VAR+$55
79 LTDV       =      VAR+$61
80 LTQ        =      VAR+$65
81 LTEM       =      VAR+$69
82 RA         =      VAR+$6E
83 RY         =      VAR+$6F
84 RX         =      VAR+$70
85 RP         =      VAR+$71

```

86	LVP	==	VAR+72
87	LASTHP	==	VAR+73
88	KYVALUE	==	VAR+74
89	TWINDTOP	==	VAR+75
90	SCNMBR	==	VAR+76
91	SCPT	==	VAR+77
92	SCPCB	==	VAR+78
93	SCWP	==	VAR+79
94	SCHKYVLU	==	VAR+7A
95	SCORCT	==	VAR+7B
96	SCFLTP	==	VAR+7C
97	SCULPNT	==	VAR+7D
98	PTRANGE	==	VAR+7E
99	SPDLPNTR	==	VAR+7F
100	POS	==	VAR+80
101	POD	==	VAR+81
102	PDS	==	VAR+82
103	PDD	==	VAR+83
104	DCCSLOT	==	VAR+84
105	DRVCOUNT	==	VAR+85
106	CTRKO	==	VAR+86
107	CTRKO	==	VAR+87
108	STARTRK	==	VAR+88
109	ENDTRK	==	VAR+89
110	STEP	==	VAR+8A
111	TRACK	==	VAR+8B
112	SYNCF LG	==	VAR+8C
113	NBLCLFLG	==	VAR+8D
114	TIMEFLG	==	VAR+8E
115	DRVLETT R	==	VAR+8F
116	TLENL	==	VAR+90
117	TLENH	==	VAR+91
118	WRKPNTR	==	VAR+92
119	WS	==	VAR+93
120	WSL	==	VAR+94
121	WSH	==	VAR+95
122	FLG	==	VAR+96
123	WRKPNTR2	==	VAR+97
124	WS2	==	VAR+98
125	WSL2	==	VAR+99
126	WSH2	==	VAR+9A
127	EPV	==	VAR+9B
128	EPH	==	VAR+9C
129	EPTSV	==	VAR+9D
130	EPTSH	==	VAR+9E
131	CNVHEX	==	VAR+9F
132	CNVDEC	==	VAR+A1
133	TEMPF	==	VAR+A6
134	TEMPL	==	VAR+A7
135	TEMPH	==	VAR+A8
136	TTLENL	==	VAR+A9
137	TTLENH	==	VAR+AA
138	DIFL	==	VAR+BB
139	DIFH	==	VAR+BC
140	ARMMAITR	==	VAR+BD
141	ARMCUL	==	VAR+BE
142	ARMCVH	==	VAR+BF
143	WRKSPC	==	VAR+C0
144	TRKDSL	==	VAR+C1
145	TRKDSH	==	VAR+C2
146	TRKTSH	==	VAR+C3
147	TRKDEL	==	VAR+C4
148	TRKDEH	==	VAR+C5
149	TRKTEH	==	VAR+C6
150	TRKLL	==	VAR+C7
151	TRKLN	==	VAR+C8
152	ERRORCD	==	VAR+C9
153	EDDVRSN	==	VAR+CA
154			
155			
156	*-----*		
157	* PARAMETERS *		
158	*-----*		
159	SYNCTBLE	==	PARMS+00
160	TIMEBITS	==	PARMS+09
161	SPCLCNTL	==	PARMS+0A
162	ABSLNGTL	==	PARMS+0C
163	ABSLNGTH	==	PARMS+0D
164	MINLNGLH	==	PARMS+10
165	MAXLNGLH	==	PARMS+11
166	PLNGCNTL	==	PARMS+12
167	PENDCNTL	==	PARMS+13
168	PTGAPMIN	==	PARMS+17
169	RERRORS	==	PARMS+19
170	WERRORS	==	PARMS+1A
171	TRKSYNC	==	PARMS+1B
171	MNBTEQLN	==	PARMS+1C

```

172
173 *-----*
174 * EDD4 COMMON ROUTINE HOOKS *
175 *-----*
176 *W1 = EDD4+$3
177 *W2 = EDD4+$2
178 *W3 = EDD4+$9
179 *EPCALC = EDD4+$C
180 *EPCALC1 = EDD4+$F
181 *EPOUT = EDD4+$12
182 *CHKESC = EDD4+$15
183
184 *-----*
185 * COMMON ANALYZE ROUTINE HOOKS *
186 *-----*
187 ANALYZET = ANALYZE+$0
188 FNDLNTH = ANALYZE+$3
189 WSTSYNC = ANALYZE+$6
190 NCAUTO = ANALYZE+$9
191
192 *-----*
193 * COMMON DRIVE ROUTINE HOOKS *
194 *-----*
195 TDUMPW = DRVR+$00
196 TDUMPP = DRVR+$03
197 ARMV = DRVR+$04
198 ARMV2 = DRVR+$09
199 SYNCTRK2 = DRVR+$0C
200 TRKV1 = DRVR+$0F
201 TRKV2 = DRVR+$12
202 TRKV3 = DRVR+$15
203 ARMSPD = DRVR+$18
204 WRITETRK = DRVR+$1B
205 DCCDUMP = DRVR+$1E
206 TDUMPV = DRVR+$21
207 TRKDS = DRVR+$24
208 PCRDCHK = DRVR+$27
209
210 *-----*
211 * EDD 4 MANAGER *
212 *-----*
213
214 ORG EDD4 ;$0C00
215
216 JMP EDD
217 JMP W1 ;$0C03
218 JMP W2 ;$0C04
219 JMP W3 ;$0C09
220 JMP EPCALC ;$0C0C
221 JMP EPCALC1 ;$0C0F
222 JMP EPOUT ;$0C12
223 JMP CHKESC ;$0C15
224
225 EDD LDY #0 ;INIT
226 STY SCVP ;EDD
227 STY SCHP
228 STY TWINDTOP
229 STY VMODE
230 E LDA PARMS,Y ;RESET
231 STA PARMSET,Y ;PARMS
232 INY ;TO
233 BNE E ;DEFLT
234 LDA $C051 ;SET
235 LDA $C055 ;SCREEN
236 LDA POS
237 ASLA ;SET
238 ASLA ;CURRENT
239 ASLA ;DRIVE
240 ASLA ;SLOT
241 STA CSLT
242 LDA #$FF ;UNSET
243 STA CTRKO ;CURNT
244 STA CTRKD ;TRACKS
245 LDA #0 ;DISPLY
246 JSR TOUT ;TITLE
247 JSR BL ;SCREEN
248 E0 LDA $C000
249 BPL E0
250 BIT $C010
251 E1 LDA #1 ;DISPLY
252 JSR TOUT ;E/PCODE
253 LDA #33 ;MENU
254 JSR TOUT
255 LDA #34
256 JSR TOUT
257 DE JSR MTROFF ;DOESC

```

```

00C45: 20 00 1F 25 JSR CHECKMEM
00C46: 20 00 13 58 BIT #C051
00C47: 20 00 08 60 E2 JSR SCDDSPY
00C48: 20 00 08 60 LDA #8
00C49: 20 00 75 62 STA TWINDTOP ; SET WINDOW
00C50: 20 00 03 64 LDA #3 ; DISPLAY
00C51: 20 00 4F 64 JSR TOUT ; AND GET
00C52: 20 00 4F 64 JSR SCGETO ; OPTION
00C53: 20 00 B6 66 LDX LTEDDO+1,Y
00C54: 20 00 B7 66 LDA LTEDDO+1,Y ; GET
00C55: 20 00 00 68 E3 STX WIL ; READY
00C56: 20 00 01 70 STA WIL ; TO DO
00C57: 20 00 01 70 JSR EPCLEAN ; OPTION
00C58: 20 00 01 71 LDY #1
00C59: 20 00 80 72 LDA POS
00C60: 20 00 82 72 CMP POS
00C61: 20 00 09 74 BNE #5
00C62: 20 00 81 75 LDA POS
00C63: 20 00 01 77 CMP #1
00C64: 20 00 88 78 BNE #5
00C65: 20 00 88 78 DEY ;
00C66: 20 00 44 80 ES STY DRVCOUNT ; 0=ONE
00C67: 20 00 68 80 JSR EPC ; 1=TWO
00C68: 20 00 00 80 JMP E2 ; DRIVE
00C69: 20 00 00 80 JMP (WIL) ; SYSTEM
00C70: 20 00 00 80
00C71: 20 00 00 80
00C72: 20 00 00 80
00C73: 20 00 00 80
00C74: 20 00 00 80
00C75: 20 00 00 80
00C76: 20 00 00 80
00C77: 20 00 00 80
00C78: 20 00 00 80
00C79: 20 00 00 80
00C80: 20 00 00 80
00C81: 20 00 00 80
00C82: 20 00 00 80
00C83: 20 00 00 80
00C84: 20 00 00 80
00C85: 20 00 00 80
00C86: 20 00 00 80
00C87: 20 00 00 80
00C88: 20 00 00 80
00C89: 20 00 00 80
00C90: 20 00 00 80
00C91: 20 00 00 80
00C92: 20 00 00 80
00C93: 20 00 00 80
00C94: 20 00 00 80
00C95: 20 00 00 80
00C96: 20 00 00 80
00C97: 20 00 00 80
00C98: 20 00 00 80
00C99: 20 00 00 80
00D00: 20 00 00 80
00D01: 20 00 00 80
00D02: 20 00 00 80
00D03: 20 00 00 80
00D04: 20 00 00 80
00D05: 20 00 00 80
00D06: 20 00 00 80
00D07: 20 00 00 80
00D08: 20 00 00 80
00D09: 20 00 00 80
00D10: 20 00 00 80
00D11: 20 00 00 80
00D12: 20 00 00 80
00D13: 20 00 00 80
00D14: 20 00 00 80
00D15: 20 00 00 80
00D16: 20 00 00 80
00D17: 20 00 00 80
00D18: 20 00 00 80
00D19: 20 00 00 80
00D20: 20 00 00 80
00D21: 20 00 00 80
00D22: 20 92 00 35 KYCLRGET JSR K7

```

* COMMON SUBROUTINES *

```

00D0C: 20 1F 11 KYPRMPT JSR LNFLASH ; STANDRD
00D0D: 20 00 00 JSR KYGET ; KEY
00D0E: 20 00 00 JSR KYSUB ; PROMPT
00D0F: 20 00 00 STA KYVALUE ; ROUTINE
00D10: 20 00 11 JSR LNORM
00D11: 20 00 00 JSR CHECKMEM
00D12: 20 00 00 LDA KYVALUE
00D13: 20 00 00 RTS
00D22: 20 92 00 KYCLRGET JSR K7

```

0D22	2C	10	C0	33	44	BIT	\$C010	:	CLEAR,
0D23	2C	40	00	34	45	JSR	RPH	:	GET A
0D24	2C	40	00	35	46	JSR	KYIN	:	KEY
0D25	2C	40	00	36	47	JSR	RPL	:	
0D26	2C	40	00	37	48	LDA	KYVALUE	:	
0D27	2C	40	00	38	49	RTS		:	
0D33	2C	40	00	40	50	CMP	##A0	:	REPLACE
0D34	2C	40	00	41	51	BEQ	K2	:	MOVEMNT
0D35	2C	40	00	42	52	CMP	##8A	:	KEYS
0D36	2C	40	00	43	53	BEQ	K2	:	WITH
0D37	2C	40	00	44	54	CMP	##95	:	STANDRD
0D38	2C	40	00	45	55	BEQ	K2	:	VALUES
0D39	2C	40	00	46	56	CMP	##8B	:	
0D40	2C	40	00	47	57	BNE	K3	:	
0D41	2C	40	00	48	58	LDA	##88	:	
0D42	2C	40	00	49	59	RTS		:	
0D43	2C	80	60	60	61	LDA	##8D	:	
0D44	2C	80	60	61	62	RTS		:	
0D4B	AD	00	C0	64	64	KYIN	LDA \$C000	:	GET A
0D4C	AD	10	00	65	65	BPL	KYIN	:	KEY
0D4D	AD	10	00	66	66	CMP	##E0	:	
0D4E	AD	10	00	67	67	BCC	KL3	:	
0D4F	AD	10	00	68	68	AND	##DF	:	;FIXCASE
0D50	AD	10	00	69	69	STA	KYVALUE	:	
0D51	AD	10	00	70	70	LDY	##4	:	
0D52	AD	10	00	71	71	LDX	##40	:	JUST
0D53	AD	10	00	72	72	LDA	\$C0EC	:	CLICK
0D54	AD	10	00	73	73	DEX		:	BELL
0D55	AD	10	00	74	74	BNE	KL2	:	BRIEFLY
0D56	AD	10	00	75	75	BIT	\$C030	:	
0D57	AD	10	00	76	76	DEY		:	
0D58	AD	10	00	77	77	BNE	KL1	:	
0D59	AD	10	00	78	78	BIT	\$C010	:	CHECK
0D5A	AD	10	00	79	79	LDA	KYVALUE	:	FOR
0D5B	AD	10	00	80	80	CMP	##9B	:	ESC KEY
0D5C	AD	10	00	81	81	BEQ	K4	:	AND
0D5D	AD	10	00	82	82	CMP	##84	:	CTRL-D
0D5E	AD	10	00	83	83	BEQ	K6	:	KEY
0D5F	AD	10	00	84	84	RTS		:	
0D78	AD	00	C0	85	85	KYDN1	LDA \$C000	:	ANOTHER
0D79	AD	14	00	86	86	BPL	K3	:	KYPRESS
0D7A	AD	14	00	87	87	CMP	##E0	:	ROUTINE
0D7B	AD	14	00	88	88	BCC	KL4	:	
0D7C	AD	14	00	89	89	AND	##DF	:	;FIXCASE
0D7D	AD	14	00	90	90	BIT	\$C010	:	
0D7E	AD	14	00	91	91	PHA		:	
0D7F	AD	14	00	92	92	JSR	MTROFF	:	
0D80	AD	14	00	93	93	PLA		:	
0D81	AD	14	00	94	94	CMP	##9B	:	;ESC
0D82	AD	14	00	95	95	BEQ	K4	:	
0D83	AD	14	00	96	96	PLA		:	
0D84	AD	14	00	97	97	PLA		:	
0D85	AD	14	00	98	98	RTS		:	
0D92	AC	00	C0	400	400	K7	LDY \$C000	:	CHECK
0D93	AC	00	C0	401	401	CPY	##9B	:	KYBOARD
0D94	AC	00	C0	402	402	BNE	K3	:	FOR ESC
0D95	AC	10	C0	403	403	LDA	\$C010	:	
0D96	AC	10	C0	404	404	JMP	DE	:	
0D97	AC	10	C0	405	405			:	
0D98	AC	10	C0	406	406			:	
0D99	AC	10	C0	407	407	K6	LDX PDS	:	DO
0DA0	AC	10	C0	408	408	LDY	POD	:	CNTRL-D
0DA1	AC	10	C0	409	409	LDA	PDS	:	
0DA2	AC	10	C0	410	410	STA	PDS	:	SWAP
0DA3	AC	10	C0	411	411	LDA	PDD	:	DUP
0DA4	AC	10	C0	412	412	STA	POD	:	WITH
0DA5	AC	10	C0	413	413	STX	PDS	:	ORIGNL
0DA6	AC	10	C0	414	414	STY	PDD	:	DRIVE
0DA7	AC	10	C0	415	415	LDY	CTRKO	:	
0DA8	AC	10	C0	416	416	LDX	CTRKO	:	
0DA9	AC	10	C0	417	417	STY	CTRKO	:	
0DAB	AC	10	C0	418	418	STX	CTRKO	:	
0DAC	AC	10	C0	419	419	JSR	SCDD2	:	
0DAD	AC	10	C0	420	420	JMP	KYIN	:	
0DAE	AC	10	C0	421	421			:	
0D92	85	FF	C0	422	422	CHKESC	STA \$FF	:	ANOTHER
0D93	85	FF	C0	423	423	LDA	\$C000	:	CHECK
0D94	85	FF	C0	424	424	CMP	##9B	:	ESC
0D95	85	FF	C0	425	425	BEQ	K5	:	ROUTINE
0D96	85	FF	C0	426	426	LDA	\$FF	:	
0D97	85	FF	C0	427	427	RTS		:	
0D98	85	FF	C0	428	428			:	
0D99	85	FF	C0	429	429	BL	JSR RPH	:	JUST

0DD8:	A9	00		430		LDA	#0		A
0DDA:	85	00		431		STA	#0		SIMPLE
0DDC:	AD	30	CO	432	B1	LDA	\$C030		BELL
0DDF:	20	0D	OE	433		JSR	W4		
0DE2:	C6	00		434		DEC	#0		
0DE4:	D0	F6		435		BNE	B1		
0DE6:	20	DD	15	436		JSR	RPL		
0DE9:	60			437		RTS			
0DEA:	AD	BD	B2	438					
0DED:	F0	09		439	W1	LDA	ARMWAITR		WAIT
0DEF:	AE	BF	B2	440		BEQ	W5		ROUTINE
0DF2:	AC	BE	B2	441		LDX	ARMCVH		BETWEEN
0DF5:	4C	1B	OE	442		LDY	ARMCVL		ARM
0DF8:	A2	00		443	W1S	JMP	WTIN		PHASE
0DFA:	A0	DC		444		LDX	#\$00		
0DFC:	4C	1B	OE	445		LDY	#\$DC		NORMAL
0DFE:	A2	04		446		JMP	WTIN		
0E01:	A0	00	OE	447	W2	LDX	#\$04		AFTER
0E03:	4C	1B	OE	448		LDY	#\$00		ARMMOVE
0E06:	A2	20		449		JMP	WTIN		
0E08:	A0	00		450	W3	LDX	#\$20		MOTOR
0E0A:	4C	1B	OE	451		LDY	#\$00		ON
0E0D:	A2	00		452		JMP	WTIN		
0E0F:	A0	0B	OE	453	W4	LDX	#\$00		BELL
0E11:	4C	1B	OE	454		LDY	#\$0B		STONE
0E14:	A2	03		455		JMP	WTIN		
0E16:	A0	00		456	W5	LDX	#\$03		SCREEN
0E18:	4C	1B	OE	457		LDY	#\$00		PROMPT
				458		JMP	WTIN		
				459					
0E1B:	A9	02		460	WTIN	LDA	#\$2		ACTUAL
0E1D:	8D	EC	B2	461		STA	WRKSPC		WAIT
0E20:	AD	C0	CO	462	WL	LDA	\$C0EC		ROUTINE
0E23:	CE	C0	B2	463		DEC	WRKSPC		
0E26:	D0	F8		464		BNE	WL		
0E28:	88			465		DEY			
0E29:	C0	FF		466		CPY	#\$FF		
0E2B:	D0	EE		467		BNE	WTIN		
0E2D:	CA			468		DEX			
0E2E:	E0	FF		469		CPX	#\$FF		
0E30:	D0	E9		470		BNE	WTIN		
0E32:	60			471		RTS			
				472					
0E33:	A9	00		473	CNVDH	LDA	#0		CONVERT
0E35:	8D	9F	B2	474		STA	CNVHEX		DECIMAL
0E38:	8D	A0	B2	475		STA	CNVHEX+1		INPUT
0E3B:	8D	92	B2	476		STA	WRKPNTR		CHARS
0E3E:	AC	92	B2	477	CNL1	LDY	WRKPNTR		TO HEX
0E41:	C0	05		478		CPY	#5		NUMBER
0E43:	F0	35		479		BEQ	CND1		
0E45:	B9	A1	B2	480		LDA	CNVDEC,Y		
0E48:	29	0F		481		AND	#\$0F		
0E4A:	0E	9F	B2	482		ASL	CNVHEX		
0E4D:	2E	A0	B2	483		ROL	CNVHEX+1		
0E50:	7D	9F	B2	484		ADC	CNVHEX		
0E53:	AA			485		TAX			
0E54:	A9	00		486		LDA	#0		
0E56:	6D	A0	B2	487		ADC	CNVHEX+1		
0E59:	A8			488		TAY			
0E5A:	0E	9F	B2	489		ASL	CNVHEX		
0E5D:	2E	A0	B2	490		ROL	CNVHEX+1		
0E60:	0E	9F	B2	491		ASL	CNVHEX		
0E63:	2E	A0	B2	492		ROL	CNVHEX+1		
0E66:	8A			493		TXA			
0E67:	6D	9F	B2	494		ADC	CNVHEX		
0E6A:	8D	9F	B2	495		STA	CNVHEX		
0E6D:	98			496		TYA			
0E6E:	6D	A0	B2	497		ADC	CNVHEX+1		
0E71:	8D	A0	B2	498		STA	CNVHEX+1		
0E74:	EE	92	B2	499		INC	WRKPNTR		
0E77:	4C	3E	OE	500		JMP	CNL1		
0E7A:	18			501	CND1	CLC			
0E7B:	60			502		RTS			
				503					
0E7C:	A2	00		504	CNVHAD	LDX	#0		
0E7E:	8E	A0	B2	505	CNVHAD	STX	CNVHEX+1		
0E81:	8D	9F	B2	506		STA	CNVHEX		
0E84:	A9	05		507	CNVHD	LDA	#5		CONVERT
0E86:	8D	92	B2	508		STA	WRKPNTR		HEX
0E89:	A9	A1		509		LDA	#<CNVDEC		NUMBER
0E8B:	85	08		510		STA	W5L		TO
0E8D:	A9	B2		511		LDA	#>CNVDEC		DECIMAL
0E8F:	85	09		512		STA	W5H		SCREEN
0E91:	AD	9F	B2	513		LDA	CNVHEX		OUTPUT
0E94:	8D	94	B2	514		STA	W5L		CHARS
0E97:	AD	A0	B2	515		LDA	CNVHEX+1		

0F41:	65	03	602		ADC	W2H	;MULPAND
0F43:	90	02	603		BCC	MPS1	
0F45:	E6	05	604		INC	W3H	;RSLHIGH
0F47:	88		605	MPS1	DEY		
0F48:	D0	EF	606		BNE	MPL1	
0F4A:	85	04	607		STA	W3L	;RSLLOW
0F4C:	A6	05	608		LDX	W3H	
0F4E:	60		609		RTS		
0F4F:	20	B5	610	SCGETO	JSR	SSRCH	;MANGER
0F52:	20	63	612	SCGETO2	JSR	SCCHNG	GETTING
0F55:	20	61	613		JSR	SCODSPLY	OPTION
0F58:	20	28	614		JSR	KYGET	FROM
0F5B:	C9	8D	615		CMP	#8D	SCREEN
0F5D:	F0	1D	616		BEQ	SS2	
0F5F:	20	66	617		JSR	SCCHNG1	TXNORML
0F62:	F0	D8	618		JSR	SCCHKARR	CHKKEY
0F65:	20	3F	619		BEQ	SCGETO2	
0F67:	29	3F	620		AND	#3F	IF =
0F69:	CD	76	621		CMP	SSNMBR	CURRENT
0F6C:	F0	0E	622		BEQ	SS2	NOWAIST
0F6E:	20	24	623		JSR	CHKY	
0F71:	F0	06	624		BEQ	SS1	
0F73:	20	D5	625		JSR	BL	
0F76:	4C	52	626	SS1	JMP	SCGETO2	
0F79:	20	61	627	SS2	JSR	SCODSPLY	DISPLAY
0F7C:	A5	0A	628		LDA	SCVP	BOTTOM
0F7E:	38		629		SEC		CALC
0F7F:	ED	77	630		SBC	SCPT	PTN
0F82:	AA		631		TAX		
0F83:	0A		632		ASLA		
0F84:	A8		633		TAY		
0F85:	60		634		RTS		
0F86:	85	02	635	SCVLSL	STA	W2L	
0F88:	84	04	636		STX	W3L	
0F8A:	84	06	637		STY	W4L	
0F8C:	60		638		RTS		
0F8D:	80	03	639	SCVLSHGT	STA	W2H	
0F8F:	84	07	640		STX	W3H	
0F91:	20	07	641		STY	W4H	
0F93:	20	09	642	SL1	JSR	SCCVFILL	MANAGER
0F96:	20	09	643		JSR	SCFNLN	GET VAL
0F99:	20	28	644		JSR	SCFLASH	FROM
0F9C:	20	99	645		JSR	KYGET	SCREEN
0F9F:	20	99	646		JSR	SCCFFLASH	
0FA2:	F0	D8	647		BEQ	SCCHKARR	
0FA5:	F0	0B	648		BEQ	SS3	
0FA7:	20	66	649		JSR	CHKNMBR	
0FAA:	B0	0E	650	SCE	BCC	GETVL	
0FAC:	20	D5	651		JSR	BEQ	
0FAF:	4C	96	652	SS3	JMP	L1	
0FB2:	90	E2	653		BCC	#F1	
0FB4:	A0	50	654		LDY	#A0	
0FB6:	20	EA	655		JSR	W1	
0FB9:	60		656		RTS		
0FBA:	A6		657	GETVL	TAX		
0FBB:	AD	7D	658		LDA	SCVLPNT	
0FBE:	0A		659		ASLA		
0FBF:	A8		660		TAY		
0FC0:	B1	06	661		LDA	(W4L),Y	;GETDGT
0FC2:	F0	E7	662		TXA		
0FC3:	F0		663		BEQ	SCE	
0FC5:	C8		664		INY		
0FC6:	D1	06	665		CMP	(W4L),Y	
0FC8:	80	E2	666		BCC	SCE	
0FCA:	AC	7D	667		LDY	SCVLPNT	
0FCD:	91	02	668		STA	(W2L),Y	
0FCE:	20	DB	669		JSR	W3OUT	
0FD2:	20	FB	670		JSR	SS3	
0FD5:	4C	B2	671		JMP	SS3	
0FD8:	AD	74	672	SCCHKARR	LDA	KYVALUE	CHECK
0FD9:	F0	8B	673		CMP	#8B	UP ARRW
0FDD:	F0	15	674		BEQ	SS4	
0FDF:	F0	88	675		CMP	#88	LT ARRW
0FE1:	F0	11	676		BEQ	SS4	
0FE3:	F0	8A	677		CMP	#8A	DN ARRW
0FE5:	F0	14	678		BEQ	SS5	
0FE7:	F0	95	679		CMP	#95	RT ARRW
0FE9:	F0	10	680		BEQ	SS5	
0FEB:	F0	A0	681		CMP	#A0	<SPACE>
0FEF:	F0	80	682		BEQ	SS5	
0FF1:	F0	08	683		BEQ	#08	<RETRN>

OFF3:	60			688		RTS			BNE IF
OFF4:	CE	7D	B2	689	SS4	DEC	SCVLPNT		NO
OFF7:	A9	FF		690		LDA	##FF		MATCH
OFF9:	D0	05		691		BNE	SCCALCD		
OFFB:	EE	7D	B2	692	SS5	INC	SCVLPNT		
OFFE:	A9	01		693		LDA	#1		
1000:	8D	7B	B2	694	SCCALCD	STA	SCDRCT		
1003:	AD	7B	B2	695	SCCALCD2	LDA	SCDRCT		BEQ &
1006:	18			696		CLC			
1007:	65	0A		697		ADC	SCVP		CLC IF
1009:	CD	77	B2	698		CMP	SCPT		MOVE OK
100C:	90	00		699		BCC	SS6		
100E:	CD	78	B2	700		CMP	SCPB		SEC IF
1011:	90	0C		701		BCC	SS7		WRAP
1013:	18			702		CLC			
1014:	F0	09		703		BEQ	SS7		AROUND
1016:	AD	77	B2	704		LDA	SCPT		
1019:	D0	03		705		BNE	SS41		RST TOP
101B:	AD	78	B2	706	SS6	LDA	SCPB		RST BTM
101E:	38			707	SS41	SEC			
101F:	85	0A		708	SS7	STA	SCVP		
1021:	A9	00		709		LDA	#0		
1023:	60			710		RTS			
				711					
1024:	29	3F	B2	712	SCHKY	AND	##3F		CHECK
1026:	8D	7A	B2	713		STA	SCHKYVLU		CURRENT
1029:	A5	0A		714		LDA	SCVP		KEY
102B:	8D	79	B2	715		STA	SCWP		PRESSED
102E:	20	66	10	716	SL2	JSR	SCCHNG1		TO SEE
1031:	AD	76	B2	717		LDA	SCNMBR		IF IT'S
1034:	CD	7A	B2	718		CMP	SCHKYVLU		A VALID
1037:	F0	20		719		BEQ	SCD1		OPTION
1039:	20	14	0E	720		JSR	WS		FROM
103C:	20	66	10	721		JSR	SCCHNG1		CURRENT
103F:	A5	0A		722		LDA	SCVP		MENU
1041:	CD	78	B2	723		CMP	SCPB		
1044:	F0	04		724		BEQ	SS8		
1046:	E6	0A		725		INC	SCVP		
1048:	D0	03		726		BNE	SS9		
104A:	20	5A	10	727	SS8	JSR	SSTOP		
104D:	20	51	15	728	SS9	JSR	SCVTAB		
1050:	A5	0A		729		LDA	SCVP		
1052:	CD	79	B2	730		CMP	SCWP		
1055:	D0	D7		731		BNE	SL2		
1057:	A9	FF		732		LDA	##FF		BNE
1059:	60			733	SCD1	RTS			BEQ
				734					
105A:	AD	77	B2	735	SSTOP	LDA	SCPT		
105D:	85	0A		736		STA	SCVP		
105F:	60			737		RTS			
				738					
1060:	20	03	10	739	SL3	JSR	SCCALCD2		
1063:	20	51	15	740	SCCHNG	JSR	SCVTAB		
1066:	A0	28		741	SCCHNG1	LDY	#40		IF LINE
1068:	88			742	SL4	DEY			IS BLNK
1069:	30	F5		743		BMI	SL3		CALC
106B:	B1	0C		744		LDA	(SAL),Y		NEXT
106D:	29	3F		745		AND	##3F		LINE
106F:	49	20		746		EOR	##20		
1071:	F0	F5		747		BEQ	SL4		OTHERWS
1073:	8C	93	B2	748		STY	WS		CHANGE
1076:	A0	FF		749		LDY	##FF		LINE
1078:	C8			750	SL5	INY			TO
1079:	B1	0C		751		LDA	(SAL),Y		OPITE
107B:	29	3F		752		AND	##3F		
107D:	8D	76	B2	753		STA	SCNMBR		STR 1ST
1080:	49	20		754		EOR	##20		
1082:	F0	F4		755		BEQ	SL5		
1084:	88			756		DEY			
1085:	C8			757	SL6	INY			CHANGE
1086:	B1	0C		758		LDA	(SAL),Y		NORMAL
1088:	49	20		759		EOR	##20		TO
108A:	29	20		760		AND	##20		INVERSE
108C:	0A			761		ASLA			- OR -
108D:	09	80		762		ORA	##80		INVERSE
108F:	51	0C		763		EOR	(SAL),Y		TO
1091:	91	0C		764		STA	(SAL),Y		NORMAL
1093:	CC	93	B2	765		CPY	WS		
1096:	D0	ED		766		BNE	SL6		
1098:	60			767		RTS			
				768					
1099:	20	CB	15	769	SCFLASH	JSR	RPH		TAKE
109C:	20	F2	10	770		JSR	SSLN		CURRENT
109F:	B1	0C		771	SL7	LDA	(SAL),Y		LINE
10A1:	20	66	15	772		JSR	CHKNMBR		AND
10A4:	90	0B		773		BCC	SCD2		TURN

10A6:	B1	0C	774		LDA	(SAL),Y	IT TO
10A8:	49	0C	775		EOR	#\$C0	FLASH
10AA:	91	0C	776		STA	(SAL),Y	
10AC:	84	0B	777		STY	SCHP	
10AF:	88		778		DEY		
10AF:	D0	EE	779		BNE	SL7	
10B1:	20	DD	780	SCD2	JSR	RPL	
10B4:	60		781		RTS		
			782				
10B5:	A9	17	783	SSRCH	LDA	#23	SEARCH
10B7:	85	0A	784		STY	SCVP	SCREEN
10B9:	C6	0A	785	SL8	DEC	SCVP	FOR
10BB:	20	F2	786		JSR	SSLN	LAST
10BB:	F0	F9	787		BEQ	SL8	LINE
10CC:	A5	0A	788		LDA	SCVP	OF
10CC:	8D	78	789	B2	STA	SCPB	MENU,
10CC:	A9	0A	790		LDA	SCVP	THEN,
10CC:	85	0A	791		STA	SCVP	FIRST
10CC:	E6	0A	792	SL9	INC	SCVP	LINE
10CC:	20	F2	793		JSR	SSLN	
10CC:	F0	F9	794		BEQ	SL9	
10DD:	A5	0A	795		LDA	SCVP	
10D2:	8D	77	796	B2	STA	SCPT	
10D5:	60		797		RTS		
			798				
10D6:	A5	0A	799	SSFNLN	LDA	SCVP	FIND
10D8:	CD	78	800	B2	CMP	SCPB	NEXT
10DB:	F0	08	801		BEQ	SCD3	VALID
10DD:	E6	0A	802		INC	SCVP	LINE
10DF:	20	F2	803	10	JSR	SSLN	
10FE:	F0	F2	804		BEQ	SSFNLN	
10FE:	18		805		CLC		CLC/
10FE:	60		806	SCD3	RTS		SEC
			807				
10F4:	20	03	808	SL10	JSR	SCCALCD2	
10FE:	20	F2	809	SCFNLN	JSR	SSLN	
10FE:	F0	F8	810		BEQ	SL10	
10FE:	20	0A	811		JSR	SCPNUMB1	
10F1:	60		812		RTS		
			813				
10F2:	20	51	814	SSLN	JSR	SCVTAB	
10F5:	A0	27	815		LDY	#39	
10F7:	84	0B	816	SL11	STY	SCHP	
10F9:	EE	0B	817		INC	SCHP	
10FB:	88		818		DEY		SEARCH
10FC:	C0	FF	819		CPY	#\$FF	SCREEN
10FE:	F0	09	820		BEQ	SCD4	LINE
1100:	B1	0C	821		LDA	(SAL),Y	FOR NON
1102:	AA		822		TAX		SPACE
1103:	29	3F	823		AND	#\$3F	BEQ =
1105:	C9	20	824		CMP	#\$20	IF NO
1107:	F0	EE	825		BEQ	SL11	CHARS
1109:	60		826	SCD4	RTS		BEQ/BNE
			827				
110A:	B1	0C	828	SCPNUMB1	LDA	(SAL),Y	GET THE
110C:	29	3F	829		AND	#\$3F	NUMBER
110E:	C9	30	830		CMP	#\$30	OF THE
1110:	90	07	831		BCC	SCD5	CURRENT
1112:	C9	3A	832		CMP	#\$3A	OPTION
1114:	B0	03	833		BCS	SCD5	FROM
1116:	88		834		DEY		SCREEN
1117:	D0	F1	835		BNE	SCPNUMB1	
1119:	C8		836	SCD5	INY		
111A:	C8		837		INY		
111B:	84	0B	838		STY	SCHP	
111D:	60		839		RTS		
			840				
111E:	A0	27	841	LNFLASH	LDY	#39	ACTUAL
1120:	B1	0C	842	LFL1	LDA	(SAL),Y	FLASH
1122:	C9	A0	843		CMP	#\$A0	THE
1124:	F0	12	844		BEQ	LFS1	CURRENT
1126:	C9	BD	845		CMP	#"	SCREEN
1128:	F0	11	846		BEQ	LFS2	LINE
112A:	C9	BA	847		CMP	#":"	
112C:	F0	0D	848		BEQ	LFS2	
112E:	C9	BF	849		CMP	#"?"	
1130:	F0	09	850		BEQ	LFS2	
1132:	29	3F	851		AND	#\$3F	
1134:	09	40	852		ORA	#\$40	
1136:	91	0C	853		STA	(SAL),Y	
1138:	88		854	LFS1	DEY		
1139:	D0	E5	855		BNE	LFL1	
113B:	60		856	LFS2	RTS		
			857				
113C:	A0	27	858	LNNORM	LDY	#39	TAKE
113E:	B1	0C	859	LNL1	LDA	(SAL),Y	LINE

```

1140:  A0          CMP    #A0      AND
1142:  A0          BEQ    LNS2     TURN
1144:  A0          CMP    #A1      IT
1146:  A0          BEQ    LNS3     BACK
1148:  A0          CMP    #A2      TO
1150:  A0          BEQ    LNS3     NORMAL
1152:  A0          AND    #03F
1154:  A0          STA    WS      #C0
1156:  A0          LDA    LNS1
1158:  A0          BCC    LNS1
1160:  A0          ORA    A      WS
1162:  A0          STA    (SAL),Y (SAL),Y
1164:  A0          LNS2  DEY     LNS1
1166:  A0          BNE     LNS1
1168:  A0          RTS
1170:  A0          SCODSPLY LDA    SCVP      DISPLY
1172:  A0          PHA          SCRN
1174:  A0          LDA    #4      OPTION
1176:  A0          JSR    TOUT     AT
1178:  A0          LDA    SCNMBR  BTM
1180:  A0          ORA    #B0     OF
1182:  A0          JSR    COUT     SCR
1184:  A0          PLA          THEN
1186:  A0          JSR    SCVTAB1 RESET
1188:  A0          RTS          SCREEN
1190:  A0          GTDRV01 LDA    #D"    DLT=DUP
1192:  A0          JSR    SCGTDRV  GETDRV
1194:  A0          LDA    #0      DISPLAY
1196:  A0          JSR    SCDINSRT INSERT
1198:  A0          RTS          BLANK
1200:  A0          GTDRV02 LDA    #0"    ;DFT=ORG
1202:  A0          JSR    SCGTDRV
1204:  A0          JSR    SCDINSR1
1206:  A0          RTS
1208:  A0          BLNKIND LDA    #D"    ;INSRT
1210:  A0          JSR    SETDRV  BLNK
1212:  A0          LDA    #0      INTO
1214:  A0          JSR    SCDINSRT DUP
1216:  A0          RTS
1218:  A0          SCGTDRV STA    DRVLETTR  GET
1220:  A0          LDA    #9      EITHER
1222:  A0          JSR    TOUT     ORIGINAL
1224:  A0          JSR    SCDIND02 OR
1226:  A0          JMP    SS10     DUP
1228:  A0          JSR    BL      DRIVE
1230:  A0          JSR    KYGET
1232:  A0          CMP    #B0     ;RTRN
1234:  A0          BNE    SETDRV
1236:  A0          SETDRV2 LDA    DRVLETTR
1238:  A0          SETDRV  TAX
1240:  A0          CMP    #D"    #D"
1242:  A0          BEQ    SS12     SS12
1244:  A0          CMP    #0"    #0"
1246:  A0          BNE    SL12     SL12
1248:  A0          LDA    CTRK0   CTRK0
1250:  A0          STA    CTRK     CTRK
1252:  A0          LDA    POS      POS
1254:  A0          LDY    POD      POD
1256:  A0          JMP    STRCNT2  STRCNT2
1258:  A0          SS12  LDA    CTRKD   CTRKD
1260:  A0          STA    CTRK     CTRK
1262:  A0          LDA    PDS      PDS
1264:  A0          LDY    PDD      PDD
1266:  A0          STRCNT2 STX    DRVLETTR  DRVLETTR
1268:  A0          ASLA          ASLA
1270:  A0          ASLA          ASLA
1272:  A0          ASLA          ASLA
1274:  A0          STA    CSLT    CSLT
1276:  A0          STY    CDRV    CDRV
1278:  A0          RTS          ;$10
1280:  A0          SCDINSR1 LDA    DRVLETTR  ;$11
1282:  A0          SCDINSRT PHA
1284:  A0          LDA    #10     #10
1286:  A0          JSR    TOUT     DISK
1288:  A0          PLA          A=0,
1290:  A0          JSR    SCDIND0 A=D,
1292:  A0          BCC    SS14  OR

```

111	200	A0	02	980	GETRKS3AH	LDY	#2	;ADD=HLF
111	200	A0	02	981	GETRKS3AH	BNE	GETRKS1	
111	200	A0	04	982	GETRKS3AH	LDY	#4	
111	200	A0	00	983	GETRKS3AH	LDX	#0	1
111	200	A0	00	984	GETRKS3AH	LDX	##88	0
111	200	A0	00	985	GETRKS3AH	STA	STARTRK	34
111	200	A0	00	986	GETRKS3AH	STX	ENDTRK	DFLT
111	200	A0	00	987	GETRKS3AH	STY	STEP	DFLT
111	200	A0	00	988	GETRKS3AH	LDY	#13	DFLT
111	200	A0	00	989	GETRKS3AH	JSR	SCVTAB1	
111	200	A0	00	990	GETRKS3AH	LDY	#0	
111	200	A0	00	991	GETRKS3AH	STA	SCHP	
111	200	A0	00	992	GETRKS3AH	LDY	#30	GET
111	200	A0	00	993	GETRKS3AH	JSR	TOUT	START
111	200	A0	00	994	GETRKS3AH	LDY	STARTRK	END &
111	200	A0	00	995	GETRKS3AH	JSR	GETNUMB	STEP
111	200	A0	00	996	GETRKS3AH	BCS	GETRKS3	TRACKS
111	200	A0	00	997	GETRKS3AH	STA	STARTRK	FROM
111	200	A0	00	998	GETRKS3AH	JSR	SCNV	USER
111	200	A0	00	999	GETRKS3AH	LDY	#31	
111	200	A0	00	1000	GETRKS3AH	JSR	TOUT	
111	200	A0	00	1001	GETRKS3AH	LDY	ENDTRK	
111	200	A0	00	1002	GETRKS3AH	JSR	GETNUMB	
111	200	A0	00	1003	GETRKS3AH	STA	ENDTRK	
111	200	A0	00	1004	GETRKS3AH	BCC	GTS1	
111	200	A0	00	1005	GETRKS3AH	JSR	SLV	
111	200	A0	00	1006	GETRKS3AH	JMP	GETRKS3	
111	200	A0	00	1007	GETRKS3AH	CMP	STARTRK	
111	200	A0	00	1008	GETRKS3AH	BEQ	GTS3	
111	200	A0	00	1009	GETRKS3AH	JSR	SCNV	
111	200	A0	00	1010	GETRKS3AH	LDY	#32	
111	200	A0	00	1011	GETRKS3AH	JSR	TOUT	
111	200	A0	00	1012	GETRKS3AH	LDY	STEP	
111	200	A0	00	1013	GETRKS3AH	JSR	GETNUMB	
111	200	A0	00	1014	GETRKS3AH	STA	STEP	
111	200	A0	00	1015	GETRKS3AH	BCC	GTS3	
111	200	A0	00	1016	GETRKS3AH	JSR	SLV	
111	200	A0	00	1017	GETRKS3AH	JMP	GTL2	
111	200	A0	00	1018	GETRKS3AH	RTS		
111	200	A0	00	1019	GETRKS3AH	JSR	SHTAB	GET
111	200	A0	00	1020	GETRKS3AH	STA	TRACK	TRACK
111	200	A0	00	1021	GETRKS3AH	JSR	RHTAB	NUMBER
111	200	A0	00	1022	GETRKS3AH	JSR	TRKOUT	
111	200	A0	00	1023	GETRKS3AH	JSR	KYPRMPT	
111	200	A0	00	1024	GETRKS3AH	CMP	" "	DECML?
111	200	A0	00	1025	GETRKS3AH	BEQ	GETDEC	
111	200	A0	00	1026	GETRKS3AH	JSR	GNBCHKD	
111	200	A0	00	1027	GETRKS3AH	CMP	##B0	
111	200	A0	00	1028	GETRKS3AH	BCC	GNBL2	
111	200	A0	00	1029	GETRKS3AH	CMP	##BA	
111	200	A0	00	1030	GETRKS3AH	BCS	GNBL2	

10	AD	8B	B2	10		LDA	TRACK	
11	4A			11		L\$RRA		
12	4A			12		L\$RRA		
13	20	7C	0E	13		JSR	CNVHAD	
14	AD	AD	B2	14		LDA	CNVDEC+4	
15	AD	AD	B2	15		CMP	#\$B4	
16	AD	AD	B2	16		BCC	GNBS2	
17	AD	AD	B2	17		LDA	#\$B0	
18	AD	AD	B2	18	GNBS2	STA	CNVDEC+3	
19	AD	AD	B2	19		LDA	KYVALUE	
20	AD	AD	B2	20		STA	CNVDEC+4	
21	AD	AD	B2	21		JSR	CNVDH	
22	AD	AD	B2	22		LDA	CNVHEX	
23	AD	AD	B2	23		ASLA		
24	AD	AD	B2	24		ASLA		
25	AD	AD	B2	25		JMP	GNBL	
26	AD	AD	B2	26				
27	AD	AD	B2	27	GETDEC	LDA	TRACK	: GET
28	AD	AD	B2	28		AND	#3	: HALF
29	AD	AD	B2	29		BNE	GDL1	: OR
30	AD	AD	B2	30		LDA	"."	: QUARTR
31	AD	AD	B2	31		JSR	COU	: TRACK
32	AD	AD	B2	32		JSR	KYPRMPT	
33	AD	AD	B2	33	GDL1	JSR	GNBCHKD	
34	AD	AD	B2	34		LDY	#3	
35	AD	AD	B2	35	GDL2	CMP	LTQ,Y	
36	AD	AD	B2	36		BEQ	GDS1	
37	AD	AD	B2	37		DEY		
38	AD	AD	B2	38		BPL	GDL2	
39	AD	AD	B2	39		JMP	GDL1	
40	AD	AD	B2	40				
41	AD	AD	B2	41	GDS1	LDA	TRACK	: DISPLAY
42	AD	AD	B2	42		AND	#\$FC	: CURRENT
43	AD	AD	B2	43		STA	TRACK	: TRACK
44	AD	AD	B2	44		TYA		: VALUE
45	AD	AD	B2	45		QBA	TRACK	: AT
46	AD	AD	B2	46		STA	TRACK	: THIS
47	AD	AD	B2	47		JSR	RHTAB	: TIME
48	AD	AD	B2	48		JSR	TRKOUT	
49	AD	AD	B2	49		LDA	TRACK	
50	AD	AD	B2	50		AND	#3	
51	AD	AD	B2	51		BEQ	GNBL2	
52	AD	AD	B2	52		JMP	GDL1	
53	AD	AD	B2	53				
54	AD	AD	B2	54	GNBCHKD	CMP	#\$8D	: DONE
55	AD	AD	B2	55		BEQ	GNBCS1	: GETTING
56	AD	AD	B2	56		CMP	#\$88	: TRACK
57	AD	AD	B2	57		BNE	GNBD	: VALUE?
58	AD	AD	B2	58		SEC		
59	AD	AD	B2	59		BCS	GNBC3	
60	AD	AD	B2	60	GNBCS1	CLC		
61	AD	AD	B2	61	GNBC3	PLA		
62	AD	AD	B2	62		PLA		
63	AD	AD	B2	63		LDA	TRACK	
64	AD	AD	B2	64	GNBD	RTS		
65	AD	AD	B2	65				
66	AD	AD	B2	66	GETSYN	LDA	#35	: SYNC
67	AD	AD	B2	67		JSR	GETYSNO	: TRACKS?
68	AD	AD	B2	68		STY	SYNCFLG	
69	AD	AD	B2	69		RTS		
70	AD	AD	B2	70	GETTIME	LDA	#45	: READ
71	AD	AD	B2	71		CLC		: TIMING
72	AD	AD	B2	72		JSR	GETYSNO	: BITS?
73	AD	AD	B2	73		STY	TIMEFLG	
74	AD	AD	B2	74		RTS		
75	AD	AD	B2	75	GETYSNO	PHP		: DEFLT:
76	AD	AD	B2	76		JSR	TOUT	
77	AD	AD	B2	77		JSR	SHTAB	
78	AD	AD	B2	78		LDY	#37	: CLC=N
79	AD	AD	B2	79		PLP		: SEC=Y
80	AD	AD	B2	80		BCC	GSS1	
81	AD	AD	B2	81	GSS1	DEY		
82	AD	AD	B2	82		STY	WS2	
83	AD	AD	B2	83		TYA		
84	AD	AD	B2	84		JSR	TOUT	
85	AD	AD	B2	85		JSR	RHTAB	
86	AD	AD	B2	86	GSL1	JSR	KYPRMPT	
87	AD	AD	B2	87		CMP	#\$8D	
88	AD	AD	B2	88		BEQ	GSS3	
89	AD	AD	B2	89		LDY	#37	
90	AD	AD	B2	90		CMP	"N"	
91	AD	AD	B2	91		BEQ	GSS2	
92	AD	AD	B2	92		DEY		
93	AD	AD	B2	93		CMP	"Y"	
94	AD	AD	B2	94		BNE	GSL1	
95	AD	AD	B2	95	GSS2	STY	WS2	

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12200200 00 B2 15 98          TYA  TOUT
12200200 00 B2 16 98          JSR  #F
12200200 00 B2 22 08 GSS3  LDA  COUT
12200200 00 B2 23 08          LDA  WS2
12200200 00 B2 24 08          LDY  #1
12200200 00 B2 25 08          CMP  #37
12200200 00 B2 26 08          BNE  GSS4
12200200 00 B2 27 08          RTS
                                        : 0=NO
                                        : 1=YES

12200200 00 B2 00 92          NTRKCALC JSR  K7
12200200 00 B2 01 92          LDA  STEP
12200200 00 B2 02 92          BEQ  NTD1
12200200 00 B2 03 92          LDA  NTD1
12200200 00 B2 04 92          BEQ  NTD1
12200200 00 B2 05 92          LDA  CTRK
12200200 00 B2 06 92          BEQ  NTD1
12200200 00 B2 07 92          LDA  ENDTRK
12200200 00 B2 08 92          BEQ  NTD1
12200200 00 B2 09 92          LDA  NTD1
12200200 00 B2 10 92          BEQ  NTD1
12200200 00 B2 11 92          LDA  NTD1
12200200 00 B2 12 92          BEQ  NTD1
12200200 00 B2 13 92          LDA  ENDTRK
12200200 00 B2 14 92          BEQ  NTD1
12200200 00 B2 15 92          LDA  NTD1
12200200 00 B2 16 92          BEQ  NTD1
12200200 00 B2 17 92          LDA  CTRK
12200200 00 B2 18 92          BEQ  NTD1
12200200 00 B2 19 92          LDA  NTD1
12200200 00 B2 20 92          BEQ  NTD1

12200200 00 B2 01 93          EPCALC  LDA  CTRK
12200200 00 B2 02 93          EPALC1 CMP  #90
12200200 00 B2 03 93          BCC  EPCCS1
12200200 00 B2 04 93          LDA  #8F
12200200 00 B2 05 93          PHA
12200200 00 B2 06 93          AND  #3
12200200 00 B2 07 93          CLC
12200200 00 B2 08 93          ADC  #3
12200200 00 B2 09 93          STA  EPU
12200200 00 B2 10 93          LDA  #4
12200200 00 B2 11 93          AND  #4
12200200 00 B2 12 93          STA  EPH
12200200 00 B2 13 93          RTS
                                        : CALC
                                        : WINDOW
                                        : POSTN
                                        : FOR
                                        : CURRENT
                                        : TRACK
                                        : IN E/P
                                        : CODE
                                        : STATUS

12200200 00 B2 07 15          SCDDSPY LDA  #7
12200200 00 B2 08 15          JSR  SCVTAB1
12200200 00 B2 09 15          LDA  #2
12200200 00 B2 10 15          JSR  TOUT
12200200 00 B2 11 15          LDY  #0
12200200 00 B2 12 15          LDX  #0
12200200 00 B2 13 15          SCDD2  LDA  #B80,Y
12200200 00 B2 14 15          SCDDL  CMP  #B80
12200200 00 B2 15 15          BCC  SCDDS
12200200 00 B2 16 15          CMP  #B9
12200200 00 B2 17 15          BCS  SCDDS
12200200 00 B2 18 15          LDA  POS,X
12200200 00 B2 19 15          ORA  #B80,Y
12200200 00 B2 20 15          STA  INX
12200200 00 B2 21 15          SCDDS INY
12200200 00 B2 22 15          CPY  #40
12200200 00 B2 23 15          BNE  SCDDL
12200200 00 B2 24 15          RTS

12200200 00 B2 10 11          SCVFILL LDA  #0
12200200 00 B2 11 11          STA  SCFLTP
12200200 00 B2 12 11          JSR  SSRCH
12200200 00 B2 13 11          JSR  SCPNUMB1
12200200 00 B2 14 11          LDY  SCFLTP
12200200 00 B2 15 11          LDA  (W2L),Y
12200200 00 B2 16 11          JSR  HADUT
12200200 00 B2 17 11          INC  SCFLTP
12200200 00 B2 18 11          JSR  SFFNLN
12200200 00 B2 19 11          BCC  SL14
12200200 00 B2 20 11          JSR  SSTOP
12200200 00 B2 21 11          LDA  #0
12200200 00 B2 22 11          STA  SCVLPNT
12200200 00 B2 23 11          STA  PTRANGE
                                        : FILL
                                        : SCREEN
                                        : WITH
                                        : CURRENT
                                        : VALUES
                                        :
                                        : OR
                                        : DEFAULT
                                        : VALUES

SL14

```

140E:	60		1204	RTS		
140F:	A9	00	1205			
1411:	8D	98	1206	EPCLEAN	LDA #0	:ERASE
1414:	20	A7	1207		STA WS2	:CURRENT
1417:	20	43	1208	EPCL1	JSR EPCALC1	:E/P
141A:	C9	40	1209		JSR EPIN	:CODES
141C:	B0	05	1210		CMP ##40	
141E:	A9	A0	1211		BCS EPCS1	
1420:	20	35	1212		LDA ##A0	
1423:	EE	98	1213	EPCS1	JSR EPQUT	
1426:	AD	98	1214		INC WS2	
1429:	C9	90	1215		LDA WS2	
142B:	D0	E7	1216		CMP ##90	
142D:	20	A5	1217		BNE EPCL1	
1430:	60		1218		JSR EPCALC	:RESET
			1219	RTS		
			1220			
1431:	08		1221	EPBOUT	PHP	:BLANK
1432:	A9	A0	1222		LDA ##A0	:OUT
1434:	28		1223		PLP	
1435:	08		1224	EPOUT	PHP	
1436:	48		1225		PHA	
1437:	20	4E	1226		JSR EPR1	
143A:	68		1227		PLA	
143B:	20	20	1228		JSR COUT	
143E:	20	64	1229		JSR EPR2	
1441:	28		1230		PLP	
1442:	60		1231		RTS	
1443:	20	4E	1232	EPIN	JSR EPR1	:E/P IN
1446:	B1	0C	1233		LDA (SAL),Y	:READ
1448:	48		1234		PHA	:SCREEN
1449:	20	64	1235		JSR EPR2	
144C:	28		1236		PLA	
144D:	60		1237		RTS	
144E:	A5	0A	1238	EPR1	LDA SCVP	
1450:	8D	9D	1239		STA EPTSV	
1453:	A5	0B	1240		LDA SCHP	
1455:	8D	9E	1241		STA EPTSH	
1458:	AD	9B	1242		LDA EPV	
145B:	20	53	1243		JSR SCVTAB1	
145E:	AC	9C	1244		LDY EPH	
1461:	84	0B	1245		STY SCHP	
1463:	60		1246		RTS	
1464:	AD	9D	1247	EPR2	LDA EPTSV	
1467:	20	53	1248		JSR SCVTAB1	
146A:	AD	9E	1249		LDA EPTSH	
146D:	85	0B	1250		STA SCHP	
146F:	60		1251	RTS		
			1252			
1470:	20	79	1253	TRKOUT	JSR TRKOUT1	
1473:	A9	0B	1254		LDA #'C'	
1475:	20	20	1255		JSR COUT	
1478:	60		1256		RTS	
1479:	AD	8B	1257	TRKOUT1	LDA TRACK	
147C:	85	16	1258	TRKOUT2	STA HXL	:DISPLAY
147E:	A9	00	1259		LDA #0	:TRACK
1480:	85	17	1260		STA HXH	:NUMBER
1482:	46	16	1261		LSR HXL	
1484:	6A		1262		RORA	
1485:	46	16	1263		LSR HXL	
1487:	6A		1264		RORA	
1488:	85	15	1265		STA HXF	
148A:	20	A5	1266		JSR NMBFOUT2	
148D:	AD	A5	1267		LDA CNUDEC+4	:HNDRTHS
1490:	C9	B0	1268		CMP ##B0	
1492:	F0	03	1269		BEQ TRS1	
1494:	20	20	1270		JSR COUT	
1497:	60		1271	TRS1	RTS	
			1272			
1498:	20	FE	1273	RPMOUT	JSR SHTAB	:DISPLY
149B:	20	E3	1274		JSR HOUT	:DRIVE
149E:	20	BF	1275		JSR TNTHCLCO	:SPEED
14A1:	A9	14	1276		LDA #20	:IN RPMS
14A3:	20	05	1277		JSR TOUT	
14A6:	20	07	1278		JSR RHTAB	
14A9:	60		1279		RTS	
14AA:	A5	16	1280	NMBFOUT2	LDA HXL	
14AC:	A6	17	1281		LDX HXH	
14AE:	20	DD	1282		JSR HXAOUT	:DISPLY
14B1:	A5	15	1283		LDA HXF	:WHOLE
14B3:	85	04	1284		STA W3L	:NUMBERS
14B5:	A9	01	1285		LDA #1	:AND
14B7:	85	01	1286		STA W1H	:FRCTN
14B9:	A9	00	1287		LDA #0	
14BB:	85	05	1288		STA W3H	
14BD:	85	00	1289		STA W1L	

14B	20	0E	12	TNTHCLCO	JSR	CALCF2		
14C	D4	B2	22		LDA	CNVDEC+3		
14C	B0		29		CMP	##B0		
14C	11		29	TNTHSOUT	BEQ	NMS2		
14C	20		29		LDA	#		
14C	20		29		JSR	COUT		
14C	20	16	29		LDA	CNVHEX		
14D	8D	B2	29		STA	TEMPF		
14D	20	B2	29		LDA	CNVDEC+3		; TENTHS
14D	20	16	29		JSR	COUT		
14D	60		30	NMS2	RTS			
14D	22	0E	30	HAOUT	LDX	#0		: DISPLY
14D	20	14	30	HXAOUT	JSR	CNVHXAD		HEX
14D	20	0E	30		JMP	DOUT		NUMBER
14D	20	0E	30	HOUT	JSR	CNVHD		
14D	20		30	DOUT	LDX	#0		: DISPLY
14D	20	B2	30		LDA	##B0		DECIML
14D	20	B2	30	DOL1	STA	WS		NUMBER
14D	20	B2	30		LDA	CNVDEC,X		
14D	20	B2	30		BCPX	#4		
14D	20	B2	30		BEQ	DOS1		
14D	20	B2	30		CMP	WS		
14D	20	16	30	DOS1	BEQ	DOS2		
14D	20	B2	30		JSR	COUT		
14D	20	B2	30	DOS2	STX	WS		
14D	20	05	30		INX	#5		
14D	20	09	30		CPXX	DOL1		
14D	20		30		BNE			
14D	20		30		RTS			
14E	20	CB	15	TOUT	JSR	RPH		: TEXTOUT
14E	20		15		ASLA			ROUTINE
14E	20		15		TAY			
14E	20		15		LDA	TXTABLE,Y		: PRINT
14E	20		15		STA	WIL		FORMTID
14E	20		15		LDA	TXTABLE+1,Y		: TEXT
14E	20		15	TOL1	STA	WIL		ONTO
14E	20		15		LDY	#0		SCREEN
14E	20		15		LDA	(WIL),Y		
14E	20		15		CMP	#0		: CHECK
14E	20		15		BEQ	TOD1		TEXT
14E	20		15		CMP	#0		FOR
14E	20		15		BEQ	TOD2		SPECIAL
14E	20		15		CMP	#0		CHRS
14E	20		15		BEQ	TOD4		
14E	20		15		CMP	#0		
14E	20		15		BEQ	TOD3		
14E	20		15	TOL2	JSR	COUT		
14E	20		15		INC	WIL		
14E	20		15	TOD1	BNE	TOL1		
14E	20		15		INC	WIL		
14E	20		15	TOD4	JMP	TOL1		
14E	20		15	TOD3	LDA	#0		
14E	20		15	TOD2	STA	VMODE		
14E	20		15	TOS1	JMP	RPL		
14E	20		15		LDA	##FF		
14E	20		15		BNE	TOS1		
14E	20		15		LDA	#0		
14E	20		15		BEQ	TOS1		
14E	20		15		LDA	#1		
14E	20		15		STA	VMODE		
14E	20		15		JMP	TOL2		
14F	0A	15	30	SCNV	INC	SCVP		
14F	0A		30		JMP	SCVTAB		
14F	0A		30	SLV	DEC	SCVP		
14F	0A		30	SCVTAB	LDA	SCVP		: CALC
14F	0A		30	SCVTAB1	STA	SCVP		SCREEN
14F	0A		30		ASLA			: VTAB
14F	0A		30		TAY			ADDRESS
14F	0A	B2	30		LDA	LTS,Y		
14F	0A	B2	30		STA	SAL		
14F	0A		30		LDA	LTS+1,Y		
14F	0A		30		STA	SAH		
14F	0A		30		LDY	#0		
14F	0A		30		STY	SCHP		
14F	0A		30		RTS			
14F	20	3F	30	CHKNMBR	AND	##3F		: CHECK
14F	20	05	30		CMP	##3A		"A" FOR
14F	20	0F	30		BCS	CHS1		VALID
14F	20		30		CMP	##30		DECIML
14F	20		30		AND	##0F		NUMBER
14F	20		30	CHS1	RTS			
14F	20		30		CLC			: SEC=YES

1572:	60			1376	RTS		;CLC=NO
1573:	A9	FF		1377			
1575:	A0	00		1378	SETBS	LDA	#\$FF
1577:	20	83	15	1379		LDY	#0
157A:	A9	AA		1380		JSR	SETBV
157C:	80	FF	93	1381		LDA	#\$AA
157E:	80	FF	93	1382		STA	\$93FE
1582:	60			1383		STA	\$93FF
				1384		RTS	
				1385			
1583:	80	93	B2	1386	SETBV	STA	WS
1585:	8C	98	B2	1387		STY	WS2
1588:	A9	78		1388		LDA	#\$78
158B:	85	01		1389		STA	\$1
158D:	A9	94		1390		LDA	#\$94
158F:	85	03		1391		STA	\$3
1591:	A0	00		1392		LDY	#0
1593:	84	00		1393		STY	\$0
1595:	84	02		1394		STY	\$2
1597:	AD	93	B2	1395	SE1	LDA	WS
1599:	91	00		1396		STA	(\$0),Y
159B:	AD	98	B2	1397		LDA	WS2
159D:	91	02		1398		STA	(\$2),Y
159F:	A1	C8		1399		INY	
15A2:	D0	F3		1400		BNE	SE1
15A4:	E6	03		1401		INC	\$3
15A6:	E6	01		1402		INC	\$1
15A8:	A5	03		1403		LDA	\$3
15AA:	C9	B0		1404		CMP	#\$B0
15AC:	D0	E9		1405		BNE	SE1
15AE:	A9	FF		1406		LDA	#\$FF
15B0:	8D	90	B2	1407		STA	TLENL
15B2:	A9	1B		1408		LDA	#\$1B
15B4:	8D	91	B2	1409		STA	TLENH
15B8:	60			1410		RTS	
				1411			
15B9:	20	99	17	1412	PDONE	JSR	MTROFF
15BB:	A9	18		1413	PDONE1	LDA	#24
15BD:	20	05	15	1414		JSR	TOUT
15BF:	20	D5	0D	1415		JSR	BL
15C1:	20	22	0D	1416		JSR	KYCLRGET
15C3:	2C	51	C0	1417		BIT	\$C051
15C7:	60			1418		RTS	
				1419			
15CB:	08			1420	RPH	PHP	
15CD:	8D	6E	B2	1421		STA	RA
15CF:	8C	6F	B2	1422		STY	RY
15D1:	8E	70	B2	1423		STX	RX
15D3:	68			1424		PLA	
15D5:	8D	71	B2	1425		STA	RP
15D7:	AD	6E	B2	1426		LDA	RA
15DB:	60			1427		RTS	
				1428			
15DD:	AD	71	B2	1429	RPL	LDA	RP
15DF:	48			1430		PHA	
15E1:	AD	6E	B2	1431		LDA	RA
15E3:	AC	6F	B2	1432		LDY	RY
15E5:	AE	70	B2	1433		LDX	RX
15E7:	28			1434		PLP	
15EB:	60			1435		RTS	
				1436			
15EC:	A6	0A		1437	SVTAB	LDX	SCVP
15EE:	8E	72	B2	1438		STX	LVP
15F1:	60			1439		RTS	
15F2:	AE	72	B2	1440	RVTAB	LDX	LVP
15F4:	86	0A		1441		STX	SCVP
15F7:	20	51	15	1442		JSR	SCVTAB
15FA:	60			1443		RTS	
				1444			
15FB:	20	EC	15	1445	PUSHTAB	JSR	SVTAB
15FE:	A6	0B		1446	SHTAB	LDX	SCHP
1600:	8E	73	B2	1447		STX	LASTHP
1603:	60			1448		RTS	
1604:	20	F2	15	1449	PULLTAB	JSR	RVTAB
1607:	AE	73	B2	1450	RHTAB	LDX	LASTHP
160A:	86	0B		1451		STX	SCHP
160C:	60			1452		RTS	
				1453			
160D:	48			1454	ERSBTM	PHA	
160E:	20	FB	15	1455		JSR	PUSHTAB
1611:	A9	16		1456		LDA	#22
1613:	20	53	15	1457		JSR	SCVTAB1
1616:	A9	DE		1458		LDA	#XA
1618:	20	20	16	1459		JSR	COUT
161B:	20	04	16	1460		JSR	PULLTAB
161E:	68			1461		PLA	

161F: 60

620: 20 CB 15
 623: A0 DF
 625: C9 4B
 627: F0 4B
 629: F0 E0
 62B: F0 46
 62D: C9 FE
 62F: F0 D3
 631: A4 0B
 633: C9 DD
 635: F0 46
 637: C9 D8
 639: F0 42
 63B: F0 A6
 63D: F0 5F
 63F: C9 DE
 641: F0 47
 643: AF CA B2
 646: F0 08
 648: A6 20
 64A: F0 FF
 64C: F0 21
 64E: D0 06
 650: A6 20
 652: F0 01
 654: F0 19
 656: F0 0C
 658: E6 0B
 65A: A5 0B
 65C: C9 28
 65E: D0 0F
 660: A9 00
 662: 85 0B
 664: A5 0A
 666: C9 17
 668: F0 05
 66A: FE 0A
 66C: 20 51 15
 66F: 20 DD 15
 672: 60
 673: 88
 674: 20 FB 15
 677: 98
 678: 85 0A
 67A: 4C 60 16
 67D: 20 AC 16
 680: AD 6E B2
 683: C9 DD
 685: D0 E8
 687: 4C 60 16
 68A: 20 AC 16
 68D: A5 0A
 68F: C9 17
 691: F0 0A
 693: FE 0A
 695: 20 51 15
 698: A0 00
 69A: 4C 8A 16
 69D: AD 75 B2
 6A0: 85 0A
 6A2: A9 00
 6A4: 85 0B
 6A6: 20 51 15
 6A9: 4C 6F 16
 6AC: A9 A0
 6AE: 91 0C
 6B0: C8
 6B1: C0 28
 6B3: D0 F9
 6B5: 60

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COUT JSR RPH
 LDY #22
 CMP #"-"
 BEQ C1
 CMP #"-"
 BEQ C2
 CMP #"-"
 BEQ PULLTAB
 LDY SCHP
 CMP #"]"
 BEQ C3
 CMP #"["
 BEQ C3
 CMP #"& "
 BEQ C4
 CMP #"^ "
 BEQ C5
 LDX EDVRSN
 BEQ C6
 LDX VMODE
 CPX #FF
 BEQ CD
 BNE C7
 LDX VMODE
 CPX #1
 BEQ CD
 STA (SAL),Y
 INC SCHP
 LDA SCHP
 CMP #40
 BNE CD
 LDA #0
 STA SCHP
 LDA SCVP
 CMP #23
 BEQ CD
 INC SCVP
 JSR SCVTAB
 RPL
 RTS
 DEY
 JSR PUSHTAB
 TYA
 STA SCVP
 JMP C8
 JSR C9
 LDA RA
 CMP #"]"
 BNE CD
 JMP C8
 JSR C9
 LDA SCVP
 CMP #23
 BEQ C4
 INC SCVP
 JSR SCVTAB
 LDY #0
 JMP C5
 LDA TWINDTOP ;WINDOW
 STA SCVP
 LDA #0
 STA SCHP
 JSR SCVTAB
 JMP CD
 LDA #A0
 STA (SAL),Y
 INY
 CPY #40
 BNE C91
 RTS

CHARCTR
 OUTPUT
 SCREEN
 ROUTINE

 * OPTION TABLE LOOKUP *

16B6: 26 19 LTEDDO DA COPYDISK :1
 16B8: C3 17 DA CHNGPARM :2
 16BA: 03 21 DA DRVSPEED :3
 16BC: 03 1D DA SCANDISK :4
 16BE: 00 1D DA CERTDISK :5
 16C0: AF 0C DA CHNGSLTS :6
 16C2: 00 21 DA DRVEXAM :7

```

16C4: A7 0C
16C6: D1 0C

16C8: E2 0C
16CA: 6B 0C

```

```

548 DA CLRERRCD :8
549 DA EDDQUIT :9
550
551 LTQT DA QUITEDD :9-1
552 DA E2 :9-2
553
554 *****
555
556 -----*
557 * DRIVE ROUTINES DRIVERS *
558 -----*
559

```

```

16CC: 08
16CD: A9 15
16CE: 20 98 B2
16CF: 20 28
16D0: 20 4C 17
16D1: 20 0C 0D
16D2: A9 17
16D3: 20 35 14
16D4: AC 90 B2
16D5: AD 91 B2
16D6: 20 1B B7
16D7: 20 00
16D8: 20 00

```

```

560 TRKWRTER PHP
561 LDA #21
562 STA WS2
563 PLP
564 JSR WPEDO
565 TRKWRT JSR CHKESC :WRITE
566 LDA #17 :TRACK
567 JSR EPOUT :MANAGER
568 LDY TLENL
569 LDA TLENH
570 JSR WRITETRK
571 BCS TRKWRTER
572 WPD
573

```

```

16EA: A9 17
16EB: 20 98 B2
16EC: AD 10
16ED: BD 00 C0
16EE: BD 00 C0
16EF: 20 10
16F0: 20 4C 17
16F1: 20 0C 16
16F2: A9 17
16F3: 20 98 B2
16F4: 20 00 B2
16F5: 20 00 B2
16F6: A6 10
16F7: BD 00 C0
16F8: BD 00 C0
16F9: 20 30 C0
16FA: 20 4C 17
16FB: 20 08 17

```

```

574 CHKNW LDA #23 :CHECK
575 STA WS2 :FOR NO
576 CN LDX CSLT :WRITE-
577 LDA $C08D,X :PRTCTN
578 LDA $C08E,X
579 BPL WPD
580 JSR WPEDO
581 JMP CN
582 WP1 LDA #23
583 WPOCHK STA WS2 :A=MSG
584 LDY DRVLETTR :UTAG
585 CPY #"D"
586 BEQ WPD
587 WPD2 LDX CSLT
588 LDA $C08D,X :WRTPTCT
589 LDA $C08E,X :ORIGINL
590 BMI WPD0 :CHECK
591 JSR WPEDO
592 JMP WP2

```

```

171B: AD CA B2
171C: AD 86 B2
171D: 20 00 04
171E: 20 00 FF
171F: 20 00 C0
1720: 20 27 B7
1721: 20 90 00
1722: 20 90 00
1723: 20 90 00
1724: AD 33 B2
1725: AD 73 08
1726: AD 83 B2
1727: 20 00 08
1728: 20 22 08
1729: 20 4C 0C

```

```

593 WPDO LDA EDDVRSN :GET
594 BEQ WPD :READY
595 LDA CTRKO :TO
596 BEQ WP3 :DISPLAY
597 CMP #FF :ERROR
598 BNE WPD :MESSAGE
599 WP3 JSR PCRDCHK
600 BCC WPD
601 JSR MTROFF
602 LDA #59
603 JSR TOUT
604 LDA POS
605 ORA #B0
606 STA #873
607 LDA DCCSLOT
608 ORA #B0
609 STA #B3A
610 JSR KYCLRGET
611 JMP CHNGSLTS

```

```

174C: 08
174D: 20 FB 15
174E: 20 99 08
174F: AD 53 B2
1750: 20 53 15
1751: A9 1B
1752: 20 28
1753: 20 30 02
1754: A9 1A
1755: 20 05 15
1756: 20 05 0D
1757: 20 22 0D
1758: 20 00 08
1759: 20 00 08
175A: 20 00 08
175B: 20 00 08
175C: 20 00 08
175D: 20 00 08
175E: 20 00 08
175F: 20 00 08
1760: 20 00 08
1761: 20 00 08
1762: 20 00 08
1763: 20 00 08
1764: 20 00 08
1765: 20 00 08
1766: 20 00 08
1767: 20 00 08
1768: 20 00 08
1769: 20 00 08
176A: 20 00 08
176B: 20 00 08
176C: 20 00 08
176D: 20 00 08
176E: 20 00 08
176F: 20 00 08
1770: 20 00 08
1771: 20 00 08
1772: 20 00 08
1773: 20 00 08
1774: 20 00 08
1775: 20 00 08
1776: 20 00 08
1777: 20 00 08
1778: 20 00 08

```

```

612 WPEDO PHP
613 JSR PUSHTAB :DISPLAY
614 JSR MTROFF :WRITE-
615 LDA WS2 :PROTECT
616 JSR SCVTAB1 :DISK
617 LDA #27 :ERROR
618 PLP :MESSAGE
619 BMI WPS1
620 LDA #26
621 JSR TOUT
622 JSR BL
623 JSR KYCLRGET
624 LDA #0
625 STA SCHP
626 LDA #"I"
627 JSR COUT
628 JSR MTRON
629 JSR PULLTAB
630
631
632
633

```

```

1779: 20 82 17 1634 MTRONCW JSR MTRON ;MOTORON
177C: A9 15 1635 LDA #21 ;CHECK
177E: 20 01 17 1636 JSR WPOCHK ;ORIGINAL
1781: 60 1637 RTS ;DISK
1782: 20 92 0D 1638 MTRON JSR K7 ;TURN
1785: 20 AD 11 1639 JSR SETDRV2 ;DRIVE
1788: A6 10 1640 LDX CSLT ;MOTOR
178A: BD 89 C0 1641 LDA #C089,X ;ON
178D: 8A 1642 TXA ;ROUTINE
178E: 18 1643 CLC
178F: 65 11 1644 ADC CDRV
1791: AA 1645 TAX
1792: BD 89 C0 1646 LDA #C089,X
1795: 20 06 0E 1647 JSR W3
1798: 60 1648 RTS
1799: A6 10 1650 MTROFF LDA CSLT ;TURN
179B: BD 88 C0 1651 LDA #C088,X ;MOTOR
179E: 60 1652 RTS ;OFF
179F: 20 99 17 1653 ZX JSR MTROFF
17A2: 20 05 0D 1654 JSR BL
17A5: 20 28 0D 1655 JSR KYGET
17A8: 20 82 17 1656 MTRONVD JSR MTRON ;MOTORON
17AB: A9 00 1657 LDA #0 ;AND
17AD: 20 06 B7 1658 JSR ARMV ;VERIFY
17B0: A9 AA 1659 LDA #AA ;THE
17B2: A0 00 1660 LDY #0 ;BLANK
17B4: 20 83 15 1661 JSR SETBV ;DISK
17B7: 20 D6 16 1662 JSR TRKWRT
17BA: 20 0F B7 1663 JSR TRKV1
17BD: B0 E0 1664 BCS ZX
17BF: 20 0D 16 1665 JSR ERSBTM
17C2: 60 1666 RTS
1667
1668
1669
1670 *-----*
1671
1672 *****
1673 * CHANGE PARAMETERS OPTION *
1674 *****
1675
1676 CHNGPARM LDA #49 ;CHANGE
1677 JSR TOUT ;PARMS
1678 CPL1 JSR SCGET0 ;OPTION
1679 TXA
1680 CMP #3
1681 BCC CP
1682 CMP #4
1683 BNE CS1
1684 RTS ;END
1685
1686 CS1 LDY #0 ;RESET
1687 CL2 LDA PARMSET,Y ;DEFAULT
1688 STA PARMS,Y ;VALUES
1689 INY
1690 BNE CL2
1691 LDA #49
1692 JSR TOUT
1693 LDA #19
1694 JSR SCVTAB1
1695 LDA #54
1696 JSR TOUT
1697 JMP CPL1
1698
1699 CP LDY #>PARMS ;SET UP
1700 LDX #50 ;PARM
1701 CMP #0 ;BUFFER
1702 BEQ CS2 ;POINTRS
1703 LDY #>PREANLZ
1704 INX
1705 CMP #1
1706 BEQ CS2
1707 LDY #>CONTRLP
1708 INX
1709
1710 CS2 STY W2H ;SET UP
1711 LDY #0 ;PARM
1712 STY W2L ;SCREEN
1713 STY PARMNMBR
1714 TXA
1715 PHA
1716 LDA #C
1717 JSR SCVTAB1
1718 LDA #53
1719 JSR TOUT

```

1000000000	LDA	#12			
1000000000	JSR	SCVTAB1			
1000000000	PLA				
1000000000	JSR	TOUT			
1000000000	LDA	#0		:	CHANGE
1000000000	STA	ZFLAG		:	ACTUAL
1000000000	BEQ	PS2		:	PARMS
1000000000	PS2			:	MANAGER
1000000000	STA	PARMMBR			
1000000000	JSR	SCPMI			
1000000000	JSR	SCVLN			
1000000000	LDA	PARMMBR			
1000000000	JSR	HDGET			
1000000000	JSR	PS1			
1000000000	BCC	CK3			
1000000000	JSR	PS5			
1000000000	BFC	KYSUB2			
1000000000	JSR	PS8			
1000000000	CMP	##88			
1000000000	BNE	PS6			
1000000000	DEC	PARMMBR			
1000000000	JMP	PS0			
1000000000	CMP	##8D			
1000000000	BNE	PS7			
1000000000	INC	PARMMBR			
1000000000	JMP	PS0			
1000000000	CMP	"Q"		:	QUIT
1000000000	BNE	PS0			
1000000000	JMP	CHNGPARM			
1000000000	INC	PARMMBR			
1000000000	LDA	#0			
1000000000	STA	ZFLAG			
1000000000	BEQ	PS4			
1000000000	LDY	PARMMBR			
1000000000	STA	(W2L),Y			
1000000000	JSR	SCPMN			
1000000000	JSR	SCVLI			
1000000000	LDY	PARMMBR			
1000000000	LDA	(W2L),Y			
1000000000	JSR	HDGET			
1000000000	BCC	PS3			
1000000000	CMP	##A0			
1000000000	BEQ	PS9			
1000000000	CMP	##8D			
1000000000	BEQ	PS0			
1000000000	JMP	PS8			
1000000000	CMP	##A0		:	CHECK
1000000000	BEQ	CKD		:	FOR
1000000000	CMP	"."		:	SPECIAL
1000000000	BEQ	CKD		:	KEYS
1000000000	CMP	"="			
1000000000	BEQ	CKD			
1000000000	CMP	"-"			
1000000000	RTS				
1000000000	CMP	##A0			
1000000000	BEQ	CKD			
1000000000	CMP	"."			
1000000000	BEQ	CKD			
1000000000	CMP	"="			
1000000000	BEQ	CKD			
1000000000	CMP	"-"			
1000000000	RTS				
1000000000	LDX	#0		:	DISPLY
1000000000	BEQ	SP2		:	CURRENT
1000000000	LDX	#1		:	PARMS
1000000000	LDA	PARMMBR		:	ON SCRN
1000000000	LDY	#25			
1000000000	BNE	SP1			
1000000000	LDX	#0			
1000000000	BEQ	SP3			
1000000000	LDX	#1			
1000000000	LDY	PARMMBR			
1000000000	LDA	(W2L),Y			
1000000000	LDY	#30			
1000000000	STY	SCHP			
1000000000	STX	IFLAG			
1000000000	LPSRA				
1000000000	LPSRA				
1000000000	LPSRA				
1000000000	LPSRA				
1000000000	JSR	HB			
1000000000	PLA				
1000000000	AND	##0F			
1000000000	CMP	##A			
1000000000	BCS	HBS2			
1000000000	LDX	IFLAG			
1000000000	BEQ	HBS1			
1000000000	ORA	##70			
1000000000	BNE	HBS4			
1000000000	ORA	##B0			
1000000000	CMP	##88			
1000000000	BNE	PS6			
1000000000	DEC	PARMMBR			
1000000000	JMP	PS0			
1000000000	CMP	##8D			
1000000000	BNE	PS7			
1000000000	INC	PARMMBR			
1000000000	JMP	PS0			
1000000000	CMP	"Q"		:	QUIT
1000000000	BNE	PS0			
1000000000	JMP	CHNGPARM			
1000000000	INC	PARMMBR			
1000000000	LDA	#0			
1000000000	STA	ZFLAG			
1000000000	BEQ	PS4			
1000000000	LDY	PARMMBR			
1000000000	STA	(W2L),Y			
1000000000	JSR	SCPMN			
1000000000	JSR	SCVLI			
1000000000	LDY	PARMMBR			
1000000000	LDA	(W2L),Y			
1000000000	JSR	HDGET			
1000000000	BCC	PS3			
1000000000	CMP	##A0			
1000000000	BEQ	PS9			
1000000000	CMP	##8D			
1000000000	BEQ	PS0			
1000000000	JMP	PS8			
1000000000	CMP	##A0		:	CHECK
1000000000	BEQ	CKD		:	FOR
1000000000	CMP	"."		:	SPECIAL
1000000000	BEQ	CKD		:	KEYS
1000000000	CMP	"="			
1000000000	BEQ	CKD			
1000000000	CMP	"-"			
1000000000	RTS				
1000000000	LDX	#0		:	DISPLY
1000000000	BEQ	SP2		:	CURRENT
1000000000	LDX	#1		:	PARMS
1000000000	LDA	PARMMBR		:	ON SCRN
1000000000	LDY	#25			
1000000000	BNE	SP1			
1000000000	LDX	#0			
1000000000	BEQ	SP3			
1000000000	LDX	#1			
1000000000	LDY	PARMMBR			
1000000000	LDA	(W2L),Y			
1000000000	LDY	#30			
1000000000	STY	SCHP			
1000000000	STX	IFLAG			
1000000000	LPSRA				
1000000000	LPSRA				
1000000000	LPSRA				
1000000000	LPSRA				
1000000000	JSR	HB			
1000000000	PLA				
1000000000	AND	##0F			
1000000000	CMP	##A			
1000000000	BCS	HBS2			
1000000000	LDX	IFLAG			
1000000000	BEQ	HBS1			
1000000000	ORA	##70			
1000000000	BNE	HBS4			
1000000000	ORA	##B0			

1803:	D0	0A		1804	BNE	HBS4	
1805:	AE	23	19	1807	CLC		
1806:	D0	02		1808	LDX	I FLAG	
1809:	D0	80		1809	BNE	HBS3	
180B:	09	80		1810	ORA	##80	
180D:	69	37		1811	ADC	##37	
180F:	20	20	16	1812	JSR	COUT	
18E2:	60			1813	RTS		
18E3:	8D	22	19	1814			
18E5:	20	20	0D	1815	HDGET	STA	HBWRK
18E6:	C9	B0		1816	JSR	KYGET	:GET A
18E8:	90	2F		1817	CMP	##B0	:HEX
18E9:	C9	BA		1818	BCC	NOTHEX	:DIGIT
18EA:	C9	0D		1819	CMP	##BA	
18EB:	C9	C1		1820	BCC	HEXOK	
18ED:	90	27		1821	CMP	##C1	
18EE:	C9	C7		1822	BCC	NOTHEX	
18EF:	80	23		1823	CMP	##C7	
18F0:	E9	B7		1824	BCC	NOTHEX	
18F1:	D0	02		1825	SEC		
18F2:	29	0F		1826	SBC	##B7	
18F3:	AE	24	19	1827	BNE	HEXOK1	
18F4:	D0	04		1828	AND	##0F	
18F5:	8E	22	19	1829	LDX	ZFLAG	
18F6:	8E	22	19	1830	BNE	HEXOK2	
18F7:	8E	22	19	1831	STX	HBWRK	
18F8:	0E	22	19	1832	INC	ZFLAG	
18F9:	0E	22	19	1833	ASL	HBWRK	
18FA:	0E	22	19	1834	ASL	HBWRK	
18FB:	0E	22	19	1835	ASL	HBWRK	
18FC:	0E	22	19	1836	ASL	HBWRK	
18FD:	18			1837	ORA	HBWRK	
18FE:	60			1838	CLC		
191A:	60			1839	RTS		
191B:	38			1840	SEC		
191C:	60			1841	RTS		
191D:	60			1842			
191E:	00			1843	RERCNTR	DFB	0
191F:	00			1844	WERCNTR	DFB	0
1920:	00			1845	MJRERR	DFB	0
1921:	00			1846			
1922:	00			1847	PARMNMBR	DFB	0
1923:	00			1848	HBWRK	DFB	0
1924:	00			1849	I FLAG	DFB	0
1925:	00			1850	ZFLAG	DFB	0
				1851	DFSIGN	DFB	0
				1852			
				1853			
				1854			
				1855			
				1856			
				1857	COPYDISK	LDA	##44
1926:	A9	2C		1858	JSR	TOUT	:BACK UP
1928:	20	05	15	1859	JSR	GETRKS	:A DISK
192B:	20	30	12	1860	CLC		:OPTION
192E:	18			1861	JSR	GETSYNC	:GET
1930:	20	23	13	1862	JSR	SCNV	:TRACKS,
1932:	20	4A	15	1863	JSR	GNC	:SYNC,
1935:	20	51	1A	1864	JSR	SCNV	:AND
1938:	20	4A	15	1865	LDA	"I"	:NIBBLE
193B:	A9	DB		1866	JSR	COUT	:COUNT
193D:	20	20	16	1867	LDA	#0	:INPUTS
1940:	A9	00		1868	STA	TIMEFLG	:FROM
1942:	8D	8E	B2	1869	LDA	NBLCFLG	:USER
1945:	AD	8D	B2	1870	CMP	#1	
1948:	C9	01		1871	BEQ	CD3	
194A:	F0	08		1872	LDA	EDVRSN	
194C:	AD	CA	B2	1873	BEQ	CD3	
194F:	F0	03		1874	JSR	GETTIME	
1951:	20	2C	13	1875	LDA	DRVCOUNT	
1954:	AD	85	B2	1876	BEQ	CD1	:INSERT
1957:	F0	08		1877	LDA	##46	:BOTH
1959:	A9	2E		1878	JSR	TOUT	:DISK???
195B:	20	05	15	1879	JSR	KYCLRGET	
195E:	20	22	0D	1880	LDA	STARTRK	
1961:	AD	88	B2	1881	STA	TRACK	
1964:	8D	88	B2	1882	LDA	DRVCOUNT	
1967:	AD	85	B2	1883	BNE	CD2	:INSERT
196A:	D0	08		1884	LDA	##47	:ORIGINAL
196C:	A9	2F		1885	JSR	TOUT	:DISK???
196E:	20	05	15	1886	JSR	KYCLRGET	
1971:	20	22	0D	1887	LDA	"0"	:SET ORG
1974:	A9	CF		1888	JSR	SETDRV	:DRIVE
1976:	20	B0	11	1889	LDA	RERRORS	
1979:	AD	19	B3	1890	STA	RERCNTR	:RESET
197C:	8D	1E	19	1891	LDA	"."	:ERRORS
197F:	A9	AE					

1981	:	8D	:	19	:	STA	MJRERR	:	
1982	:	20	:	19	:	JSR	TRKR	:	; READ
1983	:	20	:	19	:	JSR	SCCOPY	:	
1984	:	20	:	19	:	LDA	DRVCOUNT	:	
1985	:	20	:	19	:	BNE	CD4	:	; INSRT
1986	:	20	:	19	:	LDA	#48	:	; DUPLCT
1987	:	20	:	19	:	JSR	TOUT	:	; DISK???
1988	:	20	:	15	:	JSR	KYCLRGET	:	
1989	:	20	:	0D	:	LDA	#"D"	:	
1990	:	20	:	11	:	JSR	SETDRV	:	
1991	:	20	:	11	:	JSR	TRKWJ	:	
1992	:	20	:	11	:	LDA	MJRERR	:	; DSPLY
1993	:	20	:	14	:	JSR	EPOUT	:	; ECODE
1994	:	20	:	14	:	JSR	NTRKCALC	:	
1995	:	20	:	B2	:	STA	STARTRK	:	
1996	:	20	:	B2	:	BCC	CD1	:	
1997	:	4C	:	15	:	JMP	PDONE1	:	
19B0	:	CE	:	1E	:	DEC	RERCNTR	:	; READ
19B1	:	00	:	11	:	BNE	TR4	:	; ERROR
19B2	:	A9	:	D2	:	LDA	#"R"	:	; CNTR
19B3	:	8D	:	20	:	STA	MJRERR	:	
19B4	:	4C	:	44	:	JMP	TR3	:	
19B5	:	20	:	16	:	JSR	ERSBTM	:	; READ
19B6	:	20	:	7	:	JSR	MTRON	:	; ORIGINAL
19B7	:	20	:	7	:	JSR	WP1	:	; TRACK
19B8	:	20	:	B2	:	LDA	STARTRK	:	; MANAGER
19B9	:	20	:	B2	:	JSR	SYNCTRK2	:	
19C0	:	20	:	14	:	LDA	#\$12	:	; DISPLY
19C1	:	20	:	B2	:	JSR	EPOUT	:	; INV-R
19C2	:	20	:	14	:	LDA	TIMEFLG	:	
19C3	:	20	:	B7	:	BNE	TR1	:	
19C4	:	20	:	B7	:	JSR	DCCDUMP	:	
19C5	:	20	:	B7	:	JMP	TR2	:	
19C6	:	20	:	26	:	JSR	TDUMPU	:	; DUMP
19C7	:	20	:	B2	:	JSR	ANALYZE	:	; TRACK,
19C8	:	20	:	B2	:	BCC	TR5	:	; THEN
19C9	:	20	:	B2	:	LDA	TRKLL	:	; ANALYZE
19CA	:	20	:	B2	:	LDA	TRKLN	:	
19CB	:	20	:	B2	:	STY	TTLENL	:	; IF ERR
19CC	:	20	:	B2	:	STA	TTLENH	:	; THEN
19CD	:	20	:	17	:	JSR	MTROFF	:	; REPEAT
19CE	:	20	:	17	:	RTS		:	
19F4	:	CE	:	1F	:	DEC	WERCNTR	:	; WRITE
19F5	:	00	:	17	:	BNE	TW2	:	; ERROR
19F6	:	A9	:	D7	:	LDA	#"W"	:	; CNTR
19F7	:	8D	:	20	:	STA	MJRERR	:	
19F8	:	4C	:	4D	:	JMP	TWD	:	
19F9	:	20	:	16	:	JSR	ERSBTM	:	; WRITE
19FA	:	20	:	82	:	JSR	MTRON	:	; TRACK
19FB	:	20	:	17	:	JSR	CHKWJ	:	; MANAGER
19FC	:	20	:	16	:	JSR	WERRORS	:	
19FD	:	AD	:	1A	:	LDA	WERCNTR	:	
19FE	:	8D	:	1F	:	STA	STARTRK	:	
19FF	:	20	:	B2	:	LDA	SYNCTRK2	:	
1A00	:	20	:	B2	:	JSR	SYNCTRK2	:	
1A01	:	20	:	26	:	BNE	TR3	:	
1A02	:	20	:	16	:	JSR	WSTSYNC	:	
1A03	:	20	:	16	:	JSR	TRKWRT	:	; WRITE
1A04	:	20	:	19	:	LDA	MJRERR	:	; TRACK
1A05	:	20	:	19	:	CMR	#"R"	:	; THEN
1A06	:	20	:	16	:	BNE	TWD	:	; VERIFY
1A07	:	20	:	16	:	LDA	#\$16	:	; TRACK
1A08	:	20	:	14	:	JSR	EPOUT	:	; LENGTH
1A09	:	20	:	0D	:	JSR	CHKESC	:	; WITH
1A0A	:	20	:	07	:	JSR	TDUMPU	:	; ORIGINAL
1A0B	:	20	:	26	:	JSR	FNDLNTH	:	; LENGTH
1A0C	:	20	:	1B	:	BCC	TW	:	
1A0D	:	20	:	04	:	JSR	DSPLYDIF	:	
1A0E	:	20	:	10	:	BCC	TWD	:	
1A0F	:	AD	:	8D	:	LDA	NBLCFLG	:	; DO
1A10	:	20	:	B2	:	BNE	TWD	:	; NIBBLE
1A11	:	20	:	B2	:	BNE	#2	:	; COUNT
1A12	:	20	:	26	:	CMR	TW1	:	; IF
1A13	:	20	:	26	:	BNE	NCAUTO	:	; NEEDED
1A14	:	20	:	26	:	JSR	TW1	:	
1A15	:	20	:	17	:	BCC	TWE	:	
1A16	:	20	:	17	:	JSR	MTROFF	:	; TRACK
1A17	:	20	:	17	:	RTS		:	; DONE
1A51	:	A9	:	2B	:	LDA	#43	:	; ASK
1A52	:	20	:	05	:	JSR	TOUT	:	; USER
1A53	:	20	:	4F	:	JSR	SLV	:	; IF
1A54	:	20	:	07	:	JSR	RHTAB	:	; TRACKS

A5C:	A9	25		1978	LDA	#37	NEED	
A5E:	A9	98	B2	1979	STA	WS2	NIBBLE	
A61:	20	05	15	1980	JSR	TOUT	COUNT	
A64:	20	07	16	1981	JSR	RHTAB		
A67:	20	0C	0D	1982	JSR	KYPRMPT		
A6A:	20	8D		1983	CMP	#8D		
A6C:	F0	IC		1984	BEQ	GNCS3		
A6E:	A0	25		1985	LDY	#37		
A70:	C9	CE		1986	CMP	#N	NO!	
A72:	F0	0A		1987	BEQ	GNCS2		
A74:	C8			1988	INY			
A75:	C9	C1		1989	CMP	#A	AUTO	
A77:	F0	05		1990	BEQ	GNCS2	COUNT	
A79:	C8			1991	INY			
A7A:	C9	CD		1992	CMP	#M	MANUAL	
A7C:	D0	E9		1993	BNE	GNCL1	NIBBLE	
A7E:	8C	98	B2	1994	STY	WS2	COUNT	
A81:	98			1995	TYA			
A82:	20	05	15	1996	JSR	TOUT		
A85:	A9	DB		1997	LDA	#I		
A87:	20	20	16	1998	JSR	COUT		
A8A:	AD	98	B2	1999	LDA	WS2		
A8D:	A0	00		2000	LDY	#0		
A8F:	C9	25		2001	CMP	#37		
A91:	F0	04		2002	BEQ	GNCS4		
A93:	C8			2003	INY			
A94:	C9	26		2004	CMP	#38		
A96:	F0	01		2005	BEQ	GNCS4		
A98:	C8			2006	INY		0=NO	
A99:	8C	8D	B2	2007	STY	NBLCFLG	1=AUTO	
A9C:	60			2008	RTS		2=MANUL	
				2009				
A9D:	A9	37		2010	SCCOPY	LDA	#55	SCREEN
A9F:	20	05	15	2011	JSR	TOUT		DISPLY
AA2:	AD	C1	B2	2012	LDA	TRKDSL		WHILE
AA5:	85	02		2013	STA	\$2		DISK
AA7:	85	04		2014	STA	\$4		BACK UP
AA9:	AD	C2	B2	2015	LDA	TRKDSH		MANAGER
AAE:	85	03		2016	STA	\$3		
AB1:	AD	C3	B2	2017	LDA	TRKTSH		
AB3:	85	05		2018	STA	\$5		
AB6:	20	83	1B	2019	JSR	SCHBLN		DISPLY
AB9:	20	83	1B	2020	JSR	SCHBLN		5 LINES
ABC:	20	83	1B	2021	JSR	SCHBLN		OF
ABF:	20	83	1B	2022	JSR	SCHBLN		START
AC2:	A9	38		2023	JSR	SCHBLN		TRACK
AC4:	20	05	15	2024	LDA	#56		
AC7:	A9	E8		2025	JSR	TOUT		
AC9:	85	04		2026	LDA	#E8		
ACB:	85	02		2027	STA	\$4		
ACD:	85	02		2028	STA	\$2		
ACE:	A9	93		2029	LDA	#93		
ACF:	85	03		2030	STA	\$3		DISPLY
AD1:	A9	AF		2031	LDA	#AF		2 LINES
AD3:	85	05		2032	STA	\$5		OF
AD5:	20	83	1B	2033	JSR	SCHBLN		END
AD8:	20	83	1B	2034	JSR	SCHBLN		TRACK
ADB:	A9	39		2035	LDA	#57		
ADD:	20	05	15	2036	JSR	TOUT		
AEE:	A9	14		2037	LDA	#20		
AEE2:	20	53	15	2038	JSR	SCVTAB1		
AEE5:	A9	0C		2039	LDA	#12		DISPLY
AEE7:	85	0B		2040	STA	SCHP		TRACK
AEE9:	20	79	14	2041	JSR	TRKOUT1		NUMBER
AEEC:	A9	20		2042	LDA	#32		
AEEE:	85	0B		2043	STA	SCHP		DISPLY
AF0:	A9	A4		2044	LDA	#"		ORIGINAL
AF2:	20	20	16	2045	JSR	COUT		TRACK
AF5:	A0	00		2046	LDY	#0		LENGTH
AF7:	AD	C8	B2	2047	LDA	TRKLN		
AF9:	20	C5	1B	2048	JSR	ZZ1		
AFD:	AD	C7	B2	2049	LDA	TRKLL		
B00:	20	C5	1B	2050	JSR	ZZ1		
B03:	60			2051	RTS			
				2052				
B04:	A9	15		2053	DSPLYDIF	LDA	#21	DISPLY
B06:	20	53	15	2054	JSR	SCVTAB1		THE
B09:	A9	20		2055	LDA	#32		DIFFRNC
B0B:	85	0B		2056	STA	SCHP		BETWEEN
B0D:	AD	AA	B2	2057	LDA	ITLENH		ORIGINAL
B10:	CD	C8	B2	2058	CMP	TRKLN		AND
B13:	90	25		2059	BCC	DLNGR		DUPLCT
B15:	D0	41		2060	BNE	DLNGR		TRACK
B17:	AD	A9	B2	2061	LDA	TTLENL		LENGTHS
B1A:	CD	C7	B2	2062	CMP	TRKLL		
B1D:	90	1B		2063	BCC	DLNGR		

1B1F:	D0	37	20644	BNE	OLNGR	
1B21:	A9	A0	20655	LDA	#A0	
1B23:	8D	20	20666	STA	DFSIGN	
1B24:	20	20	20677	JSR	COUT	
1B29:	A9	30	20688	LDA	#30	: INV-0
1B2B:	20	20	20699	JSR	COUT	: (EQUAL)
1B2E:	A9	DB	20700	LDA	#"["	
1B30:	20	20	20711	JSR	COUT	
1B33:	A9	AE	20722	LDA	#"	: FORCE
1B35:	8D	20	20733	STA	MJRERR	: GOOD
1B38:	18		20744	CLC		: ERROR
1B39:	60		20755	RTS		
1B3A:	A9	BE	20766	LDA	#">"	: DUPLCT
1B3C:	8D	25	20777	STA	DFSIGN	: IS MORE
1B3F:	20	20	20788	JSR	COUT	
1B42:	A9	AE	20799	LDA	#"	: FORCE
1B44:	8D	20	20800	STA	MJRERR	: GOOD
1B47:	AD	C7	20811	LDA	TRKLL	
1B4A:	38		20822	SEC		
1B4B:	ED	A9	20833	SBC	TTLENL	
1B4E:	A8		20844	TAY		
1B4F:	AD	C8	20855	LDA	TRKLH	
1B52:	ED	AA	20866	SBC	TTLENL	
1B55:	4C	73	20877	JMP	DDL2	
1B58:	A9	BC	20888	LDA	#"<"	: DUPLCT
1B5A:	8D	25	20899	STA	DFSIGN	: IS LESS
1B5D:	20	20	20900	JSR	COUT	
1B60:	A9	CC	20911	LDA	#"L"	: LENGTH
1B62:	8D	20	20922	STA	MJRERR	: ERROR
1B65:	AD	A9	20933	LDA	TTLENL	
1B68:	38		20944	SEC		
1B69:	ED	C7	20955	SBC	TRKLL	
1B6C:	A8		20966	TAY		
1B6D:	AD	AA	20977	LDA	TTLENL	
1B70:	ED	C8	20988	SBC	TRKLH	
1B73:	8C	9F	20999	STY	CNVHEX	
1B76:	8D	A0	21000	STA	CNVHEX+1	
1B79:	20	E3	21011	JSR	HOUT	
1B7C:	A9	DB	21022	LDA	#"["	
1B7E:	20	20	21033	JSR	COUT	
1B81:	38		21044	SEC		
1B82:	60		21055	RTS		
			21066			
1B83:	A9	0C	21077	LDA	#C	: DISPLY
1B85:	8D	98	21088	STA	WS2	: A LINE
1B88:	A9	A0	21099	LDA	#"	: OF
1B8A:	20	20	21110	JSR	COUT	: RAW
1B8D:	20	20	21121	JSR	COUT	: TRACK
1B90:	A9	A0	21132	LDA	#"	: BYTES
1B92:	20	20	21143	JSR	COUT	
1B95:	A0	00	21154	LDY	#0	
1B97:	B1	02	21165	LDA	(\$2),Y	
1B99:	48		21176	PHA		
1B9A:	C8		21187	INY		
1B9B:	B1	04	21198	LDA	(\$4),Y	
1B9D:	A8		21209	TAY		
1B9E:	A5	05	21220	LDA	\$5	
1BA0:	C9	AF	21231	CMP	#AF	
1BA2:	D0	08	21242	BNE	SCCS1	
1BA4:	A5	04	21253	LDA	\$4	
1BA6:	C9	FF	21264	CMP	#FF	
1BA8:	D0	02	21275	BNE	SCCS1	
1BAA:	A0	00	21286	LDY	#0	
1BAC:	68		21297	PLA		: SCCS1
1BAD:	20	C5	21308	JSR	ZZ1	
1BB0:	E6	02	21319	INC	\$2	
1BB2:	E6	04	21330	INC	\$4	
1BB4:	D0	04	21341	INC	\$4	: SCCS1
1BB6:	E6	03	21352	BNE	SCCL2	
1BB8:	E6	05	21363	INC	\$3	
1BBA:	CE	98	21374	INC	\$5	
1BBD:	D0	D1	21385	DEC	WS2	: SCCS1
1BBF:	A9	DD	21396	BNE	SCCL1	
1BC1:	20	20	21407	LDA	#"J"	
1BC4:	60		21418	JSR	COUT	
			21429	RTS		
1BC5:	48		21440	PHA		: PROCESS
1BC6:	4A		21451	LSRA		: A RAW
1BC7:	4A		21462	LSRA		: DISK
1BC8:	4A		21473	LSRA		: BYTE
1BC9:	4A		21484	LSRA		: & THEN
1BCA:	C0	02	21495	CPY	#2	: DISPLY
1BCC:	20	D4	21506	JSR	Z1	: IT ON
1BCF:	68		21517	PLA		: SCREEN
1BD0:	29	0F	21528	AND	#0F	
1BD2:	C0	01	21539	CPY	#1	

```

1BD4: 90 06 21 50 Z1
1BD6: C9 0A 21 51
1BD8: 90 08 21 52
1BDA: B0 0C 21 53
1BDC: C9 0A 21 54 Z2
1BDE: B0 06 21 55
1BE0: 09 80 21 56 Z3
1BE2: 09 30 21 57
1BE4: 00 05 21 58 Z4
1BE6: 09 C0 21 59 Z5
1BE8: 38 21 60 Z6
1BEA: 09 21 61
1BEC: 20 20 16 21 62
1BEE: 60 21 63

```

```

Z2
Z3 A ;INRSE
Z4 A ;NORMAL
Z5 A
Z6 80
Z7 80
Z8 C0
Z9
COUT
RTS

```

```

--End assembly--
4079 bytes
Errors: 0

```

:ASM

```

1670 *-----
1671
1672 *****
1673 * ESSENTIAL DATA DUPLICATOR
1674 * VERSION 4.2 STANDARD/PLUS
1675 * 6502 ASSEMBLY SOURCE CODE
1676 * COPYRIGHT (C) 1986
1677 * ALL RIGHTS RESERVED
1678 * UTILICO MICROWARE
1679 * DONALD ANTHONY SCHNAPP
1680 * PRINTED APRIL 23, 1986
1681 *****
1682
1683 *****
1684 * OPTION 4 & 5 MODUAL *
1685 * $1D00-$1FFF *
1686 *****
1687
1688 FLAG DS $1D00-FLAG
1689
1000: 4C FD 1D 1690 CERTDISK JMP CDISK
1691
1692 *****
1693 * SCAN DISK OPTION *
1694 *****
1695
1696 SCANDISK LDA #28 ; SCANDSK
1697 JSR TOUT ; MANAGER
1698 JSR GETRKSAB
1699 CLC
1700 JSR GETSYNC ; GET
1701 JSR GTDRVDD2 ; USER
1702 JSR MTRONCW ; INFO &
1703 LDA #$40 ; TURN
1704 STA $1 ; MOTOR
1705 LDY #0 ; ON
1706 STY $0
1707 TYA
1708 LDX #$20
1709 SCNL1 STA (<#0),Y ; ERASE
1710 INY ; HGR2
1711 BNE SCNL1 ; & THEN
1712 INC $1 ; TURN
1713 DEX ; SCREEN
1714 BNE SCNL1 ; ON
1715 BIT $C053
1716 BIT $C057
1717 BIT $C050
1718 LDA #20
1719 JSR SCVTAB1
1720 LDA #33
1721 JSR TOUT
1722 LDA #'^'
1723 JSR COUT
1724 LDA #1
1725 STA HGRVPOS
1726 LDA #2
1727 STA WZPAGE2
1728 SCNL2 JSR HRSCV ; SETUP
1729 LDY WZPAGE2 ; HGR
1730 LDA LTSCPT,Y ; SCREEN
1731 LDY #39
1732 HL1 STA (<#0),Y
1733 DEY
1734 CPY #3
1735 BNE HL1
1736 INC HGRVPOS
1737 DEC WZPAGE2
1738 BPL SCNL2
1739 LDA STARTRK
1740 SCNL3 JSR SYNCTRK2 ; DUMP
1741 JSR TDUMPP ; TRACK
1742 LDA #0 ; FROM
1743 STA $2 ; DISK
1744 LDA #$60
1745 STA $3
1746 LDA #5
1747 STA HGRVPOS
1748 SCNL4 JSR HRSCV
1749 JSR SCANBITS ; ANALYZE
1750 BCC SCNS1 ; AND
1751 JSR HRSDH ; DISPLAY
1752 SCNS1 INC HGRVPOS ; TRACK
1753 LDA HGRVPOS
1754 CMP #$9E

```

```

1D800C: D0 EB 1755 BNE SCNL4
1D801C: D0 70 13 1756 JSR NTRKCALC
1D802C: D0 91 03 1757 BCC SCNL3
1D803C: D0 20 B3 15 1758 JSR PDONE
1D804C: D0 60 1759 RTS
1D805C: D0 60 1760
1D806C: D0 97 A2 2D 1761 SCANBITS LDX #45 :ANALYZE
1D807C: D0 99 90 00 1762 LDY #0 :THE
1D808C: D0 9B 8C 7F 1E 1763 STY SYNC :TIMING
1D809C: D0 A0 01 02 1E 1764 SBL1 LDA ($2),Y :BITS
1D80AC: D0 A2 30 03 1E 1765 BMI SBS1 :IN
1D80BC: D0 A4 7F 02 1E 1766 INC SYNC :BUFFER
1D80CC: D0 A7 06 02 1767 SBS1 INC #2
1D80DC: D0 A9 0E 02 1768 BNE SBS2
1D80EC: D0 AB CA 03 1769 INC #3
1D80FC: D0 AD F0 1E 1770 SBS2 DEX
1D810C: D0 AE 7F 1E 1771 BNE SBL1
1D811C: D0 B1 C9 02 1772 LDA SYNC
1D812C: D0 B3 60 1773 CMP #2
1D813C: D0 B3 60 1774 RTS
1D814C: D0 B3 60 1775
1D815C: D0 B4 AD 80 1E 1776 HRSCV LDA HGRVPOS :CALC
1D816C: D0 B7 29 07 1777 AND #07 :HGR_POS
1D817C: D0 B9 0A 1778 ASLA :VERTCL
1D818C: D0 BA 0A 1779 ASLA
1D819C: D0 BB 85 1780 STA WZPAGE1
1D81AC: D0 BD 80 0E 1E 1781 LDA HGRVPOS
1D81BC: D0 C0 29 F8 1E 1782 AND #F8
1D81CC: D0 C2 4A 1783 LSRA
1D81DC: D0 C3 4A 1784 LSRA
1D81EC: D0 C5 4A 1785 TAY
1D81FC: D0 C8 85 00 1E 1786 LDA LTVHRS,Y
1D820C: D0 CA 85 40 1E 1787 STA $0
1D821C: D0 CD 38 1788 LDA LTVHRS+1,Y
1D822C: D0 CE 55 0E 1E 1789 SEC
1D823C: D0 D0 60 01 1790 SBC WZPAGE1
1D824C: D0 D2 60 1791 STA $1
1D825C: D0 D2 60 1792 RTS
1D826C: D0 D2 60 1793
1D827C: D0 D3 A5 12 1794 HRS DH LDA CTRK :DISPLAY
1D828C: D0 D5 90 8D 1795 CMP #8D :RESULTS
1D829C: D0 D7 90 02 1796 BCC HRS DHS :FROM
1D82AC: D0 D9 4A 8C 1797 SBC #8C :SCAN...
1D82BC: D0 DB 4A 1798 LSRA :IF A
1D82CC: D0 DD 4A 1799 LSRA :TIMING
1D82DC: D0 DF 18 1800 CLC :BIT IS
1D82EC: D0 E1 65 04 1801 ADC #4 :PRESENT
1D82FC: D0 E3 65 00 1802 ADC $0 :THEN
1D830C: D0 E5 65 00 1803 STA $0 :TURN ON
1D831C: D0 E7 4A 12 1804 LDA CTRK :THAT
1D832C: D0 E9 29 03 1805 AND #03 :BIT ON
1D833C: D0 EB 0A 1806 ASLA :SCREEN
1D834C: D0 ED 0A 1807 TAX
1D835C: D0 EF 0A 1808 LDY #0
1D836C: D0 F1 74 00 1E 1809 LDA LTHHRS,X
1D837C: D0 F3 11 00 1810 ORA ($0),Y
1D838C: D0 F5 11 00 1811 STA ($0),Y
1D839C: D0 F7 11 00 1812 INY
1D83AC: D0 F9 11 00 1813 INX
1D83BC: D0 FB 74 1E 1814 LDA LTHHRS,X
1D83CC: D0 FD 11 00 1815 ORA ($0),Y
1D83DC: D0 FF 11 00 1816 STA ($0),Y
1D83EC: D0 90 60 1817 RTS
1D83FC: D0 90 60 1818
1D840C: D0 90 60 1819
1D841C: D0 90 60 1820 *****
1D842C: D0 90 60 1821 * CERTIFY & ERASE DISK OPTION *
1D843C: D0 90 60 1822 *****
1D844C: D0 90 60 1823
1D845C: D0 90 60 1824 CDISK LDA #40 :CERTIFY
1D846C: D0 90 60 1825 JSR TOUT :AND
1D847C: D0 90 60 1826 JSR GETRKS AH :ERASE
1D848C: D0 90 60 1827 JSR BLNKIND :DISK
1D849C: D0 90 60 1828 JSR MTRON :MANAGER
1D84AC: D0 90 60 1829 JSR SETBS
1D84BC: D0 90 60 1830 LDA STARTRK
1D84CC: D0 90 60 1831 JSR ARMV
1D84DC: D0 90 60 1832 JSR TRKWRT
1D84EC: D0 90 60 1833 JSR ERSBTM
1D84FC: D0 90 60 1834 LDA #0 :SETUP
1D850C: D0 90 60 1835 STA FLG :FLAG
1D851C: D0 90 60 1836 LDA STARTRK
1D852C: D0 90 60 1837 JSR ARMV
1D853C: D0 90 60 1838 JSR TRKWRT
1D854C: D0 90 60 1839 JSR TRKV1
1D855C: D0 90 60 1840 LDA # " :IF ERR
1D856C: D0 90 60 1841 BCC CES1 :THEN

```

```

1E2F: A9 08 1841 LDA #X UNSET
1E31: 80 94 B2 1842 STA FLG FLAG
1E34: 20 2F 14 1843 JSR EPOUT
1E37: 20 70 13 1844 JSR NTRKCALC
1E3A: 90 E4 1845 BCC CEL1
1E3C: A0 29 1846 LDY #41
1E3E: AD 96 B2 1847 LDA FLG
1E41: F0 01 1848 BEQ CES2
1E43: C8 1849 INY
1E44: 98 1850 CES2 TYA
1E45: 20 FF 14 1851 JSR TOUT
1E48: 20 B3 15 1852 JSR PDONE
1E4B: 60 1853 RTS

```

```

*-----*
* HGR2 BASE ADDRESS TABLE *
*-----*

```

```

1E4C: D0 5D 1858 LTVHRS DA $5000
1E4E: 50 5D 1859 DA $5050
1E50: D0 5D 1860 DA $50C0
1E52: 50 5D 1861 DA $5050
1E54: A8 5D 1862 DA $50A8
1E56: 28 5D 1863 DA $5028
1E58: A8 5D 1864 DA $50A8
1E5A: 28 5D 1865 DA $5028
1E5C: A8 5D 1866 DA $50A8
1E5E: 28 5D 1867 DA $5028
1E60: A8 5D 1868 DA $50A8
1E62: 28 5D 1869 DA $5028
1E64: 80 5D 1870 DA $5080
1E66: 00 5D 1871 DA $5000
1E68: 80 5D 1872 DA $5080
1E6A: 00 5D 1873 DA $5000
1E6C: 80 5D 1874 DA $5080
1E6E: 00 5D 1875 DA $5000
1E70: 80 5D 1876 DA $5080
1E72: 00 5D 1877 DA $5000

```

```

*-----*
* HIRES TABLE FOR BIT POSITION *
*-----*

```

```

1E74: 18 00 1882 LTHHRS DFB $18,$00 .00
1E76: 20 00 1883 DFB $20,$00 .25
1E78: 00 01 1884 DFB $00,$01 .50
1E7A: 00 04 1885 DFB $00,$04 .75

```

```

*-----*
* HIRES PATTERN/BOTTOM SCREEN *
*-----*

```

```

1E7C: 18 18 3C 1889 LTSCPT DFB $18,$18,$3C
1E7F: 00 1891 SYNC DFB 0
1E80: 00 1893 HGRVPOS DFB 0

```

```

--End assembly--
4737 bytes
Errors: 0

```


:ASM

```

620 *-----
621 *
622 *
623 * ESSENTIAL DATA DUPLICATOR
624 * VERSION 4.2 STANDARD/PLUS
625 * 6502 ASSEMBLY SOURCE CODE
626 * COPYRIGHT (C) 1986
627 * ALL RIGHTS RESERVED
628 * UTILICO MICROWARE
629 * DONALD ANTHONY SCHNAPP
630 * PRINTED APRIL 23, 1986
631 *
632 *
633 *
634 * OPTION 3 & 7 MODUAL *
635 * $2100-$24FF *
636 *
637 *
638 FLAG DS $2100-FLAG
639
640 DRVEXAM JMP DEXAM
641
642 *
643 * DRIVE SPEED OPTION *
644 *
645 *
646
647 DRVSPEED JSR CHECKMEM ;MANAGER
648 LDA #18 ;DRIVE
649 JSR TOUT ;SPEED
650 JSR GTDRVDO1 ;OPTION
651 JSR MTROND
652 LDA #22
653 JSR SCVTAB1
654 JSR SCDIND02
655 LDA #19
656 JSR TOUT
657 LDY #4 ;SET
658 STY SPDLPNTR ;BUFFER,
659 JSR SETBS ;CHECK
660 JSR CHKSPD ;SPEED
661 JSR SPDLIN ;THEN
662 JSR KYDN1 ;DISPLAY
663 JMP DRL1 ;SPEED
664
665 *
666 * EXAMINE DRIVE OPTION *
667 *
668 *
669
670 DEXAM JSR CHECKMEM ;MANAGER
671 LDA #21 ;EXAMINE
672 JSR TOUT ;DRIVE
673 JSR GTDRVDO1 ;OPTION
674 JSR MTRON
675 LDA #0
676 JSR ARMV
677 LDA #22
678 JSR TOUT
679 JSR SCDIND02
680 LDA #23
681 JSR TOUT
682 JSR SSRCH ;R/W
683 JSR EXRDWT ;ABILITY
684 JSR CHKESC
685 JSR SSFNLN ;AVERAGE
686 JSR SETBS ;FLUCTN
687 JSR EXMSPD ;SPEED
688 JSR CHKESC
689 JSR SSFNLN ;COUNT
690 JSR SETBE ;HIGH
691 JSR CTRKS ;TRACKS
692 JSR CHKESC
693 JSR SSFNLN ;BLEED
694 JSR BLDVNR ;OVER
695 JSR CHKESC
696 JSR SSFNLN ;SPEED
697 JSR SPDARM ;OF ARM
698 LDA #25
699 JSR TOUT
700 JSR PDONE
701 RTS
702
703 SPDARM LDA #0 ;FIND
704 JSR CTRKW ;THE
705 LDA #88 ;SPEED
706 JSR CTRKW ;OF
707 LDA #0 ;ARM

```


2197:	20	06	B7	1756		JSR	ARMV		:THEN
219A:	20	18	B7	1757		JSR	ARMSPD		:DISPLAY
219D:	20	D7	14	1758		JSR	HXAOUT		
21A0:	60			1759		RTS			
				1760					
21A1:	A9	88		1761	CTRKS	LDA	##88		:LOCATE
21A3:	A0	04		1762		LDY	#4		:THE
21A5:	20	0E	21	1763		JSR	CTRKD0		:HIGHEST
21A8:	A5	0E		1764		LDA	WZPAGE1		:TRACK
21AA:	C9	FF		1765		CMP	##FF		:AVAILBL
21AC:	F0	05		1766		BEG	CTS3		
21AE:	A0	02		1767		LDY	#2		
21B0:	20	EB	21	1768		JSR	CTRKD0		
21B3:	A5	0E		1769	CTS3	LDA	WZPAGE1		
21B5:	20	76	14	1770		JSR	TRKOUT2		
21B8:	60			1771		RTS			
				1772					
21B9:	A9	00		1773	BLDOVR	LDA	#0		:CHECK
21BB:	20	06	B7	1774		JSR	ARMV		:FOR
21BF:	20	2F	22	1775		JSR	CTRKW2		:BLEED
21C1:	A9	01		1776		LDA	#1		:OVER
21C3:	A0	00		1777		LDY	#0		:ABILITY
21C5:	84	0F		1778		STY	WZPAGE2		
21C7:	20	13	22	1779		JSR	VTRK		
21CA:	A9	02		1780		LDA	#2		
21CC:	20	2C	22	1781		JSR	CTRKW		
21CF:	A9	01		1782		LDA	#1		
21D1:	A0	02		1783		LDY	#2		
21D3:	20	13	22	1784		JSR	VTRK		
21D6:	20	2F	22	1785		JSR	CTRKW2		
21D9:	A9	02		1786		LDA	#2		
21DB:	A0	01		1787		LDY	#1		
21DD:	20	13	22	1788		JSR	VTRK		
21E0:	A9	00		1789		LDA	#0		
21E3:	20	15	22	1790		JSR	VTRK2		
21E5:	A5	0F		1791		LDA	WZPAGE2		
21E7:	20	57	23	1792		JSR	DCP0UT		
21EA:	60			1793		RTS			
				1794					
21EB:	84	0F		1795	CTRKD0	STY	WZPAGE2		:COMMON
21FD:	20	2C	22	1796	CTL1	JSR	CTRKW		:ROUTINE
21F0:	A5	12		1797		LDA	CTRK		:TO
21F2:	38			1798		SEC			:VERIFY
21F3:	F9	04		1799		SBC	#4		:A KNOWN
21F5:	20	2C	22	1800		JSR	CTRKW		:TRACK
21F8:	A5	12		1801		LDA	CTRK		
21FA:	18			1802		CLC			
21FB:	69	04		1803		ADC	#4		
21FD:	20	06	B7	1804		JSR	ARMV		
2200:	20	12	B7	1805		JSR	TRKV2		
2203:	C5	12		1806		CMP	CTRK		
2205:	D0	0B		1807		BNE	CD1		
2207:	85	0E		1808		STA	WZPAGE1		
2209:	18			1809		CLC			
220A:	85	0F		1810		ADC	WZPAGE2		
220C:	90	0F		1811		BCC	CTL1		
220E:	A9	FF		1812		LDA	##FF		
2210:	85	0E		1813		STA	WZPAGE1		
2212:	60			1814	CD1	RTS			
				1815					
2213:	84	0E		1816	VTRK	STY	WZPAGE1		:IF
2215:	20	06	B7	1817	VTRK2	JSR	ARMV		:TRACK
2218:	20	12	B7	1818	VTRK3	JSR	TRKV2		:VERIFY
221B:	B0	0B		1819		BCS	VD2		:THEN
221D:	C5	0E		1820		CMP	WZPAGE1		:GIVE
221F:	D0	07		1821		BNE	VD2		:25%
2221:	A9	19		1822	VD1	LDA	#25		:CREDIT
2223:	18			1823		CLC			
2224:	65	0F		1824		ADC	WZPAGE2		
2227:	85	0F		1825		STA	WZPAGE2		
2228:	20	2B	14	1826	VD2	JSR	EPBOUT		
222B:	60			1827		RTS			
				1828					
222C:	20	06	B7	1829	CTRKW	JSR	ARMV		:COMMON
222F:	A5	12		1830	CTRKW2	LDA	CTRK		:ROUTINE
2231:	4A			1831		LSRA			:THAT
2232:	09	AA		1832		ORA	##AA		:WRITES
2234:	80	02	83	1833		STA	\$8302		:A KNOWN
2237:	A5	12		1834		LDA	CTRK		:TRACK
2239:	09	AA		1835		ORA	##AA		:FOR
223B:	80	03	83	1836		STA	\$8303		:TESTING
223E:	20	CC	16	1837		JSR	TRKWRT		:PURPOSES
2241:	20	2B	14	1838		JSR	EPBOUT		
2244:	60			1839		RTS			
				1840					
2245:	A9	00		1841	EXMSPD	LDA	#0		:EXAMINE

2247:	A0	07	1842		LDY	#7	DRIVE
2249:	99	15	1843	EXL1	STA	HXF,Y	SPEED
224C:	88		1844		DEY		TO GET
224D:	10	FA	1845		BPL	EXL1	AVERAGE
224F:	84	1D	1846		STY	LHXH	AND
2251:	A9	10	1847		LDA	#16	FLUCT
2253:	8D	97	1848	EXL2	STA	WRKPNTR2	THEN
2256:	20	28	1849		JSR	CHKSPD	DISPLAY
2259:	20	2B	1850		JSR	EPBOUT	BOTH
225C:	AD	A4	1851		LDA	CNVDEC+3	
225F:	29	0F	1852		AND	##0F	
2261:	85	0E	1853		STA	WZPAGE1	
2263:	20	9D	1854		JSR	CALCFLUC	
2266:	CE	97	1855		DEC	WRKPNTR2	
2269:	D0	EB	1856		BNE	EXL2	
226B:	A9	00	1857		LDA	#0	
226D:	85	15	1858		STA	HXF	
226F:	A0	04	1859		LDY	#4	
2271:	46	17	1860	EXL3	LSR	HXH	
2273:	66	16	1861		ROR	HXL	
2275:	66	15	1862		ROR	HXF	
2277:	88		1863		DEY		
2279:	D0	F7	1864		BNE	EXL3	
227A:	20	62	1865		JSR	SPDOUTFH	
227D:	20	D0	1866		JSR	SSFNLN	
2280:	A5	18	1867		LDA	HDCF	
2282:	38		1868		SEC		
2283:	E5	1B	1869		SBC	LDCF	
2285:	B0	04	1870		BCC	EXS1	
2287:	38		1871		SEC		
2288:	E9	9C	1872		SBC	#156	
228A:	18		1873		CLC		
228B:	85	14	1874	EXS1	STA	DCF	
228D:	A5	19	1875		LDA	HXL	
228F:	E5	1C	1876		SBC	LHXL	
2291:	85	16	1877		STA	HXL	
2293:	A5	1A	1878		LDA	HXXH	
2295:	E5	1D	1879		SBC	LHXH	
2297:	85	17	1880		STA	HXH	
2299:	20	71	1881		JSR	SPDOUTFD	
229C:	60		1882		RTS		
			1883				
229D:	20	C3	1884	CALCFLUC	JSR	CHKESC	ACTUAL
22A0:	AD	9A	1885		LDA	WSH2	CALC
22A3:	C5	1A	1886		CMP	HXXH	FLUCT
22A5:	90	21	1887		BCC	CAS2	ROUTINE
22A7:	D0	10	1888		BNE	CAS1	
22A9:	AD	99	1889	B2	LDA	WSL2	
22AC:	C5	19	1890		CMP	HXL	
22AE:	90	18	1891		BCC	CAS2	
22B0:	D0	07	1892		BNE	CAS1	
22B2:	AD	9F	1893	B2	LDA	CNVHEX	
22B5:	C5	18	1894		CMP	HDCF	
22B7:	90	0F	1895		BCC	CAS2	
22B9:	AD	9A	1896	CAS1	LDA	WSH2	
22BC:	85	1A	1897		STA	HXXH	
22BE:	AD	99	1898	B2	LDA	WSL2	
22C1:	85	19	1899		STA	HXL	
22C3:	AD	9F	1900	B2	LDA	CNVHEX	
22C6:	85	18	1901		STA	HDCF	
22C8:	AD	9A	1902	CAS2	LDA	WSH2	
22CB:	C5	1D	1903		CMP	LHXH	
22CD:	90	12	1904		BCC	CAS3	
22CF:	D0	1F	1905		BNE	CAS4	
22D1:	AD	99	1906	B2	LDA	WSL2	
22D4:	C5	1C	1907		CMP	LHXL	
22D6:	90	09	1908		BCC	CAS3	
22D8:	D0	16	1909		BNE	CAS4	
22DA:	AD	9F	1910	B2	LDA	CNVHEX	
22DD:	C5	1B	1911		CMP	LDCF	
22DF:	B0	0F	1912		BCC	CAS4	
22E1:	AD	9A	1913	CAS3	LDA	WSH2	
22E4:	85	1D	1914		STA	LHXH	
22E6:	AD	99	1915	B2	LDA	WSL2	
22E9:	85	1C	1916		STA	LHXL	
22EB:	AD	9F	1917	B2	LDA	CNVHEX	
22EE:	85	1B	1918		STA	LDCF	
22F0:	A5	0E	1919	CAS4	LDA	WZPAGE1	
22F2:	18		1920		CLC		
22F3:	F8		1921		SED		
22F4:	65	15	1922		ADC	HXF	
22F6:	D8		1923		CLD		
22F7:	C9	10	1924		CMP	##10	
22F9:	90	09	1925		BCC	CAS5	
22FB:	29	0F	1926		AND	##0F	
22FD:	18		1927		CLC		


```

199 *****
200 * ESSENTIAL DATA DUPLICATOR
201 * VERSION 4.2 STANDARD/PLUS
202 * 6502 ASSEMBLY SOURCE CODE
203 * COPYRIGHT (C) 1986
204 * ALL RIGHTS RESERVED
205 * UTILICO MICROWARE
206 * DONALD ANTHONY SCHNAPP
207 * PRINTED APRIL 23, 1986
208 *****
209

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210 *****
211 * ANALYZE ROUTINES *
212 *****
213

```

				ORG	ANALYZE	
2600:	4C	31	26			
2603:	4C	EE	26	JMP	ANALYZET	
2606:	4C	0C	26	JMP	FNDLNTH	
2609:	4C	1C	2B	JMP	WSTSYNC	;WAIST
				JMP	NCAUTO	;NBLCNT
260C:	AD	27	2C	WSTSYNC	LDA	WSYNCL
260F:	85	02			STA	\$2
2611:	AD	28	2C		LDA	WSYNCH
2614:	85	03			STA	\$3
2616:	48			WSTL1	PHA	
2617:	68				PLA	
2618:	A5	02			LDA	\$2
261A:	EA				NOP	
261B:	A5	02		WSTL2	LDA	\$2
261D:	AD	EC	C0		LDA	\$C0EC
2620:	C6	02			DEC	\$2
2622:	A5	02			LDA	\$2
2624:	C9	FF			CMP	##FF
2626:	D0	EE			BNE	WSTL1
2628:	C6	03			DEC	\$3
262A:	A5	03			LDA	\$3
262C:	C9	FF			CMP	##FF
262E:	D0	EB			BNE	WSTL2
2630:	60			RTS		
2631:	A9	00	0C	ANALYZET	JSR	CHKESC
2634:	8D	C1	B2		LDA	#0
2636:	8D	C2	B2		STA	TRKDSL
2639:	8D	C3	B2		STA	TRKDSH
263C:	8D	C4	B2		STA	TRKTSH
263F:	8D	C5	B2		STA	TRKDEL
2642:	8D	C6	B2		STA	TRKDEH
2645:	8D	C7	B2		STA	TRKTEH
2648:	8D	C8	B2		STA	TRKLL
264B:	8D	C9	B2		STA	TRKLN
264E:	85	FF			STA	\$FF
2650:	A9	50			LDA	##50
2652:	20	12	0C		JSR	EPOUT
2655:	A9	00			LDA	#0
2657:	20	2A	2C		JSR	CONTROL
265A:	A9	01			LDA	##01
265C:	20	12	0C		JSR	EPOUT
265F:	20	AA	27		JSR	TRKE
2662:	B0	59			BCS	ERRORE
2664:	20	9F	27		JSR	TRKL
2667:	B0	63			BCS	ERRORL
2669:	AD	C8	B2		LDA	TRKLN
266C:	CD	11	B3		CMP	MAXLNTH
266F:	B0	5B			BCS	ERRORL
2671:	CD	10	B3		CMP	MINLNTH
2674:	90	56			BCC	ERRORL
2676:	AC	C7	B2	ANL22	LDY	TRKLL
2679:	AE	C8	B2		LDX	TRKLN
267C:	AD	0A	B3		LDA	SPCLNTL
267F:	29	80			AND	##80
2681:	F0	15			BEQ	ANL24
2683:	AD	C4	B2		LDA	TRKDEL
2686:	38				SEC	
2687:	E9	80			SBC	##80
2689:	A8				TAY	
268A:	AD	C5	B2		LDA	TRKDEH
268D:	E9	40			SBC	##40
268F:	AA				TAX	
2690:	E0	1C			CPX	##1C
2692:	90	04			BCC	ANL24
2694:	A0	FF			LDY	##FF
2696:	A2	1B			LDX	##1B
2698:	8C	90	B2	ANL24	STY	TLENL
269B:	8E	91	B2		STX	TLENH

2649E	AD	8C	B2	285		LDA	SYNCLFLG	:	OF TRK
264A1	FD	09		286		BEO	ANLZ3	:	LENGTH
264A3	A9	20	2B	287		JSR	CALCSYNC	:	
264A6	A9	43		288	ANLZ3	LDA	##43	:	
264A8	A9	12	0C	289		JSR	EPOUT	:	DO
264AB	A9	01		290		LDA	#1	:	PREWRIT
264AD	A9	2A	2C	291		JSR	CONTROL	:	ROUTINE
264B0	A9	20		292		LDA	##20	:	
264B2	A9	12		293		JSR	EPOUT	:	
264B5	A9	8D	2A	294		JSR	MOVEBUFF	:	
264B8	A9	B5	27	295		JSR	TRKS	:	CALC
264B9	A9	18		296		CLC		:	TRACK
264BC	A9	60		297		RTS		:	START
264BD	A9	5E		298				:	
264BF	A9	C5	B2	299	ERRORE	LDY	##5E	:	END
264C2	A9	96		300		STY	TRKDEH	:	ERROR
264C4	A9	C6	B2	301		LDY	##96	:	MANAGER
264C7	A9	00		302		STY	TRKTEH	:	
264C9	A9	00		303		LDY	#0	:	
264CC	A9	C4	B2	304	ERRORL	STY	TRKDEL	:	
264CE	A9	FF		305		STA	##FF	:	LENGTH
264D0	A9	FF		306		LDY	##FF	:	ERROR
264D3	A9	C7	B2	307		STY	TRKLL	:	MANAGER
264D5	A9	1B		308		LDY	##1B	:	
264D8	A9	C5	B2	309		LDA	TRKDEH	:	
264DA	A9	38		310		SEC		:	
264DB	A9	40		311		SBC	##40	:	
264DD	A9	1C		312		CMP	##1C	:	
264DE	A9	07		313		BCS	ESKP1	:	
264E0	A9	C4	B2	314		LDY	TRKDEL	:	
264E2	A9	C7	B2	315		STY	TRKLL	:	
264E5	A9	00		316		TAY		:	
264E6	A9	C8	B2	317	ESKP1	STY	TRKLH	:	
264E9	A9	76	26	318		JSR	ANLZ2	:	
264EC	A9	38		319	CSERRF	SEC		:	
264ED	A9	60		320		RTS		:	
264EE	A9	00		321				:	
264EF	A9	42		322	FNDLNTH	LDY	#0	:	VERIFY
264F0	A9	20	2A	323		LDA	##42	:	DISK
264F2	A9	0E		324		JSR	CSAME	:	MANAGER
264F4	A9	F5		325		BCS	CSERRF	:	
264F7	A9	F3		326		BNE	CSERRF	:	
264F9	A9	00		327		STY	#0	:	
264FB	A9	18		328		CLC		:	
264FD	A9	6D	B2	329		ADC	TRKLL	:	
264FF	A9	06		330		STA	\$6	:	
27001	A9	42		331		LDA	##42	:	
27003	A9	69	00	332		ADC	#0	:	
27005	A9	38		333		SEC		:	
27006	A9	F9	02	334		SBC	#2	:	
27008	A9	18		335		CLC		:	
27009	A9	6D	B2	336		ADC	TRKLH	:	
2700C	A9	07		337		STA	\$7	:	
2700E	A9	00		338		LDA	#0	:	
27100	A9	8D	0B	339		STA	TSTLL	:	
27103	A9	0C	2C	340		STA	TSTLH	:	
27106	A9	0A		341		LDA	#10	:	
27108	A9	85	08	342		STA	\$8	:	
2710A	A9	5C	2A	343				:	
2711A	A9	20	51	344	FLL0	JSR	FSAME	:	
2711D	A9	B0	5C	345		BCS	FLS6	:	
2711F	A9	55	06	346		LDA	\$6	:	
27221	A9	85	02	347		STA	\$2	:	
27223	A9	55	05	348		LDA	\$5	:	
27225	A9	85	01	349		STA	\$1	:	
27227	A9	55	07	350		LDA	\$7	:	
27229	A9	85	03	351		STA	\$3	:	
2722B	A9	00		352		LDY	#0	:	
2722D	A9	B1	00	353	FLL1	LDA	(\$0),Y	:	
2722F	A9	D1	02	354		CMP	(\$2),Y	:	
27231	A9	D0	11	355		BNE	FLS1	:	
27233	A9	E6	0C	356		INC	\$C	:	
27235	A9	C8		357		INY		:	
27236	A9	D0	F5	358		BNE	FLL1	:	
27238	A9	E6	0D	359		INC	\$D	:	
2723A	A9	66	03	360		INC	\$3	:	
2723C	A9	E6	01	361		INC	\$1	:	
2723E	A9	A5	01	362		LDA	\$1	:	
27240	A9	C9	78	363		CMP	##78	:	
27242	A9	D0	E9	364		BNE	FLL1	:	
27244	A9	A4	0C	365	FLS1	LDY	\$C	:	
27246	A9	A6	0D	366		LDX	\$D	:	
27248	A9	EC	0C	367		CPX	TSTLH	:	
2724B	A9	90	24	368		BCC	FLS2	:	
2724D	A9	D0	07	369		BNE	FLS3	:	
2724F	A9	CC	0B	370		CPY	TSTLL	:	

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2752: 1D 321 BCC FLS2
2754: 1B 322 BEQ FLS2
2756: 00 323 STX TSTLH
2758: 00 324 STY TSTLL
2759: 00 325 LDA #6
275C: 00 326 STA TSTAL
275E: 00 327 SEC
2761: 00 328 SBC $4
2764: 00 329 STA TRKLL
2767: 00 330 LDA $7
2769: 00 331 STA TSTAH
276C: 00 332 SBC $5
276E: 00 333 STA TRKLH
2771: 00 334 INC $6
2773: 00 335 BNE FLL0
2775: 00 336 INC $7
2777: 00 337 DEC $8
2779: 00 338 BNE FLL0
277E: 00 339 LDA TSTLH
277F: 00 340 BNE FLS5
2780: 00 341 LDA TSTLL
2783: 00 342 CMP MNBTEQLN ;PARM$1C
2786: 00 343 BCC FLS4
2788: 00 344 LDA TRKLL
278B: 00 345 SEC
278E: 00 346 SBC TTLENL
2792: 00 347 STA DIFL
2795: 00 348 LDA TRKLH
2798: 00 349 SBC TTLENH
279B: 00 350 STA DIFH
279C: 00 351 CLC
279D: 00 352 RTS
279E: 00 353 RTS

279F: A9 406 TRKL LDA #>LTLNGTH ;FIND
27A1: AD 407 LDY #<LTLNGTH ;TRACK
27A3: AF 408 LDX PLNGCNTL ;LENGTH
27A6: 20 409 JSR DOPSUBO ;MANAGER
27A9: 60 410 RTS

27AA: A9 411 TRKE LDA #>LTEND ;FIND
27AC: AD 412 LDY #<LTEND ;TRACK
27AE: AF 413 LDX PENDCNTL ;END
27B1: 20 414 JSR DOPSUBO ;MANAGER
27B4: 60 415 RTS

27B5: AD 416 TRKS LDA TRKDEL ;CALC
27B8: 38 417 SEC ;TRACK
27B9: ED 418 SBC TRKLL ;START
27BC: 00 419 STA TRKDSL ;ROUTINE
27BF: 00 420 PHP
27C0: ED 421 LDA TRKDEH
27C3: 00 422 SBC TRKLH
27C6: 00 423 STA TRKDSH
27C9: ED 424 LDA TRKTEH
27CC: 00 425 PLP
27CD: ED 426 SBC TRKLH
27D0: 00 427 STA TRKTSH
27D3: 60 428 RTS

27D4: AD 429 TRKS1 LDA TRKDEL ;CALC
27D7: 38 430 SEC ;TRACK
27D8: ED 431 SBC TLENL ;START
27DB: 00 432 STA TRKDSL ;FOR
27DE: 00 433 PHP ;SYNC
27DF: AD 434 LDA TRKDEH ;ROUTINE
27E2: ED 435 SBC TLENH
27E5: 00 436 STA TRKDSH
27E8: AD 437 LDA TRKTEH
27EB: ED 438 PLP
27EE: 00 439 SBC TLENH
27EF: ED 440 STA TRKTSH
27F2: 60 441 RTS

442
443
444
445
446
447 * ADDRESS TABLES FOR TRACK *
448 * LENGTH AND TRACK END ROUTINES *
449
450
451 LTLNGTH DA TRKDGL ;DATPTRN
452 DA TRKUQL ;UNIQUE
453 DA TRKABL ;ABSLTE
454
455
456 LTEND DA TRKTGE ;TIMEGAP
457 DA TRKDPE ;DATPTRN
458 DA TRKDGE ;DATAGAP

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27FF:	A9	03		457					
2801:	20	2A	2C	458	TRKDGL	LDA	#3		MANAGER
2804:	A0	00		459		JSR	CONTROL		FOR
2806:	A9	78		460		LDY	#0		DATA
2808:	20	CB	29	461		LDA	#78		PATTERN
280B:	B0	1C		462		JSR	FTMARKR		TRACK
280D:	A5	01		463		BCS	TDGLE		LENGTH
280F:	85	03		464		LDA	\$1		ROUTINE
2811:	84	02		465		STA	\$3		
2813:	20	D3	29	466		STY	\$2		
2816:	B0	11		467		JSR	FTMARKR2		
2818:	98			468		BCS	TDGLE		
2819:	38			469		TYA			
281A:	E5	02		470		SEC			
281C:	8D	C7	B2	471		SBC	\$2		
281F:	A5	01		472		STA	TRKLL		
2821:	E5	03		473		LDA	\$1		
2823:	8D	C8	B2	474		SBC	\$3		
2826:	20	B0	29	475		STA	TRKLN		
2829:	60			476		JSR	CTMARKR		
				477	TDGLE	RTS			
				478					
282A:	38			479	CSERROR	SEC			
282B:	60			480		RTS			
				481					
282C:	AD	C4	B2	482	TRKUQL	LDA	TRKDEL		MANAGER
282F:	18			483		CLC			UNIQUE
2830:	69	08		484		ADC	#8		TRACK
2832:	A8			485		TAY			LENGTH
2833:	AD	C5	B2	486		LDA	TRKDEH		
2836:	18			487		CLC			
2837:	69	00		488		ADC	#0		
2839:	20	0E	2A	489		JSR	CSAME		
283C:	B0	EE		490		BCS	CSERROR		
283E:	D0	EA		491		BNE	CSERROR		
2840:	84	00		492		STY	\$0		
2842:	84	06		493		STY	\$6		
2844:	AD	C5	B2	494		LDA	TRKDEH		
2847:	38			495		SEC			
2848:	F9	1B		496		SBC	##1B		
284A:	85	07		497		STA	\$7		
284C:	A9	08		498		LDA	#8		
284E:	85	08		499		STA	#8		
2850:	A9	00		500		LDA	#0		
2852:	8D	0B	2C	501		STA	TSTLL		
2855:	8D	0C	2C	502		STA	TSTLH		
2858:	20	51	2A	503	TQL0	JSR	FSAME		
285B:	B0	5E		504		BCS	TQS6		
285D:	A5	06		505		LDA	\$6		
285F:	85	02		506		STA	\$2		
2861:	A5	05		507		LDA	\$5		
2863:	85	01		508		STA	\$1		
2865:	A5	07		509		LDA	\$7		
2867:	85	03		510		STA	\$3		
2869:	B1	00		511	TQL1	LDA	(#0),Y		
286B:	D1	02		512		CMP	(#2),Y		
286D:	D0	11		513		BNE	TQS1		
286F:	F6	0C		514		INC	\$C		
2871:	C8			515		INY			
2872:	D0	F5		516		BNE	TQL1		
2874:	E6	0D		517		INC	\$D		
2876:	E6	03		518		INC	\$3		
2878:	E6	01		519		INC	\$1		
287A:	A5	01		520		LDA	\$1		
287C:	C9	78		521		CMP	##78		
287E:	D0	E9		522		BNE	TQL1		
2880:	A4	0C		523	TQS1	LDY	\$C		
2882:	A6	0D		524		LDX	\$D		
2884:	EC	0C	2C	525		CPX	TSTLH		
2887:	90	28		526		BCC	TQS2		
2889:	D0	07		527		BNE	TQS3		
288B:	CC	0B	2C	528		CPY	TSTLL		
288E:	90	21		529		BCC	TQS2		
2890:	F0	1F		530		BEQ	TQS2		
2892:	8C	0B	2C	531	TQS3	STY	TSTLL		
2895:	8E	0C	2C	532		STX	TSTLH		
2898:	A5	06		533		LDA	\$6		
289A:	8D	0D	2C	534		STA	TSTAL		
289D:	A5	07		535		LDA	\$7		
289F:	8D	0E	2C	536		STA	TSTAH		
28A2:	A5	04		537		LDA	\$4		
28A4:	38			538		SEC			
28A5:	E5	06		539		SBC	\$6		
28A7:	8D	C7	B2	540		STA	TRKLL		
28AA:	A5	05		541		LDA	\$5		
28AC:	E5	07		542		SBC	\$7		

28000000	EA	8D	C8	B2	543	TQS2	STA	TRKLH		
28000001	EA	E6	06		544		INC	\$6		
28000002	EA	D0	A0		545		BNE	TQL0		
28000003	EA	E6	07		546		INC	\$7		
28000004	EA	C6	08		547		DEC	\$8		
28000005	EA	D0	90		548		BNE	TQL0		
28000006	EA	AD	0C	2C	549	TQS6	LDA	TSTLH		
28000007	EA	D0	08		550		BNE	TQS5		
28000008	EA	AD	09	2C	551		LDA	TSTLL		
28000009	EA	CD	1C	B3	552		CMP	MNBTEQLN		;PARM#1C
28000010	EA	C6	90		553		BCC	TQS4		
28000011	EA	18			554	TQS5	CLC			
28000012	EA	60			555		RTS			
28000013	EA	38			556	TQS4	SEC			
28000014	EA	60			557		RTS			
28000015	EA				558					
28000016	EA	AD	0C	B3	559	TRKABL	LDA	ABSLNGTL		;ABSOLUTE
28000017	EA	8D	C7	B2	560		STA	TRKLL		;LENGTH
28000018	EA	AD	0D	B3	561		LDA	ABSLNGTH		;ROUTINE
28000019	EA	8D	C8	B2	562		STA	TRKLH		
28000020	EA	18			563		CLC			
28000021	EA	60			564		RTS			
28000022	EA				565					
28000023	EA	A9	93		566	TRKTGE	LDA	##93		;MANAGER
28000024	EA	85	01		567		STA	\$1		;TIMING
28000025	EA	80	B0		568		LDA	##B0		;GAP
28000026	EA	A9	21	2C	569		STA	ENDBCHK		;TRACK
28000027	EA	8D	00		570		LDY	#0		;END
28000028	EA	AD	00		571		STY	\$0		
28000029	EA	80	84		572		STY	TRKDEL		
28000030	EA	80	C4	B2	573		STY	TRKTEH		
28000031	EA	10	10	2C	574		STY	TGLL		
28000032	EA	11	10	2C	575		STY	TGLH		
28000033	EA	F0	11	2C	576	FTGL1	LDA	(#0),Y		
28000034	EA	F0	15		577		BEQ	FTGL3		
28000035	EA	F6	00		578		INC	\$0		
28000036	EA	D0	F8		579		BNE	FTGL1		
28000037	EA	E6	01		580		INC	\$1		
28000038	EA	A5	01		581		LDA	\$1		
28000039	EA	CD	21	2C	582		CMP	ENDBCHK		
28000040	EA	D0	22		583		BNE	FTGL1		
28000041	EA	A9	83		584		LDA	##83		
28000042	EA	38			585	FTGDE	SEC			
28000043	EA	60			586		RTS			
28000044	EA	B0	00		587	FTGL2	LDA	(#0),Y		
28000045	EA	D0	2E		588		BNE	FTGS1		
28000046	EA	E6	00		589	FTGL3	INC	\$0		
28000047	EA	F0	F8		590		BNE	FTGL2		
28000048	EA	E6	01		591		INC	\$1		
28000049	EA	A5	01		592		LDA	\$1		
28000050	EA	CD	21	2C	593		CMP	ENDBCHK		
28000051	EA	F0	22		594		BCC	FTGL2		
28000052	EA	11	11	2C	595	FTGL4	LDY	TGLH		
28000053	EA	D0	0A		596		BNE	FTGD		
28000054	EA	AC	10	2C	597		LDY	TGLL		
28000055	EA	CC	17	B3	598		CPY	PTGAPMIN		
28000056	EA	A9	84		599		LDA	##84		
28000057	EA	90	DE		600		BCC	FTGDE		
28000058	EA	ACE	C4	B2	601	FTGD	DEC	TRKDEL		
28000059	EA	CE	44	B2	602		LDA	TRKDEL		
28000060	EA	C0	06		603		CMP	##FF		
28000061	EA	D0	00		604		BNE	FTGD1		
28000062	EA	C0	05	B2	605		DEC	TRKDEH		
28000063	EA	CE	C6	B2	606		DEC	TRKTEH		
28000064	EA	18			607	FTGD1	CLC			
28000065	EA	A5			608		RTS			
28000066	EA	A5	00		609	FTGS1	LDA	\$0		
28000067	EA	8D	22	2C	610		STA	TTGAL		
28000068	EA	8D	01		611		LDA	\$1		
28000069	EA	80	23	2C	612		STA	TTGAH		
28000070	EA	F0	00		613	FTGL5	INC	\$0		
28000071	EA	F0	08		614		BNE	FTGS2		
28000072	EA	E6	01		615		INC	\$1		
28000073	EA	A9	01		616		LDA	\$1		
28000074	EA	C0	B0		617		CMP	##B0		
28000075	EA	B0	04		618		BCS	FTGS4		
28000076	EA	D0	F0		619	FTGS2	LDA	(#0),Y		
28000077	EA	A5	00		620		BNE	FTGL5		
28000078	EA	F0	00		621	FTGS4	LDA	\$0		
28000079	EA	F0	22	2C	622		SEC			
28000080	EA	A9			623		SBC	TTGAL		
28000081	EA	A9			624		TAX			
28000082	EA	A5	01		625		LDA	\$1		
28000083	EA	D0	23	2C	626		SBC	TTGAH		
28000084	EA	CD	11	2C	627		CMP	TGLH		
28000085	EA	90	21		628		BCC	FTGS5		

2945	DO	07	629	BNE	FTGS3	
2946	FF	10	630	CPX	TGLL	
2947	FO	1A	631	BCC	FTGS5	
2948	FO	1B	632	BEQ	FTGS5	
2949	FE	10	633	STX	TGLL	FTGS3
2950	FE	11	634	STA	TGLH	
2951	AD	22	635	LDA	TTGAL	
2952	AD	23	636	STA	TRKDEL	
2953	AD	23	637	LDA	TTGAH	
2954	DD	6	638	STA	TRKTEH	
2955	DD	33	639	SEC		
2956	DD	35	640	SBC	##38	
2957	DD	01	641	STA	TRKDEH	
2958	DD	80	642	LDA	#1	FTGS5
2959	DD	80	643	CMP	##80	
2960	DD	80	644	BNE	FTGL3	
2961	CC	19	645	JMP	FTGL4	
2962			646			
2963	BF	A9	647	LDA	#2	TRKDPE
2964	AD	2A	648	JSR	CONTROL	: MANAGER
2965	AD	00	649	LDY	#0	: DATA
2966	AD	99	650	LDA	##95	: PATTERN
2967	DD	00	651	JSR	FTMARKR	: TRACK
2968	DD	05	652	BCC	TDPE2	: END
2969	DD	80	653	JSR	CTMARKR	
2970	AD	33	654	SEC		
2971	AD	60	655	RTS		
2972	AD	01	656	STY	TRKDEL	
2973	AD	01	657	LDA	\$1	
2974	AD	07	658	STA	TRKTEH	
2975	AD	07	659	SEC		
2976	AD	33	660	SBC	##38	
2977	AD	00	661	STA	TRKDEH	
2978	DD	00	662	LDY	#0	: CLEAR
2979	DD	08	663	LDA	##78	: MARKER
2980	DD	01	664	STA	\$1	: LEFTOVR
2981	DD	00	665	LDA	(�),Y	: FROM
2982	DD	10	666	BPL	TDPE4	: DATA
2983	DD	04	667	AND	##7F	: PATTERN
2984	DD	7F	668	STA	(�),Y	: SEARCH
2985	DD	00	669			
2986	DD	00	670	INY	TDPE3	
2987	DD	01	671	BNE	\$1	
2988	DD	01	672	INC	\$1	
2989	DD	01	673	LDA	\$1	
2990	DD	80	674	CMP	##80	
2991	DD	ED	675	BNE	TDPE3	
2992	DD	80	676	CLC		
2993	CA	60	677	RTS		
2994	CB	84	678			
2995	CD	00	679	FTMARKR	STY \$0	: FIND
2996	CE	01	680	FTMARKR1	STA \$1	: MARKER
2997	CF	00	681	FTMARKR2	LDA (�),Y	: FROM
2998	D0	F6	682		BMI FTMDN	: DATA
2999	D1	00	683		INY	: PATTERN
3000	D3	00	684		BNE FTMARKR1	: SEARCH
3001	D4	F9	685		INC \$1	
3002	D6	01	686		LDA \$1	
3003	D8	01	687		CMP ##AF	
3004	DA	AF	688		BNE FTMARKR1	
3005	DC	F1	689		SEC	
3006	DE	38	690		RTS	
3007	DF	60	691			
3008			692	TRKDGE	LDA ##5C	: MANAGER
3009	EQ	A9	693		STA \$1	: DATA
3010	EQ	85	694		LDY #0	: GAP
3011	EQ	00	695		STY \$0	: TRACK
3012	EQ	00	696		LDA (�),Y	: END
3013	EQ	00	697		INY	
3014	EQ	00	698		BNE FEG1	
3015	EQ	00	699		INC \$1	
3016	EQ	01	700		LDX \$1	
3017	EQ	01	701		CPX ##78	
3018	EQ	78	702		BNE FEG1	
3019	EQ	05	703		LDA ##85	
3020	EQ	05	704		JMP FTGDE	
3021	EQ	85	705		CMP (�),Y	
3022	EQ	85	706		BEQ FEG3	
3023	EQ	06	707		STY TRKDEL	
3024	EQ	00	708		LDA \$1	
3025	EQ	00	709		STA TRKDEH	
3026	EQ	01	710		CLC	
3027	EQ	01	711		ADC ##38	
3028	EQ	80	712		STA TRKTEH	
3029	EQ	18	713		CLC	
3030	EQ	18	714		RTS	

```

*****
2A0E: 85 05 215
2A10: 85 0B 216
2A12: 85 00 217
2A14: 85 04 218
2A16: 85 0A 219
2A18: 84 08 220
2A1A: B1 04 221
2A1C: 8D 0F 2C 222
2A1F: C8 08 223
2A20: D0 08 224
2A22: E6 05 225
2A24: A6 05 226
2A26: F0 08 227
2A28: F0 0C 228
2A2A: D1 04 229
2A2C: F0 F1 230
2A2E: A5 05 231
2A30: 84 04 232
2A32: A2 00 233
2A34: 18 234
2A35: 60 235
2A36: A4 08 236
2A38: 88 237
2A39: C0 FF 238
2A3B: D0 08 239
2A3D: C6 0B 240
2A3F: A6 0B 241
2A41: E0 5B 242
2A43: F0 0B 243
2A45: D1 0A 244
2A47: F0 EF 245
2A49: A5 0B 246
2A4B: 84 0A 247
2A4D: A2 01 248
2A4F: 18 249
2A50: 60 250
2A51: A4 06 251
2A53: A9 00 252
2A55: 85 06 253
2A57: 85 0C 254
2A59: 85 0D 255
2A5B: AD 0F 2C 256
2A5E: D1 06 257
2A60: F0 0B 258
2A62: C8 259
2A63: D0 F9 260
2A65: E6 07 261
2A67: C6 08 262
2A69: D0 F3 263
2A6B: 38 264
2A6C: 60 265
2A6D: A5 07 266
2A6F: 85 0B 267
2A71: 84 0A 268
2A73: AD 0F 2C 269
2A76: C8 270
2A77: D0 06 271
2A79: E6 07 272
2A7B: C6 08 273
2A7D: F0 EC 274
2A7F: E6 0C 275
2A81: D0 02 276
2A83: E6 0D 277
2A85: D1 06 278
2A87: F0 ED 279
2A89: 84 06 280
2A8B: 18 281
2A8C: 60 282
2A8D: AD C6 B2 283
2A90: AE C4 B2 284
2A93: A0 AF 285
2A95: 8C C6 B2 286
2A98: 84 03 287
2A9A: A0 FF 288
2A9C: 84 02 289
2A9E: A0 00 290
2AA0: 20 B7 2A 291
2AA3: AD C5 B2 292
2AA6: AE C4 B2 293
2AA9: 20 B7 2A 294
2AAC: A9 93 295
2AAE: 8D C5 B2 296
297
298
299
300
CSAME STA $5 COUNT
STA $B ALL THE
LDA #0 BYTES
STA $4 WHICH
STA $A ARE THE
STY $8 SAME
LDA ($4),Y IN A
STA SGVAL ROW
CSL1 INY
BNE CSS1
INC $5
LDX $5
CPX $78
BEQ CSHTEND
CSS1 CMP ($4),Y
BEQ CSL1
LDA $5
STY $4
LDX #0
CLC
RTS
CSHTEND LDY $8
CSL2 DEY
CPY ##FF
BNE CSS2
DEC $B
LDX $B
CPX $5B
BEQ ALLSAME
CSS2 CMP ($A),Y
BEQ CSL2
LDA $B
STY $A
LDX #1
CLC
RTS
ALLSAME
RTS
FSAME LDY $6
LDA #0
STA $6
STA $C
STA $D
LDA SGVAL
FSL1 CMP ($6),Y
BEQ FSGTONE
INY
BNE FSL1
INC $7
DEC $8
BNE FSL1
FSE SEC
RTS
FSGTONE LDA $7
STA $B
STY $A
LDA SGVAL
FSL2 INY
BNE FSS1
INC $7
DEC $8
BEQ FSE
FSS1 INC $C
BNE FSS2
INC $D
FSS2 CMP ($6),Y
BEQ FSL2
STY $6
CLC
RTS
MOVEBUFF LDA TRKTEH
LDX TRKDEL
LDY ##AF
STY TRKTEH
STY $3
LDY ##FF
STY $2
LDY #0
JSR MOVE
LDA TRKDEH
LDX TRKDEL
JSR MOVE
LDA ##93
STA TRKDEH
MOVE THE
RAW DATA
BYTES
TO THE
WRITE
BUFFER
FOR
WRITING

```

```

2AB1: A9 FF      801      LDA    ##FF
2AB3: 8D C4 B2  802      STA    TRKDEL
2AB6: 60          803      RTS
                804
2AB7: 85 01      805      MOVE   STA    $1          ;ACTUAL
2AB9: 86 00      806      STX    $0          ;MOVE
2ABB: A9 1C      807      LDA    ##1C        ;ROUTINE
2ABD: 85 05      808      STA    $5
2ABF: B1 00      809      ML1    LDA    ($0),Y
2AC1: 91 02      810      STA    ($2),Y
2AC3: C6 00      811      DEC    $0
2AC5: A5 00      812      LDA    $0
2AC7: C9 FF      813      CMP    ##FF
2AC9: D0 02      814      BNE   MS1
2ACB: C6 01      815      DEC    $1
2ACD: C6 02      816      DEC    $2
2ACF: A5 02      817      LDA    $2
2AD1: C9 FF      818      CMP    ##FF
2AD3: D0 EA      819      BNE   ML1
2AD5: C6 03      820      DEC    $3
2AD7: C6 05      821      DEC    $5
2AD9: D0 E4      822      BNE   ML1
2ADB: 60          823      RTS
                824
                *****
                *
                * DOPSUBO: DO PARM JSR ORDER
                *
                * A/Y = HIGH/LOW = JSR TABLE
                *
                * X = KEY ORDER PATRN (3213 213X)
                *
                * EXAMPLES:
                *   ORDER 1,2,3 = 0010 1010 ($2A)
                *   ORDER 3,2,1 = 1110 0000 ($E0)
                *   ORDER 2 ONLY = 0100 0000 ($40)
                *
                *****
2ADC: 85 05      838      DOPSUBO STA $5          ;JSR
2ADE: 84 04      839      STY $4          ;PARM
2AE0: 8E 24 2C  840      STX ODPTRN     ;ORDER
2AE3: A9 07      841      LDA #7
2AE5: 8D 25 2C  842      STA ODCNTR     ;A=LTAH
2AE8: A9 02      843      DOPL1 LDA #2      ;Y=LTAL
2AEA: 8D 26 2C  844      STA ODPNTR     ;X=PATRN
2AF0: 0E 24 2C  845      DOPL2 ASL ODPTRN
2AF2: AD 16      846      BCC DOPS1
2AF5: AD 26 2C  847      LDA ODPNTR
2AF8: 0A      848      ASLA
2AF9: B1 04      849      TAY
2AF9: 85 00      850      LDA ($4),Y
2AFB: C8      851      STA $0
2AFC: B1 04      852      INY
2AFF: 86 01      853      LDA ($4),Y
2B00: 20 14 2B  854      STA $1
2B03: 90 16      855      JSR IJMP0
2B05: 8D C9 B2  856      BCC DOPD
2B08: CE 25 2C  857      STA ERRORCD
2B0B: F0 0A      858      DOPS1 DEC ODCNTR
2B0D: CE 26 2C  859      BEQ DOPDE
2B10: 10 DB      860      DEC ODPNTR
2B12: 30 04      861      BPL DOPL2
2B14: 6C 00 00  862      BMI DOPL1
2B17: 38      863      IJMP0 JMP ($0)
2B18: AD C9 B2  864      DOPDE SEC          ;ERROR
2B1B: 60          865      LDA ERRORCD
                866      DOPD  RTS
                867
2B1C: AD C1 B2  868      NCAUTO LDA TRKDSL     ;MANAGER
2B1F: 18      869      CLC          ;AUTO
2B20: 69 10      870      ADC ##10     ;NIBBLE
2B22: A8      871      TAY          ;COUNT
2B23: A9 00      872      LDA #0
2B25: 85 00      873      STA $0
2B27: 85 05      874      STA $5
2B29: 6D C3 B2  875      ADC TRKTSH
2B2C: 85 01      876      STA $1
2B2E: AD BC B2  877      LDA DIFH
2B31: 30 2E      878      BMI CHOP
2B33: A9 01      879      CREATE LDA #1
2B35: 85 03      880      STA $3
2B37: A9 02      881      LDA #2
2B39: 85 04      882      STA $4
2B3B: A9 08      883      CRTL2 LDA #8
2B3D: 85 06      884      STA $6
2B3F: 20 83 2B  885      CRTL1 JSR NXTIME
2B42: B0 18      886      BCS CRTD

```



```

2BEE: 65 03 973 ADC #3
2BF0: 8D 28 2C 974 STA WSYNCH
2BF3: AD 27 2C 975 LDA WSYNCL
2BF6: 38 976 SEC
2BF7: F9 977 SBC #7
2BF9: 8D 07 2C 978 STA WSYNCL
2BFF: E9 28 2C 979 LDA WSYNCH
2C01: 8D 00 2C 980 SBC #0
2C04: 60 28 2C 981 STA WSYNCH
          982 RTS
          983
          984

```

```

*-----*
* STORAGE AND WORKSPACE *
*-----*

```

```

2C05: 00 987 DGL1L DFB 0 DATA
2C06: 00 988 DGL2L DFB 0 LENGTH
2C07: 00 989 DGL2H DFB 0
2C08: 00 990 TDGL1L DFB 0
2C09: 00 991 TDGL1H DFB 0
2C0A: 00 992 TDGL2L DFB 0
2C0B: 00 993 TSTLL DFB 0 UNIQUE
2C0C: 00 994 TSTLH DFB 0 LENGTH
2C0D: 00 995 TSTAL DFB 0
2C0E: 00 996 TSTAH DFB 0
2C0F: 00 997 SGVAL DFB 0
2C10: 00 998 TGLL DFB 0 TIMEGAP
2C11: 00 999 TGLH DFB 0 LENGTH
2C12: 00 1000 TTRKLL DFB 0 TEST
2C13: 00 1001 TTRKLH DFB 0 LENGTH
2C14: 00 1002 TDGSA2L DFB 0 TEST
2C15: 00 1003 TDGSA2H DFB 0 START
2C16: 00 1004 DGSA1L DFB 0 DATA
2C17: 00 1005 DGSA2L DFB 0 START
2C18: 00 1006 DGSA2H DFB 0 ADDRESS
2C19: 00 1007 DGEA1L DFB 0 DATA
2C1A: 00 1008 DGEA2L DFB 0 END
2C1B: 00 1009 DGEA2H DFB 0 ADDRESS
2C1C: 00 1010 WS1L DFB 0
2C1D: 00 1011 WS1H DFB 0
2C1E: 00 1012 WS2L DFB 0
2C1F: 00 1013 WS2H DFB 0
2C20: 00 1014 ESRC DFB 0
2C21: 00 1015 ENDBCHK DFB 0
2C22: 00 1016 TTGAL DFB 0
2C23: 00 1017 TTGAH DFB 0
2C24: 00 1018 ODPTRN DFB 0
2C25: 00 1019 ODCNTR DFB 0
2C26: 00 1020 ODPNTR DFB 0
2C27: 00 1021 WSYNCL DFB 0
2C28: 00 1022 WSYNCH DFB 0

```

--End assembly--

1577 bytes

Errors: 0

```

199 *****
200 * ESSENTIAL DATA DUPLICATOR
201 * VERSION 4.2 STANDARD/PLUS
202 * 6502 ASSEMBLY SOURCE CODE
203 * COPYRIGHT (C) 1986
204 * ALL RIGHTS RESERVED
205 * UTILICO MICROWARE
206 * DONALD ANTHONY SCHNAPP
207 * PRINTED APRIL 23, 1986
208 *****
209
210 *****
211 * CONTROL ROUTINES *
212 * $2C2A-$2FFF *
213 *****
214
215 RDP EQU $0
216 RDWRKP EQU $2
217 RTWRKP EQU $4
218 CPP EQU $6
219 CPWP EQU $8
220 ZWRKSPC EQU $FE
221
222 *-----*
223 * INSTRUCTION BYTES:
224 *
225 * 1XXX XXXX = DATA
226 * 0000 00XX = TIMING
227 *
228 * $03 MATCH OR FIND ONE TIMING
229 *   BYTE DURING SEARCH
230 *
231 * $10 ANLDONE; ROUTINE DONE
232 *
233 * $20 START SUB FLAG (TCPPSUB)
234 * $21 RETURN SUB (TSUBCPP)
235 *   IF SUB IS DONE, RESET
236 *   SUB FLAG
237 *
238 * $30 SEARCH MODE, SET DATA
239 *   BUFF POINTER TO $4000
240 * $31 SEARCH MODE, CONTINUE DATA
241 *   BUFF PNTR FROM S/R END
242 * $32 SEARCH MODE, SET DATA BUFF
243 *   POINTER TO S/R START
244 *
245 * $35 REPLACE MODE, CONTINUE DATA
246 *   BUFF PNTR FROM S/R END
247 * $36 REPLACE MODE, SET DATA
248 *   BUFF PNTR TO S/R START
249 *
250 * $40 TRANSFER RDP TO WORK
251 * $41 TRANSFER WORK TO RDP
252 * $42 TRANSFER RDP TO STORAGE
253 * $43 TRANSFER STORAGE TO RDP
254 *
255 * $50 FIND NEXT INVALID BYTE
256 * $51 FIND NEXT NON $FF
257 * $55 RPLC DATA WITH RANDOM VALID
258 * $56 RPLC DATA WITH RNDM INVALID
259 * $57 RPLC WITH RNDM VERY INVLD
260 * $58 RPLC DATA WITH ZERO
261 *
262 * $60 ADD NXT 2 BYTES TO RDWRKP
263 * $61 SUB NXT 2 BYTES FRM RDWRKP
264 * $62 ADD NEXT TWO BYTES TO RDP
265 * $63 SUB NXT TWO BYTES FRM RDP
266 *
267 * $70 SINGLE CHAR WILDCARD
268 * $71 MULTBLE CHAR WILDCARD
269 *   AND RESET RDP
270 *
271 * $73 SET TIMING BYTE HIGH BIT
272 *   OR LOCATING TEND/TLENGTH
273 *
274 * $75 BREAK INTO MONITOR
275 *
276 * NON-COMMANDS ARE IGNORED
277 *
278 *****
279
280
281 ORG CONTROL ;2C2A
282

```


2D7B:	20	8F	2E	455	FNONFF	JSR	INCDT3		
2D7E:	20	84	2D	456		JMP	FNFL2		
2D81:	20	99	2E	457	FNFL1	JSR	INCDT		
2D84:	B1	02		458	FNFL2	LDA	(R0WRKP),Y	::INSTRCT	
2D86:	C9	FF		459		CMP	#FF	::#51	
2D88:	F0	FF		460		BEO	FNFL1		
2D8A:	20	CD	2E	461		JSR	TWRKRP		
2D8D:	20	84	2E	462		JSR	SETINCF		
2D90:	60			463		RTS			
				464					
				465					
2D91:	20	94	2E	466	RRVALID	JSR	INCDT2		
2D94:	EE	31	2F	467		INC	RNDMULD	::INSTRCT	
2D97:	AE	31	2F	468		LDX	RNDMULD	::#52	
2D9A:	F0	42		469		CPX	#42		
2D9C:	D0	05		470		BNE	RRVS1		
2D9E:	A2	00		471		LDX	#0		
2DA0:	8E	31	2F	472		STX	RNDMULD		
2DA3:	BD	89	2F	473	RRVS1	LDA	LTRVALID,X		
2DA6:	91	02		474		STA	(R0WRKP),Y		
2DAB:	20	99	2E	475		JSR	INCDT		
2DAB:	60			476		RTS			
				477					
2DAC:	20	94	2E	478	RRINULD	JSR	INCDT2		
2DAF:	EE	32	2F	479		INC	RNDMINV	::INSTRCT	
2DB2:	AE	32	2F	480		LDX	RNDMINV	::#56	
2DB5:	F0	2E		481		CPX	#2E		
2DB7:	D0	05		482		BNE	RRIS1		
2DB9:	A2	00		483		LDX	#0		
2DBB:	8E	32	2F	484		STX	RNDMINV		
2DBE:	BD	CB	2F	485	RRIS1	LDA	LTRINULD,X		
2DC1:	91	02		486		STA	(R0WRKP),Y		
2DC3:	20	99	2E	487		JSR	INCDT		
2DC6:	60			488		RTS			
				489					
				490					
2DC7:	20	94	2E	490	RRIVULD	JSR	INCDT2		
2DCA:	EE	33	2F	491		INC	RNDMVIU	::INSTRCT	
2DCD:	AE	33	2F	492		LDX	RNDMVIU	::#57	
2DD0:	F0	06		493		CPX	#6		
2DD2:	D0	05		494		BNE	RRVIS1		
2DD4:	A2	00		495		LDX	#0		
2DD6:	8E	33	2F	496		STX	RNDMVIU		
2DD9:	BD	F9	2F	497	RRVIS1	LDA	LTRIVULD,X		
2DDC:	91	02		498		STA	(R0WRKP),Y		
2DDE:	20	99	2E	499		JSR	INCDT		
2DE1:	60			500		RTS			
				501					
2DE2:	20	94	2E	502	RRZERO	JSR	INCDT2		
2DE5:	A9	00		503		LDA	#0	::INSTRCT	
2DE7:	91	02		504		STA	(R0WRKP),Y	::#58	
2DE9:	20	99	2E	505		JSR	INCDT		
2DEC:	60			506		RTS			
				507					
				508					
2DED:	E6	08		508	ADDBYTW	INC	CPWP	::INSTRCT	
2DEF:	B1	08		509		LDA	(CPWP),Y	::#60	
2DF1:	18			510		CLC			
2DF2:	65	04		511		ADC	RTWRKP		
2DF4:	AA			512		TAX			
2DF5:	F6	08		513		INC	CPWP		
2DF7:	B1	08		514		LDA	(CPWP),Y		
2DF9:	65	05		515		ADC	RTWRKP+1		
2DFB:	C9	80		516	DBCHK	CMP	#80		
2DFD:	B0	0C		517		BCS	ADDBER		
2DFF:	C9	78		518		CMP	#78		
2E01:	90	08		519		BCC	ADDBER		
2E03:	85	05		520	ADDBDN	STA	RTWRKP+1		
2E05:	86	04		521		STX	RTWRKP		
2E07:	20	F0	2E	522		JSR	TDCALC		
2E0A:	60			523		RTS			
2E0B:	4C	B1	2E	524	ADDBER	JMP	HITBEND		
				525					
2E0E:	E6	08		526	SUBBYTW	INC	CPWP	::INSTRCT	
2E10:	A5	04		527		LDA	RTWRKP	::#61	
2E12:	68			528		SEC			
2E13:	F1	08		529		SBC	(CPWP),Y		
2E15:	AA			530		TAX			
2E16:	E6	08		531		INC	CPWP		
2E18:	A5	05		532		LDA	RTWRKP+1	::INSTRCT	
2E1A:	F1	08		533		SBC	(CPWP),Y	::#41	
2E1C:	4C	FB	2D	534		JMP	DBCHK		
				535					
2E1F:	E6	08		536	ADDBYT	INC	CPWP	::INSTRCT	
2E21:	B1	08		537		LDA	(CPWP),Y	::#62	
2E23:	18			538		CLC			
2E24:	65	00		539		ADC	RDP		
2E26:	85	00		540		STA	RDP		

2E	00	00	541	INC	CPWP	
2E	00	08	542	LDA	(CPWP),Y	
2E	01	01	543	ADC	RDP+1	
2E	01	01	544	STA	RDP+1	
2E	D9	2E	545	JSR	TRDPWRK	
2E	60		546	RTS		
2E	00	08	547			
2E	00	00	548	SUBBYT	INC	CPWP
2E	00	00	549	LDA	RDP	: INSTRUCT
2E	00	00	550	SEC		: #63
2E	00	08	551	SBC	(CPWP),Y	
2E	00	00	552	STA	RDP	
2E	01	00	553	INC	CPWP	
2E	01	00	554	LDA	RDP+1	
2E	01	00	555	SBC	(CPWP),Y	
2E	D9	2E	556	STA	RDP+1	
2E	60		557	JSR	TRDPWRK	
2E	60		558	RTS		
2E	99	2E	559			
2E	84	2E	560	SWLDCD	JSR	INCDT
2E	60		561	JSR	SETINCF	: INSTRUCT
2E	60		562	RTS		: #70
2E	00	00	563			
2E	00	2E	564	MWLDCD	LDA	#0
2E	00	2E	565	STA	MPFLAG	: INSTRUCT
2E	99	2E	566	JSR	INCDT	: #71
2E	60		567	RTS		
2E	00	00	568			
2E	94	2E	569	STHIGH	JSR	INCDT2
2E	04	2E	570	LDA	(RTWRKP),Y	: INSTRUCT
2E	80		571	ORA	#80	: #73
2E	04		572	STA	(RTWRKP),Y	
2E	99	2E	573	JSR	INCDT	
2E	60		574	RTS		
2E	60		575			
2E66:	4C	59	576	QUIT	JMP	\$FF59 ; INST#75
			577			
			578	*-----*		
			579	* COMMON ROUTINES *		
			580	*-----*		
			581			
2E	A9	40	582	RSETUP	LDA	##40 ; SETUP
2E	85	01	583	STA	RDP+1	THE
2E	00	00	584	LDA	#0	RAW
2E	00	00	585	STA	RDP	DISK
2E	2A	2F	586	STA	IMODE	BYTE
2E	2B	2F	587	STA	MPFLAG	BUFFER
2E	20	2E	588	STA	ENDBFLAG	
2E	D9	2E	589	JSR	TRDPWRK	
2E	60		590	RTS		
2E	A2	00	591			
2E	8E	2F	592	CLRMPFLG	LDX	#0 ; CLEAR
2E	60		593	STX	MPFLAG	MP
2E	60		594	RTS		FLAG
2E	00	00	595			
2E	D0	80	596	SETINCF	LDX	##80 ; SET
2E	02		597	BNE	SIS1	FORCE
2E	01		598	SETINCN	LDX	##01 ; SET
2E	8E	2F	599	SIS1	STX	MNBFLAG ; NOFORCE
2E	60		600	RTS		INC
2E	00	00	601			
2E	02	2F	602	INCDT3	LDX	MNBFLAG ; INC
2E	06		603	BMI	INCDT	DATA/
2E	00		604	RTS		TIME
2E	00	2F	605	INCDT2	LDX	MNBFLAG ; BUFFER
2E	00		606	BEQ	IL1	POINTER
2E	00		607	INCDT	LDX	#0 ; IF
2E	00	2F	608	STX	MNBFLAG	MNB
2E	04		609	INC	RTWRKP	FLAG IS
2E	02		610	INC	RDWRKP	SET
2E	01		611	BEQ	IS1	
2E	00		612	RTS		
2E	00	05	613	IL1	IS1	
2E	00		614	INC	RTWRKP+1	
2E	00		615	INC	RDWRKP+1	
2E	00		616	LDX	RTWRKP+1	
2E	00		617	CPX	##80	
2E	00		618	BNE	IL1	
2E	00		619	PLA		
2E	00		620	PLA		
2E	01	2F	621	HITBEND	LDX	#1
2E	00		622	STX	ENDBFLAG	
2E	02		623	LDX	##FF	
2E	04		624	STX	RDWRKP	
2E	77		625	STX	RTWRKP	
2E	03		626	LDX	##77	
2E	03		626	STX	RDWRKP+1	

2EC0:	A2	AF	627		LDX	#\$AF	
2EC2:	86	05	628		STX	RTWRKP+1	
2EC4:	60		629		RTS		
2EC5:	AE	2B	2F	PATFSET	LDX	MPFLAG	PATRN
2EC8:	D0	0E	632		BNE	PATS1	FLAG
2ECA:	EE	2B	2F		INC	MPFLAG	SET &
2ECD:	A6	02	634	TWRKRD	LDX	RDWRKP	TRANSFER
2ECF:	86	00	635		STX	RDP	RDWRKP
2ED1:	A6	03	636		LDX	RDWRKP+1	TO RDP
2ED3:	86	01	637		STX	RDP+1	
2ED5:	20	0B	2F		JSR	TWRKCPP	
2ED8:	60		639	PATS1	RTS		
2ED9:	48		640	TRDPWRK	PHA		INSTRCT
2EDA:	A9	00	641		LDA	#0	#40
2EDC:	8D	2C	2F		STA	MNBFLAG	
2EDF:	A5	00	644		LDA	RDP	TRANSFR
2EE1:	85	02	645		STA	RDWRKP	RDP TO
2EE3:	85	04	646		STA	RTWRKP	DATA
2EE5:	A5	01	647		LDA	RDP+1	WORK
2EE7:	85	03	648		STA	RDWRKP+1	AND
2EE9:	18		649		CLC		CALC
2EEA:	69	38	650		ADC	#\$38	TIME
2EEC:	85	05	651		STA	RTWRKP+1	WORK
2EEF:	60		652		PLA		
			653		RTS		
2EF0:	A5	04	654	TDCALC	LDA	RTWRKP	CALC
2EF2:	85	02	655		STA	RDWRKP	DATA
2EF4:	A5	05	656		LDA	RTWRKP+1	WORK
2EF6:	38		657		SEC		FROM
2EF7:	E9	38	658		SBC	#\$38	TIME
2EF9:	85	03	660		STA	RDWRKP+1	WORK
2EFB:	60		661		RTS		
2EFC:	A6	06	662	TCPPWRK	LDX	CPP	TRANSFR
2EFE:	86	08	663		STX	CPWP	CPP TO
2F00:	A6	07	664		LDX	CPP+1	CNTRL
2F02:	86	09	665		STX	CPWP+1	WORK
2F04:	60		666		RTS		
2F05:	20	0B	2F	TWRKCPP1	JSR	TWRKCPP	POINT
2F08:	E6	06	669		INC	CPP	AFTER
2F0A:	60		670		RTS		COMMAND
2F0B:	A6	08	671	TWRKCPP	LDX	CPWP	TRANSFR
2F0D:	86	06	672		STX	CPP	CNTRL
2F0F:	A6	09	673		LDX	CPWP+1	WORK
2F11:	86	07	674		STX	CPP+1	TO CPP
2F13:	60		675		RTS		
2F14:	A6	00	676	TRDPSTR	LDX	RDP	INSTRCT
2F16:	8E	2E	2F		STX	STORAGE	#42
2F19:	A6	01	679		LDX	RDP+1	TRANSFR
2F1B:	8E	2F	2F		STX	STORAGEH	RDP TO
2F1E:	60		681		RTS		STORAGE
2F1F:	AE	2E	2F	TSTRD	LDX	STORAGE	INSTRCT
2F22:	86	00	684		STX	RDP	#43
2F24:	AE	2F	2F		LDX	STORAGEH	TRANSFR
2F27:	86	01	687		STX	RDP+1	STORAGE
2F29:	60		688		RTS		TO RDP
2F2A:	00		689	IMODE	DFB	0	
2F2B:	00		690	MPFLAG	DFB	0	
2F2C:	00		691	MNBFLAG	DFB	0	
2F2D:	00		692	ENDBFLAG	DFB	0	
2F2E:	00		693	STORAGE	DFB	0	
2F2F:	00		694	STORAGEH	DFB	0	
2F30:	00		695	SUBPNTR	DFB	0	
2F31:	00		696	RNDMVL	DFB	0	
2F32:	00		697	RNDMINV	DFB	0	
2F33:	00		698	RNDMIV	DFB	0	
			699		DFB	0	
			700				
			701				
			702				
			703				
			704				
2F34:	10		705	LTCINST	DFB	\$10	ANL DONE
2F35:	20		706		DFB	\$20	STRTSUB
2F36:	21		707		DFB	\$21	RTNSUB
2F37:	35		708		DFB	\$35	SIMODE
2F38:	36		709		DFB	\$36	SIMODE2
2F39:	30		710		DFB	\$30	CIMODE5
2F3A:	31		711		DFB	\$31	CIMODE
2F3B:	32		712		DFB	\$32	CIMODER

-----*
 * LOOK UP TABLE FOR COMMANDS *
 -----*

2F3C: 40
 2F3D: 41
 2F3E: 42
 2F3F: 43
 2F40: 50
 2F41: 51
 2F42: 55
 2F43: 56
 2F44: 57
 2F45: 58
 2F46: 60
 2F47: 61
 2F48: 62
 2F49: 63
 2F4A: 70
 2F4B: 71
 2F4C: 73
 2F4D: 75

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DFB \$40
 DFB \$41
 DFB \$42
 DFB \$43
 DFB \$50
 DFB \$51
 DFB \$55
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 DFB \$61
 DFB \$62
 DFB \$63
 DFB \$70
 DFB \$71
 DFB \$73
 DFB \$75

TRDPWRK
 TWRKRDP
 TRDPSTR
 TSTRROP
 FINVLD
 FNONFF
 RRVALID
 RRINVLD
 RRVIULD
 RRZERO
 ADDBYTW
 SUBBYTW
 ADDBYT
 SUBBYT
 SWLDCC
 MWLDCC
 STHIGH
 QUIT

 * LOOK UP TABLE FOR COMMAND *
 * ADDRESSES *

2F4E: 0D 2D
 2F50: 1B 2D
 2F52: 24 2D
 2F54: 38 2D
 2F56: 4A 2D
 2F58: 55 2D
 2F5A: 34 2D
 2F5C: 46 2D
 2F5E: D9 2E
 2F60: CD 2E
 2F62: 14 2F
 2F64: 1F 2F
 2F66: 5B 2D
 2F68: 7B 2D
 2F6A: 91 2D
 2F6C: AC 2D
 2F6E: C7 2D
 2F70: E2 2D
 2F72: ED 2D
 2F74: 0E 2E
 2F76: 1F 2E
 2F78: 34 2E
 2F7A: 49 2E
 2F7C: 50 2E
 2F7E: 59 2E
 2F80: 66 2E

LTAINST	DA	ANLDONE	10	0
	DA	STRSUB	20	1
	DA	RTRNSUB	21	2
	DA	SIMODE	25	3
	DA	SIMODE2	26	4
	DA	CIMODES	30	5
	DA	CIMODE1	31	6
	DA	CIMODER	32	7
	DA	TRDPWRK	40	8
	DA	TWRKRDP	41	9
	DA	TRDPSTR	42	A
	DA	TSTRROP	43	B
	DA	FINVLD	50	C
	DA	FNONFF	51	D
	DA	RRVALID	55	E
	DA	RRINVLD	56	F
	DA	RRVIULD	60	10
	DA	RRZERO	61	11
	DA	ADDBYTW	62	12
	DA	SUBBYTW	63	13
	DA	ADDBYT	64	14
	DA	SUBBYT	65	15
	DA	SWLDCC	70	16
	DA	MWLDCC	71	17
	DA	STHIGH	73	18
	DA	QUIT	75	19

 * LOOK UP TABLE OF INVALID DISK *
 * BYTE PATTERNS *

2F82: 07 0E 1C
 2F85: 38 70 E0 80

LTFINVLD HEX 070E1C3870E080

 * LOOK UP TABLE FOR REPLACING *
 * WITH VALID BYTES *

2F89: 96 97 9A
 2F8C: 9B 9D 9E
 2F91: A7 AB AC
 2F94: AD AE AF
 2F99: B4 B5 B6
 2F9C: B7 B8 B9
 2FA1: BD BE BF
 2FA4: CB CD CE
 2FA9: D6 D7 D8
 2FAC: DA DB DC
 2FB1: DF E0 E1
 2FB4: E2 E3 E4
 2FB9: F0 F1 F2
 2FBC: F3 F4 F5
 2FC1: F7 F8 F9
 2FC4: FB FC FD
 2FC9: DA D5

LTRVALID HEX 96979A9B9D9E9FA6
 HEX A7ABACADAEAFB2B3
 HEX B4B5B6B7B8B9BBC
 HEX BDBEBFCBCDCECFD3
 HEX D6D7D8D9DADBCDDDE
 HEX DFE5E6E7E9EAEBEC
 HEX EDEEEFF2F3F4F5F6
 HEX F7F9FAFBFCFDFEFF
 HEX AAD5

 * LOOK UP TABLE FOR REPLACING *
 * WITH INVALID BYTES *

```

790
2FCB: 80 81 82 791 LTRINVLD HEX 8081828384858687
2FCE: 83 84 85 86 87
2FD3: 88 89 8A 8B 8C 8D 8E 8F
2FD6: 90 91 92 93 94 95 96 97
2FDB: 98 99 9A 9B 9C 9D 9E 9F
2FDE: A0 A1 A2 A3 A4 A5 A6 A7
2FE3: B0 B1 B2 B3 B4 B5 B6 B7
2FE6: C0 C1 C2 C3 C4 C5 C6 C7
2FEB: D0 D1 D2 D3 D4 D5 D6 D7
2FEF: E0 E1 E2 E3 E4 E5 E6 E7
2FF3: F0 F1 F2 F3 F4 F5 F6 F7
2FF6: F8 F9 FA FB FC FD FE FF

```

```

797
798 *-----*
799 * LOOK UP TABLE FOR REPLACING *
800 * WITH VERY INVALID BYTES *
801 *-----*
802
803

```

```

2FF9: 80 81 82 803 LTRVIVLD HEX 80818283C0C1
2FFC: 83 C0 C1

```

--End assembly--

981 bytes

Errors: 0


```

30A9: DD A0 A0 80 ASC " ) ; ) VERSION 4.2( PLUS)"
30AC: A0 FC A0 A0 FD A0 A0 A0 D6 A0 A0 A0 D2
30AD: A0 A0 A0 A0 A0 A0 A0 C5 A0 A0 A0 D2
30AE: A0 A0 A0 A0 A0 A0 A0 B4 A0 A0 A0 B2
30AF: D3 C9 CF CE CC CC D0 D3 D3
30B0: FB A0 D0 D5 D3
30B1: DD A0 A0 81 ASC " ) SERIAL NUMBER #000000"
30B2: A0 A0 A0 A0 A0 A0 A0 C1 A0 A0 D3
30B3: A0 A0 A0 A0 A0 A0 A0 C1 A0 A0 D5
30B4: A0 A0 A0 A0 A0 A0 A0 D2 A0 A0 D5
30B5: C5 C2 C5 D2 A0 A3 B0 B0
30B6: B0 B0 B0 B0 B0 82 ASC " ) APRIL 23, 1986 ]"
30B7: DD A0 A0 A0 A0 A0 A0 A0 A0 A0 A0
30B8: A0 A0 A0 A0 A0 A0 A0 C1 A0 A0 A0
30B9: A0 A0 A0 A0 A0 A0 A0 D0 A0 A0 A0
30BA: A0 A0 A0 A0 A0 A0 A0 B2 A0 A0 A0
30BB: A0 A0 A0 A0 A0 A0 A0 B3 A0 A0 A0
30BC: A0 A0 A0 A0 A0 A0 A0 AC A0 A0 A0
30BD: A0 A0 A0 A0 A0 A0 A0 A0 A0 A0
30BE: B6 A0 A0 A0 A0 A0 A0 A0 A0 A0
30BF: A0 A0 A0 A0 A0 A0 A0 DD A0 A0
30C0: DD A0 A0 A0 A0 A0 A0 A0 83 ASC " ) UTILICO MICROWARE"
30C1: A0 A0 A0 A0 A0 A0 A0 A0 A0 A0
30C2: A0 A0 A0 A0 A0 A0 A0 D5 A0 A0 A0
30C3: A0 A0 A0 A0 A0 A0 A0 D4 A0 A0 A0
30C4: A0 A0 A0 A0 A0 A0 A0 C9 A0 A0 A0
30C5: A0 A0 A0 A0 A0 A0 A0 C3 A0 A0 A0
30C6: DD A0 A0 A0 A0 A0 A0 A0 84 ASC " ) 3377 SOLANO AVE., SUITE#352"
30C7: A0 A0 A0 A0 A0 A0 A0 A0 A0 A0
30C8: A0 A0 A0 A0 A0 A0 A0 D3 A0 A0 A0
30C9: C1 D4 C5 AE AC A0 A0 D3 A0 A0
30CA: DD A0 A0 A0 A0 A0 A0 A0 A0 A0 A0
30CB: A0 A0 A0 A0 A0 A0 A0 D4 A0 A0 A0
30CC: A0 A0 A0 A0 A0 A0 A0 C5 A0 A0 A0
30CD: A0 A0 A0 A0 A0 A0 A0 A0 A0 A0
30CE: A0 A0 A0 A0 A0 A0 A0 A0 A0 A0
30CF: A0 A0 A0 A0 A0 A0 A0 A0 A0 A0
30D0: DD A0 A0 A0 A0 A0 A0 A0 85 ASC " ) NAPA, CALIFORNIA 9455811"
30D1: A0 A0 A0 A0 A0 A0 A0 A0 A0 A0
30D2: A0 A0 A0 A0 A0 A0 A0 C1 A0 A0 A0
30D3: A0 A0 A0 A0 A0 A0 A0 AC A0 A0 A0
30D4: C6 CF D2 C3 C1 C1 C1 A0 A0
30D5: B9 B4 B5 B5 B8 DD DD
30D6: DD A0 A0 A0 A0 A0 A0 A0 86 ASC " ) (SOFTWARE) BY DONALD A. SCHNAPP]"
30D7: FC A0 A0 A0 A0 A0 A0 A0 FD A0 A0 A0
30D8: FB D3 CF A0 A0 A0 A0 C6 D4 D7 C1 D2
30D9: A0 A0 A0 A0 A0 A0 A0 C2 D9 A0 C4 CF
30DA: CE C1 CC C4 A0 C1 AE A0
30DB: D3 C3 C8 CE C1 D0 DD DD
30DC: FB A0 A0 A0 A0 A0 A0 A0 87 ASC " ( HARDWARE BY CHARLES J. ROSENBERG) )"
30DD: A0 A0 A0 A0 A0 A0 A0 C1 D2 C4 D7 C1
30DE: D2 C5 A0 A0 A0 A0 C2 D9 A0 C3 C8
30DF: C1 D2 CC C5 D3 A0 A0 CA AE
30E0: A0 D2 CF D3 C5 CE C2 C5
30E1: DD A0 A0 A0 A0 A0 A0 A0 88 ASC " ) COPYRIGHT (C) 1986 UTILICO MICROWARE"
30E2: C3 CF D0 D9 D2 C9 C7 C8
30E3: D4 A0 A8 C3 A9 A0 B1 B9
30E4: B8 B6 A0 A0 D5 D4 C9 CC C9
30E5: C3 CF A0 A0 CD C9 C3 D2 CF
30E6: D7 C1 D2 C5 89 ASC " ) ALL RIGHTS ARE RESERVED^2"
30E7: DD A0 A0 A0 A0 A0 A0 A0 A0 A0 A0
30E8: A0 A0 A0 A0 A0 A0 A0 A0 A0 A0
30E9: A0 A0 A0 A0 A0 A0 A0 C9 C7 C8
30EA: CC A0 D2 C9 A0 D2 D2 C5 D3
30EB: A0 C1 D2 C5 A0 A0 DE C0
30EC: C5 D2 D6 C5 C4
30ED: A6 A0 FC 90 TXTS ASC "& ; ) ESSENTIAL DATA DUPLICATOR 4( PLUS)?"
30EE: A0 A0 FD A0 A0 A0 A0 C5
30EF: D3 D3 C5 CE D4 C9 C1 CC
30F0: A0 C4 C1 D4 C1 A0 C4 D5
30F1: D0 CC C9 C3 C1 D4 CF D2
30F2: A0 B4 FB A0 D0 CC D5 D3
30F3: DD C0
30F4: A0 A0 A0 91 TXTRK ASC " 000000000111111111222222222333333"
30F5: A0 B0 B0 B0 B0 B0 B0 B0 B0 B0
30F6: B0 B0 B0 B0 B0 B0 B0 B0 B0
30F7: B1 B1 B1 B1 B1 B1 B1 B1 B1
30F8: B2 B2 B2 B2 B2 B2 B2 B2 B2
30F9: B3 B3 B3 B3 B3 B3 B3 B3 B3
30FA: B3 B3 B3 B3 B3 B3 B3 B3 B3
30FB: D4 D2 C8 92 ASC "TRK:012345678901234567890123456789012345?"
30FC: BA B0 B0 B1 B2 B3 B4 B5 B6
30FD: B7 B8 B9 B0 B1 B2 B3 B4 B5
30FE: B5 B6 B7 B8 B9 B0 B1 B2 B3
30FF: B3 B4 B5 B6 B7 B8 B9 B0
3100: B1 B2 B3 B4 B5
3101: AE B0 B0 93 TXTF ASC ".00( )"
3102: A8 DD
3103: AE B2 B5 94 ASC ".25( )"
3104: A8 DD
3105: AE B5 B0 95 ASC ".50( )"
3106: A8 DD
3107: AE B7 B5 96 ASC ".75( )"
3108: A8 DD
3109: A0 A0 97
310A: FC A0 A0 98 TXSLT ASC " ; ) ORIGINAL:S=0,D=0 DUPLICATE:S=0,D=0( (0)
310B: A0 FD A0 A0 CF D2 C9 C7 C9
310C: CE C1 CC BA D3 BD B0 AC
310D: C4 B0 B0 A0 A0 C4 D5 D0

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32CCBB: CC C9 C3 C1 D4 C5 BA D3
32C3BB: BD B0 AC C4 BD B0 FB A0
32CB: A8 B0 A9 FD C0
          99
3300: A6 DD DD 100 TXMNU ASC "&]] - OPTION MENU -]]"
3301: A0 A0 A0 A0 A0 A0 A0 A0 A0 A0
3302: A0 A0 CF D0 D4 C9 CF CE A0
3303: A0 A0 CD D0 D5 A0 A0 A0 DD
3304: A0 A0 DD 101 A0 A0 A0 ASC "
3305: A0 A0 A0 B1 AE A0 C2 C1 ASC " 1. BACK UP A DISK]"
3306: A0 A0 A0 D5 D0 A0 C1 A0
3307: A0 A0 C8 B0 DD
3308: A0 A0 C3 CB DD
3309: A0 A0 C9 D3 CB DD
3310: A0 A0 A0 102 A0 A0 A0 ASC "
3311: A0 A0 A0 B2 AF A0 C3 C8 ASC " 2. CHANGE PARAMETERS]"
3312: A0 A0 A0 C7 C5 A0 D2 D3 DD
3313: A0 A0 A0 D4 C5 A0 C1 D2 DD
3314: A0 A0 A0 103 A0 A0 A0 ASC "
3315: A0 A0 A0 B3 AE A0 C3 C8 ASC " 3. CHECK DRIVE SPEED]"
3316: A0 A0 A0 A0 C3 CB C9 D4 DD
3317: A0 A0 A0 D0 D0 C5 C4 DD
3318: A0 A0 A0 104 A0 A0 A0 ASC "
3319: A0 A0 A0 B4 AE A0 C4 C9 ASC " 4. DISK SCAN]"
3320: A0 A0 A0 D3 C3 C1 CE DD
3321: A0 A0 A0 105 A0 A0 A0 ASC "
3322: A0 A0 A0 B5 AE A0 C3 C5 ASC " 5. CERTIFY AND ERASE DISK]"
3323: A0 A0 A0 C6 D9 A0 C1 CE
3324: A0 A0 A0 D2 C7 D3 C5 A0
3325: A0 A0 A0 106 A0 A0 A0 ASC "
3326: A0 A0 A0 B6 AE A0 C3 C8 ASC " 6. CHANGE SLOTS AND DRIVES]"
3327: A0 A0 A0 C5 A0 D3 CC CF
3328: A0 A0 A0 C1 CF C4 A0 C4
3329: A0 A0 A0 D6 C5 D3 DD
3330: A0 A0 A0 107 A0 A0 A0 ASC "
3331: A0 A0 A0 B7 AE A0 C5 D8 ASC " 7. EXAMINE DISK DRIVE]"
3332: A0 A0 A0 CE C5 A0 C4 C9
3333: A0 A0 A0 C4 D2 C9 D6 C5
3334: A0 A0 A0 108 A0 A0 A0 ASC "
3335: A0 A0 A0 B8 AE A0 C3 CC ASC " 8. CLEAR ERROR CODES]"
3336: A0 A0 A0 A0 C5 D2 D2 CF
3337: A0 A0 A0 C1 D2 C4 C5 D3 DD
3338: A0 A0 A0 109 A0 A0 A0 ASC "
3339: A0 A0 A0 B9 AE A0 D1 D5
3340: A0 A0 A0 C0
3341: A0 A0 A0 110 TX0 ASC "- PRESS <"
3342: A0 A0 A0 D0 D2 C5 D3 D3
3343: A0 A0 A0 111
3344: A0 A0 A0 54 112 FLS "RETURN"
3345: A0 A0 A0 4E
3346: A0 A0 A0 D4 113 ASC "> TO SELECT #[?]"
3347: A0 A0 A0 C5 CC C5 C3 D4
3348: A0 A0 A0 C0
3349: A0 A0 A0 114
3350: A0 A0 A0 115 TX0D ASC "` <"
3351: A0 A0 A0 BC
3352: A0 A0 A0 116 FLS "0"
3353: A0 A0 A0 D2 C9 117 ASC ">RIGINAL OR <"
3354: A0 A0 A0 C7 C9 CE C1 CC A0 CF D2
3355: A0 A0 A0 BC
3356: A0 A0 A0 118 FLS "D"
3357: A0 A0 A0 D5 D0 119 ASC ">UPLICATE DRIVE?] PRESS <"
3358: A0 A0 A0 C3 C3 C1 D4 C5 A0 C4
3359: A0 A0 A0 C9 D6 D0 A0 A0
3360: A0 A0 A0 D0 D2 C5 D3 D3 A0
3361: A0 A0 A0 120 INV "RETURN"
3362: A0 A0 A0 0E
3363: A0 A0 A0 C3 121 ASC "> FOR ?"
3364: A0 A0 A0 D2 C0
3365: A0 A0 A0 122
3366: A0 A0 A0 123 TX11 ASC "` INSERT ?"
3367: A0 A0 A0 C9 CE D3 C5 D2
3368: A0 A0 A0 124
3369: A0 A0 A0 125 TX10 FLS "ORIGINAL"
3370: A0 A0 A0 41 4C
3371: A0 A0 A0 126 ASC "?
3372: A0 A0 A0 55 50 127 TX1D FLS "DUPLICATE"
3373: A0 A0 A0 49 43 41 54 45
3374: A0 A0 A0 C0 128 ASC "?
3375: A0 A0 A0 129 TX1BL ASC "A"
3376: A0 A0 A0 4C 41 130 FLS "BLANK"
3377: A0 A0 A0 4E 4B

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345D: C0          131 ASC "2"
345E: A0 A0 C9 132 TXIB2 ASC "DISK INTO THE] 2"
3461: D3 C4 C9 A0 C9 CE D4 CF A0
3469: D4 C8 C5 DD A0 A0 A0 C0
3471: 0F 12 09 133 TXIOD INV "ORIGINAL"
3474: 07 09 0E 01 0C
3479: A0 C4 D2 134 ASC "DRIVE2"
347C: C9 D6 C5 C0
3480: 04 15 10 135 TXIDD INV "DUPLICATE"
3483: 0C 09 03 01 14 05
3489: A0 C4 D2 136 ASC "DRIVE2"
348C: C9 D6 C5 C0
3490: 42 4F 54 137 TXIB FLS "BOTH"
3493: 48
3494: A0 C4 C9 138 ASC "DISKS2"
3497: D3 CB D3 C0
349B: A0 C1 CE 139 TXI2 ASC "AND PRESS <"
349E: C4 A0 D0 D2 C5 D3 D3 A0
34A6: BC
34A7: 12 05 14 141 INV "RETURN"
34AA: 15 12 0E
34AD: BE DB C0 142 ASC ">[2"
34B0: E0 A0 C9 143 TXIBPR ASC "` INSERT "
34B3: CE D3 C5 D2 D4 A0
34B9: 42 4F 54 145 FLS "BOTH"
34BC: 48
34BD: A0 C4 C9 146 ASC "DISKS, THEN PRESS <"
34C0: D3 CB D3 AC A0 D4 C8 C5
34C8: CE A0 D0 D2 C5 D3 D3 A0
34D0: BC
34D1: 12 05 14 147 INV "RETURN"
34D4: 15 12 0E
34D7: BE DB C0 148 ASC ">[2"
34DA: E0 A0 C9 149 TXIOPR ASC "` INSERT "
34DD: CE D3 C5 D2 D4 A0
34E3: 4F 52 49 151 FLS "ORIGINAL"
34E6: 47 49 4E 41 4C
34EB: A0 C4 C9 152 ASC "DISK; PRESS <"
34EE: D3 CB BB A0 D0 D2 C5 D3
34F6: D3 A0 BC
34F9: 12 05 14 153 INV "RETURN"
34FC: 15 12 0E
34FF: BE DB C0 154 ASC ">[2"
3502: DF A0 C9 155 TXIDPR ASC "_ INSERT "
3505: CE D3 C5 D2 D4 A0
3508: 44 55 50 157 FLS "DUPLICATE"
350E: 4C 49 43 41 54 45
3514: A0 C4 C9 158 ASC "DISK; PRESS <"
3517: D3 CB BB A0 D0 D2 C5 D3
351F: D3 A0 BC
3522: 12 05 14 159 INV "RETURN"
3525: 15 12 0E
3528: BE DB C0 160 ASC ">[2"
352B: A0 A0 A0 161 TXST ASC "START TRACK: 2"
352E: A0 A0 A0 D3 D4 C1 D2 D4
3537: A0 D4 D2 C1 C3 CB BA A0
353E: C0
353F: A0 A0 A0 163 TXET ASC "END TRACK: 2"
3542: A0 A0 A0 A0 A0 C5 CE C4
354A: A0 D4 D2 C1 C3 CB BA A0
3552: C0
3553: A0 A0 A0 164 TXAT ASC "STEP: 2"
3556: A0 A0 A0 A0 A0 A0 A0 A0
355E: A0 A0 D3 D4 C5 D0 BA A0
3566: C0
3567: DD DD A0 165 TXSY ASC "] SYNCHRONIZE TRACKS? 2"
356A: A0 A0 A0 D3 D9 CE C3 C8
3572: D2 CF CE C9 DA C5 A0 D4
357A: D2 C1 C3 CB D3 BF A0 C0
3582: A0 A0 A0 167 TXNC ASC "NIBBLE COUNT?"
3585: A0 A0 A0 A0 A0 A0 A0 CE
358D: C9 C2 C2 CC C5 A0 A0 C3 CF
3595: D5 CE D4 BF
3599: DD A0 A0 169 ASC "] <"
359C: A8
359D: 4E
359E: CF 170 FLS "N"
35A0: 41 AF 171 ASC "O/"
35A1: D5 D4 CF 172 FLS "A"
35A1: D5 D4 CF 173 ASC "UTOMATIC/"

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35A4: CD C1 D4 C9 C3 AF
35AA: 4D 174 FLS "M"
35AB: C1 CE D5 175 ASC "ANUAL)"
35AE: C1 CC A9 C0
35B2: DD A0 A0 176 TXRTB ASC "J BIT COPY TRACKS? )"
35B5: A0 A0 A0 A0 A0 C2 C9 D4
35BD: A0 C3 CF D0 D9 A0 D4 D2
35C5: C1 C3 CB D3 BF A0 C0
35CC: D9 C5 D3 178 TXY ASC "YES)"
35CF: C0
35D0: CE CF C0 180 TXN ASC "NO)"
35D3: C1 D5 D4 181 TXA ASC "AUTOMATIC)"
35D6: CF CD C1 D4 C9 C3 C0
35DD: CD C1 CE 182 TXM ASC "MANUAL)"
35E0: D5 C1 CC C0
35E4: A6 DD DD 183 TXCHPRM ASC "&]] - CHANGE PARAMETERS -"
35E7: A0 A0 A0 A0 A0 A0 A0 A0
35EF: A0 C3 C8 C1 CE C7 C5 A0
35F7: D0 C1 D2 C1 CD C5 D4 C5
35FF: D2 D3 A0 A0 AD
3604: DD DD A0 185 ASC "]] 1. CHANGE PARAMETER VALUES"
3607: A0 A0 A0 A0 A0 B1 AE A0
360F: C3 C8 C1 CE C7 C5 A0 D0
3617: C1 D2 C1 CD C5 D4 C5 D2
361F: A0 D6 C1 CC D5 C5 D3
3626: DD A0 A0 186 ASC "J 2. REPROGRAM PREANALYZE ROUTINE"
3629: A0 A0 A0 A0 B2 AE A0 D2
3631: C5 D0 D2 CF C7 D2 C1 CD
3639: A0 D0 D2 C5 C1 CE C1 CC
3641: D9 DA C5 A0 D2 CF D5 D4
3649: C9 CE C5
364C: DD A0 A0 187 ASC "J 3. REPROGRAM PREWRITE ROUTINE"
364F: A0 A0 A0 A0 B3 AE A0 D2
3657: C5 D0 D2 CF C7 D2 C1 CD
365F: A0 D0 D2 C5 D7 D2 C9 D4
3667: C5 A0 D2 CF D5 D4 C9 CE
366F: C5
3670: DD A0 A0 188 ASC "J 4. RESET PARAMETERS TO DEFAULT"
3673: A0 A0 A0 A0 B4 AE A0 D2
367B: C5 D3 C5 D4 A0 D0 C1 D2
3683: C1 CD C5 D4 C5 C6 C1 D5
368B: D4 CF A0 C4 C5
3693: CC D4
3695: DD A0 A0 189 ASC "J 5. RETURN TO OPTION MENU^)"
3698: A0 A0 A0 A0 B5 AE A0 D2
36A0: C5 D4 D5 D2 CE A0 D4 CF
36A8: A0 CF D0 D4 C9 CF CE A0
36B0: CD C5 CE D5 DE C0
36B6: DD A0 A0 190 TXNOTE ASC "J REFER TO YOUR EDD DOCUMENTATION AND"
36B9: A0 D2 C5 C6 C5 D2 A0 D4
36C1: CF A0 D9 CF D5 D2 A0 C5
36C9: C4 C4 A0 C4 CF C3 D5 CD
36D1: C5 CE D4 C1 D4 C9 CF CE
36D9: A0 C1 CE C4
36DD: DD A0 D0 192 ASC "J PROGRAM INFORMATION LISTS IF NECESSARY."
36E0: D2 CF C7 D2 C1 CD A0 C9
36E8: CE C6 CF D2 CD C1 D4 C9
36F0: CF CE A0 CC C9 D3 D4 D3
36F8: A0 C9 C6 A0 CE C5 C3 C5
3700: D3 D3 C1 D2 D9 AE
3706: DD A0 A0 193 ASC "J PRESS <Q> TO QUIT.]]]]"
3709: A0 A0 A0 A0 A0 A0 A0
3711: A0 D0 D2 C5 D3 D3 A0 BC
3719: D1 BE A0 D4 CF A0 D1 D5
3721: C9 D4 AE DD DD DD DD
3728: A0 A0 A0 194 ASC " / /]"
372B: A0 A0 A0 A0 A0 A0 A0
3733: A0 A0 A0 A0 A0 A0 A0
373B: A0 A0 A0 A0 A0 AF A0
3743: A0 A0 A0 AF DD
3748: A0 A0 A0 195 ASC " / /]"
374B: A0 A0 A0 A0 A0 A0 A0
3753: A0 A0 A0 A0 A0 AF A0
375B: A0 A0 A0 A0 A0 AF A0
3763: A0 A0 AF DD
3767: A0 A0 A0 196 ASC " CURRENT NUMBER /]"
376A: A0 A0 A0 A0 A0 A0 A0
3772: C3 D5 D2 D2 C5 CE D4 A0
377A: CE D5 CD C2 C5 D2 A0 A0
3782: A0 AF DD
3785: A0 A0 A0 197 ASC " /]"
3788: A0 A0 A0 A0 A0 A0

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3790: A0 A0 A0 A0 A0 A0 A0 A0
3798: A0 A0 A0 A0 A0 A0 A0 A0
37A0: AF DD
37A2: A0 A0 A0 198 ASC " CURRENT VALUE^?"
37A5: A0 A0 A0 A0 A0 A0 A0 A0
37AD: A0 A0 A0 C3 D5 D2 D2 C5
37B5: CE D4 A0 D6 C1 CC D5 C5
37BD: DE C0

37BF: A0 A0 A0 199 TXWPARM ASC " CHANGE "
37C2: A0 A0 A0 200 C8 C1 CE
37CA: C7 C5 A0
37CD: 10 01 12 201 INV "PARAMETER"
37D0: 01 0D 05 14 05 12
37D6: BA A0 A0 202 ASC ": =?"
37D9: A0 A0 BD C0

37DD: A0 C3 C8 203 TXWPCNL ASC " CHANGE "
37E0: C1 CE C7 C5 A0
37E5: 10 13 05 205 INV "PREANALYZE"
37E8: 01 0E 01 0C 19 1A 05
37EF: A0 C2 D9 206 ASC " BYTE: =?"
37F2: D4 C5 BA A0 A0 A0 A0 BD
37FA: C0

37FB: A0 A0 A0 207 TXWCNTL ASC " CHANGE "
37FE: C3 C8 C1 CE C7 C5 A0
3805: 10 12 05 209 INV "PREWRITE"
3808: 17 12 09 14 05
380D: A0 C3 D9 210 ASC " BYTE: =?"
3810: D4 C5 BA A0 A0 A0 A0 BD
3818: C0

3819: A0 A0 A0 211 TXRPARM ASC " >>> PARAMETERS HAVE BEEN RESET <<<]"
381C: A0 A0 A0 BE BE BE A0 D0 C1 D2
3824: C1 CD C7 C5 A0 D2 D3 A0
382C: C8 C1 D6 C5 A0 C2 C5 C5
3834: CE CE A0 D2 C5 D3 C5 D4 A0
383C: BC BC BC DD
3840: A0 A0 A0 213 ASC " >>> TO THEIR DEFAULT VALUE <<<[?"
3843: A0 A0 A0 BE BE BE A0 A0 D4
384B: CF A0 D4 C8 C5 C5 D2 A0
3853: C4 C5 C6 C1 D5 CC D4 A0
385B: D6 C1 CC D5 C5 A0 A0 A0
3863: BC BC BC DE C0

3868: A6 DD DD 214 TXAD ASC "&]] - FLOPPY DISK UTILITIES -"
386B: A0 A0 A0 A0 A0 A0 A0 A0
3873: A0 C6 CC CF D0 D0 D9 A0
387B: C4 C9 D3 CB A0 D5 D4 C9
3883: CC C9 D4 C9 C5 D3 A0 A0
388B: AD

388C: DD DD A0 216 ASC "]] 1. DISK SCAN"
388F: A0 A0 A0 A0 A0 B1 AE A0
3897: C4 C9 D3 CB A0 D3 C3 C1
38A0: DD

38A3: A0 A0 A0 217 ASC "]] 2. CERTIFY AND ERASE DISK"
38A6: A0 A0 A0 A0 B2 AE A0 C3
38AB: C5 D2 D4 C9 C6 D2 A0 C1
38B3: CE C4 A0 C5 D2 C1 D3 C5
38BB: A0 A0 A0 D3 CB
38C0: DD DD A0 218 ASC "]] 3. RETURN TO OPTION MENU^?"
38C3: A0 A0 A0 A0 B3 AE A0 D2
38CB: C5 D4 D5 D2 A0 D4 CF
38D3: A0 CF 00 D4 C9 CF CE A0
38DB: CD C5 CE D5 DE C0

38E1: A6 DD DD 219 TXADR ASC "&]] - DISK DRIVE UTILITIES -]]"
38E4: A0 A0 A0 A0 A0 A0 A0 A0
38F4: A0 C4 C9 D3 CB A0 C4 D2
38FC: C9 D6 C5 A0 D5 D4 C9 CC
3904: C9 D4 C9 C5 D3 A0 A0 AD
3906: DD DD

3909: A0 A0 A0 221 ASC " 1. CHECK DRIVE SPEED]"
3911: A0 A0 A0 B1 AE A0 C3 C8
3919: C5 C3 CB A0 C4 D2 C9 D6
3921: A0 A0 A0 D0 D0 C5 C5 C4 DD
3924: A0 A0 A0 222 ASC " 2. EXAMINE DRIVE]"
392C: A0 A0 A0 B2 AE A0 C5 D8
3934: C1 CD C9 CE C5 A0 C4 D2
3938: C9 D6 C5 DD
393B: A0 A0 A0 223 ASC " 3. RETURN TO OPTION MENU^?"
3943: A0 A0 A0 B3 AE A0 D2 C5
394B: D4 D5 D2 CE A0 CF A0
3953: CF D0 D4 C9 CF CE A0 CD
3953: C5 CE D5 DE C0

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224
339588: A6 DD DD 225 TXQ ASC "&]] - QUIT, BOOT DISK -]]]"
339589: A0 A0 A0 A0 A0 A0 A0 A0 A0
339590: A0 D1 D5 A0 A0 AC D4 AD A0
339591: A0 CF D4 A0 A0 C9 D4 A0 C2
339592: A0 A0 A0 A0 DD C4 C9 D3 CB
339593: A0 A0 A0 A0 DD DD
339594: A0 A0 A0 A0 226 ASC " 1. QUIT EDD, AND BOOT DISK]"
339595: A0 A0 A0 A0 B1 AE A0 D1 D5
339596: A0 A0 A0 A0 C4 AC C4 A0 A0
339597: A0 A0 A0 A0 C1 C5 A0 AC C4 A0
339598: A0 A0 A0 A0 C4 C4 A0 CF CF A0
339599: A0 A0 A0 A0 C4 C9 D3 CB DD
339600: A0 A0 A0 A0 227 ASC " 2. RETURN TO THE OPTION MENU^?"
339601: A0 A0 A0 A0 B2 AE A0 D2 C5
339602: A0 A0 A0 A0 C4 AC C4 A0 A0
339603: A0 A0 A0 A0 D4 D4 A0 CF A0
339604: A0 A0 A0 A0 C4 C4 A0 D0 D4 C9
339605: A0 A0 A0 A0 C4 C4 A0 D5 D5 DE
339606: A0 A0 A0 A0 CD C5 CE

228
339607: A6 DD DD 229 TXCS ASC "&]] - CHANGE SLOTS AND DRIVES -]]]"
339608: A0 A0 A0 A0 A0 A0 A0 A0 A0
339609: A0 A0 A0 A0 C1 C3 C7 C5 A0
339610: A0 D3 C3 C8 D4 D3 A0 C1 CE
339611: A0 C4 A0 C4 D2 C9 D6 C5 D3
339612: A0 A0 A0 A0 DD DD DD
339613: A0 A0 A0 A0 230 ASC " ORIGINAL DISK SLOT=]"
339614: A0 A0 A0 A0 CF D2 C9 C7 C9 CE C1 CC
339615: A0 A0 A0 A0 CF D4 C4 C9 D3 CB A0 D3 CC
339616: A0 A0 A0 A0 DD DD
339617: A0 A0 A0 A0 231 ASC " (MASTER) DRIVE=]]]"
339618: A0 A0 A0 A0 A8 CD C1 D3 D4
339619: A0 A0 A0 A0 D2 C5 A0 C4 D2 C9
339620: A0 A0 A0 A0 DD DD
339621: A0 A0 A0 A0 232 ASC " DUPLICATE DISK SLOT=]"
339622: A0 A0 A0 A0 D5 A0 C4 C9 C9 C3 C1 D4 C5
339623: A0 A0 A0 A0 C4 C9 D3 CB A0 D3 CC
339624: A0 A0 A0 A0 DD DD
339625: A0 A0 A0 A0 233 ASC " (BLANK) DRIVE="
339626: A0 A0 A0 A0 CB A9 A8 C2 CC C1 CE
339627: A0 A0 A0 A0 D6 C5 BD A0 A0 C4 D2 C9
339628: A0 A0 A0 A0 FB DD DD
339629: A0 A0 A0 A0 234 PL SLOT ASC "{]] EDD PLUS CARD SLOT=]^?"
339630: A0 A0 A0 A0 C5 C4 C4 A0 D0
339631: A0 A0 A0 A0 D5 C3 C1 D2 C4
339632: A0 A0 A0 A0 D3 CC CF D4 BD FD DE

235
339633: A6 DD DD 236 TXDS1 ASC "&]] - CHECK DRIVE SPEED -]"
339634: A0 A0 A0 A0 A0 A0 A0 A0 A0
339635: A0 A0 A0 A0 C3 C8 C5 C3 CB
339636: A0 A0 A0 A0 C9 D6 C5 A0 D3
339637: A0 DD C5 C5 C4 A0 A0 DD
339638: A0 DD DD D3 237 ASC "]]SLOW-----FAST]]"
339639: A0 CC CF D7 AD AD AD AD AD
339640: A0 AD AD AD AD AD AD AD AD
339641: A0 AD AD AD AD AD AD AD AD
339642: A0 AD AD AD AD AD AD AD AD
339643: A0 AD AD AD AD AD AD AD AD
339644: A0 AD AD AD AD AD AD AD AD
339645: A0 A0 A0 A0 C6 C1 D3 D4 DD
339646: A0 A0 A0 A0 238 ASC " ! ! !]"
339647: A0 A0 A0 A0 A0 A0 A0 A0 A0
339648: A0 A0 A0 A0 A0 A0 A0 A0 DD
339649: A0 A0 A0 A0 239 ASC " ! ! ORIGINAL DRIVE]"
339650: A0 A0 A0 A0 A0 A0 A0 A0 A0
339651: A0 A0 A0 A0 A0 A0 A0 A0 A0
339652: A0 A1 A0 A0 A0 CF D2 C9 C7
339653: A0 A0 A0 A0 C9 CE C1 CC A0 C4 D2 C9
339654: A0 D4 C5 DD
339655: A0 A0 A0 A0 240 ASC " DUPLICATE DRIVE ! 300 RPM]"
339656: A0 D5 DD CC C9 C3 C1 D4 C5
339657: A0 A0 C4 D2 C9 D6 C5 A0 A0
339658: A0 A1 A0 A0 A0 A0 B3 B0
339659: A0 B0 A0 D2 D0 CD DD
339660: A0 A0 A0 A0 241 ASC " 297 RPM !]"
339661: A0 A0 A0 A0 B2 B9 B7 A0 D2 D0
339662: A0 CD A0 A0 A0 A0 A0 A0
339663: A0 A0 A0 A0 DD
339664: A0 A0 A0 A0 242 ASC " SINGLE DRIVE]"
339665: A0 A0 A0 A0 A0 A0 A0 A0 A0
339666: A0 A0 A0 A0 A0 A0 A0 D3 C9
339667: A0 A0 A0 A0 CE C7 CC C5 A0 C4 D2 C9
339668: A0 D6 C5 DD
339669: A0 A0 A0 A0 243 ASC " 298.5 RPM^?"
339670: A0 A0 A0 A0 A0 A0 A0 A0 A0
339671: A0 A0 A0 A0 A0 A0 A0 B2
339672: A0 B9 B8 AE
339673: A0 DE C0

```

```

3B5D: A0 D3 D0 244 TXDS2 ASC " SPEED IS: 2"
3B60: C5 C5 C4 A0 C9 D3 BA A0
3B68: C0
3B69: A0 D2 D0 245 TXRPM ASC " RPM[2]"
3B6C: CD DB C0
3B6F: A0 CC CF 246 TXLP ASC " LOOPS2"
3B72: CF D0 D3 C0 247
3B76: A6 DD DD 248 TXED ASC "&]] - EXAMINE DISK DRIVE -]]]"
3B79: A0 A0 A0 A0 A0 A0 A0 A0
3B81: A0 C5 D8 C1 CD C9 CE C5
3B89: A0 C4 C9 D3 CB A0 C4 D2
3B91: C9 D6 C5 A0 A0 AD DD DD
3B99: DD
3B9A: A0 A0 D2 250 ASC " READ/WRITE TRACK ABILITY =]"
3B9D: C5 C1 C4 AF D7 D2 C9 D4
3BA5: C5 A0 D4 D2 C1 C3 CB A0
3BAD: C1 C2 C9 CC C9 D4 D9 A0
3BB5: BD DD
3BB7: A0 A0 A0 251 ASC " AVERAGE DRIVE SPEED =]"
3BBA: A0 A0 A0 A0 C1 D6 C5 D2
3BC2: C1 C7 C5 A0 C4 D2 C9 D4
3BCA: C5 A0 D3 D0 C5 C5 C4 A0
3BD2: BD DD
3BD4: A0 A0 A0 252 ASC " DRIVE SPEED FLUCTUATION =]"
3BD7: C4 D2 C9 D6 C5 A0 D3 D0
3BDF: C5 C5 C4 A0 C6 CC D5 C3
3BE7: D4 D5 C1 D4 C9 CF CE A0
3BEF: BD DD
3BF1: A0 A0 C8 253 ASC " HIGHEST TRACK ACCESSIBLE =]"
3BF4: C9 C7 C8 C5 D3 D4 A0 D4
3BFC: D2 C1 C3 CB A0 C1 C3 C3
3C04: C5 D3 D3 C9 C2 CC C5 A0
3C0C: BD DD
3C0E: A0 A0 D1 254 ASC " QUARTER TRACK BLEED OVER =]"
3C11: D5 C1 D2 D4 C5 D2 A0 D4
3C19: D2 C1 C3 CB A0 C2 CC C5
3C21: C5 C4 A0 CF D6 C5 D2 A0
3C29: BD DD
3C2B: A0 A0 A0 255 ASC " MINIMUM ARM PHASE TIME =]^2"
3C2E: A0 CD C9 CE C9 CD D5 CD
3C36: A0 C1 D2 CD A0 D0 C8 C1
3C3E: D3 C5 A0 D4 C9 CD C5 A0
3C46: BD DD DE C0
3C4A: E0 A0 A0 256 TXEM1 ASC "\ EXAMINING THE 2"
3C4D: A0 A0 A0 C5 D8 C1 CD C2
3C55: CE C9 CE C7 A0 D4 C8 C5
3C5D: A0 C0
3C5F: DF A0 A0 258 TXEM2 ASC "_ (THIS OPTION TAKES ABOUT 60 SECONDS)[2]"
3C62: A8 D4 C8 C9 D3 A0 CF D0
3C6A: D4 C9 CF CE A0 D4 C1 CB
3C72: C5 D3 A0 C1 C2 CF D5 D4
3C7A: A0 B6 B0 A0 D3 C5 C3 CF
3C82: CE C4 D3 A9 DB C0
3C88: DF A0 A0 259 TXD ASC "_ PRESS <"
3C8B: D0 D2 C5 D3 D3 A0 BC
3C92: 52 45 54 261 FLS "RETURN"
3C95: 55 52 4E
3C98: BE AC A0 262 ASC ">, PROCESS IS "
3C9B: D0 D2 CF C3 C5 D3 D3 A0
3CA3: C9 D3 A0
3CA6: 04 09 0E 263 INV "FINISHED"
3CA9: 09 13 08 05 04
3CAE: DB C0 264 ASC "[2]"
3CB0: A0 A0 A0 265 TXWD ASC " "
3CB3: A0 266
3CB4: 57 52 49 267 FLS "WRITE-PROTECT"
3CB7: 54 45 6D 50 52 4F 54 45
3CBF: 43 54
3CC1: A0 D4 C8 268 ASC " THE "
3CC4: C5 A0
3CC6: 4F 52 49 269 FLS "ORIGINAL"
3CC9: 47 49 4E 41 4C
3CCE: A0 C4 C9 270 ASC " DISK[2]"
3CD1: D3 CB DB C0 271
3CD5: A0 272 TXRWD ASC " "
3CD6: 52 45 4D 273 FLS "REMOVE"
3CD9: 4F 54 45
3CDC: A0 D7 D2 274 ASC " WRITE-PROTECT FROM "
3CDF: C9 D4 C5 AD D0 D2 CF D4
3CE7: C5 C3 D4 A0 C6 D2 CF CD

```



```

B0D03: D5 AA AD 60 56
B0D08: 00 35 58 60
B0DB: 58 58 58 21 10
61
62 * $E0 = CLEAN TIMING BITS:
63 HEX 3103000361020035
64
65 HEX 0121310003006102
66
67 HEX 0035002110101010
68
69 HEX 1010101010101010
70
71
72 *-----*
73 * PREWRITE BUFFER *
74 * $B100 - $B1FF *
75 *-----*
76 CONTRLP HEX 01
77 HEX 1010101010101010
78
79 HEX 1010101010101010
80
81 HEX 1010101010101010
82
83 HEX 1010101010101010
84
85 HEX 1010101010101010
86
87 HEX 1010101010101010
88
89 HEX 1010101010101010
90
91 HEX 1010101010101010
92
93 HEX 1010101010101010
94
95 HEX 1010101010101010
96
97 HEX 1010101010101010
98
99 HEX 1010101010101010
100
101 HEX 1010101010101010
102
103 HEX 1010101010101010
104
105 HEX 1010101010101010
106
107 *-----*
* PROGRAM VARIABLES *

```

```

108 * $B200 - $B2FF *
109 *-----*
110 LTS DA $800 LOOK UP
111 DA $880 TABLE
112 DA $900 FOR
113 DA $980 VTAB
114 DA $A00 SCREEN
115 DA $A80 POSTION
116 DA $B00
117 DA $B80
118 DA $828
119 DA $8A8
120 DA $928
121 DA $9A8
122 DA $A28
123 DA $AA8
124 DA $B28
125 DA $BA8
126 DA $850
127 DA $8D0
128 DA $950
129 DA $9D0
130 DA $A50
131 DA $AD0
132 DA $B50
133 DA $BD0
134
135 *-----*
136 * LOOKUP TABLE FOR *
137 * DIVIDE ROUTINE *
138 *-----*
139 B230: 10 27 F8 01 LTC DA 10000,1000,100,10,1
140 B233: 03 34 00 01
141 DFB 0
142 DFB 0
143 DFB 0
144 DFB 0
145
146 *-----*
147 * LOOK UP TABLE FOR *
148 * CHANGE SLOT OPTION *
149 *-----*
150 B240: 80 08 LTP DFB $80,8 OS
151 B243: 00 03 DFB $80,3 OD
152 B244: 00 00 DFB $80,8 DS
153 B245: 00 00 DFB $80,3 DD
154 B246: 00 08 DFB $80,8 PLUSCRD
155
156 *-----*
157 * LOOK UP TABLES FOR *
158 * READ/WRITE ABILITY *
159 * (EXAMINE DRIVE OPTION) *
160 *-----*
161 B248: FF FF FE 161 LTEX DFB $FF,$FF,$FE,$EE
162 B249: FF FF CC F8 162 DFB $FC,$CC,$F8,$88
163 B250: FF FF E0 C0 163 DFB $F0,$E0,$C0,$80
164 B251: 80 00 164 DFB 0
165
166 B255: 1C 19 05 166 LTEA DFB 28,25,5,5 ;TOGTHR
167 B256: 05 05 05 167 DFB 10,5,5,5 ;EQUALS
168 B257: 05 04 03 168 DFB 5,4,3,3 ;100%
169 B260: 03
170
171 *-----*
172 * LOOK UP TABLE FOR DRIVE *
173 * SPEED CALCULATE ROUTINE *
174 *-----*
175 B261: 5C 2C 1D 174 LTDV DFB $5C,$2C,$1D,$00
176
177 B265: B0 B2 B5 175 LTQ DFB $B0,$B2,$B5,$B7
178 B268: B7
179
180 *-----*
181 * THE REST OF THE VARIABLES *
182 * ARE USED FOR VALUE STORING *
183 * AND GENERAL WORKSPACE DURING *
184 * PROGRAM EXECUTION. *
185 *-----*
186 B269: 00 00 00 184 LTEM DFB 0,0,0,0,0

```



```

B2C7: 00      269 TRKLL   DFB  0
B2C8: 00      270 TRKLH   DFB  0
B2C9: 00      271 ERRORCD DFB  0
B2CA: 00      272 EDDVRSN DFB  0
B2CB: 00      273 EDDSNL  DFB  0
B2CC: 00      274 EDDSNM  DFB  0
B2CD: 00      275 EDDSNH  DFB  0
276
277 *-----*
278 * PARAMETER BUFFER *
279 * $B300 - $B3FF *
280 *-----*
281 SPAGE   DS   $B300-SPAGE
282
283 *-----*
284 * PARS $00-$08 = SYNCTBLE
285 *
286 * THESE 9 PARAMETERS MAKE UP THE
287 * RAW DISK BYTE PATTERN WHICH
288 * EDD USES FOR SEARCHING, TO
289 * SYNCHRONIZE EACH TRACK.
290 *
291 * THIS PATTERN MUST BE FOUND ON
292 * THE TRACK SPECIFIED BY THE
293 * "TRKSYNC" PARAMETER, (PARM$1B)
294 * WHICH HAS A DEFAULT VALUE OF
295 * TRACK 0.
296 *
297 * USING THE VALUE "7F" IN THIS
298 * TABLE, REPRESENTS A "WILDCARD"
299 * AND WILL MATCH ANY DISK BYTE.
300 *
301 * THIS TABLE HAS BEEN PRESET TO
302 * SYNCHRONIZE OFF OF SECTOR 0
303 * OF TRACK 0.
304 *-----*
B300: D5 AA 96  305 SYNCTBLE DFB  $D5,$AA,$96,$7F
B303: 7F
B304: 7F AA AA  306           DFB  $7F,$AA,$AA,$AA
B307: AA
B308: AA           307           DFB  $AA
308
309 *-----*
310 * PARM $09 = TIMEBITS
311 *
312 * THIS IS THE AMOUNT OF TIMING
313 * BITS THAT A TIMING BYTE IS
314 * GIVEN WHEN EDD READS THE TRACK
315 * USING THE "NORMAL" MODE. SINCE
316 * MANY DISKS USE TWO TIMING BITS
317 * INSTEAD OF ONE, YOU MAY NEED
318 * TO USE A VALUE OF "2" HERE, IF
319 * THE COPY-PROTECTION IS
320 * CHECKING TIMING BITS.
321 *
322 * WHEN USING EDD 4 PLUS'S BIT-
323 * COPY MODE, THE ACTUAL AMOUNT
324 * OF TIMING BITS FOUND ON THE
325 * TRACK IS USED, AND THIS PARM
326 * IS NOT USED.
327 *-----*
B309: 01      328 TIMEBITS DFB  $1
329
330 *-----*
331 * PARM $0A = SPECIAL CONTROL
332 *
333 * THIS PARAMETER AFFECTS THE
334 * AMOUNT OF BYTES WRITTEN FOR
335 * EACH TRACK:
336 *
337 * $00 = WRITE THE AMOUNT OF
338 * BYTES DISPLAYED FOR THE
339 * TRACK LENGTH.
340 *
341 * $80 = WRITE A FULL TRACK OF
342 * $1BFF BYTES WHEN POSSIBLE
343 *-----*
B30A: 80      344 SPCLCNTL DFB  $80
345
B30B: 00      346           DFB  $0           ;UNUSED
347
348 *-----*
349 * PARM $0C-$0D = ABSLNGT
350 *
351 * IF THE TRACK LENGTH IS TO
352 * BE AN ABSOLUTE FORCED LENGTH.

```

```

353 * (SEE PARM #12), USE THESE TWO
354 * VALUES AS THE ABSOLUTE TRACK
355 * LENGTH.
356 -----
B30C: 72 357 ABSLNGLT DFB $72
B30D: 18 358 ABSLNGLH DFB $18
359
B30E: 00 360 DFB $0 ;UNUSED
B30F: 00 361 DFB $0 ;UNUSED
362
363 * -----
364 * PARM #10 = MINLNGLH
365 *
366 * THIS VALUE REPRESENTS THE
367 * HIGH BYTE OF THE LOWEST TRACK
368 * LENGTH ACCEPTABLE.
369 -----
B310: 14 370 MINLNGLH DFB $14
371
372 * -----
373 * PARM #11 = MAXLNGLH
374 *
375 * THIS VALUE REPRESENTS THE
376 * HIGH BYTE OF THE LARGEST
377 * TRACK LENGTH ACCEPTABLE.
378 -----
B311: 1C 379 MAXLNGLH DFB $1C
380
381 * -----
382 * PARM #12 = PLNGCNTL
383 *
384 * WHICH TRACK LENGTH ROUTINE(S)
385 * TO USE AND ORDER OF ROUTINE IF
386 * AN ERROR OCCURS:
387 *
388 * BIT POSITION: 7654 3210
389 *
390 * ROUTINE: 3213 213X
391 *
392 * ROUTINES AVAILABLE:
393 *
394 * 1 = DATA PATTERN
395 * LOCATE TWO MATCHING DATA
396 * PATTERNS (SEE PARMS $80-
397 * -$FF) THEN SUBTRACT THEIR
398 * DISTANCE TO OBTAIN TRACK
399 * LENGTH.
400 *
401 * 2 = UNIQUE DATA PATTERN
402 * LOCATE A UNIQUE DATA
403 * PATTERN, THEN SEARCH FOR A
404 * MATCHING PATTERN, THEN
405 * SUBTRACT THEIR DISTANCE
406 * TO OBTAIN TRACK LENGTH
407 * (USES NO ADDITIONAL PARMS)
408 *
409 * 3 = ABSOLUTE FORCED LENGTH
410 * THE VALUES FOUND AT PARMS
411 * $0C-$0D ARE USED FOR THE
412 * TRACK LENGTH. NO TRACK
413 * SEARCHING IS NECESSARY.
414 *
415 * EXAMPLES:
416 * 0111 0000 = ORDER: 2,1,3
417 * 1000 0000 = 3 ONLY
418 *
419 * EDD HAS BEEN PRESET TO USE THE
420 * "UNIQUE DATA PATTERN" ROUTINE
421 * $40 = 01000000 = ROUTINE#2
422 -----
B312: 40 423 PLNGCNTL DFB $40
424
425 * -----
426 * PARM #13 = PENDCNTL
427 *
428 * WHICH TRACK END ROUTINE(S) TO
429 * USE AND ORDER OF ROUTINES IF
430 * AN ERROR OCCURS:
431 *
432 * BIT POSITION: 7654 3210
433 *
434 * ROUTINE: 3213 213X
435 *
436 * ROUTINES AVAILABLE:
437 *
438 * 1 = TIMING GAP
439 * POINT TO THE BYTE LOCATED
440 * JUST BEFORE THE 1ST BYTE

```

```

439 * OF THE LARGST TIMING GAP.
440 * 2 = DATA PATTERN
441 * USE THE TRKSRCH INSTRUCTN
442 * ROUTINE (PARAMETERS $80-
443 * -$FF) FOR LOCATING THE
444 * TRACK END.
445 * 3 = DATA GAP
446 * POINT TO THE BYTE LOCATED
447 * JUST BEFORE THE 1ST BYTE
448 * OF THE LARGEST DATA GAP.
449 *
450 * EXAMPLES:
451 * 0010 1010 = ORDER 1,2,3
452 * 0100 0000 = 2 ONLY
453 *
454 * EDD HAS BEEN PRESET TO USE THE
455 * "TIMING GAP" ROUTINE:
456 * $20 = 00100000 = ROUTINE#1
457 * -----
B313: 20 458 PENDCNL DFB $20
459 *
460 * DFB $0 ;UNUSED
B314: 00 461 DFB $0 ;UNUSED
B315: 00 462 DFB $0 ;UNUSED
B316: 00 463 *
464 * -----
465 * PARM $17 = PTGAPMIN
466 *
467 * WHEN FINDING THE TRACK END BY
468 * SEARCHING FOR THE LARGEST
469 * TIMING GAP (SEE PARM $13) THIS
470 * PARM CONTAINS THE MINIMUM
471 * AMOUNT OF BYTES THE GAP MUST
472 * CONTAIN. IF NOT, THE TIMING
473 * ROUTINE FAILS.
474 * -----
B317: 02 475 PTGAPMIN DFB $2
476 *
477 * DFB $0 ;UNUSED
B318: 00 478 *
479 * -----
480 * PARM $19 = ERRORS
481 *
482 * THE MAXIMUM AMOUNT OF ATTEMPTS
483 * TO READ THE TRACK PROPERLY
484 * BEFORE A READ ERROR IS FORCED
485 * -----
B319: 03 486 ERRORS DFB $3
487 *
488 * -----
489 * PARM $1A = WERRORS
490 *
491 * THE MAXIMUM AMOUNT OF ATTEMPTS
492 * OF WRITING THE TRACK PROPERLY
493 * BEFORE A WRITE ERROR IS FORCED
494 * -----
B31A: 03 495 WERRORS DFB $3
496 *
497 * -----
498 * PARM $1B = TRKSYNC
499 *
500 * THIS IS THE TRACK TO SYNCHRONZ
501 * FROM WHEN USING THE SYNC TRACK
502 * MODE.
503 *
504 * THIS TRACK VALUE IS THE ACTUAL
505 * QUARTER TRACK TO USE, (IE, IF
506 * THE VALUE OF $04 IS USED, THIS
507 * REPRESENTS 4 QUARTER TRACKS, &
508 * TRACK #1 WILL BE THE "SYNC
509 * FROM TRACK".
510 * -----
B31B: 00 511 TRKSYNC DFB $0
512 *
513 * -----
514 * PARM $1C = MNBTEQLN
515 *
516 * WHEN LOCATING THE TRACK LENGTH
517 * - IF MORE THAN THIS AMOUNT OF
518 * BYTES DON'T MATCH UP, THE
519 * LENGTH IS CONSIDERED INVALID,
520 * WHICH A READ ERROR OCCURS.
521 * -----
B31C: 10 522 MNBTEQLN DFB $10
523 *
524 * -----

```



```

525 * PARM $80-$BF = TBLEND
526 *
527 * WHEN USING A RAW DISK BYTE
528 * PATTERN TO LOCATE THE TRACK'S
529 * END (PARM $13), THIS TABLE
530 * IS USED FOR THE RAW DISK BYTE
531 * PATTERNS.
532 *
533 * THIS TABLE IS USED IN THE SAME
534 * FASHION AS A PREANALYZE OR
535 * PREWRITE ROUTINE (AS DESCRIBED
536 * IN THE EDD OPERATING MANUAL)
537 * THE MAIN DIFFERENCE HERE,
538 * IS THIS ROUTINE IS DONE
539 * DURING THE ANALYZE ROUTINE
540 * AND THE INSTRUCTION "$73" SETS
541 * A "FLAG" FOR FINDING THE END
542 * TRACK.
543 *
544 * PARAMETER $80 POINTS TO THE
545 * FIRST POSITION OF THE TABLE
546 * WHICH HAS A DEFAULT VALUE OF
547 * $81, MEANING THAT PARAMETER
548 * $81 IS THE FIRST INSTRUCTION
549 * BYTE FOLLOWED.
550 *
551 * THE PRESET ROUTINE STARTS AT
552 * PARM $81, AND IT FINDS THE
553 * TRACK END BY LOCATING A DATA
554 * FIELD, THEN POINTING TO THE
555 * BYTE LOCATED AFTER A DATA
556 * FIELD EPILOGUE.
557 *
558 * REFER TO THE "INSTRUCTION
559 * BYTES" SECTION OF THE EDD 4
560 * MANUAL FOR A COMPLETE DESCRIPTION
561 * (INCLUDING SOME EXAMPLES)
562 * OF INSTRUCTION BYTES.
563 *
564 *-----

```

B380:	81	D5	AA	565	TBLEND	DS	\$B380-TBLEND
B383:	AD	71	DE	566	HEX	81D5AAAD71DEAA73	
B388:	21	10	10	567	HEX	2110101010101010	
B390:	10	10	10	568	HEX	1010101010101010	
B393:	10	10	10	569	HEX	1010101010101010	
B398:	10	10	10	570	HEX	1010101010101010	
B39B:	10	10	10	571	HEX	1010101010101010	
B3A0:	10	10	10	572	HEX	1010101010101010	
B3A3:	10	10	10	573			
B3A6:	10	10	10	574			
B3AB:	10	10	10	575			
B3B0:	10	10	10	576			
B3B3:	10	10	10	577			
B3B8:	10	10	10	578			
B3BB:	10	10	10	579			

```

573 *-----
574 * PARM $C0-$FF = TRKLENGTH
575 *
576 * WHEN USING A RAW DISK BYTE
577 * PATTERN TO LOCATE THE TRACK'S
578 * LENGTH (PARM $12), THIS TABLE
579 * IS USED FOR THE RAW DISK BYTE
580 * PATTERNS.
581 *
582 * THIS TABLE IS USED IN THE SAME
583 * FASHION AS THE TBLEND TABLE
584 * ABOVE.
585 *
586 * PARAMETER $C0 POINTS TO THE
587 * FIRST POSITION OF THE TABLE
588 * WHICH HAS A DEFAULT VALUE OF
589 * $C1, MEANING THAT PARAMETER
590 * $C1 IS THE FIRST INSTRUCTION
591 * BYTE FOLLOWED.
592 *
593 * THE PRESET ROUTINE HERE,
594 * LOCATES THE ADDRESS FIELD
595 * OF SECTOR ZERO, THEN LOOKS
596 * FOR THE REPEAT, SUBTRACTS
597 * THE DISTANCE FROM THEIR
598 * POSITIONS TO CALCULATE TRACK
599 * LENGTH.
600 *
601 *-----

```

B3C0:	C1	31	D5	602	TBLNGTH	HEX	C131D5AA96707070
-------	----	----	----	-----	---------	-----	------------------

```
B3C3: AA 96 70 70 70
B3C8: 70 AA AA 603
B3CB: 36 73 21 10 10
B3D0: 10 10 10 604
B3D3: 10 10 10 10 10
B3D8: 10 10 10 605
B3DB: 10 10 10 10 10
B3E0: 10 10 10 606
B3E3: 10 10 10 10 10
B3E8: 10 10 10 607
B3EB: 10 10 10 10 10
B3F0: 10 10 10 608
B3F3: 10 10 10 10 10
B3F8: 10 10 10 609
B3FB: 10 10 10 10 10
```

```
HEX 70AAAA3673211010
HEX 1010101010101010
HEX 1010101010101010
HEX 1010101010101010
HEX 1010101010101010
HEX 1010101010101010
HEX 1010101010101010
HEX 1010101010101010
HEX 1010101010101010
HEX 1010101010101010
```

--End assembly--

1024 bytes

Errors: 0


```

199 *****
200 * ESSENTIAL DATA DUPLICATOR
201 * VERSION 4.2 STANDARD/PLUS
202 * 6502 ASSEMBLY SOURCE CODE
203 * COPYRIGHT (C) 1986
204 * ALL RIGHTS RESERVED
205 * UTILICO MICROWARE
206 * DONALD ANTHONY SCHNAPP
207 * PRINTED APRIL 23, 1986
208 *****

```

```

209 *****
210 * DRIVE ROUTINES *
211 *****

```

```

212 -----*
213 * JUMP TABLE *
214 -----*

```

				ORG	DRVR	
						;B700
B700:	4C	00	B8	220	JMP	TDUMPW ;B700
B703:	4C	34	B8	221	JMP	TDUMPP ;B703
B706:	4C	70	B8	222	JMP	ARMV ;B706
B709:	4C	81	B8	223	JMP	ARMV2 ;B709
B70C:	4C	CF	B9	224	JMP	SYNCTRK2 ;B70C
B70F:	4C	4C	B9	225	JMP	TRKV1 ;B70F
B712:	4C	81	B9	226	JMP	TRKV2 ;B712
B715:	4C	1C	B8	227	JMP	TRKV3 ;B715
B718:	4C	1A	BA	228	JMP	ARMSPD ;B718
B71B:	4C	74	B8	229	JMP	WRITETRK ;B71B
B71E:	4C	2A	B7	230	JMP	DCCDUMP ;B71E
B721:	4C	E2	B7	231	JMP	TDUMPV ;B721
B724:	4C	29	B9	232	JMP	TRKDS ;B724
B727:	4C	CE	BA	233	JMP	PCRDCHK ;B727
B72A:	AD	84	B2	235	DCCDUMP	LDA DCCSLOT ;DUMP A
B72D:	0A			236	ASL	A ;TRACK
B72E:	0A			237	ASL	A ;USING
B72F:	0A			238	ASL	A ;THE EDD
B730:	0A			239	ASL	A ;PLUS
B731:	AA			240	TAX	CARD
B732:	A9	40		241	LDA	#\$40
B734:	A9	01		242	STA	\$1
B736:	A0	00		243	LDY	#0
B738:	84	00		244	STY	\$0
B73A:	A5	01		245	LDA	\$1
B73C:	C9	7F		246	CMP	#\$7F
B73E:	F0	11		247	BEQ	DNDUMP
B740:	BD	81	C0	248	LDA	\$(C0)1,X
B743:	10	FB		249	BPL	CHKRDY
B745:	BD	80	C0	250	LDA	\$(C0)0,X
B748:	91	00		251	STA	(\$0),Y
B74A:	C8			252	INY	
B74B:	D0	ED		253	BNE	LOOP1
B74D:	E6	01		254	INC	\$1
B74F:	D0	EF		255	BNE	CHKRDY
B751:	A9	40		256	LDA	#\$40
B753:	85	05		257	STA	\$5
B755:	85	07		258	STA	\$7
B757:	A9	AF		259	LDA	#\$AF
B759:	85	09		260	STA	\$9
B75B:	A0	00		261	LDY	#0
B75D:	84	00		262	STY	\$0
B75F:	84	04		263	STY	\$4
B761:	84	06		264	STY	\$6
B763:	84	08		265	STY	\$8
B765:	A9	F8		266	LDA	#\$F8
B767:	85	02		267	STA	\$2
B769:	A2	08		268	LDX	#8
B76B:	B1	04		269	LDA	(\$4),Y
B76D:	85	01		270	STA	\$1
B76F:	E6	02		271	INC	\$2
B771:	06	01		272	ASL	\$1
B773:	26	00		273	ROL	\$0
B775:	30	06		274	BMI	STORE
B777:	A5	02		275	LDA	\$2
B779:	C9	02		276	CMP	#2
B77B:	D0	1E		277	BNE	LOOP4
B77D:	A5	00		278	LDA	\$0
B77F:	91	06		279	STA	(\$6),Y
B781:	A5	02		280	LDA	\$2
B783:	91	08		281	STA	(\$8),Y
B785:	84	00		282	STY	\$0
B787:	A9	F8		283	LDA	#\$F8
B789:	85	02		284	STA	\$2

B829:	60		371	RTS		
B82A:	09 80		372	ORA	#\$80	
B82C:	91 00		373	STA	(\$0),Y	
B82E:	AD 09	B3	374	LDA	TIMEBITS	
B831:	4C 1A	B8	375	JMP	TCL2	
			376			
B834:	A9 60		377	TDUMPP	LDA	#\$60
B836:	85 01		378	STA	\$1	DUMP
B838:	A0 00		379	LDY	#0	PART
B83A:	84 00		380	STY	#0	OF THE
B83C:	A9 7F		381	LDA	#\$7F	TRACK
B83E:	85 02		382	STA	\$2	INTO
B840:	A6 10		383	LDX	CSLT	MEMORY
B842:	EA		384	TDR	NOP	
B843:	85 03		385	STA	\$3	
B845:	EA		386	NOP		
B846:	EA		387	NOP		
B847:	BD 8C	C0	388	LDA	\$C08C,X	TIME
B84A:	30 18		389	BMI	TDS2	THE
B84C:	BD 8C	C0	390	LDA	\$C08C,X	BYTE TO
B84F:	30 16		391	BMI	TDS2	SEE IF
B851:	BD 8C	C0	392	LDA	\$C08C,X	THERE
B854:	30 18		393	BMI	TDS3	IS AT
B856:	BD 8C	C0	394	LDA	\$C08C,X	LEAST
B859:	30 16		395	BMI	TDS3	ONE
B85B:	BD 8C	C0	396	LDA	\$C08C,X	TIMING
B85E:	30 11		397	BMI	TDS3	BIT
B860:	BD 8C	C0	398	LDA	\$C08C,X	ATTACHD
B863:	30 0C		399	BMI	TDS3	
B865:	10 E5		400	BPL	TDL2	
B867:	91 00		401	TDS2	STA	(\$0),Y
B869:	C8		402	INY		
B86A:	D0 D6		403	BNE	TDR	
B86C:	E6 01		404	INC	\$1	
B86E:	10 D6		405	BPL	TDL1	
B870:	60		406	RTS		
B871:	25 02		407	TDS3	AND	\$2
B873:	91 00		408	STA	(\$0),Y	
B875:	C8		409	INY		
B876:	D0 CE		410	BNE	TDL1	
B878:	E6 01		411	INC	\$1	
B87A:	10 D0		412	BPL	TDL2	
B87C:	60		413	RTS		
			414			
B87D:	A0 00		415	ARMV	LDY	#0
B87F:	F0 02		416	BEG	AMS1	ARM
B881:	A0 01		417	ARMV2	LDY	#1
B883:	8C BD	B2	418	AMS1	STY	ARMWAITR
B886:	A4 12		419		LDY	CTRK
B888:	C0 FF		420		CPY	#\$FF
B88A:	D0 07		421		BNE	AM
B88C:	48		422		PHA	
B88D:	A9 00		423		LDA	#0
B88F:	20 93	B8	424		JSR	AM
B892:	68		425		PLA	
B893:	8D 32	BB	426	AM	STA	WANTTRK
B896:	F5 12		427		CMP	CTRK
B898:	F0 59		428		BEG	ARMDONE1
B89A:	29 FE		429		AND	#\$FE
B89C:	8D 33	BB	430		STA	WANTHALF
B89F:	A0 01		431		LDY	#1
B8A1:	8C 34	BB	432		STY	PHSLST
B8A4:	A5 12		433		LDA	CTRK
B8A6:	29 FE		434		AND	#\$FE
B8A8:	20 0F	B9	435		JSR	ARMD01
B8AB:	A5 12		436	AML1	LDA	CTRK
B8AD:	CD 33	BB	437		CMP	WANTHALF
B8B0:	F0 13		438		BEG	ARMQTR
B8B2:	B0 07		439		BCS	AMS2
B8B4:	E6 12		440		INC	CTRK
B8B6:	E6 12		441		INC	CTRK
B8B8:	4C BF	B8	442		JMP	AMS3
B8BB:	C6 12		443	AMS2	DEC	CTRK
B8BD:	C6 12		444		DEC	CTRK
B8BF:	20 11	B9	445	AMS3	JSR	ARMD0
B8C2:	4C AB	BB	446		JMP	AML1
B8C5:	AD 32	BB	447	ARMQTR	LDA	WANTTRK
B8C8:	C5 12		448		CMP	CTRK
B8CA:	F0 16		449		BEG	ARMDONE
B8CC:	85 12		450		STA	CTRK
B8CE:	29 07		451		AND	#\$07
B8D0:	05 10		452		ORA	CSLT
B8D2:	A8		453		TAY	
B8D3:	18		454		CLC	
B8D4:	69 02		455		ADC	#2
B8D6:	29 F7		456		AND	#\$F7

B980	A0	00	457	TAX			
B981	A0	00	458	LDA	\$C080,Y		
B982	A0	01	459	LDA	\$C080,X		
B983	A0	02	460	JSR	W1		
B984	A0	03	461	JSR	W2		
B985	A0	04	462	LDA	CSLT		
B986	A0	05	463	LDA	\$C080,X		
B987	A0	06	464	LDA	\$C082,X		
B988	A0	07	465	LDA	\$C084,X		
B989	A0	08	466	LDA	\$C086,X		
B990	A0	09	467	JSR	EPCALC		
B991	A0	10	468	LDY	CTRK		
B992	A0	11	469	LDA	DRVCOUNT		
B993	A0	12	470	BEQ	PCS2		
B994	A0	13	471	LDA	DRVLETR		
B995	A0	14	472	CMP	"#0"		CURNT
B996	A0	15	473	BEQ	PCS1		TRK
B997	A0	16	474	STY	CTRKD		PLACE
B998	A0	17	475	RTS			
B999	A0	18	476	STY	CTRKD		
B980	A0	19	477	STY	CTRKO		
B981	A0	20	478	RTS			
B982	A0	21	479	STA	CTRK		
B983	A0	22	480	LDA	CTRK		
B984	A0	23	481	AND	#\$06		
B985	A0	24	482	ORA	CSLT		
B986	A0	25	483	TAX			
B987	A0	26	484	INX			
B988	A0	27	485	LDY	PHSLST		
B989	A0	28	486	STA	PHSLST		
B990	A0	29	487	LDA	\$C080,Y		
B991	A0	30	488	LDA	\$C080,X		
B992	A0	31	489	JSR	W1		
B993	A0	32	490	RTS			
B994	A0	33	491	LDX	CSLT		
B995	A0	34	492	LDY	#4		DISK
B996	A0	35	493	JSR	DSKBYTE		SPEED
B997	A0	36	494	CMP	#\$FF		TRACK
B998	A0	37	495	BNE	TRKDSL1		DUMP
B999	A0	38	496	DEY			ROUTINE
B980	A0	39	497	BNE	TRKDSL2		
B981	A0	40	498	STY	\$1		
B982	A0	41	499	LDA	\$C08C,X		
B983	A0	42	500	BPL	TRKDSL3		
B984	A0	43	501	CMP	#\$FF		
B985	A0	44	502	BNE	DRVSS1		
B986	A0	45	503	INX			
B987	A0	46	504	BNE	TRKDSL3		
B988	A0	47	505	INC	\$1		;HIGH
B989	A0	48	506	BNE	TRKDSL3		
B990	A0	49	507	STY	\$0		;LOW
B991	A0	50	508	RTS			
B992	A0	51	509	LDX	#\$10		TRACK
B993	A0	52	510	STA	\$0		VERIFY
B994	A0	53	511	STA	\$1		ROUTINE
B995	A0	54	512	STA	\$2		FOR
B996	A0	55	513	STA	\$3		CERTFY
B997	A0	56	514	LDX	CSLT		TRACK
B998	A0	57	515	DEC	\$1		
B999	A0	58	516	BEQ	TRKV1ER		
B980	A0	59	517	LDY	#\$10		
B981	A0	60	518	LDA	\$C08C,X		
B982	A0	61	519	BPL	TRKV1L2		
B983	A0	62	520	CMP	\$0		
B984	A0	63	521	STA	\$0		
B985	A0	64	522	BNE	TRKV1L1		
B986	A0	65	523	DEY			
B987	A0	66	524	BNE	TRKV1L2		
B988	A0	67	525	LDA	\$C08C,X		
B989	A0	68	526	BPL	TRKV1L3		
B990	A0	69	527	CMP	\$0		
B991	A0	70	528	STA	\$0		
B992	A0	71	529	BNE	TRKV1ER		
B993	A0	72	530	DEC	\$2		
B994	A0	73	531	BNE	TRKV1L3		
B995	A0	74	532	DEC	\$3		
B996	A0	75	533	BNE	TRKV1L3		
B997	A0	76	534	CLC			
B998	A0	77	535	RTS			
B999	A0	78	536	RTS			
B980	A0	79	537	TRKV1ER			
B981	A0	80	538	SEC			
B982	A0	81	539	RTS			
B983	A0	82	540	TRKV2	LDY	#0	TRACK
B984	A0	83	541	STY	\$1		VERIFY
B985	A0	84	542	LDA	#\$33		ROUTINE

BA	35	BB	629	STA	ARMWOKL
BA	36	BB	630	SEC	
BA	37	BB	631	SBC	ARMTFSL
BA	38	BB	632	STA	\$0
BA	39	BB	633	LDA	ARMCVH
BA	40	BB	634	STA	ARMWOKH
BA	41	BB	635	SBC	ARMTFSH
BA	42	BB	636	STA	\$1
BA	43	BB	637	LSR	\$1
BA	44	BB	638	ROR	\$0
BA	45	BB	639	CLC	
BA	46	BB	640	LDA	\$0
BA	47	BB	641	ADC	ARMTFSL
BA	48	BB	642	STA	ARMCVH
BA	49	BB	643	LDA	\$1
BA	50	BB	644	ADC	ARMTFSH
BA	51	BB	645	STA	ARMCVH
BA	52	BB	646	LDA	\$0
BA	53	BB	647	ORA	\$1
BA	54	BB	648	BEQ	ARMSPL2
BA	55	BB	649	JMP	ARMSPS1
BA	56	BB	650	LDA	ARMCVH
BA	57	BB	651	STA	ARMTFSL
BA	58	BB	652	LDA	ARMCVH
BA	59	BB	653	STA	ARMTFSH
BA	60	BB	654	LDA	ARMWOKL
BA	61	BB	655	SEC	
BA	62	BB	656	SBC	ARMCVH
BA	63	BB	657	STA	\$0
BA	64	BB	658	LDA	ARMWOKH
BA	65	BB	659	SBC	ARMCVH
BA	66	BB	660	STA	\$1
BA	67	BB	661	LSR	\$1
BA	68	BB	662	ROR	\$0
BA	69	BB	663	LDA	\$0
BA	70	BB	664	CLC	
BA	71	BB	665	ADC	ARMCVH
BA	72	BB	666	STA	ARMCVH
BA	73	BB	667	LDA	\$1
BA	74	BB	668	ADC	ARMCVH
BA	75	BB	669	STA	ARMCVH
BA	76	BB	670	LDA	\$0
BA	77	BB	671	ORA	\$1
BA	78	BB	672	BEQ	ARMSPL2
BA	79	BB	673	LDA	ARMTFSH
BA	80	BB	674	CMP	ARMWOKH
BA	81	BB	675	BCC	ARMSPL1
BA	82	BB	676	LDA	ARMTFSL
BA	83	BB	677	CMP	ARMWOKL
BA	84	BB	678	BCC	JMPHEL P
BA	85	BB	679	LDA	ARMCVH
BA	86	BB	680	LDX	ARMCVH
BA	87	BB	681	RTS	
BA	88	BB	682		
BA	89	BB	683	TESTIT	LDA #88
BA	90	BB	684		JSR ARMV2
BA	91	BB	685		JSR TRKV3
BA	92	BB	686		BCS TEER
BA	93	BB	687		LDA #0
BA	94	BB	688		JSR ARMV2
BA	95	BB	689		JSR TRKV3
BA	96	BB	690	TEER	RTS
BA	97	BB	691	PCRDCHK	LDA DCCSLOT
BA	98	BB	692		ASL A
BA	99	BB	693		ASL A
BA	100	BB	694		ASL A
BA	101	BB	695		ASL A
BA	102	BB	696		TAX
BA	103	BB	697		LDY #0
BA	104	BB	698		STY #0
BA	105	BB	699		STY \$1
BA	106	BB	700	PC1	INY
BA	107	BB	701		BEQ PCERR
BA	108	BB	702		PHA
BA	109	BB	703		PLA
BA	110	BB	704		PHA
BA	111	BB	705		PLA
BA	112	BB	706		PHA
BA	113	BB	707		PLA
BA	114	BB	708		LDA \$C081,X
BA	115	BB	709		BPL PC1
BA	116	BB	710		LDY #0
BA	117	BB	711	PC2	LDA \$C081,X
BA	118	BB	712		BPL PCERR
BA	119	BB	713		INY
BA	120	BB	714		BNE PC2

TOfAST

:A=LOW
:X=HIGH

:CHECK
:NEW ARM
:TEST
:SPEED

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BAF4: A0 00 715 PC3 LDY #0
BAF6: BD 80 716 LDA #C080,X
BAF9: C0 80 717 PC4 INY
BAFA: F0 17 718 BEQ PCERR
BAFC: BD 81 719 LDA #C081,X
BAFF: 10 F8 720 BPL PC4
BB01: BD 80 721 LDA #C080,X
BB04: BD 81 722 LDA #C081,X
BB07: 10 04 723 BPL PC5
BB09: F6 01 724 INC #1
BB0B: F0 06 725 BEQ PCERR
BB0D: E6 00 726 PC5 INC $0
BB0F: D0 E3 727 BNE PC3
BB11: F0 04 728 BEQ PC6
BB13: A9 FF 729 PCERR LDA #FF
BB15: A5 01 730 PC6 STA $1
BB17: A5 01 731 LDA $1
BB19: C9 20 732 CMP #20
BB1B: 60 733 RTS
BB1C: 20 81 B9 734 TRKV3 JSR TRKV2 TRACK
BB1F: BD 06 735 BCS TRKV3ER VERIFY
BB21: C5 12 736 CMP CTRK ROUTINE
BB23: D0 02 737 BNE TRKV3ER FOR
BB25: 18 738 CLC EXAMINE
BB26: 60 739 RTS DRIVE'S
BB27: A9 8C 740 TRKV3ER LDA #BC ARM
BB29: A9 12 741 STA CTRK SPEED
BB2B: A9 00 742 LDA #0 TEST
BB2D: 20 7D B8 743 JSR ARMU
BB30: 38 744 SECS
BB31: 60 745 RTS
746
747
748
749 *-----*
750 * WORK SPACE FOR DRIVE ROUTINES *
751 *-----*
752
753 WANTTRK DFB 0
754 WANTHALF DFB 0
755 PHSLST DFB 0
756 ARMWOKL DFB 0 ;WORK OK
757 ARMWOKH DFB 0
758 ARMTFSL DFB 0 ;TOSMALL
759
760
761 MODWRITE DS $BB74-MODWRITE
762
763 WRITETRK ASLA ;ACTUAL
764 TAX ;WRITE
765 LDA LTWRITE,X ;TRACK
766 STA WRTJMP+1,X ;ROUTINE
767 LDA LTWRITE+1,X
768 STA WRTJMP+2,X
769 LDX CSLT
770 LDA #C080,X
771 LDA #C08E,X
772 BPL S1
773 SEC
774 RTS
775 S1 TYA
776 EOR #FF
777 TAY
778 INY
779 NOP
780 NOP
781 NOP
782 NOP
783 NOP
784 LDA #0
785 STA #C08F,X
786 ORA #C08C,X
787 NOP
788 WRTJMP JMP $FFFF
789
790 *-----*
791 * WRITE ROUTINE LOOKUP TABLE *
792 *-----*
793
794 BBA4: B4 BF 794 LTWRITE DA LAF 01
795 BBA6: 90 BF 795 DA LAE 02
796 BBA8: 6C BF 796 DA LAD 03
797 BBA9: 48 BF 797 DA LAC 04
798 BBAF: 24 BF 798 DA LAB 05
799 BBAE: 00 BF 799 DA LAA 06
800 BBE0: D8 BE 800 DA LA9 07

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BC4D:	F0	0C	887		BEQ	S97		
BC4F:	CA		888		DEX			
BC50:	F0	09	889		BEQ	S97		
BC52:	CA		890		DEX			
BC53:	F0	06	891		BEQ	S97		
BC55:	CA		892		DEX			
BC56:	F0	03	893		BEQ	S97		
BC58:	CA		894		DEX			
BC59:	A5	00	895		LDA	\$0		
BC5B:	A6	10	896	S97	LDX	CSSLT		
BC5D:	B9	00	897		LDA	\$7B00,Y		
BC60:	9D	8D	898		STA	\$C08D,X		
BC63:	1D	8C	899		ORA	\$C08C,X		
BC66:	C8		900		INY			
BC67:	D0	DF	901		BNE	L97		
BC69:	4C	6D	902		JMP	W98		
			903					
BC6C:	EA		904	L98	NOP			
BC6D:	B9	00	905	W98	LDA	\$9800,Y		;\$7C00
BC70:	AA		906		TAX			
BC71:	F0	0C	907		BEQ	S98		
BC73:	CA		908		DEX			
BC74:	F0	09	909		BEQ	S98		
BC76:	CA		910		DEX			
BC77:	F0	06	911		BEQ	S98		
BC79:	CA		912		DEX			
BC7A:	F0	03	913		BEQ	S98		
BC7C:	CA		914		DEX			
BC7D:	A5	00	915		LDA	\$0		
BC7F:	A6	10	916	S98	LDX	CSSLT		
BC81:	B9	00	917		LDA	\$7C00,Y		
BC84:	9D	8D	918		STA	\$C08D,X		
BC87:	1D	8C	919		ORA	\$C08C,X		
BC8A:	C8		920		INY			
BC8B:	D0	DF	921		BNE	L98		
BC8D:	4C	91	922		JMP	W99		
			923					
BC90:	EA		924	L99	NOP			
BC91:	B9	00	925	W99	LDA	\$9900,Y		;\$7D00
BC94:	AA		926		TAX			
BC95:	F0	0C	927		BEQ	S99		
BC97:	CA		928		DEX			
BC98:	F0	09	929		BEQ	S99		
BC9A:	CA		930		DEX			
BC9B:	F0	06	931		BEQ	S99		
BC9D:	CA		932		DEX			
BC9E:	F0	03	933		BEQ	S99		
BCA0:	CA		934		DEX			
BCA1:	A5	00	935		LDA	\$0		
BCA3:	A6	10	936	S99	LDX	CSSLT		
BCA5:	B9	00	937		LDA	\$7D00,Y		
BCA8:	9D	8D	938		STA	\$C08D,X		
BCAB:	1D	8C	939		ORA	\$C08C,X		
BCAE:	C8		940		INY			
BCAF:	D0	DF	941		BNE	L99		
BCB1:	4C	B5	942		JMP	W9A		
			943					
BCB4:	EA		944	L9A	NOP			
BCB5:	B9	00	945	W9A	LDA	\$9A00,Y		;\$7E00
BCB8:	AA		946		TAX			
BCB9:	F0	0C	947		BEQ	S9A		
BCBB:	CA		948		DEX			
BCBC:	F0	09	949		BEQ	S9A		
BCBE:	CA		950		DEX			
BCBF:	F0	06	951		BEQ	S9A		
BCC1:	CA		952		DEX			
BCC2:	F0	03	953		BEQ	S9A		
BCC4:	CA		954		DEX			
BCC5:	A5	00	955		LDA	\$0		
BCC7:	A6	10	956	S9A	LDX	CSSLT		
BCC9:	B9	00	957		LDA	\$7E00,Y		
BCCC:	9D	8D	958		STA	\$C08D,X		
BCCF:	1D	8C	959		ORA	\$C08C,X		
BCD2:	C8		960		INY			
BCD3:	D0	DF	961		BNE	L9A		
BCD5:	4C	D9	962		JMP	W9B		
			963					
BCD8:	EA		964	L9B	NOP			
BCD9:	B9	00	965	W9B	LDA	\$9B00,Y		;\$7F00
BCDC:	AA		966		TAX			
BCDD:	F0	0C	967		BEQ	S9B		
BCDF:	CA		968		DEX			
BCE0:	F0	09	969		BEQ	S9B		
BCE2:	CA		970		DEX			
BCE3:	F0	06	971		BEQ	S9B		
BCE5:	CA		972		DEX			

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BCCE6: F0 03 9773
BCCE7: CA 00 9774
BCCE8: A5 00 9775
BCCE9: A6 10 9776 S9B
BCCEA: B9 00 7F 9777
BCCEB: 9D 8D C0 9778
BCCEC: 1D 8C C0 9779
BCCEE: C8 980
BCCF7: 00 DF 981
BCCF9: 4C 05 BD 982
          983
BCFC: 00 00 00 984
BCFF: 00 00 00 00 985
          986 L9C
BD04: EA 00 9C 986 W9C
BD05: B9 00 9C 987
BD06: AA 00 9C 988
BD08: F0 0C 989
BD08: CA 00 990
BD0C: F0 09 991
BD0E: CA 00 992
BD0F: F0 06 993
BD11: CA 00 994
BD12: F0 03 995
BD14: CA 00 996
BD15: A5 00 997
BD17: A6 10 998 S9C
BD19: B9 00 80 999
BD1C: 9D 8D C0 1000
BD1F: 1D 8C C0 1001
BD22: C8 1002
BD23: 00 DF 1003
BD25: 4C 29 BD 1004
          1005 L9D
BD28: EA 00 9D 1006 W9D
BD29: B9 00 9D 1007
BD2C: AA 00 9D 1008
BD2D: F0 0C 1009
BD2F: CA 00 1010
BD30: F0 09 1011
BD32: CA 00 1012
BD33: F0 06 1013
BD35: CA 00 1014
BD36: F0 03 1015
BD38: CA 00 1016
BD39: A5 00 1017
BD3B: A6 10 1018 S9D
BD3D: B9 00 81 1019
BD40: 9D 8D C0 1020
BD43: 1D 8C C0 1021
BD44: C8 1022
BD47: 00 DF 1023
BD49: 4C 4D BD 1024
          1025 L9E
BD4C: EA 00 9E 1026 W9E
BD4D: B9 00 9E 1027
BD50: AA 00 9E 1028
BD51: F0 0C 1029
BD53: CA 00 1030
BD54: F0 09 1031
BD56: CA 00 1032
BD57: F0 06 1033
BD59: CA 00 1034
BD5A: F0 03 1035
BD5C: CA 00 1036
BD5D: A5 00 1037 S9E
BD5F: A6 10 1038
BD61: B9 00 82 1039
BD64: 9D 8D C0 1040
BD67: 1D 8C C0 1041
BD6A: C8 1042
BD6B: 00 DF 1043
BD6D: 4C 71 BD 1044
          1045 L9F
BD70: EA 00 9F 1046 W9F
BD71: B9 00 9F 1047
BD74: AA 00 9F 1048
BD75: F0 0C 1049
BD77: CA 00 1050
BD78: F0 09 1051
BD7A: CA 00 1052
BD7B: F0 06 1053
BD7D: CA 00 1054
BD7E: F0 03 1055
BD80: CA 00 1056
BD81: A5 00 1057

```

```

BEQ S9B
DEX
LDA $0
LDX CSLT
LDA $7F00,Y
STA $C08D,X
ORA $C08C,X
INY
BNE L9B
JMP W9C
DFB 0,0,0,0,0,0,0,0
NOP
LDA $9C00,Y ;$8000
TAX
BEQ S9C
DEX
BEQ S9C
DEX
BEQ S9C
DEX
LDA $0
LDX CSLT
LDA $8000,Y
STA $C08D,X
ORA $C08C,X
INY
BNE L9C
JMP W9D
NOP
LDA $9D00,Y ;$8100
TAX
BEQ S9D
DEX
BEQ S9D
DEX
BEQ S9D
DEX
LDA $0
LDX CSLT
LDA $8100,Y
STA $C08D,X
ORA $C08C,X
INY
BNE L9D
JMP W9E
NOP
LDA $9E00,Y ;$8200
TAX
BEQ S9E
DEX
BEQ S9E
DEX
BEQ S9E
DEX
LDA $0
LDX CSLT
LDA $8200,Y
STA $C08D,X
ORA $C08C,X
INY
BNE L9E
JMP W9F
NOP
LDA $9F00,Y ;$8300
TAX
BEQ S9F
DEX
BEQ S9F
DEX
BEQ S9F
DEX
LDA $0

```


00000000	00	00	00	1266	DFB	0,0,0,0
00000000	00	00	00	1267		
00000000	00	00	00	1268		
00000000	00	00	00	1269		
00000000	00	00	00	1270		
00000000	00	00	00	1271		
00000000	00	00	00	1272		
00000000	00	00	00	1273		
00000000	00	00	00	1274		
00000000	00	00	00	1275		
00000000	00	00	00	1276		
00000000	00	00	00	1277		
00000000	00	00	00	1278		
00000000	00	00	00	1279		
00000000	00	00	00	1280		
00000000	00	00	00	1281		
00000000	00	00	00	1282		
00000000	00	00	00	1283		
00000000	00	00	00	1284		
00000000	00	00	00	1285		
00000000	00	00	00	1286		
00000000	00	00	00	1287		
00000000	00	00	00	1288		
00000000	00	00	00	1289		
00000000	00	00	00	1290		
00000000	00	00	00	1291		
00000000	00	00	00	1292		
00000000	00	00	00	1293		
00000000	00	00	00	1294		
00000000	00	00	00	1295		
00000000	00	00	00	1296		
00000000	00	00	00	1297		
00000000	00	00	00	1298		
00000000	00	00	00	1299		
00000000	00	00	00	1300		
00000000	00	00	00	1301		
00000000	00	00	00	1302		
00000000	00	00	00	1303		
00000000	00	00	00	1304		
00000000	00	00	00	1305		
00000000	00	00	00	1306		
00000000	00	00	00	1307		
00000000	00	00	00	1308		
00000000	00	00	00	1309		
00000000	00	00	00	1310		
00000000	00	00	00	1311		
00000000	00	00	00	1312		
00000000	00	00	00	1313		
00000000	00	00	00	1314		


```

BF 06 1 130315
FF 03 1 130316
FF 03 1 130317
FF 03 1 130318
FF 00 1 130319
FF 10 1 130320 SAC
FF 00 1 130321
FF 8D 1 130322
FF 8C 1 130323
FF 8C 1 130324
FF DF 1 130325
FF 6D BF 1 130326
FF 6C EA 1 130327
FF 6D B9 00 AD 1 130328 LAD
FF 70 AA 1 130329 WAD
FF 71 F0 0C 1 130330
FF 73 F0 0C 1 130331
FF 74 F0 09 1 130332
FF 76 F0 06 1 130333
FF 77 F0 06 1 130334
FF 79 F0 03 1 130335
FF 7A F0 03 1 130336
FF 7C AA 00 1 130337
FF 7D A6 10 1 130338
FF 7F B9 00 91 1 130339 SAD
FF 81 90 8D 1 130340 CO
FF 84 90 8C 1 130341 CO
FF 87 C8 1 130342
FF 88 D0 DF 1 130343
FF 89 4C 91 BF 1 130344
FF 90 EA 1 130345 LAE
FF 91 B9 00 AE 1 130346 WAE
FF 94 AA 1 130347
FF 95 F0 0C 1 130348
FF 97 F0 09 1 130349
FF 99 F0 06 1 130350
FF 9B F0 03 1 130351
FF 9D AA 00 1 130352
FF 9E A6 10 92 1 130353 SAD
FF A0 90 8D 1 130354 CO
FF A3 90 8C 1 130355 CO
FF A5 C8 1 130356
FF A7 D0 DF 1 130357
FF B1 4C B5 BF 1 130358
FF B4 EA 1 130359 LAF
FF B5 B9 00 AF 1 130360 WAF
FF B7 AA 1 130361
FF B8 F0 0C 1 130362
FF BA F0 09 1 130363
FF BC F0 06 1 130364
FF BE F0 03 1 130365
FF BF AA 00 1 130366
FF C1 A6 10 93 1 130367 SAD
FF C3 90 8D 1 130368 CO
FF C6 90 8C 1 130369 CO
FF C8 D0 DF 1 130370
FF CA 4C B5 BF 1 130371
FF CB 6C EA 1 130372
FF CD 6D B9 00 AD 1 130373
FF CF 70 AA 1 130374
FF D1 71 F0 0C 1 130375
FF D3 73 F0 0C 1 130376
FF D5 74 F0 09 1 130377
FF D7 76 F0 06 1 130378
FF D9 77 F0 06 1 130379
FF DB 79 F0 03 1 130380
FF DD 7A F0 03 1 130381
FF DF 7C AA 00 1 130382
FF E1 7D A6 10 1 130383
FF E3 7F B9 00 91 1 130384 SAD
FF E5 81 90 8D 1 130385 CO
FF E8 84 90 8C 1 130386 CO
FF EA 87 C8 1 130387
FF EC 88 D0 DF 1 130388
FF EE 89 4C 91 BF 1 130389
FF F0 90 EA 1 130390
FF F2 91 B9 00 AE 1 130391
FF F4 94 AA 1 130392
FF F6 95 F0 0C 1 130393
FF F8 97 F0 09 1 130394
FF FA 99 F0 06 1 130395
FF FC 9B F0 03 1 130396
FF FE 9D AA 00 1 130397
FF 10 A6 10 92 1 130398 SAD
FF 12 90 8D 1 130399 CO
FF 14 90 8C 1 130400 CO
FF 16 C8 1 130401
FF 18 D0 DF 1 130402
FF 1A 4C B5 BF 1 130403
FF 1C 6C EA 1 130404
FF 1E 6D B9 00 AD 1 130405
FF 20 70 AA 1 130406
FF 22 71 F0 0C 1 130407
FF 24 73 F0 0C 1 130408
FF 26 74 F0 09 1 130409
FF 28 76 F0 06 1 130410
FF 2A 77 F0 06 1 130411
FF 2C 79 F0 03 1 130412
FF 2E 7A F0 03 1 130413
FF 30 7C AA 00 1 130414
FF 32 7D A6 10 1 130415
FF 34 7F B9 00 91 1 130416 SAD
FF 36 81 90 8D 1 130417 CO
FF 38 84 90 8C 1 130418 CO
FF 3A 87 C8 1 130419
FF 3C 88 D0 DF 1 130420
FF 3E 89 4C 91 BF 1 130421
FF 40 90 EA 1 130422
FF 42 91 B9 00 AE 1 130423
FF 44 94 AA 1 130424
FF 46 95 F0 0C 1 130425
FF 48 97 F0 09 1 130426
FF 4A 99 F0 06 1 130427
FF 4C 9B F0 03 1 130428
FF 4E 9D AA 00 1 130429
FF 50 A6 10 92 1 130430 SAD
FF 52 90 8D 1 130431 CO
FF 54 90 8C 1 130432 CO
FF 56 C8 1 130433
FF 58 D0 DF 1 130434
FF 5A 4C B5 BF 1 130435
FF 5C 6C EA 1 130436
FF 5E 6D B9 00 AD 1 130437
FF 60 70 AA 1 130438
FF 62 71 F0 0C 1 130439
FF 64 73 F0 0C 1 130440
FF 66 74 F0 09 1 130441
FF 68 76 F0 06 1 130442
FF 6A 77 F0 06 1 130443
FF 6C 79 F0 03 1 130444
FF 6E 7A F0 03 1 130445
FF 70 7C AA 00 1 130446
FF 72 7D A6 10 1 130447
FF 74 7F B9 00 91 1 130448 SAD
FF 76 81 90 8D 1 130449 CO
FF 78 84 90 8C 1 130450 CO
FF 7A 87 C8 1 130451
FF 7C 88 D0 DF 1 130452
FF 7E 89 4C 91 BF 1 130453
FF 80 90 EA 1 130454
FF 82 91 B9 00 AE 1 130455
FF 84 94 AA 1 130456
FF 86 95 F0 0C 1 130457
FF 88 97 F0 09 1 130458
FF 8A 99 F0 06 1 130459
FF 8C 9B F0 03 1 130460
FF 8E 9D AA 00 1 130461
FF 90 A6 10 92 1 130462 SAD
FF 92 90 8D 1 130463 CO
FF 94 90 8C 1 130464 CO
FF 96 C8 1 130465
FF 98 D0 DF 1 130466
FF 9A 4C B5 BF 1 130467
FF 9C 6C EA 1 130468
FF 9E 6D B9 00 AD 1 130469
FF A0 70 AA 1 130470
FF A2 71 F0 0C 1 130471
FF A4 73 F0 0C 1 130472
FF A6 74 F0 09 1 130473
FF A8 76 F0 06 1 130474
FF AA 77 F0 06 1 130475
FF AC 79 F0 03 1 130476
FF AE 7A F0 03 1 130477
FF B0 7C AA 00 1 130478
FF B2 7D A6 10 1 130479
FF B4 7F B9 00 91 1 130480 SAD
FF B6 81 90 8D 1 130481 CO
FF B8 84 90 8C 1 130482 CO
FF BA 87 C8 1 130483
FF BC 88 D0 DF 1 130484
FF BE 89 4C 91 BF 1 130485
FF C0 90 EA 1 130486
FF C2 91 B9 00 AE 1 130487
FF C4 94 AA 1 130488
FF C6 95 F0 0C 1 130489
FF C8 97 F0 09 1 130490
FF CA 99 F0 06 1 130491
FF CC 9B F0 03 1 130492
FF CE 9D AA 00 1 130493
FF D0 A6 10 92 1 130494 SAD
FF D2 90 8D 1 130495 CO

```

```

BEQ SAC
DEX SAC
DEX SAC
LDA $0
LDX CSLT
LDA $9000,Y
STA $C08D,X
ORA $C08C,X
INY
BNE LAC
JMP WAD
NOP
LDA $AD00,Y ;$9100
TAX
BEQ SAD
DEX
BEQ SAD
DEX
BEQ SAD
DEX
BEQ SAD
LDA $0
LDX CSLT
LDA $9100,Y
STA $C08D,X
ORA $C08C,X
INY
BNE LAD
JMP WAE
NOP
LDA $AE00,Y ;$9200
TAX
BEQ SAE
DEX
BEQ SAE
DEX
BEQ SAE
DEX
LDA $0
LDX CSLT
LDA $9200,Y
STA $C08D,X
ORA $C08C,X
INY
BNE LAE
JMP WAF
NOP
LDA $AF00,Y ;$9300
TAX
BEQ SAF
DEX
BEQ SAF
DEX
BEQ SAF
DEX
LDA $0
LDX CSLT
LDA $9300,Y
STA $C08D,X
ORA $C08C,X
INY
BNE LAF
PHA ;WRITE
PLA ;DONE
PHA
PLA
CLC
BCC SD1
STA $C08E,X
ORA $C08C,X
CLC
RTS

```

--End assembly--

2276 bytes

Errors: 0

