

ESSENTIAL DATA DUPLICATOR

4

SOURCE CODE LISTING

UTILICO MICROWARE

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** ** **

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 ** ** **

INTRODUCTION

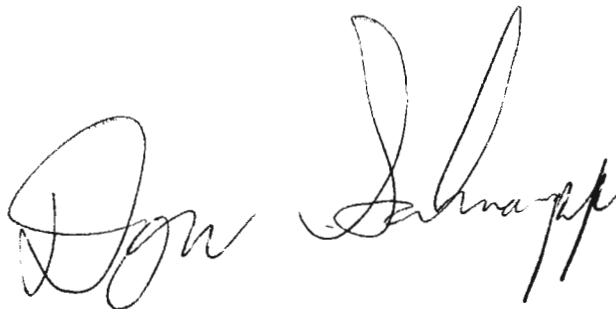
Written by Donald Anthony Schnapp using an apple IIe computer, Essential Data Duplicator 4 is a powerful computer program for allowing the user to make back up copies of his "copy-protected" software. The 6502 assembler which was used to enter EDD 4 is named "BIG MAC", which is similar to the "MERLIN" 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 dark ink on a white background.

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            ;
          LDX  #$50          ;Slot number of PLUS card.
CHKREADY 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:
      1111111100111111110011111111001111111100111111110011111111

```

```

      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 - \$B0FF = 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 HXH         =      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	SCPB	==	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	PDD	==	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	NBLCF LG	==	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	WRKSPCC	==	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	TRKLLH	==	VAR+\$C8
152	ERRORCD	==	VAR+\$C9
153	EDDVRSN	==	VAR+\$CA
154	*-----*		
155	* PARAMETERS *		
156	*-----*		
157	SYNCTBLE	==	PARMS+\$00
158	TIMEBITS	==	PARMS+\$09
159	SPCLCNTL	==	PARMS+\$0A
160	ABSLNGTL	==	PARMS+\$0C
161	ABSLNGTH	==	PARMS+\$0D
162	MINLNGTH	==	PARMS+\$10
163	MAXLNGTH	==	PARMS+\$11
164	PLNGCNTL	==	PARMS+\$12
165	PENDCNTL	==	PARMS+\$13
166	PTGAPMIN	==	PARMS+\$17
167	RERRORS	==	PARMS+\$19
168	WERRORS	==	PARMS+\$1A
169	TRKSYNC	==	PARMS+\$1B
170	MBTEQLN	==	PARMS+\$1C
171			

```

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 *EPCALC2 = EDD4+$12
182 *CHKESC = EDD4+$15
183
184 *-----*
185 * COMMON ANALYZE ROUTINE HOOKS *
186 *-----*
187 ANALYZET = ANALYZE+$0
188 FNDLNGTH = 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+$06
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 TDUMPU = 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 ;$0C06
219 JMP W3 ;$0C09
220 JMP EPCALC ;$0C0C
221 JMP EPCALC1 ;$0C0F
222 JMP EPCALC2 ;$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 PARMS,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

```

0C65:	20	0C	1F	258		JSR	CHECKMEM	
0C68:	2C	51	C0	259		BIT	#C051	
0C6B:	20	C0	13	260	E2	JSR	SCDDSPY	
0C6E:	A9	08		261		LDA	#8	SET
0C70:	8D	75	B2	262		STA	TWINDTOP	WINDOW
0C73:	A9	03		263		LDA	#3	DISPLY
0C75:	20	05	15	264		JSR	TOUT	AND GET
0C78:	20	4F	0F	265		JSR	SCGETO	OPTION
0C7B:	BE	B6	16	266		LDX	LTEDDO+1,Y	
0C7E:	B9	B7	16	267		LDA	LTEDDO+1,Y	GET
0C81:	86	00		268	E3	STX	WIL	READY
0C83:	85	01		269		STA	WIL	TO DO
0C85:	20	0F	14	270		JSR	EPCLEAN	OPTION
0C88:	A0	01		271		LDY	#1	
0C8A:	AD	80	B2	272		LDA	PDS	
0C8D:	CD	82	B2	273		CMP	PDS	
0C90:	D0	09		274		BNE	ES	
0C92:	AD	81	B2	275		LDA	PDD	
0C95:	CD	83	B2	276		CMP	PDD	O=ONE
0C98:	D0	01		277		BNE	ES	I=TWO
0C9A:	88			278		DEY		DRIVE
0C9B:	8C	85	B2	279	ES	STY	DRVCOUNT	SYSTEM
0C9E:	20	A4	0C	280		JSR	EJ	
0CA1:	4C	6B	0C	281		JMP	E2	
0CA4:	6C	00	00	282	EJ	JMP	(WIL)	;DO OPTN
0CA7:	A9	00		283				
0CAC:	8D	75	B2	284	CLRERRCD	LDA	#0	CLEAR
	4C	53	0C	285		STA	TWINDTOP	ERROR
				286		JMP	E1	CODES
0CAF:	A9	08		287				
0CB1:	20	05	15	288	CHNGSLTS	LDA	#8	CHANGE
0CB4:	A9	FF		289		JSR	TOUT	SLOTS &
0CB6:	8D	86	B2	290		LDA	#\$FF	DRIVES
0CB9:	8D	87	B2	291		STA	CTRKO	
0CBC:	A9	80		292		STA	CTRKO	
0CBF:	A2	69		293		LDA	#<POS	
0CC0:	A0	3E		294		LDX	#<LTEM	
0CC2:	20	86	0F	295		LDY	#>LTP	
0CC5:	A9	82		296		JSR	SCVLSL	
0CC7:	A2	82		297		LDA	#>POS	
0CC9:	A0	82		298		LDX	#>LTEM	
0CCB:	20	8D	0F	299		LDY	#>LTP	
0CCE:	4C	6B	0C	300		JSR	SCVLSHGT	
				301		JMP	E2	
0CD1:	A9	07		302				
0CD3:	20	05	15	303	EDDQUIT	LDA	#7	QUIT
0CD6:	20	4F	0F	304		JSR	TOUT	OPTION
0CD9:	BE	C8	16	305		JSR	SCGETO	
0CDC:	B9	C9	16	306		LDX	LTQT+1,Y	
0CDF:	4C	81	0C	307		LDA	LTQT+1,Y	
				308		JMP	E3	
0CE2:	AD	83	B2	309				
0CE5:	C9	01		310	QUITEDD	LDA	PDD	WHEN
0CE7:	F0	15		311		CMP	#1	QUITTING
0CE9:	AD	81	B2	312		BEQ	Q0	BOOT
0CEE:	C9	01		313		LDA	PDD	FRM THE
0CF0:	F0	08		314		CMP	#1	DISK IN
0CF3:	AD	82	B2	315		BEQ	Q0	DRV #1
0CF6:	CD	80	B2	316		LDA	PDS	OR BOOT
0CF8:	B0	06		317		CMP	PDS	FRM THE
0CFB:	AD	80	B2	318		BCS	Q0	HIGHEST
0CFE:	4C	01	0D	319	Q0	LDA	PDS	SLOT
0CFF:	AD	82	B2	320		JMP	QS	
0D01:	09	C0		321	QD	LDA	PDS	
0D03:	85	01		322	QS	ORA	#\$C0	
0D05:	A9	00		323</				

0D25:	2C	10	C0	344	BIT	%C010	: CLEAR,
0D26:	20	C0	15	345	JSR	RPH	: GET A
0D27:	20	40	0D	346	JSR	KYIN	: KEY
0D28:	20	0D	15	347	JSR	RPL	
0D29:	AD	74	B2	348	LDA	KYVALUE	
0D34:	60			349	RTS		
0D35:	C9	A0		350			
0D37:	F0	0F		351	CMP	##A0	: REPLACE
0D38:	C9	0A		352	BEQ	K2	: MOVEMNT
0D39:	C9	0A		353	CMP	##8A	: KEYS
0D3A:	C9	0A		354	BEQ	K2	: WITH
0D3B:	C9	0A		355	CMP	##95	: STANDRD
0D3C:	C9	0A		356	BEQ	K2	: VALUES
0D41:	C9	0A		357	CMP	##8B	
0D43:	00	4C		358	BNE	K3	
0D45:	A9	88		359	LDA	##88	
0D47:	60			360	RTS		
0D48:	A9	80		361	LDA	##8D	
0D4A:	60			362	RTS		
0D4B:	AD	00	C0	363			
0D4C:	10	F0		364	LDA	%C000	: GET A
0D4D:	C9	F0		365	BPL	KYIN	: KEY
0D50:	C9	02		366	CMP	##E0	
0D52:	29	0F		367	BCC	KL3	
0D54:	80	74	B2	368	AND	##DF	: ;FIXCASE
0D56:	A0	04		369	STA	KYVALUE	
0D59:	A2	40		370	LDY	##4	
0D5B:	AD	EC	C0	371	LDX	##40	: JUST
0D5D:	CA	F2		372	LDA	%C0EC	: CLICK
0D61:	00	FA		373	DEX		: BELL
0D63:	2C	30	C0	374	BNE	KL2	: BRIEFLY
0D66:	88			375	BIT	%C030	
0D67:	00	F2		376	DEY		
0D69:	2C	10	C0	377	BNE	KL1	
0D6C:	AD	74	B2	378	BIT	%C010	: CHECK
0D6F:	C9	9B		379	LDA	KYVALUE	: FOR
0D71:	F0	29		380	CMP	##9B	: ESC KEY
0D73:	C9	84		381	BEQ	K4	: AND
0D75:	F0	28		382	CMP	##84	: CTRL-D
0D77:	60			383	BEQ	K6	: KEY
0D78:	AD	00	C0	384	RTS		
0D7B:	10	14		385			
0D7D:	C9	EQ		386	LDA	%C000	: ANOTHER
0D7F:	29	0F		387	BPL	K3	: KYPRESS
0D81:	29	0F		388	CMP	##E0	: ROUTINE
0D83:	2C	10	C0	389	BCC	KL4	
0D86:	40			390	AND	##DF	: ;FIXCASE
0D87:	20	99	17	391	BIT	%C010	
0D8A:	68			392	PHA		
0D8B:	C9	9B		393	JSR	MTR0FF	
0D8D:	F0	0D		394	PLA		
0D8F:	68			395	CMP	##9B	: ;ESC
0D90:	68			396	BEQ	K4	
0D91:	60			397	PLA		
0D92:	AC	00	C0	398	PLA		
0D95:	C0	9B		399	RTS		
0D97:	00	F0		400			
0D99:	AD	10	C0	401	LDY	%C000	: CHECK
0D9C:	4C	62	0C	402	CPY	##9B	: KYBOARD
0D9F:	AE	80	B2	403	BNE	K3	: FOR ESC
0DA2:	AC	81	B2	404	LDA	%C010	
0DA5:	AD	82	B2	405	JMP	DE	
0DA8:	AD	83	B2	406			
0DAB:	AD	83	B2	407	LDX	PDS	: DO
0DAE:	AD	83	B2	408	LDY	PDS	: CNTRL-D
0DB1:	AD	83	B2	409	LDA	PDS	
0DB4:	AD	83	B2	410	STA	PDS	: SWAP
0DB7:	AD	83	B2	411	LDA	PDS	: DUP
0DBA:	AD	83	B2	412	STA	PDS	: WITH
0DBD:	AD	83	B2	413	STX	PDS	: ORIGNL
0DBF:	AD	83	B2	414	STY	PDS	: DRIVE
0DC0:	AD	83	B2	415	LDY	CTRKO	
0DC3:	AD	83	B2	416	LDX	CTRKO	
0DC6:	AD	83	B2	417	STY	CTRKO	
0DC9:	AD	83	B2	418	STX	CTRKO	
0DCB:	AD	83	B2	419	JSR	SCDD2	
0DCE:	AD	83	B2	420	JMP	KYIN	
0DD0:	AD	83	B2	421			
0DD2:	AD	83	B2	422	STA	##FF	: ANOTHER
0DD4:	AD	83	B2	423	LDA	%C000	: CHECK
0DD5:	AD	83	B2	424	CMP	##9B	: ESC
0DD6:	AD	83	B2	425	BEQ	K5	: ROUTINE
0DD7:	AD	83	B2	426	LDA	##FF	
0DD8:	AD	83	B2	427	RTS		
0DD9:	AD	83	B2	428			
0DDA:	AD	83	B2	429			
0DDB:	AD	83	B2				
0DDC:	AD	83	B2				
0DDD:	AD	83	B2				
0DDE:	AD	83	B2				
0DDF:	AD	83	B2				
0DE0:	AD	83	B2				
0DE1:	AD	83	B2				
0DE2:	AD	83	B2				
0DE3:	AD	83	B2				
0DE4:	AD	83	B2				
0DE5:	AD	83	B2				
0DE6:	AD	83	B2				
0DE7:	AD	83	B2				
0DE8:	AD	83	B2				
0DE9:	AD	83	B2				
0DEA:	AD	83	B2				
0DEB:	AD	83	B2				
0DEC:	AD	83	B2				
0DED:	AD	83	B2				
0DEE:	AD	83	B2				
0DEF:	AD	83	B2				
0DE0:	AD	83	B2				
0DE1:	AD	83	B2				
0DE2:	AD	83	B2				
0DE3:	AD	83	B2				
0DE4:	AD	83	B2				
0DE5:	AD	83	B2				
0DE6:	AD	83	B2				
0DE7:	AD	83	B2				
0DE8:	AD	83	B2				
0DE9:	AD	83	B2				
0DEA:	AD	83	B2				
0DEB:	AD	83	B2				
0DEC:	AD	83	B2				
0DED:	AD	83	B2				
0DEE:	AD	83	B2				
0DEF:	AD	83	B2				
0DE0:	AD	83	B2				
0DE1:	AD	83	B2				
0DE2:	AD	83	B2				
0DE3:	AD	83	B2				
0DE4:	AD	83	B2				
0DE5:	AD	83	B2				
0DE6:	AD	83	B2				
0DE7:	AD	83	B2				
0DE8:	AD	83	B2				
0DE9:	AD	83	B2				
0DEA:	AD	83	B2				
0DEB:	AD	83	B2				
0DEC:	AD	83	B2				
0DED:	AD	83	B2				
0DEE:	AD	83	B2				
0DEF:	AD	83	B2				
0DE0:	AD	83	B2				
0DE1:	AD	83	B2				
0DE2:	AD	83	B2				
0DE3:	AD	83	B2				
0DE4:	AD	83	B2				
0DE5:	AD	83	B2				
0DE6:	AD	83	B2				
0DE7:	AD	83	B2				
0DE8:	AD	83	B2				
0DE9:	AD	83	B2				
0DEA:	AD	83	B2				
0DEB:	AD	83	B2				
0DEC:	AD	83	B2				
0DED:	AD	83	B2				
0DEE:	AD	83	B2				
0DEF:	AD	83	B2				
0DE0:	AD	83	B2				
0DE1:	AD	83	B2				
0DE2:	AD	83	B2				
0DE3:	AD	83	B2				
0DE4:	AD	83	B2				
0DE5:	AD	83	B2				
0DE6:	AD	83	B2				
0DE7:	AD	83	B2				
0DE8:	AD	83	B2				
0DE9:	AD	83	B2				
0DEA:	AD	83	B2				
0DEB:	AD	83	B2				
0DEC:	AD	83	B2				
0DED:	AD	83	B2				
0DEE:	AD	83	B2				
0DEF:	AD	83	B2				
0DE0:	AD	83	B2				
0DE1:	AD	83	B2				
0DE2:	AD	83	B2				
0DE3:	AD	83	B2				
0DE4:	AD	83	B2				
0DE5:	AD	83	B2				
0DE6:	AD	83	B2				
0DE7:	AD	83	B2				
0DE8:	AD	83	B2				
0DE9:	AD	83	B2				
0DEA:	AD	83	B2				
0DEB:	AD	83	B2				
0DEC:	AD	83	B2				
0DED:	AD	83	B2				
0DEE:	AD	83	B2				
0DEF:	AD	83	B2				
0DE0:	AD	83	B2				
0DE1:	AD	83	B2				
0DE2:	AD	83	B2				
0DE3:	AD	83	B2				
0DE4:	AD	83	B2				
0DE5:	AD	83	B2				
0DE6:	AD	83	B2				
0DE7:	AD	83	B2				
0DE8:	AD	83	B2				
0DE9:	AD	83	B2				
0DEA:	AD	83	B2				
0DEB:	AD	83	B2				

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

0F41:	65	03	602	ADC	W2H	;MULPAND
0F43:	90	02	603	BCC	MPS1	
0F45:	E6	05	604	INC	W3H	;RSLHIGH
0F47:	88		605	DEY		
0F48:	00	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			
0F52:	20	63	611	SCGET0	JSR	SSRCH ;MANGER
0F55:	20	61	612	SCGET02	JSR	SCCHNG GETTING
0F58:	20	61	613	JSR	SCODSPY	OPTION
0F5B:	20	28	614	JSR	KYGET	FROM
0F5D:	C9	8D	615	CMP	##8D	SCREEN
0F5F:	F0	1D	616	BEQ	SS2	
0F62:	20	66	617	JSR	SCCHNG1	TXNORML
0F65:	20	D8	618	JSR	SCCHKARR	CHKKEY
0F67:	F0	EB	619	BEQ	SCGET02	
0F69:	29	3F	620	AND	##3F	IF =
0F6C:	CD	76	621	CMP	SCNMBR	CURRENT
0F6E:	F0	0E	622	BEQ	SS2	NOWAIST
0F71:	20	24	623	JSR	CHKY	
0F73:	F0	06	624	BEQ	SS1	
0F76:	20	D5	625	JSR	BL	
0F77:	4C	52	626	JMP	SCGET02	
0F79:	20	61	627	JSR	SCODSPY	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			
0F88:	86	04	636	SCVLSL	STA	W2L
0F8A:	84	06	637	STX	W3L	
0F8C:	60		638	STY	W4L	
0F8D:	85	03	639	RTS		
0F8F:	86	05	640	SCVLSHGT	STA	W2H
0F91:	84	07	641	STX	W3H	
0F93:	20	E8	642	STY	W4H	
0F96:	20	EF	643	JSR	SCVFILL	MANAGER
0F99:	20	99	644	JSR	SCFNLN	GET VAL
0F9C:	20	28	645	JSR	SCFLASH	FROM
0F9F:	20	99	646	JSR	KYGET	SCREEN
0FA2:	20	D8	647	JSR	SCFLASH	
0FA5:	F0	0B	648	JSR	SCCHKARR	
0FA7:	20	66	649	BEQ	SS3	
0FAA:	B0	0E	650	JSR	CHKNMBR	
0FAC:	20	D5	651	BCC	GETVL	
0FAF:	4C	96	652	JSR	BL	
0FB2:	90	E2	653	JMP	SC1	
0FB4:	A0	50	654	BCC	SC1	
0FB6:	20	EA	655	LDY	##50	
0FB9:	60		656	JSR	W1	
0FBA:	AA		657	RTS		
0FBB:	AD	7D	658			
0FBE:	0A	B2	659	GETVL	TAX	
0FBF:	A8		660	LDA	SCVLPNT	
0FC0:	B1	06	661	ASLA		
0FC2:	8A		662	TAY		
0FC3:	F0	E7	663	LDA	(W4L),Y	
0FC5:	C8		664	TXA		;GETDGT
0FC6:	D1	06	665	BEQ	SCE	
0FC8:	B0	E2	666	INY		
0FCA:	AC	7D	667	CMP	(W4L),Y	
0FCD:	91	02	668	BCC	SCE	
0FCE:	20	DB	669	LDY	SCVLPNT	
0FD2:	20	FB	670	STA	(W2L),Y	
0FD5:	4C	B2	671	JSR	W2OUT	
0FD8:	AD	74	672	JSR	SS5	
0FDB:	F0	8B	673	JMP	SS3	
0FDD:	F0	15	674			
0FDF:	F0	88	675	SCCHKARR	LDA	KYVALUE
0FE1:	F0	11	676	CMP	##8B	CHECK
0FE3:	F0	8A	677	BEQ	SS4	UP ARRW
0FE5:	F0	14	678	CMP	##88	
0FE7:	F0	95	679	BEQ	SS4	LT ARRW
0FE9:	F0	10	680	CMP	##8A	DN ARRW
0FEB:	F0	95	681	BEQ	SS5	RT ARRW
0FED:	F0	10	682	CMP	##55	
0FEF:	F0	80	683	BEQ	##55	<SPACE>
0FF1:	F0	08	684	CMP	##8D	<RETRN>
0FF3:	F0	08	685	BEQ	SS5	

0FF3:	60			688		RTS		BNE IF
0FF4:	CE 7D	B2		689	SS4	DEC	SCVLPNT	NO
0FF7:	A9 FF			690		LDA	##FF	MATCH
0FF9:	D0 05			691		BNE	SCCALCD	
0FFB:	EE 7D	B2		692	SS5	INC	SCVLPNT	
0FFE:	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		CLC IF
1007:	65 0A			697		ADC	SCVP	MOVE OK
1009:	CD 77	B2		698		CMP	SCPT	
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	SS61	RST TOP
101B:	AD 78	B2		706	SS6	LDA	SCPB	RST BTM
101F:	38			707	SS61	SEC		
101F:	85 0A			708	SS7	STA	SCVP	
1021:	A9 00			709		LDA	#0	
1023:	60			710		RTS		
				711				
1024:	29 3F			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	SCVP	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	W5	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	SCVP	
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	W5	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	W5	
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	C0	775		EOR	#\$C0	FLASH
10AA:	91	0C	776		STA	(SAL),Y	
10AC:	84	0B	777		STY	SCHP	
10AE:	88		778		DEY		
10AF:	D0	EE	779		BNE	SL7	
10B1:	20	DD	780	SCD2	JSR	RPL	
10B4:	60		781		RTS		
10B5:	A9	17	782				
10B7:	85	0A	783	SSRCH	LDA	#23	SEARCH
10B9:	C6	0A	784		STA	SCVP	SCREEN
10BB:	20	F2	785	SL8	DEC	SCVP	FOR
10BE:	F0	F9	786		JSR	SSLN	LAST
10BF:	A5	0A	787		BEQ	SL8	LINE
10C0:	80	78	788		LDA	SCVP	OF
10C2:	A9	0A	789		STA	SCP8	MENU,
10C4:	85	0A	790		LDA	#10	THEN,
10C7:	E6	0A	791		STA	SCVP	FIRST
10C9:	20	F2	792	SL9	INC	SCVP	LINE
10CB:	F0	F9	793		JSR	SSLN	
10CE:	A5	0A	794		BEQ	SL9	
10D0:	80	77	795		LDA	SCVP	
10D2:	60		796		STA	SCPT	
10D5:			797		RTS		
10D6:	A5	0A	798				
10D8:	CD	78	799	SSFNLN	LDA	SCVP	FIND
10DB:	F0	08	800		CMP	SCP8	NEXT
10DD:	E6	0A	801		BEQ	SCD3	VALID
10DF:	20	F2	802		INC	SCVP	LINE
10E2:	F0	F2	803		JSR	SSLN	
10E4:	18		804		BEQ	SSFNLN	
10E5:	60		805		CLC		CLC/
			806	SCD3	RTS		SEC
10E6:	20	03	807				
10E9:	20	F2	808	SL10	JSR	SCCALCD2	
10EC:	F0	F8	809	SCFNLN	JSR	SSLN	
10EE:	20	0A	810		BEQ	SL10	
10F1:	60		811		JSR	SCPNUMB1	
			812		RTS		
10F2:	20	51	813				
10F5:	A0	27	814	SSLN	JSR	SCVTAB	
10F7:	84	0B	815		LDY	#39	
10F9:	E6	0B	816	SL11	STY	SCHP	
10FB:	88		817		INC	SCHP	
10FC:	C0	FF	818		DEY		SEARCH
10FE:	F0	09	819		CPY	#\$FF	SCREEN
1100:	B1	0C	820		BEQ	SCD4	LINE
1102:	AA		821		LDA	(SAL),Y	FOR NON
1103:	29	3F	822		TAX		SPACE
1105:	C9	20	823		AND	#\$3F	BEQ =
1107:	F0	EE	824		CMP	#\$20	IF NO
1109:	60		825		BEQ	SL11	CHARS
			826	SCD4	RTS		BEQ/BNE
110A:	B1	0C	827				
110C:	29	3F	828	SCPNUMB1	LDA	(SAL),Y	GET THE
110E:	C9	30	829		AND	#\$3F	NUMBER
1110:	90	07	830		CMP	#\$30	OF THE
1112:	C9	3A	831		BCC	SCD5	CURRENT
1114:	B0	03	832		CMP	#\$3A	OPTION
1116:	88		833		BCS	SCD5	FROM
1117:	D0	F1	834		DEY		SCREEN
1119:	C8		835		BNE	SCPNUMB1	
111A:	C8		836	SCD5	INY		
111B:	84	0B	837		INY		
111D:	60		838		STY	SCHP	
			839		RTS		
111E:	A0	27	840				
1120:	B1	0C	841	LNFLASH	LDY	#39	ACTUAL
1122:	C9	A0	842	LFL1	LDA	(SAL),Y	FLASH
1124:	F0	12	843		CMP	#\$A0	THE
1126:	C9	BD	844		BEQ	LFS1	CURRENT
1128:	F0	11	845		CMP	#"	SCREEN
112A:	C9	BA	846		BEQ	LFS2	LINE
112C:	F0	0D	847		CMP	#"	
112E:	C9	BF	848		BEQ	LFS2	
1130:	F0	09	849		CMP	#"	
1132:	29	3F	850		BEQ	LFS2	
1134:	09	40	851		AND	#\$3F	
1136:	91	0C	852		ORA	#\$40	
1138:	88		853	LFS1	STA	(SAL),Y	
1139:	D0	E5	854		DEY		
113B:	60		855	LFS2	BNE	LFL1	
			856		RTS		
113C:	A0	27	857				
113E:	B1	0C	858	LNNORM	LDY	#39	TAKE
			859	LNL1	LDA	(SAL),Y	LINE

1140:	C9	A0	860		CMP	##A0	AND
1142:	T0	19	861		BEQ	LNS2	TURN
1144:	T0	0A	862		CMP	##1	IT BACK
1146:	T0	18	863		BEQ	LNS3	TO
1148:	T0	14	864		CMP	##3	NORMAL
114A:	T0	00	865		BEQ	LNS3	
114C:	T0	00	866		CMP	##60	
114E:	T0	93	867		AND	##3F	
1150:	8D	B2	868		STA	WS	
1152:	33	01	869		LDA	##C0	
1154:	00	01	870		BCC	LNS1	
1156:	00	93	871		ASLA		
1158:	91	B2	872	LNS1	ORA	WS	
115A:	0C		873		STA	(SAL),Y	
115C:	DE		874	LNS2	DEY		
115E:	60		875	LNS3	BNE	LNL1	
1160:	60		876		RTS		
1161:	A5	0A	877				
1163:	48		878	SCODSPLY	LDA	SCVP	DISPLY
1164:	A9	04	879		PHA		SCRN
1166:	20	05	880		LDA	#4	OPTION
1168:	AD	76	881		JSR	TOUT	AT BTM
116A:	09	B2	882		LDA	SCNMBR	OF SCR
116C:	20	20	883		ORA	##80	
116E:	20	16	884		JSR	COUT	THEN
1171:	68		885		PLA		RESET
1172:	20	53	886		JSR	SCVTAB1	SCREEN
1175:	60	15	887		RTS		PITNS
1176:	A9	C4	888				
1178:	20	95	889	GTDRVD01	LDA	##D"	DLT=DUP
117A:	A9	00	890		JSR	SCGTDRV	GETDRV
117C:	20	E1	891		LDA	#0	DISPLAY
117E:	20	E1	892		JSR	SCDINSRT	INSERT
1180:	60		893		RTS		BLANK
1181:	A9	CF	894				
1183:	20	95	895	GTDRVD02	LDA	##0"	DFT=ORG
1184:	20	DE	896		JSR	SCGTDRV	
1186:	20	DE	897		JSR	SCDINSR1	
1188:	60		898		RTS		
118A:	A9	C4	899				
118C:	20	80	900	BLNKIND	LDA	##D"	INSRT
118E:	A9	00	901		JSR	SETDRV	BLNK
1191:	20	E1	902		LDA	#0	INTO
1194:	60		903		JSR	SCDINSRT	DUP
1195:	8D	8F	904		RTS		
1198:	A9	09	905				
119A:	20	05	906	SCGTDRV	STA	DRVLETR	GET
119C:	20	0D	907		LDA	#9	EITHER
119E:	4C	A6	908		JSR	TOUT	ORIGINAL
11A0:	20	0D	909		JSR	SCDIND02	OR DUP
11A3:	20	05	910	SL12	JMP	SS10	DRIVE
11A4:	20	05	911	SS10	JSR	BL	
11A6:	C9	8D	912		JSR	KYGET	
11AB:	D0	03	913		CMP	##8D	RTRN
11AD:	AD	8F	914		BNE	SETDRV	
11B0:	AD	8F	915	SETDRV2	LDA	DRVLETR	
11B1:	AD	8F	916	SETDRV	TAX		
11B3:	C9	C4	917		CMP	##D"	
11B5:	C9	12	918		BEQ	SS12	
11B7:	C9	CF	919		CMP	##0"	
11B9:	AD	86	920		BNE	SL12	
11BB:	AD	86	921		LDA	CTRKO	SET UP
11BD:	AD	86	922		STA	CTRK	ORIGINAL
11BF:	AD	86	923		LDA	PDS	DRIVE
11C1:	AD	86	924		LDY	POD	
11C3:	AD	86	925		JMP	STRCNT2	
11C5:	AD	86	926	SS12	LDA	CTRKD	SET UP
11C7:	AD	86	927		STA	CTRK	DUPLCT
11C9:	AD	86	928		LDA	PDS	DRIVE
11CB:	AD	86	929		LDY	PDD	
11CD:	AD	86	930	STRCNT2	STX	DRVLETR	
11CF:	AD	86	931		ASLA		
11D1:	AD	86	932		ASLA		
11D3:	AD	86	933		ASLA		
11D5:	AD	86	934		ASLA		
11D7:	AD	86	935		STA	CSLT	\$10
11D9:	AD	86	936		STY	CDRV	\$11
11DB:	AD	86	937		RTS		
11DE:	AD	8F	938				
11E1:	AD	8F	939	SCDINSR1	LDA	DRVLETR	
11E2:	AD	8F	940	SCDINSRT	PHA		INSERT
11E4:	AD	0A	941		LDA	#10	DISK
11E6:	AD	05	942		JSR	TOUT	A=0,
11E8:	AD	05	943		PLA		A=D,
11EA:	AD	05	944		JSR	SCDIND0	OR
11EB:	AD	05	945		BCC	SS14	

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12AE	AD	8B	B2	1032		LDA	TRACK	
12BB	4A			1033		LSRA		
12BB	4A			1034		LSRA		
12BB	20	7C	0E	1035		JSR	CNVHAD	
12BB	AD	8B	B2	1036		LDA	CNVDEC+4	
12BB	C9	00		1037		CMP	##B4	
12BB	90	00		1038		BCC	GNBS2	
12BB	A9	80		1039		LDA	##B0	
12BB	80	44	B2	1040	GNBS2	STA	CNVDEC+3	
12BB	AD	74	B2	1041		LDA	KYVALUE	
12BB	8D	A5	B2	1042		STA	CNVDEC+4	
12BB	C9	00		1043		JSR	CNVDH	
12BB	AD	9F	B2	1044		LDA	CNVHEX	
12BB	0A			1045		ASLA		
12BB	0A			1046		ASLA		
12D0	4C	93	12	1047		JMP	GNBL	
12D3	AD	8B	B2	1048				
12D6	29	00		1049	GETDEC	LDA	TRACK	
12D8	00	05		1050		AND	#3	
12DA	A9	AF		1051		BNE	GDL1	
12DC	20	20	16	1052		LDA	##"	
12DE	20	0C	00	1053		JSR	COUT	
12DE	20	11	13	1054	GDL1	JSR	KYPRMPT	
12DE	20	03		1055		JSR	GNBCHKD	
12DE	09	65	B2	1056		LDY	#3	
12DE	F0	06		1057	GDL2	CMP	LTQ,Y	
12DE	88			1058		BEQ	GDS1	
12DE	10	F8		1059		DEY		
12DE	4C	DF	12	1060		BPL	GDL2	
				1061		JMP	GDL1	
12F2	AD	8B	B2	1062				
12F3	29	00		1063	GDS1	LDA	TRACK	
12F7	8D	8B	B2	1064		AND	##FC	
12FA	98			1065		STA	TRACK	
12FB	00	88	B2	1066		TYA		
12FB	8D	88	B2	1067		QBA	TRACK	
1301	20	07	16	1068		STA	TRACK	
1304	20	70	14	1069		JSR	RHTAB	
1307	AD	8B	B2	1070		JSR	TRKOUT	
130A	29	00		1071		LDA	TRACK	
130C	F0	8F		1072		AND	#3	
130E	4C	DF	12	1073		BEQ	GNBL2	
				1074		JMP	GDL1	
1311	C9	80		1075				
1311	F0	07		1076	GNBCHKD	CMP	##8D	
1311	C9	88		1077		BEQ	GNBCS1	
1311	00	09		1078		CMP	##88	
1311	38			1079		BNE	GNBD	
1311	80	01		1080		SEC		
1311	18			1081		BCS	GNBC3	
1311	68			1082	GNBCS1	CLC		
1311	68			1083	GNBC3	PLA		
1311	AD	8B	B2	1084		PLA		
1322	60			1085		LDA	TRACK	
				1086	GNBD	RTS		
1323	A9	23		1087				
1323	20	36	13	1088	GETSYNC	LDA	#35	
1323	8C	8C	B2	1089		JSR	GETYSNO	
1323	60			1090		STY	SYNCFLG	
1323	A9	20		1091		RTS		
1323	18			1092	GETTIME	LDA	#45	
1323	20	36	13	1093		CLC		
1323	8C	8E	B2	1094		JSR	GETYSNO	
1323	60			1095		STY	TIMEFLG	
1323	08			1096		RTS		
1323	20	05	15	1097	GETYSNO	PHP		
1323	20	25	15	1098		JSR	TOUT	
1323	20	25		1099		JSR	SHTAB	
1323	90	01		1100		LDY	#37	
1323	88			1101		PLP		
1323	44	33		1102		BCC	GSS1	
1323	98	B2		1103		DEY		
1323	98			1104	GSS1	STY	WS2	
1323	20	05	15	1105		TYA		
1323	20	07	16	1106		JSR	TOUT	
1323	20	0C	0D	1107	GSL1	JSR	RHTAB	
1323	C9	8D		1108		JSR	KYPRMPT	
1323	20	17		1109		CMP	##8D	
1323	20	25		1110		BEQ	GSS3	
1323	C9	05		1111		LDY	#37	
1323	88			1112		CMP	##"N"	
1323	09			1113		BEQ	GSS2	
1323	00			1114		DEY		
1323	00			1115		CMP	##"Y"	
1323	8C	98	B2	1116		BNE	GSL1	
				1117	GSS2	STY	WS2	

GET
HALF
OR
QUARTER
TRACK

DISPLAY
CURRENT
TRACK
VALUE
AT
THIS
TIME

DONE
GETTING
TRACK
VALUE?

SYNC
TRACKS?

READ
TIMING
BITS?

DEFLT:
CLC=N
SEC=Y

1362	98			118	TYA		
1363	20	05	15	119	JSR	TOUT	
1364	A9	DB		120	LDA	#1	
1365	A9	20	16	121	JSR	COUT	
1366	AD	98	B2	122	LDA	WS2	
1367	A0	01		123	LDY	#1	
1368	70	25		124	CMP	#37	
1369	00	01		125	BNE	GSS4	
1370	88			126	DEF		
1371	60			127	RTS		
							0=NO 1=YES
1372	20	92	00	128	NTRKCALC	JSR	K7
1373	AD	8A	B2	129	LDA	STEP	
1374	70	25		130	BEQ	NTD1	
1375	A5	89	B2	131	LDA	CTRK	
1376	70	25		132	CMP	ENDTRK	
1377	00	00		133	BEQ	NTD1	
1378	80	00		134	NTD1	STEP	
1379	70	25		135	NTD1	STEP	
1380	00	00		136	CMP	ENDTRK	
1381	80	00		137	BEQ	NTD1	
1382	70	25		138	NTD1	CTRK	
1383	00	00		139	CMP	NTD1	
1384	80	00		140	BCC	NTD1	
1385	70	25		141	CLC		
1386	00	00		142	RTS		
1387	80	00		143	NTD		
1388	70	25		144	NTD1		
1389	00	00		145	STEP		
1390	80	00		146	CTRK		
1391	70	25		147	NTD1		
1392	00	00		148	ENDTRK		
1393	80	00		149	NTD		
1394	70	25		150	RTS		
							REALY DONE
1395	A5	12		151	EPCALC	LDA	CTRK
1396	70	25		152	EPCALC1	CMP	#90
1397	A9	00		153	BCC	EPCCS1	
1398	AD	8F		154	LDA	#8F	
1399	70	25		155	PHA		
1400	00	03		156	AND	#3	
1401	80	03		157	CLC		
1402	70	25		158	ADC	#3	
1403	00	9B	B2	159	STA	EPV	
1404	80	00		160	PLA		
1405	70	25		161	LSRA		
1406	00	04		162	CLC		
1407	80	9C	B2	163	ADC	#4	
1408	70	25		164	STA	EPH	
1409	00	00		165	RTS		
1410	A9	07	15	166	SCDDSPY	LDA	#7
1411	20	53		167	JSR	SCVTAB1	
1412	A9	00	15	168	LDA	#2	
1413	20	05		169	JSR	TOUT	
1414	A0	00		170	LDY	#0	
1415	80	00		171	LDX	#0	
1416	70	25		172	LDA	\$B80,Y	
1417	00	00		173	CMP	\$B80	
1418	80	00		174	BCC	SCDDS	
1419	70	25		175	CMP	\$B9	
1420	00	00		176	BCC	SCDDS	
1421	80	00		177	LDA	POS,X	
1422	70	25		178	ORA	\$B80,Y	
1423	00	00		179	STA		
1424	80	00		180	INX		
1425	70	25		181	INX		
1426	00	00		182	CPY	#40	
1427	80	00		183	BNE	SCDDL	
1428	70	25		184	RTS		
1429	A9	00		185	SCVFILL	LDA	#0
1430	20	85	B2	186	STA	SCFLTP	
1431	A0	0A		187	JSR	SSRCH	
1432	70	25		188	JSR	SCPNUMB1	
1433	00	00		189	LDY	SCFLTP	
1434	80	00		190	LDA	(W2L),Y	
1435	70	25		191	JSR	HADUT	
1436	00	00		192	INC	SCFLTP	
1437	80	00		193	JSR	SSFNLN	
1438	70	25		194	BCC	SL14	
1439	00	00		195	JSR	SSTOP	
1440	80	00		196	LDA	#0	
1441	70	25		197	STA	SCVLPNT	
1442	00	00		198	STA	PTRANGE	

140E: 60		1204	RTS		
140F: A9 00		1205			
1411: 8D 98 B2		1206	EPCLEAN	LDA #0	:ERASE
1414: 20 A7 13		1207		STA WS2	:CURRENT
1417: 20 43 14		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 14		1212		LDA ##A0	
1423: EE 98 B2		1213	EPCS1	JSR EPQUT	
1426: AD 98 B2		1214		INC WS2	
1429: C9 90		1215		LDA WS2	
142B: D0 E7		1216		CMP ##90	
142D: 20 A5 13		1217		BNE EPCL1	
1430: 60		1218		JSR EPCALC	:RESET
		1219	RTS		
1431: 08		1220			
1432: A9 A0		1221	EPBOUT	PHP	:BLANK
1434: 28		1222		LDA ##A0	:OUT
1435: 08		1223		PLP	
1436: 48		1224	EPQUT	PHP	
1437: 20 4E 14		1225		PHA	
143A: 68		1226		JSR EPR1	
143B: 20 20 16		1227		PLA	
143E: 20 64 14		1228		JSR COUT	
1441: 28		1229		JSR EPR2	
1442: 60		1230		PLP	
1443: 20 4E 14		1231	EPIN	RTS	
1446: B1 0C		1232		JSR EPR1	:E/P IN
1448: 48		1233		LDA (SAL),Y	:READ
1449: 20 64 14		1234		PHA	:SCREEN
144C: 68		1235		JSR EPR2	
144D: 60		1236		PLA	
144E: A5 0A		1237		RTS	
1450: 8D 9D B2		1238	EPR1	LDA SCVP	
1453: A5 0B		1239		STA EPTSV	
1455: 8D 9E B2		1240		LDA SCHP	
1458: AD 9B B2		1241		STA EPTSH	
145B: 20 53 15		1242		LDA EPV	
145E: AC 9C B2		1243		JSR SCVTAB1	
1461: 84 0B		1244		LDY EPH	
1463: 60		1245		STY SCHP	
1464: AD 9D B2		1246		RTS	
1467: 20 53 15		1247	EPR2	LDA EPTSV	
146A: AD 9E B2		1248		JSR SCVTAB1	
146D: 85 0B		1249		LDA EPTSH	
146F: 60		1250		STA SCHP	
		1251	RTS		
1470: 20 79 14		1252			
1473: A9 0B		1253	TRKOUT	JSR TRKOUT1	
1475: 20 20 16		1254		LDA #0	
1478: 60		1255		JSR COUT	
1479: AD 8B B2		1256		RTS	
147C: 85 16		1257	TRKOUT1	LDA TRACK	
147E: A9 00		1258	TRKOUT2	STA HXL	:DISPLAY
1480: 85 17		1259		LDA #0	:TRACK
1482: 46 16		1260		STA HXH	:NUMBER
1484: 6A		1261		LSR HXL	
1485: 46 16		1262		RORA	
1487: 6A		1263		LSR HXL	
1488: 85 15		1264		RORA	
148A: 20 A5 14		1265		STA HXE	
148D: AD A5 B2		1266		JSR NMBFOUT2	:HNDRTHS
1490: C9 B0		1267		LDA CNUDEC+4	
1492: F0 03		1268		CMP ##B0	
1494: 20 20 16		1269		BEQ TRS1	
1497: 60		1270		JSR COUT	
		1271	TRS1	RTS	
1498: 20 FE 15		1272			
149B: 20 E3 14		1273	RPMOUT	JSR SHTAB	:DISPLY
149E: 20 BF 14		1274		JSR HOUT	:DRIVE
14A1: A9 14		1275		JSR TNTHCLCO	:SPEED
14A3: 20 05 15		1276		LDA #20	:IN RPMs
14A6: 20 07 16		1277		JSR TOUT	
14A9: 60		1278		JSR RHTAB	
14AA: A5 16		1279		RTS	
14AC: A6 17		1280	NMBFOUT2	LDA HXL	
14AE: 20 D0 14		1281		LDX HXH	:DISPLY
14B1: A5 15		1282		JSR HXAOUT	:WHOLE
14B3: 85 04		1283		LDA HXF	:NUMBERS
14B5: A9 01		1284		STA W3L	:AND
14B7: 85 01		1285		LDA #1	:FRCTN
14B9: A9 00		1286		STA W1H	
14BB: 85 05		1287		LDA #0	
14BD: 85 00		1288		STA W3H	
		1289		STA W1L	

14BF	20	D4	0E	1290	TNTHCLCO	JSR	CALCF2		
14C2	AD	A4	B2	1291		LDA	CNVDEC+3		
14C5	B0			1292		CMP	#\$B0		
14C7	70	11		1293	TNTHSOUT	BEQ	NMS2		
14C9	A9	AE		1294		LDA	#		
14CB	20	20	16	1295		JSR	COUT		
14CE	AD	9F	B2	1296		LDA	CNVHEX		
14D1	8D	A6	B2	1297		STA	TEMPE		
14D4	AD	A4	B2	1298		LDA	CNVDEC+3		;TENTHS
14D7	20	20	16	1299		JSR	COUT		
14DA	60			1300	NMS2	RTS			
14DB	A2	00		1301	HAOUT	LDX	#0		DISPLY
14DD	20	7E	0E	1302	HXAOUT	JSR	CNVHXAD		HEX
14E0	AD	EA	14	1303		JMP	DOUT		NUMBER
14E3	20	84	0E	1304	HOUT	JSR	CNVHD		
14E6	A2	00		1305	DOUT	LDX	#0		DISPLY
14E8	AD	80	B2	1306		LDA	#\$B0		DECIML
14EA	8D	93	B2	1307	DOL1	STA	WS		NUMBER
14ED	AD	00		1308		LDA	CNVDEC,X		
14F0	20	00		1309		CPX	#4		
14F2	70	00	B2	1310		BEQ	DOS1		
14F4	AD	00	B2	1311		CMP	WS		
14F7	20	00	16	1312	DOS1	BEQ	DOS2		
14FA	AD	93	B2	1313	DOS2	JSR	COUT		
14FD	20	00		1314		STX	WS		
1500	AD	00		1315		INX			
1502	00	05		1316		CPX	#5		
1504	60	E9		1317		BNE	DOL1		
				1318		RTS			
1505	20	CB	15	1319	TOUT	JSR	RPH		TEXTOUT
1508	AD			1320		ASLA			ROUTINE
150B	80	00	30	1321		TAY			
150E	AD	00		1322		LDA	TXTABLE,Y		PRINT
1511	80	00	30	1323		STA	W1L		FORMTID
1514	AD	00		1324		LDA	TXTABLE+1,Y		TEXT
1517	80	00		1325	TOL1	STA	W1H		ONTO
151A	AD	00		1326		LDY	#0		SCREEN
151D	80	00		1327		LDA	(W1L),Y		
1520	AD	00		1328		CMP	#\$		CHECK
1523	80	00		1329		BEQ	TOD1		TEXT
1526	AD	00		1330		CMP	#\$		FOR
1529	80	00		1331		BEQ	TOD2		SPECIAL
152C	AD	00		1332		CMP	#\$		CHRS
152F	80	00		1333		BEQ	TOD4		
1532	AD	00		1334		CMP	#\$		
1535	80	00	16	1335	TOL2	BEQ	TOD3		
1538	AD	00		1336		JSR	COUT		
153B	80	00		1337		INC	W1L		
153E	AD	00		1338		BNE	TOL1		
1541	80	00	15	1339	TOD1	INC	W1H		
1544	AD	00		1340		JMP	TOL1		
1547	80	00		1341		LDA	#0		
154A	AD	00	15	1342	TOD4	STA	VMODE		
154D	80	00		1343		JMP	RPL		
1550	AD	00		1344		LDA	#\$FF		
1553	80	00		1345	TOD3	BNE	TOS1		
1556	AD	00		1346		LDA	#0		
1559	80	00		1347	TOD2	BEQ	TOS1		
155C	AD	00	15	1348	TOS1	LDA	#1		
155F	80	00		1349		STA	VMODE		
1562	AD	00		1350		JMP	TOL2		
1565	E6	0A	15	1351	SCNV	INC	SCVP		
1568	AD	51		1352		JMP	SCVTAB		
156B	80	0A		1353	SLV	DEC	SCVP		
156E	AD	0A		1354	SCVTAB	LDA	SCVP		CALC
1571	80	0A		1355	SCVTAB1	STA	SCVP		SCREEN
1574	AD	0A		1356		ASLA			VTAB
1577	80	00	B2	1357		TAY			ADDRESS
157A	AD	00		1358		LDA	LTS,Y		
157D	80	01	B2	1359		STA	SAL		
1580	AD	00		1360		LDA	LTS+1,Y		
1583	80	00		1361		STA	SAH		
1586	AD	00		1362		LDY	#0		
1589	80	0B		1363		STY	SCHP		
158C	AD	00		1364		RTS			
158F	29	3F		1365	CHKNMBR	AND	#\$3F		CHECK
1592	AD	3A		1366		CMP	#\$3A		"A" FOR
1595	80	05		1367		BCS	CHS1		VALID
1598	AD	30		1368		CMP	#\$30		DECIML
159B	80	0F		1369		AND	#\$0F		NUMBER
159E	AD	00		1370		RTS			
15A1	80	18		1371	CHS1	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
157F:	80	FF	93	1382		STA	;\$93FE
1582:	60			1383		STA	;\$93FF
				1384		RTS	
				1385			
1583:	80	93	B2	1386	SETBV	STA	WS
1586:	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
159A:	91	00		1396		STA	(\$0),Y
159C:	AD	98	B2	1397		LDA	WS2
159F:	91	02		1398		STA	(\$2),Y
15A1:	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:	80	90	B2	1407		STA	TLENL
15B3:	A9	1B		1408		LDA	;\$1B
15B5:	80	91	B2	1409		STA	TLENH
15B8:	60			1410		RTS	
				1411			
15B9:	20	99	17	1412	PDONE	JSR	MTROFF
15BC:	A9	18		1413	PDONE1	LDA	#24
15BE:	20	05	15	1414		JSR	TOUT
15C1:	20	D5	0D	1415		JSR	BL
15C4:	20	22	0D	1416		JSR	KYCLRGET
15C7:	2C	51	C0	1417		BIT	\$C051
15CA:	60			1418		RTS	
				1419			
15CB:	08			1420	RPH	PHP	
15CC:	80	6E	B2	1421		STA	RA
15CE:	8C	6F	B2	1422		STY	RY
15D2:	8E	70	B2	1423		STX	RX
15D5:	68			1424		PLA	
15D6:	80	71	B2	1425		STA	RP
15D9:	AD	6E	B2	1426		LDA	RA
15DC:	60			1427		RTS	
				1428			
15DD:	AD	71	B2	1429	RPL	LDA	RP
15E0:	48			1430		PHA	
15E1:	AD	6E	B2	1431		LDA	RA
15E4:	AC	6F	B2	1432		LDY	RY
15E7:	AE	70	B2	1433		LDX	RX
15EA:	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
15F5:	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	;\$XX
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 16
625: C9 DF
627: F0 4B
629: C9 E0
62B: F0 46
62D: C9 FE
62F: F0 03
631: A4 0B
633: C9 DD
635: F0 46
637: C9 DB
639: F0 42
63B: C9 A6
63D: F0 5E
63F: C9 DE
641: F0 47
643: AE 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: 91 0C
658: E6 0B
65A: A5 0B
65C: C9 2B
65E: D0 0F
660: A9 00
662: 85 0B
664: A5 0A
666: C9 17
668: F0 05
66A: E6 0A
66C: 20 51
66E: 20 DD 15
672: 60 15
673: 88
674: 20 FB 15
677: 98
678: 85 0A
67A: 4C 60
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: E6 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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1462

COUT

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463:
464:
465:
466:
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547:

```

RTS

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 EDDVRSN
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
C9
C91
STA (SAL),Y
INY
CPY #40
BNE C91
RTS

```

```

CHARCTR
OUTPUT
SCREEN
ROUTINE

```

```

*-----*
* OPTION TABLE LOOKUP *
*-----*

```

LTEDDO

```

DA COPYDISK
DA CHNGPARM
DA DRVSPEED
DA SCANDISK
DA CERTDISK
DA CHNGSLTS
DA DRVEXAM

```

```

1
2
3
4
5
6
7

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16C4:	A7	0C	548	DA	CLRRRCO	8
16C6:	D1	0C	549	DA	EDDQUIT	9
16C8:	E2	0C	551	LTQT	DA	QUITEDD
16CA:	6B	0C	552	DA	E2	9-1
			553			9-2
			554	*****		
			555	*-----*		
			556	* DRIVE ROUTINES DRIVERS *		
			557	*-----*		
16CC:	08		560	TRKWRTER	PHP	
16CD:	A9	15	561		LDA	#21
16CE:	8D	98	562		STA	WS2
16D2:	28		563		PLP	
16D3:	20	4C	564		JSR	WPEDO
16D6:	20	C9	565	TRKWRT	JSR	CHKESC
16D9:	A9	17	566		LDA	#17
16DB:	20	35	567		JSR	EPOUT
16DE:	AC	90	568		LDY	TLENL
16E1:	AD	91	569		LDA	TLENH
16E4:	20	1B	570		JSR	WRITETRK
16E7:	80	E3	571		BCS	TRKWRTER
16E9:	60		572	WPD	RTS	
			573			
16EA:	A9	17	574	CHKNW	LDA	#23
16EC:	8D	98	575		STA	WS2
16ED:	A6	10	576	CN	LDX	CSLT
16F1:	BD	80	577		LDA	\$C08D,X
16F4:	BD	80	578		LDA	\$C08E,X
16F7:	10	F0	579		BPL	WPD
16F9:	20	4C	580		JSR	WPEDO
16FC:	4C	FF	581		JMP	CN
16FE:	A9	17	582	WP1	LDA	#23
701:	80	98	583	WPOCHK	STA	WS2
704:	AC	8F	584		LDY	DRVLETTR
707:	FC	C4	585		CPY	#D
709:	FC	DE	586		BEQ	WPD
70B:	A6	10	587	WP2	LDX	CSLT
70D:	BD	80	588		LDA	\$C08D,X
710:	BD	80	589		LDA	\$C08E,X
713:	30	06	590		BMI	WPD0
715:	20	4C	591		JSR	WPEDO
718:	4C	0B	592		JMP	WP2
			593			
71B:	AD	CA	594	WPD0	LDA	EDDVRSN
71E:	FD	CC	595		BEQ	WPD
720:	AD	86	596		LDA	CTRKO
723:	FC	04	597		BEQ	WP3
725:	CC	FF	598		CMP	##FF
727:	00	C0	599		BNE	WPD
729:	20	27	600	WP3	JSR	PCRDCHK
72C:	90	BB	601		BCC	WPD
72E:	20	99	602		JSR	MTROFF
731:	A9	3B	603		LDA	#59
733:	20	05	604		JSR	TOUT
736:	AD	80	605		LDA	POS
739:	09	B0	606		ORA	##B0
73B:	80	73	607		STA	\$873
73E:	AD	84	608		LDA	DCCSLOT
741:	09	B0	609		ORA	##B0
743:	80	3A	610		STA	\$B3A
746:	20	22	611		JSR	KYCLRGET
749:	4C	AF	612		JMP	CHNGSLTS
			613			
74C:	08		614	WPEDO	PHP	
74D:	20	FB	615		JSR	PUSHTAB
750:	20	99	616		JSR	MTROFF
753:	AD	98	617		LDA	WS2
756:	20	53	618		JSR	SCUTAB1
759:	A9	1B	619		LDA	#27
75B:	28		620		PLP	
75C:	30	02	621		BMI	WPS1
75E:	A9	1A	622		LDA	#26
760:	20	05	623	WPS1	JSR	TOUT
763:	20	05	624		JSR	BL
766:	20	22	625		JSR	KYCLRGET
769:	A9	00	626		LDA	#0
76B:	85	0B	627		STA	SCHP
76D:	A9	0B	628		LDA	#I
76F:	20	20	629		JSR	COUT
772:	20	08	630		JSR	MTRON
775:	20	04	631		JSR	PULLTAB
778:	60		632		RTS	
			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 00 1638
1785: 20 AD 11 1639 MTRON JSR K7 ;TURN
1788: A6 10 1640 JSR SETDRV2 ;DRIVE
178A: BD 89 C0 1641 LDX CSLT ;MOTOR
178D: 8A 1642 LDA $C089,X ;ON
178E: 18 1643 TXA ;ROUTINE
178F: 65 11 1644 CLC
1791: AA 1645 ADC CDRV
1792: BD 89 C0 1646 TAX
1795: 20 06 0E 1647 LDA $C089,X
1798: 60 1648 JSR W3
1799: A6 10 1649 RTS
179B: BD 88 C0 1650
179E: 60 1651 MTROFF LDX CSLT ;TURN
179F: 20 99 17 1652 LDA $C088,X ;MOTOR
17A2: 20 05 00 1653 RTS ;OFF
17A5: 20 28 00 1654
17A8: 20 82 17 1655 ZX JSR MTROFF
17AB: A9 00 1656 JSR BL
17AD: 20 06 B7 1657 JSR KYGET
17B0: A9 AA 1658 JSR MTRON ;MOTORON
17B2: A0 00 1659 LDA #0 ;AND
17B4: 20 83 15 1660 JSR ARMV ;VERIFY
17B7: 20 D6 16 1661 LDA #AA ;THE
17BA: 20 0F B7 1662 LDY #0 ;BLANK
17BD: B0 E0 1663 JSR SETBV ;DISK
17BF: 20 0D 16 1664 JSR TRKWRT
17C2: 60 1665 JSR TRKV1
1634 MTRONCW JSR ERSBTM
1635 LDA #21
1636 JSR WPOCHK
1637 RTS
1638
1639 MTRON JSR K7
1640 JSR SETDRV2
1641 LDX CSLT
1642 LDA $C089,X
1643 TXA
1644 CLC
1645 ADC CDRV
1646 TAX
1647 LDA $C089,X
1648 JSR W3
1649 RTS
1650
1651 MTROFF LDX CSLT
1652 LDA $C088,X
1653 RTS
1654
1655 ZX JSR MTROFF
1656 JSR BL
1657 JSR KYGET
1658 JSR MTRON
1659 LDA #0
1660 JSR ARMV
1661 LDA #AA
1662 LDY #0
1663 JSR SETBV
1664 JSR TRKWRT
1665 JSR TRKV1
1666 BCS ZX
1667 JSR ERSBTM
1668 RTS
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 PARMSET,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

```


1803:	D0	0A		1806	BNE	HBS4	
1805:	18			1807	CLC		
1806:	AE	23	19	1808	LDX	IFLAG	
1809:	D0	02		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	1815	HDGET	STA	HBWRK
18E6:	20	20	0D	1816	JSR	KYGET	:GET A
18E9:	C9	B0		1817	CMP	#\$B0	:HEX
18EB:	90	2F		1818	BCC	NOTHEX	:DIGIT
18ED:	C9	BA		1819	CMP	#\$BA	
18EF:	90	0D		1820	BCC	HEXOK	
18F1:	C9	C1		1821	CMP	#\$C1	
18F3:	90	27		1822	BCC	NOTHEX	
18F5:	C9	C7		1823	CMP	#\$C7	
18F7:	80	23		1824	BCC	NOTHEX	
18F9:	38			1825	SEC		
18FA:	E9	B7		1826	SBC	#\$B7	
18FC:	D0	02		1827	BNE	HEXOK1	
18FE:	29	0F		1828	AND	#\$0F	
1900:	AE	24	19	1829	LDX	ZFLAG	
1903:	D0	06		1830	BNE	HEXOK2	
1905:	EE	22	19	1831	STX	HBWRK	
1908:	EE	24	19	1832	INC	ZFLAG	
190B:	0E	22	19	1833	ASL	HBWRK	
190E:	0E	22	19	1834	ASL	HBWRK	
1911:	0E	22	19	1835	ASL	HBWRK	
1914:	0E	22	19	1836	ASL	HBWRK	
1917:	0D	22	19	1837	ORA	HBWRK	
191A:	18			1838	CLC		
191B:	60			1839	RTS		
191C:	38			1840	SEC		
191D:	60			1841	RTS		
191E:	00			1842			
191F:	00			1843	RERCNTR	DFB	0
1920:	00			1844	WERCNTR	DFB	0
				1845	MJRERR	DFB	0
1921:	00			1846			
1922:	00			1847	PARMINMBR	DFB	0
1923:	00			1848	HBWRK	DFB	0
1924:	00			1849	IFLAG	DFB	0
1925:	00			1850	ZFLAG	DFB	0
				1851	DFSIGN	DFB	0
				1852			:INVRSE
				1853			:ZEROUT
				1854			:DIFFRNT
				1855	*****		
				1856	* BACK UP A DISK OPTION *		
				1857	*****		
1926:	A9	2C		1858	COPYDISK	LDA	#44
1928:	20	05	15	1859	JSR	TOUT	:BACK UP
192B:	20	30	12	1860	JSR	GETRKS	:A DISK
192E:	18			1861	CLC		:OPTION
1931:	20	23	13	1862	JSR	GETSYNC	:GET
1932:	20	4A	15	1863	JSR	SCNV	:TRACKS,
1935:	20	51	1A	1864	JSR	GNC	:SYNC,
1938:	20	4A	15	1865	JSR	SCNV	:AND
193B:	A9	DB		1866	LDA	#1	:NIBBLE
193D:	20	20	16	1867	JSR	COUT	:COUNT
1940:	A9	00		1868	LDA	#0	:INPUTS
1942:	8D	8E	B2	1869	STA	TIMEFLG	:FROM
1945:	AD	8D	B2	1870	LDA	NBLCFLG	:USER
1948:	C9	01		1871	CMP	#1	
194A:	F0	08		1872	BEQ	CD3	
194C:	AD	CA	B2	1873	LDA	EDDVRSN	
194F:	F0	03		1874	BEQ	CD3	
1951:	20	2C	13	1875	JSR	GETTIME	
1954:	AD	85	B2	1876	LDA	DRVCOUNT	
1957:	F0	08		1877	BEQ	CD1	:INSERT
1959:	A9	2E		1878	LDA	#46	:BOTH
195B:	20	05	15	1879	JSR	TOUT	:DISK???
195E:	20	22	0D	1880	JSR	KYCLRGET	
1961:	AD	88	B2	1881	LDA	STARTRK	
1964:	8D	8B	B2	1882	STA	TRACK	
1967:	AD	85	B2	1883	LDA	DRVCOUNT	
196A:	D0	08		1884	BNE	CD2	:INSERT
196C:	A9	2F		1885	LDA	#47	:ORIGINAL
196E:	20	05	15	1886	JSR	TOUT	:DISK???
1971:	20	22	0D	1887	JSR	KYCLRGET	
1974:	A9	CF		1888	LDA	#0	:SET ORG
1976:	20	B0	11	1889	JSR	SETDRV	:DRIVE
1979:	AD	19	B3	1890	LDA	RERRORS	
197C:	8D	1E	19	1891	STA	RERCNTR	:RESET
197F:	A9	AE			LDA	#"	:ERRORS

1981:	8D	20	19	1989	STA	MJRERR	
1984:	20	BD		1990	JSR	TRKR	; READ
1987:	20	9D	1A	1991	JSR	SCCOPY	
198A:	AD	85	B2	1992	LDA	DRVCOUNT	
198D:	D0	08		1993	BNE	CD4	; INSRT
198F:	A9	30		1994	LDA	#48	; DUPLCT
1991:	20	05	15	1995	JSR	TOUT	; DISK???
1994:	20	22	0D	1996	JSR	KYCLRGET	
1997:	A9	CC		1997	LDA	#0	
1999:	20	B0	11	1998	JSR	SETDRV	
199C:	20	01	1A	1999	JSR	TRKWV	
199F:	AD	20		199A	LDA	MJRERR	; DSPLY
19A2:	20	35	14	199B	JSR	EPOUT	; ECODE
19A5:	20	7A	B2	199C	JSR	NTRKCALC	
19A8:	8D	88		199D	STA	STARTRK	
19AB:	9D	B4		199E	BCC	CD1	
19AD:	4C	BC	15	199F	JMP	PDONE1	
19B0:	CE	1E	19	1999	DEC	RERCNTR	; READ
19B3:	D0	11		199A	BNE	TR4	; ERROR
19B5:	A9	D2		199B	LDA	#R	; CNTR
19B7:	8D	20	19	199C	STA	MJRERR	
19BA:	4C	FA		199D	JMP	TR3	
19BD:	20	00	16	199E	JSR	ERSBTM	; READ
19C0:	20	82	17	199F	JSR	MTRON	; ORIGINAL
19C3:	20	7F	16	1999	JSR	WP1	; TRACK
19C6:	AD	88	B2	199A	LDA	STARTRK	; MANAGER
19C9:	20	0C	B7	199B	JSR	SYNCTRK2	
19CC:	A9	12		199C	LDA	#12	; DISPLY
19CE:	20	35	14	199D	JSR	EPOUT	; INV-R
19D1:	AD	8E	B2	199E	LDA	TIMEFLG	
19D4:	F0	06		199F	BEQ	TR1	
19D6:	20	1E	B7	1999	JSR	DCCDUMP	
19D9:	4C	0F	19	199A	JMP	TR2	
19DC:	20	00	B7	199B	JSR	TDUMPU	; DUMP
19DF:	20	00	26	199C	JSR	ANALYZE	; TRACK,
19E2:	B0	CC		199D	BCC	TR5	; THEN
19E4:	AC	CC	B2	199E	LDY	TRKLL	; ANALYZE
19E7:	AD	C8	B2	199F	LDA	TRKLL	
19EA:	8C	A9	B2	1999	STY	TTLENL	; IF ERR
19ED:	8D	2A	B2	199A	STA	TTLENH	; THEN
19F0:	20	99	17	199B	JSR	MTROFF	; REPEAT
19F3:	60			199C	RTS		
19F4:	CE	1F	19	199D	DEC	WERCNTR	; WRITE
19F7:	D0	17		199E	BNE	TW2	; ERROR
19F9:	A9	D7		199F	LDA	#W	; CNTR
19FB:	8D	20	19	1999	STA	MJRERR	
19FE:	4C	4D	1A	199A	JMP	TW0	
1A01:	20	0D	16	199B	JSR	ERSBTM	; WRITE
1A04:	20	82	17	199C	JSR	MTRON	; TRACK
1A07:	20	FA	16	199D	JSR	CHKWV	; MANAGER
1A0A:	AD	1A	B3	199E	LDA	WERRORS	
1A0D:	8D	1F	19	199F	STA	WERCNTR	
1A10:	AD	88	B2	1999	LDA	STARTRK	
1A13:	20	0C	B2	199A	JSR	SYNCTRK2	
1A16:	AD	8C	B2	199B	LDA	SYNCF LG	
1A19:	F0	03		199C	BEQ	TW3	
1A1B:	20	06	26	199D	JSR	WSTSYNC	
1A1E:	20	D6	16	199E	JSR	TRKWRT	; WRITE
1A21:	AD	20	19	199F	LDA	MJRERR	; TRACK
1A24:	C9	D2		1999	CMPI	#R	; THEN
1A26:	F0	25		199A	BEQ	TW0	; VERIFY
1A28:	A9	16		199B	LDA	#16	; TRACK
1A2A:	20	35	14	199C	JSR	EPOUT	; LENGTH
1A2D:	20	C9	0D	199D	JSR	CHKESC	; WITH
1A30:	20	21	B7	199E	JSR	TDUMPU	; ORIGINAL
1A33:	20	03	26	199F	JSR	FNDLNGTH	; LENGTH
1A36:	B0	BC		1999	BCC	TW	
1A38:	20	04	1B	199A	JSR	DSPLYDIF	
1A3B:	9D	10		199B	BCC	TW0	
1A3D:	AD	8D	B2	199C	LDA	NBL CFLG	; DO
1A40:	F0	0B		199D	BEQ	TW0	; NIBBLE
1A42:	C9	02		199E	CMPI	#2	; COUNT
1A44:	F0	C4		199F	BEQ	TW1	; IF
1A46:	20	09	26	1999	JSR	NCAUTO	; NEEDED
1A49:	9D	BF		199A	BCC	TW1	
1A4B:	B0	AC		199B	BCC	TWE	
1A4D:	20	99	17	199C	JSR	MTROFF	; TRACK
1A50:	60			199D	RTS		; DONE
1A51:	A9	2B		199E	LDA	#43	; ASK
1A53:	20	05	15	199F	JSR	TOUT	; USER
1A56:	20	4F	15	1999	JSR	SLV	; IF
1A59:	20	07	16	199A	JSR	RHTAB	; TRACKS

A5C:	A9	25	1978	LDA	#37	NEED
A5E:	8D	98	1979	STA	WS2	NIBBLE
A61:	20	05	1980	JSR	TOUT	COUNT
A64:	20	07	1981	JSR	RHTAB	
A67:	20	0C	1982	JSR	KYPRMPT	
A6A:	C9	8D	1983	CMP	#8D	
A6C:	F0	1C	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	1994	STY	WS2	COUNT
A81:	98		1995	TYA		
A82:	20	05	1996	JSR	TOUT	
A85:	A9	DB	1997	LDA	#I	
A87:	20	20	1998	JSR	COUT	
A8A:	AD	98	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	2007	STY	NBLCLG	1=AUTO
A9C:	60		2008	RTS		2=MANUL
A9D:	A9	37	2009	LDA	#55	SCREEN
A9F:	20	05	2010	JSR	TOUT	DISPLY
AA2:	AD	C1	2011	LDA	TRKDSL	WHILE
AA5:	85	02	2012	STA	\$2	DISK
AA7:	85	04	2013	STA	\$4	BACK UP
AA9:	AD	C2	2014	LDA	TRKDSH	MANAGER
AAE:	85	03	2015	STA	\$3	
AB1:	AD	C3	2016	LDA	TRKTSH	
AB3:	85	05	2017	STA	\$5	
AB6:	20	83	2018	JSR	SCHBLN	DISPLY
AB9:	20	83	2019	JSR	SCHBLN	5 LINES
ABC:	20	83	2020	JSR	SCHBLN	OF
ABF:	20	83	2021	JSR	SCHBLN	START
AC2:	A9	38	2022	JSR	SCHBLN	TRACK
AC4:	20	05	2023	LDA	#56	
AC7:	A9	E8	2024	JSR	TOUT	
AC9:	85	04	2025	LDA	#E8	
ACB:	85	02	2026	STA	\$4	
ACD:	A9	93	2027	STA	\$2	
ACE:	85	03	2028	LDA	#93	
AD1:	A9	AF	2029	STA	\$3	DISPLY
AD3:	85	05	2030	LDA	#AF	2 LINES
AD5:	20	83	2031	STA	\$5	OF
AD8:	20	83	2032	JSR	SCHBLN	END
ADB:	A9	39	2033	JSR	SCHBLN	TRACK
ADD:	20	05	2034	LDA	#57	
AEE:	A9	14	2035	JSR	TOUT	
AEE2:	20	53	2036	LDA	#20	
AEE5:	A9	0C	2037	JSR	SCVTAB1	
AEE7:	85	0B	2038	LDA	#12	DISPLY
AEE9:	20	79	2039	STA	SCHP	TRACK
AEEC:	A9	20	2040	JSR	TRKOUT1	NUMBER
AEEF:	85	0B	2041	LDA	#32	
AF0:	A9	A4	2042	STA	SCHP	DISPLY
AF2:	20	20	2043	LDA	#"	ORIGINAL
AF5:	A0	00	2044	JSR	COUT	TRACK
AF7:	AD	C8	2045	LDY	#0	LENGTH
AF9:	20	C5	2046	LDA	TRKLH	
AFD:	AD	C7	2047	JSR	ZZ1	
B00:	20	C5	2048	LDA	TRKLL	
B03:	60		2049	JSR	ZZ1	
B04:	A9	15	2050	RTS		
B06:	20	53	2051	LDA	#21	DISPLY
B09:	A9	20	2052	JSR	SCVTAB1	THE
B0B:	85	0B	2053	LDA	#32	DIFFRCE
B0D:	AD	AA	2054	STA	SCHP	BETWEEN
B10:	CD	C8	2055	LDA	TTLENH	ORIGINAL
B13:	90	25	2056	CMP	TRKLH	AND
B15:	D0	41	2057	BCC	DLNGR	DUPLCT
B17:	AD	A9	2058	BNE	DLNGR	TRACK
B1A:	CD	C7	2059	LDA	TTLENL	LENGTHS
B1D:	90	1B	2060	CMP	TRKLL	
			2061	BCC	DLNGR	
			2062			
			2063			

1B1F:	D0	37	2064	BNE	OLNGR	
1B21:	A9	A0	2065	LDA	#\$A0	
1B23:	8D	25	19	STA	DFSIGN	
1B24:	20	20	16	JSR	COUT	
1B29:	A9	30	2068	LDA	#\$30	: INV-0
1B2B:	20	20	16	JSR	COUT	: (EQUAL)
1B2E:	A9	DB	2070	LDA	#"["	
1B30:	20	20	16	JSR	COUT	
1B33:	A9	AE	2072	LDA	#" "	
1B35:	8D	20	19	STA	MJRERR	: FORCE
1B38:	18		2074	CLC		: GOOD
1B39:	60		2075	RTS		: ERROR
1B3A:	A9	BE	2076	LDA	#">"	
1B3C:	8D	25	19	STA	DFSIGN	: DUPLCT
1B3F:	20	20	16	JSR	COUT	: IS MORE
1B42:	A9	AE	2079	LDA	#" "	
1B44:	8D	20	19	STA	MJRERR	: FORCE
1B47:	AD	C7	B2	LDA	TRKLL	: GOOD
1B4A:	38		2082	SEC		
1B4B:	ED	A9	B2	SBC	TTLENL	
1B4E:	A8		2084	TAY		
1B4F:	AD	C8	B2	LDA	TRKLH	
1B52:	ED	AA	B2	SBC	TTLENH	
1B55:	4C	73	1B	JMP	DDL2	
1B58:	A9	BC	2088	LDA	#"<"	: DUPLCT
1B5A:	8D	25	19	STA	DFSIGN	: IS LESS
1B5D:	20	20	16	JSR	COUT	
1B60:	A9	CC	2091	LDA	#"L"	: LENGTH
1B62:	8D	20	19	STA	MJRERR	: ERROR
1B65:	AD	A9	B2	LDA	TTLENL	
1B68:	38		2094	SEC		
1B69:	ED	C7	B2	SBC	TRKLL	
1B6C:	A8		2096	TAY		
1B6D:	AD	AA	B2	LDA	TTLENH	
1B70:	ED	C8	B2	SBC	TRKLH	
1B73:	8C	9F	B2	STY	CNVHEX	
1B76:	8D	A0	B2	STA	CNVHEX+1	
1B79:	20	E3	14	JSR	HOUT	
1B7C:	A9	DB	2102	LDA	#"["	
1B7E:	20	20	16	JSR	COUT	
1B81:	38		2104	SEC		
1B82:	60		2105	RTS		
1B83:	A9	0C				
1B85:	8D	98	B2	LDA	#\$C	: DISPLY
1B88:	A9	A0		STA	WS2	: A LINE
1B8A:	20	20	16	LDA	#" "	: OF
1B8D:	20	20	16	JSR	COUT	: RAW
1B90:	A9	A0		JSR	COUT	: TRACK
1B92:	20	20	16	LDA	#" "	: BYTES
1B95:	A0	00		JSR	COUT	
1B97:	B1	02		LDY	#0	
1B99:	48		2115	LDA	(\$2),Y	
1B9A:	C8		2116	PHA		
1B9B:	B1	04		INY		
1B9D:	A8		2118	LDA	(\$4),Y	
1B9E:	A5	05		TAY		
1BA0:	C9	AF		LDA	\$5	
1BA2:	D0	08		CMP	#\$AF	
1BA4:	A5	04		BNE	SCCS1	
1BA6:	C9	FF		LDA	\$4	
1BA8:	D0	02		CMP	#\$FF	
1BAA:	A0	00		BNE	SCCS1	
1BAC:	68		2126	LDY	#0	
1BAD:	20	C5	1B	PLA		
1BB0:	E6	02		JSR	ZZ1	
1BB2:	E6	04		INC	\$2	
1BB4:	D0	04		INC	\$4	
1BB6:	E6	03		BNE	SCCL2	
1BB8:	E6	05		INC	\$3	
1BBA:	CE	98	B2	INC	\$5	
1BBD:	D0	D1		DEC	WS2	
1BBF:	A9	00		BNE	SCCL1	
1BC1:	20	20	16	LDA	#"J"	
1BC4:	60		2137	JSR	COUT	
1BC5:	48		2138	RTS		
1BC6:	4A		2139			
1BC7:	4A		2140	PHA		: PROCESS
1BC8:	4A		2141	LSRA		: A RAW
1BC9:	4A		2142	LSRA		: DISK
1BCA:	C0	02		LSRA		: BYTE
1BCC:	20	D4	1B	LSRA		: & THEN
1BCF:	68		2145	CPY	#2	: DISPLY
1BD0:	29	0F		JSR	Z1	: IT ON
1BD2:	C0	01	2147	PLA		: SCREEN
			2148	AND	#\$0F	
			2149	CPY	#1	

1BD4:	90	06	2150	Z1	BCC	Z2	
1BD6:	C9	0A	2151		BCCM	##A	;INVRSE
1BD8:	90	08	2152		BCCM	Z3	
1BDA:	B0	0C	2153		BCCM	Z4	
1BDC:	C9	0A	2154	Z2	BCCM	##A	;NORMAL
1BDE:	B0	06	2155		BCCM	Z5	
1BE0:	09	80	2156		ORA	##80	
1BE2:	09	30	2157	Z3	ORA	##30	
1BE4:	00	05	2158		BNE	Z6	
1BE6:	09	C0	2159	Z5	ORA	##C0	
1BE8:	38		2160	Z4	SEC		
1BE9:	E9	09	2161		SBC	#9	
1BED:	20	20	2162	Z6	SR	COUT	
1BEE:	60		2163		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 ; SCANDISK
1697 JSR TOUT ; MANAGER
1698 JSR GETRKSAA
1699 CLC
1700 JSR GETSYNC ; GET
1701 JSR GTDRVD02 ; 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 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 #^A^
1723 JSR COUT
1724 LDA #1
1725 STA HGRVPOS
1726 LDA #2
1727 STA WZPAGE2 ; SETUP
1728 JSR HRSCV ; HGR
1729 LDY WZPAGE2 ; SCREEN
1730 LDA LTSCPT,Y
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 JSR SYNCTRK2
1741 JSR TDUMPP ; DUMP
1742 LDA #0 ; TRACK
1743 STA $2 ; FROM
1744 LDA #$60 ; DISK
1745 STA $3
1746 LDA #5
1747 STA HGRVPOS
1748 JSR HRSCV
1749 JSR SCANBITS ; ANALYZE
1750 BCC SCNS1 ; AND
1751 JSR HRSDH ; DISPLAY
1752 INC HGRVPOS ; TRACK
1753 LDA HGRVPOS
1754 CMP #$9E
```



```

1DB8C: D0 EB 1755 BNE SCNL4
1DB8E: 20 13 1756 JSR NTRKCALC
1D91: 90 03 1757 BCC SCNL3
1D93: 20 B3 15 1758 JSR PDONE
1D96: 60 1759 RTS
1760
1D97: A2 2D 1761 SCANBITS LDX #45 ;ANALYZE
1D99: A0 00 1762 LDY #0 ;THE
1D9B: 8C 7F 1E 1763 STY SYNC ;TIMING
1D9E: B1 02 1764 SBL1 LDA ($2),Y ;BITS
1DA0: 30 03 1765 BMI SBS1 ;IN
1DA2: EE 7F 1E 1766 INC SYNC ;BUFFER
1DA5: EE 02 1767 SBS1 INC #2
1DA7: 00 02 1768 BNE SBS2
1DA9: E6 03 1769 INC #3
1DAB: CA 1770 SBS2 DEX
1DAC: D0 F0 1771 BNE SBL1
1DAE: AD 7F 1E 1772 LDA SYNC
1DB1: C9 02 1773 CMP #2
1DB3: 60 1774 RTS
1775
1DB4: AD 80 1E 1776 HRSCV LDA HGRVPOS ;CALC
1DB7: 29 07 1777 AND #07 ;HGR POS
1DB9: 0A 1778 ASLA ;VERTCL
1DBA: 0A 1779 ASLA
1DBB: 85 0E 1780 STA WZPAGE1
1DBD: AD 80 1E 1781 LDA HGRVPOS
1DC0: 29 F8 1782 AND #F8
1DC2: 4A 1783 LSRA
1DC3: 4A 1784 LSRA
1DC4: A8 1785 TAY
1DC5: B9 4C 1E 1786 LDA LTVHRS,Y
1DC8: 85 00 1787 STA $0
1DCA: B9 40 1E 1788 LDA LTVHRS+1,Y
1DCD: 38 1789 SEC
1DCE: E5 0E 1790 SBC WZPAGE1
1DD0: 65 01 1791 STA $1
1DD2: 60 1792 RTS
1793
1DD3: A5 12 1794 HRSDH LDA CTRK ;DISPLAY
1DD5: C9 80 1795 CMP #80 ;RESULTS
1DD7: 90 02 1796 BCC HRSDHS ;FROM
1DD9: E9 8C 1797 SBC #8C ;SCAN...
1DDB: 4A 1798 HRSDHS LSRA ;IF A
1DDC: 4A 1799 LSRA ;TIMING
1DDD: 18 1800 CLC ;BIT IS
1DE0: 69 04 1801 ADC #4 ;PRESENT
1DE2: 65 00 1802 ADC $0 ;THEN
1DE4: 65 00 1803 STA $0 ;TURN ON
1DE6: A5 12 1804 LDA CTRK ;THAT
1DE8: 29 03 1805 AND #03 ;BIT ON
1DEA: 0A 1806 ASLA ;SCREEN
1DEC: AA 1807 TAX
1DEE: A0 00 1808 LDY #0
1DE9: B0 74 1E 1809 LDA LTHHRS,X
1DF1: 11 00 1810 ORA ($0),Y
1DF3: C9 00 1811 STA ($0),Y
1DF5: E8 1812 INY
1DF7: 4A 1813 INX
1DF9: B0 74 1E 1814 LDA LTHHRS,X
1DFA: 11 00 1815 ORA ($0),Y
1DFC: 91 00 1816 STA ($0),Y
1817 RTS
1818
*****
* CERTIFY & ERASE DISK OPTION *
*****
1821
1822
1DFD: A9 28 1823 CDISK LDA #40 ;CERTIFY
1DFF: 20 FF 14 1824 JSR TOUT ;AND
1E02: 20 26 11 1825 JSR GETRKSAM ;ERASE
1E05: 20 84 11 1826 JSR BLNKIND ;DISK
1E08: 20 78 17 1827 JSR MTRON ;MANAGER
1E0B: 20 60 15 1828 JSR SETBS
1E0E: AD 88 1829 LDA STARTRK
1E11: 20 06 1830 JSR ARMV
1E14: 20 CC 16 1831 JSR TRKWRT
1E17: 20 07 16 1832 JSR ERSBTM
1E1A: 29 00 1833 LDA #0 ;SETUP
1E1D: 2A 96 1834 STA FLG ;FLAG
1E20: AD 88 1835 LDA STARTRK
1E23: 20 06 1836 JSR ARMV
1E26: 20 CC 16 1837 JSR TRKWRT
1E29: 20 0F 1838 JSR TRKV1
1E2B: A9 AE 1839 LDA #0 ;IF ERR
1E2D: 90 05 1840 BCC CES1 ;THEN

```

```

1E2F: A9 08 1841 LDA #X" UNSET
1E31: 80 96 B2 1842 STA FLG FLAG
1E34: 20 2F 14 1843 CES1 JSR EPOUT
1E37: 20 70 13 1844 JSR NTRKCALC
1E3A: 90 E6 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
1854
1855 *-----*
1856 * HGR2 BASE ADDRESS TABLE *
1857 *-----*
1858 LTVHRS DA $50D0
1859 DA $5050
1860 DA $50C0
1861 DA $50C5
1862 DA $50FA
1863 DA $50F2
1864 DA $50EA
1865 DA $50E2
1866 DA $50DA
1867 DA $50D2
1868 DA $50CA
1869 DA $50C2
1870 DA $50F8
1871 DA $50F0
1872 DA $50E8
1873 DA $50E0
1874 DA $50D8
1875 DA $50D0
1876 DA $50C8
1877 DA $50C0
1878
1879 *-----*
1880 * HIRES TABLE FOR BIT POSITION *
1881 *-----*
1882 LTHHRS DFB $18,$00 .00
1883 DFB $20,$00 .25
1884 DFB $00,$01 .50
1885 DFB $00,$04 .75
1886
1887 *-----*
1888 * HIRES PATTERN/BOTTOM SCREEN *
1889 *-----*
1890 LTSCPT DFB $18,$18,$3C
1891
1892 SYNC DFB 0
1893 HGRVPOS DFB 0

```

--End assembly--

4737 bytes

Errors: 0


```

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
2100: 4C 32 21 690 DRVEXAM JMP DEXAM
691
692 *****
693 * DRIVE SPEED OPTION *
694 *****
695
696 DRVSPEED JSR CHECKMEM :MANAGER
697 LDA #18 :DRIVE
698 JSR TOUT :SPEED
699 JSR GTDRVD01 :OPTION
700 JSR MTROND
701 LDA #22
702 JSR SCVTAB1
703 JSR SCDIND02
704 LDA #19
705 JSR TOUT
706 LDY #4
707 STY SPDLPNTR :SET
708 JSR SETBS :BUFFER,
709 DRL1 JSR CHKSPD :CHECK
710 JSR SPDLINE :SPEED
711 JSR KYDN1 :THEN
712 JMP DRL1 :DISPLAY
713 :SPEED
714
715 *****
716 * EXAMINE DRIVE OPTION *
717 *****
718
2132: 20 0C 1F 718 DEXAM JSR CHECKMEM :MANAGER
2133: A9 15 14 719 LDA #21 :EXAMINE
2134: 20 FF 14 720 JSR TOUT :DRIVE
2135: 20 70 11 721 JSR GTDRVD01 :OPTION
2136: 20 78 17 722 JSR MTRON
2137: A9 00 00 723 LDA #0
2138: 20 04 B7 724 JSR ARMV
2139: A9 16 14 725 LDA #22
2140: 20 FF 14 726 JSR TOUT
2141: 20 07 12 727 JSR SCDIND02
2142: A9 17 14 728 LDA #23
2143: 20 FF 14 729 JSR TOUT
2144: 20 AF 10 730 JSR SSRCH :R/W
2145: 20 15 23 731 JSR EXRDWT :ABILITY
2146: 20 C3 00 732 JSR CHKESC
2147: 20 D0 10 733 JSR SSFNLN :AVERAGE
2148: 20 6D 15 734 JSR SETBS :/FLUCTN
2149: 20 45 22 735 JSR EXMSPD :SPEED
2150: 20 C3 00 736 JSR CHKESC
2151: 20 D0 10 737 JSR SSFNLN :COUNT
2152: 20 18 24 738 JSR SETBS :HIGH
2153: 20 A1 21 739 JSR CTRKS :TRACKS
2154: 20 C3 00 740 JSR CHKESC
2155: 20 D0 10 741 JSR SSFNLN :BLEED
2156: 20 B9 21 742 JSR BLOVR :OVER
2157: 20 C3 00 743 JSR CHKESC
2158: 20 D0 10 744 JSR SSFNLN :SPEED
2159: 20 8B 21 745 JSR SPDARM :OF ARM
2160: A9 19 746 LDA #25
2161: 20 FF 14 747 JSR TOUT
2162: 20 B3 15 748 JSR PDONE
2163: 60 749 RTS
2164:
2165 *****
2166
2188: A9 00 751 SPDARM LDA #0 :FIND
2189: 20 2C 22 752 JSR CTRKW :THE
2190: A9 88 753 LDA #88 :SPEED
2191: 20 2C 22 754 JSR CTRKW :OF
2192: A9 00 755 LDA #0 :ARM

```

2197:	20	06	B7	1756	JSR	ARMV	:THEN
219A:	20	18	B7	1757	JSR	ARMSPD	:DISPLAY
219D:	20	07	14	1758	JSR	HXAOUT	
21A0:	60			1759	RTS		
21A1:	A9	88		1760			
21A3:	A0	04		1761	CTRKS	LDA	:\$88
21A5:	20	04	21	1762	LDY		:LOCATE
21A8:	A5	0E		1763	JSR	CTRKDO	:THE
21AA:	C9	FF		1764	LDA	WZPAGE1	:HIGHEST
21AC:	F0	05		1765	CMP	:\$FF	:TRACK
21AE:	A0	02		1766	BEQ	CTS3	:AVAILBL
21B0:	20	0E	21	1767	LDY	#2	
21B3:	A5	0E		1768	JSR	CTRKDO	
21B5:	20	76	14	1769	LDA	WZPAGE1	
21B8:	60			1770	JSR	TRKOUT2	
				1771	RTS		
21B9:	A9	00		1772			
21BB:	20	06	B7	1773	BLDOVR	LDA	#0
21BE:	20	2F	22	1774	JSR	ARMV	:CHECK
21C1:	A9	01		1775	JSR	CTRKW2	:FOR
21C3:	A0	00		1776	LDA	#1	:BLEED
21C5:	84	0F		1777	LDY	#0	:OVER
21C7:	20	13	22	1778	STY	WZPAGE2	:ABILITY
21CA:	A9	02		1779	JSR	VTRK	
21CC:	20	2C	22	1780	LDA	#2	
21CF:	A9	01		1781	JSR	CTRKW	
21D1:	A0	02		1782	LDA	#1	
21D3:	20	13	22	1783	LDY	#2	
21D6:	20	2F	22	1784	JSR	VTRK	
21D9:	A9	02		1785	JSR	CTRKW2	
21DB:	A0	01		1786	LDA	#2	
21DD:	20	13	22	1787	LDY	#1	
21E0:	A9	00		1788	JSR	VTRK	
21E3:	20	15	22	1789	LDA	#0	
21E5:	A5	0F		1790	JSR	VTRK2	
21E7:	20	57	23	1791	LDA	WZPAGE2	
21EA:	60			1792	JSR	DCPOUT	
				1793	RTS		
21EB:	84	0F		1794			
21ED:	20	2C	22	1795	CTRKDO	STY	WZPAGE2
21F0:	A5	12		1796	CTL1	JSR	CTRKW
21F2:	38			1797	LDA	CTRK	:COMMON
21F3:	E9	04		1798	SEC		:ROUTINE
21F5:	20	2C	22	1799	SBC	#4	:TO
21F8:	A5	12		1800	JSR	CTRKW	:VERIFY
21FA:	18			1801	LDA	CTRK	:A KNOWN
21FB:	69	04		1802	CLC		:TRACK
21FD:	20	06	B7	1803	ADC	#4	
2200:	20	12	B7	1804	JSR	ARMV	
2203:	C5	12		1805	JSR	TRKV2	
2205:	D0	0B		1806	CMP	CTRK	
2207:	85	0E		1807	BNE	CD1	
2209:	18			1808	STA	WZPAGE1	
220A:	85	0F		1809	CLC		
220C:	90	0F		1810	ADC	WZPAGE2	
220E:	A9	FF		1811	BCC	CTL1	
2210:	85	0E		1812	LDA	:\$FF	
2212:	60			1813	STA	WZPAGE1	
				1814	RTS		
2213:	84	0E		1815			
2215:	20	06	B7	1816	VTRK	STY	WZPAGE1
2218:	20	12	B7	1817	VTRK2	JSR	ARMV
221B:	B0	0B		1818	VTRK3	JSR	TRKV2
221D:	C5	0E		1819	BCS	VD2	:IF
221F:	D0	07		1820	CMP	WZPAGE1	:TRACK
2221:	A9	19		1821	BNE	VD2	:VERIFYS
2223:	18			1822	LDA	#25	:THEN
2224:	65	0F		1823	CLC		:GIVE
2226:	85	0F		1824	ADC	WZPAGE2	:25%
2228:	20	2B	14	1825	STA	WZPAGE2	:CREDIT
222B:	60			1826	JSR	EPBOUT	
				1827	RTS		
222C:	20	06	B7	1828			
222F:	A5	12		1829	CTRKW	JSR	ARMV
2231:	4A			1830	CTRKW2	LDA	CTRK
2232:	09	AA		1831		LSRA	:COMMON
2234:	80	02	83	1832	ORA	:\$AA	:ROUTINE
2237:	A5	12		1833	STA	\$8302	:THAT
2239:	09	AA		1834	LDA	CTRK	:WRITES
223B:	80	03	83	1835	ORA	:\$AA	:A KNOWN
223E:	20	CC	16	1836	STA	\$8303	:TRACK
2241:	20	2B	14	1837	JSR	TRKWRT	:FOR
2244:	60			1838	JSR	EPBOUT	:TESTING
				1839	RTS		:PURPSES
2245:	A9	00		1840			
				1841	EXMSPD	LDA	#0
							:EXAMINE

2247:	A0	07	1842	LDY	#7	DRIVE
2249:	99	15	1843	STA	HXF,Y	SPEED
224C:	88		1844	DEY		TO GET
224D:	10	FA	1845	BPL	EXL1	AVERAGE
224F:	84	10	1846	STY	LHXH	AND
2251:	A9	10	1847	LDA	#16	FLUCT
2253:	8D	97	1848	STA	WRKPNTR2	THEN
2256:	20	86	1849	JSR	CHKSPD	DISPLAY
2259:	20	28	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	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	18	1869	SBC	LDCF	
2285:	B0	04	1870	BCS	EXS1	
2287:	38		1871	SEC		
2288:	E9	9C	1872	SBC	#156	
228A:	18		1873	CLC		
228B:	85	14	1874	STA	DCF	
228D:	A5	19	1875	LDA	HXL	
228F:	E5	1C	1876	SBC	LXL	
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		
229D:	20	C3	1883			
22A0:	AD	9A	1884	JSR	CHKESC	ACTUAL
22A3:	C5	1A	1885	LDA	WSH2	CALC
22A5:	90	21	1886	CMP	HXXH	FLUCT
22A7:	D0	10	1887	BCC	CAS2	ROUTINE
22A9:	AD	99	1888	BNE	CAS1	
22AC:	C5	19	1889	LDA	WSL2	
22AE:	90	18	1890	CMP	HXXL	
22B0:	D0	07	1891	BCC	CAS2	
22B2:	AD	9F	1892	BNE	CAS1	
22B5:	C5	18	1893	LDA	CNVHEX	
22B7:	90	0F	1894	CMP	HDCF	
22B9:	AD	9A	1895	BCC	CAS2	
22BC:	85	1A	1896	LDA	WSH2	
22BE:	AD	99	1897	STA	HXXH	
22C1:	85	19	1898	LDA	WSL2	
22C3:	AD	9F	1899	STA	HXXL	
22C6:	85	18	1900	LDA	CNVHEX	
22C8:	AD	9A	1901	STA	HDCF	
22CB:	C5	1D	1902	LDA	WSH2	
22CD:	90	12	1903	CMP	LHXH	
22CF:	D0	1F	1904	BCC	CAS3	
22D1:	AD	99	1905	BNE	CAS4	
22D4:	C5	1C	1906	LDA	WSL2	
22D6:	90	09	1907	CMP	LXXL	
22D8:	D0	16	1908	BCC	CAS3	
22DA:	AD	9F	1909	BNE	CAS4	
22DD:	C5	1B	1910	LDA	CNVHEX	
22DF:	B0	0F	1911	CMP	LDCF	
22E1:	AD	9A	1912	BCS	CAS4	
22E4:	85	1D	1913	LDA	WSH2	
22E6:	AD	99	1914	STA	LXXH	
22E9:	85	1C	1915	LDA	WSL2	
22EB:	AD	9F	1916	STA	LXXL	
22EE:	85	1B	1917	LDA	CNVHEX	
22F0:	A5	0E	1918	STA	LDCF	
22F2:	18		1919	LDA	WZPAGE1	
22F3:	F8		1920	CLC		
22F4:	65	15	1921	SED		
22F6:	D8		1922	ADC	HXF	
22F7:	C9	10	1923	CLD		
22F9:	90	09	1924	CMP	#10	
22FB:	29	0F	1925	BCC	CAS5	
22FD:	18		1926	AND	#0F	
			1927	CLC		

22330000	00			19228	INC	HXL		
22330001	00			19229	BNE	CAS5		
22330002	00			19230	INC	HXL		
22330003	00			19231	STA	HXL		
22330004	00			19232	LDA	WSL2		
22330005	00			19233	ADC	HXL		
22330006	00			19234	STA	HXL		
22330007	00			19235	LDA	WSH2		
22330008	00			19236	ADC	HXL		
22330009	00			19237	STA	HXL		
22330010	00			19238	RTS			
22330011	00			19239				
22330012	00			19240	EXRDWT	LDA	#0	CHECK
22330013	00			19241	STA	WRKPNTR		READ
22330014	00			19242	STA	WZPAGE2		WRITE
22330015	00			19243	JMP	EXS2		ABILITY
22330016	00			19244	JSR	TRKWRT		THEN
22330017	00			19245	JSR	TRKV1		DISPLAY
22330018	00			19246	JSR	EPBOUT		RESULTS
22330019	00			19247	BCC	EXS3		
22330020	00			19248	LDY	WRKPNTR		
22330021	00			19249	LDA	LTEA,Y		
22330022	00			19250	ADC	WZPAGE2		
22330023	00			19251	STA	WZPAGE2		
22330024	00			19252	INC	WRKPNTR		
22330025	00			19253	LDA	#3		
22330026	00			19254	STA	WRKPNTR2		
22330027	00			19255	JSR	SETBDEX		
22330028	00			19256	BEQ	DCPOUT		
22330029	00			19257	JSR	TRKWRT		
22330030	00			19258	JSR	TRKV1		
22330031	00			19259	JSR	EPBOUT		
22330032	00			19260	BCC	EXL4		
22330033	00			19261	LDA	WZPAGE2		
22330034	00			19262	BEQ	DCPOUT		
22330035	00			19263	DEC	WZPAGE2		
22330036	00			19264	DEC	WRKPNTR2		
22330037	00			19265	BNE	EXL5		
22330038	00			19266	LDA	WZPAGE2		
22330039	00			19267	JSR	HAOUT		
22330040	00			19268	LDA	#"/"		
22330041	00			19269	JSR	COUT		
22330042	00			19270	RTS			
22330043	00			19271				
22330044	00			19272	SPDOUTFH	JSR	SHTAB	DISPLAY
22330045	00			19273	JSR	NMBFOUT2		HEX
22330046	00			19274	LDA	#20		NUMBER
22330047	00			19275	JSR	TOUT		& FRCTN
22330048	00			19276	JSR	RHTAB		THEN
22330049	00			19277	RTS			"RPM"
22330050	00			19278				
22330051	00			19279	SPDOUTFD	JSR	SHTAB	DISPLAY
22330052	00			19280	LDA	HXL		DECIMAL
22330053	00			19281	LDX	HXL		NUMBER
22330054	00			19282	JSR	HXAOUT		& FRCTN
22330055	00			19283	LDA	DCF		THEN
22330056	00			19284	JSR	CNVHAD		"RPM"
22330057	00			19285	JSR	TNTHSOUT		
22330058	00			19286	JMP	SPL1		
22330059	00			19287				
22330060	00			19288	CHKSPD	JSR	TRKWRT	CHECK
22330061	00			19289	JSR	TRKDS		DRIVE
22330062	00			19290	JSR	CALCRPM		SPEED
22330063	00			19291	LDA	CNVHEX		DRIVER
22330064	00			19292	STA	WSL2		
22330065	00			19293	SEC			
22330066	00			19294	SBC	#26		
22330067	00			19295	STA	TEMPL		
22330068	00			19296	LDA	CNVHEX+1		
22330069	00			19297	STA	WSH2		
22330070	00			19298	SBC	#01		
22330071	00			19299	STA	TEMPH		
22330072	00			20000	JSR	RPMOUT		
22330073	00			20001	JSR	EPBOUT		
22330074	00			20002	RTS			
22330075	00			20003				
22330076	00			20004	SPDLINE	LDY	SPDLPNTR	DISPLAY
22330077	00			20005	LDA	#"-"		DRIVE
22330078	00			20006	STA	\$AA8,Y		SPEED
22330079	00			20007	LDA	#25		IN A
22330080	00			20008	LDX	#0		"LINE"
22330081	00			20009	LDY	TEMPF		FORMAT
22330082	00			20010	STY	\$0		
22330083	00			20011	JSR	DIVDAXY		
22330084	00			20012	STA	TEMPF		
22330085	00			20013	LDA	TEMPH		

233C7:	30	2E	2014	BMI	SPS2	
233C9:	D0	30	2015	BNE	SPS3	
233CB:	A7	B2	2016	LDA	TEMPL	
233CD:	0A		2017	ASLA		
233CE:	0A		2018	ASLA		
233D0:	18		2019	CLC		
233D1:	6D	A6	2020	ADC	TEMPF	
233D3:	04		2021	TAY		
233D5:	04		2022	LDA	W3L	
233D7:	0C		2023	CMP	#12	
233D9:	01		2024	BCC	SPS1	
233DB:			2025	INY		
233DD:			2026	INY		
233DE:	04		2027	CPY	#4	
233DF:	16		2028	BCC	SPS2	
233E1:	22		2029	CPY	#34	
233E3:	16		2030	BCS	SPS3	
233E5:	28	0B	2031	LDA	\$B28,Y	
233E7:	A0		2032	CMP	#A0	
233E9:	02		2033	BNE	SPL3	
233EB:	A0		2034	LDA	#"-"	
233ED:	49		2035	EDR	#80	
233EF:	80		2036	STA	\$AA8,Y	
233F1:	A8	0A	2037	STY	SPDLPNTR	
233F3:	7F	B2	2038	RTS		
233F5:	60		2039	LDY	#4	
233F7:	A0	04	2040	BNE	SPL2	
233F9:	D0	EA	2041	LDY	#34	
233FB:	A0	22	2042	BNE	SPL2	
233FD:	D0	E6	2043	RTS		
233FF:	60		2044			
2400:	A0	03	2045	CALCRPM	LDY	#3
2402:	B9	61	2046	CAL1	LDA	LTDV,Y
2405:	99	02	2047		STA	W2L,Y
2408:	88	00	2048		DEY	
2409:	10	F7	2049		BPL	CAL1
240B:	20	FA	2050		JSR	DIVIDE
240E:	8D	9F	2051		STA	CNVHEX
2411:	8A		2052		TXA	
2412:	29	01	2053		AND	#01
2414:	8D	A0	2054		STA	CNVHEX+1
2417:	60	B2	2055		RTS	
2418:	A9	FF	2056			
241A:	A0	01	2057	SETBE	LDA	#\$FF
241C:	20	7D	2058		LDY	#1
241F:	A9	D5	2059		JSR	SETBV
2421:	80	00	2060		LDA	#\$D5
2424:	A9	96	2061		STA	\$8300
2426:	8D	01	2062		LDA	#\$96
2429:	60	83	2063		STA	\$8301
242A:	AC	92	2064		RTS	
242D:	B9	48	2065			
2430:	A0	00	2066	SETBDEX	LDY	WRKPNTR
2432:	20	7D	2067		LDA	LTEX,Y
2435:	48	15	2068		LDY	#0
2436:	68		2069		JSR	SETBV
2437:	60		2070		PHA	
			2071		PLA	
			2072		RTS	

--End assembly--

6200 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 * ANALYZE ROUTINES *
212 *****
213
214 ORG ANALYZE
215
216 JMP ANALYZET
217 JMP FNDLNTH
218 JMP WSTSYNCL ;WAIST
219 JMP NCAUTO ;NBLCNT
220
221 WSTSYNCL LDA WSYNCL ;WAIST
222 STA $2 ;TIME
223 LDA WSYNCH ;FOR
224 STA $3 ;SYNCRNZ
225 WSTL1 PHA ;TRACK
226 PLA
227 LDA $2
228 NOP
229 WSTL2 LDA $2
230 LDA $C0EC
231 DEC $2
232 LDA $2
233 CMP #$FF
234 BNE WSTL1
235 DEC $3
236 LDA $3
237 CMP #$FF
238 BNE WSTL2
239 RTS
240
241 ANALYZET JSR CHKESC ;ANALYZE
242 LDA #0 ;TRACK
243 STA TRKDSL ;MANAGER
244 STA TRKDSH
245 STA TRKTSH ;SETUP
246 STA TRKDEL ;WORK
247 STA TRKDEH ;SPACE
248 STA TRKTEH
249 STA TRKLL
250 STA TRKLH
251 STA $FF
252 LDA #$50
253 JSR EPOUT ;DO
254 LDA #0 ;PREANLZ
255 JSR CONTROL ;ROUTINE
256 LDA #$01
257 JSR EPOUT ;DO TRK
258 JSR TRKE ;END
259 BCS ERRRE
260 JSR TRKL ;DO TRK
261 BCS ERRRL ;LENGTH
262 LDA TRKLH
263 CMP MAXLNTH
264 BCS ERRRL
265 CMP MINLNTH
266 BCC ERRRL
267 ANLZ2 LDY TRKLL
268 LDX TRKLH
269 LDA SPCLCNTRL ;PARM$0A
270 AND #$80
271 BEQ ANLZ4
272 LDA TRKDEL
273 SEC
274 SBC #$80
275 TAY
276 LDA TRKDEH
277 SBC #$40
278 TAX
279 CPX #$1C
280 BCC ANLZ4
281 LDY #$FF
282 LDX #$1B
283 ANLZ4 STY TLENL ;KEEP
284 STX TLENH ;TRACK

```

269E:	AD	8C	B2	285		LDA	SYNCLG	: OF TRK
26A1:	FD	09		286		BEO	ANLZ3	: LENGTH
26A3:	20	9E	2B	287		JSR	CALCSYNC	
26A6:	A9	43		288	ANLZ3	LDA	##43	
26A8:	20	12	0C	289		JSR	EPOUT	: DO
26AB:	A9	01		290		LDA	#1	: PREWRIT
26AD:	20	2A	2C	291		JSR	CONTROL	: ROUTINE
26B0:	A9	20		292		LDA	##20	
26B2:	20	12	0C	293		JSR	EPOUT	
26B5:	20	80	2A	294		JSR	MOVEBUFF	
26B8:	20	B5	27	295		JSR	TRKS	: CALC
26BB:	18			296		CLC		: TRACK
26BC:	60			297		RTS		: START
26BD:	A0	5E		298				
26BF:	8C	C5	B2	299	ERRORE	LDY	##5E	: END
26C2:	A0	96		300		STY	TRKDEH	: ERROR
26C4:	8C	C6	B2	301		LDY	##96	: MANAGER
26C7:	A0	00		302		STY	TRKTEH	
26C9:	8C	C4	B2	303		LDY	#0	
26CC:	85	FF		304	ERRORL	STY	TRKDEL	
26CE:	A0	FF		305		STA	\$FF	: LENGTH
26D0:	8C	C7	B2	306		LDY	##FF	: ERROR
26D3:	A0	1B		307		STY	TRKLL	: MANAGER
26D5:	A0	C5	B2	308		LDY	##1B	
26D8:	38			309		LDA	TRKDEH	
26DA:	F9	40		310		SEC		
26DB:	C9	1C		311		SBC	##40	
26DD:	B0	07		312		CMP	##1C	
26DF:	AC	C4	B2	313		BCS	ESKP1	
26E2:	8C	C7	B2	314		LDY	TRKDEL	
26E5:	A0			315		STY	TRKLL	
26E6:	8C	C8	B2	316	ESKP1	TAY		
26E9:	20	76	26	317		STY	TRKLH	
26EC:	38			318	CSERRF	JSR	ANLZ2	
26ED:	60			319		SEC		
26EE:	A0	00		320		RTS		
26F0:	A9	42		321	FNDLNGTH	LDY	#0	: VERIFY
26F2:	20	0E	2A	322		LDA	##42	: DISK
26F5:	B0	F5		323		JSR	CSAME	: MANAGER
26F7:	D0	F3		324		BCS	CSERRF	
26F9:	84	00		325		BNE	CSERRF	
26FB:	18			326		STY	#0	
26FD:	60	C7	B2	327		CLC		
26FF:	85	06		328		ADC	TRKLL	
2701:	A9	42		329		STA	\$6	
2703:	69	00		330		LDA	##42	
2705:	38			331		ADC	#0	
2706:	F9	02		332		SEC		
2708:	18			333		SBC	#2	
2709:	60	C8	B2	334		CLC		
270C:	85	07		335		ADC	TRKLH	
270E:	A9	00		336		STA	\$7	
2710:	80	0B	2C	337		LDA	#0	
2713:	80	0C	2C	338		STA	TSTLL	
2716:	A9	0A		339		STA	TSTLH	
2718:	85	08		340		LDA	#10	
271A:	20	51	2A	341		STA	\$8	
271D:	B0	5C		342				
271F:	A5	06		343	FLL0	JSR	FSAME	
2721:	85	02		344		BCS	FLS6	
2723:	A5	05		345		LDA	\$6	
2725:	85	01		346		STA	\$2	
2727:	A5	07		347		LDA	\$5	
2729:	85	03		348		STA	\$1	
272B:	A0	00		349		LDA	\$7	
272D:	B1	00		350		STA	\$3	
272F:	D1	02		351	FLL1	LDY	#0	
2731:	D0	11		352		LDA	(\$0),Y	
2733:	E6	0C		353		CMP	(\$2),Y	
2735:	C8			354		BNE	FLS1	
2736:	D0	F5		355		INC	\$C	
2738:	E6	00		356		INY		
273A:	E6	03		357		BNE	FLL1	
273C:	E6	01		358		INC	\$0	
273E:	A5	01		359		INC	\$3	
2740:	C9	78		360		INC	\$1	
2742:	D0	E9		361		LDA	\$1	
2744:	A4	0C		362		CMP	##78	
2746:	A6	00		363		BNE	FLL1	
2748:	EC	0C	2C	364	FLS1	LDY	\$C	
274B:	90	24		365		LDX	\$0	
274D:	D0	07		366		CPX	TSTLH	
274F:	CC	0B	2C	367		BCC	FLS2	
				368		BNE	FLS3	
				369		CPY	TSTLL	
				370				

2752:	90	1D	371	BCC	FLS2	
2754:	00	1B	372	BEQ	FLS2	
2756:	00	2C	373	STX	TSTLH	
2758:	00	2C	374	STY	TSTLL	
2759:	00	06	375	LDA	\$6	
275C:	00	0D	376	STA	TSTAL	
2761:	00		377	SEC		
2762:	05	04	378	SBC	\$4	
2764:	00	C7	379	STA	TRKLL	
2767:	05	07	380	LDA	\$7	
2769:	00	00	381	STA	TSTAH	
276C:	00	00	382	SBC	\$5	
276E:	00	00	383	STA	TRKLH	
2771:	00	06	384	INC	\$6	
2773:	00	00	385	BNE	FLL0	
2775:	00	07	386	INC	\$7	
2777:	00	08	387	DEC	\$8	
2779:	00	09	388	BNE	FLL0	
277B:	AD	0C	389	LDA	TSTLH	
277E:	00	08	390	BNE	FLS5	
2780:	AD	0B	391	LDA	TSTLL	
2783:	CD	1C	392	CMP	MNBTEQLN	;PARM\$1C
2786:	AD	15	393	BCC	FLS4	
2788:	AD	C7	394	LDA	TRKLL	
278B:	00		395	SEC		
278C:	AD	A9	396	SBC	TLENL	
278E:	00	00	397	STA	DIFL	
2792:	AD	08	398	LDA	TRKLH	
2795:	AD	0A	399	SBC	TLENH	
2798:	00	BC	400	STA	DIFH	
279B:	18		401	CLC		
279C:	00		402	RTS		
279D:	38		403	SEC		
279E:	60		404	RTS		
279F:	A9	27	405	TRKL	LDA #>LTLNGTH	;FIND
27A1:	AD	F3	407	LDY	#<LTLNGTH	TRACK
27A3:	AE	12	408	LDX	PLNGCNTL	LENGTH
27A6:	20	DC	409	JSR	DOPSUB0	MANAGER
27A9:	60		410	RTS		
27AA:	A9	27	411	TRKE	LDA #>LTEND	;FIND
27AC:	AD	F9	412	LDY	#<LTEND	TRACK
27AE:	AE	13	413	LDX	PENDCNTL	END
27B1:	20	DC	414	JSR	DOPSUB0	MANAGER
27B4:	60		415	RTS		
27B5:	AD	C4	416	TRKS	LDA TRKDEL	;CALC
27B8:	38		417	SEC		TRACK
27B9:	ED	C7	418	SBC	TRKLL	START
27BC:	00	C1	419	STA	TRKDSL	ROUTINE
27BF:	08		420	PHP		
27C0:	AD	C5	421	LDA	TRKDEH	
27C3:	ED	C8	422	SBC	TRKLH	
27C6:	00	C2	423	STA	TRKDSH	
27C9:	AD	C6	424	LDA	TRKTEH	
27CC:	28		425	PLP		
27CD:	ED	C8	426	SBC	TRKLH	
27D0:	00	C3	427	STA	TRKTSH	
27D3:	60		428	RTS		
27D4:	AD	C4	429	TRKS1	LDA TRKDEL	;CALC
27D7:	38		430	SEC		TRACK
27D8:	ED	90	431	SBC	TLENL	START
27DB:	00	C1	432	STA	TRKDSL	FOR
27DE:	08		433	PHP		SYNC
27DF:	AD	C5	434	LDA	TRKDEH	ROUTINE
27E2:	ED	91	435	SBC	TLENH	
27E5:	00	C2	436	STA	TRKDSH	
27E8:	AD	C6	437	LDA	TRKTEH	
27EB:	28		438	PLP		
27EC:	ED	91	439	SBC	TLENH	
27EF:	00	C3	440	STA	TRKTSH	
27F2:	60		441	RTS		
			442			
			443			
			444			
			445			
			446			
			447			
			448			
			449			
27F3:	FF	27	450	LTLNGTH	DA	TRKDGL
27F5:	2C	28	451		DA	TRKUQL
27F7:	CC	28	452		DA	TRKABL
			453			DATPTRN
			454			UNIQUE
			455			ABSLTE
27F9:	DA	28	456	LTEND	DA	TRKTGE
27FB:	8F	29	457		DA	TRKDPE
27FD:	E0	29	458		DA	TRKDGE
			459			TIMEGAP
			460			DATPTRN
			461			DATAGAP

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	TRKLH	
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	EC		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:	E9	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:	E6	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	

28AE	:	8D	C8	B2	543		STA	TRKLH		
28B1	:	E6	06		544	TQS2	INC	\$6		
28B3	:	D0	A3		545		BNE	TQL0		
28B5	:	E6	07		546		INC	\$7		
28B7	:	C6	08		547		DEC	\$8		
28B9	:	D0	9D		548		BNE	TQL0		
28BB	:	AD	0C	2C	549	TQS6	LDA	TSTLH		
28BD	:	D0	08		550		BNE	TQS5		
28BF	:	AD	08	2C	551		LDA	TSTLL		
28C3	:	CD	1C	B3	552		CMP	MNBTQLN	;PARM\$1C	
28C6	:	90	02		553		BCC	TQS4		
28C8	:	18			554	TQS5	CLC			
28CA	:	60			555	TQS4	RTS			
28CB	:	38			556		SEC			
28CC	:	60			557		RTS			
28CE	:	AD	0C	B3	558	TRKABL	LDA	ABSLNGTL	;ABSOLUTE	
28CF	:	8D	C7	B2	559		STA	TRKLL	;LENGTH	
28D2	:	AD	0D	B3	560		LDA	ABSLNGTH	;ROUTINE	
28D5	:	8D	C8	B2	561		STA	TRKLH		
28D8	:	18			562		CLC			
28D9	:	60			563		RTS			
28DA	:	A9	93		564	TRKTGE	LDA	#\$93	;MANAGER	
28DC	:	85	01		565		STA	\$1	;TIMING	
28DE	:	A9	80		566		LDA	#\$80	;GAP	
28E0	:	8D	21	2C	567		STA	ENDBCHK	;TRACK	
28E3	:	AD	00		568		LDY	#0	;END	
28E6	:	84	00		569		STY	\$0		
28E9	:	8C	C4	B2	570		STY	TRKDEL		
28EB	:	8C	C6	B2	571		STY	TRKTEH		
28ED	:	8C	10	2C	572		STY	TGLL		
28EF	:	8C	11	2C	573		STY	TGLH		
28F3	:	B1	00		574	FTGL1	LDA	(\$0),Y		
28F6	:	F0	15		575		BEQ	FTGL3		
28F9	:	E6	00		576		INC	\$0		
28FB	:	D0	F8		577		BNE	FTGL1		
28FD	:	E6	01		578		INC	\$1		
28FF	:	A5	01		579		LDA	\$1		
2902	:	CD	21	2C	580		CMP	ENDBCHK		
2905	:	D0	EF		581		BNE	FTGL1		
2908	:	A9	83		582	FTGDE	LDA	#\$83		
290B	:	38			583		SEC			
290E	:	60			584		RTS			
2911	:	B1	00		585	FTGL2	LDA	(\$0),Y		
2914	:	D0	2E		586		BNE	FTGS1		
2917	:	E6	00		587	FTGL3	INC	\$0		
291A	:	D0	F8		588		BNE	FTGL2		
291D	:	E6	01		589		INC	\$1		
2920	:	A5	01		590		LDA	\$1		
2923	:	CD	21	2C	591		CMP	ENDBCHK		
2926	:	90	EF		592		BCC	FTGL2		
2929	:	AC	11	2C	593	FTGL4	LDY	TGLH		
292C	:	D0	0A		594		BNE	FTGD		
292F	:	AC	10	2C	595		LDY	TGLL		
2932	:	CC	17	B3	596		CPY	PTGAPMIN		
2935	:	A9	84		597		LDA	#\$84		
2938	:	90	DE		598	FTGD	BCC	FTGDE		
293B	:	AD	C4	B2	599		DEC	TRKDEL		
293E	:	D0	FF	B2	600		LDA	TRKDEL		
2941	:	D0	06		601		CMP	#\$FF		
2944	:	D0	06		602		BNE	FTGD1		
2947	:	CD	C5	B2	603		DEC	TRKDEH		
294A	:	CE	C6	B2	604	FTGD1	DEC	TRKTEH		
294D	:	18			605		CLC			
294F	:	60			606		RTS			
2953	:	A5	00		607	FTGS1	LDA	\$0		
2956	:	8D	22	2C	608		STA	TTGAL		
2959	:	A5	01		609		LDA	\$1		
295C	:	8D	23	2C	610		STA	TTGAH		
295F	:	E6	00		611	FTGL5	INC	\$0		
2963	:	D0	08		612		BNE	FTGS2		
2966	:	E6	01		613		INC	\$1		
2969	:	A5	01		614		LDA	\$1		
296C	:	CD	9B		615		CMP	#\$B0		
296F	:	B0	04		616		BCS	FTGS4		
2973	:	D0	F0		617	FTGS2	LDA	(\$0),Y		
2976	:	A5	00		618		BNE	FTGL5		
2979	:	38			619	FTGS4	LDA	\$0		
297C	:	ED	22	2C	620		SEC			
297F	:	AD			621		SBC	TTGAL		
2983	:	A5	01		622		TAX			
2986	:	AD	23	2C	623		LDA	\$1		
2989	:	CD	11	2C	624		SBC	TTGAH		
298B	:	90	21		625		CMP	TGLH		
298D	:				626		BCC	FTGS5		

2945	D0	07	629	BNE	FTGS3	
2946	90	10	630	CPX	TGLL	
2947	90	1A	631	BCC	FTGS5	
2948	90	18	632	BEQ	FTGS5	
2949	90	11	633	STX	TGLL	FTGS3
2950	90	11	634	STA	TGLH	
2951	90	22	635	LDA	TTGAL	
2952	90	23	636	STA	TRKDEL	
2953	90	23	637	LDA	TTGAH	
2954	90	23	638	STA	TRKTEH	
2955	90	38	639	SEC		
2956	90	38	640	SBC	##38	
2957	90	01	641	STA	TRKDEH	
2958	90	01	642	LDA	\$1	FTGS5
2959	90	80	643	CMP	##80	
2960	90	80	644	BNE	FTGL3	
2961	90	19	645	JMP	FTGL4	
2962	90	19	646			
2963	90	02	647	LDA	#2	TRKDPE
2964	90	2A	648	JSR	CONTROL	MANAGER
2965	90	00	649	LDY	#0	DATA
2966	90	95	650	LDA	##95	PATTERN
2967	90	05	651	JSR	FTMARKR	TRACK
2968	90	05	652	BCC	TDPE2	END
2969	90	80	653	JSR	CTMARKR	
2970	90	38	654	SEC		
2971	90	01	655	RTS		
2972	90	01	656	STY	TRKDEL	
2973	90	01	657	LDA	\$1	TDPE2
2974	90	01	658	STA	TRKTEH	
2975	90	38	659	SEC		
2976	90	38	660	SBC	##38	
2977	90	00	661	STA	TRKDEH	
2978	90	00	662	LDY	#0	CTMARKR
2979	90	78	663	LDA	##78	
2980	90	01	664	STA	\$1	TDPE3
2981	90	00	665	LDA	(\$0),Y	
2982	90	04	666	BPL	TDPE4	
2983	90	7F	667	AND	##7F	
2984	90	00	668	STA	(\$0),Y	
2985	90	00	669	INY		TDPE4
2986	90	F5	670	BNE	TDPE3	
2987	90	01	671	INC	\$1	
2988	90	01	672	LDA	\$1	
2989	90	80	673	CMP	##80	
2990	90	ED	674	BNE	TDPE3	
2991	90	18	675	CLC		FTMDN
2992	90	60	676	RTS		
2993	90	00	677			
2994	90	01	678	STY	\$0	FTMARKR
2995	90	00	679	STA	\$1	
2996	90	F6	680	LDA	(\$0),Y	FTMARKR1
2997	90	00	681	BMI	FTMDN	
2998	90	08	682	INY		FTMARKR2
2999	90	F9	683	BNE	FTMARKR1	
3000	90	01	684	INC	\$1	
3001	90	01	685	LDA	\$1	
3002	90	AF	686	CMP	##AF	
3003	90	F1	687	BNE	FTMARKR1	
3004	90	38	688	SEC		
3005	90	60	689	RTS		
3006	90	5C	690			
3007	90	01	691	LDA	##5C	TRKDGE
3008	90	00	692	STA	\$1	
3009	90	00	693	LDY	#0	
3010	90	00	694	STY	\$0	
3011	90	00	695	LDA	(\$0),Y	
3012	90	00	696	INY		FEG3
3013	90	00	697	BNE	FEG1	
3014	90	01	698	INC	\$1	
3015	90	01	699	LDX	\$1	
3016	90	78	700	CPX	##78	
3017	90	05	701	BNE	FEG1	
3018	90	85	702	LDA	##85	
3019	90	06	703	JMP	FTGDE	
3020	90	00	704	CMP	(\$0),Y	FEG1
3021	90	EC	705	BEQ	FEG3	
3022	90	C4	706	STY	TRKDEL	
3023	90	01	707	LDA	\$1	
3024	90	01	708	STA	TRKDEH	
3025	90	C5	709	CLC		
3026	90	38	710	ADC	##38	
3027	90	C6	711	STA	TRKTEH	
3028	90	18	712	CLC		
3029	90	60	713	RTS		
3030	90	60	714			

2A0E:	85	05	215	*****		
2A10:	85	0B	216			
2A12:	A9	00	217	CSAME	STA	\$5
2A14:	85	04	218		STA	\$B
2A16:	85	0A	219		LDA	#0
2A18:	84	08	220		STA	\$4
2A1A:	B1	04	221		STA	\$A
2A1C:	80	0F	222		STY	\$8
2A1E:	C8		223		LDA	(\$4),Y
2A20:	D0	08	224		STA	SGVAL
2A22:	E6	05	225	CSL1	INY	
2A24:	A6	05	226		BNE	CSS1
2A26:	F0	78	227		INC	\$5
2A28:	F0	0C	228		LDX	\$5
2A2A:	D1	04	229		CPX	#78
2A2C:	F0	F1	230		BEQ	CSTEND
2A2E:	A5	05	231	CSS1	CMP	(\$4),Y
2A30:	84	04	232		BEQ	CSL1
2A32:	A2	00	233		LDA	\$5
2A34:	18		234		STY	\$4
2A36:	A4	08	235		LDX	#0
2A38:	88		236		CLC	
2A3A:	C0	FF	237		RTS	
2A3B:	D0	08	238	CSHTEND	LDY	\$8
2A3D:	C6	0B	239	CSL2	DEY	
2A3E:	A6	0B	240		CPY	##FF
2A41:	E0	5B	241		BNE	CSS2
2A43:	F0	0B	242		DEC	\$B
2A45:	D1	0A	243		LDX	\$B
2A47:	F0	EF	244		CPX	##5B
2A49:	A5	0B	245		BEQ	ALLSAME
2A4B:	84	0A	246	CSS2	CMP	(\$A),Y
2A4D:	A2	01	247		BEQ	CSL2
2A4F:	18		248		LDA	\$B
2A50:	60		249		STY	\$A
			250		LDX	#1
			251	ALLSAME	CLC	
			252		RTS	
2A51:	A4	06	253			
2A53:	A9	00	254	FSAME	LDY	\$6
2A55:	85	06	255		LDA	#0
2A57:	85	0C	256		STA	\$6
2A59:	85	00	257		STA	\$C
2A5B:	AD	0F	258		STA	\$D
2A5E:	D1	06	259		LDA	SGVAL
2A60:	F0	0B	260	FSL1	CMP	(\$6),Y
2A62:	C8		261		BEQ	FSGTONE
2A64:	D0	F9	262		INY	
2A66:	E6	07	263		BNE	FSL1
2A68:	C6	08	264		INC	\$7
2A6A:	D0	F3	265		DEC	\$8
2A6B:	38		266		BNE	FSL1
2A6C:	60		267	FSE	SEC	
2A6D:	A5	07	268		RTS	
2A6E:	85	0B	269	FSGTONE	LDA	\$7
2A71:	84	0A	270		STA	\$B
2A73:	AD	0F	271		STY	\$A
2A75:	C8		272		LDA	SGVAL
2A77:	D0	06	273	FSL2	INY	
2A79:	E6	07	274		BNE	FSS1
2A7B:	C6	08	275		INC	\$7
2A7D:	F0	EC	276		DEC	\$8
2A7E:	E6	0C	277		BEQ	FSE
2A81:	D0	02	278	FSS1	INC	\$C
2A83:	E6	0D	279		BNE	FSS2
2A85:	D1	06	280		INC	\$D
2A87:	F0	ED	281	FSS2	CMP	(\$6),Y
2A89:	84	06	282		BEQ	FSL2
2A8B:	18		283		STY	\$6
2A8C:	60		284		CLC	
			285		RTS	
2A8D:	AD	C6	286			
2A90:	AE	C4	287	MOVEBUFF	LDA	TRKTEH
2A93:	A0	AF	288		LDX	TRKDEL
2A95:	8C	C6	289		LDY	##AF
2A98:	84	03	290		STY	TRKTEH
2A9A:	A0	FF	291		STY	\$3
2A9C:	84	02	292		LDY	##FF
2A9E:	A0	00	293		STY	\$2
2AA0:	20	B7	294		LDY	#0
2AA3:	AD	C5	295		JSR	MOVE
2AA6:	AE	C4	296		LDA	TRKDEH
2AA9:	20	B7	297		LDX	TRKDEL
2AAC:	A9	93	298		JSR	MOVE
2AAE:	8D	C5	299		LDA	##93
			800		STA	TRKDEH


```

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 MS1 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
*****
*
* DOPSUB0: 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 DOPSUB0 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=LTAL
2AE8: A9 02 843 DOPL1 LDA #2 ;Y=LTAL
2AEA: 8D 26 2C 844 STA ODPNTR ;X=PATRN
2AED: 0E 24 2C 845 DOPL2 ASL ODPTRN
2AF0: 90 16 846 BCC DOPS1
2AF2: AD 26 2C 847 LDA ODPNTR
2AF5: 0A 26 2C 848 ASLA
2AF6: A8 849 TAY
2AF7: B1 04 850 LDA ($4),Y
2AF9: 85 00 851 STA $0
2AFB: C8 852 INY
2AFC: B1 04 853 LDA ($4),Y
2AFE: 85 01 854 STA $1
2B00: 20 14 2B 855 JSR IJMP0
2B03: 90 16 856 BCC DOPD
2B05: 8D C9 B2 857 STA ERRORCD
2B08: CE 25 2C 858 DOPS1 DEC ODCNTR
2B0B: F0 0A 859 BEQ DOPDE
2B0D: CE 26 2C 860 DEC ODPNTR
2B10: 10 DB 861 BPL DOPL2
2B12: 30 04 862 BMI DOPL1
2B14: 6C 00 00 863 IJMP0 JMP ($0)
2B17: 38 864 DOPDE SEC ;ERROR
2B18: AD C9 B2 865 LDA ERRORCD
2B1B: 60 866 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	974	STA	WSYNCH	
2BF3:	AD	27	975	LDA	WSYNCL	
2BF6:	38		976	SEC		
2BF7:	E9	07	977	SBC	#7	
2BF9:	8D	27	978	STA	WSYNCL	
2BFC:	AD	28	979	LDA	WSYNCH	
2BFF:	E9	00	980	SBC	#0	
2C01:	8D	28	981	STA	WSYNCH	
2C04:	60		982	RTS		
			983			
			984	*-----*		
			985	* STORAGE AND WORKSPACE *		
			986	*-----*		
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
282

```

```

                ORG CONTROL    ;2C2A

```

2C75A	20	FC	2E	2C75A	LDX	#>PARMS	:MANAGER
2C75B	20	7C	2E	2C75B	LDY	##80	:CONTROL
2C75C	20	08	2E	2C75C	CMP	#2	
2C75D	20	71	2C	2C75D	BEQ	SSKIP2	:A=CNTRL
2C75E	20	05	2F	2C75E	LDY	##C0	:ROUTINE
2C75F	20	00	2F	2C75F	CMP	#3	:TO USE:
2C760	20	00	2F	2C760	BEQ	SSKIP2	:0=PRE
2C761	20	00	2F	2C761	LDX	#>PREANLZ	:1=CNTRL
2C762	20	00	2F	2C762	CMP	#0	:2=TEND
2C763	20	00	2F	2C763	BEQ	SSKIP	:3=TLNG
2C764	20	00	2F	2C764	LDX	#>CONTRLP	
2C765	20	00	2F	2C765	LDY	#0	
2C766	20	00	2F	2C766	STX	CPP+1	
2C767	20	00	2F	2C767	LDA	#0	
2C768	20	00	2F	2C768	STA	CPP	
2C769	20	00	2F	2C769	LDA	(CPP),Y	
2C76A	20	00	2F	2C76A	BEQ	CDONE1	
2C76B	20	00	2F	2C76B	STA	CPP	
2C76C	20	00	2F	2C76C	LDY	#0	
2C76D	20	00	2F	2C76D	JSR	TCPPWRK	
2C76E	20	00	2F	2C76E	JSR	SSETUP	
2C76F	20	00	2F	2C76F	JMP	COMMAND	
2C770	20	00	2F	2C770	RTS		
2C771	20	00	2F	2C771	JSR	TCPPWRK	
2C772	20	00	2F	2C772	JSR	CLMPFLG	
2C773	20	00	2F	2C773	LDA	(CPWP),Y	:GET A
2C774	20	00	2F	2C774	JSR	COMR1	:COMMAND
2C775	20	00	2F	2C775	BCC	INCMND	:FROM
2C776	20	00	2F	2C776	LDX	ENDBFLAG	:INSTRCT
2C777	20	00	2F	2C777	BEQ	ERROR	:BUFFER
2C778	20	00	2F	2C778	INC	CPWP	
2C779	20	00	2F	2C779	JMP	COMMAND	
2C77A	20	00	2F	2C77A	JSR	COMR2	
2C77B	20	00	2F	2C77B	CLC		
2C77C	20	00	2F	2C77C	RTS		
2C77D	20	00	2F	2C77D	BMI	DATABYTE	:START
2C77E	20	00	2F	2C77E	TAX		:TO
2C77F	20	00	2F	2C77F	AND	##FC	:DECODE
2C780	20	00	2F	2C780	PHP		:COMMAND
2C781	20	00	2F	2C781	TXA		
2C782	20	00	2F	2C782	PLP		
2C783	20	00	2F	2C783	BEQ	TIMEBYTE	
2C784	20	00	2F	2C784	LDX	##19	
2C785	20	00	2F	2C785	CMP	LTCINST,X	:FINISH
2C786	20	00	2F	2C786	BEQ	COMS1	:DECODE
2C787	20	00	2F	2C787	DEX		
2C788	20	00	2F	2C788	BPL	COML2	
2C789	20	00	2F	2C789	RTS		
2C78A	20	00	2F	2C78A	TXA		:SETUP
2C78B	20	00	2F	2C78B	ASLA		:COMMAND
2C78C	20	00	2F	2C78C	TAX		:POINTER
2C78D	20	00	2F	2C78D	LDA	LTAINST,X	:AND
2C78E	20	00	2F	2C78E	STA	ZWRKSPC	:DO
2C78F	20	00	2F	2C78F	LDA	LTAINST+1,X	:THE
2C790	20	00	2F	2C790	STA	ZWRKSPC+1	:COMMAND
2C791	20	00	2F	2C791	JMP	(ZWRKSPC)	
2C792	20	00	2F	2C792	JSR	INCDT3	:MANAGER
2C793	20	00	2F	2C793	LDX	IMODE	:DATA
2C794	20	00	2F	2C794	BEQ	DBFIND	:BYTE
2C795	20	00	2F	2C795	STA	(RDWRKP),Y	:REPLACE
2C796	20	00	2F	2C796	JMP	DBFS1	
2C797	20	00	2F	2C797	LDX	MPFLAG	:SEARCH
2C798	20	00	2F	2C798	BEQ	DBFINDMW	
2C799	20	00	2F	2C799	CMP	(RDWRKP),Y	
2C79A	20	00	2F	2C79A	BEQ	DBFS1	
2C79B	20	00	2F	2C79B	PLA		
2C79C	20	00	2F	2C79C	PLA		
2C79D	20	00	2F	2C79D	SEC		
2C79E	20	00	2F	2C79E	RTS		
2C79F	20	00	2F	2C79F	JSR	INCDT	:MULTBLE
2C7A0	20	00	2F	2C7A0	CMP	(RDWRKP),Y	:WILD
2C7A1	20	00	2F	2C7A1	BNE	DBFL1	:CARD
2C7A2	20	00	2F	2C7A2	JSR	PATFSET	
2C7A3	20	00	2F	2C7A3	JSR	SETINCF	
2C7A4	20	00	2F	2C7A4	RTS		
2C7A5	20	00	2F	2C7A5	CMP	#3	:MANAGER
2C7A6	20	00	2F	2C7A6	BEQ	TIMEWLD	:TIME
2C7A7	20	00	2F	2C7A7	JSR	INCDT2	:BITS
2C7A8	20	00	2F	2C7A8	LDX	IMODE	
2C7A9	20	00	2F	2C7A9	BEQ	TBFIND	
2C7AA	20	00	2F	2C7AA	STA	(RTWRKP),Y	:REPLACE

2CD1:	4C	EB	2C	369	TBFL1	JMP	TBFS1	
2CD4:	AF	2B	2F	370	TBFL1	LDX	MPFLAG	;SEARCH
2CD7:	F0	0B		371	TBFL1	BEQ	TBFL1	
2CD9:	D1	04		372	TBFL1	CMP	(RTWRKP),Y	
2CD8:	F0	0E		373	TBFL1	BEQ	TBFS1	
2CDD:	68			374	TBFL1	PLA		
2CDE:	68			375	TBFL1	PLA		
2CE0:	38			376	TBFL1	SEC		
2CE1:	20	99	2E	377	TBFL1	RTS		
2CE4:	D1	04		378	TBFL1	JSR	INCDT	
2CE6:	F0	09		379	TBFL1	CMP	(RTWRKP),Y	;MULTBLE
2CE8:	20	C5	2E	380	TBFL1	BNE	TBFL1	;WILD
2CEB:	20	88	2E	381	TBFL1	JSR	PATFSET	;CARD
2CEE:	60			382	TBFL1	JSR	SETINCN	
				383	TBFL1	RTS		
				384				
2CEF2:	20	94	2E	385	TIMEWLD	JSR	INCDT2	;INSTRCT
2CF5:	AF	2B	2F	386	TIMEWLD	LDX	MPFLAG	;#03
2CF7:	F0	0B		387	TIMEWLD	BEQ	TMWS1	
2CF9:	B1	04		388	TIMEWLD	LDA	(RTWRKP),Y	
2CFB:	D0	0E		389	TIMEWLD	BNE	TMWS2	
2CFD:	68			390	TIMEWLD	PLA		
2CFC:	68			391	TIMEWLD	PLA		
2CFE:	38			392	TIMEWLD	SEC		
2CF0:	20	99	2E	393	TIMEWLD	RTS		
2CF2:	B1	04		394	TIMEWLD	JSR	INCDT	
2CF4:	F0	09		395	TIMEWLD	LDA	(RTWRKP),Y	
2CF6:	20	C5	2E	396	TIMEWLD	BEQ	TMWL1	
2CF8:	20	88	2E	397	TIMEWLD	JSR	PATFSET	
2CF9:	20	88	2E	398	TIMEWLD	JSR	SETINCN	
2D0C:	60			399	TIMEWLD	RTS		
				400				
2D0D:	68			401	ANLDONE	PLA		;INSTRCT
2D0E:	68			402	ANLDONE	PLA		;#10
2D0F:	68			403	ANLDONE	PLA		
2D10:	68			404	ANLDONE	PLA		
2D11:	60			405	ANLDONE	RTS		
				406				
2D12:	20	05	2F	407	SSETUP1	JSR	TWRKCPPI	
2D15:	20	69	2E	408	SSETUP	JSR	RSETUP	
2D18:	4C	1E	2D	409	SSETUP	JMP	SSBS1	
2D1B:	20	05	2F	410	STRTSUB	JSR	TWRKCPPI	;INSTRCT
2D1E:	A6	06		411	STRTSUB	LDX	CPP	;#20
2D20:	8E	30	2F	412	STRTSUB	STX	SUBPNTR	
2D23:	60			413	STRTSUB	RTS		
				414				
2D24:	AE	20	2F	415	RTRNSUB	LDX	ENDBFLAG	;INSTRCT
2D27:	D0	EF		416	RTRNSUB	BNE	SSETUP1	;#21
2D29:	AE	30	2F	417	RTRNSUB	LDX	SUBPNTR	
2D2C:	86	06		418	RTRNSUB	STX	CPP	
2D2E:	20	FC	2E	419	RTRNSUB	JSR	TCPPWRK	
2D31:	C6	08		420	RTRNSUB	DEC	CPWP	
2D33:	60			421	RTRNSUB	RTS		
				422				
2D34:	A9	00		423	CIMODE	LDA	#0	;INSTRCT
2D36:	F0	02		424	CIMODE	BEQ	DOMODE	;#31
2D38:	A9	01		425	CIMODE	LDA	#1	;INSTRCT
2D3A:	8D	2A	2F	426	CIMODE	STA	IMODE	;#35
2D3D:	20	94	2E	427	CIMODE	JSR	INCDT2	
2D40:	20	CD	2E	428	CIMODE	JSR	TWRKROP	
2D43:	4C	05	2F	429	CIMODE	JMP	TWRKCPPI	
				430				
2D46:	A9	00		431	CIMODER	LDA	#0	;INSTRCT
2D48:	F0	02		432	CIMODER	BEQ	DOMODE2	;#32
2D4A:	A9	01		433	CIMODER	LDA	#1	;INSTRCT
2D4C:	8D	2A	2F	434	CIMODER	STA	IMODE	;#36
2D4F:	20	D9	2E	435	CIMODER	JSR	TRDPWRK	
2D52:	4C	05	2F	436	CIMODER	JMP	TWRKCPPI	
				437				
2D55:	20	69	2E	438	CIMODES	JSR	RSETUP	;INSTRCT
2D58:	4C	05	2F	439	CIMODES	JMP	TWRKCPPI	;#30
				440				
2D5B:	20	8E	2E	441	FINVLD	JSR	INCDT3	
2D5E:	4C	64	2D	442	FINVLD	JMP	FINL3	
2D61:	20	99	2E	443	FINL1	JSR	INCDT	
2D64:	B1	02		444	FINL3	LDA	(RDWRKP),Y	;INSTRCT
2D66:	85	FE		445	FINL3	STA	ZWRKSPC	;#50
2D68:	A2	07		446	FINL3	LDX	#7	
2D6A:	CA			447	FINL2	DEX		
2D6B:	30	F4		448	FINL2	BMI	FINL1	
2D6D:	A5	FE		449	FINL2	LDA	ZWRKSPC	
2D6F:	30	82	2F	450	FINL2	AND	LTFINVLD,X	
2D72:	D0	F6		451	FINL2	BNE	FINL2	
2D74:	20	CD	2E	452	FINL2	JSR	TWRKROP	
2D77:	20	84	2E	453	FINL2	JSR	SETINCF	
2D7A:	60			454	FINL2	RTS		

2D7B:	20	8E	2E	455	FNONFF	JSR	INCDT3		
2D7E:	4C	84	2D	456		JMP	FNFL2		
2D81:	20	99	2E	457	FNFL1	JSR	INCDT		
2D84:	B1	02		458	FNFL2	LDA	(R0WRKP),Y	; INSTRUCT	
2D86:	C9	FF		459		CMP	##FF	; #51	
2D88:	F0	FF		460		BEO	FNFL1		
2D8A:	20	CD	2E	461		JSR	TWRKROP		
2D8D:	20	84	2E	462		JSR	SETINCF		
2D90:	60			463		RTS			
2D91:	20	94	2E	464	RRVALID	JSR	INCDT2		
2D94:	EE	31	2F	465		INC	RNDMULD	; INSTRUCT	
2D97:	AE	31	2F	466		LDA	RNDMULD	; #52	
2D9A:	E0	42		467		CPX	##42		
2D9C:	D0	05		468		BNE	RRVS1		
2D9E:	A2	00		469		LDA	#0		
2DA0:	8E	31	2F	470		STX	RNDMULD		
2DA3:	BD	89	2F	471	RRVS1	LDA	LTRVALID,X		
2DA6:	91	02		472		STA	(R0WRKP),Y		
2DA8:	20	99	2E	473		JSR	INCDT		
2DAB:	60			474		RTS			
2DAC:	20	94	2E	475	RRINULD	JSR	INCDT2		
2DAF:	EE	32	2F	476		INC	RNDMINV	; INSTRUCT	
2DB2:	AE	32	2F	477		LDA	RNDMINV	; #56	
2DB5:	E0	2E		478		CPX	##2E		
2DB7:	D0	05		479		BNE	RRIS1		
2DB9:	A2	00		480		LDA	#0		
2DBB:	8E	32	2F	481		STX	RNDMINV		
2DBE:	BD	CB	2F	482	RRIS1	LDA	LTRINULD,X		
2DC1:	91	02		483		STA	(R0WRKP),Y		
2DC3:	20	99	2E	484		JSR	INCDT		
2DC6:	60			485		RTS			
2DC7:	20	94	2E	486	RRIVULD	JSR	INCDT2		
2DCA:	EE	33	2F	487		INC	RNDMUIV	; INSTRUCT	
2DCD:	AE	33	2F	488		LDA	RNDMUIV	; #57	
2DD0:	E0	06		489		CPX	#6		
2DD2:	D0	05		490		BNE	RRVIS1		
2DD4:	A2	00		491		LDA	#0		
2DD6:	8E	33	2F	492		STX	RNDMUIV		
2DD9:	BD	F9	2F	493	RRVIS1	LDA	LTRIVULD,X		
2DDC:	91	02		494		STA	(R0WRKP),Y		
2DDE:	20	99	2E	495		JSR	INCDT		
2DE1:	60			496		RTS			
2DE2:	20	94	2E	497	RRZERO	JSR	INCDT2		
2DE5:	A9	00		498		LDA	#0	; INSTRUCT	
2DE7:	91	02		499		STA	(R0WRKP),Y	; #58	
2DE9:	20	99	2E	500		JSR	INCDT		
2DEC:	60			501		RTS			
2DED:	E6	08		502	ADDBYTW	INC	CPWP	; INSTRUCT	
2DEF:	B1	08		503		LDA	(CPWP),Y	; #60	
2FF1:	18			504		CLC			
2FF2:	65	04		505		ADC	RTWRKP		
2FF4:	AA			506		TAX			
2FF5:	E6	08		507		INC	CPWP		
2FF7:	B1	08		508		LDA	(CPWP),Y		
2FF9:	65	05		509		ADC	RTWRKP+1		
2FFB:	C9	B0		510	DBCHK	CMP	##B0		
2FFD:	B0	0C		511		BCS	ADDBER		
2FFF:	C9	78		512		CMP	##78		
2E01:	90	08		513		BCC	ADDBER		
2E03:	85	05		514	ADDBDN	STA	RTWRKP+1		
2E05:	86	04		515		STX	RTWRKP		
2E07:	20	F0	2E	516		JSR	TDCALC		
2E0A:	60			517		RTS			
2E0B:	4C	B1	2E	518	ADDBER	JMP	HITBEND		
2E0E:	E6	08		519	SUBBYTW	INC	CPWP	; INSTRUCT	
2E10:	A5	04		520		LDA	RTWRKP	; #61	
2E12:	38			521		SEC			
2E13:	F1	08		522		SBC	(CPWP),Y		
2E15:	AA			523		TAX			
2E16:	E6	08		524		INC	CPWP		
2E18:	A5	05		525		LDA	RTWRKP+1	; INSTRUCT	
2E1A:	F1	08		526		SBC	(CPWP),Y	; #41	
2E1C:	4C	FB	2D	527		JMP	DBCHK		
2E1F:	E6	08		528	ADDBYT	INC	CPWP	; INSTRUCT	
2E21:	B1	08		529		LDA	(CPWP),Y	; #62	
2E23:	18			530		CLC			
2E24:	65	00		531		ADC	RDP		
2E26:	85	00		532		STA	RDP		

2E330:	E6	08	541	INC	CPWP	
2E331:	B1	08	542	LDA	(CPWP),Y	
2E332:	65	01	543	ADC	RDP+1	
2E333:	00	01	544	STA	RDP+1	
2E334:	00	D9	545	JSR	TRDPWRK	
2E335:	60		546	RTS		
2E336:			547			
2E337:	E6	08	548	SUBBYT	INC	CPWP
2E338:	A3	00	549	LDA	RDP	: INSTRUCT
2E339:	00		550			: #63
2E340:	00		551	SEC		
2E341:	00	08	552	SBC	(CPWP),Y	
2E342:	00	00	553	STA	RDP	
2E343:	00	08	554	INC	CPWP	
2E344:	00	01	555	LDA	RDP+1	
2E345:	00	08	556	SBC	(CPWP),Y	
2E346:	00	01	557	STA	RDP+1	
2E347:	00	D9	558	JSR	TRDPWRK	
2E348:	60		559	RTS		
2E349:	20	99	560	SWLDCD	JSR	INCDT
2E350:	20	84	561	JSR	SETINCF	: INSTRUCT
2E351:	60		562	RTS		: #70
2E352:			563			
2E353:	A9	00	564	MWLDCD	LDA	#0
2E354:	80	28	565	STA	MPFLAG	: INSTRUCT
2E355:	20	99	566	JSR	INCDT	: #71
2E356:	60		567	RTS		
2E357:			568			
2E358:	20	94	569	STHIGH	JSR	INCDT2
2E359:	B1	04	570	LDA	(RTWRKP),Y	: INSTRUCT
2E360:	09	80	571	ORA	#\$80	: #73
2E361:	91	04	572	STA	(RTWRKP),Y	
2E362:	20	99	573	JSR	INCDT	
2E363:	60		574	RTS		
2E364:			575			
2E66:	4C	59	576	QUIT	JMP	\$FF59
			577			: INST#75
			578			
			579			
			580			
			581			
			582			
2E69:	A9	40	583	RSETUP	LDA	##40
2E68:	85	01	584	STA	RDP+1	: SETUP
2E67:	A9	00	585	LDA	#0	: THE
2E66:	00		586	STA	RDP	: RAW
2E65:	2A	2F	587	STA	IMODE	: DISK
2E64:	2B	2F	588	STA	MPFLAG	: BYTE
2E63:	20	2F	589	STA	ENDBFLAG	: BUFFER
2E62:	D9	2E	590	JSR	TRDPWRK	
2E61:	60		591	RTS		
2E60:			592			
2E5F:	A2	00	593	CLRMPFLG	LDX	#0
2E5E:	8E	2B	594	STX	MPFLAG	: CLEAR
2E5D:	60	2F	595	RTS		: MP
			596			: FLAG
2E5C:	A2	80	597	SETINCF	LDX	##80
2E5B:	00	02	598	BNE	SIS1	: SET
2E5A:	A2	01	599	SETINCN	LDX	##01
2E59:	8E	2C	600	STX	SIS1	: FORCE
2E58:	60	2F	601	RTS	MNBFLAG	: SET
			602			: NOFORCE
2E57:	AE	2C	603	INCDT3	LDX	MNBFLAG
2E56:	30	06	604	BMI	INCDT	: INC
2E55:	60		605	RTS		: DATA/
2E54:	AE	2C	606	INCDT2	LDX	MNBFLAG
2E53:	00	2F	607	BEQ	IL1	: TIME
2E52:	A2	00	608	INCDT	LDX	#0
2E51:	8E	2F	609	STX	MNBFLAG	: BUFFER
2E50:	00	04	610	INC	RTWRKP	: POINTER
2E4F:	00	02	611	INC	RDWRKP	: IF
2E4E:	A2	01	612	BEQ	IS1	: MNB
2E4D:	60		613	RTS		: FLAG
2E4C:	AE	05	614	IL1	INC	: IS
2E4B:	60	03	615	IS1	INC	
2E4A:	00	00	616	LDX	RTWRKP+1	
2E49:	00	00	617	CPX	RDWRKP+1	
2E48:	00	00	618	BNE	RTWRKP+1	
2E47:	60		619	PLA	##80	
2E46:	60		620	PLA	IL1	
2E45:	00		621	HITBEND	LDX	#1
2E44:	80	2F	622	STX	ENDBFLAG	
2E43:	A2	00	623	LDX	##FF	
2E42:	00	02	624	STX	RDWRKP	
2E41:	00	04	625	STX	RTWRKP	
2E40:	A2	77	626	LDX	##77	
2E3F:	86	03	627	STX	RDWRKP+1	

2EC0:	A2	AF	627		LDX	#AF	
2EC2:	86	05	628		STX	RTWRKP+1	
2EC4:	60		629		RTS		
			630				
2EC5:	AE	2B	631	PATFSET	LDX	MPFLAG	PATRN
2EC8:	D0	0E	632		BNE	PATS1	FLAG
2ECA:	EE	2B	633		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	638		JSR	TWRKCPP	
2ED8:	60		639	PATS1	RTS		
			640				
2ED9:	48		641	TRDPWRK	PHA		INSTRCT
2EDA:	A9	00	642		LDA	#0	#40
2EDC:	8D	2C	643		STA	MNBFLAG	
2EDF:	A5	00	644		LDA	RDP	TRANSFER
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
2EEE:	68		652		PLA		
2EEF:	60		653		RTS		
			654				
2EF0:	A5	04	655	TDCALC	LDA	RTWRKP	CALC
2EF2:	85	02	656		STA	RDWRKP	DATA
2EF4:	A5	05	657		LDA	RTWRKP+1	WORK
2EF6:	38		658		SEC		FROM
2EF7:	E9	38	659		SBC	#38	TIME
2EF9:	85	03	660		STA	RDWRKP+1	WORK
2EFB:	60		661		RTS		
			662				
2EFC:	A6	06	663	TCPPWRK	LDX	CPP	TRANSFER
2EFE:	86	08	664		STX	CPWP	CPP TO
2F00:	86	07	665		LDX	CPP+1	CNTRL
2F02:	86	09	666		STX	CPWP+1	WORK
2F04:	60		667		RTS		
			668				
2F05:	20	0B	669	TWRKCPP1	JSR	TWRKCPP	POINT
2F08:	E6	06	670		INC	CPP	AFTER
2F0A:	60		671		RTS		COMMAND
2F0B:	A6	08	672	TWRKCPP	LDX	CPWP	TRANSFER
2F0D:	86	06	673		STX	CPP	CNTRL
2F0F:	A6	09	674		LDX	CPWP+1	WORK
2F11:	86	07	675		STX	CPP+1	TO CPP
2F13:	60		676		RTS		
			677				
2F14:	A6	00	678	TRDPSTR	LDX	RDP	INSTRCT
2F16:	8E	2E	679		STX	STORAGEL	#42
2F19:	A6	01	680		LDX	RDP+1	TRANSFER
2F1B:	8E	2F	681		STX	STORAGEH	RDP TO
2F1E:	60		682		RTS		STORAGE
			683				
2F1F:	AE	2E	684	TSTRD	LDX	STORAGEL	INSTRCT
2F22:	86	00	685		STX	RDP	#43
2F24:	AE	2F	686		LDX	STORAGEH	TRANSFER
2F27:	86	01	687		STX	RDP+1	STORAGE
2F29:	60		688		RTS		TO RDP
			689				
2F2A:	00		690	IMODE	DFB	0	
2F2B:	00		691	MPFLAG	DFB	0	
2F2C:	00		692	MNBFLAG	DFB	0	
2F2D:	00		693	ENDBFLAG	DFB	0	
2F2E:	00		694	STORAGEL	DFB	0	
2F2F:	00		695	STORAGEH	DFB	0	
2F30:	00		696	SUBPNTR	DFB	0	
2F31:	00		697	RNDMULD	DFB	0	
2F32:	00		698	RNDMINV	DFB	0	
2F33:	00		699	RNDMIV	DFB	0	
			700				
			701				
			702				
			703				
			704				
			705	LTCINST	DFB	\$10	ANLDONE
2F34:	10		706		DFB	\$20	STRTSUB
2F35:	20		707		DFB	\$21	RTRNSUB
2F36:	21		708		DFB	\$35	SIMODE
2F37:	35		709		DFB	\$36	SIMODE2
2F38:	36		710		DFB	\$30	CIMODE5
2F39:	30		711		DFB	\$31	CIMODE
2F3A:	31		712		DFB	\$32	CIMODER
2F3B:	32						

2F3C: 40
2F3D: 41
2F3E: 42
2F3F: 43
2F40: 45
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
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DFB \$63
DFB \$70
DFB \$71
DFB \$73
DFB \$75

TRDPWRK
TWKRKRD
TRDPSTR
TSTRROP
FINVLD
FNONFF
RRVALID
RRINVLD
RRVIVLD
RRZERO
ADDBYTW
SUBBYTW
ADDBYT
SUBBYT
SWLDCCD
MWLDCCD
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	STRTSUB	20	1
	DA	RTRNSUB	21	2
	DA	SIMODE	35	3
	DA	SIMODE2	36	4
	DA	CIMODES	30	5
	DA	CIMODE1	31	6
	DA	CIMODER	32	7
	DA	TRDPWRK	40	8
	DA	TWKRKRD	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	RRVIVLD	57	1
	DA	RRZERO	58	11
	DA	ADDBYTW	60	12
	DA	SUBBYTW	61	13
	DA	ADDBYT	62	14
	DA	SUBBYT	63	15
	DA	SWLDCCD	70	16
	DA	MWLDCCD	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 E5 E6
2FB4: E7 E9 EA
2FB9: ED EE EF
2FBC: F3 F4 F5
2FC1: F7 F8 F9
2FC4: FB FC FD
2FC9: AA AD AE

LTRVALID	HEX	96979A9B9D9E9FA6
	HEX	A7ABACADAEAFB2B3
	HEX	B4B5B6B7B9BABBBBC
	HEX	BDBEBFCBCDCECFD3
	HEX	D6D7D9DADBDCDDDE
	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 792
2FD6: 8B 8C 8D 8E 8F
2FDB: 90 91 98 793
2FDE: A0 A1 A2 A3 B0
2FE3: B1 B8 C0 794
2FE6: C1 C2 C3 C4 C5
2FEB: C6 C7 C8 795
2FEE: D0 D1 D8 E0 E1
2FF3: E2 E3 E8 796
2FF6: F0 F1 F8

```

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797
798 *-----*
799 * LOOK UP TABLE FOR REPLACING *
800 * WITH VERY INVALID BYTES *
801 *-----*
802
803 LTRVIVLD HEX 80818283C0C1

```

--End assembly--

981 bytes

Errors: 0

[illegible]

```

3078:: A6 DD
307B:: DD DD
3083:: A0 A0
308B:: C9 C1
3093:: A0 C4
309B:: D4 CF
30A3:: CC D5

```

[illegible]

FD0003079

```
*-----*
```

```
* EDD 4 TEXT *
```

```
*-----*
```

[illegible]

```

TXT          ASC  "&]]]]]
A0  FD  A0
C5  CE  D4
C1  D4  C1
C9  C3  C1
FB  A0  D0
DD

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30A9: DD A0 A0 80 ASC "1 1 3" VERSION 4.2( PLUS)"
30AC: A0 A0 A0 FD A0 A0 A0 D2
30B4: A0 A0 A0 D6 A0 C5 D2
30BC: D3 C9 CF CE A0 B4 AE B2
30C4: FB A0 D0 CC D5 D3 FD
30CB: DD A0 A0 81 ASC "1" SERIAL NUMBER #0000000"
30CE: A0 A0 A0 A0 A0 A0 D3
30D4: C5 D2 C9 C1 CC A0 CE D5
30DE: CD C2 C5 D2 A0 A3 B0 B0
30E6: B0 B0 B0 B0
30FA: DD A0 A0 82 ASC "1" APRIL 23, 1986 1"
30FD: A0 A0 A0 A0 A0 A0 A0
30F5: A0 A0 A0 C1 D0 D2 C9 CC
30FD: A0 A0 B2 B3 AC A0 B1 B9 B8
3105: B6 A0 A0 A0 A0 A0 A0
310D: A0 A0 A0 D0
3111: DD A0 A0 83 ASC "1" UTILICO MICROWARE"
3114: A0 A0 A0 A0 A0 A0 A0
311C: A0 D5 D4 C9 CC C9 C3 CF
3124: A0 CD C9 C3 D2 CF D7 C1
312C: D2 C5
312E: DD A0 A0 84 ASC "1" 3377 SOLANO AVE., SUITE#352"
3131: A0 A0 A0 A0 B3 B3 B7 B7
3139: A0 D3 CF CC C1 CE CF A0
3141: C1 D4 C5 AE AC A0 D3 D5
3149: C9 D4 C5 A3 B3 B5 B2
3150: DD A0 A0 85 ASC "1" NAPA, CALIFORNIA 9455811"
3153: A0 A0 A0 A0 A0 A0 CE C1
3158: DD C1 AC A0 C3 C1 CC C9
3163: C6 CF D2 CE C9 C1 A0
3168: B9 B4 B5 B5 B8 DD
3172: DD A0 A0 86 ASC "1 1 3" (SOFTWARE) BY DONALD A. SCHNAPP1"
3175: FC A0 A0 A0 FD A0 A0 A0
317D: FB D3 CF C6 D4 D7 C1 D2
3185: C5 FD A0 C2 D9 A0 C4 CF
318D: CE C1 CC C4 A0 C1 AE A0
3195: D3 C3 C8 CE C1 D0 D0 DD
319D: FB A0 A0 87 ASC "1" HARDWARE BY CHARLES J. ROSENBERG1"
31A8: A0 A0 C8 C1 D2 C4 D7 C1
31B0: D2 C5 A0 C2 D9 A0 C3 C8
31B8: C1 D2 CC CE D3 A0 CA AE
31C0: A0 D2 CF D3 C5 CE C2 C5
31C4: DD A0 A0 88 ASC "1" COPYRIGHT (C) 1986 UTILICO MICROWARE"
31C7: C3 CF D0 D2 D2 C9 C7 C8
31CF: D4 A0 A8 C3 A9 A0 B1 B9
31D7: B8 B6 A0 D5 D4 C9 CC C9
31DF: C3 CF A0 CD C9 C3 D2 CF
31E7: D7 C1 D2 C5
31EB: DD A0 A0 89 ASC "1" ALL RIGHTS ARE RESERVED^2"
31EE: A0 A0 A0 A0 A0 C1 CC
31F6: CC A0 D2 C9 C7 C8 D4 D3
31FE: A0 C1 D2 C5 A0 D2 C5 D3
3206: C5 D2 D6 C5 C4 DE C0
320D: A6 A0 FC 90 TXTS ASC "& 1 3" ESSENTIAL DATA DUPLICATOR 4( PLUS12"
3210: A0 A0 FD A0 A0 A0 A0 C5
3218: D3 D3 C5 CE D4 C9 C1 CC
3220: A0 C4 C1 D4 C1 A0 C4 D5
3228: D0 CC C9 C3 C1 D4 CF D2
3230: A0 B4 FB A0 D0 CC D5 D3
3238: DD C0
323A: A0 A0 91 TXTRK ASC "0000000000111111111222222222333333"
323D: A0 B0 B0 B0 B0 B0 B0 B0
3245: B0 B0 B0 B1 B1 B1 B1 B1
324D: B1 B1 B1 B1 B1 B2 B2 B2
3255: B2 B2 B2 B2 B2 B2 B2 B3
325D: B3 B3 B3 B3 B3
3262: D4 D2 C8 92 ASC "TRK:0123456789012345678901234567890123452"
3265: BA B0 B1 B2 B3 B4 B5 B6
326D: B7 B8 B9 B0 B1 B2 B3 B4
3275: B5 B6 B7 B8 B9 B0 B1 B2
327D: B3 B4 B5 B6 B7 B8 B9 B0
3285: B1 B2 B3 B4 B5 C0
3288: AE B0 B0 93 TXTF ASC ".00(1)"
328E: A8 DD
3290: AE B2 B5 94 ASC ".25(1)"
3293: A8 DD
3295: AE B5 B0 95 ASC ".50(1)"
3298: A8 DD
329A: AE B7 B5 96 ASC ".75(12)"
329D: A8 DD C0
32A0: FC A0 A0 97
32A3: A0 FD A0 98 TXSLT ASC "1 3" ORIGINAL:S=0,D=0 DUPLICATE:S=0,D=0( (0)
32AB: CE C1 CC BA D3 BD B0 AC
32B3: C4 BD B0 A0 A0 C4 D5 D0

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32BB: CC C9 C3 C1 D4 C5 BA D3
32C3: BD B0 AC C4 BD B0 FB A0
32CB: A8 B0 A9 FD C0
          99
32D0: A6 DD DD 100 TX00 ASC "&]] - OPTION MENU -]]"
32D3: A0 A0 A0 A0 A0 A0 A0 A0
32D6: A0 CF D0 D4 C9 CF CE A0
32D9: A0 CD C5 CE D5 A0 A0 DD
32DE: DD
32E0: A0 A0 A0 101 ASC " 1. BACK UP A DISK]"
32E3: A0 A0 A0 B1 AE A0 C2 C1
32E6: C3 CB A0 D5 D0 A0 C1 A0
32E9: C4 C9 D3 CB DD
32EC: A0 A0 A0 102 ASC " 2. CHANGE PARAMETERS]"
32EF: A0 A0 A0 B2 AE A0 C3 C8
32F2: C1 CE C7 D4 C5 D0 C1 D2
32F5: A0 A0 A0 103 ASC " 3. CHECK DRIVE SPEED]"
32F8: A0 A0 A0 B3 AE A0 C3 C8
32FB: C5 C3 CB A0 C4 D2 C9 D4
32FE: A0 A0 A0 D0 C5 C5 C4 DD
3301: A0 A0 A0 104 ASC " 4. DISK SCAN]"
3304: A0 A0 A0 B4 AE A0 C4 C9
3307: D3 CB A0 D3 C3 C1 CE DD
330A: A0 A0 A0 105 ASC " 5. CERTIFY AND ERASE DISK]"
330D: A0 A0 A0 B5 AE A0 C3 C5
3310: D2 D4 C9 C6 D9 A0 C1 CE
3313: C4 A0 C5 D2 C1 D3 C5 A0
3316: A0 A0 A0 106 ASC " 6. CHANGE SLOTS AND DRIVES]"
3319: A0 A0 A0 B6 AE A0 C3 C8
331C: C1 CE C7 C5 A0 D3 CC CF
331F: D4 D3 A0 C1 CE C4 A0 C4
3322: A0 A0 A0 107 ASC " 7. EXAMINE DISK DRIVE]"
3325: A0 A0 A0 B7 AE A0 C5 D8
3328: C1 CD C9 CE C5 A0 C4 C9
332B: D3 CB A0 C4 D2 C9 D6 C5
332E: A0 A0 A0 108 ASC " 8. CLEAR ERROR CODES]"
3331: A0 A0 A0 B8 AE A0 C3 CC
3334: C5 C1 D2 A0 C5 D2 D2 CF
3337: D2 A0 C3 CF C4 C5 D3 DD
333A: A0 A0 A0 109 ASC " 9. QUIT^2"
333D: A0 A0 A0 B9 AE A0 D1 D5
3340: C9 D4 DE C0
3343: DF A0 A0 110 TX00 ASC "_ PRESS <"
3346: A0 A0 A0 D0 D2 C5 D3 D3
3349: A0 BC
334C: 54 112 FLS "RETURN"
334F: 52 4E
3352: A0 D4 113 ASC "> TO SELECT #[2]"
3355: A0 D3 C5 CC C5 C3 D4
3358: A0 A3 DB C0
335B: E0 A0 A0 114 TX0D ASC "` <"
335E: A0 A0 A0 BC
3361: A0 A0 115
3364: BE D2 C9 116 FLS "0"
3367: C7 C9 CE C1 CC A0 CF D2 117 ASC ">RIGINAL OR <"
336A: A0 BC
336D: 118 FLS "D"
3370: BE D5 D0 119 ASC ">UPLICATE DRIVE?] PRESS <"
3373: CC C9 C3 C1 D4 C5 A0 C4
3376: D2 C9 D6 C5 BF DD A0 A0
3379: A0 A0 D0 D2 C5 D3 D3 A0
337C: BC
337F: 120 INV "RETURN"
3382: 05 14 120
3385: 12 0E
3388: A0 C3 121 ASC "> FOR 2"
338B: CF D2 A0 C0
338E: E0 A0 A0 122 TX11 ASC "` INSERT 2"
3391: A0 A0 A0 C9 CE D3 C5 D2
3394: D4 A0 C0
3397: 124
339A: 4F 52 49 125 TX10 FLS "ORIGINAL"
339D: 47 49 4E 41 4C
339F: C0
33A2: 44 55 50 126 TX1D FLS "2"
33A5: 4C 49 43 41 54 45 FLS "DUPLICATE"
33A8: C0
33AB: C1 A0 127 TX1BL ASC "2"
33AE: 42 4C 41 128 ASC "A"
33B1: 4E 4B 130 FLS "BLANK"

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345D: C0 131 ASC "2"
345E: A0 C4 C9 132 TXIB2 ASC "DISK INTO THE] 2"
3461: D3 C8 A0 C9 CE D4 CF A0
3469: D4 C8 C5 D0 A0 A0 C0
3471: 0F 12 09 133 TXID0 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 C8 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 C8 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 C8 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 C8 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
3532: A0 D4 D2 C1 C3 C8 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 C8 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 C8 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 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 "0/"
35A1: D5 D4 CF 172 FLS "A"
173 ASC "UTOMATIC/"

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35A4: CD C1 D4 C9 C3 AF
35AA: 4D 174
35AB: C1 CE D5 175 FLS "M"
35AE: C1 CC A9 C0 175 ASC "ANUAL)?"
35B2: DD A0 A0 176 TXRTB ASC "J BIT COPY TRACKS? ?"
35B5: A0 A0 A0 177 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 179
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 184 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 D2 D3 A0
368B: D4 CF A0 C4 C5 C6 C1 D5
3693: CD 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 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 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^2"
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 C3 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 ": =2"
37D9: A0 A0 BD C0

37DD: A0 C3 C8 203 TXWPCNL ASC " CHANGE "
37E0: C1 CE C7 C5 A0
37E5: 10 12 05 204
37E8: 01 0E 01 0C 19 1A 05 INV "PREANALYZE"
37EF: A0 C2 D9 206 ASC " BYTE: =2"
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 C2 D9 210 ASC " BYTE: =2"
3810: D4 C5 BA A0 A0 A0 A0 BD
3818: C0

3819: A0 A0 A0 211 TXRPARM ASC " >>> PARAMETERS HAVE BEEN RESET <<<]"
381C: A0 BE BE BE A0 D0 C1 D2
3824: C1 CD C5 D4 C5 D2 D3 A0
382C: C8 C1 D6 C5 A0 C2 C5 C5
3834: CE A0 D2 C5 D3 C5 D4 A0
383C: BC BC BC DD
3840: A0 A0 A0 213 ASC " >>> TO THEIR DEFAULT VALUE <<<[2"
3843: A0 BE BE BE A0 A0 A0 D4
384B: CF A0 D4 C8 C5 C9 D2 A0
3853: C4 C5 C6 C1 D5 CC D4 A0
385B: D6 C1 CC D5 C5 A0 A0 A0
3863: BC BC BC DB C0

3868: A6 DD DD 214 TXAD ASC "&]] - FLOPPY DISK UTILITIES -"
386B: A0 A0 A0 215 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
389F: CE
38A0: DD A0 A0 217 ASC "] 2. CERTIFY AND ERASE DISK"
38A3: A0 A0 A0 A0 B2 AE A0 C3
38AB: C5 D2 D4 C9 C6 D9 A0 C1
38B3: CE C4 A0 C5 D2 C1 D3 C5
38BB: A0 C4 C9 D3 CB
38C0: DD A0 A0 218 ASC "] 3. RETURN TO OPTION MENU^2"
38C3: A0 A0 A0 A0 B3 AE A0 D2
38CB: C5 D4 D5 D2 CE A0 D4 CF
38D3: A0 CF D0 D4 C9 CF CE A0
38DB: CD C5 CE D3 DE C0

38E1: A6 DD DD 219 TXADR ASC "&]] - DISK DRIVE UTILITIES -]]"
38E4: A0 A0 A0 220 A0 A0 A0 A0
38EC: A0 C4 C9 D3 CB A0 C4 D2
38F4: C9 D6 C5 A0 D5 D4 C9 CC
38FC: C9 D4 C9 C5 D3 A0 A0 AD
3904: DD DD
3906: A0 A0 A0 221 ASC " 1. CHECK DRIVE SPEED]"
3909: A0 A0 A0 B1 AE A0 C3 C8
3911: C5 C3 CB A0 C4 D2 C9 D6
3919: C5 A0 D3 D0 C5 C5 C4 DD
3921: A0 A0 A0 222 ASC " 2. EXAMINE DRIVE]"
3924: A0 A0 A0 B2 AE A0 C5 D8
392C: C1 CD C9 CE C5 A0 C4 D2
3934: C9 D6 C5 DD
3938: A0 A0 A0 223 ASC " 3. RETURN TO OPTION MENU^2"
393B: A0 A0 A0 B3 AE A0 D2 C5
3943: D4 D5 D2 CE A0 D4 CF A0
394B: CF D0 D4 C9 CF CE A0 CD
3953: C5 CE D5 DE C0

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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 C0 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 C0 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 C0 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: 06 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 56 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

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3CEFF:	A0					FLS	"BLANK"
3CFD:	4C	41	275				
3CF3:	4E	4B					
3CF5:	A0	C4	C9	276		ASC	"DISK[?]"
3CF8:	D3	CB	DB	C0			
3CFC:	A6	DD	DD	277			
3CFF:	A0	A0	A0	278	TXSC	ASC	"&]] - DISK SCAN -^?"
3D07:	A0	A0	A0	A0	A0	A0	
3D0F:	D3	CB	A0	D3	C3	C1	CE
3D17:	AD	DE	C0				
3D1A:	A6	DD	DD	279			
3D1D:	A0	A0	A0	280	TXCE	ASC	"&]] - CERTIFY AND ERASE DISK -^?"
3D25:	A0	A0	C3	A0	A0	A0	AD
3D2D:	A0	C1	CE	D2	D4	C9	C6
3D35:	D3	C5	A0	C4	A0	C5	D2
3D3D:	AD	DE	C0	C4	C9	D3	CB
3D40:	E0	A0	A0	281			
3D43:	A0	A0	D3	282	TXCEG	ASC	"` SELECTED TRACKS CERTIFIED O.K.[?]"
3D4B:	C5	C4	A0	C5	C3	D4	
3D53:	D3	A0	C3	D4	D2	C1	C3
3D5B:	C9	C5	C4	C5	D2	D4	C9
3D63:	DB	C0		A0	CF	AE	CB
3D65:	E0	A0	A0	283			
3D68:	A0	A0	A0	284	TXCEB	ASC	"` BAD DISK; CERTIFY HAS "
3D70:	C9	D3	CB	C2	C1	C4	A0
3D78:	D4	C9	C6	BB	A0	C3	C5
3D80:	A0			D9	A0	C8	C1
3D81:	06	01	09				
3D84:	0C	05	04	285		INV	"FAILED"
3D87:	DB	C0				ASC	"[?]"
3D89:	A6	DD	DD	286			
3D8C:	A0	A0	A0	287			
3D94:	A0	A0	A0	288	TXCPYDSK	ASC	"&]] - BACK UP A DISK -^?"
3D9C:	C3	CB	A0	A0	A0	A0	A0
3DA4:	C4	C9	D3	A0	A0	A0	A0
3DAC:	A6	DD	A0	289			
3DAF:	A0	D4	D2	290	TXCPY1	ASC	"&] TRACK START: (RAW DISK BYTES)]?"
3DB7:	D4	C1	D2	C1	C3	CB	A0
3DBF:	C1	D7	A0	D4	BA	A0	A8
3DC7:	C2	D9	D4	C4	C9	D3	CB
3DCF:	DD	A0	A0	C5	D3	A9	DD
3DD2:	DD	A0	A0	291			
3DDA:	C5	CE	C4	291	TXCPY2	ASC	"] END TRACK: (RAW DISK BYTES)]?"
3DE2:	CB	BA	A0	A0	D4	D2	C1
3DEA:	C4	CC	D3	A8	D2	C1	D7
3DEF:	C5	D3	A9	CB	A0	C2	D9
3DF2:	DD	A0	A0	DD	C0		
3DFA:	A0	A0	A0	292	TXCPY3	ASC	"] TRACK: TRACK LENGTH:]"
3DFE:	CB	BA	A0	A0	D4	D2	C1
3E02:	A0	D4	D2	A0	A0	A0	A0
3E0A:	C5	CE	C7	C1	C3	CB	A0
3E11:	A0	A0	A0	D4	C8	BA	DD
3E14:	A0	A0	A0	293			
3E1A:	A0	A0	A0	A0	A0	A0	A0
3E24:	A0	A0	A0	A0	A0	A0	A0
3E2C:	C5	CE	C3	C9	C6	C6	C5
3E33:	A6	DD	DD	294			
3E36:	DD			295	PCSER	ASC	"&]]]"
3E37:	50	4C	55	296		FLS	"PLUS"
3E3A:	53						
3E3B:	A0			297		ASC	" "
3E3C:	43	41	52	298		FLS	"CARD"
3E3D:	44						
3E3E:	A0			299		ASC	" "
3E40:	41	52	52	300		FLS	"ERROR:"
3E44:	4F	52	7A				
3E47:	DD	DD	A0	301		ASC	"]] EITHER THE EDD PLUS CARD IS NOT]"
3E4A:	A0	C5	C9	D4	C8	C5	D2
3E4B:	D4	C8	C5	A0	C5	C4	C4
3E4C:	DD	CC	D5	D3	A0	C3	C1
3E4D:	C4	A0	C9	D3	A0	CE	CF
3E4E:	DD						
3E4F:	A0	A0	CC	302		ASC	" LOCATED IN SLOT# , OR THE PLUS CARD]"
3E52:	CF	C3	C1	D4	C5	C4	A0
3E5A:	CF	A0	D3	CC	CF	D4	A3
3E66:	AC	A0	CF	D2	A0	D4	C8
3E7E:	A0	DD	CC	D5	D3	A0	C3
3E86:	D2	C4	DD				
3E91:	A0	A0	C9	303		ASC	" IS NOT CONNECTED TO THE "
3E94:	D3	A0	CE	CF	D4	A0	C3


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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 * PREANALYZE BUFFER *
14 * B000 - $B0FF *
15 *-----*
16
17 ORG $B000
18
19 PREANLZ HEX 01
20 HEX 1010101010101010
21
22 HEX 1010101010101010
23
24 HEX 1010101010101010
25
26 HEX 1010101010101010
27
28 HEX 1010101010101010
29
30 HEX 1010101010101010
31
32 HEX 1010101010101010
33
34 HEX 1010101010101010
35
36 HEX 1010101010101010
37
38 HEX 1010101010101010
39
40 HEX 1010101010101010
41
42 HEX 1010101010101010
43
44 HEX 1010101010101010
45
46 HEX 1010101010101010
47
48 HEX 1010101010101010
49
50
51 * $80 = CHANGE INVALID TO FF'S
52 *
53 * $90 = GENERIC BITSLIP PRCTN 2
54 * USED ON SOME EPYX SFTWR
55 * SIMILAR TO GENERIC BIT
56 * -SLIP PRCTN (BELOW)
57 *
58
59 B080: 32 50 36 00 E7
60 B083: FF 01 21 00 E7
61 B088: 10 10 10 01 01
62 B08B: 10 10 10 02 00
63
64 * $B0 = GENERIC BITSLIP PROTECTN
65 * USE BY LOCKSMITH 5.0
66 * (COMPUTER) ADVANCED IDEAS
67 * MINDSCAPE
68 *
69
70 B0B0: 31 D5 AA 00 E7
71 B0B3: AD 60 FB 00 E7
72 B0B8: E7 E7 35 01 02
73 B0BB: 01 02 00 01 02
74 B0C0: 00 01 01 02 00
75 B0C3: 00 00 00 21 10
76
77 * $C8 = LOCK-IT-UP PROTECTION:
78 *
79
80 B0C8: 31 D5 AA 58
81 B0CB: 96 70 70 AA AA
82 B0D0: AF AA 71 59

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B0D3: D5 AA AD 60 56
B0D8: 00 35 58 60
B0DB: 58 58 58 21 10
                                HEX 0035585858582110
                                61
                                62 * $E0 = CLEAN TIMING BITS:
                                63 HEX 3103000361020035
B0E0: 31 03 00 00 35
B0E3: 01 61 02 00 64
B0E6: 00 21 31 61 02
B0E9: 00 03 00 65
B0EC: 21 35 00 10 10
B0EF: 10 10 10 10 10
B0F0: 10 10 10 10 10
                                HEX 1010101010101010
                                67
                                68 *-----*
                                69 * PREWRITE BUFFER *
                                70 * $B100 - $B1FF *
                                71 *-----*
B000: 01
B001: 10
B002: 10
B003: 10
B004: 10
B005: 10
B006: 10
B007: 10
B008: 10
B009: 10
B00A: 10
B00B: 10
B00C: 10
B00D: 10
B00E: 10
B00F: 10
B010: 10
B011: 10
B012: 10
B013: 10
B014: 10
B015: 10
B016: 10
B017: 10
B018: 10
B019: 10
B01A: 10
B01B: 10
B01C: 10
B01D: 10
B01E: 10
B01F: 10
B020: 10
B021: 10
B022: 10
B023: 10
B024: 10
B025: 10
B026: 10
B027: 10
B028: 10
B029: 10
B02A: 10
B02B: 10
B02C: 10
B02D: 10
B02E: 10
B02F: 10
B030: 10
B031: 10
B032: 10
B033: 10
B034: 10
B035: 10
B036: 10
B037: 10
B038: 10
B039: 10
B03A: 10
B03B: 10
B03C: 10
B03D: 10
B03E: 10
B03F: 10
B040: 10
B041: 10
B042: 10
B043: 10
B044: 10
B045: 10
B046: 10
B047: 10
B048: 10
B049: 10
B04A: 10
B04B: 10
B04C: 10
B04D: 10
B04E: 10
B04F: 10
B050: 10
B051: 10
B052: 10
B053: 10
B054: 10
B055: 10
B056: 10
B057: 10
B058: 10
B059: 10
B05A: 10
B05B: 10
B05C: 10
B05D: 10
B05E: 10
B05F: 10
B060: 10
B061: 10
B062: 10
B063: 10
B064: 10
B065: 10
B066: 10
B067: 10
B068: 10
B069: 10
B06A: 10
B06B: 10
B06C: 10
B06D: 10
B06E: 10
B06F: 10
B070: 10
B071: 10
B072: 10
B073: 10
B074: 10
B075: 10
B076: 10
B077: 10
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B079: 10
B07A: 10
B07B: 10
B07C: 10
B07D: 10
B07E: 10
B07F: 10
B080: 10
B081: 10
B082: 10
B083: 10
B084: 10
B085: 10
B086: 10
B087: 10
B088: 10
B089: 10
B08A: 10
B08B: 10
B08C: 10
B08D: 10
B08E: 10
B08F: 10
B090: 10
B091: 10
B092: 10
B093: 10
B094: 10
B095: 10
B096: 10
B097: 10
B098: 10
B099: 10
B09A: 10
B09B: 10
B09C: 10
B09D: 10
B09E: 10
B09F: 10
B0A0: 10
B0A1: 10
B0A2: 10
B0A3: 10
B0A4: 10
B0A5: 10
B0A6: 10
B0A7: 10
B0A8: 10
B0A9: 10
B0AA: 10
B0AB: 10
B0AC: 10
B0AD: 10
B0AE: 10
B0AF: 10
B0B0: 10
B0B1: 10
B0B2: 10
B0B3: 10
B0B4: 10
B0B5: 10
B0B6: 10
B0B7: 10
B0B8: 10
B0B9: 10
B0BA: 10
B0BB: 10
B0BC: 10
B0BD: 10
B0BE: 10
B0BF: 10
B0C0: 10
B0C1: 10
B0C2: 10
B0C3: 10
B0C4: 10
B0C5: 10
B0C6: 10
B0C7: 10
B0C8: 10
B0C9: 10
B0CA: 10
B0CB: 10
B0CC: 10
B0CD: 10
B0CE: 10
B0CF: 10
B0D0: 10
B0D1: 10
B0D2: 10
B0D3: 10
B0D4: 10
B0D5: 10
B0D6: 10
B0D7: 10
B0D8: 10
B0D9: 10
B0DA: 10
B0DB: 10
B0DC: 10
B0DD: 10
B0DE: 10
B0DF: 10
B0E0: 10
B0E1: 10
B0E2: 10
B0E3: 10
B0E4: 10
B0E5: 10
B0E6: 10
B0E7: 10
B0E8: 10
B0E9: 10
B0EA: 10
B0EB: 10
B0EC: 10
B0ED: 10
B0EE: 10
B0EF: 10
B0F0: 10
B0F1: 10
B0F2: 10
B0F3: 10
B0F4: 10
B0F5: 10
B0F6: 10
B0F7: 10
B0F8: 10
B0F9: 10
B0FA: 10
B0FB: 10
B0FC: 10
B0FD: 10
B0FE: 10
B0FF: 10
                                105 *-----*
                                106 * PROGRAM VARIABLES *
                                107

```

```

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 0A LTC 00      DA      10000,1000,100,10,1
140 B233: 03 34 00 0A 01 00
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 B23F: 80 08      LTP      DFB      $80,8      OS
151 B240: 800 03      DFB      $80,3      OD
152 B242: 800 08      DFB      $80,8      DS
153 B244: 800 03      DFB      $80,3      DD
154 B246: 80 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: FFF      DFB      $FC,$CC,$F8,$88
163 B24C: FFC CC F8 162      DFB      $F0,$E0,$C0,$80
164 B24F: FFF E0 C0 163      DFB      0
165 B250: FFF      164
166 B253: 80      165
167 B255: 1C 19 05 166 LTEA      DFB      28,25,5,5 ;TOGTHR
168 B258: 05      167      DFB      10,5,5,5 ;EQUALS
169 B259: 0A 05 05 167      DFB      5,4,3,3 ;100%
170 B25C: 05      168
171 B25D: 05 04 03 169
172 B260: 03      170
173
174 *-----*
175 * LOOK UP TABLE FOR DRIVE *
176 * SPEED CALCULATE ROUTINE *
177 *-----*
178 B261: 5C 2C 1D 174 LTDV      DFB      $5C,$2C,$1D,$00
179 B264: 00      175
180
181 B265: B0 B2 B5 176 LTQ      DFB      $B0,$B2,$B5,$B7
182 B268: B7      177
183
184 *-----*
185 * THE REST OF THE VARIABLES *
186 * ARE USED FOR VALUE STORING *
187 * AND GENERAL WORKSPACE DURING *
188 * PROGRAM EXECUTION. *
189 *-----*
190 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 * PARMS $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, (PARAM$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      306 DFB $7F,$AA,$AA,$AA
B304: 7F 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 ABSLNGTL DFB $72
B30D: 18 358 ABSLNGLTH DFB $18
359
360 DFB $0 ;UNUSED
361 DFB $0 ;UNUSED
362
363 -----
364 * PARM $10 = MINLNGLTH
365 *
366 * THIS VALUE REPRESENTS THE
367 * HIGH BYTE OF THE LOWEST TRACK
368 * LENGTH ACCEPTABLE.
369 -----
B310: 14 370 MINLNGLTH DFB $14
371
372 -----
373 * PARM $11 = MAXLNGLTH
374 *
375 * THIS VALUE REPRESENTS THE
376 * HIGH BYTE OF THE LARGEST
377 * TRACK LENGTH ACCEPTABLE.
378 -----
B311: 1C 379 MAXLNGLTH 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
B314: 00 460             DFB $0             ;UNUSED
B315: 00 461             DFB $0             ;UNUSED
B316: 00 462             DFB $0             ;UNUSED
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
B318: 00 477             DFB $0             ;UNUSED
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 *-----
565 TBLEND DS $B380-TBLEND
566 HEX 81D5AAAD71DEAA73
567
568 HEX 2110101010101010
569
570 HEX 1010101010101010
571
572 HEX 1010101010101010
573
574 HEX 1010101010101010
575
576 HEX 1010101010101010
577
578 HEX 1010101010101010
579
580 HEX 1010101010101010
581
582 HEX 1010101010101010
583
584
585 *-----
586 * PARM $C0-$FF = TRKLENGTH
587 *
588 * WHEN USING A RAW DISK BYTE
589 * PATTERN TO LOCATE THE TRACK'S
590 * LENGTH (PARM $12), THIS TABLE
591 * IS USED FOR THE RAW DISK BYTE
592 * PATTERNS.
593 *
594 * THIS TABLE IS USED IN THE SAME
595 * FASHION AS THE TBLEND TABLE
596 * ABOVE.
597 *
598 * PARAMETER $C0 POINTS TO THE
599 * FIRST POSITION OF THE TABLE
600 * WHICH HAS A DEFAULT VALUE OF
601 * $C1, MEANING THAT PARAMETER
602 * $C1 IS THE FIRST INSTRUCTION
603 * BYTE FOLLOWED.
604 *
605 * THE PRESET ROUTINE HERE,
606 * LOCATES THE ADDRESS FIELD
607 * OF SECTOR ZERO, THEN LOOKS
608 * FOR THE REPEAT, SUBTRACTS
609 * THE DISTANCE FROM THEIR
610 * POSITIONS TO CALCULATE TRACK
611 * LENGTH.
612 *-----
613
614 B3C0: C1 31 D5 602 TBLLNGTH 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 *****
211 * DRIVE ROUTINES *
212 *****
213
214 *-----*
215 * JUMP TABLE *
216 *-----*
217
218 ORG   DRVR   ;B700
219
220 JMP   TDUMPW ;B700
221 JMP   TDUMPP ;B703
222 JMP   ARMV   ;B706
223 JMP   ARMV2  ;B709
224 JMP   SYNCTRK2 ;B70C
225 JMP   TRKV1  ;B70F
226 JMP   TRKV2  ;B712
227 JMP   TRKV3  ;B715
228 JMP   ARMSPD ;B718
229 JMP   WRITETRK ;B71B
230 JMP   DCCDUMP ;B71E
231 JMP   TDUMPV ;B721
232 JMP   TRKDS  ;B724
233 JMP   PCRDCHK ;B727
234
235 DCCDUMP LDA DCCSL0T ;DUMP A
236 ASL A ;TRACK
237 ASL A ;USING
238 ASL A ;THE EDD
239 ASL A ;PLUS
240 TAX ;CARD
241 LDA #$40
242 STA $1
243 LDY #0
244 STY $0
245 LOOP1 LDA $1
246 CMP #$7F
247 BEQ DNDUMP
248 LDA $C0B1,X
249 BPL CHKRDY
250 LDA $C080,X
251 STA ($0),Y
252 INY
253 BNE LOOP1
254 INC $1
255 BNE CHKRDY
256 DNDUMP LDA #$40
257 STA $5
258 STA $7
259 LDA #$AF
260 STA $9
261 LDY #0
262 STY $0
263 STY $4
264 STY $6
265 STY $8
266 LDA #$F8
267 STA $2
268 LOOP3 LDX #8
269 LDA ($4),Y
270 STA $1
271 LOOP2 INC $2
272 ASL $1
273 ROL $0
274 BMI STORE
275 LDA $2
276 CMP #2
277 BNE LOOP4
278 STORE LDA $0
279 STA ($6),Y
280 LDA $2
281 STA ($8),Y
282 STY $0
283 LDA #$F8
284 STA $2

```


Address	Hex	Label	Instruction	Comments
B780	06		INC	\$6
B781	08		INC	\$8
B782	00		BNE	LOOP4
B783	07		INC	\$7
B784	06		DEC	\$9
B785	05		LDA	\$5
B786	00		CMP	\$9
B787	0F		BCC	DCL3
B788	CA	LOOP4	DEX	
B789	D0		BNE	LOOP2
B78A	06		INC	\$4
B78B	00		BNE	LOOP3
B78C	2A		INC	\$5
B78D	4A		LDA	\$5
B78E	7A		CMP	\$9
B78F	90		BCC	LOOP3
B790	A4		LDY	\$6
B791	AC	DCL3	LDA	#0
B792	2A		STA	\$6
B793	7A		STA	\$8
B794	90		JMP	DCL4
B795	4A	DCL2	STA	(\$6),Y
B796	7A		STA	(\$8),Y
B797	90		INY	
B798	BA		BNE	DCL2
B799	7A		DEC	\$9
B79A	06		INC	\$7
B79B	7C	DCL4	LDX	\$7
B79C	2A		CPX	\$78
B79D	4A		BNE	DCL2
B79E	7C		LDA	\$AF
B79F	90		STA	\$9
B7A0	CA	DCL1	LDA	(\$6),Y
B7A1	AC		TAX	
B7A2	2A		LDA	(\$8),Y
B7A3	7A		STA	(\$6),Y
B7A4	90		TXA	
B7A5	4A		STA	(\$8),Y
B7A6	7A		INY	
B7A7	90		BNE	DCL1
B7A8	D0		INC	\$7
B7A9	7A		DEC	\$9
B7AA	06		LDA	\$7
B7AB	7C		CMP	\$9
B7AC	2A		BCC	DCL1
B7AD	4A		RTS	
B7AE	7A		LDA	#0
B7AF	90		STA	#0
B7B0	CA		LDA	\$40
B7B1	AC		STA	\$1
B7B2	2A		LDX	CSLT
B7B3	7A		LDA	\$C08C,X
B7B4	90		BPL	TDVL
B7B5	4A		STA	(\$0),Y
B7B6	7A		INY	
B7B7	90		BNE	TDVL
B7B8	D0		INC	\$1
B7B9	7A		LDA	\$1
B7BA	06		CMP	\$78
B7BB	7C		BNE	TDVL
B7BC	2A		RTS	
B7BD	4A		DS	\$B800-MODDUMP
B7BE	7A		LDA	#40
B7BF	90		JSR	TDS1
B7C0	CA		LDA	#40
B7C1	AC		STA	\$1
B7C2	2A		LDA	\$78
B7C3	7A		STA	\$3
B7C4	90		LDA	#0
B7C5	4A		STA	\$0
B7C6	7A		STA	\$2
B7C7	90		TAY	
B7C8	BA	TCL1	LDA	(\$0),Y
B7C9	7A		BPL	TCS1
B7CA	06		LDA	#0
B7CB	7C	TCL2	STA	(\$2),Y
B7CC	2A		INY	
B7CD	4A		BNE	TCL1
B7CE	7A		INC	\$1
B7CF	90		INC	\$3
B7D0	CA		LDA	\$3
B7D1	AC		CMP	\$B0
B7D2	2A		BNE	TCL1
B7D3	7A		RTS	

```

DUMP
WHOLE
TRACK
INTO
MEMORY

```

B829:	60		371	RTS		
B82A:	09	80	372	ORA	#80	
B82C:	91	00	373	STA	(\$0),Y	
B82E:	AD	09	374	LDA	TIMEBITS	
B831:	4C	1A	375	JMP	TCL2	
		B3	376			
		B8	377			
B834:	A9	60	377	TDUMPP	LDA	#60
B836:	85	01	378	TDS1	STA	\$1
B838:	A0	00	379		LDY	#0
B83A:	84	00	380		STY	#0
B83C:	A9	7F	381		LDA	#7F
B83E:	85	02	382		STA	\$2
B840:	A6	10	383	TDUMP	LDX	CSLT
B842:	EA		384	TDR	NOP	
B843:	85	03	385		STA	\$3
B845:	EA		386		NOP	
B846:	EA		387		NOP	
B847:	BD	8C	388	TDL1	LDA	\$C08C,X
B84A:	30	18	389		BMI	TDS2
B84C:	BD	8C	390	TDL2	LDA	\$C08C,X
B84F:	30	16	391		BMI	TDS2
B851:	BD	8C	392		LDA	\$C08C,X
B854:	30	18	393		BMI	TDS3
B856:	BD	8C	394		LDA	\$C08C,X
B859:	30	16	395		BMI	TDS3
B85B:	BD	8C	396		LDA	\$C08C,X
B85E:	30	11	397		BMI	TDS3
B860:	BD	8C	398		LDA	\$C08C,X
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		BEQ	AMS1
B881:	A0	01	417	ARMV2	LDY	#1
B883:	8C	BD	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	424		JSR	AM
B892:	68		425		PLA	
B893:	8D	32	426	AM	STA	WANTTRK
B896:	C5	12	427		CMP	CTRK
B898:	F0	59	428		BEQ	ARMDONE1
B89A:	29	FE	429		AND	#FE
B89C:	8D	33	430		STA	WANTHALF
B89F:	A0	01	431		LDY	#1
B8A1:	8C	34	432		STY	PHSLST
B8A4:	A5	12	433		LDA	CTRK
B8A6:	29	FE	434		AND	#FE
B8A8:	20	0F	435		JSR	ARMD01
B8AB:	A5	12	436	AML1	LDA	CTRK
B8AD:	CD	33	437		CMP	WANTHALF
B8B0:	F0	13	438		BEQ	ARMQTR
B8B2:	B0	07	439		BCS	AMS2
B8B4:	E6	12	440		INC	CTRK
B8B6:	E6	12	441		INC	CTRK
B8B8:	4C	BF	442		JMP	AMS3
B8BB:	C6	12	443	AMS2	DEC	CTRK
B8BD:	C6	12	444		DEC	CTRK
B8BF:	20	11	445	AMS3	JSR	ARMD0
B8C2:	4C	AB	446		JMP	AML1
B8C5:	AD	32	447	ARMQTR	LDA	WANTTRK
B8C8:	C5	12	448		CMP	CTRK
B8CA:	F0	16	449		BEQ	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

DUMP
PART
OF THE
TRACK
INTO
MEMORY

TIME
THE
BYTE TO
SEE IF
THERE
IS AT
LEAST
ONE
TIMING
BIT
ATTACHD

ARM
MOVE
ROUTINE

THIS
ROUTINE
HANDLES
WHOLE,
HALF,
AND
QUARTER
TRACKS

MOVE
UP

MOVE
DOWN

QUARTER
TRACKING
MANAGER

B980	A0	00	457	TAX		
B981	A0	00	458	LDA	\$C080,Y	
B982	A0	00	459	LDA	\$C080,X	
B983	A0	00	460	JSR	W1	
B984	A0	00	461	JSR	W2	
B985	A0	00	462	LDX	CSLT	
B986	A0	00	463	LDA	\$C080,X	
B987	A0	00	464	LDA	\$C082,X	
B988	A0	00	465	LDA	\$C084,X	
B989	A0	00	466	LDA	\$C086,X	
B990	A0	00	467	JSR	EPCALC	
B991	A0	00	468	LDY	CTRK	
B992	A0	00	469	LDA	DRVCOUNT	
B993	A0	00	470	BEQ	PCS2	
B994	A0	00	471	LDA	DRVLETTR	CURNT
B995	A0	00	472	CMP	#0	TRK
B996	A0	00	473	BEQ	PCS1	PLACE
B997	A0	00	474	STY	CTRKD	
B998	A0	00	475	RTS		
B999	A0	00	476	PCS2	CTRKD	
B900	A0	00	477	PCS1	CTRKO	
B901	A0	00	478	RTS		
B902	A0	00	479	ARMDO1	CTRK	
B903	A0	00	480	ARMDO	CTRK	
B904	A0	00	481	AND	#06	
B905	A0	00	482	ORA	CSLT	
B906	A0	00	483	TAX		
B907	A0	00	484	INX		
B908	A0	00	485	LDY	PHSLST	
B909	A0	00	486	STA	PHSLST	
B910	A0	00	487	LDA	\$C080,Y	
B911	A0	00	488	LDA	\$C080,X	
B912	A0	00	489	JSR	W1	
B913	A0	00	490	RTS		
B914	A0	00	491			
B915	A0	00	492	TRKDS	CSLT	
B916	A0	00	493	TRKDSL1	#4	
B917	A0	00	494	TRKDSL2	DSKBYTE	
B918	A0	00	495	CMP	#FF	
B919	A0	00	496	BNE	TRKDSL1	
B920	A0	00	497	DEY		
B921	A0	00	498	BNE	TRKDSL2	
B922	A0	00	499	STY	\$1	
B923	A0	00	500	LDA	\$C08C,X	
B924	A0	00	501	BPL	TRKDSL3	
B925	A0	00	502	CMP	#FF	
B926	A0	00	503	BNE	DRVSS1	
B927	A0	00	504	INX		
B928	A0	00	505	BNE	TRKDSL3	
B929	A0	00	506	INC	\$1	
B930	A0	00	507	BNE	TRKDSL3	
B931	A0	00	508	STY	\$0	
B932	A0	00	509	RTS		
B933	A0	00	510			
B934	A0	00	511	TRKV1	\$10	
B935	A0	00	512	STA	\$0	
B936	A0	00	513	STA	\$1	
B937	A0	00	514	STA	\$2	
B938	A0	00	515	STA	\$3	
B939	A0	00	516	LDX	CSLT	
B940	A0	00	517	DEC	\$1	
B941	A0	00	518	BEQ	TRKV1ER	
B942	A0	00	519	LDY	\$10	
B943	A0	00	520	LDA	\$C08C,X	
B944	A0	00	521	BPL	TRKV1L2	
B945	A0	00	522	CMP	\$0	
B946	A0	00	523	STA	\$0	
B947	A0	00	524	BNE	TRKV1L1	
B948	A0	00	525	DEY		
B949	A0	00	526	BNE	TRKV1L2	
B950	A0	00	527	LDA	\$C08C,X	
B951	A0	00	528	BPL	TRKV1L3	
B952	A0	00	529	CMP	\$0	
B953	A0	00	530	BNE	TRKV1ER	
B954	A0	00	531	DEC	\$2	
B955	A0	00	532	BNE	TRKV1L3	
B956	A0	00	533	DEC	\$3	
B957	A0	00	534	BNE	TRKV1L3	
B958	A0	00	535	CLC		
B959	A0	00	536	RTS		
B960	A0	00	537	TRKV1ER		
B961	A0	00	538	RTS		
B962	A0	00	539			
B963	A0	00	540	TRKV2	\$0	
B964	A0	00	541	STY	\$1	
B965	A0	00	542	LDA	\$33	

85	00	543	STA	\$0	FOR
86	10	544	LDX	CSLT	MISC.
87	00	545	DEY		TRACKING
88	04	546	BNE	TRKV2L2	ROUTINS
89	00	547	DEC	\$0	
90	00	548	BEQ	TRKV2ER	
91	00	549	LDA	\$C08C,X	
92	C0	550	BPL	TRKV2L2	
93	00	551	TRKV2L3	CMF	
94	00	552	BNE	TRKV2L1	
95	B9	553	JSR	DSKBYTE	
96	00	554	CMF	#\$96	
97	00	555	BNE	TRKV2L3	
98	00	556	LDY	#\$10	
99	B9	557	JSR	DSKBYTE	
100	00	558	AND	#\$55	
101	00	559	ASLA		
102	00	560	STA	\$2	
103	B9	561	JSR	DSKBYTE	
104	00	562	AND	#\$55	
105	00	563	ORA	\$2	
106	00	564	STA	CWRK	
107	B9	565	TRKV2L4	JSR	
108	00	566	CMF	DSKBYTE	
109	00	567	BNE	TRKV2ER	
110	00	568	DEC	\$1	
111	00	569	BNE	TRKV2L4	
112	00	570	DEY		
113	00	571	BNE	TRKV2L4	
114	00	572	LDA	CWRK	
115	00	573	CLC		
116	00	574	RTS		
117	00	575	TRKV2ER	SEC	
118	00	576	RTS		
119	00	577			
120	00	578	DSKBYTE	LDA	\$C08C,X
121	00	579	BPL	DSKBYTE	GET A
122	00	580	RTS		DISK
123	00	581			BYTE
124	00	582	SYNCTR2	PHA	
125	00	583	LDY	SYNCF LG	SYNCTRK
126	00	584	BEQ	SYS3	SYNCF LG
127	00	585	CPY	#2	0=NO
128	00	586	BEQ	SYS4	1=MAYBE
129	00	587	CMF	TRKSYNC	2=YES
130	00	588	BEQ	SYS3	
131	00	589	SYS4	LDA	TRKSYNC
132	00	590	JSR	ARMV	SYNC
133	00	591	PLA		FROMTRK
134	00	592	PHA		
135	00	593	JSR	EPCALC1	
136	00	594	LDA	#\$53	FLASH
137	00	595	JSR	EP OUT	"S"
138	00	596	LDX	CSLT	E/PCODE
139	00	597	LDY	#0	
140	00	598	SYL1	LDA	\$C000
141	00	599	BMI	SYS2	
142	00	600	SYL2	LDA	\$C08C,X
143	00	601	BPL	SYL2	
144	00	602	EOR	SYNCTBLE,Y	
145	00	603	BMI	SYS1	
146	00	604	BNE	SYL1	
147	00	605	SYS1	INY	
148	00	606	CPY	#\$9	
149	00	607	BNE	SYL2	
150	00	608	SYL3	PLA	
151	00	609	JSR	ARMV	
152	00	610	RTS		
153	00	611	SYL2	CMF	#\$9B
154	00	612	BEQ	DOESC	
155	00	613	BIT	\$C010	
156	00	614	JMP	SYL1	
157	00	615	DOESC	JMP	CHKESC
158	00	616			
159	00	617	ARMSPD	LDA	#0
160	00	618	STA	ARMTFSL	ARM
161	00	619	STA	ARMWOKL	SPEED
162	00	620	STA	ARMCVL	FINDER
163	00	621	STA	ARMTFSH	FOR
164	00	622	LDA	#9	EXAMINE
165	00	623	STA	ARMWOKH	DISK
166	00	624	LDA	#1	DRIVE
167	00	625	STA	ARMCVH	OPTION
168	00	626	ARMSPL1	JSR	TESTIT
169	00	627	BCS	TOFAST	
170	00	628	LDA	ARMCVL	

BAB3A:	80	35	BB	629	STA	ARMWOKL	
BAB3B:	80			630	SEC		
BAB3C:	ED	37	BB	631	SBC	ARMTFSL	
BAB41:	85	00		632	STA	\$0	
BAB43:	AD	BF	B2	633	LDA	ARMCVH	
BAB46:	80	36	BB	634	STA	ARMWOKH	
BAB49:	ED	38	BB	635	SBC	ARMTFSH	
BAB4C:	85	01		636	STA	\$1	
BAB4F:	46	01		637	LSR	\$1	
BAB50:	46	00		638	ROR	\$0	
BAB53:	18			639	CLC		
BAB55:	A5	00		640	LDA	\$0	
BAB58:	80	37	BB	641	ADC	ARMTFSL	
BAB5B:	80	BF	B2	642	STA	ARMCVL	
BAB5D:	A5	01		643	LDA	\$1	
BAB5F:	60	38	BB	644	ADC	ARMTFSH	
BAB60:	80	BF	B2	645	STA	ARMCVH	
BAB63:	A5	00		646	LDA	\$0	
BAB65:	05	01		647	ORA	\$1	
BAB67:	F0	48		648	BEQ	ARMSPL2	
BAB69:	4C	A4	BA	649	JMP	ARMSPS1	
BAB6C:	AD	BE	B2	650	LDA	ARMCVL	
BAB6F:	80	37	BB	651	STA	ARMTFSL	
BAB72:	AD	BF	B2	652	LDA	ARMCVH	
BAB75:	80	38	BB	653	STA	ARMTFSH	
BAB78:	AD	35	BB	654	LDA	ARMWOKL	
BAB7B:	38			655	SEC		
BAB7C:	ED	BE	B2	656	SBC	ARMCVL	
BAB7F:	85	00		657	STA	\$0	
BAB81:	AD	36	BB	658	LDA	ARMWOKH	
BAB84:	ED	BF	B2	659	SBC	ARMCVH	
BAB87:	85	01		660	STA	\$1	
BAB89:	46	01		661	LSR	\$1	
BAB8B:	46	00		662	ROR	\$0	
BAB8D:	A5	00		663	LDA	\$0	
BAB8F:	18			664	CLC		
BAB90:	80	BE	B2	665	ADC	ARMCVL	
BAB93:	80	BF	B2	666	STA	ARMCVL	
BAB96:	A5	01		667	LDA	\$1	
BAB98:	60	BF	B2	668	ADC	ARMCVH	
BAB9B:	80	BF	B2	669	STA	ARMCVH	
BAB9E:	A5	00		670	LDA	\$0	
BABA0:	05	01		671	ORA	\$1	
BABA2:	F0	10		672	BEQ	ARMSPL2	
BABA4:	AD	38	BB	673	LDA	ARMTFSH	
BABA7:	CD	36	BB	674	CMP	ARMWOKH	
BABA9:	90	8A		675	BCC	ARMSPL1	
BABAC:	AD	37	BB	676	LDA	ARMTFSL	
BABAF:	CD	35	BB	677	CMP	ARMWOKL	
BABB2:	90	FA		678	BCC	JMPHELP	
BABB4:	AD	BF	B2	679	LDA	ARMCVL	
BABB7:	AE	BF	B2	680	LDX	ARMCVH	
BABA:	60			681	RTS		
BABB:	A9	88		682			
BABBD:	20	81	BB	683	TESTIT	LDA	#\$88
BABD0:	20	1C	BB	684	JSR	ARMV2	:CHECK
BABD3:	B0	08		685	JSR	TRKV3	:NEW ARM
BABD5:	A9	00		686	BCS	TEER	:TEST
BABD7:	20	81	BB	687	LDA	#0	:SPEED
BABD9:	20	1C	BB	688	JSR	ARMV2	
BABDB:	60			689	JSR	TRKV3	
BABDE:	AD	84	B2	690	TEER	RTS	
BAD01:	0A			691	PCRDCHK	LDA	DCCSLOT
BAD02:	0A			692		ASL	A
BAD03:	0A			693		ASL	A
BAD04:	0A			694		ASL	A
BAD05:	0A			695		ASL	A
BAD06:	A0	00		696	TAX		
BAD08:	84	00		697	LDY	#0	
BAD0A:	84	01		698	STY	\$0	
BAD0C:	C8			699	STY	\$1	
BAD0D:	F0	34		700	PC1	INY	
BAD0F:	48			701	BEQ	PCERR	
BAD10:	68			702	PHA		
BAD11:	48			703	PLA		
BAD12:	48			704	PHA		
BAD13:	48			705	PLA		
BAD14:	68			706	PHA		
BAD15:	68			707	PLA		
BAD18:	BD	81	C0	708	LDA	\$C081,X	
BAD1B:	10	F2		709	BPL	PC1	
BAD1D:	A0	00		710	LDY	#0	
BAD1F:	BD	81	C0	711	LDA	\$C081,X	
BAD21:	10	22		712	BPL	PCERR	
BAD23:	C8			713	INY		
BAD25:	D0	F8		714	BNE	PC2	

TOFAST

ARMSPS1

JMPHELP

ARMSPL2

TESTIT

TEER
PCRDCHK

PC1

PC2

:A=LOW
:X=HIGH

:CHECK
:NEW ARM
:TEST
:SPEED

```

BAF4: A0 00 715 PC3 LDY #0
BAF6: BD 80 C0 716 LDA #C080,X
BAF9: C8 17 717 PC4 INY
BAFA: F0 81 718 BEQ PCERR
BAFC: BD 81 C0 719 LDA #C081,X
BAFF: 10 F8 720 BPL PC4
BB01: BD 80 C0 721 LDA #C080,X
BB04: BD 81 C0 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: 85 01 730 STA #1
BB17: A5 01 731 PC6 LDA #1
BB19: C9 20 732 CMP #20
BB1B: 60 733 RTS
734
BB1C: 20 81 B9 735 TRKV3 JSR TRKV2 TRACK
BB1F: B0 06 736 BCS TRKV3ER VERIFY
BB21: C5 12 737 CMP CTRK ROUTINE
BB23: D0 02 738 BNE TRKV3ER FOR
BB25: 18 739 CLC EXAMINE
BB26: 60 740 RTS DRIVE'S
BB27: A9 8C 741 TRKV3ER LDA #BC ARM
BB29: 85 12 742 STA CTRK SPEED
BB2B: A9 00 743 LDA #0 TEST
BB2D: 20 7D B8 744 JSR ARMV
BB30: 38 745 SEC
BB31: 60 746 RTS
747
*-----*
* WORK SPACE FOR DRIVE ROUTINES *
*-----*
748
749
750
751
752 WANTTRK DFB 0
753 WANTHALF DFB 0
754 PHSLST DFB 0
755 ARMWOKL DFB 0 ;WORK OK
756 ARMWOKH DFB 0
757 ARMTFSL DFB 0 ;TOSMALL
758 ARMTFSH DFB 0
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
*-----*
* WRITE ROUTINE LOOKUP TABLE *
*-----*
790
791
792
793
794 LTWRITE DA LAF 01
795 DA LAE 02
796 DA LAD 03
797 DA LAC 04
798 DA LAB 05
799 DA LAA 06
800 DA LA9 07

```

```
BC48: EA
BC49: B9 00 97
BC4C: AA
```

L97
W97

NOP
LDA \$9700,Y
TAX

; \$7B00

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	CSLT	
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	CSLT	
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	CSLT	
BCA5:	B9	00	937		LDA	\$7D00,Y	
BCA8:	9D	8D	938		STA	\$C08D,X	
BCAB:	1D	8C	939		ORA	\$C08C,X	
BCAF:	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	CSLT	
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		

BCFE6:	F0	03	973		
BCFE6:	CA		974		
BCFE6:	A5	00	975		
BCFE6:	A6	10	976	S9B	
BCFE6:	B9	00	977		
BCFE6:	9D	8D	978		
BCFE6:	1D	8C	979		
BCFE6:	C8		980		
BCFE6:	00	DF	981		
BCFE6:	4C	05	982		
BCFE6:			983		
BCFE6:			984		
BCFE6:			985		
BCFE6:			986		
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BCFE6:			1001		
BCFE6:			1002		
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BCFE6:			1050		
BCFE6:			1051		
BCFE6:			1052		
BCFE6:			1053		
BCFE6:			1054		
BCFE6:			1055		
BCFE6:			1056		
BCFE6:			1057		

BEG	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			
BEG	S9C		
DEX			
BEG	S9C		
DEX			
BEG	S9C		
DEX			
BEG	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			
BEG	S9D		
DEX			
BEG	S9D		
DEX			
BEG	S9D		
DEX			
BEG	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			
BEG	S9E		
DEX			
BEG	S9E		
DEX			
BEG	S9E		
DEX			
BEG	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			
BEG	S9F		
DEX			
BEG	S9F		
DEX			
BEG	S9F		
DEX			
BEG	S9F		
DEX			
LDA	\$0		

BE21:	4C	25	BE	144	JMP	WA4	
BE22:	EA			145	NOP		
BE23:	B9	00	A4	146	LDA	\$A400,Y	;\$8800
BE24:	AA			147	TAX		
BE25:	F0	0C		148	BEQ	SA4	
BE26:	CA			149	DEQ	SA4	
BE27:	F0	09		150	BEQ	SA4	
BE28:	CA			151	DEQ	SA4	
BE29:	F0	06		152	BEQ	SA4	
BE30:	CA			153	DEQ	SA4	
BE31:	F0	03		154	BEQ	SA4	
BE32:	CA			155	DEQ	SA4	
BE33:	A5	00		156	LDA	\$0	
BE34:	A6	10		157	LDA	CSLT	
BE35:	B9	00	88	158	LDA	\$8800,Y	
BE36:	90	80	C0	159	STA	\$C080,X	
BE37:	10	8C	C0	160	ORA	\$C08C,X	
BE38:	C8			161	INY		
BE39:	D0	DF		162	BNE	LA4	
BE40:	4C	49	BE	163	JMP	WA5	
BE41:	EA			164	NOP		
BE42:	B9	00	A5	165	LDA	\$A500,Y	;\$8900
BE43:	AA			166	TAX		
BE44:	F0	0C		167	BEQ	SA5	
BE45:	CA			168	DEQ	SA5	
BE46:	F0	09		169	BEQ	SA5	
BE47:	CA			170	DEQ	SA5	
BE48:	F0	06		171	BEQ	SA5	
BE49:	CA			172	DEQ	SA5	
BE50:	F0	03		173	BEQ	SA5	
BE51:	CA			174	DEQ	SA5	
BE52:	A5	00		175	LDA	\$0	
BE53:	A6	10		176	LDA	CSLT	
BE54:	B9	00	89	177	LDA	\$8900,Y	
BE55:	90	80	C0	178	STA	\$C080,X	
BE56:	10	8C	C0	179	ORA	\$C08C,X	
BE57:	C8			180	INY		
BE58:	D0	DF		181	BNE	LA5	
BE59:	4C	6D	BE	182	JMP	WA6	
BE60:	EA			183	NOP		
BE61:	B9	00	A6	184	LDA	\$A600,Y	;\$8A00
BE62:	AA			185	TAX		
BE63:	F0	0C		186	BEQ	SA6	
BE64:	CA			187	DEQ	SA6	
BE65:	F0	09		188	BEQ	SA6	
BE66:	CA			189	DEQ	SA6	
BE67:	F0	06		190	BEQ	SA6	
BE68:	CA			191	DEQ	SA6	
BE69:	F0	03		192	BEQ	SA6	
BE70:	CA			193	DEQ	SA6	
BE71:	A5	00		194	LDA	\$0	
BE72:	A6	10		195	LDA	CSLT	
BE73:	B9	00	8A	196	LDA	\$8A00,Y	
BE74:	90	80	C0	197	STA	\$C080,X	
BE75:	10	8C	C0	198	ORA	\$C08C,X	
BE76:	C8			199	INY		
BE77:	D0	DF		200	BNE	LA6	
BE78:	4C	91	BE	201	JMP	WA7	
BE79:	EA			202	NOP		
BE80:	B9	00	A7	203	LDA	\$A700,Y	;\$8B00
BE81:	AA			204	TAX		
BE82:	F0	0C		205	BEQ	SA7	
BE83:	CA			206	DEQ	SA7	
BE84:	F0	09		207	BEQ	SA7	
BE85:	CA			208	DEQ	SA7	
BE86:	F0	06		209	BEQ	SA7	
BE87:	CA			210	DEQ	SA7	
BE88:	F0	03		211	BEQ	SA7	
BE89:	CA			212	DEQ	SA7	
BE90:	A5	00		213	LDA	\$0	
BE91:	A6	10		214	LDA	CSLT	
BE92:	B9	00	8B	215	LDA	\$8B00,Y	
BE93:	90	80	C0	216	STA	\$C080,X	
BE94:	10	8C	C0	217	ORA	\$C08C,X	
BE95:	C8			218	INY		
BE96:	D0	DF		219	BNE	LA7	
BE97:	4C	B5	BE	220	JMP	WA8	
BE98:	EA			221	NOP		
BE99:	B9	00	A8	222	LDA	\$A800,Y	;\$8C00
BE00:	AA			223	TAX		
BE01:	F0	0C		224	BEQ	SA8	

00000000	CA	09	1230		DEX		
00000000	CA	06	1231		BEQ	SA8	
00000000	CA	03	1232		DEX		
00000000	CA	00	1233		BEQ	SA8	
00000000	CA	10	1234		DEX		
00000000	CA	00	1235	SA8	LDA	\$0	
00000000	CA	80	1236		LDX	CSLT	
00000000	CA	80	1237		LDA	\$8C00,Y	
00000000	CA	80	1238		STA	\$C080,X	
00000000	CA	80	1239		ORA	\$C08C,X	
00000000	CA	DF	1240		INY		
00000000	CA	DF	1241		BNE	LA8	
00000000	CA	DF	1242		JMP	WA9	
00000000	CA	DF	1243				
00000000	CA	DF	1244				
00000000	CA	DF	1245				
00000000	CA	DF	1246	LA9	NOP		
00000000	CA	DF	1247	WA9	LDA	\$A900,Y	;\$8D00
00000000	CA	DF	1248		TAX		
00000000	CA	DF	1249		BEQ	SA9	
00000000	CA	DF	1250		DEX		
00000000	CA	DF	1251		BEQ	SA9	
00000000	CA	DF	1252		DEX		
00000000	CA	DF	1253		BEQ	SA9	
00000000	CA	DF	1254		DEX		
00000000	CA	DF	1255		BEQ	SA9	
00000000	CA	DF	1256		DEX		
00000000	CA	DF	1257		LDA	\$0	
00000000	CA	DF	1258	SA9	LDX	CSLT	
00000000	CA	DF	1259		LDA	\$8D00,Y	
00000000	CA	DF	1260		STA	\$C080,X	
00000000	CA	DF	1261		ORA	\$C08C,X	
00000000	CA	DF	1262		INY		
00000000	CA	DF	1263		BNE	LA9	
00000000	CA	DF	1264		JMP	WAA	
00000000	CA	DF	1265				
00000000	CA	DF	1266		DFB	0,0,0,0	
00000000	CA	DF	1267				
00000000	CA	DF	1268	LAA	NOP		
00000000	CA	DF	1269	WAA	LDA	\$AA00,Y	;\$8E00
00000000	CA	DF	1270		TAX		
00000000	CA	DF	1271		BEQ	SAA	
00000000	CA	DF	1272		DEX		
00000000	CA	DF	1273		BEQ	SAA	
00000000	CA	DF	1274		DEX		
00000000	CA	DF	1275		BEQ	SAA	
00000000	CA	DF	1276		DEX		
00000000	CA	DF	1277		BEQ	SAA	
00000000	CA	DF	1278		DEX		
00000000	CA	DF	1279		LDA	\$0	
00000000	CA	DF	1280	SAA	LDX	CSLT	
00000000	CA	DF	1281		LDA	\$8E00,Y	
00000000	CA	DF	1282		STA	\$C080,X	
00000000	CA	DF	1283		ORA	\$C08C,X	
00000000	CA	DF	1284		INY		
00000000	CA	DF	1285		BNE	LAA	
00000000	CA	DF	1286		JMP	WAB	
00000000	CA	DF	1287				
00000000	CA	DF	1288	LAB	NOP		
00000000	CA	DF	1289	WAB	LDA	\$AB00,Y	;\$8F00
00000000	CA	DF	1290		TAX		
00000000	CA	DF	1291		BEQ	SAB	
00000000	CA	DF	1292		DEX		
00000000	CA	DF	1293		BEQ	SAB	
00000000	CA	DF	1294		DEX		
00000000	CA	DF	1295		BEQ	SAB	
00000000	CA	DF	1296		DEX		
00000000	CA	DF	1297		BEQ	SAB	
00000000	CA	DF	1298		DEX		
00000000	CA	DF	1299		LDA	\$0	
00000000	CA	DF	1300	SAB	LDX	CSLT	
00000000	CA	DF	1301		LDA	\$8F00,Y	
00000000	CA	DF	1302		STA	\$C080,X	
00000000	CA	DF	1303		ORA	\$C08C,X	
00000000	CA	DF	1304		INY		
00000000	CA	DF	1305		BNE	LAB	
00000000	CA	DF	1306		JMP	WAC	
00000000	CA	DF	1307				
00000000	CA	DF	1308	LAC	NOP		
00000000	CA	DF	1309	WAC	LDA	\$AC00,Y	;\$9000
00000000	CA	DF	1310		TAX		
00000000	CA	DF	1311		BEQ	SAC	
00000000	CA	DF	1312		DEX		
00000000	CA	DF	1313		BEQ	SAC	
00000000	CA	DF	1314		DEX		

BF53:	F0	06	1315		BEQ	SAC		
BF55:	CA		1316		DEX			
BF56:	F0	03	1317		BEQ	SAC		
BF58:	CA		1318		DEX			
BF59:	A5	00	1319		LDA	\$0		
BF5B:	A6	10	1320	SAC	LDX	CSLT		
BF5D:	B9	00	1321		LDA	\$9000,Y		
BF60:	9D	8D	1322		STA	\$C08D,X		
BF63:	1D	8C	1323		ORA	\$C08C,X		
BF66:	C8		1324		INY			
BF67:	D0	DF	1325		BNE	LAC		
BF69:	4C	6D	1326		JMP	WAD		
BF6C:	EA		1327					
BF6D:	B9	00	1328	LAD	NOP			
BF70:	AA		1329	WAD	LDA	\$AD00,Y	;\$9100	
BF71:	F0	0C	1330		TAX			
BF73:	CA		1331		BEQ	SAD		
BF74:	F0	09	1332		DEX			
BF76:	CA		1333		BEQ	SAD		
BF77:	F0	06	1334		DEX			
BF79:	CA		1335		BEQ	SAD		
BF7A:	F0	03	1336		DEX			
BF7C:	CA		1337		BEQ	SAD		
BF7D:	A5	00	1338		DEX			
BF7F:	A6	10	1339	SAD	LDA	\$0		
BF81:	B9	00	1340		LDX	CSLT		
BF84:	9D	8D	1341		LDA	\$9100,Y		
BF87:	1D	8C	1342		STA	\$C08D,X		
BF8A:	C8		1343		ORA	\$C08C,X		
BF8B:	D0	DF	1344		INY			
BF8D:	4C	91	1345		BNE	LAD		
			1346		JMP	WAE		
BF90:	EA		1347					
BF91:	B9	00	1348	LAE	NOP			
BF94:	AA		1349	WAE	LDA	\$AE00,Y	;\$9200	
BF95:	F0	0C	1350		TAX			
BF97:	CA		1351		BEQ	SAE		
BF98:	F0	09	1352		DEX			
BF9A:	CA		1353		BEQ	SAE		
BF9B:	F0	06	1354		DEX			
BF9D:	CA		1355		BEQ	SAE		
BF9E:	F0	03	1356		DEX			
BFA0:	CA		1357		BEQ	SAE		
BFA1:	A5	00	1358		DEX			
BFA3:	A6	10	1359		LDA	\$0		
BFAC:	B9	00	1360	SAE	LDX	CSLT		
BFAD:	9D	8D	1361		LDA	\$9200,Y		
BA00:	1D	8C	1362		STA	\$C08D,X		
BA01:	C8		1363		ORA	\$C08C,X		
BA04:	D0	DF	1364		INY			
BA11:	4C	B5	1365		BNE	LAE		
			1366		JMP	WAF		
BA14:	EA		1367					
BA15:	B9	00	1368	LAF	NOP			
BA16:	AA		1369	WAF	LDA	\$AF00,Y	;\$9300	
BA18:	F0	0C	1370		TAX			
BA19:	CA		1371		BEQ	SAF		
BA1C:	F0	09	1372		DEX			
BA1D:	CA		1373		BEQ	SAF		
BA1E:	F0	06	1374		DEX			
BA21:	CA		1375		BEQ	SAF		
BA22:	F0	03	1376		DEX			
BA24:	CA		1377		BEQ	SAF		
BA25:	A5	00	1378		DEX			
BA27:	A6	10	1379		LDA	\$0		
BA29:	B9	00	1380	SAF	LDX	CSLT		
BA2C:	9D	8D	1381		LDA	\$9300,Y		
BA2D:	1D	8C	1382		STA	\$C08D,X		
BA2E:	C8		1383		ORA	\$C08C,X		
BA30:	D0	DF	1384		INY			
BA31:	4C		1385		BNE	LAF		
BA34:	68		1386		PHA		WRITE	
BA35:	68		1387		PLA		DONE	
BA36:	68		1388		PHA			
BA37:	68		1389		PLA			
BA39:	18		1390		CLC			
BA3A:	9D	00	1391		BCC	SD1		
BA3C:	1D	8C	1392	SD1	STA	\$C08E,X		
BA3E:	18		1393		ORA	\$C08C,X		
BA3F:	60		1394		CLC			
BE3:			1395		RTS			

--End assembly--

2276 bytes

Errors: 0

