

A large, stylized letter 'A' is formed using the characters 'S' and 'Y'. The letter is symmetrical and composed of multiple rows of these characters. The top of the 'A' is formed by a row of 'S's, followed by rows of 'Y's and 'S's. The middle section consists of a row of 'Y's, followed by rows of 'S's and 'Y's. The bottom of the 'A' is formed by a row of 'S's, followed by rows of 'Y's and 'S's. The overall shape is a wide, triangular 'A' with a central vertical stem.

(1)	96	INITIALIZE DRIVER DATA BASE
(1)	125	REINITIALIZE DRIVER DATA BASE
(1)	160	LOCAL SUBROUTINE TO EXECUTE OPERATION CODE
(1)	248	LOCAL SUBROUTINE TO LOCATE DATA STRUCTURE TYPE
(1)	315	IOCSRELOC_DDT - relocate DDT and FDT to system addresses


```
0000 1 .TITLE RELOCDRV - RELOCATE DRIVER DATABASE
0000 2 .IDENT 'V04-000'
0000 3
0000 4
0000 5 *****
0000 6 *
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0000 24 *
0000 25 *
0000 26 *****
0000 27
0000 28 D. N. CUTLER 16-JUN-78
0000 29
0000 30 RELOCATE DRIVER DATABASE
0000 31
0000 32 MODIFICATION HISTORY:
0000 33
0000 34 V03-003 LMP0221 L. Mark Pilant, 26-Mar-1984 16:02
0000 35 Add an ORB to the list of known structures that may be
0000 36 initialized.
0000 37
0000 38 V03-002 ROW0289 Ralph O. Weber 26-JAN-1984
0000 39 Add DDT$L_MNTV_SQD, DDT$L_MNTV_FOR, and DDT$L_MNTV_SSSC to the
0000 40 list of DDT cells to be relocated. Update size of DDT in
0000 41 ASSUME statement.
0000 42
0000 43 V03-001 ROW0125 Ralph O. Weber 19-SEP-1982
0000 44 Add DDT$L_CLONEDUCB to list of DDT cells to be relocated.
0000 45 Update size of DDT in ASSUME statement.
0000 46
0000 47 V02-003 KTA0058 Kerbey T. Altmann 30-Dec-1981
0000 48 Change name to IOC$RELOC_DDT so symbol len <= 15.
0000 49
0000 50 V02-002 JLV0047 Jake VanNoy 13-Jul-1981
0000 51 Added IOC$RELOC_DDT_FDT, called from SYSGEN and the
0000 52 INIT module in SYS to relocate DDT's and FDT's to
0000 53 absolute system addresses.
0000 54
0000 55 MACRO LIBRARY CALLS
0000 56
0000 57
```



```
0000 58 $DDTDEF ;DEFINE DDT OFFSETS
0000 59 $CRBDEF ;DEFINE CRB OFFSETS
0000 60 $DDBDEF ;DEFINE DDB OFFSETS
0000 61 $DPTDEF ;DEFINE DPT OFFSETS
0000 62 $DYNDEF ;DEFINE DATA STRUCTURE TYPES
0000 63 $IDBDEF ;DEFINE IDB OFFSETS
0000 64 $UCBDEF ;DEFINE UCB OFFSETS
0000 65 $VECDDEF ;DEFINE VEC OFFSETS
0000 66
0000 67 :
0000 68 : LOCAL DATA
0000 69 :
0000 70 : STRUCTURE TYPE BYTE ARRAY
0000 71 :
0000 72 :
10 09 06 05 0000 73 .PSECT Z$INIT DRIVER
49 0004 74 STYPE: .BYTE DYN$C_CRB,DYN$C_DDB,DYN$C_IDB,DYN$C_UCB ;
0005 75 .BYTE DYN$C_ORB ;
0005 76
0005 77 ASSUME DDT$C_LENGTH EQ 56 ; So new entries in DDT will be added here
0005 78
0005 79 RELOC_DDT_TABLE: ; All these offsets in the DDT must be relocated
0005 80
00 0005 81 .BYTE DDT$C_START
04 0006 82 .BYTE DDT$C_UNSOLOINT
08 0007 83 .BYTE DDT$C_FDT
0C 0008 84 .BYTE DDT$C_CANCEL
10 0009 85 .BYTE DDT$C_REGDUMP
18 000A 86 .BYTE DDT$C_UNITINIT
1C 000B 87 .BYTE DDT$C_ALTSTART
20 000C 88 .BYTE DDT$C_MNTVER
24 000D 89 .BYTE DDT$C_CLONEDUCB
2C 000E 90 .BYTE DDT$C_MNTV_SSSC
30 000F 91 .BYTE DDT$C_MNTV_FOR
34 0010 92 .BYTE DDT$C_MNTV_SQD
FF 0011 93 .BYTE -1 ; End of table
0012 94
```



```
0012 96 .SBTTL INITIALIZE DRIVER DATA BASE
0012 97 :+
0012 98 : IOCSINITDRV - INITIALIZE DRIVER DATA BASE
0012 99 :
0012 100 : THIS ROUTINE IS CALLED AFTER HAVING LOADED ALL OR PART OF A DEVICE DATA BASE.
0012 101 : IT MUST BE CALLED FOR EACH UNIT THAT IS DEFINED. ITS FUNCTION IS TO USE THE
0012 102 : INITIALIZATION TABLE IN THE DRIVER PROLOGUE TO INITIALIZE STATIC INFORMATION
0012 103 : IN THE DRIVER DATA BASE.
0012 104 :
0012 105 : INPUTS:
0012 106 :
0012 107 : R4 = ADDRESS OF DRIVER PROLOGUE TABLE.
0012 108 : R5 = ADDRESS OF DEVICE UCB.
0012 109 :
0012 110 : OUTPUTS:
0012 111 :
0012 112 : THE DRIVER PROLOGUE TABLE IS INTERPRETED AND THE RESPECTIVE DATA BASE
0012 113 : IS INITIALIZED.
0012 114 :
0012 115 : R0 LOW BIT CLEAR INDICATES A BAD DATA STRUCTURE.
0012 116 :
0012 117 : R0 LOW BIT SET INDICATES SUCCESSFUL COMPLETION.
0012 118 :-
0012 119 :
0012 120 .ENABL LSB
0012 121 IOCSINITDRV::
0012 122 MOVZWL DPT$W_INITTAB(R4),R3
0016 123 BRB 10$

53 10 A4 3C 0012 122 ;INITIALIZE DRIVER DATA BASE
04 11 0016 123 ;GET OFFSET TO INITIALIZATION TABLE
;BR TO COMMON CODE
```



```
0018 125 .SBTTL REINITIALIZE DRIVER DATA BASE
0018 126 :+
0018 127 : IOC$REINITDRV - REINITIALIZE DRIVER DATA BASE
0018 128 :
0018 129 : THIS ROUTINE IS CALLED AFTER HAVING LOADED A DRIVER WHOSE DEVICE DATA BASE IS
0018 130 : ALREADY RESIDENT IN MEMORY. IT MUST BE CALLED FOR EACH UNIT THAT IS DEFINED.
0018 131 : ITS FUNCTION IS TO INITIALIZE ONLY THOSE FIELDS IN THE DATA BASE THAT ARE NOT
0018 132 : DYNAMIC.
0018 133 :
0018 134 : INPUTS:
0018 135 :
0018 136 : R4 = ADDRESS OF DRIVER PROLOGUE TABLE.
0018 137 : R5 = ADDRESS OF DEVICE UCB.
0018 138 :
0018 139 : OUTPUTS:
0018 140 :
0018 141 : THE DRIVER PROLOGUE TABLE IS INTERPRETED AND THE RESPECTIVE DATA BASE
0018 142 : IS REINITIALIZED.
0018 143 :
0018 144 : R0 LOW BIT CLEAR INDICATES A BAD DATA STRUCTURE.
0018 145 :
0018 146 : R0 LOW BIT SET INDICATES SUCCESSFUL COMPLETION.
0018 147 :-
0018 148 :
0018 149 IOC$REINITDRV::
53 12 A4 3C 0018 150 MOVZWL DPT$W_REINITTAB(R4),R3 ;REINITIALIZE DRIVER DATA BASE
53 54 C0 001C 151 10$: ADDL R4,R3 ;GET OFFSET TO REINITIALIZATION TABLE
51 5F 10 001F 152 20$: BSBB LOCATE ;CALCULATE ADDRESS OF INITIALIZE TABLE
51 83 9A 0021 153 MOVZBL (R3)+,R1 ;LOCATE STRUCTURE TYPE
52 51 C0 0024 154 ADDL R1,R2 ;GET OFFSET IN STRUCTURE
51 83 9A 0027 155 MOVZBL (R3)+,R1 ;CALCULATE BASE ADDRESS OF FIELD
02 10 002A 156 BSBB EXECUTE ;GET OPERATION CODE
F1 11 002C 157 BRB 20$ ;EXECUTE OPERATION CODE
002E 158 .DSABL LSB ;
```



```
002E 160      .SBTTL LOCAL SUBROUTINE TO EXECUTE OPERATION CODE
002E 161      :
002E 162      : EXECUTE - EXECUTE OPERATION CODE
002E 163      :
002E 164      : THIS ROUTINE IS CALLED TO EXECUTE A SINGLE RELOCATION OPERATION CODE.
002E 165      :
002E 166      : INPUTS:
002E 167      :
002E 168      :     R1 = OPERATION CODE.
002E 169      :     R2 = STRUCTURE FIELD BASE ADDRESS.
002E 170      :     R3 = ADDRESS OF NEXT RELOCATION BYTE.
002E 171      :     R4 = BASE ADDRESS OF DRIVER PROLOGUE TABLE.
002E 172      :     R5 = ADDRESS OF DEVICE UCB.
002E 173      :
002E 174      : OUTPUTS:
002E 175      :
002E 176      :     IF AN INVALID OPERATION CODE IS SPECIFIED, A FAILURE IS RETURNED TO THE
002E 177      :     CALLERS CALLER. ELSE THE OPERAND VALUE IS STORE IN THE SPECIFIED FIELD
002E 178      :     IN THE SPECIFIED STRUCTURE.
002E 179      :
002E 180      :
002E 181      EXECUTE:
002E 182      CASE      R1,<-
002E 183      10$,-
002E 184      30$,-
002E 185      50$,-
002E 186      70$,-
002E 187      90$,-
002E 188      >
003C 189      :
003C 190      :
003C 191      : INDIRECT OPERAND
003C 192      :
003C 193      :
50  93  D0 003C 194      MOVL      @ (R3)+,R0
003F 195      CASE      R1,<-
003F 196      20$,-
003F 197      40$,-
003F 198      60$,-
003F 199      80$,-
003F 200      100$,-
003F 201      >,LIMIT=#^X80
004F 202      TSTL      (SP)+
8E  D5 0051 203      CLRL      R0
50  D4 0053 204      RSB
0054 205      :
0054 206      :
0054 207      : BYTE IMMEDIATE
0054 208      :
0054 209      :
50  83  9A 0054 210 10$:      MOVZBL  (R3)+,R0
62  50  90 0057 211 20$:      MOVB    R0,(R2)
005A 212      RSB
005B 213      :
005B 214      :
005B 215      : WORD IMMEDIATE
005B 216      :
```

```
:EXECUTE RELOCATION OPERATION
:DISPATCH TO FETCH ROUTINE
:BYTE IMMEDIATE
:WORD IMMEDIATE
:WORD DISPLACED
:LONGWORD IMMEDIATE
:FIELD IMMEDIATE
```

```
:GET DATA LONGWORD
:DISPATCH TO STORE ROUTINE
:STORE BYTE
:STORE WORD
:STORE WORD DISPLACED
:STORE LONGWORD
:STORE FILED
```

```
:REMOVE RETURN FROM STACK
:SET FAILURE INDICATION
```

```
:GET DATA BYTE
:STORE BYTE
```

```
50 83 3C 005B 217  
62 50 80 005B 218 30$: MOVZWL (R3)+,R0 ;GET DATA WORD  
05 005E 219 40$: MOVW R0,(R2) ;STORE WORD  
0061 220 RSB ;  
0062 221 ;  
0062 222 ;  
0062 223 ; WORD DISPLACED  
0062 224 ;  
0062 225 ;  
50 83 32 0062 226 50$: CVTWL (R3)+,R0 ;GET WORD DISPLACEMENT  
50 54 C0 0065 227 60$: ADDL R4,R0 ;CALCULATE ACTUAL ADDRESS  
03 11 0068 228 BRB 80$ ;  
006A 229 ;  
006A 230 ;  
006A 231 ; LONGWORD IMMEDIATE  
006A 232 ;  
006A 233 ;  
50 83 D0 006A 234 70$: MOVL (R3)+,R0 ;GET DATA LONGWORD  
62 50 D0 006D 235 80$: MOVL R0,(R2) ;STORE DATA LONGWORD  
05 0070 236 RSB ;  
0071 237 ;  
0071 238 ;  
0071 239 ; FIELD STRUCTURE  
0071 240 ;  
0071 241 ;  
50 83 D0 0071 242 90$: MOVL (R3)+,R0 ;GET DATA LONGWORD  
7E 83 9A 0074 243 100$: MOVZBL (R3)+,-(SP) ;GET STARTING BIT NUMBER  
51 83 9A 0077 244 MOVZBL (R3)+,R1 ;GET SIZE OF FIELD  
62 51 8E 50 F0 007A 245 INSV R0,(SP)+,R1,(R2) ;STORE FIELD  
05 007F 246 RSB ;
```



```
0080 248 .SBTTL LOCAL SUBROUTINE TO LOCATE DATA STRUCTURE TYPE
0080 249 :
0080 250 : LOCATE - LOCATE DATA STRUCTURE TYPE
0080 251 :
0080 252 : INPUTS:
0080 253 :
0080 254 : R5 = ADDRESS OF DEVICE UCB.
0080 255 :
0080 256 : OUTPUTS:
0080 257 :
0080 258 : IF THE STRUCTURE TYPE CODE IS ZERO, THEN SUCCESS IS RETURNED TO THE CALLERS
0080 259 : CALLER. IF THE STRUCTURE TYPE CODE IS INVALID, THEN AN ERROR IS RETURNED
0080 260 : TO THE CALLERS CALLER. ELSE THE APPROPRIATE STRUCTURE BASE ADDRESS IS
0080 261 : RETURNED IN R2.
0080 262 :
0080 263 :
0080 264 : LOCATE:
50 01 88 0080 265 BISB #1,R0 ;LOCATE DATA STRUCTURE TYPE
63 95 0083 266 TSTB (R3) ;ASSUME END OF RELOCATION TABLE
14 13 0085 267 BEQL 10$ ;END OF TABLE?
FF73 CF 05 83 3A 0087 268 LOCC (R3)+,#5,STYPE ;IF EQL YES
008D 269 CASE R0,<- ;LOCATE STRUCTURE CODE
008D 270 60$,- ;DISPATCH TO STRUCTURE ROUTINE
008D 271 20$,- ;ORB
008D 272 30$,- ;UCB
008D 273 40$,- ;IDB
008D 274 50$,- ;DDB
008D 275 >,LIMIT=#1 ;CRB
8E D5 009B 276 10$: TSTL (SP)+ ;REMOVE RETURN FROM STACK
05 009D 277 RSB ;
009E 278 :
009E 279 : UCB STRUCTURE
009E 280 :
009E 281 :
52 55 D0 009E 282 20$: MOVL R5,R2 ;SET UCB ADDRESS
05 00A1 283 RSB ;
00A2 284 :
00A2 285 : IDB STRUCTURE
00A2 286 :
00A2 287 :
00A2 288 :
52 24 A5 D0 00A2 289 30$: MOVL UCB$L_CRB(R5),R2 ;GET ADDRESS OF CRB
52 2C A2 D0 00A6 291 MOVL CRB$L_INTD+VEC$L_IDB(R2),R2 ;GET ADDRESS OF IDB
05 00AA 292 RSB ;
00AB 293 :
00AB 294 : DDB STRUCTURE
00AB 295 :
00AB 296 :
00AB 297 :
52 28 A5 D0 00AB 298 40$: MOVL UCB$L_DDB(R5),R2 ;GET ADDRESS OF DDB
05 00AF 299 RSB ;
00B0 300 :
00B0 301 : CRB STRUCTURE
00B0 302 :
00B0 303 :
00B0 304 :
```

RELOCDRV
V04-000

- RELOCATE DRIVER DATABASE
LOCAL SUBROUTINE TO LOCATE DATA STRUCTUR

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```
52  24 A5  D0 00B0 305 50$:  MOVL  UCB$L_CRB(R5),R2      ;GET ADDRESS OF CRB
           05 00B4 306      RSB                          ;
           00B5 307
           00B5 308 :
           00B5 309 : ORB STRUCTURE
           00B5 310 :
           00B5 311
52  1C A5  D0 00B5 312 60$:  MOVL  UCB$L_ORB(R5),R2;      ;GET ADDRESS OF ORB
           05 00B9 313      RSB                          ;
```



```
00BA 315 .SBTTL IOC$RELOC_DDT - relocate DDT and FDT to system addresses
00BA 316
00BA 317 ;+
00BA 318
00BA 319 : FUNCTIONAL DESCRIPTION:
00BA 320 :
00BA 321 : This routine will relocate any driver-relative addresses to be
00BA 322 : absolute system addresses.
00BA 323
00BA 324 : CALLING SEQUENCE:
00BA 325 :
00BA 326 : JSB IOC$RELOC_DDT
00BA 327
00BA 328 : INPUTS:
00BA 329 :
00BA 330 : R11 - Address of DDB
00BA 331
00BA 332 : OUTPUTS:
00BA 333 :
00BA 334 : R4,R5,R6 are destroyed, DDT and FDT are relocated.
00BA 335
00BA 336 : COMPLETION CODES:
00BA 337 :
00BA 338 : None.
00BA 339
00BA 340 :-
00BA 341
00BA 342 IOC$RELOC_DDT::
00BA 343
00BA 344 :
00BA 345 : Relocate the driver dispatch table (DDT)
00BA 346 :
00BA 347
55 FF47 CF 9E 00BA 348 MOVAB RELOC_DDT_TABLE,R5 ; Address of offsets table
54 0C AB D0 00BF 349 MOVL DDB$$_DDT(R11),R4 ; Address of DDT
00C3 350
00C3 351 10$: CVTBL (R5)+,R6 ; Get next offset
00C6 352 BLSS 20$ ; Branch if end of table
00C8 353 ADDL2 R4,R6 ; Add start address of driver to offset
F4 66 1F E0 00CB 354 BBS #31,(R6),10$ ; Branch if already system address
66 54 C0 00CF 355 ADDL2 R4,(R6) ; Add in driver base
EF 11 00D2 356 BRB 10$ ; Loop
00D4 357
00D4 358
00D4 359 : Relocate the function dispatch table (FDT)
00D4 360 :
00D4 361
55 28 A4 3C 00D4 362 20$: MOVZWL DDT$_FDTSIZE(R4),R5 ; Size of FDT
54 08 A4 D0 00D8 363 MOVL DDT$_FDT(R4),R4 ; Address of FDT
55 54 C0 00DC 364 ADDL2 R4,R5 ; Add in base of FDT to get end
54 04 C0 00DF 365 ADDL2 #4,R4 ; Initial offset past legal and
00E2 366 ; buffered I/O masks
00E2 367
54 0C C0 00E2 368 30$: ADDL2 #12,R4 ; Get next dispatch block (12 bytes)
54 55 D1 00E5 369 CMPL R5,R4 ; Past end?
F3 08 A4 1F E0 00E8 370 BLEQ 40$ ; branch if yes
00EA 371 BBS #31,8(R4),30$ ; Branch if already system address
```

RELOCDRV
V04-000

- RELOCATE DRIVER DATABASE
IOC\$RELOC_DDT - relocate DDT and FDT to

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08 A4	54	C0	00EF	372	ADDL2	R4,8(R4)	; Add in current base
	ED	11	00F3	373	BRB	30\$	
			00F5	374			
		05	00F5	375 40\$:	RSB		
			00F6	376			
			00F6	377	.END		

RELOCDRV
Symbol table

- RELOCATE DRIVER DATABASE

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CRBSL_INTD	=	00000024		
DDBSL_DDT	=	0000000C		
DDTSL_LENGTH	=	00000038		
DDTSL_ALTSTART	=	0000001C		
DDTSL_CANCEL	=	0000000C		
DDTSL_CLONEDUCB	=	00000024		
DDTSL_FDT	=	00000008		
DDTSL_MNTVER	=	00000020		
DDTSL_MNTV_FOR	=	00000030		
DDTSL_MNTV_SQD	=	00000034		
DDTSL_MNTV_SSSC	=	0000002C		
DDTSL_REGDUMP	=	00000010		
DDTSL_START	=	00000000		
DDTSL_UNITINIT	=	00000018		
DDTSL_UNSQLINT	=	00000004		
DDTSL_FDTSIZE	=	00000028		
DPTSL_INITTAB	=	00000010		
DPTSL_REINITTAB	=	00000012		
DYN\$CRB	=	00000005		
DYN\$DDB	=	00000006		
DYN\$IDB	=	00000009		
DYN\$ORB	=	00000049		
DYN\$UCB	=	00000010		
EXECUTE		0000002E	R	02
IOCSINITDRV		00000012	RG	02
IOCSREINITDRV		00000018	RG	02
IOCSRELOC_DDT		000000BA	RG	02
LOCATE		00000080	R	02
RELOC_DDT_TABLE		00000005	R	02
SType		00000000	R	02
UCBSL_CRB	=	00000024		
UCBSL_DDB	=	00000028		
UCBSL_ORB	=	0000001C		
VECSL_IDB	=	00000008		

+-----+
! Psect synopsis !
+-----+

PSECT name	Allocation	PSECT No.	Attributes														
. ABS .	00000000 (0.)	00 (0.)	NOPIC	USR	CON	ABS	LCL	NOSHR	NOEXE	NORD	NOWRT	NOVEC	BYTE				
\$AB\$\$	00000000 (0.)	01 (1.)	NOPIC	USR	CON	ABS	LCL	NOSHR	EXE	RD	WRT	NOVEC	BYTE				
Z\$INIT_DRIVER	000000F6 (246.)	02 (2.)	NOPIC	USR	CON	REL	LCL	NOSHR	EXE	RD	WRT	NOVEC	BYTE				

+-----+
! Performance indicators !
+-----+

Phase	Page faults	CPU Time	Elapsed Time
Initialization	35	00:00:00.10	00:00:02.52
Command processing	124	00:00:00.55	00:00:03.04
Pass 1	250	00:00:06.53	00:00:22.52
Symbol table sort	0	00:00:00.93	00:00:03.57
Pass 2	78	00:00:01.42	00:00:05.05
Symbol table output	5	00:00:00.06	00:00:00.39

Psect synopsis output	1	00:00:00.02	00:00:00.02
Cross-reference output	0	00:00:00.00	00:00:00.00
Assembler run totals	495	00:00:09.61	00:00:37.33

The working set limit was 1350 pages.
36935 bytes (73 pages) of virtual memory were used to buffer the intermediate code.
There were 40 pages of symbol table space allocated to hold 644 non-local and 28 local symbols.
377 source lines were read in Pass 1, producing 13 object records in Pass 2.
17 pages of virtual memory were used to define 16 macros.

+-----+
! Macro library statistics !
+-----+

Macro library name	Macros defined
_\$255\$DUA28:[SYS.OBJ]LIB.MLB;1	9
-\$255\$DUA28:[SYS.LIB]STARLET.MLB;2	4
TOTALS (all libraries)	13

738 GETS were required to define 13 macros.

There were no errors, warnings or information messages.

MACRO/LIS=LIS\$:RELOCDRV/OBJ=OBJ\$:RELOCDRV MSRC\$:RELOCDRV/UPDATE=(ENH\$:RELOCDRV)+EXECML\$/LIB

0379 AH-BT13A-SE
VAX/VMS V4.0

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