RI -

Eliminer ces memos

Pointer sur la liste page 2 et suivantes ceux que j'ai.

JECT: Table of Contents and Obsolete NSS Memoranda

The following is a list of NSS Memoranda which are obsolete and should be removed from your NSS Notebook. They will no longer appear on the attached Table of Contents.

69-03-01A	Benchmark Submittal for Sigma 2, Sigma 5/7
69-03-02A	Magnetic Tapes Available for Copying
69-10-01A	Sigma 7 Benchmark Submittal
69-14-09A	An Example of the Use of File Manage in Sigma 7 BPM
69-16-03A	Sigma 5/7 Batch Processing Monitor
69-16-06A	Description - BPM System Generation
69-40-02A	Sigma 2 Software Sizes
69-40-03A	Sigma 2 Software Publications
69-70-03A	Current 9 Series Standard Software
69-70-04A	Basic Library of SDS Manuals
69-70-05A	List of Available Special Programs
69-70-06A	Tape Copy Requests for 9 Series
69-73-02A	Monarch System Tape Release
69-73-05A	Monarch System Release
69-74-01A	Overlay Note
69-75-02A	900 Series Real-Time Monitor Overlay Structure
69-76-05A	Backspacing Binary Records in FORTRAN II and FORTRAN II Real-Time
69-90-01A	Conversational Compiler System (CCS)
69-90-02A	Modifying the SDS Time-Sharing System I/O

Attachment
Table of Contents

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BJECT: Table of Contents

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SUBJECT: SIGMA 5/7 BCM/STAND-ALONE COMMON SOFTWARE PACKAGE

The "Sigma 5/7 BCM/Stand-Alone Common Software Package", catalog number 704127 - 24A00, is a library of relocatable binary programs from which absolute binary programs may be generated.

The absolute binary programs which can be formed are:

1. BCM
2. Stand-Alone ABS Dump Loader with I/O handlers
3. Stand-Alone Loader with I/O handlers

A. In order to generate the above absolute binary programs, procede in the following manner:

1. Obtain the following SDS program or comparable programs:

   Sigma 5/7 Absolute Bootstrap Program
   (704145-24, or -23)

   Sigma 5/7 Stand-Alone Loader with I/O handlers
   (704142-84, or -83)

   Sigma 5/7 Stand-Alone ABS Dumping Loader with I/O handlers
   (704155-84, or -83)

   Sigma 5/7 Stand-Alone Symbol Assembler
   (704160-84, or -83)

   Sigma 5/7 BCM/Stand-Alone Common Software Package
   (704127-24, or -23)

2. Generate a relocatable binary deck which contains primary external references to each SDS common software module desired. The primary external references are of the form CNXXXXXX where XXXXXX is a six character SDS catalog number. The Stand-Alone Symbol Assembler may be used to generate the relocatable object module. (See NSS 69-12-03A)

3. Generate an ABS Boot Loader. The ABS Boot Program (704145) may be used to produce an ABS Boot Loader on the BO device. (See NSS 69-14-06A,pg. 2)

4. Generate the desired ABS binary program. This may be accomplished with the Sigma 5/7 Stand-Alone ABS Dump Loader with I/O handlers. Assign the relocatable binary module produced by Step 2 above to BI and the Sigma 5/7 BCM/Stand-Alone Common Software Package to LI (Library Mode). The output of ABS Dump Loader to the BO device will follow the ABS Bootstrap Loader produced in Step 3. (For sample deck set-up, see appendix I)

   a. Recommended Relocation Bias for use in forming various ABS decks:

      BCM: Bias must be $\geq 60_{16}$. If no external interrupts are to be used, 60_{16} may be used. If external interrupts are used, the bias should be the first doubleword boundary above the last interrupt.

      Processors (SYMBOL, FORTRAN, LOADER): Bias should be the first page boundary above TOPMON as listed in the map output when BCM was formed (i.e. 7 pages, $0E00_{16}$).

   b. Recommended Relocation Bias for use in forming various Stand-Alone ABS decks:
      S.A. Loader with I/O handler, Catalog No.704142,
      S.A. ABS Dump Loader with I/O handlers, Catalog No. 704155:

      1) Stand-Alone I/O handlers: Bias must be $\geq 60_{16}$.

      2) Stand-Alone Loader, Catalog No. 704141: Bias must be the first doubleword boundary above the value for HIGHEST LOC obtained from the map produced by loading S.A. I/O handlers.

      3) S.A. ABS Dump Loader, Catalog No. 704154: (Same as 2).

B. Binary programs included in the Sigma 5/7 BCM/Stand-Alone Common Software Package (relocatable binary deck*) are ordered as indicated below.

Cat. No.	Title
704133	Sigma 5/7 Monitor for BCM
704367	Sigma 5/7 Stand-Alone I/O Control Program (SALIO)
704368	Sigma 5/7 I/O Handler Interface
704852	Sigma 5/7 FORTRAN BCD Conversion
704854	Sigma 5/7 Dummy FORTRAN BCD Conversion
704851	Sigma 5/7 7-Track Magnetic Tape Handler
704369	Sigma 5/7 Mag Tape I/O Handler
704370	Sigma 5/7 Line Printer I/O Handler
704371	Sigma 5/7 Card Reader I/O Handler
704372	Sigma 5/7 Card Punch I/O Handler
704373	Sigma 5/7 Typewriter I/O Handler
704374	Sigma 5/7 Paper Tape I/O Handler
704363	Sigma 5/7 Ft. Pt. Inst. Simulator (BCM)
704364	Sigma 5/7 Decimal Inst.Simulator (BCM)
704365	Sigma 5/7 Byte Inst. Simulator (BCM)
704366	Sigma 5/7 Convert Inst. Simulator (BCM)
704149	Sigma 5/7 Ft. Pt. Inst. Simulator (SA)
704150	Sigma 5/7 Decimal Inst. Simulator (SA)
704151	Sigma 5/7 Byte Inst. Simulator (SA)
704152	Sigma 5/7 Convert Inst. Simulator (SA)
704153	Sigma 5/7 Unimplemented Instruction Trap Handler (SA)
704131	Sigma 5/7 Initialization Package for BCM
704853	Sigma 5/7 Stand-Alone I/O Initialization
704141	Sigma 5/7 Stand-Alone Loader
704154	Sigma 5/7 Stand-Alone ABS Dump Loader

*This consists of one relocatable binary card deck (704127-84) or two relocatable binary paper tapes (704127-83, 1 of 2, 2 of 2). The 2 of 2 paper tape contains the Sigma 5/7 Stand-Alone Loader (704141-23) and the Sigma 5/7 Stand-Alone ABS Dump Loader (704154-23).

C. General comments on selection of I/O handlers:

1. A primary external reference must be generated for the I/O handler interface (704368) module.

2. A primary external reference must be generated for either the FORTRAN BCD Conversion or the Dummy FORTRAN BCD Conversion Module.

3. If the 7-track magnetic tape handler is desired, a primary external reference must be generated for the magnetic tape I/O handler as well as one for the 7-track magnetic tape handler.

D. Examples:

1. To form a bootable copy of BCM with line printer, card reader, 7/9 track mag tape, typewriter, FORTRAN BCD Conversion, and floating point simulator, the following is necessary:

   a. Assemble the following program:
   ```
   REF CN704133, CN704368, CN704852, CN704851,
   REF CN704369, CN704370, CN704371, CN704373,
   REF CN704363, CN704131
   END
   ```

   b. Execute the ABS Boot Program.

   c. Load the above relocatable object module using the ABS Dump Loader. (See appendix I.)

2. To form a bootable copy of the Stand-Alone Loader with I/O handlers for typewriter and card reader, the following is necessary:

   a. Assemble the following programs:
   ```
   REF CN704367, CN704368, CN704371, CN704373
   REF CN704854, CN704853
   END
   REF CN704141
   END
   ```

D. (Cont'd)

2.

b. Execute the ABS boot program.

c. Load the first relocatable object module using the ABS Dump Loader. (See appendix I.)

d. Load the second relocatable object module above by repeating Step "c".

1 Attachment

MS/sf

IDENTIFICATION: 69-12-02 B

DATE ISSUED January 8, 1968

SECURITY

SUBJECT: SIGMA 5/7 BCM/STAND-ALONE COMMON SOFTWARE PACKAGE

APPENDIX I - Use of Sigma 5/7 Stand-Alone ABS Dump Loader (704155-84)

Deck Setup

< Sigma 5/7 Stand-Alone ABS Dump Loader >

Deck will be loaded unconditionally

< Symbol program with REF's to catalog numbers to be used >

!EOD

!EOD

Treated as library - only decks referenced by Symbol Prog. will be loaded.

<Sigma 5/7 BCM/Stand-Alone Common Software Package>

!EOD

!EOD

Operating Instructions:

1. Boot in loader from card reader (or paper tape reader)
2. After loader is read, the select light on teletype will be turned on. Type in load command:

   !L MAP, RB060(NL) (See SDS Sigma 5/7 Stand-Alone Systems Operations Manual, 901053.)

3. When entire deck has been read, the select light on the teletype will be turned on. Type in run command:

   !R ^ (NL)

4. Absolute binary deck will be output on BO device.

MS/sf

69-14-01A
7 February 1967

SUBJECT: SIGMA 7 Basic Control Monitor Modifications

FROM: Jim Gaines

TO: T Distribution

A number of modifications have been made to the Basic Control Monitor, BCM Loader, BCM Symbol and Free Standing Symbol. These are described in this memo.

Jim Gaines

JG:jp

The following is a description of a Sigma 7 load map and how it is interpreted.

```
                                        Hexadecimal word address of DEF
                                        byte within the given word address where
SREF          BF:DDOR                   the DEF appears (0 ≤ byte ≤ 3).
SREF          BF:DATA3
SREF          BF:OHFOR
UDEF    60 0  M:C
DEF     65 0  M:OC
UDEF    6A 0  M:LO
UDEF    6F 0  M:LL                      Monitor Residency = E00
UDEF    74 0  M:DO    Monitor DCB's
UDEF    79 0  M:PO
UDEF    7E 0  M:BO
UDEF    83 0  M:LI
UDEF    88 0  M:SI
UDEF    8D 0  M:BI
UDEF   E00 0  LOWEST LOC              lowest location allocated for the program
UDEF   E02 0  M:LDRST                 *A
                                      User's program resides here. The size of
DEF    E64 0  BF:PIN                  the program is the location of BF:PIN minus
DEF    E6A 0  BF:TRP                  the location of M:LDRST (if the load BIAS
DEF    EA6 0  BF:TRC                  is other than E00, subtract the LOWEST LOC.)
UDEF   EA8 0  BF:S8                   If the user's program contains subroutines,
        .                             they will be listed here.
        .
        .                             All Library (RUN-TIME & MATH) Routines
        .                             defined and/or referenced are listed here,
        .                             with the location of their ENTRY points
        .                             specified. The size of the library used by
        .                             a program is the location of the first user
        .                             DCB minus the location of the first library
        .                             routine, BF:PIN (i.e. 944 hex. words).
        .
        .
        .
DEF   15EF 0  L:1COMP
DEF   165B 0  M:SLEM                  *A location of loader's Stack Point
UDEF  1660 0  M:ETMP                     Doubleword for the table of external
UDEF  1736 0  M:LIBER                    references and/or definitions.
```

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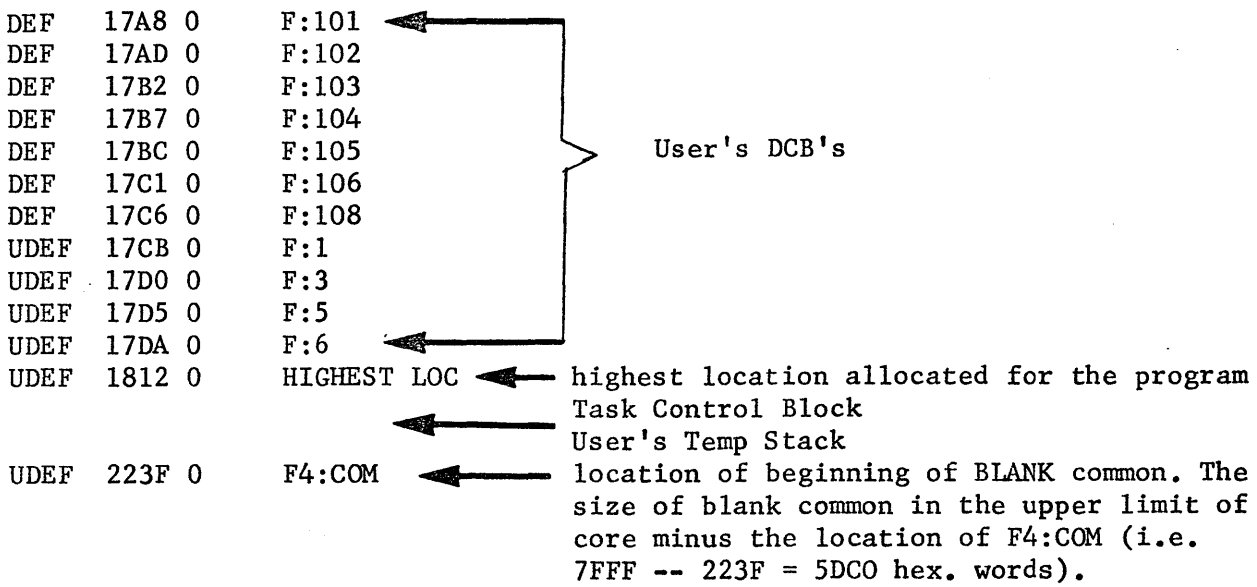
Sheldon Klee	Nancy Candon	69-14-04	B	23 May 1967


DEF 17A8 0 F:101
DEF 17AD 0 F:102
DEF 17B2 0 F:103
DEF 17B7 0 F:104
DEF 17BC 0 F:105
DEF 17C1 0 F:106
DEF 17C6 0 F:108
UDEF 17CB 0 F:1
UDEF 17D0 0 F:3
UDEF 17D5 0 F:5
UDEF 17DA 0 F:6
User's DCB's
UDEF 1812 0 HIGHEST LOC
highest location allocated for the program
Task Control Block
User's Temp Stack
UDEF 223F 0 F4:COM
location of beginning of BLANK common. The size of blank common in the upper limit of core minus the location of F4:COM (i.e. 7FFF -- 223F = 5DC0 hex. words).

A. The load map contains all labels which are either referenced (REF) or defined (DEF) in the load module. Associated with each label is its location (in hexadecimal) and a message as to what "type" of label it is. The label types are:

1. PREF (Primary Reference)

   The label is referenced by a program, but no program with that label has been loaded.

2. DDEF (Double Definition)

   The label has been encountered more than once during the load process. The first definition is used.

3. UDEF (Unused Definition)

   The label has been defined but never referenced.

4. SREF (Secondary Reference)

   The label has been referenced only as a secondary reference.

5. DEF (Definition)

   The label has been defined and referenced.

B. Loader Error Messages (Printed before Load Map) These are of the form
! !ERR xx SEQ nn where xx = error code
nn = sequence number of the record*

*Note:

The sequence numbers on binary cards is found in columns 1 and 2. The last four punches in column one (6-7-8-9) represent the first four bits (one hexadecimal digit) of the sequence, and the first four punches in column two (12-11-0-1) represent the last four bits (one hexadecimal digit) of the sequence.

A deck will be considered to be "out of sequence" if the last card of the object module is missing or if the cards are out of order. Every card in an object module has "0-1" punches in column one except the last card, which only has a "1" punch in column one.

B. Loader Error Messages (Cont'd)

1. xx = A2 no main program
2. xx = A3 error severity level exceeded (perhaps as result of loading an object module which corresponds to a source deck with a diagnostic).
3. xx = A4 program exceeded core during load -- the temp stacks and program have met.
4. xx = A5 sequence error
   nn = sequence number of card which had the error.
5. xx = A6 checksum error.
   nn = sequence number of card which had the error.
6. xx = A7 this error message will be given for any of the following errors:
   a. The first program in user's deck to be loaded did not contain largest blank COMMON reference.
   b. !EOD card encountered when binary deck expected.
   c. Compiler error in generating object module (or deck off-punched).
7. xx = A8 illegal load address caused by giving a BIAS (option on !LOAD card) which is not within limits of memory or trying to load a program which references areas outside memory limits.
8. xx = A9 TSS (Temporary Storage Stack) too large -- overlaps COMMON when building TCB.
9. xx = AA compiler error in creation of object module (or deck off-punched).

NC/sf

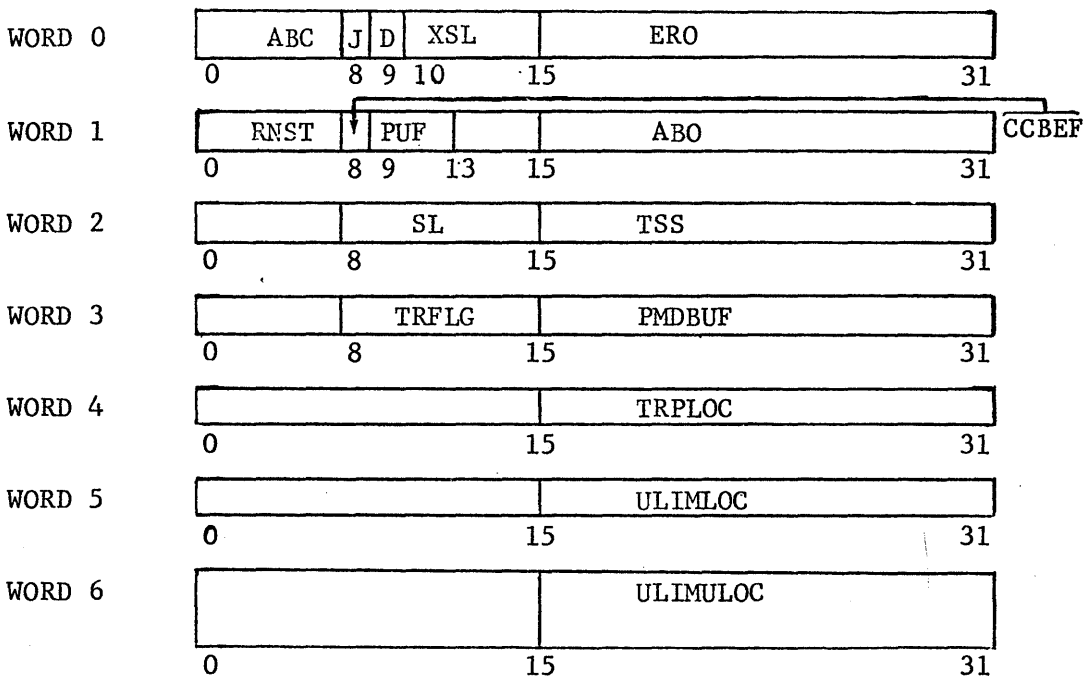
SUBJECT: BASIC CONTROL MONITOR FOR SIGMA 5 and 7 - JOB INFORMATION TABLE (JIT)

A basic part of the Basic Control Monitor for Sigma 5/7 is the Job Information Table (JIT). This table is used by the monitor for storage of information pertinent to control of background - or foreground-program execution.

This memorandum outlines, in detail, each entry in the JIT and is intended to serve systems programmers as technical documentation supporting BCM in lieu of a monitor technical reference manual.

The JIT for background program execution requires seven words of resident monitor storage. The monitor utilizes a trap location that is, by definition, unused by the Sigma 5/7 hardware for storage of a pointer (right-justified word address) to the first word of the table; this location is '4F'. Each foreground program must supply it's own JIT of seven words, initialized to zero. Upon entry, the foreground program alters the JIT pointer ('4F') to refer to the foreground JIT. The monitor JIT pointer must then be restored before the foreground program exits to the monitor.

The format of the JIT is shown below. The names of the various fields generally correspond to those in the BCM symbolic listing.



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Sheldon Klee	B. H. Purdy	69-14-07	A	

Each field of the JIT is defined as follows:

ABC - I/O Error ABORT Code: Two hexadecimal digits defining the I/O error that has occured; BCM reference manual 90 09 53A, Pg. 9, Table 6.

J - Missing Job Flag: This bit is set (1) when a missing JOB control command error (code 60) occurs in order to suppress redundant error print out while searching the C device for the next JOB card. The flag is reset (0) when the next JOB card is encountered.

D - Data Flag: This bit is set (1) when a data card (non-control command) is encountered when reading the C device. This condition results in a monitor error print out (code 63) and causes the C device to then be read for the next JOB card. This flag is set in order to suppress repetitive error print out in the event several additional data cards are encountered while reading the C device; the flag is reset (0) when the next JOB card is processed.

XSL - Execution Severity Level: The loader severity level that is to be tolerated by the monitor in accepting a program for execution. This information exists as an option of the RUN control command.

NOTE: One should be aware that although XSL is retained in the JIT, BCM will still allow execution regardless of the entry.

ERO - Error Override: Temporary storage of the error return address specified in the FPT when an I/O request is made to the monitor.

RNST - Run Status: A two digit hexadecimal code specifying the reason the program was aborted; BCM reference manual, Pg. 10.

CCBEF - Control Command Buffer Flag: This flag is set (1) when the Control Command Buffer is full; it is reset (0) when the buffer is empty. The monitor double-buffers the read from the C device.

PUF - Processor/User Flag: One hexadecimal digit defining who is running; BCM reference manual 90 09 53A, Pg. 10.

ABO - Abnormal Override: Temporary storage of the abnormal return address specified in the FPT when an I/O request is made to the monitor.

SL - Severity Level: The severity level (read from the LOAD card) that is to betolerated by the loader in accepting a relocatable object module.

TSS - Temporary Stack Size: Size, in words, of the user program temporary stack formed by the loader. The stack pointer double-word is part of the user's task control block.

NOTE: Originally the monitor was responsible for processing all the options in the LOAD control card. This task is now performed by the loader, thus this entry is no longer used by the monitor.

TRFLG - Trap Flags: A right-justified field, each bit corresponding to a specified user trap set-reset state. This field is altered by the user trap control function entry to the monitor; BCM reference manual 90 09 53A, Pg. 21.

PMDBUF - Dump Buffer: The address (word resolution) of a 50 word block of memory, reserved by the loader, immediately following the user program for use by the monitor as: a) a 30 word buffer used to honor requests for snap-shot and post-mortem memory dumps, and; b) a 20 word word buffer used for temporary storage by the monitor in the process of servicing a call for the trap controlfunction; BCM reference manual 90 09 53A, Pg. 21.

TRPLOC - Trap Location: The address (word resolution) of the entry point to the user's trap routine to be taken if a specified trap occurs. This location is set during the trap control function call to the monitor.

ULIMLOC - User Lower Limit The word address defining the lower memory limit of background activity; all memory up to this limit is considered to be monitor residence. This limit is calculated during execution of the monitor initialization routine as the location of the next page (1 page = 512 words) boundary following the last word of the resident monitor. The last word +1 of the resident monitor is expressed symbolicly as 'TOPMON'. This location is an external DEF and will, therefore, appear on the load map when an ABS deck of the monitor is created using the dumping loader.

ULIMULOC - User Upper Limit: The word address defining the highest memory limit of background activity; usually the last location in the object machine. This limit is calculated during execution of the monitor initialization routine as the last memory location minus the number of pages reserved for the non-resident foreground area.

NOTE: BCM, during initialization after being booted into memory, will determine the memory limit of any Sigma 5/7 by adding 1000_{16} to a word (in the first 4K) and repetitively executing an indirect memory fetch through this word until a trap to '40' occurs. Location '40' had previously been loaded with the appropriate XPSD to return control to the initialization routine which then knows the memory limit.

Miscellaneous Notes

The JIT is maintained entirely by the monitor. Except where noted, each field of the JIT is reset when a JOB (or FIN) control command is read.

The monitor manipulates non-byte fields of the JIT through the use of Load/Store selective instructions. Bits are tested by means of comparing the word to a bit-mask and branching if the AND is (or is not) zero. This technique would allow one to make use of any unused bit positions in the table without affecting current monitor operation.

Monitor routines expect the pointer to the JIT to be in R5 (general register 5) upon entry.

SUBJECT: DEVICES AND OPERATIONAL LABELS IN SIGMA 7 BCM

In lieu of a BCM technical manual, this note documents the structure and function of the key device and operational label tables.

Essentially, there exist two sets of tables, the operational label tables (OPLBT) and the device tables (DCT). OPLBT points to DCT. DCT points to the handlers and the current DCB.

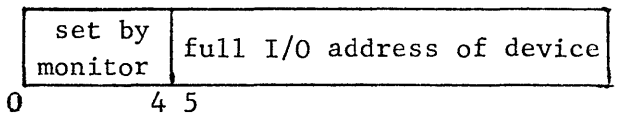
I. DCT Tables

The DCT tables include one entry per physical device. They are parallel in that all the i^{th} entries correspond, although the tables themselves are of different resolutions (i.e., byte, half-word etc.).

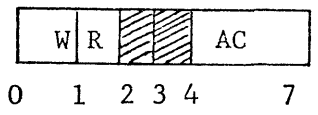
The symbols TYN,PRN,PPN,... are displacements into the tables pointing to the first entry for that device type. Thus, MTN is a displacemeent into the DCT tables pointing to the first mag tape unit.

The DCT's marked with an asterisk are the ones established at assembly time and may, therefore, be reassembled to extend the hardware configuration. The remaining DCT's are dynamic -- they are set and used by the monitor and/or the IO handlers.

* DCT1 A half-word table of device addresses.



* DCT3 A byte table of permissable functions (i.e. read/write) and accounting type.



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Sheldon Klee	Sharon Kory	69-14-08	A	

where, W=1 for write permitted
R=1 for read permitted
AC a classification code which may be included in an accounting routine.

* DCT4 A byte table of device types. The device "type" is actually a displacement into the table of I/O handler addresses (IODEF1).

DCT7 A half-word table of I/O interrupt return addresses. Set by handler.

* DCT9 A half-word table of command pair addresses.

DCT10 A word table of DCB addresses and functions. Set by monitor.

In addition, there are two tables with one entry per device type.

*IODEF1 A half-word table of I/O handler addresses.

*DVLTB A half-word EBCDIC table of device names. The position in this table is also the device type. Thus, the card reader is type 4.

DCT tables continued...

DCT tables (as they exist in BCM - "B" version)

	DCT1	DCT3	DCT4	DVLTB	IODEF1
	0	C1	0	'NO'	0
TYN →	1	C1	1	'TY'	KBTIO
PRN →	5	40	2	'PR'	PTAP
PPN →	5	81	3	'PP'	PTAP
CRN →	3	40	4	'CR'	CRDIN
CPN →	4	81	5	'CP'	CRDOUT
LPN →	2	83	6	'LP'	PRTOUT
MTN →	80	C4	8	'DC'	DISCIO
	81	C4	8	'9T'	MTAP
	:	:	:	'7T'	MTAP
	:	:	:	'MT'	
	87	.	8		
	C0	.	9		
	C1	.	9		
	:	:	:		
	:	:	:		
	C7	C4	9		

Example:

If in a SYST,ASSIGN or FPT, '7TAC2' has been mentioned, the device is "verified" in the following way. '7T' is a valid device name (DVLTB). AC2 (IOPO, device C2) is a valid device address since it exists in the DCT1 table (17th entry). The device can be read and written (17th entry in DCT3). The handler address can be found by looking at the 17th entry in DCT4, which says that the handler for AC2 is the 9th entry in IODEF1.

II. OPLBT Tables

The OPLB tables link the label to the device. Like the DCT's, they are also parallel.

OPLBT1 A half-word text table of labels

OPLBT2 A byte table of displacements into DCT. An entry in this table is the "current" operational label assignment to the device.

OPLBT3 Same as OPLBT3 except that it is "permanent".

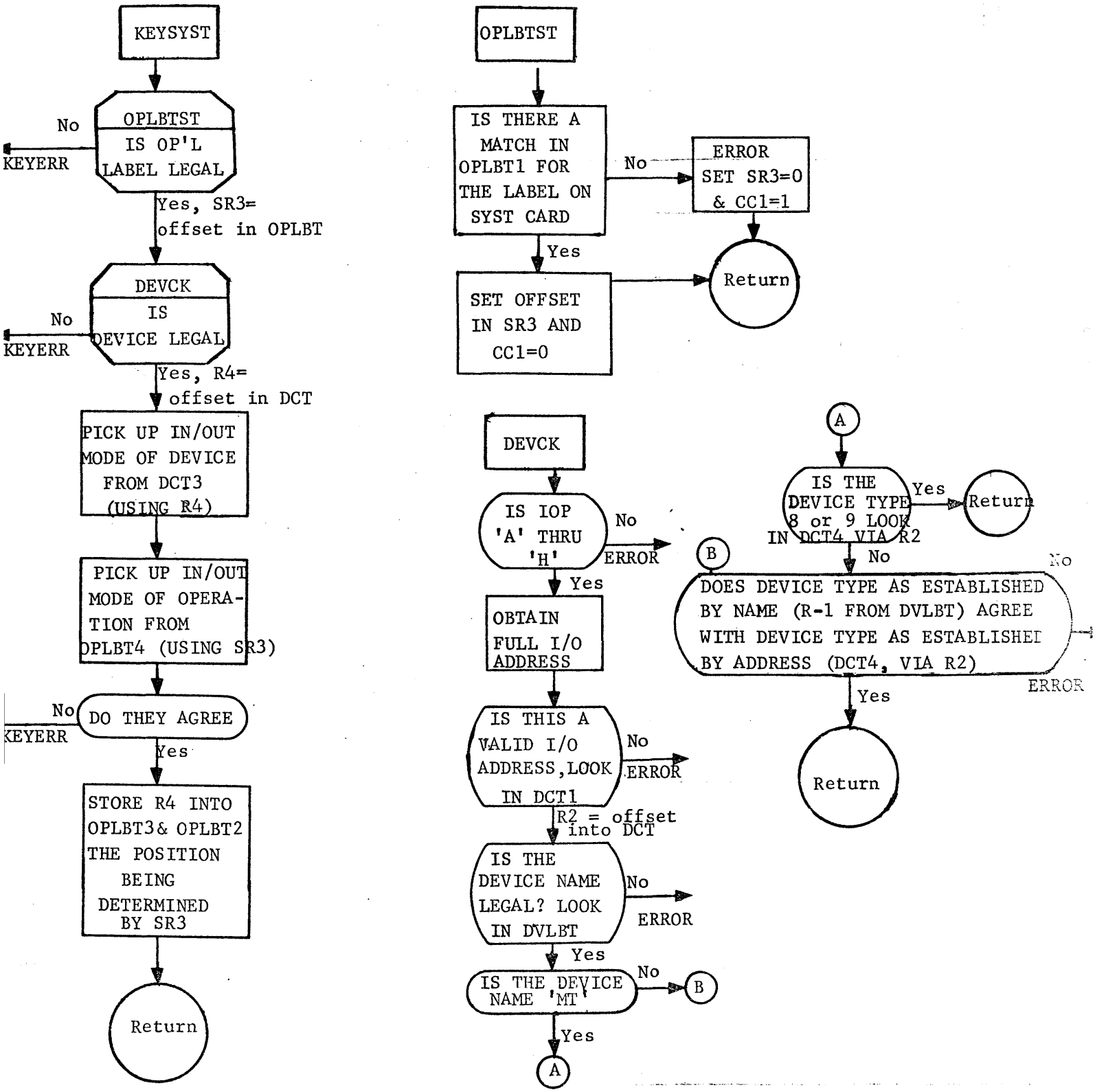
OPLBT4 A byte table of permissable functions. Format is the same as DCT3.

When a !JOB card is read, OPLBT3 is copied into OPLBT2. A !SYST card changes the appropriate entry in OPLBT2 and OPLBT2. In BCM these are the only control cards which affect the OPLBT tables. (The !ASSIGN causes a change in the DCB only.) Effectively, OPLBT2 is redundant in BCM, since it never differs from OPLBT3. (In BPM, this is not the case.)

OPLB Tables
(As they exist in BCM - "B" Version)

OPBLBT1	OPLBT2 (Current) (Pointers to DCT)	OPLBT3 (Permanent)	OPLBT4
'NO'	0	0	C4
' C'	CRN		40
'OC'	TYN	SAME	C2
'LO'	LPN		83
'LL'	LPN	AS	83
'DO'	CPN		82
'PO'	CPN	OPLBT2	81
'BO'	CPN		81
'LI'	CRN		40
'SI'	CRN		40
'BI'	CRN		40

III. !SYST Card. A quick picture of the relationship between DCT and OPLBT can be gained by looking at the monitor response to the !SYST card.



IV. Example of Adding a Device

The following update cards will provide for another card reader whose device address is X'06'. The line numbers correspond to the "B" version listing (Cat. 704133), Revision B00 (7/12/67).

```
+95
CRB     EQU         X'06'       ESTABLISH SYMBOLIC DEVICE ADDRESS
+639
        DATA,2      CRB         ENTER DEVICE ADDRESS IN DCT1
+662
        DATA,1      X'40'       ENTER FUNCTION (read only) into DCT3
+677
        DATA,1      4           ENTER DEVICE "TYPE" INTO DCT4
+694
        DATA,2      DA(A45)     ENTER ADDRESS OF COMMAND PAIR INTO DCT9
+805
A45     GEN,8,24    2,0         ESTABLISH COMMAND LIST FOR CRA06
        GEN,8,24    X'1E',0
```

SIGMA 7 BASIC CONTROL MONITOR MODIFICATIONS

Additional Processing Capabilities

I. Basic Control Monitor

A. The following control commands have been added:*

!REW dcb

The device associated with the dcb is rewound if the device is mag tape, otherwise this control command is ignored.

!WEOF dcb

(1) dcb device = mag tape – tape mark is written

(2) dcb device = paper tape punch – !EOD record is written

(3) dcb device = card punch – !EOD record is written

(4) dcb device = any other – ignored

!PFIL dcb [,BACK] [,N]

The device associated with dcb is positioned N files (backward or forward) if the device is mag tape, otherwise this control command is ignored.

Note: The default case is forward one file.

B. The following I/O function calls have been added:

1. Rewind (REW) and Write Tape Mark (WEOF) calls

CAL,1 address

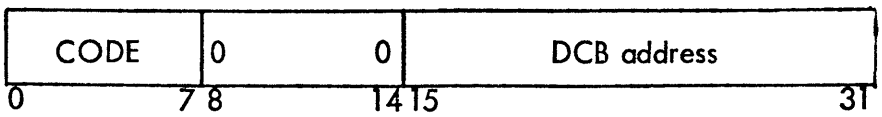
where

address points to word 0 of the FPT shown below.

---

*Consult the SIGMA 7 Basic Control Monitor Manuals (90 09 63A), page 19, for a definition of 'dcb'.

word 0



where

CODE is X'01' for REWIND, and X'02' for WEOF.**

DCB address is the address of the associated DCB.

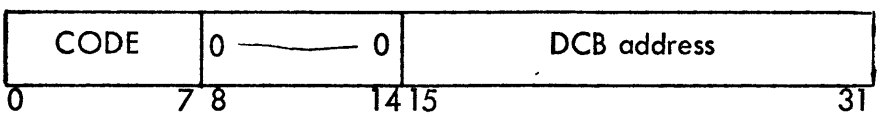
2. File and Record positioning calls

CAL1,1 address

where

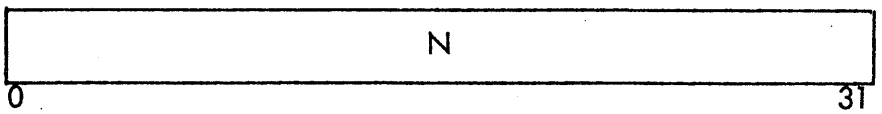
address points to word 0 of the FPT shown below.

word 0

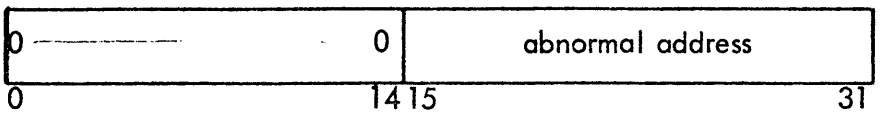


word 1

optional



optional



**If the device associated with the dcb is mag tape, a tape mark is written. If the device is a card or paper tape punch, an !EOD record is written.

where

CODE is X'1C' for position file, and X'1D' for position record.

DCB address is the address of the associated DCB.

*P1 is the record count (N) address parameter presence indicator (0 means absent, 1 means present) P1 must be 0 for position file.

P2 is the abnormal address parameter presence indicator (o means absent, 1 means present) P2 must be 0 for position file.

DIR is the direction indicator (0 means forward positioning, 1 means backward positioning).

N is the number of records to position.

Abnormal address is the address of the entry to the users routine that will handle abnormal conditions for this I/O operation (position record only).

Note: Each of the I/O function calls described in 1 and 2 pertain only to magnetic tape and will be ignored if not applicable.

C. Changes to File Maintenance call philosophy:

1. Close File

The close file function (code X'15') has been modified to do the following:

a. An !EOD record will be written if the device associated with the DCB is either the card punch or paper tape punch.

b. Two successive tape marks (EOF's) are written followed by a backspace if the device associated with the DCB is mag tape (out file).

The implications of the close file changes are as follows:

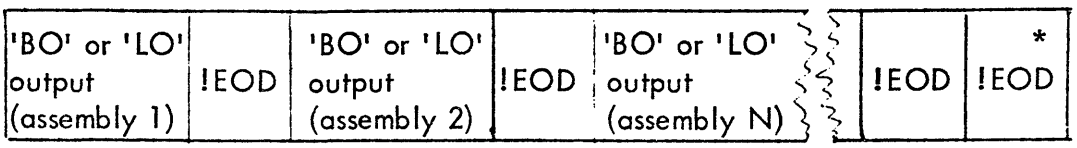
Assembly or Compilation

'BO' and 'LO' mag tapes

'BO' or 'LO' output (assembly 1)	EOF	'BO' or 'LO' output (assembly 2)	EOF	≈	'BO' or 'LO' output (assembly N)	EOF	EOF

*If the count address parameter is 0 the default case for N is 1.

'BO' and 'LO' paper tapes



II. BCM Loader and BCM Abs Dump Loader

A. Load and Library phase

The loader reads the first record from the BI or LI device and examines it for two possibilities:

1. The first read resulted in an End of Data return.
2. The first read resulted in a normal return.

If the End of Data return occurs (EOF on mag tape), the BI device is rewound, another read issued, and loading takes place.

If the normal return occurs, the image is accepted and loading takes place.

This change allows semibatch processing capabilities inasmuch as binary output to mag tape can be loaded as part of the same assembly compilation job. I.e.,

```
!JOB
!ABS (PROCESSOR)
    processor abs deck
!ASSIGN  M:BO, (DEVICE, MTA80)
!Processor     BO
    deck 1
!Processor     BO
    deck 2
    .
    .
    .
!Processor     BO
    deck N
!ABS   LOADER
    loader abs deck
!ASSIGN  M:BI, (DEVICE, MTA80)
!ASSIGN  M:LI, (DEVICE, CRA03)
```

*Second !EOD record can be generated by the !WEOF $\begin{Bmatrix} M:BO \\ M:LO \end{Bmatrix}$ control command.

```
!LOAD   (MAP)
    library decks
!EOD
!EOD
!DATA
!RUN
!FIN
```

Note: The loaders (either F. S. or BCM versions) terminate the load phase upon encountering 2 successive End of Data returns (!EOD, !EOD for paper tape or cards; EOF EOF for mag tape). An end transfer address will no longer cause the load phase to terminate.

The same 2 successive End of Data returns apply to the termination of the library phase with the exception that after all external references are satisfied the remainder of LI is read but not loaded.

III. BCM and Free-Standing SYMBOL Assembler

Both versions of the SYMBOL Assembler will now assemble multifile source tapes as follows:

An End of Data return from the first read of any assembly causes another read to be made. If the second read results in a normal return, assembly begins. If the second read results in an End of Data return the following message is written on the OC device:

2 SUCCESSIVE EOF'S READ...EOT

BCM SYMBOL then exits to the monitor.

F. S. SYMBOL enters a "wait" state. (Clearing the wait results in a restart.)