PRODUCT SPECIFICATION

REV LTR	REVISION ISSUE DATE	APPROVED BY	REVISIONS
F	8-20-79	[signature]	Changes for Mark 9.0 Release

Changes for Mark 9.0 Release

1-1   Deleted "which runs....MCPII," from GENERAL paragraph.
Replaced "not defective" with "usable" in GENERAL.

2-1   Added "backup" to "A listing will be...sectors" to
OPERATING INSTRUCTIONS.
Deleted "It will be...jobs" from OPERATING INSTRUCTIONS.
Added "relocated or removed sector" to "Executing the
program...to backup" in OPERATING INSTRUCTIONS.
Deleted "and cylinder zero: from CI section.
Added last sentences "If cylinder zero...user on MCP
data)." to CI section.
Changed "*" in R or RC, RI, & CI sections to "(See
Note 1)".

2-2   Deleted "and have... in tact." from "Note 1: These
options..." sentence.

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SANTA BARBARA PLANT

P.S. 2212 5488
B1800/B1700 SYSTEM/DISK.INIT

PRODUCT SPECIFICATION

REV LTR	REVISION ISSUE DATE	APPROVED BY	REVISIONS
E	6-7-79	*[signature]*	Changes for Mark 8.0 Release

Changes for Mark 8.0 Release

1-1   Changed "A 225, 206, or 207 disk...default error conditions" sentence in INITIALIZATION STANDARDS paragraph.
      Replaced "5" with "-" in "207 Packs" in Table 1-1.

2-1   Updated KEYBOARD CONSOLE (SPO) section with the following:
      Number 2. replaced by "ENTER ACTION:..." section.
      Number 3. deleted.
      Renumbered section 4 thru 8 now 3 thru 7.

2-2   Added "Up to 14 characters" and "if an incorrect ...message that follows." to number 6.
      Deleted ending sentence "The REMOVE option..." from REMOVE OPTION section.

2-3   Deleted ending sentence "This option must be..." from LIMIT SPECIFIER OPTION section.
      Added "(I, RI, or CI only)" to MARGINAL SECTORS OPTION title.
      Added ending sentence "When using this...are being initialized." to MARGINAL SECTORS OPTION section.
      Added "to add initialization...CI only)" to first paragraph in DOLLAR-SIGN OPTION section.
      Deleted "Note:...verification has occured." from DOLLAR-SIGN OPTION section.
      Added "(I, RI, or CI only)" after "The Initialization pattern" in second paragraph of DOLLAR-SIGN OPTION section.
      Added "This entry will be..." as ending sentence in fourth paragraph of DOLLAR-SIGN OPTION section.
      Added "This entry will be..." as ending sentence in fifth paragraph of DOLLAR-SIGN OPTION section.

2-4   Added "8.   ENTER CYLINDER This display...at this time." section.
      Revised SPECIFICATION CARD FORMAT section "Initialization:" thru "CYLINDER INITIALIZE" and "The <drive> entry...processed DP <?>."
      Deleted "The "V" entry...@6363@ (see example 1)."

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PRODUCT SPECIFICATION

REV LTR	REVISION ISSUE DATE	APPROVED BY	REVISIONS
			Changes for Mark 8.0 Release (Cont)
			2-5 Added "(I, RI, or CI only)" after MARGINAL SECTOR CARD title.
			Added ending sentence "When using this..." to MARGINAL SECTOR CARD section.
			2-6 Added CYLINDER CARD (CI or CV only) section.
			2-7 Revised "207 disk" in DEFAULT INITIALIZE/VERIFY PROCEDURES section.
			3-2 Changed #5. "DPC R U" to "DPC RC U".
			Changed "NORMAL I/V operation" list in SPO section.
			3-3 In "Normal verification only operation" section changed MSG:SYSTEM/DISK.INIT "VERIFICATION ONLY..." to "ENTER VERIFICATION...". Also in same section Changed RSP: "AXYES" to "AXV".
			In "Normal reconfiguation operation" section changed MSG:SYSTEM/DISK.INIT "VERIFICATION ONLY..." to "ENTER ACTION...".
			Changed RSP:"AXNO" to "AXRC".
			Deleted MSG:SYSTEM/DISK.INIT...DPC IS INIT AS: to RSP: job-number AXS.
			4-1 Changed "This is a safety...correct one." to "This is a safety...correct one for initialization only." in ERROR MESSAGES section #6.
			4-2 Added numbers 17. thru 20. to ERROR MESSAGES section.

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GENERAL

SYSTEM/DISK.INIT is designed to label, initialize and verify both packs and cartridges. Removable disk cartridges and packs must be initialized before they can be used with B1800/B1700 systems software. The program assigns addresses to the appropriate sectors, writes a random pattern in the sector data area, and reads these patterns back to insure that the sectors are usable.

INITIALIZATION STANDARDS

If a sector on a disk cartridge is found to cause errors, the entire track in which it resides is removed from the Master Available Table. Should a sector have to be removed from among the first 64 sectors of the disk, that disk cannot be used with B1800/B1700 systems software. When a sector on a disk pack is found to cause errors, it is relocated on a spare sector. A 225, 206, or 207 disk pack is rejected and is unuseable if the number of errors detected exceeds the default limits in table 1-1. See "REMOVE" or "LIMIT" options for changing the default error conditions.

	225 Packs	206 Packs	207 Packs
Per cyliner	5	5	-
Per pack	2030	4070	7815

Table 1-1: Default Error Conditions

Note: 225 disk packs are limited to 20 transient errors per cylinder and 1,000 per pack. These are errors that fail during verification but not during retry.

RELATED DOCUMENTATION

Name	Number
B1800/B1700 Software Operational Guide	1068731
B1800/B1700 MCP II	P. S. 2212 5462

OPERATING INSTRUCTIONS

The SYSTEM/DISK.INIT program operates under the control of the MCP and can be executed through either the keyboard console or the card reader.A backup listing will be produced containing the relocated or removed sectors. Executing the program with SW = 1 will produce the relocated or removed sector report on the SPO instead of sending it to backup.

KEYBOARD CONSOLE (SPO)

When executed from the SPO, SYSTEM/DISK.INIT responds with a set of messages followed by an ACCEPT message for each.   With each valid ACCEPT, the next message in the string will appear.   To stop SYSTEM/DISK.INIT, enter a blank after the first message in the string. The message string is as follows:

1. ENTER UNIT ID <DP?>

2. ENTER ACTION :   <I,V,RC,RI,CI, or CV>

    Response   Action

    I   :   Initialization

    V   :   Verification only

    R or RC :   Reconfiguration - This purges the pack, verifies
                it, and changes the pack type to that specified.
                Packs with an interchange label also are allowed.
                This response will skip the message string to
                message number 5. (See Note 1)

    RI   :   Reinitialization - relocates all sectors found
               to be bad on the previous initialize. (See Note 1)

    CI   :   Cylinder Initialization - reinitializes only
               specified cylinders and relocates sectors found
               to be bad on the previous initialization. This
               can also be used to restart a previously aborted
               initialization within 50 cylinders of the previously
               aborted cylinder. If cylinder zero is initialized,
               the pack will be purged. A single cylinder may be
               initialized without purging the pack provided all
               sectors in the cylinder are available (ie. no user
               or MCP data). (See Note 1)

       CV   :   Cylinder verification - Verfies only specified
                cylinders.

Note 1: These options can only be used for packs that have been
initialized previously.

3. ENTER 6 DIGIT SERIAL NUMBER

Any decimal value except zero.

4. ENTER PACK ID

Up to 10 characters with no embedded blanks.

5. ENTER PACK TYPE - <U, S, or R>

ENTER PACK TYPE - <U, S, R, or I> (225 disk pack only)

U = Unrestricted

S = System

R = Restricted

I = Interchange (225 disk pack only)

6. ENTER OWNER'S NAME

Up to 14 characters

If an incorrect response is encountered, then an appropriate
error message will be displayed and the response will be
requested again (See ERROR MESSAGES Section).

7. ENTER OPTIONS

At this point optional parameters can be supplied as follows:

REMOVE OPTION

If REMOVE is specified (not valid for cartridge), then after the
first five sectors in error have been relocated for a given
cyliner, all other sectors found in error for that cylinder will
be removed from the master available table. This option over-
rides the default rejection of a pack, if more than 5 sectors in
a cylinder cause errors. When the REMOVE option is specified,
the pack will be rejected only if it exceeds the default pack
error limit or, optionally, a specified pack error limit set with
the LIMIT option.

LIMIT SPECIFIER OPTION

This option allows the user to specify the total number of errors
allowed per pack, not to exceed the number of sectors contained
on the disk. Limits are set through the keyword LIMIT which must
precede the digit(s) that indicate the number of errors. See
table 1-1 for default error conditions.

MARGINAL SECTORS OPTION (I, RI, or CI only)

Sectors that are known to require relocation or removal can be
entered at this time. More than one sector can appear in each
entry, but each address must be a valid decimal address separated
by spaces. When using this option during cylinder initializa-
tion, the sector address must fall within the cylinders that are
being initialized.

DOLLAR-SIGN OPTIONS

Through dollar-sign options, the user has the ability to add
initialization passes (I, RI or CI only), to verify offset or
compare on verification, to change the number of retries on
sectors that cause errors, and to modify the number of errors
before that sector is considered defective.

> $ [Initialization-pattern] [(+ or -) or (C or CR)]
>   [Number-of-retries] [Number-of-errors]

The Initialization-pattern (I, RI, or CI only) entry is a four
digit representation of a hexadecimal pattern (0000-FFFF). If
omitted for the first "$" entry in a string, the default pattern
will be 363633. For succeeding "$" entries in a string, the
default will be verify only, with relocation of bad sectors.

The "+" or "-" entry is used to change the way a disk pack can be
read during verification. The "+" indicates "read offset in" and
"-" indicates "read offset out". The "C" or "CR" entry is used
for disk cartridges to specify compare (C) or compare and remove
(CR) during verification. If this entry is omitted, normal
verification will be done without offset or comparison.

The Number-of-retries entry is used to change the number of
retries made on a sector if an exception is encountered. The
default is ten retries. This entry will be valid during the
entire process.

The Number-of-errors entry is used to change the default for the
number of times a sector can fail during successive retries
before that sector is considered to be a sector that causes
errors. The default is one failure for pack or eight failures
for cartridge. This entry will be in effect through the entire
process.

8.   ENTER CYLINDER

This display is only for the CV or CI actions. One cylinder or a range of cylinders may be specified at this time.

CARD READER (80 OR 96 COLUMNS)

The SYSTEM/DISK.INIT execute control deck has the following format:

    ?EXECUTE SYSTEM/DISK.INIT FILE SPEC NAME <SPEC FILE ID>;
    ?DATA <SPEC FILE ID>
    (Specification cards)
    ?END

All specifications are free form (up to 96 columns) and must be separated by one or more spaces.

SPECIFICATION CARD FORMAT

Initialization:	<drive> I <pack-serial-number> <pack-id> <pack-type> [Owner's name]
Verification:	<drive> V
Reconfiguration:	<drive> RC <pack-type>
Reinitialization:	<drive> RI <pack-serial-number> <pack-id> <pack-type> [Owner's name]
Cylinder initialize:	<drive> CI <pack-serial-number> <pack-id> <pack-type> [Owner's name]

The <drive> entry is used to specify the unit to be processed.

                              DP<?>

The <pack-serial-number> entry can be any decimal value except zero. The <pack-id> entry can contain up to ten characters with no embedded blanks. The <pack-type> entry can be:

        U = Unrestricted
        S = System
        R = Restricted
        I = Interchange (225 disk pack only)

REMOVE OPTION CARD

If the keyword REMOVE is specified (not valid for cartridge),
then after the first five sectors in error have been relocated
for a given cylinder, all other sectors found in error for that
cylinder will be removed from the Master Available Table. This
option overrides the default rejection of a pack if more than 5
sectors in a cylinder cause errors. When the REMOVE option is
specified, the pack will be rejected only if it exceeds the
default pack error limit or, optionally, a specified pack error
limit set with the LIMIT option. The REMOVE option must be spec-
ified prior to any marginal sector or dollar sign options when
required for the standard pack initialization process.

LIMIT SPECIFIER CARD

This option allows the user to specify the total number of errors
allowed per pack, not to exceed the number of sectors contained
on the disk. Limits are set through the keyword LIMIT which must
precede the digit(s) that indicate the number of errors. See
table 1-1 for default error conditions. This card must be spec-
ified prior to any marginal sector or dollar sign cards for the
standard pack initialization process.

MARGINAL SECTOR CARD (I, RI, or CI only)

This provides the initializer with information about known bad
sectors. The format is the same as the Marginal Sector Option
format, except that it will be entered through the card reader.
When using this option during cylinder initialization, the user
should ensure that the sector falls within the cylinders that are
being initialized.

DOLLAR-SIGN CARD

The dollar-sign card allows optional patterns for initialization,
the ability to verify offset or compare data, change the number
of retries on error-causing sectors, and change the number of
errors before that sector is considered as such. The format is
the same as the Dollar-Sign Option format except that it will be
on a free formatted card (See DOLLAR-SIGN OPTIONS for details).

CYLINDER CARD (CI or CV only)

This card is used to specify the cylinder or range of cylinders
to be initialized or verified. The first entry on this card must
be the letters "CYL". The first number would be the starting
cylinder; the last number would be the ending cylinder. Spaces
must separate each token.

Example: "CYL 1 - 10 " would initialize or verify cylinder
          one through cylinder ten.

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DEFAULT INITIALIZE/VERIFY PROCEDURES

225 disk

    Initialize with pattern ∂6DB6∂
    Read/Verify three passes (0, +, -)
    Write with pattern ∂6363∂
    Read/Verify three passes (0, +, -)

206 disk

    Initialize with pattern ∂6363∂
    Read/Verify three passes (0, +, -)
    Write with pattern ∂9C9C∂
    Read/Verify three passes (0, +, -)

207 disk

    Initialize with pattern ∂0000∂
    Write with pattern ∂6DB∂
    Read/Verify three passes (+, -, 0)
    Write with pattern ∂DB6∂
    Read/Verify three passes (+, -, 0)
    Write with pattern ∂B6D∂
    Read/Verify three passes (+, -, 0)

Note: (0,+,-) indicate verify at normal position (0), offset in
       (+) and offset out (-).   For 207, offset is considered
       threshold.

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SAMPLE EXECUTE STRINGS

CARD READER

1. Normal I/V operations for disk pack:

   DPA 091543 USERABC U JOHN DOE

   This will initialize and verify the disk pack on DPA with the
   default INITIALIZE/VERIFY procedure.

   Any sector found to cause errors during a verification pass
   will be relocated or removed.

   The pack label will contain:

   Pack ID = USERABC
   Serial Number = 091543
   Type = Unrestricted
   Julian Date = The system date
   Owner's ID = JOHN DOE

2. Normal I/V operation for disk cartridge:

   DCA 084673 ABC U J. B. JONES

   This card will initialize a disk cartridge with a 363a
   pattern and verify it on DCA with a label of:

   Pack ID = ABC
   Serial Number = 084673
   Type = Unrestricted
   Owner's ID = J. B. JONES

3. Specification cards for disk cartridge:

   DCD 123456 ABC S
   7486
   $ C

   This set of cards will initialize and verify DCD as a system
   cartridge with a Cartridge ID of ABC and a serial number of
   123456. It will also remove the track containing sector 7486
   and will then compare data during verification.

4. Specification cards for disk pack:

   DPC 797601 XYZ U
   98385 18877 29765
   479665
   $ FFFF
   $ +

This set of cards will initialize DPC with the default I/V
procedures, then initialize DPC with an initialization
pattern of ƏFFFFƏ, verify one pass without offset, and one
pass with offset in(+). It will also relocate address 98385,
18877, 29765 and 479665.

5. Specification cards for reconfiguration:

   DPC RC U

   This specification purges the disk pack on DPC, verifies with
   a single pass, then relabels the disk as an unrestricted
   pack.

<u>SPO</u>

<u>Normal I/V operation</u>

```
MSG:   SYSTEM/DISK.INIT = <job-number>ENTER UNIT ID <DC? or DP?>
MSG:   SYSTEM/DISK.INIT = <job-number>ACCEPT
RSP:   <job-number>AX DPB
MSG:   SYSTEM/DISK.INIT = <job-number>ENTER ACTION :
       <I,V,RC,RI,CI, or CV>
MSG:   SYSTEM/DISK.INIT = <job-number>ACCEPT
RSP:   <job-number>AX I
MSG:   SYSTEM/DISK.INIT = <job-number>ENTER 6 DIGIT SERIAL NUMBER
MSG:   SYSTEM/DISK.INIT = <job-number>ACCEPT
RSP:   <job-number>AX 179846
MSG:   SYSTEM/DISK.INIT = <job-number>ENTER PACK ID
MSG:   SYSTEM/DISK.INIT = <job-number>ACCEPT
RSP:   <job-number>AX ABC
MSG:   SYSTEM/DISK.INIT = <job-number>ENTER PACK TYPE<U, S, OR R>
MSG:   SYSTEM/DISK.INIT = <job-number>ACCEPT
RSP:   <job-number>AX U
MSG:   SYSTEM/DISK.INIT = <job-number>ENTER OWNER'S ID
MSG:   SYSTEM/DISK.INIT = <job-number>ACCEPT
RSP:   <job-number>AX S.B.GARVEY
MSG:   SYSTEM/DISK.INIT = <job-number>ENTER OPTIONS
MSG:   SYSTEM/DISK.INIT = <job-number>ACCEPT
RSP:   <job-number>AX
```

These responses will initialize and verify, with the standard
default I/V process, disk pack "B" with the label information of:

```
      Pack-id = ABC
      Serial Number = 179846
      Type = Unrestricted
      Julian Date = The system date
      Owner's ID = S.B.GARVEY
```

Normal verification only operation:

```
MSG:    SYSTEM/DISK.INIT = <job-number>ENTER UNIT ID <DC? OR DP?>
MSG:    SYSTEM/DISK.INIT = <job-number>ACCEPT
RSP:    <job-number>AXDCC
MSG:    SYSTEM/DISK.INIT = <job-number>
        ENTER ACTION:  <I, V, RC, RI, CI, or CV>
MSG:    SYSTEM/DISK.INIT = <job-number>ACCEPT
RSP:    <job-number>AXV
```

These responses will verify the cartridge on drive "C" and report
any error-causing sectors encountered.

Normal reconfiguration operation:

```
MSG:    SYSTEM/DISK.INIT = <job-number>ENTER UNIT ID <DC? OR DP?>
MSG:    SYSTEM/DISK.INIT = <job-number>ACCEPT
RSP:    <job-number>AXDPC
MSG:    SYSTEM/DISK.INIT = <job-number>
        ENTER ACTION:  <I, V, RC, RI, CI, or CV>
MSG:    SYSTEM/DISK.INIT = <job-number>ACCEPT
RSP:    <job-number>AXRC
MSG:    SYSTEM/DISK.INIT = <job-number>ENTER PACK.TYPE - <U, S, OR R>
MSG:    SYSTEM/DISK.INIT = <job-number>ACCEPT
RSP:    <job-number>AXS
```

These responses will purge the pack on DPC, verify with a single
pass, and relabel the disk with a pack type of "S".

ERROR MESSAGES

1. INVALID ENTRY BLANK ID

2. INVALID ENTRY <entry>

3. INVALID SERIAL NUM.

4. INVALID SECTOR NUM.

5. THE FOLLOWING SECTORS ARE IN ERROR
   AND WILL BE RELOCATED (Pack initialization only)
   AND THEIR TRACKS WILL BE REMOVED (Cartridge initialization only)

6. <unit-id> IS INIT AS:
   <pack label information>
   IS <unit-id> TO BE INITIALIZED?

   This is a safety measure to insure that this disk is the
   correct one for initialization only. Answer yes or no.

7. WOULD YOU LIKE TO RETRY? <YES OR NO>

   "YES" will retry the operation. "NO" will terminate this
   process.

8. DISK ERROR - RESULT = <Result status>

   An error has occurred during a write or relocation.

9. MUST RESTART TO CONTINUE

10. WRITE LOCK <unit-id>

    Initialization only.

11. DISK NOT READY <unit-id>

12. PACK CANNOT BE USED WITH MCP <unit-id>

    One of the first 64 sectors has been removed, the Master
    Available Table has been filled, or the error limit of the
    pack has been reached.

13. PACK HAS EXCEEDED ERROR LIMIT <unit-id>

    Errors have exceeded the default error conditions (see table
    1-1) or the limit specified in the optional LIMIT entry.

14. ERROR CYL 0 <unit-id> <disk address>

15. SECTOR REMOVED <disk address>

    Disk Pack Initialization only.

16. COMPARISON ERROR <disk address>

    The "C" or "CR" option is on and this sector was found to be
    in error.

17. INVALID CYLINDER NUM.<Cylinder requested>

18. BAD LABEL OR TABLE - CANNOT <action requested>

19. SECTOR TABLE EXCEEDS LIMIT - WILL USE ONLY THE FIRST 188,940
    SECTORS IN THE TABLE OF - <drive>

20. MASTER AVAILABLE TABLE HAS BEEN FILLED

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