SIERRA

USERS MANUAL

SIERRA
COMPUTER
SYSTEMS

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011883

1.0 INTRODUCTION

The SNC 3000 In-house Computer System is composed of:

* SNC 3000 microprocessor with two built-in disk drives.
* Terminal (keyboard and CRT display).
* Optional printer.

1 The following steps will familiarize you with your computer:

READ THROUGH THIS MANUAL.

The operations manual provides instruction on the basic procedures necessary when using the SNC 3000. These procedures will be necessary at different times depending on the program being used. Read through the manual once before using the computer.

2 SET STATUS LINE

Refer to section 4.

3 COMPLETE EXERCISE

The following procedure is an instructional exercise that will acquaint you with your computer. You will be making a copy of your CP/M master disk. Use this exercise to make a working copy of ALL program disks. The original program disk should be stored in a safe place and used only for emergencies.

STEP	TASK	SECTION
1	Remove CP/M master disk from inside cover of CP/M manual.	-
2	Insert disk in microcomputer drive A.	2.1
3	Insert new blank data disk in drive B.	2.1
4	Format the data disk.	3.2
5	Make a copy of the CP/M master disk.	3.3

4 REFER TO INDIVIDUAL PROGRAM MANUALS

Once this exercise has been completed, procede to the individual program manuals.

1. Never turn the microcomputer off with disks in either
    drive, as this causes irreversable loss of all data on
    those disks.

2. Do not connect cables with the system powered on.

3. Throughout this manual commands to be typed in on the
    terminal will be expressed between "quotation marks".
    Under no circumstances are these quotation marks to be
    included with the command.

4. All new disks must be formatted on your machine before
    being used.

5. When a disk is FORMATTED, all previous data on that
    disk is wiped out.

6. Once the status line has been set on the Intertube
    terminal, do NOT use the RED key for any other purpose.

7. STATIC ELECTRICITY WIPES OUT DISKS! Handle disks from
    their extreme corner when walking.

8. When connecting the cables to and from the computer, be
    sure and insert end #1 in the computer, and end #2 in
    the peripheral (crt or printer). **Reversing the cables
    will cause both drive lights to come on.**

9. Clean the heads once a week. Computer users who smoke
    should clean the heads more frequently. Using the 3M
    Head Cleaning Kit, place a few drops of cleaning
    solution onto open area of cleaning diskette (single and
    double density users need only put solution on bottom
    side of cleaning diskette – extended density users must
    remove the black tab from the top of the cleaning
    diskette, and place some solution on it). Turn the
    computer ON, insert the cleaning diskette with the
    large white pad facing down (towards the drive lights),
    and close the drive door – wait 20 seconds, and repeat
    on the second floppy drive (if you have one). Do not
    use the cleaning diskettes more than 15 times.

2.0 DISKS

Data is processed and stored on flexible (floppy) disks which are easily inserted into the drives (A and/or B) on the microcomputer. Any of the competitive brands may be used as long as they comply with the following specifications:

      IBM compatible   * single sided
    * single density   * single head
      8 inch size   soft sector

* NOTE: Double Density and Double Sided Double Density require the appropriate disks. Section 7 has details.

2.1 INSERT DISKS

On the Disks you will notice that one side has folds around its perimeter. THESE FOLDS MUST FACE DOWNWARD TOWARDS THE RED LIGHT. Also the edge with the two notches and the OVAL SLOT, must enter the machine first.

Data processing cannot take place if the disks are inserted incorrectly. Push the disk all the way in the slot and firmly close the door of the drive.
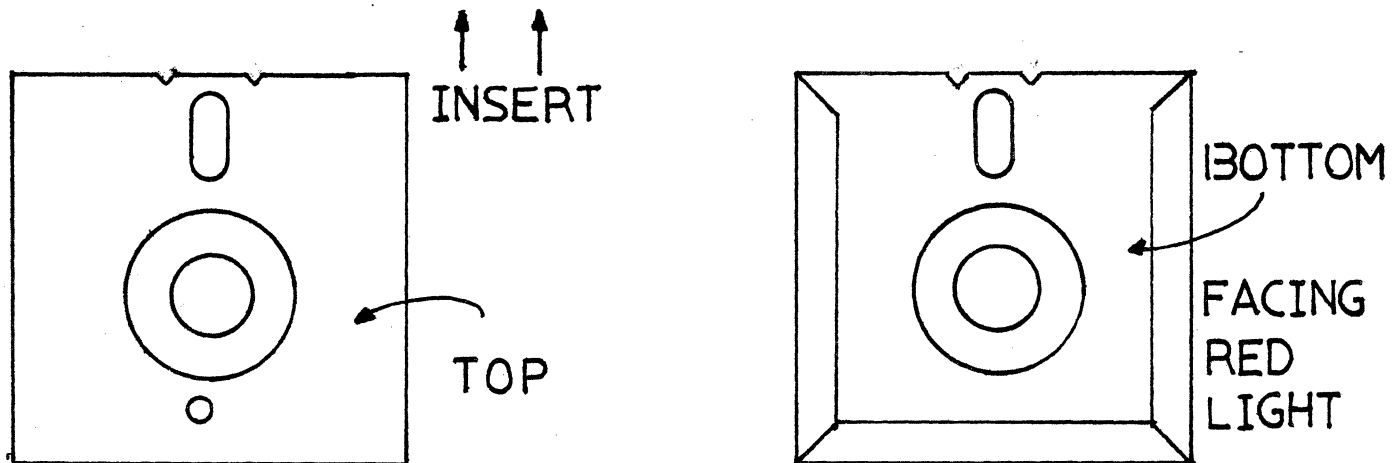
Press the red RESET button to bring up the operating system. Look for an A> on the screen. This is known as "booting" the system.

If the prompting character A does not appear, the correct disk (the one containing the operating system CP/M) is not in drive A. If this occurs: REMOVE THE DISKS, POWER THE COMPUTER OFF, try booting the system again; with the correct disk.

If this fails, call Sierra National for assistance.

3.0 PREPARING DISKS

The following sections describe the procedure for preparing and copying disks using CP/M (the operating system). When you receive your program disks from Sierra, MAKE A WORKING COPY (sec 3.3) AND STORE THE ORIGINAL IN A SAFE PLACE. Your CP/M Master disk contains many programs which can be used when needed. Refer to individual program manuals for specific instructions on preparation of disks. Some of the programs that you will be using are:

```
  D           (directory)
  FLFMT       (used to format new disks)
* COPY        (used to copy data from disk to disk)
* SYSGEN      (used to copy operating system from disk to disk)
  SETUP       (used to change BAUD rate)
  PIP         (used to transfer selected files)
```

* **NOTE: The Sierra Double and Extended density computer have different programs for copying and sysgening, and a different procedure for formatting. Refer to section 7 for instructions.**

3.1 Display Directory of Files

Your CP/M disk contains a "Directory" program enabling the user to view all the files, their length, and the remaining space available on that disk. Other features are available with "D". Refer to Appendix 002 for more details.

To display a directory of all files on a disk:

(1) Mount the disk on drive A.
(2) Type "D" .

To display a directory of all files on a disk mounted in the B drive:

(1) Type "D B:"
(2) The D program will display a directory of all files on the disk in the B drive.

3.2 FORMATTING A DISK - FLFMT

Formatting prepares the disk for use on YOUR machine. It organizes the disk so that data may recorded on it. Disks purchased must comply with the specifications listed in section 2.0. Disks are normally formatted by the manufacturer, however, each disk must be formatted on your machine.

To format a disk:

(1) Place program disk (CP/M Master Disk) containing the
file FLFMT.COM in drive A.(2) Place the disk to be
formatted in drive B.
(2) Type: "FLFMT" and follow the displayed instructions.
NOTE: S=Single Density, D=Double Density, X=Extended
Density. Type "S" under the F (format) and B: under
the D: (drive).

3.3 COPYING A DISK -   DATA AND PROGRAM DISKS

The following procedure is used to copy an entire disk.
That is, the resulting disk will be an exact copy
including all files and the operating system (if
selected).

To copy a disk:

(1) Place the program disk to be copied from in
drive A. (This disk must include the file
COPY.COM). Section 3.5 explains the procedure
for copying a file.
(2) Type "COPY" and follow the displayed
instructions:
(3)   OPTIONS:
        "A" = COPY ALL TRACKS
        "O" = COPY TRACKS Ø AND 1
        "F" = COPY FROM TRACK 2 TO END OF DISK
        "E" = EXIT TO CP/M
(4) "A" will be selected most often. When copy is
complete select "E" to exit.
(5) The process should take about a minute and no
permanent disk errors should result. If there
are errors on the disk in drive A then the copy
must be done by file, and the system
transferred using SYSGEN (see secs. 3.4 & 3.5).
If there are errors on drive B then the disk
should be reformatted (see sec. 3.2) and the
copy retried. If this does not correct the
error, the disk is defective. The type of error
detected will appear on the CRT screen. If the
information on the screen does not tell you
which disk has the error, check the RED LIGHT
to see which drive is active.

3.4 TRANSFERRING THE CP/M SYSTEM FROM ONE DISK TO ANOTHER

The first two tracks of a disk are reserved for the
CP/M operating system. A copy of the system may be
transferred to a blank disk or to an existing program
or data disk using the following procedure.

To transfer the system from the disk on drive A to the disk on drive B:

    (1) Mount the disk on drive A from which the system is to be copied. (This disk must contain the files SYSGEN.COM & SETUP.COM).

    (2) Mount the disk that is to receive CP/M on drive B.

    (3) Type: "SYSGEN" and respond to the displayed questions as follows:

                        a) Source drive "A"
                        b) Destination drive "B"
                        c) Hit RETURN

The PRINTER SPEED is already set up for you on the disk that Sierra National sent to you. However, the program SETUP is provided in the event a change in BAUD rate is desired. This alters the BAUD rate at which the computer transmits data to the printer. If a change in BAUD rate is performed using the SETUP program, the same BAUD rate must also be manually set on the printer. For your convenience Sierra National pre-sets both BAUD RATES.

    (1) Type "SETUP". Respond to displayed questions:

        READY?   "Y"
        CURRENT BAUD RATE IS:
            CRT 9600
            PRINTER 1200

        MODIFY BAUD RATE (Y OR N)? "Y"

        BAUD RATE CHOICES:

            (1) 0300 BAUD
            (2) 0600 BAUD
            (3) 1200 BAUD
            (4) 4800 BAUD
            (5) 9600 BAUD

          CRT ......(5)

          PRINTER ..(choose desired rate)

          DONE? "Y"
          STOP

    PRESS RESET ON THE COMPUTER

3.5 COPYING A FILE FROM ONE DISK TO ANOTHER

To copy a file from one disk to another:

(1) Mount the two disks. (The disk in drive A must contain the file PIP.COM). Use the Directory to determine if a disk contains a certain file (sec. 3.1)

(2) Type "PIP". After a few seconds the system will display the prompting character "*".

(3) To transfer a file FILE.COM from A to B type:
      " B:=A:FILE.COM "
    On completion, the system displays "*". At this point, hitting the RETURN will terminate PIP or another command may be entered.

(4) To transfer a file FILE.COM from B to A type:
      " A:=B:FILE.COM "

(5) The file name may be changed for the copy. To copy the file FILE.COM from A to B and change the name to FILEX.COM type the following:
      " B:FILEX.COM=A:FILE.COM "

3.6 COPYING ALL FILES FROM ONE DISK TO ANOTHER

The program PIP may be used to copy all files from one disk to another. This is useful when files are to be added to a disk, or a copy from drive B to A is required.

To copy all files from one disk to another:

(1) Mount the disks. (The disk on drive A must include the file PIP.COM).

(2) Type "PIP". After a few seconds, the system will display the prompting character "*".

(3) To copy all files from A to B type:
      " B:=A:*.* "
    The sytem will display each file as it is copied.

(4) To copy all files from B to A type:
      " A:=B:*.* "

(5) To terminate PIP hit RETURN.

4.0 TERMINALS

Your SNC 3000 system includes one of two kinds of terminals:

4.1 APPLIED DIGITAL DATA SYSTEMS "ADDS" TERMINAL

The ADDS terminal is pre-set at SNC to be used with the SNC 3000 system. Refer to your ADDS manual for details.

4.2 INTERTEC DATA SYSTEMS   INTERTUBE (II) TERMINAL

If the SNC 3000 is being used with the INTERTUBE terminal the following procedure must be followed to set the proper STATUS LINE.

To view the STATUS LINE press the RED key, hold it down, and press the RESET button (the 8 key).

```
***********************************************************
* RED    key is an  ALT MODE  key and must be held  *
* down while pressing remaining keys in the sequence.*
***********************************************************
```

The terminal STATUS LINE should read:

96	*	XX	M	C	CONV	SCROLL	UP
a		b	c	d	e	f	gh

Explanation:

a) BAUD RATE   e) OPERATING MODE
b) Disregard   f) SCROLL
c) PARITY   g) TRANSMISSION MODE
d) EOL TERMINATOR   . h) TRANSMISSION MODE

If any information on the above STATUS LINE is incorrect, they may be altered by the following:

TO SET	PRESS
BAUD RATE	(RED) (BAUD) (96)
PARITY SELECTION	(RED) (PARITY) (M)
EOL TERMINATOR	(RED) (RETURN) (RETURN)
OPERATING MODE	(RED) (CONV)
SCROLL	(RED) (SHIFT) (S)
TRANSMISSION MODE	(RED) (X) (A)

The following are SPECIAL ATTRIBUTES of the INTERTUBE
VIDEO TERMINAL.

The word "AUX" may appear on the status line. This is
an UNDESIRABLE situation and must be attended to if
routine operation is to occur. This situation may be
corrected by :

PRINTER (AUX) OFF   (RED) (P)
PRINTER (AUX) ON   (RED) (p)

If the word "LOCK" appears on the status line, the
keyboard will not function under any circumstance. This
feature is available for security purposes. To lock and
unlock the keyboard :

KEYBOARD UNLOCK   (RED) (a)
KEYBOARD LOCK   (RED) (A)

Display Status Line ON/OFF   (RED) (z/Z)

Normal Screen Video   (RED) (N)

Reverse Screen Video   (RED) (R)

Once the status line has been set, do not use the RED
key for any other purpose.

4.3   Summary of CONTROL CODES (Adds and Intertube Terminals)

Key Sequence	Function Description
CONTROL F	RIGHT ARROW
CONTROL U	LEFT ARROW
CONTROL J	DOWN ARROW
CONTROL K	UP ARROW
CONTROL I	TAB
RETURN	TAB (INTERTUBE) RETURN (ADDS)
LINE FEED	RETURN

5.0 EQUIPMENT TEST PROGRAMS

The operating systems disk (CP/M) includes a variety of test programs to enable the user to detect hardware problems by following a simple set of instructions. The test programs available are:

Test	File Name
Memory Test	MTEST
Disk Test	DSKTST
Printer Test	PRTEST

5.1 MEMORY TEST

To run the Memory Test on your computer:

(1) Place the disk with the program MTEST in drive A.

(2) Reset the machine.

(3) Type " MTEST "

The computer will respond with "WV" when it has passed the memory one time. It will then display the graph below:

End Pass Bank/Chip

```
  0 1 2 3 4 5 6 7
A 0 0 0 0 0 0 0 0
B 0 0 0 0 0 0 0 0
C 0 0 0 0 0 0 0 0
D 0 0 0 0 0 0 0 0
```

The numbers beneath 0 - 7 and to the right of A - D should all be zero. If an "X" displays the test failed. The "X" indicates which memory chip is defective.

The computer will automatically begin rerunning the memory over again. Allow it to continue. It will go through the memory many times for a more thorough check than the one made above. Each time it passes memory, it will display a "WV" on the screen, until six lines have been completed. At the end it will repeat the graph above.

5.2   DISK DRIVE AND/OR DISK TEST

To test your disk drives:

(1) Place the disk containing the program DSKTST in
    drive A.

(2) Reset the computer.

(3) Type " DSKTST "

Place a formatted scratch (blank or useless) disk in
the drive(s) to be tested. To test both drives
simultaneously, remove the program disk from drive A
and insert a scratch disk in its place.

The computer will respond with: "TEST DRIVE A: ?"

(4) Type "Y" for yes or "N" for no.

The computer will respond with: "TEST DRIVE B: ?"

(5) Type "Y" for yes or "N" for no.

The computer will respond with: "ARE YOU SURE THE DISKS
ARE SCRATCH?"

(6) Type "Y" for yes or "N" for no.

IF A PROBLEM IS DETECTED, THE COMPUTER WILL DISPLAY
ERROR DIAGNOSTICS. OTHERWISE, IT WILL FINISH THE TEST
ON BOTH DRIVES.

To test a disk:

This same test may also be used to test the disks
prior to using them for data input. First, format the
disks and follow the instructions above, using the
disks to be tested.   DO NOT TEST DISKS THAT HAVE
VALUABLE DATA ON THEM, AS THE TEST WILL WIPE IT OUT.

If an error occurs during the test, place the disk in
drive A in drive B, and the disk in drive B in drive A.
Rerun the test. If the error occurs on the same drive,
a Disk Drive error may have been found. If the error
follows the disk to the other drive, a bad disk has
been detected.

5.3 PRINTER TEST

To run the Printer Test on your system:

(1) Place the disk with the program " PRTEST " in drive A.

(2) Reset the machine.

(3) Type " PRTEST "

The printer will commence printing rows of all its characters, line by line. If this continues, uninterrupted, the test is succesful and the computer may be reset.

If for any reason the printer stops on its own or simply will not print, check the standard printer errors; i.e., cover not on, no paper, baud rate incorrect etc.

Repeat the print test.

If the test fails, contact SNC for assistance.

5.4 Diskette Errors

Disk errors may appear during the operation of your microcomputer. The terminal will display the message:

TRANSIENT DISK ERROR #XX

This message will repeat itself.

The errors may occur for the following reasons.

1) There is NO DISK in the drive which has been accessed. (Observe the red light below each disk drive).

2) The disk has NOT been properly FORMATTED.

3) This disk has a BAD SPOT.

SOLUTION:

Sierra National suggests that a back-up copy be made, and the disk be re-formatted. Attempt to re-use the disk. If the errors persist, the disk can be considered defective and should be discarded.

SIERRA NATIONAL CORPORATION

SYSTEMS 3000

TROUBLE SHOOTING GUIDE

SYMPTOM	PROBABLE CAUSE	SOLUTION
DRIVE READY LIGHT DOES NOT LIGHT WHEN KEY IS ON, FAN NOT RUNNING.	1. POWER FUSE BLOWN 2. KEY SWITCH FAULTY 3. POWER NOT PRESENT AT AC OUTLET OR POWER CORD FAULTY	1. REPLACE FUSE 2. REPLACE SWITCH 3. CHECK AC OUTLET BREAKER AND POWER CORD
DRIVE READY LIGHT OUT, NO SIGN ON MESSAGE, FAN RUNNING.	1. CRT CABLE PORT A NOT PRESENT OR IN REVERSE POLLARITY 2. POWER UP RESET DID NOT OPERATE ON POWER UP 3. CPU NOT RUNNING OR PORT A MALFUNCTION 4. FAULTY PCB 3000	1. CONNECT CABLE AND CHECK POLARITY 2. PUSH MANUAL RESET SWITCH 3. REPLACE PCB 3000 4. REPLACE PCB 3000
DRIVE READY LIGHT OUT, SIGN ON MESSAGE OKAY, FAN RUNNING WILL NOT BOOT.	1. DRIVE FAULTY 2. DISK CONTROLLER CABLE DISCONNECTED OR FAULTY 3. FAULTY PCB 3000	1. REPAIR/REPLACE 2. REPAIR/REPLACE 3. REPLACE IC'S OR PCB 3000
DRIVE READY LIGHT ON, SIGN ON MESSAGE GARBLED OR NOT PRESENT, RESETING REPEATS TROUBLE.	1. INCORRECT BAUD RATE 2. FAULTY CRT CABLE 3. FAULTY PCB 3000	1. SET BAUD RATE 2. REPAIR/REPLACE 3. REPAIR/REPLACE IC'S A SECTION
MACHINE RUNS OKAY, EXCEPTS STOPS RANDOMLY.	1. FAULTY PCB 3000 2. FAULTY TAS/CAS TIMING	1. REPLACE PCB 3000 2. REPLACE 74L04
DRIVE READY LIGHT ON, SIGN ON MESSAGE OKAY, DISKS BOOTS, MACHINE HEATS UP, FAN NOT RUNNING.	1. FAN OBSTRUCTED 2. FAULTY FAN OR NOT POWER TO FAN	1. REMOVE ANY OBSTRUCTION 2. REPLACE FAN AND CHECK POWER

SIERRA NATIONAL CORPORATION

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TROUBLE SHOOTING GUIDE

SYMPTOM	PROBABLE CAUSE	SOLUTION
DISK ERROR #10	1. DIRTY HEAD 2. FAULTY DISKETTE 3. DISKETTE BACKUP BAD WORN OR BROKEN 4. FAULTY DRIVE	1. CLEAN HEAD 2. REPLACE DISKETTE 3. REPAIR/REPLACE 4. REPAIR/REPLACE
DISK ERROR #80 OR DRIVE NOT READY	1. DISK NOT PRESENT 2. DOOR NOT CLOSED 3. DISK IN UPSIDE DOWN OR SIDEWAYS 4. FAULTY DRIVE	1. INSERT DISK 2. CLOSE DOOR 3. INSERT DISK CORRECTLY 4. REPAIR/REPLACE
PORT B		
PRINTER PRINTS GIBBERISH AND OR FORM FEED ERATICALLY	1. BAUD RATE WRONG	1. SET BAUD RATE
PRINTER DOES NOT PRINT	1. PRINTER CABLE WRONG OR NOT CONNECTED 2. PRINTER NOT SELECTED 3. PRINTER IN ERROR (PAPER OUT) 4. BAUD RATE WRONG 5. CP/M WRONG 6. FAULTY CABLE 7. FAULTY PCB 3000 8. FAULTY PRINTER	1. USE CORRECT CABLE AND CHECK CONNECTIONS. 2. PUT PRINTER IN SELECT. 3. ADD PAPER AND RESET PRINTER. 4. SET BAUD RATE 5. USE CORRECT CP/M 6. REPLACE CABLE 7. REPLACE PCB 3000 8. REPAIR/REPLACE
PORT D		
ONLINE WILL NOT COMMUNICATE.	1. FAULTY CABLE OR CONNECTION 2. FAULTY DATA SET 3. FAULTY DATA SET TO PHONE CONNECTION 4. FAULTY PCB 3000 5. TELCO TROUBLE	1. REPAIR/REPLACE 2. REPAIR/REPLACE 3. REPAIR/REPLACE 4. REPAIR/REPLACE, CHECK JUMPERS 5. NOTIFY TELCO

6.0 THE SNC 3000 COMPUTER ON THE SIERRA NETWORK

If the SNC 3000 is being used with an Intertube terminal, the STATUS LINE must be set. Refer to section 4.2.

The "ADDS" terminals are pre-set at SNC to be used on the network.

6.1 LOADING THE PROGRAM

The computer must have a "Communications" program loaded in order to be used on the network. To load the program :

(1) Place the disk labeled "Communications" in drive A.

(2) Press "RESET".

(3) Type "ONLINE2" and hit the "RETURN" key.

(4) Once the screen has cleared, hold the CONTROL key while you type "A".

This procedure will load the program into the computer. It is now ready for use on the network.

6.2 REQUESTING FORMS

Once the program has been loaded into the computer, all data is input through the terminal.

Use of the CONTROL KEY: The CONTROL (CTRL) is use to perform several functions on the terminal. It is used in the same manner as the SHIFT key. The CTRL key must be held down as the required character is depressed.

TO REQUEST A FORM:

(1) Type CONTROL and A.

(2) Type CALL.(form desired). Refer to specific accounting manuals to obtain the form desired. For example: CALL.SAR22 .

(3) Type CONTROL and T. This will Transmit the request.

If the form appears, you are operational. If not, call Sierra National for assistance.

INPUTTING DATA ON FORMS: The   following CONTROL
                          functions are used when
                          inputting data :

KEY SEQUENCE   FUNCTION DESCRIPTION

CONTROL   A   CURSOR TO HOME

CONTROL   B   BACKWARDS TAB

CONTROL   C   RE-DISPLAY SCREEN

CONTROL   E   ERASE FIELD

CONTROL   F   RIGHT ARROW

CONTROL   H   BACKSPACE

CONTROL   I   TAB

CONTROL   J   DOWN ARROW

CONTROL   K   UP ARROW

CONTROL   L   CLEAR SCREEN -
                                  Entire screen and form.

CONTROL   R   RESET -
                                  In case re-transmission
                                  is necessary.

CONTROL   S   DISPLAY SPOOL BUFFER -
                                  For restart point when
                                  spooling.

CONTROL   T   TRANSMIT

CONTROL   U   LEFT ARROW

CONTROL   V   CLEARS DATA FIELD FROM
                                  CURSOR ON

RETURN   TAB (Intertube only)
                                  RETURN (ADDS)

LINE FEED   RETURN

HOME (ADDS)   CURSOR TO HOME

LEFT ARROW (ADDS)   MOVES CURSOR LEFT
UP ARROW (ADDS)   MOVES CURSOR UP A LINE
DOWN ARROW (ADDS)   MOVES CURSOR DOWN A LINE
RIGHT ARROW (ADDS)   MOVES CURSOR TO RIGHT

6.3 INPUTTING DATA ON OPEN FORMAT

Data may be input using "open format" on either the Intertube or Adds terminals. The data is input as follows :

CODE,AMOUNT.   or   101,123456.102,456789. etc.

A negative number would be input as :

CODE,-AMOUNT. or   101,-12345.102,-45678. etc.

All of the CONTROL previously described apply to Open Format.

6.4 PRINTING REPORTS

Reports are available for SPOOLING the day after they are requested. They may be spooled as often as is necessary.   The reports will not be available for spooling after that day.

1. Turn ON printer

2. Align forms in printer. TI - Hit form feed.
                               Hit line feed to posi-
                               tion paper.

                          TTY - Hit form advance.
                                Manually position paper
                                using blue roller.

3. TI printer - Set to "ON LINE".

4. Clear screen and enter spool information as follows
    a) Enter on your terminal in the form

            SPOOL,TT/FFFF/LLLL/00000

    b) Where :
            T   = Type of form to print. i.e.
                 01= reports
                 02= checks
                 03= formatted G/L
                 04= formatted balance sheet/operating
                     statement
                 05= statements
                 06= 941a's
                 08= labels
                 10= medical sheets
                 11= physicians orders

```
                     F   = file number to begin
                     L   = location number to begin
                     Ø   = fill the remaining fields with zeros
                           as shown.
```

Example :   SPOOL,Ø2/Ø9Ø2/2ØØØ/ØØØØØ

                 means file Ø9Ø2 is to print checks at
                 location 2ØØØ.

5.   Transmit. (CONTROL) T

6.   The computer will now send a buffer of data each
     time you are polled at that location, so there will
     be pauses throughout the printing.

7.   If your forms do not line up correctly :

         a) hit (CONTROL) R to reset.
         b) Re-align forms on printer.
         c) hit (CONTROL) T to transmit.

     This will start spooling from the beginning and may
     be repeated as often as necessary.

8.   To enter data at the same time that the printer is
     operating, clear the screen and call a form in the
     usual manner. You MUST WAIT UNTIL THE PRINTER HAS
     STOPPED AND IS WAITING TO BE POLLED BEFORE YOU WILL
     BE ABLE TO TRANSMIT.

9.   Once the form is on the screen you may enter data
     while your printer is going. Again, to transmit
     your data you MUST WAIT UNTIL THE PRINTER HAS
     CEASED AND IS WAITING TO BE POLLED.

1Ø. If the PRINTING STOPS PERMANENTLY BEFORE FINISHING
     it can be started by :

         a) hit (CONTROL) R to reset.
         b) hit (CONTROL) S to display spooling re-
            starting points.
         c) hit (CONTROL) T to transmit from re-start
            point.

     The spooling will continue.

If your reports are not ready - "NO MORE" will appear
on the screen. Call the "reporting" form by entering:

                    CALL.REPORTING

The status of your report will be displayed.

6.5 Error Diagnostic

When data has been input and transmitted; error diagnostics may appear on the terminal screen. If the terminal indicates a form error with a number i.e. ERROR 5, 12, refer to your "Form Errors" manual.

GETMSG / CMONIT are messages which may appear on your terminal screen after data has been transmitted. These errors are a result of an unsuccessful transmission, and/or a temporarily bad phone line.

SOLUTION:

***The message DOES NOT INTERFERE with the data on your screen.

        Depress   CONTROL R   (to reset)
        Depress   CONTROL T   (to transmit)

6.6 SENDING DISK FILES DOWNLINE - TRSENDx

ONLINE2 - COMMUNICATIONS

TRSEND3

TRSEND3 is the program used to transmit data from any transamction file to Sierra for processing. To execute TRSEND3 insert the COMMUNICATIONS disk in drive A, RESET and enter:

   A>**TRSEND3** and hit ENTER (carriage return)

(TRSEND3 is the current version at the writing of this manual.)

The computer will respond with:

            TRSEND VERSION 3.0
            TRANSACTION FILE:
            D FFFFFFFFXXX BBBB

where
            D = Drive that data is on (B:)
     FFFFFFFFXXX = Data file name
            BBBB = Starting block number

Enter D **FFFFFFFFXXX BBBB** and ENTER (carriage return)

The starting block number does not have to be entered
if this is the first time the data file is being
transmitted, just hit ENTER after the file name.

If this is not the first attempt to transmit the data
file enter the next block number to be transmitted.
Block numbers increment sequentially by 1.

Example: If the last successfully transmitted block is
8 the next block to be transmitted is 9.

THE PROGRAM WILL NOW TRANSMIT THE TRANSACTION FILE TO
SIERRA.

During the transmission, the CRT will display:

Block Sent - Z   **Length XXXX**

                                                ACK   YYYY

Z = the block number being transmitted
XXXX = the number of characters sent in block Z message
YYYY = the number of characters received in block Z
message

*   If the number of characters sent do not match the
      number of characters received that block must be re-
      transmitted.

*   If the block sent is not ACKnowledged the block must be
      retransmitted.

*   If a PUTMSG (sending data) or a GETMSG (acknowledging
      data) diagnostic is displayed an error has occurred the
      following message will be displayed:

TRANSMISSION ERROR .... TRYING AGAIN

10 attempts to transmit the data will be made then
TRSEND3 will stop trying to transmit. If this occurs
call SIERRA to report the problem.

*   If the transmission is successful the following message
      will be displayed:

TRANSMISSION COMPLETE

Followed by:

TRSEND VERSION 3.0
TRANSACTION FILE:
D FFFFFFFFXXX BBBB

Enter the next file to be transmitted or control-C to exit the program.

Requirements:

The program SETADR.COM must be on the disk and have the correct LRN set for the terminal address.

The hardware must be configured to run with a data set on SIERRA'S network.

7.0 SIERRA COMPUTERS –   DOUBLE & EXTENDED DENSITY SYSTEMS

The Sierra 3000 & 4000 with double density option has a disk capacity of 1 Megabyte (2 x 500K). The Extended density option provides a disk capacity of 2 Megabytes (2 x 1MB). The system is capable of operating in the single, double or extended density mode. Data may be copied from single density format on one drive, to double density format on the other drive, etc.. Both drives will be automatically set to the same density during routine operation.

When the computer is powered ON, the message at the top of the screen should read:
                SIERRA NATIONAL CORPORATION   VERSION 2.3
The version number must be 2.3 or later.

Double density users will receive **two** CP/M systems disks. One will be in the single density format, and the other will be in double density format. The same applies to extended density users.

FLOPPY DISK USERS:

Double and Extended Density users must create a "Work Disk" in double density format. This disk will contain only the DENSITY and PIP programs. The rest of the space is used to copy programs onto, and to convert existing data files to double or extended density. In other words, you will use this "Work Disk" to copy updates and new programs from the standard single density format to double or extended density. At that time, the "Work Disk" will become one of your program disks. It is essential that you make several copies of this work disk. Section 7.4 describes the method for creating a work disk.

This section will describe the procedures for formatting, copying, putting the operating system on a disk and setting the density of a drive. The differences between double and extended density will be discussed in each section.

7.01 DISK SPECIFICATIONS

The disks that are to be used with the double density systems, must comply with the following specifications:

Double Density

Single Head	Single Side
Soft Sector	Double Density

Recommended brand: Scotch 3M #741-0

Extended Density

No Format	Dual Head
Soft Sector	Double Density
Double Side	

Recommended brand: Scotch 3M #743-0 (With no format)

7.1 FORMATTING A DISK

Sierra's disk formatting program allows the user to select the format density.

Insert a disk containing the format program (FLFMT) in drive A, and press RESET.

Insert a blank disk to be formatted in drive B. **Remember, formatting wipes out disks – data cannot be recovered.**

To avoid disk errors, you should use a diskette that has been certified for the appropriate density. See section 7.01.

Type: FLFMT
The computer will tell you that S=Single Density
                                D=Double Density
                                X=Extended Density

The computer will display:

F D: (where F = format, D: = drive) enter accordingly

*** INSERT DISK TO FORMAT IN DRIVE B: . . PRESS RETURN ***

Enter:

```
D B:   will format drive B: in double density
S B:   will format drive B: in single density
X B:   will format drive B: in extended density
```

Failure to insert a disk in drive B, or a bad disk will generate the error message: ***RESTORE ERROR ***   -32

When formatting has been completed, the computer will allow you to format another disk. If you are finished, hit RESET or CONTROL/C (hold the CONTROL button and hit C). If you wish to format another disk, simply insert it in drive B.

7.11 DISK TEST

Use the utility **DDSKTST**

7.2 PUTTING THE OPERATING SYSTEM (CP/M) ON A DISK

When the RESET button is pressed on the computer, a message appears that tells you if the diskette is single or double or extended density.

The following message shows the disk to be double density:

CP/M VERSION 2.2 ... DISKETTE ...D ... RELEASE X.X

The following message shows the disk to be extended density:

CP/M VERSION 2.2 ... DISKETTE ...X ... RELEASE X.X

The program used to transfer the operating system to another disk is called **DDPUT** for double density machines, and **XDPUT** for extended density machines.

* Insert the double density (or extended density) CP/M systems disk in drive A.
* Press RESET on the computer

Double Density

* Type: DDPUT and hit return (new line or enter)
* The computer will tell you to remove the disk from drive A, insert the new disk, and press return.
* The operating system will transfer.

Extended Density

* Type: XDPUT and hit return (new line or enter)
* The computer will tell you to remove the disk from drive A, insert the new disk, and press return.
* The operating system will transfer.

NOTE: The computer must be in the double density mode before attempting DDPUT (extended density mode before attempting XDPUT). If the system is RESET with a double density disk; both drives are automatically set to double density. The same logic applies to extended density. Remember to check the status line at the top of the screen when RESET is pressed (S = Single, D = Double, X = Extended).

SETTING THE BAUD RATE - SETUPF

When a new disk is created, the BAUD rate (rate of transmission) must be setup on the disk. The program SETUPF (F refers to Floppy) must be PIPed onto the disk. Assuming the disk being created is in drive B, and the CP/M disk in drive A, the command to PIP SETUPF is: PIP B:=A:SETUPF.COM

With the disk being created in drive A:

Execute: SETUPF   (the computer will display your serial #
                     and the default baud rate)

Note: Clock 1 is the CRT (always 9600)
           Clock 2 is the printer (defaults at 1200)

Select: the desired rate from the table (be sure your the
           baud rate on the printer matches the baud rate
           you select here).

           PRESS RESET ON THE COMPUTER

7.3   COPYING A DOUBLE DENSITY DISK

When copying a double density disk, verify that the blank disk in drive B, has been formatted to double density. This can be done by checking the status on drive B with STAT, or D B: (the D program lists the directory and the remaining disk space). A double density disk has close to 500K bytes available on it, while a single density diskette has approximately 250K.

Insert the disk to be copied in drive A (source drive). This disk must contain the program DDCOPY on it.

* Insert a blank formatted disk in drive B (destination drive)
* Type: **DDCOPY** and hit return (new line or enter)
* The computer will tell you to verify that the disks are in place, and hit return (new line or enter).
* The computer will copy track by track.
* Hit RESET or CONTROL/C to exit.

7.31 COPYING AN EXTENDED DENSITY DISK

When copying an extended density disk, verify that the blank disk in drive B, has been formatted to extended density. This can be done by checking the status on drive B with STAT, or D B: (the D program lists the directory and the remaining disk space). A ~~double~~ *extended* density disk has close to 1MB (884K bytes when formatted) available on it, while a single density diskette has approximately 241K.

Insert the disk to be copied in drive A (source drive). This disk must contain the program XDCOPY on it.

* Insert a blank formatted disk in drive B (destination drive)
* Type: **XDCOPY** and hit return (new line or enter)
* The computer will tell you to verify that the disks are in place, and hit return (new line or enter).
* The computer will copy track by track.
* Hit RESET or CONTROL/C to exit.

7.4   CREATE THE MASTER "WORK DISK"

As described in section 7.0, the Work Disk which you will create (and make copies of) will be used as "blank" disks.

What is a Work Disk?

The Work Disk will not actually be blank; it will contain two utility programs (DENSITY and PIP) and **your** operating system.

When to use a Work Disk

When you copy a disk that is in single density format (is-sued by Sierra) to double or extended density, or convert your existing programs and data, you will PIP the programs onto a work disk. That work disk will then become your program disk.

How to create a Work Disk

Insert the double or extended density CP/M Master disk in drive A

Press RESET on the computer

Verify that the CP/M disk is the density you are operating in by checking the message at the top of the screen when RESET is pressed.

Double: CP/M VERSION 2.2 ... DISKETTE ...D .... RELEASE 3.0
Extended: CP/M VERSION 2.2 ...DISKETTE ...X .... RELEASE X.X

1   Insert a blank disk in drive B

2   Format the blank disk using FLFMT (enter D B: for double
    density on drive B, or X B: for extended density on drive B
    — sec.7.1)

3   When format is complete, press RESET on the computer

4   Put the operating system on the disk in drive B using DDPUT
    for double density, or XDPUT for extended density.

5   Transfer the following utility programs onto the disk in
    drive B:

        A>PIP B:=A:PIP.COM   A>PIP B:=A:D.COM
        A>PIP B:=A:DENSITY.COM   A>PIP B:=A:DDCOPY.COM (double)
        A>PIP B:=A:SETUPF.COM   A>PIP B:=A:XDCOPY.COM (extended)

6   Label the newly created disk: "MASTER WORK DISK"

    **Make several copies of the Master Work Disk and store the
    original in a safe place. Section 7.6 uses an example to
    describe its use.**

7.5   SETTING THE DENSITY ON THE DRIVES

A program entitled DENSITY allows the user to set any drive to either single or double density. This will enable the user to copy files from single density to double density and vice versa.

Remember, all new software applications and updates are in single density format. These programs must be transferred to double density by setting drive B: to single, drive A: to double, and transferring files (using PIP).

Insert the CP/M disk (double density) disk in drive A and press RESET

When executing the DENSITY program you must complete the command line. For example:

```
A>DENSITY B:=D   (return)      sets drive B to double density
A>DENSITY B:=S   (return)      sets drive B to single density
A>DENSITY A:=S   (return)      sets drive A to single density
A>DENSITY A:=D   (return)      sets drive A to double density
A>DENSITY B:=X   (return)      sets drive B to extended density
A>DENSITY A:=X   (return)      sets drive A to extended density
```

```
********************************************
```
HARD DISK USERS

·The density of the floppy disks can be set from the hard disk (provided the DENSITY program is on the hard disk).

Remember; substitute M: for A: and N: for B:
```
********************************************
```

A "SYNTAX ERROR" will occur if DENSITY is entered without the parameters.

NEW PROGRAMS & UPDATES

When receiving a new program or an update, the disk you receive will be in single density format. Set the floppy drive to SINGLE (using the command DENSITY M:=S) in order to PIP the disk down to the hard disk.

To check the density of a given drive, substitute a "?" for the density. For example:

A   DENSITY B:=?   (return)   produces the following response:

"CURRENT DENSITY OF B:=S"
This message tells us that drive B is currently set to single density.

An example is provided in section 7.6.

7.6 COPYING A SINGLE DENSITY DISK TO DOUBLE DENSITY - AN EXAMPLE

Let us assume that you have just received a new Payroll program from Sierra (or an update). It will be in single density format, and you are operating in double density. The Payroll disk must be copied to a double density disk.

HOW

1 Insert a copy of your double density "Work Disk" in drive A. Remember, the Work Disk contains only DENSITY and PIP. The Work Disk will soon become the Payroll disk.

Press RESET on the computer - the CP/M message reads:

CP/M VERSION 2.2 ...DISKETTE ...D... VERSION 3.0

The D adjacent to DISKETTE indicates Double Density

2 Insert the single density Payroll Disk in drive B

3 Set drive B to single density (DENSITY B:=S hit return)

4 Erase PIP and D off drive B (ERA B:PIP.COM, ERA B:D.COM)

5 PIP all the data from the Payroll disk in B to the Work disk in drive A (PIP A:=B:*.*[V]) (section 3.5 describes the PIP command in more detail).

Remove the work disk in drive A **and label it immediately as Payroll / Double Density.**

Remove the Payroll disk (single density) from drive B and store it in a safe place.

The same logic applies to Extended Density users.

7.7 CREATE MASTER DATA DISK

The master data disk should be created and then copied. Store the master in a safe place. Use the copies to put any kind of data on i.e. inventory, accounts receivable, wordstar files, general ledger, etc..

* 1 Insert CP/M Double Density disk in drive A.

2 Insert a blank disk in drive B.

3 Format the disk in drive B (use FLFMT)

* 4 Put the operating system on the blank disk in drive B. (DDPUT)

* 5 PIP the following utility programs onto the newly created disk (put it in drive B)

```
A>PIP
 *B:=A:DDPUT.COM
 *B:=A:DDCOPY.COM
 *B:=A:PIP.COM
 *B:=A:D.COM
```

6 Label the disk in drive B "Master Data Disk".

Steps 1, 4 and 5 are repeated below for Extended Density Computers.

1 Insert the CP/M Extended Density disk in drive A

4 Put the operating system on the blank disk in drive B (XDPUT).

5 PIP the following programs onto the newly created disk (put it in drive B).

```
A>PIP
 *B:=A:XDPUT.COM
 *B:=A:XDCOPY.COM
 *B:=A:PIP.COM
 *B:=A:D.COM
```

SIERRA
HARD DISK
SYSTEMS

SIERRA

Table of Contents - SECTION II

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8.0   INTRODUCTION

The proceding chapters of this Operator's Guide are devoted to the Hard Disk System. Sections 8.1 through 8.7 are aimed at the DFR (DISK FIXED-REMOVABLE) series (32,64,96 MB drives). Sections 8.8 through 8.9 apply to the Fixed Disk systems (18,24,26 MB drives). Information not found in sections 8.8 through 8.9, indicate that the instructions apply to all systems and can be found in the first seven chapters of this section.

The Sierra Hard Disk Systems are an efficient synthesis of computer components, integrated in one unit. The Hard Disk Systems are composed of:

    Sierra Microcomputer.
    One floppy disk drive
    Hard Disk Drive.   a) fixed disk
                        b) removable cartridge (DFR series)

The basic functions of the hard disk system are the same as the floppy system. This unit can be used as either a hard disk system, with floppy drives, or, only as a floppy drive system. The PROM switch regulates this option.

The floppy disk drives on the Sierra 4000 are available in single or double density format. The Sierra 4000 Fixed Disk Systems (18, 24, 26   MB) come with a double density floppy. The Sierra 4000 Fixed/Removable Systems come with a single, double, or extended density floppy drive. **Section 7 describes the Double and Extended density floppy procedures.**

For ALL information concerning the floppy drives, terminals, and communications, refer to the first part of this guide.

I. Sierra National Corporation insists on rigid POWER REQUIRE-
    MENTS for the Sierra 4000 System to insure trouble free
    operation. Failure to comply with these standards can
    result in invalidation of warrantees and maintenance
    contracts. Please contact an electrician, and have your
    power source conform to these specifications.:

    A) CIRCUIT REQUIREMENTS

        Isolated Circuit with 30 amp breaker
        60 Hz + 2% single phase, 120 V, -15%, +10%
        3 wire outlets with a TRUE GROUND *
        Minimum four (4) outlets recommended

    B) EQUIPMENT REQUIREMENTS

        Isolation Transformer
        Anti-static mat

II. Never turn the computer OFF or ON with floppy disks in the
    drives. This will result in a loss of data on those disks.

III. Do not power off the computer until the hard disk drive has
    come to a complete halt, and the removable cartridge has
    been removed and stored in its dust-free container.

IV. All new disks must be formatted on your computer before data
    can be recorded on them. REMEMBER: FORMATTING WIPES OUT
    DISKS!

V. Clean the heads!   32, 64, 96 MB users refer to the Head
    Cleaning Manual. All Sierra computers come with one or two
    floppy disk drives that require heading cleaning periodical-
    ly. Refer to section 1.1 Cautions & Care for instructions
    on cleaning floppy drive heads.

VI. STATIC ELECTRICITY WIPES OUT DISKS. Handle floppy disks from
    their extreme corner when walking.

VII. **Keep removable cartridge free of dust, dirt, ashes etc.**

    **Formatting and ERAsing all files using ERA *.* eliminate the
    effects of RECLAIM (c).**

 * Remove outlet cover to see if a third (ground) wire extends
    back to the source and ultimatley to a pipe. This would
    constitute a true ground. A ground wire leading to the
    conduit is not a true ground.

8.1   POWER ON/OFF

A) Switch ON the convenience box inside the rear of the computer. This switch may be left on.

B) Power on the hard disk drive - black switch in the back of the drive. This switch may be left on. (DFR only)

C) Turn the KEY ON the front face of the computer.

D) Insert cartridge (DFR series only)

E) Start drive (DFR series only)

F) Set "Write Protect" switches to desired position (DFR only)

G) Power ON the terminal.

H) Power ON the printer.

I)Insert Systems Disk and press RESET. The following message will appear on the terminal screen:

SIERRA NATIONAL CORPORATION 2.X   (forfloppys only)
SIERRA NATIONAL CORPORATION 3.X, 4.X, 5.X (for floppys and
                                                     hard disk)

The CP/M version and an A> will follow.

NOTE: **THE PROM SWITCH ON THE FRONT OF THE COMPUTER WILL DETERMINE THE ACTIVE PROM.**

PROM 1 = 2.X PROM = FLOPPY SYSTEM ONLY
PROM 2 = 3.X PROM = FLOPPY AND HARD DISK SYSTEM
**   4.X PROM = FLOPPY AND HARD DISK SYSTEM**
**   5.X PROM = FLOPPY AND HARD DISK SYSTEM**

REMEMBER: A floppy systems disk must be in drive Ø when working off PROM 1.

The hard disk must contain the operating system when working off PROM 2.

If the above conditions are not met, the system will not "Boot" and the A> will not appear. Section 8.6 explains the procedure for putting the operating system on the hard disk.

TO POWER OFF THE COMPUTER:

* 1ØMB users execute OFF and hit return
A) Power off printer and terminal.
B) Stop hard disk drive and wait for a complete stop (DFR)
C) Turn key on front face OFF.
D) Switch OFF convenience box inside rear of computer.

8.2 NAMING THE DRIVES

As previously stated, this system can work as a hard
disk or floppy system. When the system is operating
with the hard disk drives, the PROM switch is in
position 2. When the system is functioning uniquely as
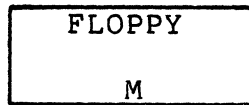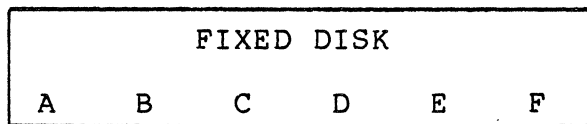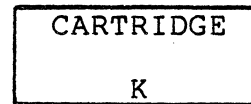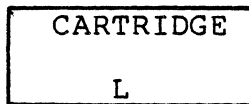a floppy unit, the PROM switch is in position 2.

<u>PROM 1</u>

```
┌─────────────────┐
│    FLOPPY       │
│                 │
│       A         │
└─────────────────┘
```
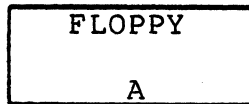
Ø

A floppy disk inserted in drive Ø is accessed as drive
A. **All previous sections of this Operators Guide apply
when the computer is used as such.**
****
**This section will continue assuming PROM 2 with
the 64 Megabyte disk is being used.**
****

PROM 2   - 64 Megabyte

```
┌─────────────────┐
│    FLOPPY       │
│                 │
│       M         │
└─────────────────┘
```

Ø

```
┌─────────────────┐          ┌─────────────────┐
│   CARTRIDGE     │          │   CARTRIDGE     │
│                 │          │                 │
│       L         │          │       K         │
└─────────────────┘          └─────────────────┘
```

```
┌──────────────────────────────────────┐
│              FIXED DISK               │
│                                        │
│   A    B    C    D    E    F          │
└──────────────────────────────────────┘
```
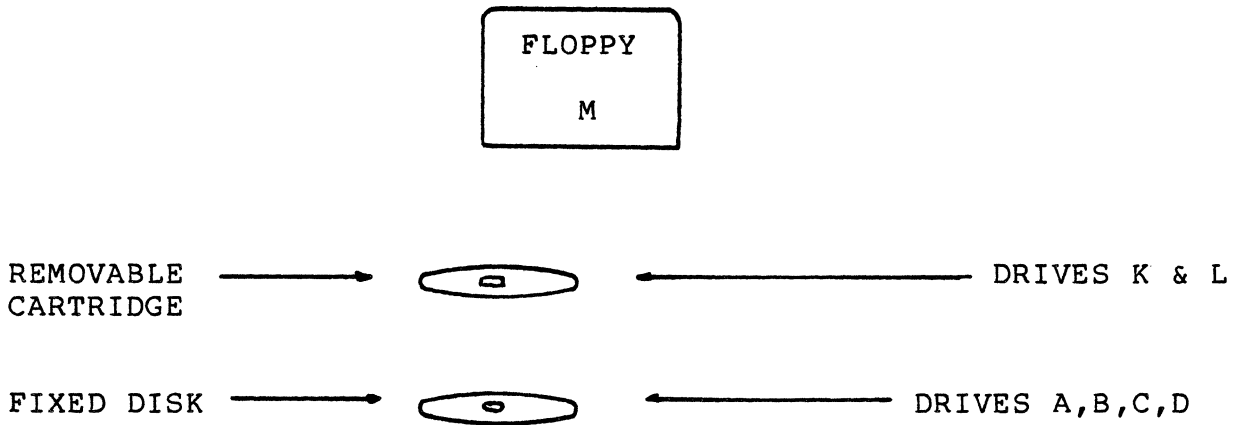
**The removable cartridge = drives K & L, and the
floppy is drive M REGARDLESS OF DISK CONFIGURATION.
The fixed module = drives A, B, C etc. and will vary
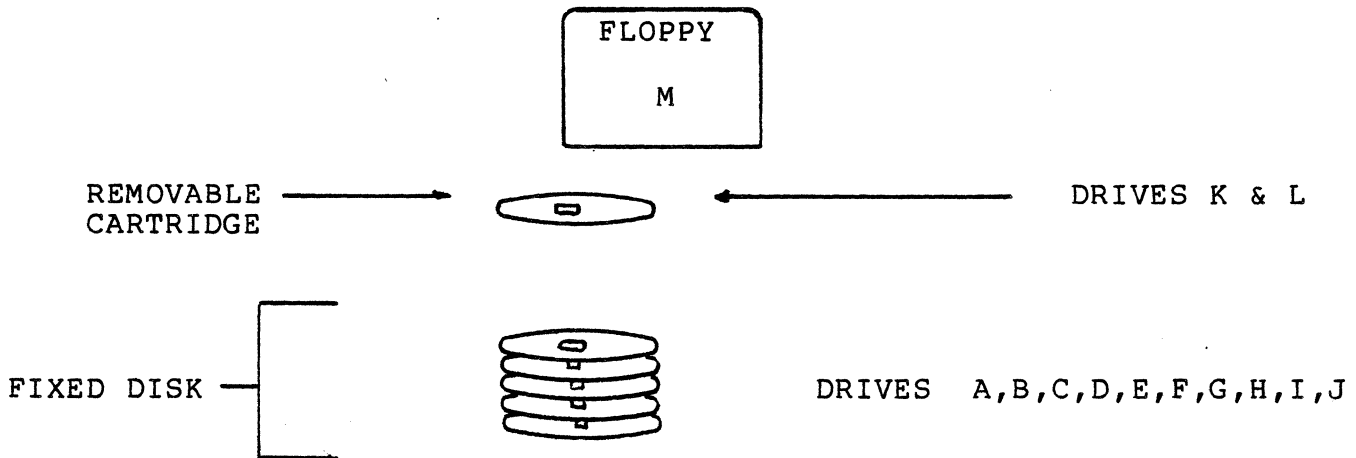according to disk configuration.**

64 Megabyte System

FLOPPY M

REMOVABLE CARTRIDGE   DRIVES K & L

FIXED DISK   DRIVES A, B, C, D, E, F
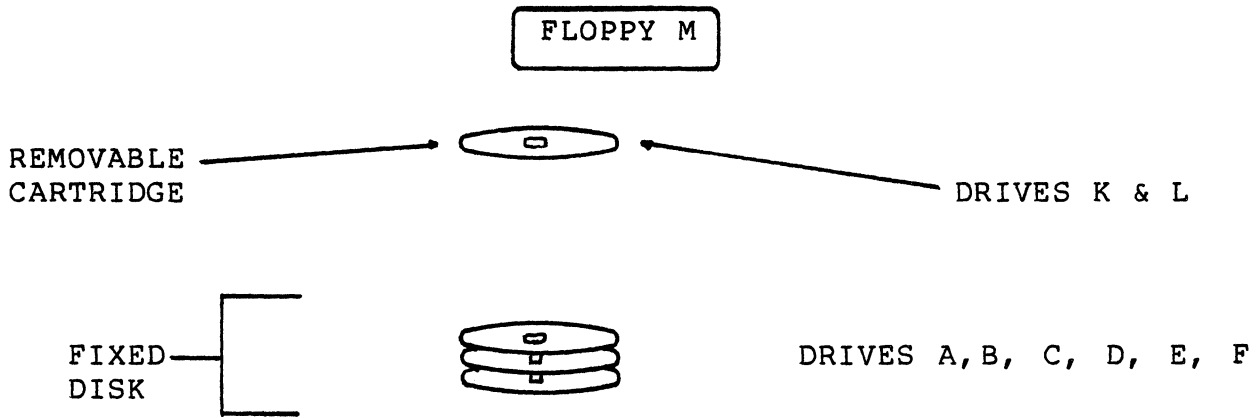
This system is also available with 32 or 96 Megabyte drives.

32 Megabyte System

FLOPPY

M

REMOVABLE CARTRIDGE   DRIVES K & L

FIXED DISK   DRIVES A,B,C,D

96 Megabyte System

FLOPPY

M

REMOVABLE CARTRIDGE   DRIVES K & L

FIXED DISK   DRIVES A,B,C,D,E,F,G,H,I,J

CP/M LOGICAL DRIVE	--PROM 1--	HEAD#	----------------PROM 2----------------		
			32 MByte	64 MByte	96 MByte
A	floppy 0	1	fixed	fixed	fixed
B		1	fixed	fixed	fixed
C		2	fixed	fixed	fixed
D		2	fixed	fixed	fixed
E		3		fixed	fixed
F		3		fixed	fixed
G		4			fixed
H		4			fixed
I		5			fixed
J		5			fixed
K		0	cartridge	cartridge	cartridge
L		0	cartridge	cartridge	cartridge
M			floppy 0	floppy 0	floppy 0

Refer to the Drive Names in the table above when accessing.

For example:
To PIP a file from floppy drive 0 to the first drive on the cartridge:
```
                A>PIP
                  *K:=M:FILENAME.COM
```

8.3 DISPLAY DIRECTORY OF FILES - D

The "D" command displays a directory of files on a given drive. The "D" command also displays: disk space for each file, disk space remaining and total disk drive capacity.

Enter D followed by the drive name to display a Directory of files on that drive. For example, to display a Directory of files on drive B, enter "D B:" after the A .

Due to the large capacity of files on a given drive, the directory often exceeds the size of one CRT screen. This is especially true of drive A which contains the programs. "CONTROL S" will stop and start the directory

To PRINT the directory: * RESET the computer.
                        * Depress and hold the CONTROL key.
                        * Depress P
                        * Enter D (hit RETURN)

APPENDIX 002 EXPLAINS ADDITIONAL "D" CAPABILITIES

8.4   FORMATTING HARD DISKS

Formatting prepares the disk for use on **your** computer. It organizes the tracks so that data may be recorded on the disk. Switch the system over to the 2.X PROM and insert the floppy CP/M **(Hard version)** disk in drive Ø. Reset the computer. The format programs differ depending on the type of disk drive and controller. If you have a Sierra 5ØØØ (18 or 26 MB) follow the instructions in section 8.41. If you have a CDC or Ampex drive (with the removable cartridge), or a 24MB BASF, follow the format instructions in section 8.42.

8.41   FORMATTING SIERRA 5ØØØ (18 or 26MB)

With the CP/M HD floppy disk in drive M and the prom in position 1, RESET the computer.

Enter: **FMT**

The computer will display:

WD-1ØØØ FORMAT/VERIFY VERSION 1.Ø

INPUT DRIVE, # HEADS, # CYLINDERS, # SECTORS, INTERLACE, TEST

D HH CCC SS LL T

Ø Ø8 154 32 Ø6 Ø	<u>Your</u> <u>entry</u> <u>for</u> <u>1Ø</u> <u>MB</u> <u>drive</u> or
Ø Ø8 216 32 Ø6 Ø	<u>Your</u> <u>entry</u> <u>for</u> <u>18</u> <u>MB</u> <u>drive</u> or
Ø Ø8 3Ø6 32 Ø6 Ø	<u>Your</u> <u>entry</u> <u>for</u> <u>26</u> <u>MB</u> <u>drive</u> or
Ø Ø8 216 32 Ø6 Ø 1 Ø8 216 32 Ø6 Ø	<u>Your</u> <u>entry</u> <u>for</u> <u>TWO</u> <u>18</u> <u>MB</u> <u>drives</u> <u>1st</u> <u>entry</u> <u>formats</u> <u>A</u> <u>&</u> <u>B,</u> <u>2nd</u> <u>entry</u> <u>formats</u> <u>C</u> <u>&</u> <u>D.</u>

A sector table will display, followed by the word PAUSE. Hit return after the word PAUSE.

The format procedure takes approximately 3Ø minutes.

8.42 FORMATTING SIERRA 4000 (32, 64, 96 MB DRIVES

With the CP/M HD floppy disk in drive M and the prom in position 1, RESET the computer.

Enter: **FMT**

Select: **F** (to format)

Enter: drive size (32 or 64 or 96)

Enter: **19** (two digit interlace factor)

Select: **A** for all heads (drives), or **S** single head

If you select a Single Head, enter the head to format. Refer to section 8.2 to determine the correct head #.

8.43 FORMAT FLOPPY DISKS

To format floppys, use FLFMT. If your computer has two floppy drives, switch to PROM position 1, insert a floppy containing FLFMT.COM in drive A, and the blank floppy to be formatted in B. Execute FLFMT and respond to the prompts.

    F D: F = format (S=single, D=double, X=extended)
            D: = drive to be formatted

If your computer has only 1 floppy drive, switch to PROM position 2, and execute FLFMT from the hard disk (drive A). Simply enter M: as the drive to be formatted and insert a blank floppy disk in the drive.

NOTE: Your floppy disk drives defaults to a certain density (either single, double, or extended). If you are not sure which it is, RESET the computer and read the status line. The right side of the screen either has an S, a D or an X, indicating the floppy drive default density. Set the density of the floppy drive, to the desired density, BEFORE formatting it. Set the density on the floppy drive using the DENSITY program:

        ØA>**DENSITY M:=S**   (single density)
        ØA>**DENSITY M:=D**   (double density)
        ØA>**DENSITY M:=X**   (extended density)

8.5 BACK UP FILES

To move a file from one drive to another (for back up), either the PIP program or FBACK2 may be used. FBACK2 will back up large data files from a hard disk to floppys, without overflowing them. Users that have a removable cartridge may use PIP.
Sierra suggests that the programs that are stored on drive A are backed up on drive K (cartridge); and data files that are stored on drive B (fixed) are backed up on drive L (cartridge). A discussion of PIP follows:

8.51   This PIP command will copy ALL files on drive A to drive K.

                    K:=A:.*[V]

        This PIP command will copy the file TEST.COM from drive B to drive L.

                    *L:=B:TEST.COM

    ** A more detailed description of the CP/M utility programs can be found in the CP/M manual by Digital Research Corporation.

   8.52   An entire drive can be copied using the program ACOPY or BCOPY. (ACOPY for Ampex and CDC drives and BCOPY for BASF 24 and 40MB drives). Use version 4.2 or later. The program is executed accordingly:

        Enter: ACOPY (or BCOPY) (hit return)
                    COPY... DISK COPY.. VERSION 4.2 (or later)
        later)
                        INPUT DRIVE ... A
                        OUTPUT DRIVE ...K

        The above commands will copy drive A onto drive K.

        The COPY process proceeds one track at a time and will take approximately 20 minutes.

        CAUTIONCOPY is a direct image copy. If the output drive has been RECLAIMED (c) use PIP.
        ****

The utility program **FBACK2** is designed to prevent overflowing floppy disks when they are used to back up large files. FBACK2 has 2 functions. 1) It splits up the file, so that it can reside on several floppy disks. This is the "Save" function. 2) It merges the divided files from the floppys, back onto the hard disk. This is the "Restore" function.

For example, a file entitled 09001000 resides on hard disk drive B: and occupies 300K bytes. Obviously this file will not fit on one floppy disk. Make sure there an ample supply of blank, formatted floppy disks available.   NOTE: 09001000 is only an example.

Enter: **FBACK2**   and hit Return or Enter
Select: S   for Save

The computer will ask for the name of the source file:

        D:FFFFFFFF.XXX   D=drive
                                     F=file name
                                     X=file type
Enter: B:09001000

The computer will ask for the name of the floppy disk drive (D:)

Enter: M:

The computer will tell you to MOUNT FLOPPY DISK IN DRIVE M:

Insert: floppy disk in drive M: and hit return. The floppy must have at least 188K of space available. FBACK copies 188K at a time. If **you are using double or extended density disks, you will be able to make two passes on one disk.**

The computer will begin to back up the file. The file being created is 09001000.001. When the disk is full, the computer will repond with:

MOUNT FLOPPY DISK IN DRIVE M:

Insert: another floppy disk in drive M: (If you have a double density floppy, simply hit return.

The computer will continue to back up the file. The file now being created is 09001000.002. In our example, 09001000 will fit on two floppys, and the computer responds with:

COPY OPERATION COMPLETE .... # OF RECORDS = XX

Record: the # of records indicated by the computer - this number will be used for comparison when the file is copied back to the hard disk.

Label: the floppy disks - Disk #1, Disk #2 . . . etc., and write the name of the file (09001000.001 etc.) on the label. _Organization_ _is_ _important._

The back up procedure is complete. Remember, disk #1 must have a filetype of .001, and disk #2 must have a filetype of .002 etc., unless you are using double density disks, in which case 09001000.001 and 09001000.002 would be on the same disk.

TO PUT THE FILE BACK ONTO THE HARD DISK: the procedure is similar. Simply select "R" for Restore; enter the destination drive and the filename with the original filetype (09001000 or 09001000.XXX); _enter_ _floppy_ _disk_ _#1_ **first,** _then_ _floppy_ _disk_ _#2_ _etc.;_ when the computer reponds with:

COPY OPERATION COMPLETE .... # OR RECORDS = XX

verify that the # of records equals the # of records displayed when the back up was originally done.

NOTE: **When backing up Sierra data files (ex. 09001000), finish backing up the data file(s) before backing up the index files (ex. 09001000.XXX). Put the index files on separate disks. Label them as "INDEX FILE 09001000.XXX". When re-using disks, be sure that they have at least 188K of space available.**

8.6 TRANSFERRING CP/M (tm) ONTO THE HARD DISK

The CP/M operating system must be put onto all program disks. The SYSGEN program effectively transfers the operating system from FLOPPY disk to FLOPPY disk. (section 3.4). The PUT program puts the operating system on the hard disk.

SINGLE TERMINAL USERS:

1) Switch the computer to the 2.X PROM (pos. 1)
2) Insert the floppy CP/M systems disk (Hard version) in drive 0.
3) Press RESET
4) Enter: PUT (hit return), when the PUT version displays, hit return again
5) Press RESET when the computer indicates that PUT is complete

The operating system is now on the hard disk.

8.61 SET THE BAUD RATE ON THE HARD DISK - SETUPH

Execute: SETUPH (computer will display serial #)

The computer will display the current baud rate.

Clock 1 is the CRT (always 9600 baud)
Clock 2 is the PRINTER (defaults at 1200)
Select the desired baud rate from the table (be sure that your printer is physically set at the same baud rate that you select here)

RESET the computer upon completion

ADLER 1010 - Adler 1010 typewriter/printer users must execute a program entitled **ADLER** directly off the A>. The command automatically sets the baud rate, and overrides the SETUPH program. The baud rate remains in effect until the computer (or the slave).

8.7 ALTERNATE DRIVE ASSIGNMENTS

Standard default drive assignments for the Sierra system have been explained in detail in section 8.2. Software is designed to operate in a programs on drive A: - data to drive B: configuration.

The drives may be equivalenced so that programs and data may run on alternate drives. A utility program entitled EQUIV is used accordingly:

    A>EQUIV (Logical Drive):=(Physical Drive):

where:

    Logical Drive = A: through L: (theoretical drive)
    Physical Drive = A: through L: (actual drive)

For example:

If a user wishes to run the Payroll System on drive C: (programs and data on C:), logical drive A: (program) would be set to physical drive C: and logical drive B: (data) would be set to physical drive C:

                    A>EQUIV B:=C:
                    A>EQUIV A:=C:

A DIR off the A will now produce a directory of drive C:, and a DIR B: will produce a directory of drive C:.

A table is provided so that the user may verify any equivalencing.

                Execute: EQUIV *

NOTE: RESET WILL RETURN ALL USER SET DRIVE EQUIVALENCES BACK TO DEFAULT STATUS.

8.8 FIXED DISK SYSTEMS (18, 24, 26 MB)

Naming the drives:

CP/M Logical Drive	PROM 1	--------------- PROM 2 ---------------		
		18 Mbyte	24 Mbyte	26 Mbyte
			Head#	Head#
A	floppy	fixed	fixed 0	fixed 0
B	floppy	fixed	fixed 1	fixed 1
C	-	-	fixed 2	fixed 2
D	-	-	-	-
E	-	-	-	-
M	-	floppy	floppy	floppy

8.9   18 & 26 MByte Drive

The 18 MByte system has operational differences for formating, activating the hard disk, and executing test programs. **The floppy disk is double density. Section 7 describes double density procedures in more detail..**

8.91 FORMAT HARD DISK

Insert CP/M master disk in floppy drive 0 and press RESET

With the CP/M HD floppy disk in drive M and the prom in position 1, RESET the computer.

Enter: **FMT**

The computer will display:

WD-1ØØØ FORMAT/VERIFY VERSION 1.Ø

INPUT DRIVE, # HEADS, # CYLINDERS, # SECTORS, INTERLACE, TEST

D HH CCC SS LL T

Ø Ø8 154 32 Ø6 Ø   <u>Your</u> <u>entry</u> <u>for</u> <u>1Ø</u> <u>MB</u> <u>drive</u>
                          or

Ø Ø8 216 32 Ø6 Ø   <u>Your</u> <u>entry</u> <u>for</u> <u>18</u> <u>MB</u> <u>drive</u>
                          or

Ø Ø8 3Ø6 32 Ø6 Ø   <u>Your</u> <u>entry</u> <u>for</u> <u>26</u> <u>MB</u> <u>drive</u>
                          or

Ø Ø8 216 32 Ø6 Ø   <u>Your</u> <u>entry</u> <u>for</u> <u>TWO</u> <u>18</u> <u>MB</u> <u>drives</u>
1 Ø8 216 32 Ø6 Ø   <u>1st</u> <u>entry</u> <u>formats</u> <u>A</u> <u>&</u> <u>B,</u> <u>2nd</u> <u>entry</u>
                          <u>formats</u> <u>C</u> <u>&</u> <u>D.</u>

A sector table will display, followed by the word PAUSE.
Hit return after the word PAUSE.

The format procedure takes approximately 3Ø minutes.

A sector table will display, followed by the word PAUSE.
Type return after the word PAUSE.
The format procedure takes approximately 3Ø minutes.

8.92 To format a floppy disk, execute **FLFMT** from the hard
      disk (drive A). Respond to the prompts (enter M: as the
      drive to be formatted, and S for single, D for double,
      or X for extended density. Insert the floppy to be
      formatted in the floppy drive.

8.92 PUT O/S (Operating System) ON HARD DISK

      Insert CP/M master disk in floppy drive Ø - press RESET

      Type: PUT and hit return

      The hard disk is now drives A: and B:
      The floppy disk is now drive M:

8.93 TEST PROGRAMS

XSBT is the name of the test program. If there are any difficulties in accessing the drive, execute XSBT, and try again.

8.10 24 MEGABYTE SYSTEM

The 24 Megabyte system uses the same format (FMT) the same system generation (PUT) and the same test programs as the 32/64/96 Megabyte systems described in sections 8.0 to 8.7.

8.11 RECEIVING NEW PROGRAMS AND UPDATES

All new programs and updates to existing programs will be sent to you in Single Density format. If your Sierra 4000 is equiped with a double or extended density drive, the drive **must be set to single density before the program(s) can be PIPed down to the hard disk.**

The **DENSITY.COM** program should be on your hard disk drive A.

Insert the new program (or update) in the floppy drive 0)

With the PROM switch set in position 2, RESET the computer.

Type: A>DENSITY M:=S   and hit return

The floppy is now set to single. PIP the contents of the diskette down to the drive of your choice.

If the computer is RESET again, the drive will go back to its default status.

9.0   HARD DISK ERRORS

The SYSTEM 4000 has been rigorously tested at SNC for
problems and defects. Hard disk systems however, are
subject to disk errors and "bad spots". Diagnostics
will appear on the terminal screen, and must be noted
for further analysis by you and/or Sierra. Use the
XCOMP manual and the proceding sections of this guide
before calling Sierra.

Disk drive diagnostics:

1)   DISK ERROR CMD=XX   STATUS N_1 N_2 N_3 N_4 AT HHTTSS

Where: N_1 N_2 = Drive Status   (sec.3.2 XCOMP manual)
         N_3 N_4 = Controller Status
         HH   = Head number
         TT   = Track number
         SS   = Sector number

         N_3 N_4 = 7 3 = Sector not found
         N_3 N_4 = 7 6 = CRC Error

2)   BDOS ERROR ON A: "MESSAGE"

Where: A   = Drive (A,B,C etc.)
         MESSAGE = Bad Sector
                   R/O (read only)
                   WRITE ERROR (overflow of disk)

Note the diagnostics listed above. The information will
be necessary in the event our technician must be
notified. If the diagnostics do not enable you to
solve your problem, contact Sierra National.

9.1   **NEW CARTRIDGE PROCEDURE**

If errors are detected on your NEW cartridge (before
any data has been recorded on it) follow the
instructions below.

9.1.1 FORMAT NEW CARTRIDGE using FMT (sec 8.0). If no errors
are detected, continue with this section. If errors are
detected, advance to section 9.1.4.

9.1.2 EXECUTE THE READ/WRITE TEST (on blank cartridge only!).
Enter: RWT. Select Continuous testing. Head 0 will test
the entire cartridge (drives K & L).

If no errors are detected, continue with this section. If errors are detected, repeat step 1 (9.1.1). If errors are detected a second time, advance to section 9.1.3.

9.1.3 This section assumes errors were detected during formatting or during the read/write test. Reclaim (c) is not part of CP/M, and must be purchased as a separate utility.

Execute the RECLAIM (c) program off the floppy drive.
Select the "Destructive" test.
Select a "Single Head".
Select head "Ø"
Refer to the RECLAIM (c) manual for details.

Go to section 9.1.3 upon completion of RECLAIM (c).

9.2 CARTRIDGE CONTAINING DATA

If Bdos errors occur during routine operation, and there is data on that disk drive, the "bad" files must be identified and subsequently ERASED.

9.2.1 For convenience, print the DIRectories of drives K and L. (CONTROL/P) DIR K:

9.2.2 PIP files from BOTH drives (one drive at a time) to another drive on the FIXED disk. As Bdos errors occur during the PIP, hit RETURN to continue and **NOTE THE NAMES OF THE BAD FILES.**

If all files copy without errors, follow the instructions for new cartridge procedure (section 8.1). Then you must PIP the files just transfered, back onto the reformatted disk.

If BAD files are noted during the copy, continue with step 9.2.3.

9.2.3 Execute the RECLAIM (c) program.

Select the "Read" option and refer to the Reclaim (c) manual for details.

9.2.4 ERAse the "BAD" files noted in section 9.2.2, using ERA.

Example: to erase file "TEST.COM" from drive B enter:

ERA B:TEST.COM

9.2.5 The "BAD" files that were ERAsed must be re-created. If you made a back-up at the time these files were created, then simply PIP them from their back-up disk.

REMEMBER: Formatting and ERAsing all files using ERA *.* will eliminate the effects of Reclaim.

(C) Reclaim is a trademark of Lifeboat Associates.

SYMPTOM	PROBABLE CAUSE	SOLUTION
-DRIVE READY LIGHT DOES NOT LIGHT WHEN KEY IS ON. -FAN NOT RUNNING	1. POWER FUSE IS BLOWN 2. POWER NOT PRESENT AT AC OUTLET 3. FAULTY CORD 4. FAULTY KEY SWITCH	1. REPLACE FUSE (CALL SIERRA 2. CHECK OUTLET AND BREAKER 3. CALL SIERRA 4. CALL SIERRA
-DRIVE READY LIGHT OUT NO "SIGN ON" MESSAGE. -FAN RUNNING	1. CRT CABLE (12301) NOT PRESENT AT PORT (A), OR CONNECTED BACKWARDS 2. POWER UP RESET FAILED 3. FAULTY PCB3000	1. CHECK THAT CRT CABLE (12301) IS IN PLACE WITH END 1 AT CPU, AND END 2 AT CRT "CURRENT LOOP" PORT. 2. PUSH RESET AGAIN 3. CALL SIERRA
-DRIVE READY LIGHT ON -"SIGN ON" MESSAGE OK -WILL NOT BOOT (NO A>)	1. NO OPERATING SYSTEM ON CARTRIDGE.	1. PUT OPERATING SYSTEM ON CARTRIDGE. (PUT)
-CART LIGHT ON. DISK WILL NOT START UP	1. CARTRIDGE DOOR IS NOT CLOSED PROPERLY.	1. OPEN AND RE-CLOSE DOOR.
-PRINTER PRINTS RANDOM CHARACTERS (GARBAGE)	1. BAUD RATE NOT SET CORRECTLY ON PRINTER 2. BAUD RATE NOT SET CORRECTLY IN OP. SYS. 3. WRONG OPERATING SYSTEM CONFIGURATION	1. SET BAUD RATE SWITCHES ON PRNTR. – SEE MANUAL 2. SET BAUD RATE ON DISK USING "SETUP" 3. CALL SIERRA
-DISK ERRORS ON N: (ANY DRIVE) DURING CPY PIP OR FORMAT	1. BAD SPOT ON N: DISK (DESTINATION DISK) 2. BAD SPOT ON N: DISK (SOURCE DISK) 3. DEFECTIVE FLOPPY DISK	1. RE-FORMAT DESTINATION DISK. RUN RECLAIM (C) IF ERRORS PERSIST. 2. GO TO BACKUP OF SOURCE DISK. RUN NON-DESTRUC-IVE RECLAIM (C). 3. REPLACE FLOPPY DISK
-THE MESSAGE *RESTORE FAILED APPEARS WHEN RESET IS PRESSED	1. LOOSE CABLE CONNECTION INTERNALLY 2. CONTROLLER MALFUNCTION	1. RUN CONTROLLER DIAG-NOSTIC PROGRAMS – XSBT.

9.4   XCOMP CONTROLLER DIAGNOSTIC TESTS

9.4.1 XSBT

If the ***RESTORE FAILED** appears when RESET is pressed, run XSBT.   XSBT   is a quick and simple test that will determine the condition of the data buffer for the controller.

Switch PROM switch to position 1 (2.x)

Insert CP/M hard disk master floppy in drive 0.

Press RESET

Enter: XSBT   (hit return)

Verify that all BANKS are OK

10.0 FLOPPY DISK ERRORS

The Sierra computer is designed to output messages to
the screen when an error is detected. The errors may
indicate either operator error, or equipment
malfunction.

Routine Operation

ERROR MESSAGE	PROBLEM	SOLUTION
BDOS ERROR ON A:	Bad spot on disk (drive A)	PIP data off disk. Reformat disk.
BDOS ERROR ON A: R/O	Disk has been set to Read Only, or RESET was not pressed when the disk was inserted in drive A.	RESET the computer
BDOS ERROR ON A: SELECT	No disk in drive A	Insert a disk

FLFMT

RESTORE ERROR	No disk in drive, or drive is in write protect	Insert a disk / reverse write protect status.
STEP ERROR	Disk is removed prematurely or disk drive is malfunctioning	Call Sierra
WRITE TRACK ERROR	Disk inserted incorrectly Wrong kind of disk Hardware Malfunction	Verify disk type Call Sierra

DDCOPY

ERROR XXXXX YYYYY ZZZZZ	Error occurred during copy XXXXX = track # YYYYY = sector # ZZZZZ = status code	Reformat and try to copy again. If error persists, use a new disk

11.0 MULTI USER SYSTEMS - NETWORKING WITH MP/M & CP/NET

The purpose of this guide is to familiarize the Sierra
microcomputer user with the multi- terminal operating
systems and features. Information specifically related to
multi-user systems will described here; **routine operation
such as formatting, transferring files from drive to drive
are described in the Sierra Hard Disk Systems (section II)
of this manual.** This section applies to multi user
networking configurations only (those using CP/NET).
Multi-user banked memory procedures are described in
section 12.

Three control programs are necessary to run a microcomputer
network; CP/M, MP/M and CP/NET (all are propriety of
Digital Research Corp.). CP/M is the conventional operat-
ing system for single user systems. MP/M (multi-program-
ming monitor) is the master operating system which handles
multiple terminals. CP/NET (network) is the control
program that networks each user to a master.

11.1   CONFIGURATION - AN OVERVIEW

The Sierra multi-user system constitutes one master
terminal and slave terminal(s). The master terminal is
used to load the MP/M operating system. The slaves run
under CP/M. All are tied together with CP/NET.
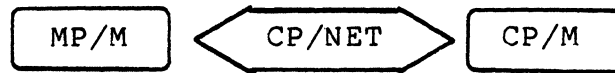
MP/M is a large program which occupies a significant amount
of memory space in RAM (random access memory), leaving
inadequate memory space for running most programs. The
Sierra 4000 has the capability to store MP/M on its own
dedicated board. The master can then be switched to become
a slave, allowing full memory capacity. This is done with a
switch box which will be described in a later section.
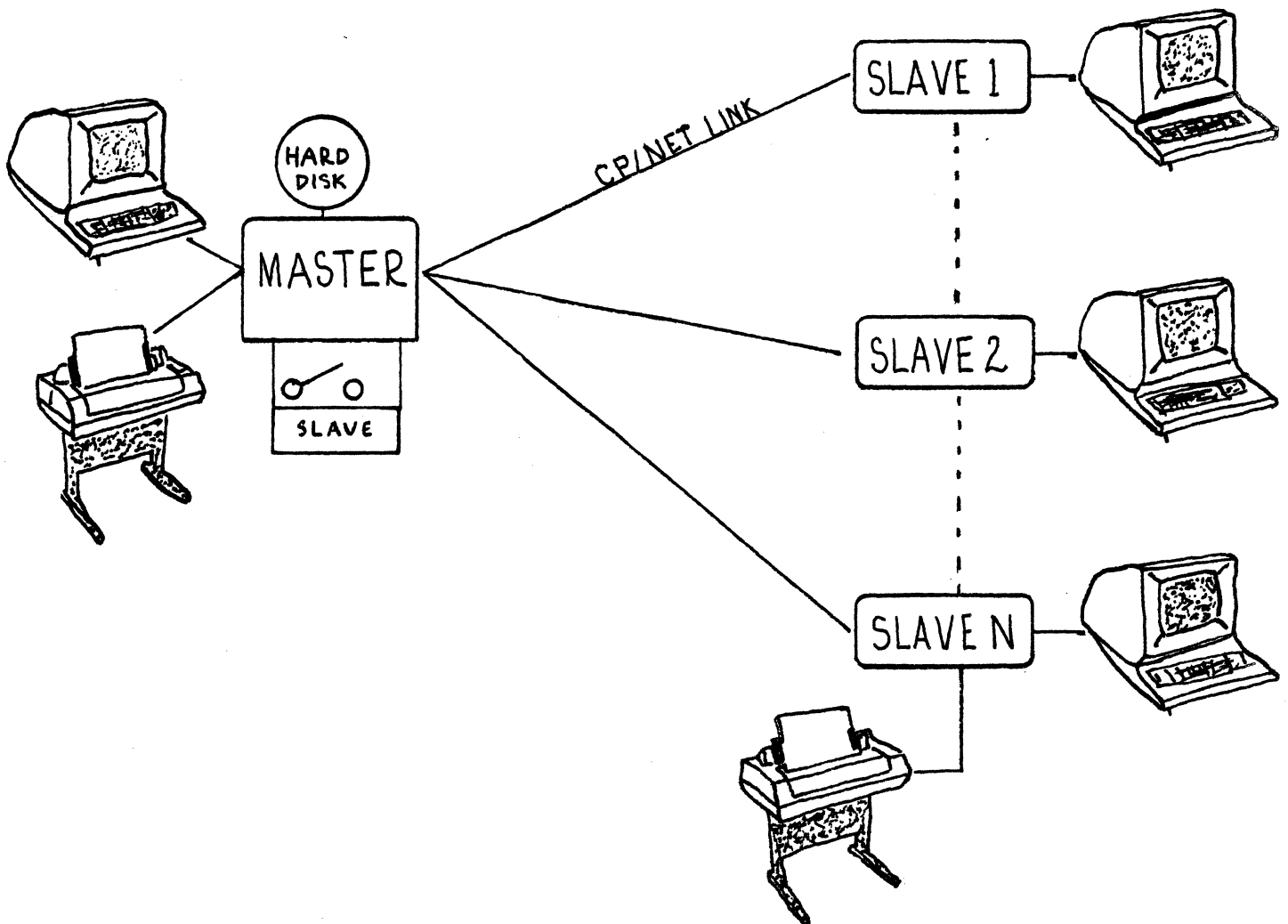
11.2   STARTING THE SYSTEM

This section describes the procedure for loading the operating systems. The computer and its peripherals must be powered on before the following procedures can be executed (section 8.1).

Once the computer is powered on, and the PROM switch is in position 2 (hard disk), the system must be RESET by pressing the RESET button on the front panel of the computer. Pressing RESET loads the CP/M operating system into memory, producing an A> on the screen of the master terminal.

NOTE: The MASTER/SLAVE SWITCH must be in the master position (M).

With an A> on the master terminal, you are ready to load the multi-user operating systems.

11.21 STARTING THE MASTER

Load MP/M from the Master terminal

Type: M (and hit return)

MP/M will load into memory and produce an ØA> on the master terminal screen.

If you have 4 or more slaves, type: N (an hit return), the ØA> will appear.

Switch the MASTER/SLAVE SWITCH to the slave position (S), and hit the reset switch on the lower right side of the master terminal. The reset switch on the terminal automatically loads CP/NET, and turns the master into a workable slave.

The following message should appear on the screen:

          CP/M VERS. X.X
          CP/NET VERS. X.X .... Release X.X
          NDOS intialization complete
          A>

If the following message appears:

          LOGIN FAILED ...TRYING AGAIN
          LOGIN FAILED ...TRYING AGAIN
          Failed to load the CP/NET CCP

either   1) MP/M was not loaded on the master
         2) The file CCP.SPR is NOT on drive A
         3) Hardware failure

11.22 STARTING THE SLAVE(S)

Once MP/M has been successfully loaded on the master (section 11.21), the slave(s) are ready to be reset.

Hit the reset switch on the lower left side of the slave terminal(s). This will automatically load CP/NET and CP/M thus activating the slaves.

The folowing message should appear on the screen:

```
CP/M VERS. X.X
CP/NET VERS. X.X  .... Release X.X
NDOS intialization complete
A>
```

If the following message appears:

```
LOGIN FAILED ...TRYING AGAIN
LOGIN FAILED ...TRYING AGAIN
Failed to load the CP/NET CCP
```

either 1) MP/M was not loaded on the master
        2) The file CCP.SPR is NOT on drive A
        3) Hardware failure

ALL TERMINALS ARE NOW OPERATIONAL

NOTE: IF THE RESET BUTTON ON THE FRONT PANEL OF THE COMPUTER IS PRESSED AFTER THIS POINT, THE ENTIRE LOADING PROCESS MUST BE RESTARTED. USE THE RESET SWITCHES ON THE INDIVIDUAL TERMINALS TO BEGIN A NEW PROCESS.

11.3 DRIVE EQUIVALENCING

At this point, all the terminals have the A> on the screen. This prompt means two things; 1) ready to accept a command, and 2) drive A is the currently logged drive.

All of the Sierra software currently operates off drive A, and the data is automatically stored on drive B. A program entitled NETWORK allows you to set up any drive equivalence that are convenient.

FOR EXAMPLE: if you would like one of the slave terminals to operate on drives C and D, simply tell the computer that the slaves drive A is actually (physically) drive C and drive B is actually drive D.

```
    Slave Drive              Master Drive (Physical Drive)

       A                                  A
       B                                  B
       C                                  C
       D                                  D
       .                                  .
```
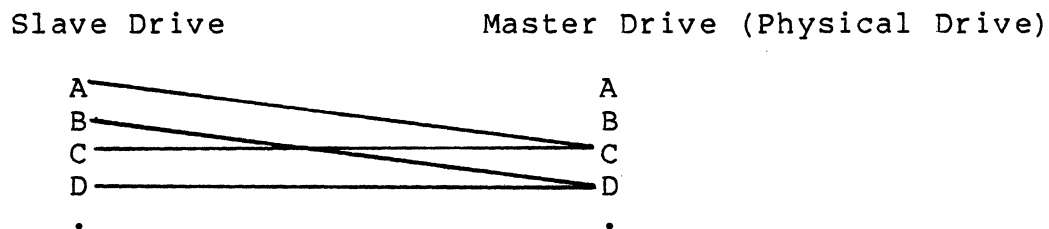
The general form of the command is:

                NETWORK (local drive)=(master drive)

The example above is accomplished with the NETWORK program. From the desired slave, type:

NETWORK A:=C: (hit return)   An A> will appear representing drive C. In order to issue the next NETWORK command, the program NETWORK.COM must be on drive C

NETWORK B:=D: (hit return)

The program now thinks it is using drives A and B, but the user is actually accessing drives C and D

A program entitled CPNETSTS (CP/NET STATUS) displays a table showing how the drives have been equivalenced. Simply enter CPNETSTS and hit return.

To reverse the drives back to their original configuration, the same logic is used

                        NETWORK A:=A:
                        NETWORK B:=B:

11.4   PRINTING

The Sierra multi-user systems are configured for spooling.
This feature may be disabled at the users request. Contact
Sierra for more information.

NO SPOOLING   -   1 PRINTER

All printing occurs on master printer.

**When printing is complete, the user must type: ENDLIST
to free the printer for other users.**

NO SPOOLING   - MULTIPLE PRINTERS

All printing dèfaults to the master. To redirect printing
to a slaves printer, the slave must type:

                    LOCAL LST: (hit return)

Printing will now occur on the slaves printer.   To reverse
the above condition (set printing back to master) type:

                    NETWORK LST: (hit return)

11.41 SPOOLING

Spooling is a printing system used in a multi-user environment. When printing is requested, the computer creates a spoolfile on the disk. A command is then issued which initiates printing. The system is available with or without spooling.

One Printer - Master

Your computer system may be configured in a variety of ways. If you have one printer, it will be connected to the master.

To print, simply execute the print routine (i.e. report writer such as RPTACR . . etc.). The computer will create a spoolfile and return with an A> when ready.

Type: ENDLIST (hit return)
Note: Typing ENDLIST puts the user in a spool queue
       (line). If more than one user request printing, the
       system will print one after the other. Spoolfiles
       can be created while printing is taking place.

Multiple Printers

One printer is connected to the master, and subsequent printers are connected to slaves. With this configuration the user may use either his local printer, or the masters printer. The term used for printer is LST: (list device). The default configuration is: all printing occurrs on the master.

To print on the Master printer only:

Simply execute the usual print routine (report writer such as RPTACR . . .etc). The computer will automatically create a spoolfile on the disk. When the A> returns, type:

                    ENDLIST (hit return)

The computer will begin printing.

To print on a local (slaves) printer:

Set a slaves printer to local.   Type: LOCAL LST:

Printing for this slave is now local. No Spoolfile is created. When printing is requested, it occurs instantly.

The printing may be set back to the master for spooling by typing: NETWORK LST:

STOP SPOOLING

To interrupt the printing process (with spooling), switch the Master/Slave switch box to master. Through the master terminal, hit the space bar to get obtain the 0A>.

Type: STOPSPLR   (from the 0A> and hit return)

To return the master to a working CP/NET slave, simply switch the Master/Slave switch box to slave, and reset the terminal. An A> will appear.

MAINTENANCE

If printing is aborted or interrupted, or ENDLIST is not executed, the temporary file created by the spooler will remain on drive A. If this occurs regularly, many unwanted files will occupy space on drive A.

The name of the temporary file is:

SLVxSPLy.TEX   where x = slave#,   y = spoolfile# (if 3 spoolfiles are created in a row, y will increment from 0 to 2.

If you are certain that the .TEX files are no longer needed, erase them using ERA. Executing ENDLIST will print the last spool file that was created. If you wish to print the others, use the command SPOOL. For example, to print (and then delete) all of the .TEX files, type

0A>**SPOOL *.TEX [D]**   (the [D] denotes delete when done)

To print a specific .TEX file use the same logic. A file named SLV2SPL2.TEX is on drive A. Before erasing it (in case it is of some value) print it using:

0A>**SPOOL SLV2SPL2.TEX [D]**   (the [D] denotes delete when
                                 done)

11.5   USING THE FLOPPY DISKS

All users can access files on the floppy disk drives. The
drives are configured as M: and N: (when using PROM
position 2 i.e. hard disk)

Sierra provides the option of double density floppy disks.
The density on each of the floppy drives may be set to
single, double or extended density.

11.51   SETTING THE DENSITY

Power up the computer

Load MP/M on the master (make sure the MASTER/SLAVE switch
                          is on M)

When the ØA> appears, type:

ØA>DENSITY M:=S   (sets M: to single density)
ØA>DENSITY N:=D   (sets N: to double density)
ØA>DENSITY M:=X   (sets M: to extended density)
ØA>DENSITY M:=?   (checks density on M:)

Drive density can only be changed from the master.

11.52   CHANGING FLOPPYS

When changing a floppy disk, pressing the RESET button on
the front of the computer might be inconvenient if the
system is running under MP/M and CP/NET (since all the
operating systems would have to be re-loaded). Some form of
RESET is necessary in order to avoid the following error
maessage: BDOS ERROR ON X: ...R/O

The DSKREST program is provided for this purpose. Type:

                A>DSKRESET   (hit return)

11.6   MAIL

The system is equipped to send messages from user to user.
The messages must be in quotation marks, be no more than 64
characters long and must follow the following guidelines:

SENDING MAIL

Slave to Slave: **SNDMAIL (XX)"message for slave"**

Slave to Master: **SNDMAIL (ØØ)"message for master"**

Master to Slave: **MSNDMAIL (XX)"message for slave"**

Master to All: **BROADCST "message"**

Where XX = slave address (eg. 8B)

See section 11.8 for Slave Address Table

RECEIVING MAIL

Users must periodically check to see if anyone has sent
them mail.

Master: MRCVMAIL

Slave: RCVMAIL

Note: All of the above commands require a carriage return
      for execution.

11.7 RESTRICTIONS

The following functions must be executed from the MASTER ONLY:

> 1) DENSITY
> 2) FLFMT
> 3) DDCOPY

The following programs may NOT be run on the slaves

> 1) D (use DIR instead)
> 2) SUBMIT

11.8 SLAVE ADDRESS TABLE

The address (in hexadecimal) is the address used for sending mail (section 11.6). The switch settings refer to the switches on the individual slave boards in the computer (1 = ON, 0 = OFF).

SLAVE	ADDRESS (HEX)	SWITCH SETTING
0	87	0001
1	8B	0010
2	8F	0011
3	93	0100
4	97	0101
5	9B	0110
6	9F	0111
7	A3	1000
8	A7	1001
9	AB	1010
10	AF	1011
11	B3	1100
12	B7	1101
13	BB	1110
14	BF	1111

11.9 GENSYS

The GENSYS program is configured at Sierra National before
the delivery of the computer.   However,   certain
circumstances (formatting drive A) make it necessary to re-
GENerate the SYStem. GENSYS must only be run on the hard
disk (it cannot be run on the floppy, and then PIPed down
to the hard disk).

**The GENSYS responses vary depending upon the version and
release of MP/M. An example is provided below for version
1.1. The GENSYS is different for MP/M II.**

After the MP/M and CP/NET floppy disks have been PIPed down
to drive A (hard disk):

Type: GENSYS and hit return

The following questions will appear one after the other.
Enter your response (bold type) and hit return.

GENSYS

MP/M 1.1 System Generation
============================

Top page of memory = **FE**
Number of consoles = **1**
Breakpoint RST #   = **7**
Add system call user stacks (Y/N)? **Y**
Z-80 CPU (Y/N)? **Y**
Bank switched memory (Y/N)? **N**
Memory segment bases, (ff terminates list)
    :**00**
    :**FF**
Select Resident System Processes: (Y/N)
SLVSP   ? **Y**
NETWRKIF   ? **Y** *
SPOOL&D   ? **Y**

RESET the computer. MP/M may now be loaded (sec 11.2)

* Answer **N** if there are 4 or more slaves. Also after
typing M to load MP/M, the 0A> appears. Type N, hit
return, and the 0A> will appear again. The slaves may now
be reset.

THIS EXAMPLE OF GENSYS IS FOR A NETWORKING SYSTEM:

```
0A>GENSYS

MP/M II V2.1 SYSTEM GENERATION
COPYRIGHT (C) 1981, DIGITAL RESEARCH

DEFAULT ENTRIES ARE SHOWN IN (PARENS).
DEFAULT BASE IS HEX, PRECEDE ENTRY WITH # FOR DECIMAL

USE SYSTEM.DAT FOR DEFAULTS (Y) ?N
TOP PAGE OF OPERATING SYSTEM (FF) ?FE
NUMBER OF TMPS (SYSTEM CONSOLES) (#1) ?
NUMBER OF PRINTERS (#1) ?
BREAKPOINT RST (06) ?
ENABLE COMPATIBILITY ATTRIBUTES (N) ?Y
ADD SYSTEM CALL USER STACKS (Y) ?
Z80 CPU (Y) ?
NUMBER OF TICKS/SECOND (#60) ?
SYSTEM DRIVE (A:) ?
TEMPORARY FILE DRIVE (A:) ?
MAXIMUM LOCKED RECORDS/PROCESS (#16) ?#50
TOTAL LOCKED RECORDS/SYSTEM (#16) ?#100
MAXIMUM OPEN FILES/PROCESS (#16) ?#100
MAXIMUM OPEN FILES/SYSTEM (#16) ?#200
BANK SWITCHED MEMORY (N) ?
NUMBER OF USER MEMORY SEGMENTS (#1) ?2
DAYFILE LOGGING AT CONSOLE (N) ?

   RESERVED        FF00H   0100H
   SYSTEM   DAT    FE00H   0100H
   TMPD     DAT    FD00H   0100H

   USERSYS  STK    FC00H   0100H
   XIOSJMP  TBL    FB00H   0100H

ACCEPT NEW SYSTEM DATA PAGE ENTRIES (Y) ?

   RESBDOS  SPR    EF00H   0C00H
   XDOS     SPR    CD00H   2200H
SELECT RESIDENT AND BANKED SYSTEM PROCESSES:
   SERVERP  RSP (N) ? Y
   SPOOL    RSP (N) ? Y           (optional -- see below)

   SERVERP  RSP    C300H   0A00H
   SPOOL    RSP    C200H   0100H

   RESXIOS  SPR    A500H   1D00H
   BNKBDOS  SPR    8200H   2300H
   BNKXDOS  SPR    7C00H   0400H
   SPOOL    BRS    7400H   0800H

   LCKLSTS  DAT    6800H   0C00H
   CONSOLE  DAT    6700H   0100H
```

```
ENTER MEMORY SEGMENT TABLE:
 BASE,SIZE,ATTRIB (67,99,80) ?
 BASE,SIZE,ATTRIB (          ) ? 44,23,00
 BASE,SIZE,ATTRIB (          ) ? 00,44,00


 MP/M II   SYS   6700H   9900H
 MEMSEG    USR   4400H   2300H
 MEMSEG    USR   0000H   4400H

ACCEPT NEW MEMORY SEGMENT TABLE ENTRIES (Y) ?

** GENSYS DONE **
```

This proceedure creates a file MPM.SYS on the A: drive which
is the memory image of the MP/M II system.

The followins files should now be on the A: drive:
SYSTEM.DAT, MPM.SYS, N12.PRL, and M.COM. To load MP/M II
and the CP/Net Server processes, type M. Depressins the
reset switch on a Requester should now result in a Losin and
"0A>" prompt.

11.10 FILE ATTRIBUTES

MP/M II Version 2.1/3.2 and CP/NET Version 1.2/3.5 (or later), require file attributes to be set for routine operation. These attributes have been set by Sierra or your dealer. However, if the drive was formatted, and the system re-generated, these attributes must be set.

A series of 3 technical bulletins (001 through 003) are provided at the back of this manual. They explain the compatibility attributes under CP/NET 1.2.

Technical bulletin 001 describes the Compaitbility Attributes under CP/NET 1.2. Technical Bulletin 002 describes network printing, and Technical Bulletin 003 contain information on CP/NET, including error messages, and GENSYS.

12.0 BANKED MEMORY COMPUTERS

INTRODUCTION

Sierra computers are available with banked memory.

To better understand the principles of bank select memory, we should briefly review the other methods of allocating memory.

Our standard single board, single user concept includes one Z-80A micro-processor chip, 64K bytes of dynamic RAM (Random Access Memory is where the programs reside) and an assortment of other chips that control the flow of data into and out of memory. CP/M is the operating system that controls the single user computer.

The networking concept gives every user a board containing a Z-80A and 64K of RAM etc.. The boards (actually individual computers) are networked together, and controlled by a master board. The MP/M operating system controls the master, CP/NET handles communication between computers, and each user interfaces with CP/M.

The banked memory concept offers multi-user capabilities without adding additional boards (computers). All the users share a single Z-80A, and each user gets a bank of 48K RAM. Four banks per board are available, with MP/M (the multi-user operating system) residing in the first bank. In essence, a computer equipped with the bank select board could accomodate up to 3 terminals and a printer (or 2 terminals & two printers etc.).

The MP/M operating system allows the Z-80A to work with one bank at a time - switching back and forth between banks, accomodating all users. MP/M II (current version of MP/M) has a long list of advanced features such as: time of day display, record locking, passwords on drives/files, user numbers, time stamping (tells you when a file was created), program detach (lets you detach the terminal from one program without terminating in order to run another program.

12.1 OPERATIONS

The Sierra Banked Memory computer is available in several configurations. For example,

Sierra 3000 / 10MByte hard disk / 1 Floppy disk

Sierra 4000 / 1 board / 24,32,40,64 or 96 MByte hard disk / 1 or 2 floppy disk drives

Sierra 4000 / multiple boards / 24,32,40,64, or 96 Mbyte hard disk / 1 or 2 floppy disk drives.

Regardless of the configuration, the Banked Memory feature functions in the same manner on all the systems. This section of the manual will explain the Banked Memory concept only. For routine operation, refer to the appropriate section.

12.2 BANKS

The computer is available with "n" banks. In other words a user may order the computer with 1, 2, 3 or 4 banks of memory. It is important to note how many banks are necessary for certain uses.

1 bank   - single user / CP/M operating system
2 banks - not practical
3 banks - up to 2 users / MP/M operating system
4 banks - up to 3 users / MP/M operating system

The most likely configurations will be 3 or 4 banks. Note that when more that one terminal is used, the MP/M operating system is necessary. MP/M takes up one bank of memory, therefore 3 banks are required for 2 users, and 4 banks are required for 3 users.   The 1 bank configuration is unlikely because the computer will simply function like a standard Sierra CP/M computer, making the banked memory option unnecessary. The 2 bank option is unlikely because it still only permits one user to operate since the second bank will be used by MP/M.

The number of banks that are present in the computer will determine how many users may operate. The banks are numbered 0 through 3, with the MP/M operating system residing in bank 0. The MP/M operating system is set up by Sierra or your dealer to operate with the number of banks (and users) that you wish to use. If additional users are to be added at any time, MP/M must be re-built. GENSYS is an MP/M program that builds the MP/M operating system - GENerate SYStem. Section 12.4 shows how to do a GENSYS for a 4 bank (up to 3 user) system.

12.3 PORTS

The banked select boards are equipped with 4 RS232C serial I/O ports. If your computer has one board, there will be 4 ports in the back. If your computer has multiple boards, each board, will have 4 ports. The ports are assigned accordingly:

The ports are named A - B - C - D from left to right (looking at the back of the computer).

PORT A	PORT B	PORT C	PORT D
1st CRT	Printer	2nd CRT	3rd CRT or 2nd Printer

Notice that the system may operate with 3 terminals (CRT'S) and one printer, or 2 terminals and 2 printers.

12.4 GENSYS

The GENSYS program may have to be run if the disk drive is formatted, or if banks are added after the initial installation. The responses to the GENSYS questions will vary according to the configuration (number of banks/terminals). A print-out of a GENSYS configuration for 3 terminal (4 banks) is provide in this section. More detail can be found in Digital Research's MP/M System Guide - section 5.

Note: The users response is in dark type. Default values appear in parentheses. A carriage return will assume the default value - a ✔ denotes a carriage return.

GENSYS

MP/M II V2.1 System Generation
Copyright (C) 1981, Digital Research

Default entries are shown in (parens).
Default base is Hex, precede entry with # for decimal

Use SYSTEM.DAT for defaults (Y) ? **N**
Top page of operating system (FF) ? **FE**
Number of TMPs (system consoles) (#4) ? **3**
Number of Printers (#1) ? **1**
Breakpoint RST (Ø6) ? ✔
Enable Compatibility Attributes (N) ? **Y**
Add system call user stacks (Y) ? ✔
Z8Ø CPU (Y) ? ✔

```
Number of ticks/second (#60) ? ✔
System Drive (A:) ? ✔
Temporary file drive (A:) ? ✔
Maximum locked records/process (#16) ? ✔
Total locked records/system (#32) ? ✔
Maximum open files/process (#16) ? ✔
Total open files/system (#32) ? ✔
Bank switched memory (Y) ? ✔
Number of user memory segments (#3) ? 4
Common memory base page (C0) ? ✔
Dayfile logging at console (Y) ? ✔


   RESERVED        FF00H   0100H
   SYSTEM   DAT    FE00H   0100H
   TMPD     DAT    FD00H   0100H
   USERSYS  STK    FC00H   0100H
   XIOSJMP  TBL    FB00H   0100H

Accept new system data page entries (Y) ? Y

   RESBDOS  SPR    EF00H   0C00H
   XDOS     SPR    CD00H   2200H

Select Resident and Banked System Processes:
 SPOOL      RSP (N) ? Y

   SPOOL    RSP    CC00H   0100H

   BNKXIOS  SPR    AB00H   2100H
   BNKBDOS  SPR    8800H   2300H
   BNKXDOS  SPR    8600H   0200H
   TMP      SPR    8200H   0400H

   SPOOL    BRS    7A00H   0800H

   LCKLSTS  DAT    7700H   0300H
   CONSOLE  DAT    7400H   0300H

Enter memory segment table:
 Base,size,attrib,bank (74,8C,80,00) ? ✔
 Base,size,attrib,bank (00,C0,00,01) ? ✔
 Base,size,attrib,bank (00,C0,00,02) ? ✔
 Base,size,attrib,bank (00,C0,00,03) ? ✔
 Base,size,attrib,bank (00,C0,00,04) ? 00,C0,00,00
 *** Memory conflict - segment trimmed ***
 Base,size,attrib,bank (00,74,00,00) ? ✔


   MP/M II Sys   7400H   8C00H   Bank 00
   Memseg  Usr   0000H   C000H   Bank 01
   Memseg  Usr   0000H   C000H   Bank 02
   Memseg  Usr   0000H   C000H   Bank 03
   Memseg  Usr   0000H   7400H   Bank 00

Accept new memory segment table entries (Y) ? Y

** GENSYS DONE **
```

12.5   MP/M UTILITIES

This section of the manual provides a brief outline of some of the MP/M utiltities that are relevant to banked memory computers.   Refer to Digital Research's MP/M II User's Guide for more complete instruction.

12.51 USER AREAS   -   USER / SET / PIP / DIR

MP/M assigns the selected user number to each file created in that user area. For example, if a file is created by user 1, MP/M assigns the number 1 to that file, and generally allows only user 1 to access it later.

USER   The USER command has 2 functions. When entered without a command tail, it displays the current (default) user number. This number is always displayed to the left of the drive specifier in the system prompt as illustrated below:

ØA>**USER**
User Number = Ø
ØA>

2B>**USER**
User Number 2
2B>

Enter the USER command with an argument to change the USER number. Any number from Ø to 15 may be used. For example:

ØA>**USER 1**
User Number = 1
1A>

2B>**USER Ø**
User Number = Ø
ØA>

In response to a request for a DIRectory listing, MP/M displays only those files that match the current user number. In effect, the user feature allows each user to access only the area of the directory that contains his files. The user can reference every disk drive in the system, but he has access only to the files created under his user number. However, if a file is assigned
SET   the attribute SYS by a SET or STAT command (section 7 MP/M Users Manual) it becomes a "system" file, accessible by all users. This means that the utility programs are accessible to all users; and any file can be made accessible to all users by typing:

ØA>**SET ANYFILE.DEF [SYS]**

PIP

Files may be PIPed from one user area to another by using the G argument. For example, if user 1 wishes to PIP the file TEST.COM from user area 0 to user area 1 (all on drive A), the command would be:

1A>**PIP A:=TEST.COM [G0]**

The [G0] denotes where the file is comming from. The default user (1A in this example) denotes where the file is going to.

Section 11 of the MP/M II User's Guide has more information on PIPing from one user area to another.

DIR

To display a directory of files on a drive, simply type:

0A>**DIR**   - will display directory for drive A

0A>**DIR B:**   - will display directory for drive B

0A>**DIR [SYS]**   - will display SYSTEM files (not normally displayed)

Section 6 of the MP/M User's Guide has more information.

SDIR

The SDIR utility is a combination of STAT and DIR. In other words it provides additional information such as how many bytes each file occupies, total bytes occupied on the drive, SYS or DIR, Read Only or Read Write, etc.. The SDIR utility uses the same syntax as DIR described above.

Section 6 of the MP/M User's Guide has more information.

NOTE: The D.COM program is also available for displaying a directory of files. It allows users to display directories of all or specific users areas, and system or directory files. See Appendix 002

^D

MP/M supports multi-programming at each terminal. You can initiate a program at a console, and then detach the console from that program with CONTROL/D. Then you can initiate another program at the same console. Of course, you must have a bank of memory that is available (not currently allocated) in order to use this feature.

A typical case is a user with all 4 banks of memory, and only 1 or 2 terminals being used (at least one memory bank free). User 0 for example prints reports. While the reports are printing, the user wishes to do something else. A CONTROL/D (hold the control key down and hit D) is typed, and the 0A> returns. At this point the user can execute another program. If there is no memory bank available, MP/M will put out a diagnostic message on the screen.

This can be repeated as many times as there are available memory banks. CONTROL/D re-attaches programs in the same order they were detached. The ATTACH utility re-attaches the program regardless of the order:

0A>ATTACH PROGRAM.COM.

Note that this facility will not work with all programs. Certain programs use CONTROL/D for other reasons. Section 2.4 in the MP/M User's Guide provides additional information.

12.53 OTHER MP/M UTILITIES

There are several other MP/M features available, such as PASSWORDS, TIME OF DAY, etc. Section 7 of the MP/M User's Guide contains information on these other features.

SIERRA COMPUTER PORT CONFIGURATION

I. GENERAL

Ports A, B, C and D are RS232C serial ports. A & B are designed for direct connect to peripherals (such as CRT's and printers). C & D are configured for direct modem connect. The UART chip is an SIO/2. Each port is capable of asynchronous or synchronous operation as well as providing high level protocol support (Bisynch, HDLC, and SDLC).

A detailed technical description of the Z80 SIO is given in "Z-80 SIO Technical Manual" available from Sierra or Zilog.

II. PINOUTS

Logical Signal		Ports (A & B) PIN	Ports (C & D) PIN
Frame Ground		1	1
Transmit Data	(from CPU)	3	2
Receive Data	(to CPU)	2	3
Request to Send	(from CPU)	5	4
Clear to send	(to CPU)	4	5
Data set ready	(to CPU)	not implemented	not/imp.
Signal Ground		7	7
Data Carrier Detect	(to CPU)	20	8
Transmit clock	(to CPU)	17	15
Receive clock	(to CPU)	15	17
Data terminal ready	(from CPU)	8	20
Reset line (Rev 3.0 board)		19	--
+ 12 Volts (Rev 3.0 board)		9	9
- 12 Volts (Rev 3.0 board)		10	10

III. Electrical Configuration

RS-232C levels are controlled as follows:

Inputs 1489/75189 Quad Tri-state receivers.
Outputs 1488/75188 Quad Tri-state line driver.

IV. Clock Selection

Two programmable baud rates are available for use with each port. The selection of clock 1 or clock 2 per port is assigned by the use of on-board jumpers.

A. Setting Baud Rates for Clocks

The clock baud rates are initialized at startup to values selected using the setup program. (CLOCK 1 = CRT CLOCK)
(CLOCK 2 = PRINTER CLOCK).

A program may modify the baud rate(s) by outputting two control bytes to the CTC clock generator chip.

	CLOCK 1	CLOCK 2
CTC ADDRESS	ØC	ØE
BAUD RATE	BYTE 1	BYTE 2
11Ø	Ø7	8D
3ØØ	Ø7	34
6ØØ	Ø7	1A
12ØØ	Ø7	ØD
24ØØ	47	34
48ØØ	47	1A
96ØØ	47	ØD

(All values are hexadecimal)

Example:
To set clock 2 to 24ØØ baud using FORTRAN

```
CALL OUT(Z'ØE', Z'47')
CALL OUT(Z'ØE', Z'34')
```

B. Setting Baud Rate Jumpers

To select clock 1 or clock 2 for a port, refer to the following table.

	jumper	Clock 1	Clock 2
Port A	J5,J6	b	a
Port B	J7,J8	b	a
Port C	J1,J2	b	a
Port D	J3,J4	b	a

Note: 1) The jumpers must go over the center terminal, and either the outside "a" or "b" terminal if an on-board clock is used.

2) If an external clock is to be used, remove the jumpers listed above, and insert the following jumpers.

PORT	JUMPERS
A	J9,J10
B	J11,J12
C	J13,J14
D	J15,J16

Jumpers J1-J16 are located about 7/8 back on the board. The front edge of the board is identified by two connectors while the back edge by three. Jumper identification labels are silk screened on the circuit board.

Jumpers J1-J8 are configured as shown below:

(Back edge of board)

```
---------------------------------------------
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | b   Clock 1
|---|---|---|---|---|---|---|---|
|   |   |   |   |   |   |   |   | a   Clock 2
---------------------------------------------
|       |       |       |       |
    C       D       A       B         Port
```
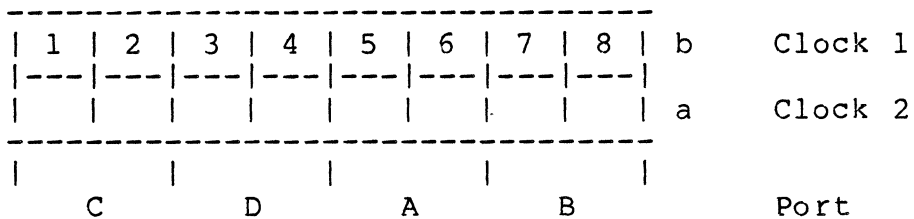
(Front edge of board)

A1-3

V. Port Addresses

The ports are accessed from a program using two addresses : command/status and data. Detailed programming of the ports requires:

            1) setup of the port (configuration)
            2) mode control
            3) status checking (polling/interrupt service)
            4) data transfer

The default configuration for all ports is asynchronous using an on-board clock. No parity checking is done and 8 bits are transferred. I/O may be performed by polling the status register and inputting or outputting data bytes. This case may be programmed with the following data:

PORT	COMMAND/STATUS ADDRESS	DATA ADDRESS
A	1D	1C
B	1F	1E
C	11	10
D	13	12

STATUS BYTE:

	BIT	
LSB	0	Receive character available
	1	
	2	Transmit buffer empty
	3	DCD
	4	
	5	CTS
	6	TX underrun
MSB	7	Break

VI. Programming Information

BIOS port I/O programs provided with CP/M, MP/M, and CP/Net allow communication with a device on any port which meets the following criteria:

1. Asynchronous communication using 8 bits, no parity, one stop bit;
2. DCD (Data Carrier Detect) held high to enable receiving by the port;
3. CTS (Clear to Send), and DCD (Data Carrier Detect) held high to enable transmitting data by the port. RTS (Request to Send) from the computer is held high constantly.

Standard CP/M logical devices in most systems are assigned as follows:

CP/M, CP/Net:		MP/M:	
A	CON:	A	Console 0
B	LST:	B	Console 3 or Printer
C	RDR:, PUN:	C	Console 1
		D	Console 2

Port assignments may be changed for CP/M or CP/Net using the STAT utility. Logical names and their port designations are shown in the following table:

PORT	A	B	C	D
CON: =>	TTY:	CRT:	BAT:	UC1:
LST: =>	TTY:	CRT:	LPT:	UL1:
RDR: =>	TTY:	PTR:	UR1:	UR2:
PUN: =>	TTY:	PTP:	UP1:	UP2:

To modify a port assignment, enter the command:

    STAT <logical device>:=<physical device>:

For example, to switch the logical list device to port D:

    STAT LST:=UL1:

This assignment will remain in effect until a hardware reset is performed.

Serial ports not being supported through the BIOS drivers may be programmed directly by the user. The following is an annotated example of simple asynchronous input/output for port D.

```
PORTIN:                            INPUT PROGRAM
      MVI   A,010H                 Select register 0 and reset
      OUT   013H                        status/interrupts.
      INP   013H                   Input status byte.
      ANI   01H                    Mask data available bit.
      JZ    PORTIN                 Jump if not set.
;
      INP   012H                   Input byte.
      RET                          Return to calling program


PORTOUT:                           OUTPUT
      MOV   B,A                    Save character
      MVI   A,010H
      OUT   013H
      INP   013H
      ANI   04H
      JZ    PORTOUT                Jump if buffer empty bit
;                                       not set.
      MOV   A,B
      OUT   012H                   Output character.
      RET
```

In this simple example, the program waits for the port. However, more than one port may be polled by breaking out the status checking from the inut/output.

CP/M EXTENDED DIRECTORY PROGRAM

WRITTEN BY: FRANK MACLACHLAN
DATE: 18-NOV-80
LAST REV: 21-MAR-81

PURPOSE:

This program will list the contents of a CP/M directory in multiple columns, sorted by filename and user number. File size and disk status information is printed in the directory.

USAGE:

D NAME.EXT $SWITCHES

OPTIONS:

F   Produce fast listing (no file sizes)
N   Negate sense of the following switch
P   Enable display page break mode
S   List files with system attribute set
U   List files in all user areas
V   Produce listing giving user numbers & file attributes

SPECIAL CONSIDERATIONS:

1. The memory requirements of the program are determined by the number of files in the directory. Each file control block requires 16 additional bytes of storage.

2. The program can currently print directories with up to 4096 files.

3. No check is made to ensure that the CP/M CCP (console command processor) is not overwritten. The system will surely crash if this occurs! This might happen on systems having little memory and huge hard disk storage, but should never occur on floppy-based systems

4. The "$" at the beginning of the switch field is required only if the filename field is empty. "D $UVS" is the equivalent to "D *.* UVS"

AVAILABLE MEMORY ON SIERRA COMPUTERS

In specifying the amount of memory available for user programs, the following terms are used:

TPA - Transient Program Area - the amount of memory available if the CCP is not overwritten.
CCP - Console Command Processor
BDOS - Basic Disk Operating System
BIOS - Basic Input/Output System
FDOS - BDOS + BIOS
TBASE, CBASE, FBASE - addresses in memory defining the limits of various areas (see diagram)

```
FFFF    +---------------------+
        |        BIOS         |
        +---------------------+
        |        BDOS         |
        +---------------------+  FBASE
        |        CCP          |
        +---------------------+  CBASE
        |                     |
        |                     |
        |                     |
        |        TPA          |
        |                     |
        |                     |
0100    +---------------------+  TBASE
0000    +---------------------+
```
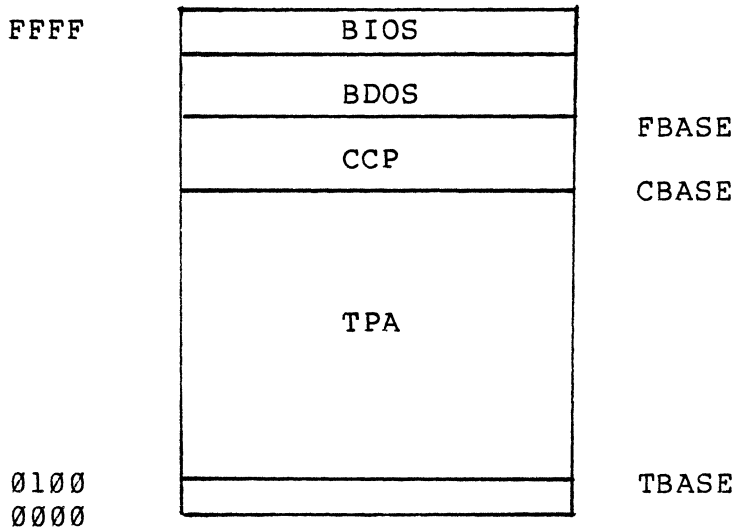
	TPA SIZE	CBASE	FBASE	TBASE
Release 2				
Single Density F/D	58K			0100
Hard Disk CP/M	52K			0100
CP/NET Slave	50K			0100
Release 3				
Single Density F/D	58K	E400	EC00	0100
Double Density F/D	56K	DC00	E400	0100
Hard Disk	54K	D400	DC00	0100
CP/NET Slave	58K	E500	ED00	0100

GLOSSARY

Backup
- Duplicate information saved in case of human or machine error.

Bank Select
- A method of partitioning user memory, so that independant operations may take place simultaneously. A typical division is 256K divided into 4 possible sections of 64K each.

Baud Rate
- The transmission rate which is in effect synonomous with signal events (usually bits)-per second. It is used as a measure of serial data flow between computers and/or communication equipment or devices.

Bit
- Binary Digit. The basic unit of memory. It has a logic value of either 0 or 1.

Boot
- v. to load, as in **boot the operating system**. Sierra computers may be "booted" by pressing the RESET button, or doing a CONTROL/C.

BPS
- Bits per second.

Buffer
- Memory area used to hold data being transferred between computer and peripheral devices.

Byte
- A cell in memory which can store 8 bits of information.

Cartridge
- The Hard Disk platter that is removable.

CP/M
- Is the operating system used by this computer. CP/M was devised by Digital Research Corp.

CPU
- Central Processing Unit. The portion of a computer system that controls the interpretation of and execution instructions and includes arithmetical capabilities.

Crash	– Usually refers to the disk drive head **crashing** against the surface of the disk. Can be caused by smoke or dirt particles.
Cursor	– Location marker on the video screen.
Data	– A general term that is used to denote any or all facts, numbers, letters, symbols, etc. which can be processed or produced by a computer.
Double Density	– Refers to double the standard disk drive capacity. An standard, single density 8 inch disketted, stores about 250K bytes of data. Double density stores approximately 500K (unformatted).
Extended Density	– Double sided, double density on the Sierra computers. 8 inch floppy disks will store approximately 1 megabyte.
Floppy Disk	– A circular piece of mylar plastic, coated with magnetic film, and encased in a protective plastic jacket. The standard size is 8 inches in diameter.
Format	– The logical organization of data or programs.
GETMSG / CMONIT	– "Time Out" error occurring during transmission of data. Possible causes are multiple use of one address, or an unsuccessful transmission due to a bad phone line.
Hard Copy	– Printed information; as opposed to information that appears on video displays.
Hard Disk	– A device in which the disk is sealed and cannot be moved by the operator. Also known as a fixed disk. (see Cartridge).
IC	– Integrated Circuit.
K	– One thousand (500K = 500,000)
Matrix Printer	– Produces characters made up of dots.
Megabyte	– A million bytes.

Memory	- ROM (Read Only Memory) is a program stored in the circuitry of the computer. It cannot be changed, displayed, or erased if the plug is pulled.
	PROM (Programmable Read Only Memory) is also stored in the circuitry of the computer. However, it is purchased unprogrammed and is programmed by the end user. Once programmed, it cannot be changed or displayed, or erased if the plug is pulled.
	RAM (Random Access Memory) Data stored in RAM can be accessed directly i.e. without having to go through other words to get to it. RAM is continuously changeable and is wiped out during a power loss.
Menu	- A "Question - Answer" format.
Modem	- Refers to MODulation/DEModulation chip or device that enables computers and terminals to communicate via data lines. Frequently used in conjunction with telephone circuits.
Networking	- A system of linking computers together. Several networking methods are available. Sierra houses multiple computers (users) in one complex, all under the control of a master computer. MP/M controls the masters tasks, CP/NET handles the communication between computers, and the operator "talks" to CP/M when using the system. All the above mentioned programs were written by Digital Research Inc.
OEM	- Original Equipment Manufacturer. A Manufacturer that buys equipment from various manufacturers, adds value to them, and puts them together as a package system.
Operating System	- The control program inside the circuitry that runs the computer system. The operating system being used by this computer is CP/M.
Parity	- An extra byte or bit added to a set of information for error checking.

Peripherals	- Units which work in conjunction with a computer but are not part of it (eg. printers, terminals, tape drives, etc.).
Ports	- A place of access to a system or circuit. An opening or connecting opportunity.
Program	- A logical orderly set of instructions that tell the computer what operations are to be performed.
RAM	- see memory
ROM	- see memory
Sector	- A sector is made up of 128 bytes of information. Several sectors make up a track on a disk.
Software	- The programs and routines used to control the hardware of computers.
Spooling	- A procedure of temporarily storing data on a disk or tape files, until another part of the system is ready to process it (such as printing).
Time Sharing	- A specific method of operation in which a computer facility is shared by several users at (apparently) the same time. Although the computer actually services each user in sequence, the high speed of the computer makes it appear that the users are all handled simultaneously.
Track	- A circular ring on a disk to which information is read on and recorded on. Most disks have approx. 26 sectors to a track and 77 tracks to a single-sided, single-density, 8 inch floppy disk.
Transient Disk Error	- Errors on the disk that have been detected by the computer. The errors are usually due to improper formatting or a possible bad spot on the disk. A Bad spot on the disk will eventually be diplayed as a Permanent Disk Error.

USERS MANUAL INDEX

TECHNICAL BULLETIN NO. 001

SUBJECT: COMPATIBILITY ATTRIBUTES UNDER CP/NET 1.2

DATE: 11/22/82

INTRODUCTION

The CP/Net 1.2 File Server uses the MP/M II file system. Under this release of CP/Net several of the extended features of the MP/M II file system are available over the network. One of these is the use of compatibility attributes.

Compatibility attributes were introduced by Digital Research to allow running of programs written prior to the introduction of MP/M II. Under MP/M II a number of file protection techniques were added to prevent corruption of files in a multi-user environment. However, some programs do not run because of these restrictions. Use of compatibility attributes allows one or more of the file protection techniques to be ignored for a particular program.

This application note describes the four compatibility attributes, how to set them, and offers some guidelines for their use under CP/Net 1.2. More details are available in "Addendum #1 to the MP/M II Operating System Programmer's Guide".

COMPATIBILITY ATTRIBUTE DEFINITIONS

The four compatibility attributes are designated F1', F2', F3', and F4'. The following is a brief definition of the effect of setting each:

F1'   Allows programs running with this attribute set to have read/write access to common files with no restrictions. No record locking is provided.

F2'   Causes all file closes to be partial rather than permanent. Used for programs which close files to update the directory but continue to use the file without reopening it.

F3'   Causes checksum error not to be displayed but to be reported as a close failure.

F4'   Disables the FCB checksum verification. Also causes F2' and F3' to be set.

SETTING AND RESETTING COMPATIBILITY ATTRIBUTES

Compatibility attributes may only be set at the Server using the
MP/M II utility SET. For example, to set attributes for Wordstar
to Fl', read only, and system the following command would be
issued:

    0A>SET WS.COM [RO,SYS,Fl=ON]

Attributes only need be set for the ".COM" file.

GUIDELINES IN THE USE OF COMPATIBLITY ATTRIBUTES

Sierra will provide assistance and information regarding the use
of compatibility attributes for existing software packages. The
following general guidelines have been suggested by Digital
Rearch:

    1. Don't use them at all unless there is a specific reason
    for their use as they override some or all of the file
    security features of the system.

    2. If a program which runs properly under CP/M returns NDOS
    Error 5 when more than one user are running it, then try
    placing the ".COM" files under User 0 and set them to SYS
    and R/O. If this does not work, then set compatibility
    attribute Fl'.

    3. If a program which runs properly under CP/M terminates
    with NDOS Error 06, set compatibility attribute F3'.

    4. If a program which runs properly under CP/M terminates
    with another NDOS error then try setting F2', then F2' and
    F3', and finally F4'. User attribute F4' only as a last
    resort.

TECHNICAL BULLETIN NO. 002

SUBJECT: CP/NET 1.2 NETWORK PRINTING

DATE: 11/12/82

CP/Net 1.2 provides three options for Requester printing. These are:

> 1.   Local list -- all output to the CP/M list device is directed through the Requester BIOS to the printer connected to the Requester board (normally port B).

> 2.   Network list without spooling -- all output to the CP/M list device is directed over the network to a printer connected to the Server board (normally port B).

> 3.   Network list with spooling -- all output to the CP/M list device is directed over the network to a file known as a spool file. This file is later placed into a queue of files to be printed. This queue is subsequently processed by the SPOOL process and printed.

Upon reset of a Requester, the mode of list output is network list. Whether with or without spooling is determined by whether the SPOOL.RSP module was included during GENSYS.

LOCAL LIST

Local list mode is initiated at a Requester by typing the command NETWORK LST:. Network list mode may be reentered by typing the command LOCAL LST:.

NETWORK LIST WITHOUT SPOOLING

In this mode, if a character is sent to the list output device the request is forwarded to the Server over the network. The Server places the character into a 128 byte buffer. If the Server list device is available when the buffer becomes full, the characters are printed at once. If the Server's list device is in use, the Requester will wait until the Server is free to print the characters.

Once a Requester sucessfully gains access to the Server's list
device it maintains control of the device until an "endlist"
character is sent. In CP/Net 1.2, the endlist character is a
hexadecimal 0FFh.

The list output device is accessed one of two ways by the
Requester: (1) a program performs a list output function during
execution or, (2) a control-P has been entered resulting in
echoing of all console characters to the list device. Either of
these will result in the Requester gaining control of the Server
list device.

An endlist character is sent releasing the network list device
under three conditions: (1) on depressing control-P a second time
turning off the echo of characters, (2) a warm boot (i.e.
returning to the "A>" prompt, (3) sending an endlist character
from a running program.

NETWORK LIST WITH SPOOLING

This mode is similar to "Network List without Spooling" above
except that, rather than waiting for the Server's list device to
be available for printing, the 128 byte character buffers are
written to a spool file. The name of the file is xySPOOLF.TEX
where x is the relative Requester number and y is a count which
allows a Requester to have multiple spool file on the disk.

Data sent to the list device continues to be added to a spool
file until an endlist character is sent. At this point, the file
is closed and it is added to the spool queue. Any subsequent
list output by the same Requester causes a new spool file to be
generated.

The MP/M II spool process searches it's queue for files to be
printed on a first-in-first-out basis. Once a file is removed
from the queue and printer, it is deleted.

TECHNICAL BULLETIN NO. 003

SUBJECT: CP/NET 1.2 RELEASE 3.5

DATE: 11/15/82

INTRODUCTION

This distribution bulletin outlines the procedure for installing CP/Net 1.2 on a Sierra system. It further describes new features and limitations.

HARDWARE REQUIREMENTS

If CP/Net 1.2 is being installed on a Sierra computer which currently runs CP/Net, the following hardware modifications are necessary:

    1. All systems require replacement of three 2716 EPROMS per Requester (Slave) board;

    2. If the system network uses the serial ports rather than the S-bus, then the S-bus high speed network interface must be installed. Systems running under Release 3.0 or later of CP/Net will not require this modification.

INSTALLATION PROCEEDURE

CP/Net 1.2 is installed as follows:

    1. Replace the three EPROMS on each Requester (Slave) board.

    2. Copy MP/M II from the distribution floppy disk to the A: drive. This step is not required if upgrading CP/Net 1.1.
    3. Copy CP/Net 1.2 from the distribution floppy disk to the A: drive.

    4. Build the MP/M II system including the CP/Net Server process using GENSYS as follows:

```
ØA>GENSYS

MP/M II V2.1 SYSTEM GENERATION
COPYRIGHT (C) 1981, DIGITAL RESEARCH

DEFAULT ENTRIES ARE SHOWN IN (PARENS).
DEFAULT BASE IS HEX, PRECEDE ENTRY WITH # FOR DECIMAL

USE SYSTEM.DAT FOR DEFAULTS (Y) ?N
TOP PAGE OF OPERATING SYSTEM (FF) ?FE
NUMBER OF TMPS (SYSTEM CONSOLES) (#1) ?
NUMBER OF PRINTERS (#1) ?
BREAKPOINT RST (Ø6) ?
ENABLE COMPATIBILITY ATTRIBUTES (N) ?Y
ADD SYSTEM CALL USER STACKS (Y) ?
Z8Ø CPU (Y) ?
NUMBER OF TICKS/SECOND (#6Ø) ?
SYSTEM DRIVE (A:) ?
TEMPORARY FILE DRIVE (A:) ?
MAXIMUM LOCKED RECORDS/PROCESS (#16) ?#5Ø
TOTAL LOCKED RECORDS/SYSTEM (#16) ?#1ØØ
MAXIMUM OPEN FILES/PROCESS (#16) ?#1ØØ
MAXIMUM OPEN FILES/SYSTEM (#16) ?#2ØØ
BANK SWITCHED MEMORY (N) ?
NUMBER OF USER MEMORY SEGMENTS (#1) ?2
DAYFILE LOGGING AT CONSOLE (N) ?

   RESERVED        FFØØH    Ø1ØØH
   SYSTEM   DAT    FEØØH    Ø1ØØH
   TMPD     DAT    FDØØH    Ø1ØØH
   USERSYS  STK    FCØØH    Ø1ØØH
   XIOSJMP  TBL    FBØØH    Ø1ØØH

ACCEPT NEW SYSTEM DATA PAGE ENTRIES (Y) ?

   RESBDOS  SPR    EFØØH    ØCØØH
   XDOS     SPR    CDØØH    22ØØH
```

```
SELECT RESIDENT AND BANKED SYSTEM PROCESSES:
 SERVERP RSP (N) ? Y
 SPOOL   RSP (N) ? Y          (optional -- see below)

 SERVERP RSP  C3ØØH  ØAØØH
 SPOOL   RSP  C2ØØH  Ø1ØØH

 RESXIOS SPR  A5ØØH  1DØØH
 BNKBDOS SPR  82ØØH  23ØØH
 BNKXDOS SPR  7CØØH  Ø4ØØH
 SPOOL   BRS  74ØØH  Ø8ØØH

 LCKLSTS DAT  68ØØH  ØCØØH
 CONSOLE DAT  67ØØH  Ø1ØØH

ENTER MEMORY SEGMENT TABLE:
 BASE,SIZE,ATTRIB (67,99,8Ø) ?
 BASE,SIZE,ATTRIB (        ) ? 44,23,ØØ
 BASE,SIZE,ATTRIB (        ) ? ØØ,44,ØØ

 MP/M II  SYS  67ØØH  99ØØH
 MEMSEG   USR  44ØØH  23ØØH
 MEMSEG   USR  ØØØØH  44ØØH

ACCEPT NEW MEMORY SEGMENT TABLE ENTRIES (Y) ?

** GENSYS DONE **
```

This proceedure creates a file MPM.SYS on the A: drive which
is the memory image of the MP/M II system.

The following files should now be on the A: drive:
SYSTEM.DAT, MPM.SYS, N12.PRL, and M.COM. To load MP/M II
and the CP/Net Server processes, type M. Depressing the
reset switch on a Requester should now result in a Login and
"ØA>" prompt.

NEW FETURES

1.   Complete FCB's are now passed back and forth across the
network.   This means that the number of open files will only
be limited by the MP/M file server parameters specified
during GENSYS.   Further, compatablity with CP/M programs
which manipulate the FCB is maintained.

2.   The Server process size is greatly reduced allowing most
utility programs to execute in the Server.

3.   The DSKRESET command now displays a "Disk Reset Failed"
message if the reset drives function failes on any specified
drive.

4. A new MAIL.COM utility replaces the old mail utilities
BROADCST.PRL, MSNDMAIL.PRL, MRCVMAIL.PRL, SNDMAIL.COM, and
RCVMAIL.COM.   MAIL is an interactive electronic mail utility
that writes mail files on the temporary file drives of
servers.

5.   Extended errors are now passed across the network and
used by the network to abort applications when fatal error
conditions occur.   If the default error mode is in effect,
the NDOS will print the following message:

                NDOS Err xx, Func yy

where xx is the extended error code and yy is the BDOS
function that caused the error.   A warm boot will then be
performed, aborting the program.   Extended error codes are
defined in the MP/M II Operating System Programmer's Guide.

The following NDOS errors are currently supported:

        01   Bad Sector : permanent error
        02   R/O : read/only disk
        03   R/O File : read/only file
              File Opened in Read/Only Mode
        04   Select : drive select error
        05   File Currently Open
        06   Close Checksum Error
        07   Password Error
        08   File Already Exists
        09   Illegal ? in FCB
        0A   Open File Limit Exceeded
        0B   No Room in System Lock List
        0C   Server Not Logged In
              Function Not Implemented on Server

6. MP/M II record lock and unlock are implemented as described in the MP/M II programmer's guide.

7. MP/M II password protection is supported on opening files. However, passwords may not be assigned accross the network and must be created directly at the Server.

8. A version of XSUB.COM which is compatible with CP/Net has been included as XSUB2.COM.

9. A version of PIP.COM which closes files during a multiple file copy operation has been included as PIPNET.COM.

10. MP/M II Compatibility Attributes are implemented in that ".COM" files with these attributes set will run according to the rules defined in Addendum #1 to the MP/M II Operating System Programmer's Guide.

11. The Server's disk allocation vector is available to the Requestors over the network so that programs such as STAT.COM and D.COM will return consistent results.

12. The ENDLIST character which causes the current spool file to closed and placed into the spool queue has been changed to the hexadecimal character ØFF.

LIMITATIONS

Most of the "limitations" known at this time are the result of using a MP/M II file server, using compatibility attributes, and use of the endlist feature of the network LST: device. These areas are described in detail in the accompanying application notes.

TECHNICAL BULLETIN NO. 004

SUBJECT: WORDSTAR MODIFICATION FOR THE DIABLO 1640

DATE: 11/13/82

PROBLEM:

The Wordstar 3.1 installation procedure for the Diablo 1640/1650 printers is in error resulting in the following problems:

1. At the completion of a print job, the page is not restored to the correct top of form. This results from a remote reset command being issued by Wordstar which inhibits the final paper positioning operation.

2. Printer speed may be slightly reduced due to unnecessary timing delays. These delays result if the CP/M LST: device I/O drivers are configured since the LF and FF characters are used in special escape sequences unrelated to paper motion.

3. In CP/Net installations, the printer is directly attached to a Requestor board. If the CP/M LST: device is used, it is necessary to perform a LOCAL LST: command on each reset.

SOLUTION:

All of the above problems may be corrected by reinstalling Wordstar and applying a patch as describe below. The new Wordstar will operate the printer correctly and it will not be necessary to specify LOCAL LST: when operating under CP/Net.

Reinstall Wordstar 3.1 using the INSTALL program and using the following options:

1. Select option "B" using WSD.COM or some other appropriate name for the new file and using an existing Wordstar file (or WSU.COM) as the file to modify.

2. Make appropriate selections for the terminal to be used.

3. Select "E" for the printer type -- Diablo 1640/1650.

4. Select "N" for the protocol -- no protocol.

5. Select "S" for the I/O drivers -- user supplied.

6. Exit INSTALL.

To install the patch including the I/O drivers and correction, begin with a disk in the A: drive containing: WSD.COM (or other user selected name for Wordstar), SUBMIT.COM, XSUB.COM, PATCHWS.SUB, AND DDT.COM.

Next, type:

SUBMIT PATCHWS WSD.COM

The file WSD.COM will be modified. WSD.COM can be replaced with a user selected file name.

TECHNICAL BULLETIN NO. 005

SUBJECT: SIERRA DRIVE CONFIGURATION PROGRAMS

DATE: 12/12/82

PURPOSE:

The current Sierra releases of CP/M and MP/M II provide
customized drive configuration where a hard disk is the primary
disk device. These programs produce a set of tables which are
used to customize the CP/M and MP/M II BIOS. The table created
for each defined logical drive is called the Extended Disk
Parameter Block (XDPB).

These same programs may be used to define a "virtual" drive.
This is a logical drive which accesses memory other than bank 0
in the same format as a disk drive. One to three banks of memory
may be configured an a single logical drive.

OPERATION:

CXDPB creates a XDPB table. It is menu driven with the following
functions:

1.	INITIALIZE	Clears all table entries used to define a new file.
2.	READ FILE	Reads a previously created "define" file into memory for display and/or modification.
3.	DISPLAY	Display the XDPB for a selected logical drive.
4.	CREATE XDPB	Create a XDPB for a specified logical disk drive.
5.	CREATE DRIVE TABLE	Define the logical drives to be used by the system.
6.	WRITE FILE	Write the memory tables to a specified disk file.

Functions 4 and 5 are described below in detail -- the others are
self-prompting.

CREATE DRIVE TABLE

Selecting this option results in a prompt which shows the
sixteen possible logical drives (A:-P:). The operator types
the letter below the drives to be assigned to the system
being created. Logical drives M:,N:,O:,P: are reserved for
floppy disk drives but must still be specified in this
table.

As an example, the following shows the input required to
specify the use of logical drives A:,B:,I:, and M:.

A: B: C: D: E: F: G: H: I: J: K: L: M: N: O: P:
A B   I   M

CREATE XDPB

A set of disk parameters are entered in response to a series
of prompt lines. The following defines the various
parameters:

      L   Logical drive (A:,B:,...,P:)

      P   Physical drive (0,1,...). -1 => virtual drive.

      HH   Number of heads used (1,2,...)
              For virtual disk it is the number of banks on the
              board (1,2,3,4).

      SS   Logical sectors / physical block.
              01 for virtual disk.

      BB   Physical blocks / track. 96 for virtual disk.

```
CCS     Starting and ending cylinder numbers for drive.
CCE     000, 003 for virtual disk.

HS      Starting and ending head numbers for drive.
HE      First and last bank numbers for virtual disk.

C       Compute type
            0 = Increment per cylinder on save head.
                (CDC,AMPEX,BASF,virtual disk).
            1 = Increment per head then cylinder.
                (RMS)

AAAA    Allocation size for drive.
            (1024,2048,4096,8192)

DDDD    Number of directory entries.

T       Track offset.
```

DISPLAY XDPB

The parameters displayed by this function include the DPB
described in the CP/M manual plus the following additional
parameters:

```
    SALV        Size of allocation vector in bytes ( <256 )
    NDR         Physical drive #
    NC          Computational type
    SSC         Sector shift constant
    SM          Sector shift mask
    HDO         First head #
    NHD         Number of heads
    CYO         First cylinder #
    S/AL        Sectors/allocation block
```

The program SXDPB updates a specified file with a particular set
of XDPB tables. Among files to be updated are PUT.COM,
RESXIOS.SPR, BNKXIOS.SPR, M.COM. The actual operation of the
program is self-prompting.