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INTRODUCTION

Data Comm Audit (DC/AUDIT) is a utility program written to monitor
RJE, HASP, and NDL line activity. This audit mechanism is a
valuable tool for initial installation of data comm systems and for
detection and monitoring of line-oriented problems.

On the completion of each data comm IO, the handler writes
information regarding the IO into a disk file that can be printed
by DC/AUDIT. The audit option in RJE, HASP, and NDL may be set or
reset dynamically through the console. For the syntax of the audit
option in RJE, HASP, and NDL, refer to the Mark V.0, or higher,
documentation of the respective program(s). This revision of the
B1700 DC/AUDIT product specification supports the Mark VI.0 release
of the program.

The audit file, DC/AUDIT.FILE, is maintained as a circular disk
file. When this file gets filled, the oldest record is overwritten
with the new record. This approach optimizes disk space and at the
same time allows the user to monitor all data comm I/O activity.
Futhermore, if the data comm handler is aborted due to software or
hardware malfunction, a permanent record of the last "n" records is
still available on disk.

The utility program, DC/AUDIT, may be executed concurrently with the
data comm handler and prints records written into the audit file.
The data comm handler and DC/AUDIT maintain synchronization through
a mailbox (record [0] of the audit file). DC/AUDIT accepts several
input parameters. By varying these input parameters, the printed
output may be structured so as to provide the most relevant
information.

This product specification describes DC/AUDIT: its   operating
procedures along with the format of the audit file.

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RELATED PUBLICATIONS

Name	Number
B1700 HASP	P.S. 2212 5256
RJE/TERMINAL (NDL)	P.S. 2212 5249
RJE/TERMINAL (SDL)	P.S. 2212 5231
B1700 RJE/DCH	P.S. 2212 5272
B1700 NDL (BNF)	P.S. 2212 5223
B1700 Software Operational Guide	1068731

DC/AUDIT FILE IMPLEMENTATION

CREATION OF AUDIT FILE

When a data comm handler receives a command to start monitoring data
comm I/O, the audit file is opened in the following manner:

```
. OPEN AUDIT INPUT, OUTPUT, LOCK;
     ON FILE.MISSING <STATEMENT>;
     ON FILE.LOCKED <STATEMENT>;
```

The FILE.LOCKED condition indicates that the file is inaccessible
for output because another data comm handler has opened it with the
LOCK option; under this circumstance the handler will display a
message and ignore the audit command. No two data comm handlers may
write to the same audit file at the same time. This is enforced
through the LOCK option of the OPEN statement.

The FILE MISSING condition indicates that the file is not present.
Each data comm handler is then responsible for the creation of a
new audit file. This is accomplished with the following statements.

```
   OPEN AUDIT INPUT, OUTPUT, NEW;
   WRITE AUDIT [0] (RECORD);
   WRITE AUDIT [LAST] (RECORD); % TO UPDATE EOF.
   CLOSE AUDIT LOCK;
```

The close with LOCK option ensures that the file has been entered in
the system directory and that it is a permanent file. The handler
then does another OPEN with the INPUT, OUTPUT, LOCK options.

If the OPEN is successful (neither on branch is executed), then the
file is locked by the handler. This implies that no other handler
has write access to it. However, DC/AUDIT may still access the
audit file on a read only basis. If two audit sessions are
initiated concurrently, then the two data comm handlers must access

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different audit files; this may be accomplished through file equation.

Record zero of the audit provides the mailbox between the handler and DC/AUDIT. It contains two pointers, START.POINTER and NEXT.AVAILABLE.RECORD. The first points to the oldest record in the file and the second points to the next available location in the audit file. Record zero also contains a count of all valid records (RECORDS.WRITTEN) in the file.

On the first OPEN, the data comm handler initializes NEXT.AVAILABLE.RECORD and START.POINTER to one and RECORDS.WRITTEN to zero. On subsequent opens, record zero is not initialized.

The data comm handlers have options of opening and closing the audit file more than once during a data comm session. In this case the START.POINTER will de updated so that it will still indicate all records relevant to the current user of the file. When the audit file is closed, the fields in record [0] will delimit all records which the current user has placed in the file.

WRITING TO THE AUDIT FILE

When adding records to the audit file, the data comm handler will write the record to the location indicated by NEXT.AVAIL-ABLE.RECORD. After each write, or group of writes, the data comm handler will update record [0] by rewriting it with NEXT.AVAILABLE.RECORD' and RECORDS.WRITTEN updated. If the number of records written has caused the file to cycle (the number of records written is greater than the file size), the oldest record will have been overwritten and the START.POINTER is set equal to NEXT.AVAILABLE.RECORD to indicate that the file has cycled. In a cycled file START.POINTER will be updated each time the NEXT.AVAILABLE.RECORD is updated.

When NEXT.AVAILABLE.RECORD is greater than the size of the file, the data comm handler will detect an end of file condition when attempting to write the next record. The data comm handler will set NEXT.AVAILABLE.RECORD (and START.POINTER if they are equal) to one and write the record again.

AUDIT DISK FILE

FILE DECLARATION

The audit file is declared as follows:

        FILE AUDIT
            (LABEL = "DC"/"AUDIT.FILE",
            DEVICE = DISK, RANDOM,
            RECORDS = 180/1,
            AREAS = 10/100);

With the above declaration, the audit file can hold 1000 records.
After   the 1000th record, the   next   record   overwrites   the   first
record   in the file and the file begins   to   cycle. On   execution,
DC/AUDIT opens the audit file named DC/AUDIT.FILE as an input file.

        OPEN AUDIT INPUT;

        ON.FILE.MISSING <STATEMENT>;

If the file is missing, then it displays an appropriate message and
terminates. The user may direct DC/AUDIT to read a different audit
file through a file equate card. This will be required in the
situation   where two handlers audit to two different files at   the
same time.

RECORD ZERO

The first record of the file, record [0], contains pointers that
describe the state of the file. The format of record [0] is as
follows:

```
01   DISK.HEADER                CHARACTER (180),

     02   NEXT.AVAILABLE.RECORD BIT        (024),
     02   START.POINTER         BIT        (024),
     02   RECORDS.WRITTEN       BIT        (024),
     02   FILLER          CHARACTER        (171);
```

NEXT.AVAILABLE.RECORD points to the next available location in the audit file. RECORDS.WRITTEN contains the total number of valid records in the audit file.

DC/AUDIT formats and prints all records from the START.POINTER to the next pointer. Since the audit file is cyclical, an end of file condition merely causes DC/AUDIT to initialize its record number to one and then to continue printing, up to the next record pointer.

DC/AUDIT may be run concurrently with the data comm handler. If DC/AUDIT catches up with the handler, it waits for "n" seconds. On being awakened, DC/AUDIT, will access record zero to determine if there are any records to be printed. If there are no records, DC/AUDIT will wait once again. This allows the system to gain control when DC/AUDIT has no work. Figure 3.1 illustrates the audit file cycle.

```
        DATA COMM HANDLER writes        DC/AUDIT prints all records
        into this area                  in the shaded area


                 **********                       **********
                 *        *                       *////////* <----|
                 *        *                       *////////* |    |
        NEXT  --->*////////*                      *////////* |    |
                 *////////*                       *////////* V    |
                 *        *              NEXT ---->*        *    /|
                 *        *                        *        *    |
        START --->*--------*             START --->*////////* |    |
                 *        *                        *////////* |    |
                 *        *                        *////////* |--->|
                 **********                        **********


                 **********                       **********
                 *        *                       *        *
                 *        *                       *        *
        START --->*--------*                      *        *
                 *        *             START --->*////////* |
                 *        *                       *////////* |
                 *        *                       *////////* V
        NEXT ---->*////////*            NEXT ---->*        *
                 *////////*                       *        *
                 **********                       **********


                 **********                       **********
                 *        *                       *        * |<---|
                 *        *                       *        * V    |
        START --->*////////*                      *--------*      |
        AND NEXT  *////////*            START --->*        * |    |
        ARE EQUAL,*        *            AND NEXT  *        * |    |
        RECORDS   *        *            ARE EQUAL,*        * |   /|
        WRITTEN   *        *            RECORDS   *        * |    |
        NOT EQUAL *        *            WRITTEN   *        * |    |
        ZERO      *        *            NOT EQUAL *        * |    |
                 **********             ZERO      ********** |--->|
```

Figure 3.1   DC/AUDIT Disk File Management

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IO DESCRIPTOR RECORD (TYPE 1)

The IO descriptor record contains one entire IO descriptor, and if applicable, its buffer. If there is not enough room for the entire buffer, the remaining portion of the buffer will follow in continuation records.

Descriptor and their related buffers are written to the file in order they were executed and written only after they have completed.

The format of the IO descriptor record is as follows:

```
01   IO.DESCRIPTOR.RECORD,

     02 TYPE                          BIT (004), % (VALUE IS 1)
     02 HEADER,
        03   TIME.START              BIT (020),
        03   TIME.FINISH             BIT (020),
        03   PORT                    BIT (003),
        03   CHANNEL                 BIT (004),
        03   ADAPTER                 BIT (004),
        03   FILLER                  BIT (016),
        03   DESCRIPTOR.DATA.ADDRESS BIT (024),
        03   DISPATCH.BIT            BIT (001),

     02   DESCRIPTOR                  BIT (272),
     02   DATA.FIELD,
        03   DATA.LENGTH             BIT (024),
        03   DATA          CHARACTER (131);
```

RESERVED WORD	MEANING
TYPE	marks this record as a IO.DESCRIPTOR. RECORD.

TIME.START   is the time that the descriptor was initiated.

TIME.FINISH   is the time that the descriptor completed.

DESCRIPTOR.DATA.ADDRESS   is the absolute address of the Result Field (RS) of the IO descriptor.

DISPATCH.BIT   If zero, it signifies that the descriptor was dispatched with a DC.INITIATE.IO. If one, it signifies that the descriptor was initiated by resetting the op-complete bit in the RS field.

DESCRIPTOR   is actual IO descriptor.

DATA.LENGTH   is the number of bytes in data.

DATA   is the contents of the buffer. If the buffer length is greater than 131 bytes, it will be continued in a CONTINUATION record that will immediately follow this IO.DESCRIPTOR.RECORD.

CONTINUATION RECORD (TYPE 2)

The continuation record contains the continuation of a buffer that
will not fit in a preceding IO descriptor record or continuation
record. A continuation record must always follow an IO descriptor
record or another continuation record.

The format of the continuation record is as follows:

```
01 CONTINUATION.RECORD,

    02  TYPE                    BIT (004), % VALUE IS 2
    02  FILLER                  BIT (364),
    02  DATA.FIELD,
        03  DATA.LENGTH         BIT (024),
        03  DATA            CHARACTER (131);
```

TYPE   marks this record as a continuation
                                  record.

DATA.LENGTH   is the number of bytes in DATA.

DATA   is   the continuation of the buffer
                                  from the previous IO descriptor.

COMMENT RECORD (TYPE 3)

A comment record is a record written by the data comm handler   to
provide additional information to the user of the audit file.

The format of the record is as follows:

```
    01 COMMENT.RECORD,

        02   TYPE                     BIT (004) % VALUE IS 3
        02   HEADER,
             03   COMMENT.TIME         BIT (020),
             03   FILLER               BIT (072),

        02   FILLER                    BIT (272),
        02   DATA.FIELD,
             03   DATA.LENGTH          BIT (024),
             03   DATA           CHARACTER (131);
```

TYPE   which   has a value of three, marks
                                 this record as a comment record.

DATA.LENGTH   is the number of bytes in DATA.

DATA   is the comment.

Comment records may not have continuation records.

RUN TIME PARAMETERS

Upon execution of DC/AUDIT, the program will look for a disk file
labeled "DC/PARAMETERS" which contains the run time parameters for
DC/AUDIT. DC/AUDIT will read this file and process the parameters.
If an error is found in the file the message: "PARAMETER FILE NOT
VALID" will be displayed and the file ignored, requiring manual
entry of the run time parameters. If an exception condition was
realized when trying to read the file the message: "PARITY ERROR ON
DISK FILE "DC/PARAMETERS"" FILE NOT USED" will be displayed and the
file ignored, requiring manual entry of the run time parameters.

The file labeled "DC/PARAMETERS" on disk can be ignored at execute
time by setting switch 0 to any value other then zero.

            EXAMPLE:= EX DC/AUDIT SW 0 = 1;

The parameter entry, whether from a card reader or console printer,
is free form. Parameters must not have imbedded blanks and
parameters with equal signs must end with a blank.

If the file "DC/PARAMETERS" is not on disk or the file is in error
or DC/AUDIT has been instructed to ignore the file the following
message will be displayed, indicating the manual entry of run time
parameters to DC/AUDIT.

            "DEFAULT PARAMETERS?"

The operator can now enter run time parameters or use default run
time parameters.

The following are acceptable responses to "DEFAULT PARAMETERS?":

    <mix-index>AX   [PARAMETER LIST] is a list of run time
                               parameters.

<mix-index>AXEND   means all run time parameters entries from console printer are complete. This message is only valid after the console printer message "ENTER FURTHER PARAMETERS OR END".

<mix-index>AXR   means read the run time parameters from card file "CARDS" labeled "DC/PARAMETERS".

<mix-index>AXYES   means use all DEFAULT PARAMETERS.

The error message INVALID PARAMETER DETECTED will be displayed if either of the following occurs:

1.   PARAMETERS LIST from the console printer, the card reader or the disk file contained an invalid parameter.

2.   Neither "R", "YES", "END" nor [PARAMETER LIST] was entered.

Following the error message, an additional field indicating the last group of characters scanned by DC/AUDIT is also displayed, to assist a user in correcting the error.

If run time parameter entry is from the console printer, DC/AUDIT will display the following message after validating the previous entries:

          ENTER FURTHER PARAMETERS OR "END".

If run time parameter entry is complete, the operator enters "END". Otherwise, the operator can enter more parameters.

    Note: "R", "YES" and "END" must immediately follow the AX when responding.

NO blanks)!

PARAMETER DEFAULTS AND FORMATS

The following is an alphabetized list of default run time
parameters. Specific run time parameters defaults are overridden by
entry of that parameter in the card file "DC/PARAMETERS" or by
entry of that parameter list on the console printer.

    PARAMETER and DEFAULT   MEANING
    ----------------------   -------

ADDRESS   Print port, channel and adapter that
                                     IO DESCRIPTOR was dispatched.

        DEFAULT: "NO.ADDRESS"

ALL.LINES   Processes records in the audit file
                                     from all data comm lines included in
                                     the file.

        DEFAULT: "ALL.LINES".

.BUFFERS   Output all buffers associated with
                                     IO descriptor and the continuation
                                     records.

        DEFAULT: "BUFFERS".

DEL.LINE=(P:C:A, P:C:A, . . .)
                                     While a valid run time parameter,
                                     this is essentially designed to be
                                     used while DC/AUDIT is executing.
                                     The parameter defines specific lines
                                     which are not to be audited.
                                     DC/AUDIT will delete the entry for
                                     the lines entered from its list of

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lines to be audited.

The format is similar to the "LINE=" parameter below.

DEFAULT   All lines are audited.

DISPATCH.BIT   Indicates whether IO DESCRIPTOR was dispatched by the MCP or by resetting the complete bit of the IO DESCRIPTOR.

DEFAULT: "NO.DISPATCH"

DOUBLE   Double space each output line.

DEFAULT: Single.

ERROR=(1,2,3 OR XXXXXX)

If ERROR=1, then output all operations.

If ERROR=2, then ignore all operations that completed with exceptions

If ERROR=3, then ignore all operations that completed without exception.

If ERROR=XXXXXX, then use XXXXXX, which will be the hex representation of a result descriptor, as a mask to output only the XXXXX result descriptor operations.

DEFAULT: ERROR=1

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HEADER

Print a header at the top of each page.

DEFAULT: Header.

IO.DESC=(1, 2)

If IO.DESC=1, then print the entire IO DESCRIPTOR in hex with each field separated by blanks.

If IO.DESC=2, then print just the Result Field. The result will be interpreted and printed in English.

DEFAULT: IO.DESC=2. All good result descriptors will be printed.

LENGTH=NNNN

NNNN is a decimal number 1 to 4 characters in length, which indicates the maximum number of characters in a buffer to print.

DEFAULT: The entire buffer will be output.

LINE=(P:C:A, P:C:A,..)

This parameter defines specific lines which are to be audited. P:C:A are the port, channel and adapter address of each line. Up to 16 lines may be entered (P, C and A must. be two decimal digits in length and colons are required).

It is not possible to enter all sixteen lines on one parameter record; consequently, additonal parameters are entered through the "LINE=" option. If more than sixteen lines in total are entered into the DC/AUDIT line list, an error condition will occur.

Example: LINE=07:12:00,07:07:00

DEFAULT: All lines are audited.

NO.ADDRESS   Suppresses printing of the address to which an I/O descriptor was dispatched.

DEFAULT: NO.ADDRESS

NO.BUFFERS   Do not print buffers associated with IO DESCRIPTOR.

DEFAULT: Print all buffers.

NO.DISPATCH   Does not print the manner in which a particular I/O descriptor was dispatched.

DEFAULT: NO.DISPATCH

NO.HEADER   Do   not print header at the top   of
                                   each page.

        DEFAULT: Header.

OPS=(1, 2 OR YY)

                                   If OPS=1, then output all operation
                                   codes.

                                   If OPS=2, then output only read and
                                   write operation codes.

                                   If OPS=YY, then use the hex mask
                                   indicated by (YY) to output the
                                   types of operation code that the
                                   user wishes to have monitored.

                                   YY BIT SETTINGS:

                                   7 6 5 4 3 2 1 0
                                   - - - - - - - -
                                   R W B T S R R R
                                   E R R E T E E E
                                   A I E S O S S S
                                   D T A T P E E E
                                     E K   R R R
                                             V V V
                                           . E E E
                                             D D D

                                   Example : If the user wishes to
                                   display read, write and break ops
                                   enter "EO".

        DEFAULT: OPS=1.

OUTPUT=(H OR A)

                                   Output=H   will   cause DC/AUDIT to
                                   display all buffers with an EBCDIC

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representation of the hexadecimal code.

Example: a01ABa will be printed "01AB".

Output=A will cause DC/AUDIT to print all buffers in alpha format. All graphics are printed, all special characters are printed by their name and all other characters are printed in EBCDIC representation of their hex code. _

Example: a01C1C2C33503a will be printed <SOH>ABC[35]<ETX>.

DEFAULT: OUTPUT=A.

SINGLE   Single space each output line.

DEFAULT: Single.

T.IME=(HH:MM OR HH:MM,HH:MM)

Time gives a start for the audit run. Any record entered with a time less than specified here will be ignored.

HH:MM represents hours and minutes in military representation.

A second time is a stop time. File will be audited from first HH:MM to second HH:MM.

DEFAULT: All the records from the last session are printed.

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DEFAULT PARAMETERS

The following is the list of run time parameters that will be
specified if the response to USE DEFAULTS? is "YES".

           ALL.LINES
           BUFFERS
           ERROR=1
           HEADER
           IO.DESC=2
           NO.ADDRESS
           NO.DISPATCH
           OPS=1
           OUTPUT=A
           SINGLE

There will be no indication of how IO was dispatched or port,
channel and adapter that IO was dispatched to. All lines and
buffers will be output.

PARAMETER LIST ENTRY

If the operator desires to override one or more of the default run
time parameters, he enters "R" or [PARAMETER LIST] in response to
"DEFAULT PARAMETERS?".

If the entry is through a [PARAMETER LIST] on the console printer,
the operator can enter up to 72 characters containing one or more
parameters to override the DEFAULT PARAMETERS. A parameter entry
must be contained wholly in the console printer response.
Additional entries can be entered after DC/AUDIT displays;

           ENTER FURTHER PARAMETERS OR "END"

If entry is through a card reader or a disk file, each card can
contain one or more parameters, but each parameter entry must be
contained wholly on one card or one record.

The parameter entry, whether from a card reader or console printer
is free form. Parameters must not have imbedded blanks and
parameters with equal signs must end with a blank.

If an error is detected (invalid keyword or value) the parameter
scan is ended and the following error message is displayed:

                    INVALID PARAMETER DETECTED

The operator must re-submit the entire list of parameters again.

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OPERATING INSTRUCTIONS

Upon execution of DC/AUDIT, the following message will be displayed
after the regular system messages.

DEFAULT PARAMETERS?

Run time parameters are entered at this time. After verifying the
parameters, DC/AUDIT will access the audit file. If the audit file
is not present, DC/AUDIT will display:

FILE DC/AUDIT.FILE NOT PRESENT

and go to end of job.

If the file is present DC/AUDIT will read record zero and start to
output the audit file per the run time parameters.

If running in the offline mode, DC/AUDIT will itself go to end of
job when it has processed the entire file (as defined by record
zero). When running in the online mode and no new entries have been
made to the audit file for a period of one minute, DC/AUDIT will
interrogate the file; and if no other program is using the file (an
indication that the generating program has gone to EOJ), DC/AUDIT
will itself go to EOJ.

The operator can stop DC/AUDIT or interrogate DC/AUDIT with the
following commands:

    <mix-index>AXWY   causes DC/AUDIT to display a summary
                                    accounting of records read and
                                    written. DC/AUDIT continues to output
                                    the audit file.

<mix-index>AXTO   causes DC/AUDIT to display all the
                                parameters and their settings under
                                which DC/AUDIT is running.

<mix-index>AXST   causes DC/AUDIT to print a summary
                                accounting of records read and
                                written. DC/AUDIT then goes to end of
                                job.

<mx>AX<PARAMETER LIST>   causes DC/AUDIT to change its run time
                                parameters while processing the audit
                                file. The format of the parameters are
                                the same as-the parameters entered at
                                the beginning of job, with the
                                exception that the TIME parameter will
                                not be accepted. If the new parameters
                                entered are different enough from
                                those previously entered, DC/AUDIT
                                will skip to the top of a new page and
                                print a new page header, if the HEADER
                                parameter is set. The LINES= parameter
                                when entered will add additional lines
                                to the list of those checked by
                                DC/AUDIT. In order to delete lines
                                from this list, the ALL.LINES
                                parameter must be first entered and
                                then the new line list with the LINE=
                                parameter.

FILES

INPUT

        RUN TIME PARAMETER FILE

        CARDS LABELED "DC"/"PARAMETERS"
        RECORD SIZE = 80
        BLOCKING 1 RECORD PER BLOCK
        DEVICE IS CARD

        AUDIT FILE

        AUDIT LABELED "DC/AUDIT.FILE"
        RECORD SIZE = 180
        AREAS = 10
        BLOCKS PER AREA = 100
        DEVICE IS RANDOM DISK

OUTPUT

        PRINT FILE

        OUT LABELED "DC/PRINT.FILE"
        RECORD SIZE = 132
        BLOCKING 1 RECORD PER BLOCK
        DEVICE IS PRINTER OR BACKUP DISK

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CONSOLE PRINTER MESSAGES

Console printer messages output by DC/AUDIT are as follows in
alphabetical order:

MESSAGE and RESPONSE   MEANING

DEFAULT PARAMETERS?   Enter run time parameters.

    RESPONSE: Variable. See RUN TIME PARAMETERS.

"DC/AUDIT.FILE" NOT PRESENT   DC/AUDIT could not locate the audit
                                   file. DC/AUDIT will now go to end of
                                   job.

    RESPONSE: None.

INVALID MESSAGE TYPE   Neither WY, ST, nor a valid
                                   paremater was entered after DC/AUDIT
                                   processing had started.   The
                                   additional   characters   printed
                                   following this message are the last
                                   charactes scanned by the program
                                   before the error was encountered.

    RESPONSE: Enter WY, ST, or a valid parameter.

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INVALID PARAMETER DETECTED   Error was detected while analyzing
                                    run time parameters. The additional
                                    chatacters printed following this
                                    message are the last characters
                                    scanned by the program before the
                                    error was encountered.

            RESPONSE: Correct and re-enter parameters.

INVALID RECORD TYPE RECEIVED   A record was read from DC/AUDIT.FILE
                                    with a TYPE value not equal to 1, 2,
                                    or 3 DC/AUDIT will dump itself,
                                    print a summary report and go to end
                                    of job.

            RESPONSE: None

NO RECORDS PRESENT IN FILE   Audit file was empty. DC/AUDIT will
                                    now go to end of job.

            RESPONSE: None.

PARAMETER FILE ON DISK
NOT VALID   The disk file "DC/PARAMETERS" was in
                                    error. Run time parameters will be
                                    entered from card or the console
                                    printer. The additional characters
                                    printed following this message are
                                    the last characters scanned by
                                    DC/AUDIT before the error was
                                    encountered.

            RESPONSE: Enter correct parameters from card
                                    or console printer, or correct disk
                                    file and re-execute DC/AUDIT.

PARITY ERROR ON DISK FILE

"DC/PARAMETERS" FILE NOT USED   DC/AUDIT obtained an error trying to read the disk file containing the run time parameters. The run time parameters will have to be entered from card or console printer. The additional characters printed following this message are the last characters scanned by DC/AUDIT before the error was encountered.

RESPONSE: Enter correct parameters from card or console printer, or correct the disk file and re-execute DC/AUDIT.

UNEXPECTED "EOF" FOUND
ON AUDIT FILE   EOF was returned on read of first record in audit file. A summary report is printed and DC/AUDIT will go to end of job.

RESPONSE: None.

TYPE2 RECORD OUT OF SEQUENCE   A TYPE 2 record does not follow a TYPE 1 record or another TYPE 2 record. A summary report is printed and DC/AUDIT will go to end of job.

RESPONSE: None.

OUTPUT FORMATS

There are four basic output formats with some additional fields printed depending on run time parameters selected. The four basic formats are:

A. Format 1

Result descriptor is interpreted and output in English. Data written or read from operation is printed.

B. Format 2

Result descriptor is interpreted and output in English. Data written or read from operation is not printed.

C. Format 3

All fields of the IO DESCRIPTOR are output in hexadecimal representation. Data written or read from operation is printed.

D. Format 4

All fields of the IO DESCRIPTOR are output in hexadecimal representation. Data written or read from operation is not printed.

With every output format, when an I/O descriptor record is being printed, columns 12 thru 18 of the printed listing will be used to indicate the type of I/O descriptor. There are four basic types namely, "READ", "WRITE", "STOP" and "TEST". A number of variants are possible. For a read I/O descriptor either "RD.NTIM" (Read No Time Out), "RD.APOL" (Read Autopoll), "RD.NEOT" (Read No EOT), or "READ" may be printed depending on the options set in the I/O descriptor. For a write I/O descriptor, either "WR.APOL" (Write Autopoll), "WR.NEOT" (Write No EOT) or "WRITE" may be printed. A stop I/O descriptor will have either "DISCONN" (Disconnect), "BREAK" or "STOP" printed. A test I/O descriptor will have "TESTRNG" (Test and Wait for a Ringing Phone). "TESTDSR" (Test and Wait for "DATA SET READY"), or TEST.

In case of a READ or WRITE I/O descriptor, if more then one variant
had been set, only one will be indicated on the listing. The
priorities of read and write variants are listed below.

```
        READ                    WRITE
        RD.APOL                 WR.NEOT
        RD.NEOT                 WRITE
        READ
```

If a simple "TEST" I/O descriptor is processed, an additional field
will be printed on the listing namely "ADAPTER.ID = XX" indicating
the type of adapter the descriptor was issued against.

    OUTPUT FORMAT 1

Output format 1 is generated when the run time parameter default of
IO.DESC=2   is specified and NO.BUFFERS has not been specified. If
the header parameter is specified each page will have the following
header format:

```
        ***** B 1700 DC/AUDIT <DATE TIME> *****
TIME    OP          BUFFER                      RESULTS
```

Records from the audit file will be output in the format described
by Figure 8.1.

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```
NN:NN:NN   AAAAAAA   DATA     NN:NN:NN   BBBBB     LENGTH=NNNN   CCCCC
--------   -------   ----     --------   -----     -----------   -----
   *          *        *         *         *       Length of data   *
   *        Op TYPE    *      If ADDRESS   *       read or written.  *
   *                   *      parameter,   *                         *
   *                   *      this will be *                         *
                       *      Port, Channel *                        *
For read op,           *      and Adapter  *                English inter-
time op com-           *      that IO des- *                pretation of
pleted. All            *      criptor was  *                abnormal com-
other ops,             *      issued to.   *                pletions. Nor-
time ops were          *                   *                mal completion
dispatched.            *                   *                will be blank.
                       *                   *
           Data written or read. If        *
           OUTPUT=A, data will consist      *
           of graphics, special line        *
           control characters with          *
           their names enclosed in          *
           < >, and non-graphics with     ******
           each four bits in hexa-           *
           decimal representation        This field will appear
           enclosed in [ ]. Charac-      if DISPATCHED.BIT para-
           ters "[" and "]" will         meter was specified.  If
           be treated as non-            IO was initialized by
           graphics.  EXAMPLE            resetting the IO complete
           <STX> [EC] ABC12 <ETX>        bit, "RESET" will be
                                         printed.  If IO was
           If OUTPUT=H each four         initialized by a dispatch
           bits of data will be         communicate to the MCP,
           in hexadecimal repre-        "DISPATCHED" will be
           sentation.                   printed.

           EXAMPLE

           01EEC1C2C3F1F203
```

Figure 8.1 Audit File: Output Format

OUTPUT FORMAT 2

OUTPUT FORMAT 2 generated when default run time parameter IO.DESC=2
is specified and NO.BUFFERS is specified. If the header parameter
is specified each page will have the following header format:

```
     ***** B 1700 DC/AUDIT <DATE AND TIME> *****
TIME                OP                          RESULTS
```

Records from the audit file will be output in the format described
by Figure 8.2.

```
NN:NN:NN   AAAAAAA      NN:NN:NN    BBBBB     LENGTH=NNNN    CCCCC
--------   -----        --------    -----     -----------    -----
   *          *             *         *      Length of data    *
   *       Op TYPE      If ADDRESS    *      read or written.  *
   *·                  parameter,     *                        *
   *                   this will be   *                        *
                       Port, Channel  *                        *
For read op,           and Adapter    *      English inter-
time op com-           that IO des-   *      pretation of
pleted. All            criptor was    *      abnormal com-
other ops,             issued to.     *      pletions. Nor-
time ops were                         *·     mal completion
dispatched.                           *      will be blank.
                                      *
                                      *
                       This field will appear
                       if DISPATCH.BIT parameter
                       was specified.  If IO was
                       initiated by resetting the
                       IO complete bit "RESET" will
                       be printed.  If IO was
                       initiated by a dispatch
                       comunicate to the MCP,
                       "DISPATCH" will be
                       printed.
```

Figure 8.2 Audit File: Output Format 2

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OUTPUT FORMAT 3

OUTPUT FORMAT 3 generated when run time parameter IO.DESC=1 is
specified and NO.BUFFERS is specified. If the header parameter is
specified each page will have the following header format:

         ***** B 1700 DC/AUDIT <DATE TIME> *****
TIME   OP   BUFFER   DESCRIPTOR

Records from the audit file will be output in the format described
by Figure 8.3.

```
NN:NN:NN   AAAAA     DATA .    AE=xxxxxx RS=xxxxxx LK=xxxxxx OP=xxxxxx
--------   -----     ----      SA=xxxxxx EA=xxxxxx MS=xxxxxx xxxxxx
   *         *        *        xxxxxx xxxxxx xxxxxx x x x  LENGTH=nnnn
   *      Op TYPE     *        ----------------------------------------
   *                  *                              *
   *         Data written or read. .    . Hexadecimal repre-
   *         See Figure 8.1 for           sentation of IO
   *         format of data.              descriptor.
   *
For read op,                            AE = Actual Ending Address
time op com-                            RS = Result Descriptor
pleted.  For                           LK = Link Address
all other ops,                         OP = Operation
time op was                            SA = Start Address
dispatched.                            EA = End Address
                                       MS = MCP Work Area

                    If ADDRESS parameter and/or DISPATCH.BIT
                    parameter is specified, the Port, Chan-
                    nel and Adapter and RESET or DISPATCHED
                    will precede LENGTH=nnnn.     -

                    LENGTH= is length of data read or writ-
                    ten.
```

Figure 8.3   Audit File: Output Format 3

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OUTPUT FORMAT 4

OUTPUT FORMAT 4 is generated when run time parameters IO.DESC=1 and
NO.BUFFERS are specified. If the HEADER parameter is specified each
page will have the following header format:

        ***** B 1700 DC/AUDIT <DATE TIME> *****
TIME   OP   DESCRIPTOR

Records from the audit file will be output in the format described
in Figure 8.4.

```
NN:NN:NN  AAAAAAA  PP:CC:AA   BBBBB   LENGTH=NNNN   AE=xxxxxx  RS=xxxxxx
--------  -------  --------   -----   -----------   LK=xxxxxx  OP=xxxxxx
    *        *        *         *    .Length of     SA=xxxxxx  EA=xxxxxx
    *    Op TYPE      *         *     data read     MS=
    *                *         *     or written.   --------------------
    *                *         *                            *
For read op,         *         *                           *
time op com-         *         *                    Hexadecimal value
pleted. For          *         *                    of the IO descrip-
all other            *         *                    tor.
ops, time op         *         *
was dispatched.      *         *              AE = Actual Ending Address
                     *         *              RS = Result Descriptor
                     *         *              LK = Link Address
       If ADDRESS parameter *                 OP = Operation
       was defined, this     *                SA = Start Address
       will be Port, Chan-   *                EA = End Address
       nel and Adapter       *                MS = MCP Work Area
       that IO was issued·    *
       to.                    *
                             *
                             *
       This field will appear
       if DISPATCH.BIT para-
       meter was specified.
       If IO was initiated
       by resetting the IO
       complete bit "RESET"
       .will be printed.  If
       IO was initiated by a
       dispatch communicate
       to the MCP, "DISPATCHED"
       will be printed.
```

Figure 8.4   Audit File: Output Format 4

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