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COMPUTER SYSTEMS GROUP  
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P.S. 2219 0185

B1000 CANDE/ANALYZER

**PRODUCT SPECIFICATION**

REV LTR	REVISION ISSUE DATE	APPROVED BY	REVISIONS
C	3/9/82	HS	<p>Changes for the Mark 11.0 Release.</p> <p>Changed "CANDE/WORK.FILE" to "CANDE/WORK-FILE" throughout document.</p> <p>1-1 Changed "B1700" to "B1000" in first paragraph.</p>

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2219 0185

B1800/B1700 CANDE/ANALYZER

**PRODUCT SPECIFICATION**

REV LTR	REVISION ISSUE DATE	APPROVED BY	REVISIONS
A	11/23/76	<i>J. Hale</i>	Original Issue - Release level MARK 6.1
B	5/16/78	<i>J. Hale</i>	Changes for the MARK VIII.0 Release Throughout Delete all references to CANDE/TANK.FILE 1-2 Add paragraph on running ANALYZER without a CANDE/AUDIT file. 3-1 Add PROGRAM.SWITCH(1) 3-1 to 3-3 Change default PROGRAM.SWITCHES meanings 3-3 Add PROGRAM.SWITCH(9) 3-4 Add CONSOLE.SWITCH(1)

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GENERAL MANAGER  
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## GENERAL

### INTRODUCTION

CANDE/ANALYZER is a companion program to B1000 CANDE and is intended primarily to aid in debugging CANDE. In an interactive real-time program such as CANDE, bugs can exist which become evident only upon entering some unusual sequence of commands or which involve a particular interaction between two or more users. When such bugs occur, it is typically difficult or impossible for users to know precisely what they did that caused the CANDE failure. CANDE/ANALYZER should help resolve this problem.

Two principles guide the analysis process:

Since bugs are the exception rather than the rule, the performance of CANDE should not be noticeably affected by the added function of maintaining a trace file.

When an analysis is required, information should be provided which is as complete and readable as possible. It is not possible to know in advance what information will be useful in tracking down bugs.

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### ANALYZER/AUDIT FILE INTERFACE

At BOJ, CANDE creates a trace file called CANDE/AUDIT and writes information about each USER/CANDE transaction into that file. CANDE/AUDIT is laid out to minimize the time required to create the trace and is not easily read by the user. CANDE/ANALYZER, then, assumes the burden of reading the audit file and of breaking it down into a format easily read by the user.

The analyzer generates two general types of information:

1. An analysis of the information included in CANDE/WORK-FILE and CANDE/RECOVERY.
2. A trace of all messages sent to and received by CANDE, excluding messages transmitted or received during any time that CANDE was instructed to stop auditing messages.

CANDE/ANALYZER will run even when the second type of information (message trace) was not maintained by CANDE or is unavailable. However, if the CANDE/AUDIT file is present, it is also printed.

### RELATED DOCUMENTATION

Name (Rev) -----	Number -----
CANDE	P.S. 2212 5561
DC/AUDIT	P.S. 2212 5421
B1700 Software Operational Guide	1068731

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### STRUCTURE OF AUDIT FILE

The audit file, called CANDE/AUDIT, is created at BOJ if CANDE finds that there are at least 720 bytes of dynamic CANDE memory available, i.e., enough for all of the audit buffers. All messages which go through the file MCSQUEUE are written to the audit file, a circular buffer of 999 records, each with 360 bytes. The first record in the file is called the Audit Parameter Block (APB) and is initialized by CANDE at BOJ to contain information about CANDE itself: compile date and time, job number, etc. The remaining 999 records constitute the circular buffer in which CANDE packs as many as fifteen messages per record. The first four bytes of each record describe the contents of that record.

### AUDIT RECORD

The audit record is described as follows:

The first four bytes of each disk record are declared as:

```

01  AUDIT.FIRST.FOUR.BYTES  BIT(32),
02  AUDIT.BUFF.COUNT        BIT(15),
02  AUDIT.BUFF.OFFSET       BIT(9),
02  AUDIT.BUFF.MESSAGES     BIT(8);

```

AUDIT.BUFF.COUNT is bumped by CANDE each time it writes a new disk record, thus providing a way for the analyzer to determine which record was the last one written. Note that this field must be able to hold a number larger than the number of records in the disk file in order to guarantee that the counter cannot wrap around more than once in one pass through the file.

AUDIT.BUFF.OFFSET is the byte address, relative to the first byte of the current record, where the first complete message begins in this record. This information is used by the analyzer, when it finds the head of the queue, to determine where in the record to begin its analysis.

AUDIT.BUFF.MESSAGES indicates the number of messages which actually BEGIN in the current record and is used by the analyzer to search "backwards" through the file in order to print the last <n> messages specified by the user. For example, the user might request that only the last 100 messages be printed. The analyzer

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can quickly determine how many records must be examined in order to analyze only the last 100 messages.

Each message is structured as follows:

```

01  AUDIT.MESSAGE
    02  AUDIT.TYPE          BIT(8),
    02  TIME.STAMP         BIT(20),
    02  FILLER             BIT(4),
    02  AUDIT.HEADER      BIT(126),
    02  FILLER             BIT(2),
    02  TEXT.LENGTH       FIXED,
    02  AUDIT.TEXT        CHAR(TEXT.LENGTH);
  
```

AUDIT.TYPE indicates the type of this message. For example, a request for permission to open a file, text sent from a user, or text sent from CANDE to a user.

TIME.STAMP is the variable SYSTEM.TIME in CANDE and is the value obtained from the SDL construct TIME(COUNTER,BIT).

AUDIT.HEADER is the NDL MESSAGE.HEADER from the current message being sent to or coming from a user. Note that this field is the bit representation of the header, not the character version. This field is always included in each message, although it would be possible to have some AUDIT.TYPE fields which did not include it. The analyzer could be modified to handle this.

TEXT.SIZE is the number of characters which follow in this message and may be zero. Note that it is entirely possible for this number to be smaller than the MESSAGE.SIZE field in the MESSAGE.HEADER because messages in the audit file will have trailing blanks crunched off. In addition, some audit messages (e.g., PAGE mode messages) only include the sequence fields, not all of the user's text.

AUDIT.TEXT is the actual text being sent to or coming from the user.

FILLER items are used to pad entries to byte boundaries and to force each record to be an integer number of bytes in length.

Note: 6.1 CANDE will delete trailing blanks on all outputs to TD800/802, TD820/822, TD830/832, and TD700 terminals.

## OPTIONAL FEATURES

Optional features associated with the CANDE/ANALYZER program are set through PROGRAM.SWITCH options. Default (zero) settings mean that the program analyzes the USER.RESIDENT areas for logged on LSNs only, prints the entire trace audit, and does not ZIP execute CANDE after analyzing CANDE's work and recovery files. It will not remove the audit file after analyzing it. The default program switch settings of zero provide as much useful information as possible.

## PROGRAM SWITCH SETTINGS

Program switches are defined as follows:

### PROGRAM.SWITCH(0)

- Zero - Print only those LSNs which have the LOGGED.ON bit in the USER.RESIDENT.AREA true.
- Non-zero - Print all LSNs.

### PROGRAM.SWITCH(1)

- Zero - Analyze the CANDE files CANDE/WORK-FILE and CANDE/RECOVERY even though the CANDE/AUDIT file is not present.
- Non-zero - Do not attempt the analysis of any CANDE files if the CANDE/AUDIT file is not present.

### PROGRAM.SWITCH(2)

- Zero - Print trace audit.
- Non-zero - Do not print trace audit.

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PROGRAM.SWITCH(3)

- Zero - Print analysis of the USER.RESIDENT areas for the various LSNs.
- Non-zero - Do not print USER.RESIDENT areas.

PROGRAM.SWITCH(4)

- Zero - When printing the USER.RESIDENT areas, include printing of the workfile contents for each user.
- Non-zero - When printing the USER.RESIDENT areas, do not print the contents of the workfile.

PROGRAM.SWITCH(5)

- Zero - Print the entire trace.
- One - Print only the final 500 entries of trace.
- 2-15 - Print only the final 100 entries of trace.

PROGRAM.SWITCH(6)

- Zero - Do not ZIP execute CANDE after using CANDE's work and recovery files.
- Non-zero - ZIP execute CANDE after using CANDE'S work and recovery files.

PROGRAM.SWITCH(7)

- Zero - Do not remove the audit file after analyzing it.
- Non-zero - Remove the audit file after analyzing it if there are no other users of it.

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### PROGRAM\_SWITCH(8)

- Zero - Print information in CANDE/WORK-FILE, and CANDE/RECOVERY even when these files are already in use. This means that the information printed may be of questionable integrity since CANDE may be changing it interspersed with the analyzer's accessing it.
- Non-zero - Do not print information in CANDE/WORK-FILE or CANDE/RECOVERY when these files are in use (or missing, obviously).

### PROGRAM\_SWITCH(9)

- Zero - Print the entire fine table for each user's workfile. (The rough table for each user's workfile is always printed.)
- Non-zero - Do not print each user's fine table for the corresponding workfile.

### CONSOLE SWITCH SETTINGS

CANDE/ANALYZER also contains run-time options, through console switch settings. Note: in order to use console switch options, the option must be set through the "SE" SPO command (See MCP CONTROL SYNTAX, P.S. 2219 0144 for a discussion of SE).

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CONSOLE\_SWITCH(0)

- Zero - Print each user's workfile in its entirety.
- Non-zero - Stop printing the current workfile. This option is included to bypass the printing of a particular user's workfile (even after the printing has begun) when that workfile is lengthy and is no longer of interest for analysis. The user (operator) should reset the switch after the printing of the current workfile stops so that the next user's workfile is printed normally. Leaving the switch set will inhibit the printing of the contents of all remaining workfiles.

CONSOLE\_SWITCH(1)

- Zero - Print each user's fine table in its entirety.
- Non-zero - Stop printing the current fine table. (See additional comments under CONSOLE\_SWITCH(0), above.)

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