

Burroughs

**DC 140/L 8000/TC 1700/TC 3500
SYSTEM SOFTWARE**

VOLUME 2

CASSETTE ROUTINES

OPERATION GUIDE

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CASSETTE ROUTINES

OPERATION GUIDE



Burroughs Corporation

Detroit, Michigan 48232

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AA466588 AA592768**

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INTRODUCTION

This manual is volume 2 of a multi-volume library which replaces the L 8000/TC 1700/TC 3500 System Software Operation Guide, form number 1068178. This manual deals specifically with magnetic tape cassette routines, when the cassette is used alone or with other peripherals.

SECTION 1

CASSETTE LOAD AND DUMP ROUTINES

UTILITY ROUTINE ID. NO. 2-2180-001.

TAPE CASSETTE LOADER FROM UNIT NO. 1 (SL3/SL5).

Peripherals required: One A 9490 Cassette Tape Station (unit number 1 only).

Firmware required: 2-2170-005-25 cassette firmware.

This utility is compatible with the SL3/SL5 Basic Interpreter revision level 2-2100-001-23 or greater.

GENERAL DESCRIPTION.

The Tape Cassette Loader utility routine permits the loading of an object-user program tape cassette to memory from cassette unit no. 1. The tape cassette must have a file identification and this file-ID must be indexed into the type IV mini-computer before the program completes its execution.

This utility routine is loaded using normal memory load procedures (PKA2 from ready mode).

This utility is compatible with cassette tapes that have been created by the utility routine 2-2180-002-03 (Tape Cassette Dump).

The utility executes in either SL3 or SL5.

This routine permits the object program to be loaded in 256-character records at approximately 700 characters per second; whereas, the regular memory load routine loads the program at the rate of 15-1/2 characters per second.

This utility routine resides in the non-accessible utility area. No other utility routines may be resident in this area simultaneously.

OPERATING INSTRUCTIONS. The following is a list of operating instructions for the Tape Cassette Loader utility.

- a. The utility program is loaded using the normal memory load procedures (PKA2 from the ready mode).
- b. Place the cassette cartridge in unit 1. From the ready mode, press PKA3 (utility key).
- c. The utility program displays FID. Index the 5-character file identification and terminate with any OCK. The utility program searches the files on the cassette cartridge for the correct file identification until one of these conditions occurs:
 - 1) The file-ID is found and the file is loaded to memory. FL is displayed. The system returns to the ready mode.

- 2) If the file-ID is not found, NF prints on the console and the system returns to the ready mode.

Error Conditions.

All error conditions cause the system to return to the ready mode and the routine must be executed again. OA is displayed on the console if the operator alert error condition is encountered. The operator must check to see that the routine has not been attempting to load a blank cassette, that the cassette has not been inserted backwards, or that a tape jam has occurred. All other error conditions are designated by their "D" indicator light pattern.

- | | |
|---------------|---|
| a. Not ready. | "D" indicator light pattern
10110000 |
|---------------|---|

Check to see that the cassette gate is closed. Press OCK1 to return to the ready mode.

- | | |
|----------------|----------|
| b. Read error. | 10111000 |
|----------------|----------|

This is a fatal error caused by a faulty cassette. This error should not affect the loading of other programs (segments) on the cassette. The utility may be attempted again, however, the use of a back-up cassette is suggested. Press OCK1 to return to the ready mode.

- | | |
|--------------------------|----------|
| c. Unintentional rewind. | 00110100 |
|--------------------------|----------|

The cassette hardware initiated a rewind of the cassette. This is caused by the cassette gate being opened and closed when the ready light, labeled R, on the cassette unit is lit. Press OCK1 to return to the ready mode.

UTILITY ROUTINE ID. NO. 2-2180-033.

DC 140 CASSETTE LOAD (SL5).

Peripherals required: One A 9490 Cassette Unit.

Firmware required:

- a. Data Handling I 2-2170-010-25 or greater.
- b. Cassette Firmware 2-2170-005-24 or greater.
- c. System Register utility 1-2101-050.

This utility routine is also compatible with the DC 140 Basic Interpreter, revision level 2-2100-003-25.

GENERAL DESCRIPTION.

This DC 140 utility routine allows files for the DC 140 to be loaded from tape cassette unit number 1.

This utility routine resides in the non-accessible utility area. No other utility routine may be resident in this area simultaneously.

OPERATING INSTRUCTIONS. The following is a list of operating instructions for the DC 140 Cassette Load (SL5) utility.

- a. Load SL5 System Register Utility 1-2101-050 using normal memory load procedures (PKA2 from the ready mode).
- b. Load this utility using normal memory load procedures (PKA2 from the ready mode).
- c. Place cassette in tape cassette unit number 1.
- d. From the ready mode press PKA3 (utility key) to initiate a cassette rewind if needed.
- e. After the rewinding of the cassette is complete, numeric values are given to the PK keys:

 PKA2 = 5
 PKA3 = 1
 PKA1 = acts as delimiter
- f. Pressing of the PK keys allows the file position on the cassette to be accessed. If the 12th file on the cassette is to be loaded, press PKA2, PKA2, PKA3, PKA3, PKA1. PK2 and PK3 may be pressed in any order. Only the file position on the cassette may be accessed, not the file-ID.
- g. Pressing the RESET key begins execution of this utility.
- h. After the file is successfully loaded, the system returns to the ready mode and the cassette is rewound.

Error Conditions.

The following is a list of error conditions which may occur during operation of the DC 140 Cassette Load utility.

- a. If the delimiter is issued before the initial cassette rewind is completed or the tape cassette unit is not ready, the program halts upon completion of the cassette rewind.
- b. Use of the delimiter prior to a PK entry is invalid and results in an error condition. No "D" indicator light pattern would be indicated. Read errors cause the "D" indicator lights to indicate an error and the program halts. To correct this error condition, the tape cassette must be manually rewound to the clear leader.

NOTE

This utility does not provide for a cassette automatic rewind. Hence any error whose recovery procedure requires a rewind of the cassette, must be corrected by a manual rewind by the operator.

UTILITY ROUTINE ID. NO. 2-2180-002.

TAPE CASSETTE DUMP (SL3/SL5).

Peripheral required: One A 9490 Cassette Tape Station.

Firmware required:

- a. Cassette Interpreter Add-On Module 2-2170-005.
- b. Data Handling Add-On Module 2-2170-010.

This utility routine is compatible with the Basic SL3/SL5 Interpreter, revision level 2-2100-001-23 or greater.

GENERAL DESCRIPTION.

The Tape Cassette Dump utility routine permits the writing of the system registers and of selected words of memory to a cassette tape unit. Rewinding of cassette tapes is optional but all tapes should be rewound before dumping the first file. Each word address is written to the cassette for each memory word selected.

This routine is loaded using normal memory load procedures (PKA2 from the ready mode).

The cassette tapes created by this routine may be loaded in type IV equipment by utilizing the utility routine 2-2180-001 (Tape Cassette Load).

This utility routine resides in the non-accessible utility area. No other utility routine may be resident in this area simultaneously.

OPERATING INSTRUCTIONS. The following is a list of operating instructions for the Tape Cassette Dump (SL3/SL5) utility.

- a. From the ready mode, load the Tape Cassette Dump utility routine using normal memory load procedures.
- b. Load a cassette cartridge in cassette unit number 1. Be sure the file-protect tabs are in the write-enabled state (when cassette unit gate is shut the WS light should be lit).
- c. Press PKA3 (utility key). The program halts on an alpha keyboard instruction after displaying FID.
- d. Index 5-character file-ID. The same 5-character file-ID must be indexed before the file may be loaded with the Tape Cassette Memory Loader 2-2180-001. Terminate the file-ID with:

OCK1 or OCK2 - For all additional files on new or existing cassette.

OCK3 - To add the first file on existing cassette.

OCK4 - Before first file on new cassette.

- e. OCK3 permits the addition of a new program or segment to a previously written cassette. The new file is written after the last file on the cassette. The tape cassette should only be rewound (OCK4) before dumping the first file to a new cassette.
- f. The program displays SR and halts on a numeric keyboard instruction. The systems registers are stored on the cassette if OCK4 is selected. Any other OCK selection does not cause the systems registers to be dumped to the cassette.
- g. The program displays FW and halts on a numeric keyboard instruction. Index a starting word number and terminate with any OCK.
- h. The program displays the entry and then displays TW and halts on a numeric keyboard instruction. Index the ending word number and terminate with:

OCK1 - Dumps memory and returns control to step f. Allows for adding more records to the file.

OCK2 - Dumps memory, writes a tape mark and returns to step c. If more than one file is to be dumped on a tape, this option should be used between files.

OCK3,4 - Dumps memory, writes two tape marks, rewinds the cassette unit, and returns to the ready mode. This option should be used when dumping the last file to the tape cassette.

NOTE

When storing records and files from memory to a tape cassette, one tape mark must be written between files and two tape marks must be written after the last file.

Error Conditions.

The following is a list of error conditions which may occur during operation of the Tape Cassette Dump (SL3/SL5) utility.

If any error condition occurs, the program prints the flags that are set and returns to the ready mode. Refer to the list below for a definition of the error.

Flag	Error
1	Read error
2	Write error
3	End-of-Tape
12	Accidental rewind

Flag

Error

13	Read error and EOT
14	Operator alert
23	Write error and EOT
24	Not ready
34	File protect or EOT and tape mark
124	Write error fatal

SECTION 2
CASSETTE INPUT ROUTINES

UTILITY ROUTINE ID. NO. 1-2101-005.

CASSETTE DUPLICATE (ASCII DATA).

Peripherals required:

- a. Two A 9490 Cassette Tape Stations.
- b. Auxiliary Printer (optional).

Firmware required: This utility is compatible with the following at the level given or greater.

2-2100-003-25	Basic Interpreter (electronic keyboard)
2-2100-001-25	Basic Interpreter (mechanical keyboard)
2-2180-019-24	Basic System Register Generator
2-2180-029-27	Memory Allocator
2-2170-010-25	Data Handling I
2-2170-005-24	Cassette Add-On Module

GENERAL DESCRIPTION.

This utility routine reads a cassette on unit number 1 and copies all the files or a selected file to a cassette on unit number 2 with the following print options:

- a. Prints to console - single space.
- b. Prints to auxiliary printer - single space.
- c. No print.

The paper may be 66 or 51 lines. The input cassette must be placed on unit number 1 with the output cassette on unit number 2. Multiple files may be copied or only one file may be selected. Data records may be up to 256 characters. Data records must be a fixed length.

The data records may be printed as they are copied, on either the console or optional auxiliary printer.

This utility resides solely in data program (user) memory. No other utility may be resident in this area simultaneously.

OPERATING INSTRUCTIONS. The following is a list of operating instructions for the Cassette Duplicate (ASCII data) utility.

- a. This utility is loaded using the normal memory load procedures (PKA2 from the ready mode).
- b. The following heading is displayed on the console:

CASSETTE TO CASSETTE AND/OR CONSOLE/AUXILIARY PRINTER

- c. Select one of the following options:

- 1) PK1 for cassette to cassette and print.
- 2) PK2 for cassette to cassette and auxiliary print.
- 3) PK3 for cassette to cassette with no print.

If PK1 or PK2 has been selected, choose one of the following:

- 1) OCK1 FOR 66 LINE PAPER.
- 2) OCK2 FOR 51 LINE PAPER.

- d. Select OCK1 to process all files.
- e. Select OCK1 for labeled tape or OCK2 for unlabeled tape.

If only one file is desired and the tape is unlabeled, enter the file number to be written.

If only one file is desired and the tape is labeled, enter file-ID.

- f. Two consecutive tape marks or one tape mark and a physical End-of-Tape indicator signifies the End-of-Data.

Error Conditions.

The following is a list of error conditions which may occur during the operation of the Cassette Duplicate (ASCII data) utility.

"D" indicator light pattern

- a. Tape cassette not ready. 10110000
 - 1) Ready the cassette.
 - 2) Press OCK1 to retry the utility.
- b. Cassette write error. 10111100
 - 1) This error occurs when the possible maximum inter-record gap has been exceeded. The last record is not written. Two tape marks are attempted.
 - 2) Press OCK1 to write two tape marks and terminate the utility.
- c. End-of-Tape during write error. 00111100
 - 1) This error occurs when the possible maximum inter-record gap has been exceeded. The last record is not written. Two tape marks are attempted.
 - 2) Press OCK1 to write two tape marks and terminate the utility.

- d. Cassette irrecoverable write error. 11111111
- 1) This error has been caused by a hardware failure. The last record may be irrecoverable. Two tape marks are attempted.
 - 2) Press OCK1 to write two tape marks and terminate the utility.
- e. Cassette read error. 10111000
- 1) Press OCK1 to attempt to read the record again (at this point the system has attempted to read the record six times via the system register setting).
 - 2) Press OCK2 to return to the ready mode.
 - 3) Press OCK3 to skip to the next record and continue the execution.
- f. Accidental rewind.
- 1) This is a fatal error and is caused by the cassette gate being closed during execution of the utility.
 - 2) Press OCK1 to return to the ready mode and restart the utility.
- g. Operator alert. 00110000
- 1) This is a fatal error and calls for operator intervention with the cassette tape unit.
 - 2) The cassette ready light, labeled R, is flashing.
 - 3) Check for a tape jam, a blank tape, or a cassette in backwards. Press OCK1 to return to the ready mode.
- h. File protected. 10110100
- 1) This condition occurs when the cassette cartridge is write inhibited. In this mode the write enable plugs (tabs) do not cover the write enable holes.
 - 2) Open the cassette door and position the tabs covering the write enable holes.
 - 3) Press OCK1 to continue the utility.
- i. Auxiliary printer not ready. 11100000
- 1) Check the paper supply and the power ON button. Press the PRINT key.

2) Press OCK1 to continue the utility.

UTILITY ROUTINE ID. NO. 1-2101-012.

CASSETTE DUPLICATE (OBJECT).

Peripherals required:

- a. Two A 9490 Cassette Tape Stations.
- b. A 9249 Auxiliary Printer (optional).

Firmware required:

- a. Interpreter Add-On Module for Tape Cassette 2-2170-005.
- b. Interpreter Add-On Module for Data Handling 2-2170-010.
- c. Add-On Module for Auxiliary Printer 2-2170-006 (optional).

The SL5 System Register Tape 1-2101-050 must be loaded prior to loading this utility.

This utility is compatible with the Basic Interpreter, revision level 2-2100-001-03.

GENERAL DESCRIPTION.

This utility searches cassette unit number 1 for a SL3/SL5 object cassette file by using the 5-character file-ID. When the file-ID is found, the cassette file associated with it is written to cassette unit number 2. This utility may be used to create library tapes containing SL5 object programs or to add files to existing tapes.

This utility resides solely in data program (user) memory. No other utility may be resident in this area simultaneously.

The system registers must be reloaded after the execution of this program to meet the particular requirements of each system.

OPERATING INSTRUCTIONS. The following is a list of operating instructions for the Cassette Duplicate (Object) utility.

- a. This utility is loaded using the normal memory load procedures (PKA1 from the ready mode) or a memory load utility.
- b. Load the input cassette cartridge on unit number 1 and the cassette cartridge upon which the cassette file(s) is to be written on unit number 2. Press PKA1.
- c. The following heading and print options are displayed on the console:

CASSETTE DUPLICATE PRINT

OCK1 NO PRINT
OCK2 66 LINE PER PAGE
OCK3 51 LINES PER PAGE
OCK4 AUX PRINTER

Press the OCK that corresponds to the print option desired.

d. Select the PK which corresponds to the desired option.

- 1) PK1 for cassette duplicate.
- 2) PK2 to add a file.
- 3) PK3 for tape control (active when required).
- 4) PK4 to print file-ID's.

If PK1 has been selected, the following is printed on the console:

PROGRAM-ID=

Index the 5-character file-ID of the SL5 object program to be copied. If the file-ID is not found the following message prints on the console:

FILE ID NOT FOUND

At this point the utility terminates.

If the file-ID is located and the file is successfully copied, the following message is printed:

FILE ID COPIED

At this point the utility returns to step d.

A tape mark should be written between each file and a double tape mark should be written after the last file.

e. If PK2 has been selected the utility searches the cassette cartridge loaded in unit number 2 for the double tape mark after the last file. If this is found, the following message is printed on the console:

DOUBLE TAPE MARK FOUND

At this point the utility returns to step d.

To add a file after the last file on the cassette, select PK1.

f. If PK4 has been selected, the file-ID's are displayed and the system returns to step d. If PK3 has been selected, the following message is printed:

TAPE CONTROL

OCK1 WRITE TM AND REWIND UNIT #2
OCK2 WRITE TM UNIT #2
OCK3 REWIND UNIT #2
OCK4 REWIND UNIT #1

Press the tape control option desired. The system executes the option and returns to step d.

- g. The utility does not write the final double tape mark or perform rewinds on unit number 1 or unit number 2 after the normal execution. This must be done by the operator through selection of PK3 (at step d) and the appropriate OCK selection. One additional tape mark should be written after the last file (OCK1). A single tape mark is automatically provided between files by the utility. Both unit number 1 and unit number 2 should be rewound before the termination of the utility. The utility returns to step d after the execution of each tape control command. Press the READY button to terminate the utility.

Error Conditions.

The following is a list of error conditions which may occur during the operation of the Cassette Duplicate (Object) utility.

- a. Read error.

- 1) The following message is printed on the console:

JOB ABORTED

This error occurs while the cassette is searching for a double tape mark.

The tapes are rewound and the utility returns to the ready mode.

- 2) At this point select one of the following options:

- a) OCK1 to retry the utility.
- b) OCK2 to terminate the utility.

The utility attempts to read a record three times. If it should fail on the third attempt, the operator is given the option to attempt to read again (OCK1) or return to the ready mode (OCK2).

- b. Write error.

- 1) The following message is printed on the console:

DOUBLE TAPE MARK ATTEMPTED

- 2) At this point unit number 2 is backspaced to the last complete file and two consecutive tape marks are written.

- 3) Both units are rewound and the utility returns to the ready mode.

c. Cassette not ready.

1) Check the following items:

- a) Cassette unit gate open.
- b) Power ON button.

2) Correct the problem and retry the utility.

d. Nonprogrammatic rewind.

1) This error has been caused by cassette unit number 1 or 2 being rewound due to the cassette gate being opened or closed during operation.

2) Correct the problem and retry the utility.

e. File protect.

1) This error has been caused by the write enable plugs (tabs) on unit number 2 inhibiting the file from being copied.

2) Correct the problem by removing the cassette cartridge placing tape over the write enable holes.

f. Operator alert.

1) Check the following conditions:

- a) Possible tape jam.
- b) A blank tape.
- c) A cassette in backwards.

2) The ready, labeled R, is flashing on the unit that contains the problem.

3) Operator intervention is required to correct the problem.

UTILITY ROUTINE ID. NO. 1-2101-007.

CASSETTE TO AUXILIARY PRINTER (SL5 DATA).

Peripherals required:

- a. A 9490 Cassette Tape Station.
- b. A 9249 Auxiliary Printer.

Firmware required: This utility is compatible with the following at the level given or greater.

2-2100-003-25	Basic Interpreter (electronic keyboard)
2-2100-001-25	Basic Interpreter (mechanical keyboard)
2-2180-019-24	Basic System Register Generator
2-2180-029-27	Memory Allocator
2-2170-010-25	Data Handling I
2-2170-005-24	Cassette Add-On Module
2-2170-006-24	Auxiliary Printer Add-On Module

The SL5 System Register Tape 1-2101-050 must be loaded prior to loading this utility.

GENERAL DESCRIPTION.

This utility reads a cassette on unit number 1 and prints all of the files to the printer. The paper on the printer is assumed to be 66 lines. The data records may be up to 256-characters. Double tape marks on the cassette signifies the End-of-Data. Data records must be of fixed length.

OPERATING INSTRUCTIONS. The following is a list of operating instructions for the Cassette to Auxiliary Printer (SL5 Data) utility.

- a. This utility is loaded using the noraml memory load procedures (PKA2 from the ready mode) or by using a memory load routine.
- b. Press PK1 to begin execution of this utility.
- c. Select one of the following options.
 - 1) PK1 for 96-column card format.
 - 2) PK2 for other.
- d. Select the PK which corresponds to the desired option.
 - 1) PK1 for a labeled cassette.
 - 2) PK3 for an unlabeled cassette.
- e. Records are printed with 80-characters to the line. If the size of the record is greater than 160, every third line has up to 96-characters. If the input is in 96-column card format, blocked 1 or 2, 96-characters per line are printed.

- f. Two consecutive tape marks or one tape mark and physical End-of-Tape indicator signifies the End-of-Data.

Error Conditions.

The following is a list of error conditions which may occur during the operation of the Cassette to Auxiliary Printer (SL5 data) utility.

"D" indicator light pattern

- a. Tape cassette not ready. 10110000
- 1) Ready the unit.
 - 2) Press OCK1 to retry the utility.
- b. Cassette write error. 10111100
- 1) This error occurs when the possible maximum inter-record gap has been exceeded. The last record is not written. Two tape marks are attempted.
 - 2) Press OCK1 to write two tape marks and terminate the utility.
- c. END-of-Tape during write error. 00111100
- Refer to cassette write error, step b.
- d. Cassette irrecoverable write error. 11111111
- 1) This error has been caused by a hardware failure. The last record may be irrecoverable. Two tape marks are attempted.
 - 2) Press OCK1 to write two tape marks and terminate the routine.
- e. Cassette read error. 10111000
- 1) Press OCK1 to attempt to read the record again (at this point the system has attempted to reread the record six times via the system register).
 - 2) Press OCK2 to return to the ready mode.
 - 3) Press OCK3 to skip to the next record and continue the execution.
- f. Accidental rewind.
- 1) This is a fatal error and has been caused by the cassette gate being closed during execution of the utility.
 - 2) Press OCK1 to return to the ready mode and restart the utility.

- g. Operator alert. 00110000
- 1) This is a fatal error and calls for operator intervention with the cassette tape unit.
 - 2) The cassette ready light, labeled R, is flashing.
 - 3) Check for a tape jam, a blank tape, or a cassette in backwards. Press OCK1 to return to the ready mode.
- h. File protected. 10100100
- 1) This condition occurs when the cassette cartridge is write inhibited. In this mode the write enable plugs (tabs) do not cover the write enable holes.
 - 2) Open the cassette door and position the tabs covering the write enable holes.
 - 3) Press OCK1 to continue the utility.
- i. Auxiliary printer not ready. 11100000
- 1) ready the unit.
 - 2) Press OCK1 to retry the utility.

UTILITY ROUTINE ID. NO. 1-2101-008.

CASSETTE TO CONSOLE/AUXILIARY PRINTER (ASCII DATA).

Peripherals required:

- a. A 9490 Cassette Tape Station.
- b. A 9249 Auxiliary Printer.

Firmware required: This utility is compatible with the following at the level given or greater.

2-2100-003-25	Basic Interpreter (electronic keyboard)
2-2100-001-25	Basic Interpreter (mechanical keyboard)
2-2180-019-24	Basic System Register Generator
2-2180-029-27	Memory Allocator
2-2170-010-25	Data Handling I

GENERAL DESCRIPTION.

This utility reads a cassette on unit number 1 and prints all of the files or a selected file to the console or auxiliary printer. Paper may be 66 or 51 lines in length. Data records may be up to 256 characters. Double tape marks on the cassette signify the End-of-Data. Data records must be fixed length. On a labeled tape, if the six character file-ID entered is not found, the utility is terminated. For labeled files, the message REC CT ERR is printed when the number of records entered on create date does not match the number found on the present run. This is also true for a block count error.

The records on the cassette must be valid fixed length data records and the cassette must have a valid End-of-Data mark (a double tape mark or the End-of-Tape and a single tape mark).

This utility resides solely in the data program (user) memory. No other utility may be resident in this area simultaneously.

OPERATING INSTRUCTIONS. The following is a list of operating instructions which may occur during the operation of the Cassette to Console/Auxiliary Printer (ASCII data) utility.

- a. This utility is loaded using the normal memory load procedures. Adjust the console paper to line 1. Press start (PK1) to begin execution of this utility.

- b. The following heading is displayed on the console.

CASSETTE TO CONSOLE OR AUXILIARY PRINTER

- c. Select one of the following options.

- 1) OCK1 for 66 line paper
- 2) OCK2 for 51 line paper

- d. Select one of the following options.

- 1) OCK1 for 96-column card format.
 - 2) OCK2 for other.
- e. Select one of the following PK's.
- 1) PK1 for cassette to console print.
 - 2) PK2 for cassette to auxiliary printer.
- f. Select one of the following.
- 1) OCK1 to process all files.
 - 2) OCK2 to process only one.
- g. Select one of the following.
- 1) OCK1 for labeled tape.
 - 2) OCK2 for unlabeled tape.
- h. If an unlabeled tape is desired and OCK2 is pressed to process only one file, enter the file number to be printed (1 for the first, 2 for the second, etc).
- i. If a labeled tape is desired, and OCK2 is pressed to process only one file, enter the six character file-ID.
- j. Records are printed with 80-characters to the line. If the size of the record is greater than 160, every third line has up to 96-characters. If input is 96-column card format, blocked 1 or 2, 96-characters per line are printed.
- Two consecutive tape marks or one tape mark and physical End-of-Tape indicator signifies End-of-Data.

Error Conditions.

The following is a list of error conditions which may occur during the operation of the Cassette to Console/Auxiliary Printer (ASCII data) utility.

- | | "D" indicator light pattern |
|--|-----------------------------|
| a. Tape cassette not ready. | 10110000 |
| 1) Ready the cassette. | |
| 2) Press OCK1 to retry the utility. | |
| b. Cassette write error. | 10111100 |
| 1) This error occurs when the possible maximum inter-record gap has been exceeded. The last record is not written. Two tape marks are attempted. | |
| 2) Press OCK1 to write two tape marks and terminate the utility. | |

- c. End-of-Tape during write error. 00111100
Refer to write error, step b.
- d. Cassette irrecoverable write error. 11111111
 - 1) This error has been caused by a hardware failure. The record may be irrecoverable. Two tape marks are attempted.
 - 2) Press OCK1 to write two tape marks and terminate the utility.
- e. Cassette read error. 10111000
 - 1) Press OCK1 to attempt to read the record again (at this point the system has attempted to reread the record six times via the system setting).
 - 2) Press OCK2 to return to the ready mode.
 - 3) Press OCK3 to skip to the next record and continue the execution.
- f. Accidental rewind.
 - 1) This is a fatal error and is caused by the cassette gate being closed during execution of the utility.
 - 2) Press OCK1 to return to the ready mode and restart the utility.
- g. Operator alert. 00110000
 - 1) This is a fatal error and calls for operator intervention with the cassette tape unit.
 - 2) The cassette ready light, labeled R, is flashing.
 - 3) Check for a tape jam, a blank tape, or a cassette in backwards. Press OCK1 to return to the ready mode.
- h. Auxiliary printer not ready. 11100000
 - 1) Check the paper supply. Press the PRINT key. Check the power ON switch.
 - 2) Press OCK1 to continue the execution.
- i. File protected. 10110100
 - 1) This condition occurs when the cassette cartridge is write inhibited.

- 2) Open the cassette door and position the tabs covering the write enable holes.
- 3) Press DCK1 to continue the utility.

UTILITY ROUTINE ID. NO. 1-2101-041.

CASSETTE TO PAPER TAPE (OBJECT).

Peripherals required:

- a. A 9490 Cassette Unit.
- b. A 9222 Paper Tape Punch.

Firmware required: This utility is compatible with the following at the level given or greater.

2-2100-003-25	Basic Interpreter (electronic keyboard)
2-2100-001-25	Basic Interpreter (mechanical keyboard)
2-2180-019-24	Basic System Register Generator
2-2180-029-27	Memory Allocator
2-2170-010-25	Data Handling I
2-2170-005-24	Cassette Firmware
2-2170-004-24	Paper Tape Output Firmware

GENERAL DESCRIPTION.

This utility searches by file-ID for a cassette file in the SL5 tape cassette memory dump/load format and writes it to paper tape in the SL5 paper tape format.

This utility resides solely in data program (user) memory. No other utility may be resident in this area simultaneously.

OPERATING INSTRUCTIONS. The following is a list of operating instructions for the Cassette to Paper Tape (Object) utility.

- a. This utility is loaded using the normal memory load procedures. Press PK1 (start) to begin the execution of this utility.
- b. The following heading is displayed on the console.

CASSETTE TO PAPER TAPE SL5

- c. Select one of the following options.
 - 1) DCK1 for no print.
 - 2) DCK2 for 66 lines per page.
 - 3) DCK3 for 51 lines per page.
 - 4) DCK4 for auxiliary printer.
- d. Select one of the following options.
 - 1) DCK1 for cassette unit number 1.
 - 2) DCK2 for cassette unit number 2.
- e. Choose the PK which corresponds to the desired option.
 - 1) PK1 for cassette to paper tape.
 - 2) PK2 to print file identification numbers.

If PK1 has been selected, the following message is printed:

PROGRAM ID=

Enter a 5-character file identification number. The following message is then printed on the console.

SEGMENT NO=

At this point select the PK which corresponds to the desired option.

- 1) PK3 if the desired file is unsegmented.
- 2) PK4 if all of the segments are desired.

Type in the segment number and terminate with any OCK if only a single segment is desired.

- f. If PK2 is selected, only the file identification numbers are printed. The program terminates at two consecutive tape marks or one tape mark and the physical End-of-Tape.

Error_Conditions.

The following is a list of error conditions which may occur during the operation of the Cassette to Paper Tape (object) utility.

	"D" indicator light pattern
a. Tape cassette not ready.	10110000
1) The cassette unit gate may be open.	
2) Press OCK1 to retry the utility.	
b. Cassette read error.	10111000
1) If this error occurs, press OCK1 to retry the utility.	
2) Press OCK2 to return the unit to the ready mode.	
3) Press OCK3 to skip to the next record.	
c. Paper tape punch condition.	10011000
1) Press the ON switch.	
2) Press OCK1 to continue the utility.	
d. Paper tape supply low.	10011100
1) Load paper tape into paper tape punch.	
2) Press OCK1 to continue the utility.	
e. Auxiliary printer not ready.	11100000
1) Press the PRINT button on the auxiliary printer.	

- 2) Check the power switch at rear of the printer.
- 3) Press OCK1 to continue the utility.

UTILITY ROUTINE ID. NO. 1-2101-020.

CASSETTE TO PAPER TAPE (ASCII DATA).

Peripherals required:

- a. A 9222 Paper Tape Punch.
- b. A 9490 Cassette Unit.
- c. A 9249 Auxiliary Printer (optional).

Firmware required:

- a. Interpreter Add-On Module for Cassette 2-2170-005.
- b. Add-On Module for Punched Paper Tape Output 2-2170-004.
- c. Add-On Module for Data Handling I 2-2170-010.

The Auxiliary Printer Add-On Module 2-2170-006 must also be resident if that option is used.

The SL5 System Register Tape 1-2101-050 must be loaded prior to loading the above program.

This utility is compatible with the Basic Interpreter, revision level 2-2100-001-22.

GENERAL DESCRIPTION.

This utility reads data records from cassette unit number 1 and punches a paper tape. The data records on the cassette must be of fixed length (maximum of 256-characters). If the records are in 80-column card format and blocked (2 or 3 per cassette record) they may be unblocked during execution of the utility. The data records may be printed on the console or auxiliary printer.

Multiple files on the cassette may be processed with 12 inches of sprocket holes punched between each file. A delimiter of 00 is punched between each record.

This utility resides solely in data program (user) memory. No other utility may be resident in this area simultaneously.

The system registers must be reloaded after the execution of this program to meet the particular requirements of each system.

OPERATING INSTRUCTIONS. The following is a list of operating instructions for the Cassette to Paper Tape (ASCII data).

- a. This utility is loaded using the normal memory load procedures. Load the input cassette in unit number 1. Adjust the console/auxiliary printer paper to line number 1.
- b. Press PKA1 (program start key). The following heading is displayed on the console.

CASSETTE TO PAPER TAPE AND/OR CONSOLE

OR AUXILIARY PRINTER

- c. The next OCK selection is used to determine if the data records are to be unblocked.

OCK1 FOR 80 CC FMT INPUT, ELSE OCK2, 3, OR 4

If OCK1 has been selected, the following instruction is printed.

OCK1 IF INPUT BLOCKED 1
OCK2 IF INPUT BLOCKED 2
OCK3 IF INPUT BLOCKED 3

Press the OCK corresponding to the blocking factor of the data records on cassette.

- d. Select the PK corresponding to the print option desired.

PK1 FOR CASSETTE TO PAPER TAPE AND CONSOLE PRINT
PK2 FOR CASSETTE TO PAPER TAPE AND AUXILIARY PRINT
PK3 FOR CASSETTE TO PAPER TAPE AND NO PRINT

If PK1 or PK2 has been selected, the following message is printed on the console.

OCK1 FOR 66 LINE PAPER
OCK2 FOR 51 LINE PAPER

- e. This OCK selection is used to determine if all the files on the input tape are to be punched on paper tape.

OCK1 TO PUNCH ALL FILES
OCK2 TO PUNCH ONLY ONE FILE
IF OCK2, ENTER FILE NUMBER TO BE PUNCHED

The numeric keyboard is enabled if OCK2 is pressed. Index 1 for the first data file, 2 for the second, etc. After punching the data file selected, the utility returns to the ready mode.

- f. The utility executes until the End-of-Data is reached. This is a double tape mark or one tape mark and physical End-of-Tape indicator. If an error condition occurs, execution of the utility is halted until the error condition is corrected.

Error Conditions.

The following is a list of error conditions which may occur during the operation of the Cassette to Paper Tape (ASCII data) utility.

"D" indicator light pattern

- a. Tape cassette not ready. 10110000

1) This error occurs when the cassette unit gate is opened.

- 2) Press OCK1 to retry the utility.
- b. Cassette read error. 10111000
- 1) Press OCK1 to retry the utility.
 - 2) Press OCK2 to return the unit to the ready mode.
 - 3) Press OCK3 to skip to the next record.
- c. Unintentional rewind. 00110100
- 1) This is a fatal error. The cassette has been rewound, usually caused by the gate being opened and closed during execution.
 - 2) Press OCK1 to return the unit to the ready mode.
- d. Operator alert. 00110000
- 1) This is a fatal error. It is usually caused by the cassette cartridge being inserted backwards. It may also be caused by a tape jam or a blank tape.
 - 2) Press OCK1 to return the unit to the ready mode.
- e. Paper tape punch condition. 10011000
- 1) Press the ON switch.
 - 2) Press OCK1 to continue the utility.
- f. Paper tape supply low. 10011100
- 1) Load additional paper tape into the paper tape punch.
 - 2) Press OCK1 to continue the utility.
- g. Auxiliary printer not ready. 11100000
- 1) Press the PRINT button on the auxiliary printer. Check the power ON switch at the rear of the printer.
 - 2) Press OCK1 to continue the utility.

UTILITY ROUTINE ID. NO. 1-2101-039.

CASSETTE TO 96-COLUMN CARD (SL5 OBJECT).

Peripherals required:

- a. A 9490 Cassette Unit.
- b. A 9419-X 96-Column Card Unit.

Firmware required:

- a. Interpreter Add-On Module for Cassette 2-2170-005.
- b. Interpreter Add-On Module for 96-Column Card 2-2170-009.
- c. Interpreter Add-On Module for Data Handling 2-2170-010.

The Auxiliary Printer Add-On Module 2-2170-006 must be loaded if that option is used.

The SL5 System Register Tape 1-2101-050 must be loaded prior to loading this utility.

This utility is compatible with the SL3/SL5 Basic Interpreter, revision level 2-2100-001-22 or greater.

GENERAL DESCRIPTION.

This utility reads a cassette object file written in SL5 object format and punches the file on 96-column cards (Refer to appendix E, volume 1). This utility handles multiple file cassette tapes as well as segmented object programs.

This program resides solely in data program (user) memory. No other utility may be resident in this area simultaneously.

The system registers must be reloaded after the execution of this utility to meet the particular requirements of each system.

OPERATING INSTRUCTIONS. The following is a list of operating instructions for the Cassette to 96-Column Card (SL5 object) utility.

- a. This utility is loaded using the normal memory load procedures or a memory load routine.
- b. Place the cassette cartridge containing the object file(s) in cassette unit number 1 or unit number 2. Place an ample supply of blank 96-column cards in the secondary hopper. Press PKA1 (program start key) to begin execution.
- c. The following heading and print options are displayed.

CASSETTE TO 96CC (SL5 OBJECT)

OCK1 FOR NO PRINT
OCK2 FOR 66 LINES PER PAGE FORM

OCK3 FOR 51 LINES PER PAGE FORM
OCK4 FOR AUX PRINTER

- d. Press the OCK corresponding to the desired print option.
- e. The next OCK selection provides the option to specify from which cassette the data is read.

OCK1 FOR CASSETTE UNIT 1 AS INPUT
OCK2 FOR CASSETTE UNIT 2 AS INPUT

- f. The next selection describes the program mode.

PK1 FOR CASSETTE TO 96 CC
PK2 TO PRINT FILE ID'S ONLY

- g. If PK1 has been selected, the following must be answered.

PROGRAM ID =

The alphanumeric keyboard is enabled. Index the five character file-ID used to locate the object program on cassette.

MESSAGE SEGMENT NO =

PK3, PK4, and the numeric keyboard are enabled after the above question is displayed. If the object program is in segmented form, index the segment number to be converted and terminate with any OCK. If the file is not segmented, press PKA3. If all segments are desired, press PKA4.

Error Conditions.

The following is a list of error conditions which may occur during operation of the Cassette to 96-Column Card (SL5 object) utility.

"D" indicator light pattern

- a. Tape cassette not ready. 10110000
 - 1) If this error occurs, check the power supply to the cassette and close the unit gate.
 - 2) Press OCK1 to continue the utility.
- b. Cassette read error. 10111000
 - 1) If this error occurs, press OCK1 to attempt to read the record again (at this point the system has attempted to reread the record six times via the system register setting).
 - 2) Press OCK2 to return the unit to the ready mode.

- c. Accidental rewind. 00110100
- 1) This is a fatal error and is caused by the cassette gate being closed during execution of the utility.
 - 2) Press OCK1 to return the unit to the ready mode and restart the utility.
- d. Operator alert. 00110000
- 1) This is a fatal error and calls for operator intervention with the cassette tape unit. The cassette ready light, labeled R, is flashing.
 - 2) Check for a tape jam, a blank tape, or a cassette in backwards.
 - 3) Press OCK1 to return the unit to the ready mode and restart the utility.
- e. Auxiliary printer not ready. 11100000
- 1) Check the power ON switch and the paper supply.
 - 2) Press the PRINT key.
 - 3) Press OCK1 to continue the utility.
- f. 96-Column card unit not ready. 11010000
- 1) Check the power supply, the power ON switch, and the ON-LINE switch.
 - 2) Press the STOP/RESET button and the START button.
 - 3) Press OCK1 to retry the utility.
- g. 96-Column card hopper empty. 11010110
- 1) Resupply the secondary hopper (#2) with blank 96-column cards. Press the RESET and START button. Press OCK 1 to retry.
- h. 96-Column card write error. 11010010
- 1) Press the RESET and START buttons.
 - 2) Press OCK1. The routine repunches the card with the error and continues. All cards with errors are ejected to the error stacker.

UTILITY ROUTINE ID. NO. 1-2101-037.

CASSETTE TO 96-COLUMN CARD (DATA) (OPTIONAL CONSOLE/AUXILIARY PRINTER).

Peripherals required:

The following is a list of 96-Column Card Readers either of which may be used with this utility.

- a. A 9419-2 96-Column Card Reader.
- b. A 9419-6 96-Column card Reader.

The following peripherals are also required for this utility.

- a. A 9490 Cassette Unit.
- b. A 9249 Auxiliary Printer (optional).

Firmware required: This utility is compatible with the following at the level given or greater.

2-2100-003-25	Basic Interpreter (electronic keyboard)
2-2100-001-25	Basic Interpreter (mechanical keyboard)
2-2180-019-24	Basic System Register Generator
2-2180-029-27	Memory Allocator
2-2170-010-25	Data Handling I
2-2170-005-24	Cassette Firmware Add-On Module
2-2170-009-23	96-Column Card Firmware Add-On Module

The SL5 System Register Tape 1-2101-050 must be loaded prior to loading this utility.

GENERAL DESCRIPTION.

This utility converts cassette input data records to 96-column card output. Optional console/auxiliary printer output is available.

This utility reads cassette and punches 96-column cards. The cassette records must be either 80- or 96-column card format. If it is 80-column card format, it may be blocked 1, 2, or 3. If it is 96-column card format, it may be blocked 1 or 2. Cassette data may be printed on a console or auxiliary printer. Data records must be of fixed length and the cassette must be placed in unit number 1. Multiple files on the cassette may be processed or only one may be chosen. The paper may be either 66 or 51 lines.

This program resides solely in data program (user) memory. No other utility may be resident in this area simultaneously.

OPERATING INSTRUCTIONS. The following is a list of operating instructions for the Cassette to 96-Column Card (Data) (Optional Console/Auxiliary Printer).

- a. This utility is loaded using the normal memory load procedures. Adjust the console paper to line 1. Press start (PK1) to begin execution.

b. The following heading is displayed on the console:

CASSETTE TO 96 COL. CARD AND/OR CONSOLE PRINT OR AUXILIARY
PRINT

c. Select one of the following:

- 1) OCK1 for 96 Column Card format
- 2) OCK2 for other

d. Select one of the following PK's corresponding to the desired option.

- 1) PK1 for cassette to 96-column card and console print.
- 2) PK2 for cassette to 96 column card and auxiliary print.
- 3) PK3 for cassette to 96 column card with no print.

e. If PK1 or PK2 was selected, choose one of the following:

- 1) OCK1 for 66 line paper.
- 2) OCK2 for 51 line paper.

f. Select one of the following:

- 1) OCK1 to process all files.
- 2) OCK2 to process only one.

g. Immediately following, select one of the following:

- 1) OCK1 for labeled tape.
- 2) OCK2 for unlabeled.

h. If only one file is desired and the tape is unlabeled, enter the file number to be written (1 for first, 2 for second, etc.). If only one file is desired, and the tape is labeled, enter the file-ID.

i. Two consecutive tape marks or one tape mark and a physical End-of-Tape indicator signifies the End-of-Data.

Error Conditions.

The following is a list of error conditions which may occur during the operation of the Cassette to 96-Column Card (Data) (Optional Console/auxiliary printer) utility.

"D" indicator light pattern

- | | |
|--|----------|
| a. Tape cassette not ready. | 10110000 |
| 1) If this error occurs, ready cassette. | |
| 2) Press OCK1 to retry the utility. | |
| b. Cassette write error. | 10111100 |

- 1) This error occurs when the possible maximum inter-record gap has been exceeded. The last record is not written. Two tape marks are attempted.
 - 2) Press OCK1 to write two tape marks and terminate the utility.
- c. End-of-Tape during write error. 00111100
- Refer to cassette write error, step b.
- d. Cassette irrecoverable write error. 11111111
- 1) This error has been caused by a hardware failure. The last record may be irrecoverable. Two tape marks are attempted.
 - 2) Press OCK1 to write two tape marks and terminate the utility.
- e. Cassette read error. 10111000
- 1) Press OCK1 to attempt to read the record again (at this point the system has attempted to reread the record six times via the system register setting).
 - 2) Press OCK2 to return the unit to the ready mode.
 - 3) Press OCK3 to skip to the next record and continue the execution.
- d. Accidental rewind.
- 1) This is a fatal error and is caused by the cassette gate being closed during execution of the utility.
 - 2) Press OCK1 to return the unit to the ready mode and restart the utility.
- g. Operator alert.
- 1) This is a fatal error and calls for operator intervention with the cassette tape unit.
 - 2) The cassette ready light, labeled R, is flashing.
 - 3) Check for a tape jam, a blank tape, or a cassette in backwards. Press OCK1 to return to the ready mode.

- h. File protected. 10110100
- 1) This condition occurs when the cassette cartridge is write inhibited. In this mode the write enable plugs (tabs) do not cover the write enable holes.
 - 2) Open the cassette door and position the tabs covering the write enable holes.
 - 3) Press DCK1 to continue the utility.
- i. Card 96 not ready. Unit No. 1 11010000
Unit No. 2 11010001
- 1) Turn the ON/OFF switch to the ON position. Set the DN/OFF line switch to the OFF position and then ON again.
 - 2) Press DCK1 to retry the utility. Press the HALT and CLEAR button to return the system to the ready mode.
- j. Card 96 hopper empty. Unit No. 1 11010110
Unit No. 2 11010111
- 1) If more cards are required, refill the primary hopper.
 - 2) Press the STOP/RESET button on the A 9418 console.
 - 3) Press the START button on the A 9418. this allows the feeding of the cards in the primary hopper to continue.
- k. Card 96 read error. Unit No. 1 11010100
Unit No. 2 11010101
- 1) The card in the visible station is the card that has caused the read error.
 - 2) Press DCK1 to move the card to stacker number 1.
 - 3) Press the STOP/RESET button on the A 9418 console.
 - 4) Replace the card containing the read error into the primary hopper.
 - 5) Press the START button on the A 9418 console to allow the feeding of cards in the primary hopper to continue.
- l. Card 96 write error. Unit No. 1 11010012
Unit No. 2 11010011
- 1) The card containing the error is in stacker number 2.
 - 2) Press the STOP/RESET button on the A 9418 console.
 - 3) Press the START button on the A 9418 console.

4) Press OCK1 to retry the utility. Press the HALT and CLEAR button to return the system to the Ready mode.

m. Card 96 hopper empty.

11010110

- 1) Reload the hopper. Press the START button on the punch.
- 2) Press OCK1 to retry the utility.

n. Auxiliary printer not ready.

11100000

- 1) Ready the unit.
- 2) Press OCK1 to continue the utility.

UTILITY ROUTINE ID. NO. 1-2101-016.

CASSETTE TO 80-COLUMN CARD (DATA) (OPTIONAL CONSOLE/AUXILIARY PRINTER).

Peripherals required:

- a. A 9490 Cassette Unit.
- b. A 149 80-Column Card Punch.
- c. A 9249 Auxiliary Printer (optional).

Firmware required: This utility is compatible with the following at the level given or greater.

2-2100-003-25	Basic Interpreter (electronic keyboard)
2-2100-001-25	Basic Interpreter (mechanical keyboard)
2-2180-019-24	Basic System Register Generator
2-2180-029-17	Memory Allocator
2-2170-010-25	Data Handling I

GENERAL DESCRIPTION.

The function of this utility is to convert cassette formatted input data card images to 80-column card output. Records are 80-characters (fixed length). An optional printer output is available.

The cassette record must be 80-column card format but may be blocked 1, 2, or 3. The cassette may be printed to the console or the auxiliary printer. The cassette must be placed on unit number 1. Multiple files on the cassette may be processed or only one may be chosen. The paper may be 66 or 51 lines.

This program resides solely in data program (user) memory. No other utility may be resident in this area simultaneously.

OPERATING INSTRUCTIONS. The following is a list of operating instructions for the Cassette to 80-Column Card (data) (optional console/auxiliary printer) utility.

- a. This utility is loaded using the normal memory load procedures. Adjust the console paper to line 1. Press PK1 (start button) to begin execution.
- b. The following heading is displayed on the console:

CASSETTE TO 80 COLUMN CARD AND/OR CONSOLE PRINT AND/OR
AUXILIARY PRINT

- c. Select one of the following options:

- 1) PK1 for cassette to 80-column card and console print.
- 2) PK2 for cassette to 80-column card and auxiliary print.
- 3) PK3 for cassette to 80-column card with no print.

If PK1 or PK2 has been selected, choose one of the following OCK's which corresponds to the desired option.

- 1) OCK1 FOR 66 LINE PAPER.
- 2) OCK2 FOR 51 LINE PAPER.

d. Select one of the following:

- 1) OCK1 to process all files.
- 2) OCK2 to process only one.

At this point, select the following option:

- 1) OCK1 FOR LABELED TAPE.
- 2) OCK2 FOR UNLABELED TAPE.

If an unlabeled tape option is selected, and OCK2 is pressed to process only one file, enter the file number to be punched (1 for first, 2 for second, etc.).

If a labeled tape option is selected, and OCK2 is pressed to process only one file, enter the 6-character file identification number.

e. Two consecutive tape marks or one tape mark and a physical End-of-Tape indicator signifies the End-of-Data.

Error Conditions.

The following is a list of error conditions which may occur during the operation of the cassette to 80-Column Card (Data) (Optional Console/ Auxiliary Printer) utility.

"D" indicator light pattern

- | | | |
|----|--|----------|
| a. | Tape cassette not ready. | 10110000 |
| | <ol style="list-style-type: none"> 1) Ready the cassette. 2) Press OCK1 to retry the utility. | |
| b. | Cassette write error. | 10111100 |
| | <ol style="list-style-type: none"> 1) This error occurs when the possible maximum inter-record gap has been exceeded. The last record is not written. Two tape marks are attempted. 2) Press OCK1 to write two tape marks and terminate the utility. | |
| c. | End-of-Tape during write error. | 00111100 |
| | Refer to cassette write error, step b. | |

- d. Cassette irrecoverable write error. 11111111
- 1) This error has been caused by a hardware failure. The last record may be irrecoverable. Two tape marks are attempted.
 - 2) Press DCK1 to write two tape marks and terminate the utility.
- e. Cassette read error. 10111000
- 1) Press DCK1 to attempt to read the record again (at this point the system has reread the record 6 times via the system register setting).
 - 2) Press DCK2 to return the unit to the ready mode.
 - 3) Press DCK3 to skip to the next record and continue the execution.
- f. Accidental rewind.
- 1) This is a fatal error and is caused by the cassette gate being closed during execution of the utility.
 - 2) Press DCK1 to return the unit to the ready mode and restart the routine.
- g. Operator alert. 00110000
- 1) This is a fatal error and calls for operator intervention with the cassette tape unit.
 - 2) The cassette ready light, labeled R, is flashing.
 - 3) Check for a tape jam, a blank tape, or a cassette in backwards. Press DCK1 to return the unit to the ready mode.
- h. File protected. 10110100
- 1) This condition occurs when the cassette cartridge is write inhibited. In this mode the write enable plugs (tabs) do not cover the write enable holes.
 - 2) Open the cassette door and position the tabs covering the write enable holes.
 - 3) Press DCK1 to continue the utility.

UTILITY ROUTINE ID. NO. 1-2101-012.

TAPE CASSETTE TO 80-COLUMN CARD (SL5 OBJECT FORMAT).

Peripherals required:

- a. A 9490 Tape Cassette.
- b. A 149 Card Punch.

Firmware required:

- a. Interpreter Add-on Module for Cassette 2-2170-005.
- b. Interpreter Add-on Module for Data Handling 2-2170-010.
- c. Interpreter Add-on Module for 80-Column Card 2-2170-001.
- d. Translation Table for 80-Column Card 2-2155-XXX.

The Add-on Module for Auxiliary Printer 2-2170-006 must also be resident in memory if that option is used.

The SL5 System Register Tape 2-2101-050 must be reloaded prior to loading the above utility.

This utility is compatible with the SL3/SL5 Basic Interpreter, revision level 2-2100-001-22.

GENERAL DESCRIPTION.

This utility reads SL5 object files from a tape cassette and punches the object code in 80-column cards. The output cards may be used with the 80-Column Card Memory Load.

This program resides solely in data program (user) memory. No other utility may be resident in this area simultaneously.

The system registers must be reloaded after the execution of this program to meet the particular requirements of each system.

OPERATING INSTRUCTIONS. The following is a list of operating instructions for the Tape Cassette to 80-Column Card (SL5 object format) utility.

- a. This utility is loaded using the normal memory load procedure or a memory load utility. Load the object file tape cassette in unit number 1 or unit number 2. Press the POWER, AUTO-FEED, and punch ON-LINE switches on the card punch. Supply the card punch with blank cards. Adjust the console/auxiliary printer paper to line 1.
- b. Press PKA1 (program start key) to begin execution of the utility. The following heading is displayed on the console printer:

TAPE CASSETTE TO 80 COLUMN OBJECT CARD - SL5

- c. The next message allows the operator to specify into which

cassette unit the object file tape cassette is loaded.

OCK1 = CASSETTE #1 OCK2 = CASSETTE #2

- d. The next PK selection allows the operator the option of having all of the file-IDs displayed on the console before punching an object file.

PKA1 = CASSETTE TO CARD PKA2 = PRINT FILE IDS

If PKA2 has been selected, the utility reads an object file cassette and displays the IDs of the object files on it.

FILE NUMBER 001 = XXXXX (file ID)

FILE NUMBER 002 = XXXXX (file ID)

.

.

.

FILE NUMBER NNN = XXXXX (file ID)

ALL FILES PROCESSED

The utility returns to step c. If the input tape does not contain any files, but does contain two tape marks, the following message is printed:

NO FILES ON CASSETTE

The utility returns to step c.

- e. If PKA1 has been selected in step d, the following print options are displayed:

OCK1 = NO PRINTING

OCK2 = 66 LINES

OCK3 = 51 LINES

OCK4 = AUXILIARY PRINTER

Select the print option desired. OCK2 or OCK3 causes printing to occur on the console.

- f. Any file on the object file tape cassette may be punched into cards. If more than one file is to be processed they do not have to be punched in the order in which they are written on cassette. The message which prints is:

ENTER FILE ID

Enter the 5-character file-ID.

The utility searches the cassette for an object file with the ID that has been indexed. If the file-ID is not found, the following message is printed on the console.

FILE NOT ON CASSETTE

The utility returns to step c and prints the following

message:

ENTER FILE ID

Enter the 5-character ID.

- g. After the file-ID has been entered, the next message printed is:

SEGMENT NUMBER

The PKA1 and PKA2 keys are enabled. The operator must make one of the following choices:

- 1) Press PKA1 to have all the files with the entered ID punched regardless of segment number. A segment header card is punched for each file.
 - 2) Press PKA2 to indicate that the file does not have a segment number. A segment header card is not punched.
 - 3) Punch a two digit segment number on the numeric keyboard and terminate with any OCK. This adds the segment number to the file-ID and only the one file corresponding to the combined file-ID is punched out. A segment header card is punched.
- h. If the file-ID is found, the utility punches SL5 80-column object cards. When the End-of-File tape mark is reached on the cassette, the utility punches an End-of-File card (\$\$ in columns 1 and 2) and the following message is printed:

XXXXX FILE PROCESSED
(file ID)

- i. The operator has the option of returning the unit to the ready mode. If OCK1 is selected, the utility returns to step c.
- j. Any error condition halts the execution of the utility. The type of error condition determines whether the utility must be restarted.

Error Conditions.

The following is a list of error conditions which may occur during the operation of the Tape Cassette to 80-Column Card (SL5 object format) utility.

- a. Card punch not ready.

- 1) The following message is printed on the console:

CARD PUNCH NOT READY
OCK1 TO RESTART

2) Check the following items:

- a) AUTO-READ button.
- b) Punch ON LINE button.
- c) Power switches.

3) Check the supply of blank cards in the punch hopper.

4) Check for a card jam.

5) Press DCK1 to continue the utility.

b. Auxiliary printer not ready.

1) The following message is printed on the console:

```
AUXILIARY PRINTER NOT READY  
DCK1 TO RESTART
```

2) Check the following items:

- a) Paper supply.
- b) Power ON switch at the rear of the printer.

3) Press the PRINT button on the printer cover.

4) Press DCK1 to continue the execution of the utility.

c. Cassette not ready.

1) The following message is printed on the console:

```
CASSETTE NOT READY  
DCK1 TO RESTART
```

2) Check the power supply.

3) Close the cassette unit gate.

4) Press DCK1 to continue the utility.

d. Operator alert.

1) The following message is printed on the console:

```
ERROR-TAPE JAM, BLANK TAPE, CASSETTE IN BACKWARDS, OR  
DOUBLE TAPE MARK MAY BE MISSING  
JOB ABORTED
```

2) This is a fatal error and calls for operator intervention to correct one of the above problems.

3) The utility returns to the ready mode.

e. Unintentional rewind.

- 1) If this error occurs, the following message is printed on the console:

```
UNINTENTIONAL REWIND  
JOB ABORTED
```

- 2) This is a fatal error generally caused by opening and closing the cassette unit gate while the utility is executing.
- 3) The utility returns to the ready mode.

f. Read error.

- 1) The following message is printed on the console:

```
READ ERROR  
O CK1 = RETRY      O CK2 = JOB ABORTED
```

- 2) The utility attempts to read a record 3 times before the read error condition occurs.
- 3) Press OCK1 for 3 additional read attempts.
- 4) Press OCK2 to return the unit to the ready mode.

g. End-of-Tape error.

- 1) The following message is printed on the console:

```
END OF TAPE  
ALL FILES PROCESSED
```

- 2) This condition occurs at the completion of the punching. The utility returns to step c of the operating instructions.

h. End-of-Tape (no file).

- 1) The following message is printed on the console:

```
END OF TAPE  
XXXXX FILE NOT ON CASSETTE
```

- 2) This condition occurs when the requested file identification number is not on the object file tape cassette. The utility returns to step c of the operating instructions.

UTILITY_ROUTINE_ID_NO_1-2101-056.

CASSETTE COPY (DATA/OBJECT).

Peripherals required: Two (2) Cassette Tape Stations (A 9490-XX).

Firmware required: None.

This utility is compatible with the Basic Interpreter, revision level 2-2100-001-22 or greater.

GENERAL DESCRIPTION.

This utility duplicates a complete tape (data or object) from the Beginning-of-Tape to a double tape mark or a tape mark and a physical End-of-Tape.

This utility resides in data program (user) memory. No other utility may be resident in this area simultaneously.

OPERATING INSTRUCTIONS. The following is a list of operating instructions for the Cassette Copy (Data/Object) utility.

- a. This utility is loaded using the normal memory load procedures.
- b. Insert the tape to be copied in unit number 1 and the tape to be written in unit number 2.
- c. Press PKA1 to begin the execution of this utility.
- d. The program executes until it successfully completes the copy or until an error condition is encountered. If the utility is successful, the following message prints on the console:

EOJ

If the utility encounters an error, the type of error is printed on the console.

Error Conditions.

The following is a list of error conditions which may occur during the operation of the Cassette Copy (Data/Object) utility.

- a. Cassette not ready.
 - 1) The following message is printed on the console:
CAS NR
 - 2) The job is aborted.
- b. Read error.
 - 1) The following message is printed on the console:

RD ER

2) The job is aborted.

c. Write error.

1) The following message is printed on the console:

WRT ER

2) The job is aborted.

d. Operator alert.

1) The following message is printed on the console:

OP ALRT

2) The job is aborted.

e. Nonprogrammatic rewind.

1) The following message is printed on the console:

NON - PROG RWND

2) When this error occurs the job is aborted.

f. File protect.

1) The following message is printed on the console:

FILE PROT

2) The job is aborted.

UTILITY ROUTINE ID. NO. 1-2101-077.

B 1700 OBJECT CASSETTE COPY AND VERIFY.

Peripherals required: A 9490 Cassette Unit(s).

Firmware required: This utility is compatible with the following at the level given or greater.

2-2100-001-25	Basic Interpreter (mechanical keyboard)
1-2101-050-00	SL5 System Registers
2-2180-029-27	Memory Allocator
2-2180-019-24	Basic System Register Generator

The memory allocator and systems register tapes must specify cassette I/O. The utility itself, 1-2101-077-00 provides its own special firmware.

GENERAL DESCRIPTION.

The function of this utility is to duplicate and/or verify B 1700 object cassettes.

This utility requires special cassette firmware. The special firmware is included in the utility, however, TAPE CASSETTE must be specified during execution of the Memory Allocator (2-2180-029). Tape cassette firmware 2-2170-005 must be reloaded after finishing the job.

This utility copies one side only, using both available tracks. The utility thus requires two executions to copy both sides of B 1700 cassettes written from both ends. Note that the A 9490 requires a cassette to be manually wound off clear leader to cause an automatic rewind of the entire cassette (refer to L 8000/TC 700/TC 3500 Equipment Reference Manual, form number 1067600).

This utility resides in the data program (user) memory and in the tape cassette add-on area of micro program memory. No other utility may be resident in this area simultaneously.

OPERATING INSTRUCTIONS. The following is a list of operating instructions for the B 1700 Object Cassette Copy and Verify utility.

- a. The utility is loaded using the normal memory load procedures (PK2 from the ready mode).

NOTE

The utility does not load if TAPE CASSETTE has not been specified during execution of the memory allocator.

- b. Insert the master cassette into unit number 1. Insert the output or copied cassette into unit number 2, or units number 2 and number 3 if two copies/verifications are desired, or units 2, 3, and 4 for 3 copies/verifications.

- c. The utility is started by pressing PK1 from the ready mode. The utility first requests the type of operation desired:

PK1 = COPY & VERIFY; PK2 = COPY ONLY; PK3 = VERIFY ONLY.

- PK1 - requests the cassette on unit number 1 to be copied, the results are displayed; followed by a comparison between the master and the copies, with results then displayed.
- PK2 - requests the cassette on unit number 1 to be copied and the results displayed.
- PK3 - requests a comparison between the master cassette on unit number 1 and the copies, with the results displayed.

The utility returns to the ready mode when the desired task has been completed.

- d. The utility then requests the means of terminating the copy and/or verification routine by the following message:

PK1 = SOFTWARE TAPE-2TM; PK2 = FIRMWARE TAPE-1TM;

Three responses may be made:

- PK1 - designates a system software tape which is terminated by two tape marks (TM).
- PK1 - designates a firmware tape (maintenance test routine) which is terminated by one tape mark (TM).
- NNN - a three digit on the numeric keyboard designates that only the first NNN records are to be copied and/or verified. NNN may be one, two, or three decimal digits and is terminated by an OCK. This value, if entered, is displayed on the console.

NOTE

A maximum of 999 records may be copied when termination by a record-count is designated.

- e. The utility finally requests the number of copies desired by the following message:

PK1 = COPY; PK2 = 2 COPIES; PK3 = 3 COPIES

- PK1 - specifies unit 1 as master and unit 2 as copy.
- PK2 - specifies unit 1 as master and units 2 and 3 as copies.
- PK3 - specifies unit 1 as master and units 2, 3, and 4 as copies.

- f. If a cassette unit rewinds by mistake, a message such as the following is printed.

NPRWND UNIT2 DELETED

- g. A fatal cassette error on any of units 2, 3, 4 is reported by an appropriate message, that unit is deleted, and the operation continues. Such messages are as follows:

NOT RDY UNIT3 DELETED

OPALRT UNIT3 DELETED

- h. A fatal cassette error on unit number 1 (master unit) causes an appropriate message to be printed and the routine aborted.

OPALRT UNIT1

- i. A non-fatal cassette error on any of the units is reported along with means of recovery, such as the following:

RD ERR UNIT3
OCK1 = RETRY

- j. Successful completion of the copy part of the routine lists the good copies:

TAPE COPIES TO UNIT2

- k. Successful completion of the verification part of the routine lists the verified units:

TAPE VERIFIED UNIT2

- l. If all copy units become deleted, the following message is displayed and the utility returns to the ready mode:

NO GOOD OUTPUT - JOB ABORTED

NOTE

Tape cassette firmware 2-2170-005 must be reloaded after finishing the job.

UTILITY ROUTINE ID. NO. 1-2101-062.

CASSETTE UNIT NUMBER 1 TO 80-COLUMN CARD (A 9418) (SL5 DATA).

Peripherals required:

- a. A 9418 80-Column Card Reader/Punch.
- b. A 9249 Auxiliary Printer.

Firmware required: None.

This utility is compatible with the Basic Interpreter, revision level 2-2100-001-23 or greater.

GENERAL DESCRIPTION.

This utility reads a cassette and punches 80-column cards in SL5 data format. The cassette record must be in 80-column format, but may be blocked 1, 2, or 3. Data must be of a fixed length. Cassette records may be labeled or unlabeled. Multiple files on the cassette may be processed or only a single record may be processed. Place cassettes only on unit number 1. The cassette record may be printed on the console or the auxiliary printer if desired.

This program resides solely in data program (user) memory. No other utility may be resident in this area simultaneously.

OPERATING INSTRUCTIONS. The following is a list of operating instructions for the Cassette Unit Number 1 to 80-Column Card (A 9418) (SL5 data) utility.

- a. This utility is loaded using the normal memory load procedures (PKA2 from the ready mode).
- b. Press PKA1 (start key) to begin the execution of this utility.
- c. The following heading is displayed on the console.

CASSETTE TO CARD 80

Select the PK which corresponds to the desired option:

- 1) PKA1 for cassette to 80-column card with console print.
- 2) PKA2 for cassette to 80-column card with auxiliary print.
- 3) PKA3 for cassette to 80-column card with no print.

If PKA1 or PKA2 has been chosen, select one of the following:

- 1) OCK1 for 66 line paper.
- 2) OCK2 for 51 line paper.

- d. Select the proper OCK for processing files:

- 1) OCK1 to process all files.
- 2) OCK2 to process one file.

e. Select the proper DCK for labeled or unlabeled file.

- 1) DCK1 for labeled tape
- 2) DCK2 for unlabeled tape

If the files are unlabeled and DCK2 is pressed to process only one file, the file number is the file position on the cassette. Enter the file number to be punched (1 for first file, 2 for second, etc.).

Error Conditions.

The following is a list of error conditions which may occur during the operation of the Cassette Unit Number 2 to 80-Column Card (A 9418) (SL5 Data) utility.

"D" indicator light pattern

- | | | |
|----|--|----------|
| a. | Tape cassette unit number 1 not ready. | 10110000 |
| | 1) Ready the cassette. | |
| | 2) Press DCK1 to retry the utility. | |
| b. | Tape cassette unit number 1 write error. | 10111100 |
| | 1) This error occurs when the possible maximum inter-record gap has been exceeded. The last record is not written. Two tape marks are attempted. | |
| | 2) Press DCK1 to write 2 tape marks and terminate the utility. | |
| c. | End-of-Tape during write error unit number 1. | 00111100 |
| | Refer to step b. | |
| d. | Unintentional rewind unit number 1. | 00110100 |
| | 1) This is a nonprogrammatic rewind. | |
| | 2) Press DCK1 to abort the utility. | |
| e. | Operator alert unit number 1. | 00110000 |
| | 1) This error is caused by a blank tape, or a cassette in backwards. | |
| | 2) Press DCK1 to abort the utility. | |
| f. | Auxiliary printer not ready. | 11100000 |
| | 1) Ready the unit. | |
| | 2) Press DCK1 to retry the utility. | |
| g. | Card 80 read error. | |

- 1) If this error occurs, press OCK1 to release the card containing the error.
- 2) Place the card that has caused the read error back into the stacker.
- 3) Ready the unit.
- 4) Press OCK1 to retry the utility.

h. Cassette irrecoverable write error. 11111111

- 1) This error has been caused by a hardware failure. The last record may be irrecoverable. Two tape marks are attempted.
- 2) Press OCK1 to write two tape marks and terminate the utility.

i. File protect. 10110100

- 1) This condition occurs when the cassette cartridge is write inhibited. In this mode the write enable plugs (tabs) do not cover the write enable holes.
- 2) Open the cassette door and position the tabs covering the write enable holes.
- 3) Press OCK1 to continue the utility.

UTILITY ROUTINE ID. NO. 1-2101-006.

KEYBOARD TO CASSETTE (SL5 DATA).

Peripherals required:

- a. A 9490-XX Tape Cassette Unit.
- b. A 9249 Auxiliary Printer (optional).

Firmware required:

- a. Interpreter Add-on Module for Cassette 2-2170-005.
- b. Interpreter Add-on Module for Data Handling 2-2170-010.

The Auxiliary Printer Add-on Module 2-2170-006 must also be resident if that print option is used.

The SL5 System Register Tape 1-2101-050 must be loaded prior to loading this utility.

This utility is compatible with the Basic Interpreter, revision level 2-2100-001-25 or greater.

GENERAL DESCRIPTION.

This utility routine accepts up to 80-characters from the alphanumeric keyboard and writes a fixed length 80-character file to cassette unit number 1. The 80-character records may be blocked into 80-, 160-, or 240-character cassette records for efficient utilization of the tape cassette. A cassette cartridge stores 880 records of 240-characters, or a total of 2640, 80-character entries. The cassette cartridge stores only 1580 unblocked 80-character records. This difference is due to the increased number of inter-record gaps for the unblocked data.

This utility resides solely in data program (user) memory. No other utility may be resident in this area simultaneously.

OPERATING INSTRUCTIONS. The following is a list of operating instructions for the Keyboard to Cassette (SL5 Data) utility.

- a. This utility is loaded using the normal memory load procedures (PKA2 from the ready mode) or a memory load utility.
- b. Press PKA1 (start key) to begin execution of this utility.
- c. The following message is printed on the console:

KEY TO CASSETTE AND CONSOLE OR AUX PRINTER

- d. Select one of the following DCK's.
 - 1) DCK1 for 66 line paper.
 - 2) DCK2 for 51 line paper.
- e. Select the desired print option:

- 1) OCK1 for console print only.
- 2) OCK2 for console and auxiliary print.

f. Select the block option desired:

- 1) OCK1 for blocked 1.
- 2) OCK2 for blocked 2.
- 3) OCK3 for blocked 3.

If blocked 2 or 3 has been selected, the last record is padded out with an undigit FF if necessary.

g. Select the label option desired:

- 1) OCK1 for labeled tape.
- 2) OCK2 for unlabeled tape.

If OCK1 has been selected, the keyboard is enabled for the entry of a 6-character multi-file identification number. This should be left blank for a tape on which only one file is to be written. The keyboard is enabled for the entry of a 6-character file identification number. The beginning label followed by a tape mark is written.

h. Type the data records to memory and terminate the utility with any OCK1.

i. After the last record is terminated with OCK1, OCK2 writes a tape mark. If OCK1 is not pressed, another file may be written. Repeat paragraphs e, f, g, and h for labeled tapes and e, f, and g for unlabeled tapes. If OCK2 is pressed, a second tape mark is written and unit number 1 is rewound.

Error Conditions.

The following is a list of error conditions which may occur during the operation of the Keyboard to Cassette (SL5 Data) utility.

"D" indicator light pattern

- | | | |
|----|--|----------|
| a. | Tape cassette not ready. | 10110000 |
| | 1) Ready the cassette. | |
| | 2) Press OCK1 to retry the utility. | |
| b. | Cassette write error. | 10111100 |
| | 1) This error occurs when the possible maximum inter-record gap has been exceeded. The last record is not written. Two tape marks are attempted. | |
| | 2) Press OCK1 to write two tape marks and terminate the utility. | |

- c. End-of-tape during write error. 00111100
Refer to step b.
- d. Cassette irrecoverable write error. 11111111
- 1) This error is caused by a hardware failure. The last record may be irrecoverable. Two tape marks are attempted.
 - 2) Press OCK! to write two tape marks and terminate the utility.
- e. Cassette read error. 10111000
- 1) Press OCK1 to attempt to read the record again (at this point the system has attempted to read the record 6 times via the system register setting).
 - 2) Press OCK2 to return the utility to the ready mode.
 - 3) Press OCK3 to skip to the next record and continue the execution of the utility.
- f. Accidental rewind. 00110100
- 1) This is a fatal error and is caused by the cassette gate being closed during execution of the utility.
 - 2) Press OCK1 to return the utility to the ready mode and restart the routine.
- g. Operator alert. 00110000
- 1) This is a fatal error and calls for operator intervention with the cassette tape unit.
 - 2) The cassette ready light, labeled R, is flashing.
 - 3) Check for a tape jam, a blank tape, or a cassette in backwards. Press OCK1 to return the utility to the Ready mode.
- h. File protected. 10110100
- 1) This condition occurs when the cassette cartridge is write inhibited. In this mode the write enable plugs (tabs) do not cover the write enable holes.
 - 2) Open the cassette door and position the tabs covering the write enable holes.
 - 3) Press OCK1 to continue the utility.

i. Auxiliary printer not ready.

11100000

1) Ready the unit.

2) Press OCK1 to retry the utility.

SECTION 3

CASSETTE SORT AND MERGE

UTILITY_ROUTINE_ID.,_NO.,_1-2101-043.

THREE TAPE CASSETTE SORT, PHASE-I.

UTILITY_ROUTINE_ID.,_NO.,_102101-044.

THREE TAPE CASSETTE SORT, PHASE-II.

Peripherals required: A 9490 Cassette Units (3).

Firmware required: Add-on for Data Handling 2-2170-010-25 or greater.

this utility is compatible with the basic Interpreter 2-2100-001-025 or greater.

GENERAL DESCRIPTION.

These utilities sort a single cassette tape file and output a single sorted file on cassette tape. The sort consists of a String Phase, utility 1-2101-043 and a Merge Phase, utility 1-2101-044. Only one tape may be initial input and one final output.

The String Phase, utility 1-2101-043, arranges the input file into strings of ascending sequence numbers and writes these to two temporary output scratch tapes. At the start of the String Phase, the operator must enter specifications for execution of the sort; the stringing operation begins after the information has been entered. During the stringing operation, part of the memory occupied by the program is overlaid by data storage for the stringing operation. Therefore, if specifications must be changed after the stringing operation has begun, the String Phase must be reloaded.

The Merge Phase, utility 1-2101-044, merges the two scratch tapes produced by the string phase into a single sorted output file and writes the file to a cassette tape. To restart the Merge Phase, the String Phase must be re-executed. (Refer to Merge Phase operating instructions.)

INPUT/OUTPUT CONSIDERATIONS.

Only one single file cassette tape may be sorted by this set of utilities, and output is one single file cassette tape. Every input record must be of the same fixed length of up to 256-characters. Keys are a fixed length of up to 31-characters and begin in the same position in every record; up to 5 keys may be specified.

This utility resides solely in data program user memory. No other utility routine may be resident in this area simultaneously.

OPERATING INSTRUCTIONS. The following is a list of operating instructions for the Three Tape Cassette Sort, Phase-I utility.

- a. This utility is loaded using the normal memory load procedures

(PKA2 from the ready mode).

- b. Press PKA1 (start key) to execute this utility.
- c. The following message is printed on the console:
 - 1) PKA1 - KEYBOARD.
 - 2) PKA2 - 80-COLUMN CARD (A 9114).
 - 3) PKA3 - 80-COLUMN CARD (A 9418-2).
- d. If PKA1 is selected, information is entered via the keyboard in the form of a question and answer routine.

The following is a list containing the message which prints on the console and the explanation and response.

- a. RECORD LENGTH - record length in characters. Acceptable response is 8 through 256.
- b. INPUT BLOCKING - message is displayed only if the record length was 128-characters or less. Response may be 1 through 32. If the input is unblocked, terminate with OCK2, 3, or 4.
- c. OUTPUT BLOCKING - displayed only if record length was 128-characters or less. Response may be 1 through 32. If the output is not to be blocked, terminate with OCK 2, 3, or 4.
- d. PAD LAST BLOCK - displayed only if output blocking was requested. OCK1 indicates yes. Any unfilled blocks are padded with 7F.

NOTE

This should be used only if the system processing sorted tape requires and is expecting blocks to be padded with 7F characters.

- e. KEY 1 LOCATION - digit starting position for the first sort key. Characters start on odd numbered locations. Digits start on even or odd locations. Response may be 1 through 512. Terminate with any OCK.
- f. DIGIT - OCK1 indicates the key length is given as numbers of digits. An even numbered location necessitates digits.

NOTE

Determine the proper number of digits to be entered. This is 2 times the number of characters if digits are used or 2 times the number of characters -1 if characters are to be used.

- g. LENGTH - length of the sort key (data field). Response may be 1 through 31 characters or 1 through 64 digits. If terminated with OCK2, 3, or 4, then no more keys may be entered. If

terminated with OCK1, then key 2, 3, or 4 and 5 locations and lengths may be entered.

NOTE

The sort can handle up to five sort fields or a maximum of 31-characters. Keys 1 through 5 are major to minor respectively.

- h. USER MEMORY - the amount of user memory available to the sort. Response is entered as number of words, 512 through 2048.
- i. SUBSTITUTE OUTPUT TAPE - if terminated with OCK1, then the sort halts just prior to the final merge pass, allowing the operator to mount a specific cassette for the sorted file.
- j. LABELED INPUT TAPE - if the input cassette contains a standard 80-character Burroughs label, terminate with OCK1.
- k. LABELED OUTPUT TAPE - if it is desired to label the output tape terminate with OCK1.

NOTE

The ending label contains the record unit.

- l. DATE - the labels on the output tape contain the date entered. The date must be a 5-digit JULIAN date with the format YYDDD. Terminate with any OCK.

If PKA2 for the A 9114 80-Column Card Reader or PKA3 for the A 9418 80-Column Card Reader has been selected, the program reads an 80-column card to obtain the information needed for the sort to be executed. The following format must be used for card input.

<u>Column</u>	<u>Entry</u>
1-2	Blank
3-5	Record length
6-7	Input blocking
8-9	Output blocking
(*1) 10	Pad last block
11-13	Key 1 information, Key 1 location
(*1) 14	Key 1 information, digit
15-16	Key 1 information, length
17-22	Key 2 information
23-28	Key 3 information
29-34	Key 4 information

1 These entries should be answered Y = YES, blank, or N = NO. All entries must be right justified and zero filled in their respective fields.

<u>Column</u>	<u>Entry</u>
35-40	Key 5 information
41-44	Amount of user memory
(*1) 45	Substitute output tape
(*1) 46	Labeled input tape
(*1) 47	Labeled output tape
48-52	Julian date (YYDDD)

OPERATING INSTRUCTIONS. The following is a list of operating instructions for the Three Tape Cassette Sort, Phase-II utility.

- a. This utility, Phase II, is loaded using normal memory load procedures immediately following the String Phase. Because Phase I passes certain data in words 0 through 14, no program may be executed using Data Program Memory between the String Phase and the Merge Phase.

NOTE

When the Merge Phase is to be copied via the Memory Dump Utilities, only words 16 through 450 should be dumped.

- b. If, during the specifications routine of the String Phase, the Substitute Output Tape query was responded to as YES, before the last pass of the Merge Phase, the message SUBSTITUTE CASSETTE N displays and execution halts until the cassette on the specified unit is replaced. The final sorted file is written to the cassette reel placed in the specified cassette unit.
- c. At completion of the Merge Phase, the message SORTED CASSETTE UNIT N is displayed to inform operator which cassette reel contains the sorted file.

Error Conditions.

The following is a list of error conditions which may occur during the operation of the Three Tape Cassette Sort, Phase-I or Phase-II utilities.

- a. Accidental rewind.

- 1) The following message is printed on the console.

1 These entries should be answered Y = YES, blank, or N = NO. All entries must be right justified and zero filled in their respective fields.

ERROR AC RWND

2) Restart string phase.

b. End-of-Tape during write.

1) The following message is printed on the console.

ERROR WR EOT

2) Restart string phase. Multi-reels are not accomodated.

c. File protect.

1) The following message is printed on the console.

ERROR FP UNIT n

2) This error has been caused by a file protect tab on the cassette on unit n.

3) If the error has occured on unit number 1, restart the merge phase.

4) If the error has occured on unit number 2 or 3, press OCK1 to retry the utility or OCK2 to discontinue it.

d. Cassette unit not ready.

1) The following message is printed on the console.

ERROR NOT RDY n

2) Press OCK1 to retry the utility.

3) Press OCK2 to terminate the utility.

e. Operator alert.

1) The following message is printed on the console.

ERROR OP ALRT

2) Restart the String phase.

f. Read error.

1) The following message is printed on the console.

ERROR RD

2) Press OCK1 to retry the utility.

3) Press OCK2 to terminate the utility.

g. Record count.

- 1) The following message is printed on the console.

ERR REC CNT

- 2) This error is caused when the input label is specified.
- 3) Press OCK1 to continue the utility.
- 4) Press OCK2 to terminate the utility.

h. Record length.

- 1) The following message is printed.

ERROR REC LEN

- 2) This error occurs when the record length specified does not match the actual record length. All data records must be a fixed length and all records must be the same length.
- 3) Restart the String phase.

i. Write error.

- 1) The following message is printed on the console.

ERROR WR

- 2) This error occurs after four attempts have been made to write on the cassette.
- 3) Restart the present phase.

j. End-of-Tape during write.

- 1) The following message is printed on the console.

ER WR EOT

- 2) Restart the String phase.

k. Write fatal.

- 1) The following message is printed on the console.

ERROR WR FATL

- 2) This error is caused by a hardware failure.
- 3) Replace the cassette and restart the present phase.

UTILITY_ROUTINE_ID._NO._1-2101-045.

CASSETTE MERGE UTILITY.

Peripherals required: A 9490 Cassette Units (3 or 4).

Firmware required: This utility is compatible with the following at the level given or greater.

2-2100-003-25	Basic Interpreter (electronic keyboard)
2-2100-001-25	Basic Interpreter (mechanical keyboard)
2-2180-019-24	Basic System Register Generator
2-2180-029-27	Memory Allocator
2-2170-010-25	Data Handling I
2-2170-005-25	Cassette Firmware

GENERAL DESCRIPTION.

The cassette merge can be used to create an input tape for the Three Tape Sort utilities 1-2101-043-03, and 1-2101-044-03 or greater. This utility can also combine output tapes from the Three Tape Sort utilities.

This utility resides solely in data program (user) memory. No other utility may be resident in this area simultaneously.

- a. This utility is loaded using normal memory load procedures (PKA2 from the ready mode).
- b. Press PKA1 (start key).
- c. The following headings are printed on the console.

```
CASSETTE MERGE
PKA1 = KEYBOARD
PKA2 = 80 COL CARD
PKA3 = CARD 80
```

- d. Press PKA1 and enter the routine which accepts the specifications for the merge to be executed through the keyboard.
- e. Press PKA2 or PKA3 to enter the routine which reads an 80-column card from the selected device to obtain the specifications for the merge to be executed.

If PKA1 has been selected, a series of messages are displayed asking the operator to provide the information to set up the variables required.

The following is a list of messages which are displayed. Included in this list is an explanation of each message and the acceptable response.

- 1) NUMBER OF CASSETTES - the number of cassette drives to be used. Acceptable response is 3 or 4. Mount cassette for

- output on the designated unit.
- 2) RECORD LENGTH - the length of a logical record in characters. Acceptable response is 8 through 256.
 - 3) ORDERED MERGE - an ordered merge is designated by OCK1. The input tapes should be sorted. OCK2, 3, or 4 designate an unordered merge.
 - 4) NUMBER OF INPUT TAPES - this message is displayed only if an unordered merge is designated. An acceptable response is from 1 to 999. However, all input data must fit on one output cassette.
 - 5) BLOCKING - this message is displayed only if the record length was 128-characters or less. A response of 1 through 32 specifies both input and output blocking. If the record is unblocked, terminate the utility with OCK2, 3, or 4.
 - 6) PAD LAST BLOCK - this message is displayed only if blocking has been requested. OCK1 indicates yes. Any unfilled blocks are padded with 7F.

NOTE

This option should be used only if the system processing the merged tape requires and is expecting blocks to be with 7F characters.

- 7) KEY 1 LOCATION - this is the digit starting position for the first sort key. Characters start on odd numbered locations, digits on even/odd locations. Response may be 1 to 512. Terminate this utility with any OCK.
- 8) DIGIT - OCK1 indicates the key length is given as numbers of digits. An even numbered location necessitates digits. Determine the proper number of digits to be entered. This is two times the number of characters if digits are to be used or two times the number of characters -1 if characters are to be used.
- 9) LENGTH - this is the length of the sort key (data field). Response may be 1 to 62 digits. If terminated with OCK2, 3, or 4 then no more keys may be entered. If terminated with OCK1, then key 2, 3, 4, and 5 locations and lengths may be entered. The merge can handle up to five sort fields with a maximum of 31 characters. Keys 1 through 5 are major to minor respectively.
- 10) LABELS - if the input cassette contains a standard 80-character Burroughs label, terminate with OCK1. A label is written on the output cassette with the same ID. The ending label contains a record count.

11) DATE - the labels on the output tapes contain the date entered. The date must be a 5-digit JULIAN date with the format YYDDD. Terminate with any OCK.

If PK1 or PK3 has been selected, the specifications should be entered as mentioned under PK1 onto the 80-column card in the following format.

<u>Column</u>	<u>Entry</u>
1-2	Blank
3-5	Record Length
6-7	Blocking for unordered merge
8-9	Blocking for ordered merge
(*2) 10	Pad last block
11-13	Key 1 information
	Key 1 location
(*2) 14	Key 1 information digit
15-16	Key 1 information
	Key 1 length
17-22	Key 2 information
23-28	Key 3 information
29-34	Key 4 information
35-40	Key 5 information
(*2) 46	Labels for unordered merge
(*2) 47	Labels for ordered merge
(*2) 48-52	Julian date
76	Number of cassettes
(*2) 77	Ordered merge
78-80	Number of input tapes

- f. If the cassette merge is used to create an input tape to the Three Tape Sort utility, the same 80-column card with the specifications for the sort may be used for the merge by adding the information in columns 76 through 80 as stated above. The sort may still use this 80-column card.
- g. The cassette merge utility may not be executed repeatedly without reloading unless all variables in the specifications are expected to remain the same. If any of the specifications need to be changed, the utility must be reloaded to accept the new specifications.
- h. When entering the specifications, a syntax analysis is performed and only a logically correct set of parameters is accepted. Should an illogical parameter be entered through the keyboard,

2 All entries must be right justified and zero filled in their respective fields.

it is discarded and the program returns to display and accept status. If the 80-column card contains an illogical parameter the message ERROR COLUMN NN is displayed before the program discontinues.

- i. If a new input tape is required during the unordered merge, the message NEW INPUT TAPE UNIT N is displayed. The operator may put the new tape on the specified unit while processing continues on the other units. If the tape substitution has not been detected before this new tape is required, the program comes to a keyboard halt to await the substitution. When the substitution is completed, press any OCK to continue processing.
- j. If the input tapes are labeled, the total of the record count contained in the ending labels are compared to the number of records actually processed. If the two totals are not equal, the message ERROR REC CNT is displayed. Termination with OCK1 indicates that the merge should be continued, OCK2 indicates that the merge is to be aborted.
- k. If during a cassette read an incorrect record length is encountered, the message ERROR REC LEN UNIT N= is displayed and the merge is discontinued. The number to the right of the equal sign is the record length encountered. If the length entered by the operator during the specifications input was incorrect, then restart the program and enter the correct specifications. If the operator had entered the correct length, then the input tape must be recreated.

NOTE

All data records must be the same length but the blocks containing these fixed length records may be of any length which is a multiple of the record length but not greater than the designated maximum block size.

The ordered merge may need more than one cassette to store its output. When a cassette is filled, the message REEL M UNIT N is displayed, indicating the cassette number and the unit it is mounted on. Substitute this cassette for the next cassette to be used for this output file and terminate.

Error Conditions.

The following is a list of error conditions which may occur during the operation of the Cassette Merge utility.

- a. Read error.

1) The following message is printed on the console.

ERROR RD

- 2) Press OCK1 to retry the utility.
 - 3) Press OCK2 to terminate the utility.
- b. Write error.
- 1) The following message is printed on the console.
ERROR WR
 - 2) This error occurs after four attempts have been made to write on the cassette.
 - 3) Restart the present phase.
- c. Read error and End-of-Tape.
- 1) The following message is printed on the console.
ERROR RD EOT
 - 2) Press OCK1 to retry the utility.
 - 3) Press OCK2 to terminate the utility.
- d. Unit not ready.
- 1) The following message is printed on the console.
ERROR NOT RDY UNIT N
 - 2) Press OCK2 to terminate the utility.
- e. File protect.
- 1) The following message is printed on the console.
ERROR FP UNIT N
 - 2) Press OCK1 to retry the utility.
 - 3) Press OCK2 to terminate the utility.
- f. End-of-Tape.
- 1) The following message is printed on the console.
ERROR EOT
 - 2) The utility is terminated.
- g. Write error and End-of-Tape.
- 1) The following message is printed on the console.

ERROR WR EOT

2) The utility is discontinued.

h. Accidental rewind.

1) The following message is printed on the console.

ERROR AC RWND

2) The utility is discontinued.

i. Operator alert.

1) The following message is printed on the console.

ERROR OP ALERT

2) The utility is discontinued.

SECTION 4

ZIP/SEGMENT ROUTINES

UTILITY_ROUTINE_ID._NO._2-2180-017.

CASSETTE ZIP/SEGMENT MEMORY LOAD (UTILITY AREA).

UTILITY_ROUTINE_ID._NO._2-2180-018.

CASSETTE ZIP/SEGMENT MEMORY LOAD (ALTERNATE UTILITY AREAS).

Peripherals required: One A 9490-X Cassette Tape System.

Firmware required:

- a. Cassette Add-on module 2-2170-005.
- b. Data Handling Add-on module 2-2170-010.

The L 8000 Cassette Zip/Segment loader 2-2180-018-03 is compatible with modular cassette firmware add-ons 2-2170-005-22 or greater. The L 8000 cassette Zip/Segment loader 2-2180-018-02 is not compatible with modular firmware add-ons 2-2170-005-25 or greater.

The cassette from which the object program segments are loaded must be created according to the procedures outlined in the Paper Tape to Cassette (1-2101-027) or 80-Column Card to Cassette (1-2101-004) utilities.

GENERAL DESCRIPTION.

This routine must reside in the utility area (2-2180-017) or in the alternate utility area (2-2180-018) whenever the cassette ZIP or Segmentation functions are executed by the user program. Refer to the Burroughs COBOL for Mini-Computers, form number 1068160 for a complete discussion of the ZIP and SEGMENTATION functions.

The link to these routines must be specified in the system register. Attempts to execute this utility without a proper system register causes indeterminate results.

The execution of this utility does not require any operator action; however, error conditions may occur which may call for operator intervention.

The ZIP capability may be used to ZIP from SL5 to SL3 or from SL5 to SL5. It may not be used to ZIP from SL3 to SL5 or from SL3 to SL3.

The Segmentation capability may only be used in SL5 Programs and must follow the construction in the COBOL for Mini-Computers Manual.

NOTE

Alternate utility area firmware utility routines may be co-resident with standard firmware utility routines (e.g., trace).
The capability of using the alternate

utility area is enabled by the basic systems registers when ZIP-SEGMENT LOADER and ALTERNATE UTILITY AREA are requested during execution of the Basic System Register Generator 2-2180-019. If the basic system registers enable the use of the alternate utility area, then no Systems Software 1-2101-XXX or machine configuration utility routine generators are properly executed.

Machine configuration utility routine generators load and/or punch the information defining the configuration of the machine, viz, the Basic System Register Generator 2-2180-019, the Cata Comm System Register Generator 2-2180-020, and the Memory Allocator 2-2180-029.

System software and configuration generators do not use the relocatable code.

When using the alternate utility area, the scratch pad memory (SPM) is increased by 512 bytes (64 words). Thus, the user memory (DPM) is decreased by 64 words.

Example:

If the alternate utility area is used and the data program memory (DPM) is 4KB (words 0 - 511) deduct 64 words (the size of the alternate utility area) and the result is the maximum size of data program memory available. This is the correct method of determining the maximum size of the program. Thus, 511 words - 64 words = 447 words.

The use of the standard utility area does not decrease the size of the data program memory (DPM).

OPERATING INSTRUCTIONS. None

Error Conditions.

The following is a list of error conditions which may occur during the operation of the Cassette ZIP/Segment Memory Load utility.

a. Operator alert.

- 1) If this error occurs, OA is printed on the console.
- 2) Check for a blank cassette.
- 3) Check for cassette being in backwards.
- 4) Check for a tape jam.

B. Cassette not ready.

D light pattern
10110000

- 1) Ready the cassette.
- 2) Press OCK1 to continue the execution.

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REMARKS FORM

TITLE: DC 140/L 8000/TC 1700/TC 3500
VOLUME 2 – CASSETTE ROUTINES
Operation Guide

FORM: 1085966
DATE: 6-75

CHECK TYPE OF SUGGESTION:

ADDITION

DELETION

REVISION

ERROR

GENERAL COMMENTS AND/OR SUGGESTIONS FOR IMPROVEMENT OF PUBLICATION:

FROM: NAME _____
TITLE _____
COMPANY _____
ADDRESS _____

DATE _____

cut along dotted line

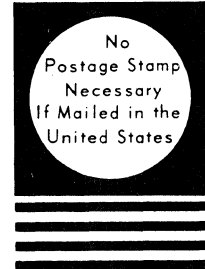
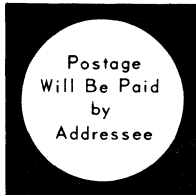
cut along dotted line

STAPLE

FOLD DOWN

SECOND

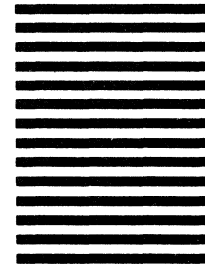
FOLD DOWN



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FOLD UP

FIRST

FOLD UP