

DataGeneral

**TECHNICAL
STATEMENT**

TEXT LISTING

068-000190-08

PROGRAM

LINE PRINTER TEST I

TEXT TAPE

097-000040-08

ABSTRACT

LINE PRINTER TEST I IS A MAINTENANCE PROGRAM DESIGNED TO TEST LINE PRINTER TYPES 4034A (DATA PRODUCTS), 4034B (DATA PRODUCTS), 4034C (CENTRONICS), 4034D (CENTRONICS). THIS PROGRAM WILL ALSO TEST THE ZONE SELECT AND FORMAT CONTROL OPTIONS.

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; NAME: LPT.TX          PART NUMBER: 097-000190
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; DESCRIPTION: LINE PRINTER TEST I
; TEXT FILE
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; REVISION HISTORY:
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; REV.          DATE
; 00          12/01/70
; 01          11/02/72
; 02          12/11/72
; 03          09/06/74
; 04          03/07/75
; 05          XX/XX/XX
; 06          06/18/76
; 07          04/15/77
; 08          12/22/78
;
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; 1976, 1977, 1978
; ALL RIGHTS RESERVED.
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;1. LPT.SR-LINE PRINTER TEST I
;
;2. REVISION HISTORY:
;   REV. 08 WAS CREATED TO IMPLEMENT CHANGES
;   NECESSARY FOR DGC COMPATIBILITY. DTR232
;   AND DTR235 WERE CLEARED AT SOURCE LEVEL.
;   THE STANDARD DIAGNOSTIC UTILITIES SWPAK
;   AND ODT WERE INCLUDED.
;
;2.1 TEXT FILE CHANGES
;     TEXT FORMAT CHANGED TO REFLECT NEW STANDARDS.
;     REVISION HISTORY SECTION WAS CREATED.
;
;2.2 SOURCE FILE CHANGES
;     ".TXTM 0" WAS ADDED TO ALLOW ASSEMBLY ON AOS.
;     DLIB PAGE ZERO MACRO PIGUU WAS EXPANDED.
;     DLIB PRE-MACRO PIREM WAS EXPANDED.
;     THE MESSAGE "4034 D KUNNING" WILL BE PRINTED
;     BEFORE ANY OTHER MESSAGE TO VERIFY THAT THE
;     PROGRAM WAS LOADED PROPERLY.
;     DLIB SETUP, LOUP, AND ERROR WERE INCLUDED.
;     DLIB POST MACRO WAS EXPANDED.
;     T21YD, SWPAK, ODT WERE INCLUDED.
;     HALTS WERE REPLACED WITH "ISR @I00I?".
;     HEADS WERE REPLACED WITH "LDA X,@ISMR?EG".
;     THE DIRT NAME WAS CHANGED TO "4034 D".
;     PROGRAM OPTIONS USING NON-STANDARD SWITCH
;     SETTINGS WERE CHANGED TO USE ALTERNATE
;     PROGRAM STARTING ADDRESSES.
;     DTR 232 AND DTR 235 CONCERNING THE LP2 WERE CLEARED.
;
;3. MACHINE REQUIREMENTS
;3.1 NOVA (EXCEPT MICRO) OR ECLIPSE FAMILY PROCESSOR
;3.2 4K READ/WRITE MEMORY
;3.3 TELETYPE OR CRT DISPLAY
;3.4 TYPE 4034 LINE PRINTER INTERFACE
;3.5 TYPE 4034A-4034D LINE PRINTER, OR
;     6073, 6074, 6086-6089 LP2.
;
;4. TEST REQUIREMENTS N/A
;
;5. SUMMARY
;     LINE PRINTER TEST I IS A MAINTENANCE
;     PROGRAM DESIGNED TO TEST LINE PRINTER
;     TYPES 4034A (DATA PRODUCTS), 4034B (DATA
;     PRODUCTS), 4034C (CENTRONICS), 4034D
;     (CENTRONICS), AND LP2 TYPES 6073 (DGC),
;     6074 (DGC), 6086-6089 (DGC). THIS PROGRAM
;     WILL ALSO TEST THE ZONE SELECT AND FORMAT
;     CONTROL OPTIONS.
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;6. RESTRICTIONS N/A
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;7. PROGRAM DESCRIPTION/THEORY OF OPERATION
;   SEE SEC. 5

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18. SWITCH SETTINGS

LOCATION "SMREG" IS USED TO SELECT THE PROGRAM OPTIONS (NOT SYSTEM CONFIGURATION). WHILE RUNNING UNDER DTOS, THIS LOCATION WILL BE LOADED BY THE MONITOR. HOWEVER UNDER STAND ALONE AND PROGRAM LOAD MODES THIS LOCATION WILL BE SET ACCORDING TO THE ANSWERS SUPPLIED BY THE OPERATOR. IN ANY CASE THE OPTIONS CAN BE CHANGED OR VERIFIED BY USING ONE OF THE COMMANDS GIVEN IN SEC. 8.2.

18.1 SWITCH OPTIONS

DIFFERENT BITS AND THEIR INTERPRETATION AT LOCATION "SMREG" IS AS FOLLOWS:

BIT	OCTAL VALUE	BINARY INTERPRETATION
1	40000 1	LOOP ON ERROR
		SKIP LOOPING ON ERROR
2	20000 1	PRINT TO CONSOLE
		ABORT PRINT OUT TO CONSOLE
3	10000 1	DO NOT PRINT % FAILURE
		PRINT % FAILURE
4	04000 1	ALLOW END OF PASS PRINT OUT
		SUPPRESS END OF PASS PRINT OUT
5	02000 1	DO NOT PRINT ON THE LINE PRINTER
		PRINT ON THE LINE PRINTER
6	01000 1	DO NOT HALT ON ERROR
		HALT ON ERROR
7	0	DO NOT PRINT SUMMARY AND/OR
		PASSING OF EACH SUBTEST
		PRINT SUMMARY AND/OR
	00400 1	PASSING OF EACH SUBTEST
		PRINT ONLY THE FIRST ERROR
8	0	PRINT EVERY ERROR
	00200 1	

18.2 SWITCH COMMANDS

ONCE THE PROGRAM STARTS EXECUTING THE STATE OF ANY OF THE BITS CAN BE CHANGED BY HITTING KEYS I-9, A-F. THE PROGRAM WILL CONTINUE RUNNING AFTER UPDATING THE OPTIONS. EACH KEY WILL COMPLEMENT THE STATE OF THE BIT AFFILIATED WITH IT, THUS BIT 4 CAN BE ALTERED BY HITTING KEY 4. SETTING OF ANY BIT OF LOCATION "SMREG" WILL SET BIT 0. (DEFAULT MODE IS DEFINED AS ALL BITS OF SMREG SET TO 0) THE PROGRAM CAN BE LOCKED INTO SWITCH MODIFICATION MODE BY TYPING A 0, IN WHICH CASE MORE THAN ONE BIT CAN BE CHANGED BEFORE CONTROL IS ALLOWED TO RETURN TO THE MAIN PROGRAM.

18.2.1 OTHER COMMANDS

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"CK" A "RETURN" CAN BE TYPED TO CONTINUE THE PROGRAM AFTER ITS LOCKED IN A SWITCH MODIFICATION MODE

"D THIS COMMAND GIVEN AT ANY TIME WILL RESET "SMREG" TO DEFAULT MODE AND RESTART THE PROGRAM.

"R THIS COMMAND GIVEN AT ANY TIME WILL RESTART THE PROGRAM. SWITCHES ARE LEFT WITH THE VALUES THEY HAD BEFORE THE COMMAND WAS ISSUED.

"U THIS COMMAND GIVEN AT ANY TIME WILL CAUSE THE PROGRAM CONTROL TO GO TO ODT (NOTE: THIS IS AN OPTIONAL COMMAND AND IS AVAILBLE ONLY IF ODTPK IS PRESENT)

M THIS COMMAND GIVEN AT ANY TIME WILL PRINT THE CURRENT OPERATING MODES.

18.3

STARTING ADDRESS=200 EXECUTE ALL TEST

STARTING ADDRESS=501 DIAGNOSTIC

STARTING ADDRESS=502 PRINT LETTER "L"

STARTING ADDRESS=503 PRINTER "N"

STARTING ADDRESS=504 PRINT LETTER "M"

STARTING ADDRESS=505 ONE LETTER EACH LINE

STARTING ADDRESS=506 PRINT CHARACTER SET

STARTING ADDRESS=507 ZONE PRINT OPTION

STARTING ADDRESS=510 FORMAT CONTROL OPTION

STARTING ADDRESS=511 KEYBOARD ECHO ON PRINTER

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19. OPERATING PROCEDURE
19.1 LOAD THE PROGRAM VIA THE BINARY LOADER
OR DIAGNOSTIC OPERATING SYSTEM.
19.2 MAKE THE PRINTER READY AND SET IT TO THE
ON LINE CONDITION.
19.3 SET THE SWITCHES TO 200
PRESS START(DIAG. OP. SYS. AUTO STARTS AT 200).
19.5 THE PROGRAM WILL BEGIN BY REQUESTING THE
OPERATOR TO TYPE THE DEVICE CODE. A 2-DIGIT
DIGIT NUMBER FOLLOWED BY A CARRIAGE RETURN.
THIS NUMBER SHOULD CORRESPOND TO THE DEVICE
CODE OF THE PRINTER UNDER TEST (USUALLY 17).
19.6 TYPE THE COLUMN WIDTH OF THE PRINTER(THIS
WILL NOT OCCUR OR RESTART UNLESS SWITCH
1 IS SET). THE OPERATOR SHOULD RESPOND
WITH A DECIMAL NUMBER REPRESENTING THE
WIDTH. THIS NUMBER IS USUALLY 80 OR 132.
OPERATOR THEN TYPES A CARRIAGE RETURN.
19.7 THE PROGRAM WILL REQUEST A "Y" BE TYPED.
IF THE ZONE SELECT OPTION IS TO BE TESTED.
OPERATOR TYPES "Y" IF YES, A CARRIAGE
RETURN IF NO.
19.8 THE PROGRAM WILL REQUEST A "M" BE TYPED
IF THE FORMAT CONTROL OPTION IS TO BE
TESTED. OPERATOR TYPES "Y" IF YES, A
CARRIAGE RETURN IF NO.
19.9 EXECUTION OF THE TEST PROGRAM WILL BEGIN.
19.10 STARTING THE PROGRAM AT ONE OF THE
SEVERAL TESTS WILL CAUSE THE PROGRAM
TO REMAIN IN THAT TEST UNTIL MANUALLY
STOPPED. STARTING AT LOCATION 200
WILL CAUSE THE SEVERAL TESTS TO
BE REPEATEDLY EXECUTED IN SEQUENCE.

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710. ERROR DESCRIPTION/PROGRAM OUTPUT
710.1 PRINTER DIAGNOSTIC (START ADDRESS 501)
WHEN AN ERROR IS DETECTED BY THE
DIAGNOSTIC THE PROGRAM WILL HALT AT
LOCATION ERR+1. IF SWITCH 1(1) IS
SET TO A ZERO THE PROGRAM WILL ENTER A
LOOP SUITABLE FOR SCOPING. CONSULT THE
ERROR. SETTING SWITCH 3(1) WILL PRINT
THE FAILURE RATE. SETTING SWITCH 1(1)
WILL CAUSE THE PROGRAM TO PROCEED
TO THE NEXT TEST.
A SPECIAL CARRIAGE POSITIONER TEST IS PROVIDED
(APPLICABLE TO PRINTER TYPES 4034C AND 4034D
ONLY) TO PROVIDE VISUAL VERIFICATION OF PROPER
OPERATION. FIRST SECTION PRINTS A LINE OF LETTERS
DIAGONALLY OVER SEVERAL PAGES, FROM COLUMN 1 TO
COLUMN N. THE SECOND SECTION PRINTS A SOLID
RIGHT TRIANGLE, FORMED BY POSITION PRINTING
OF ONE LETTER.
THE WORD "PASS" WILL BE PRINTED ON THE
TELETYPE AT THE END OF EACH ITERATION
OF THE DIAGNOSTIC.
710.1.2 WHEN A HALT IS EXECUTED IN ROUTINES
OTHER THAN THE DIAGNOSTIC CONSULT THE
LISTING FOR THE CAUSE OF THE ERROR.
710.2 SINGLE LETTER TEST
710.2.1 THESE ROUTINES STARTING AT LOCATIONS
502-503-504 PRINT TWO PAGES OF THE
LETTERS E., F., AND M. PAGES OF THESE
LETTERS OFTEN PROVE USEFUL WHEN
MAKING MECHANICAL ADJUSTMENTS ON
THE PRINTER.
710.3 ONE LETTER EACH LINE (STARTING ADDRESS=505)
710.3.1 THE FIRST LINE PRINTED CONTAINS ALL SPACES.
THE LETTER A IS PRINTED ON THE SECOND LINE,
B'S ARE PRINTED ON THE THIRD, ETC. A
TOTAL OF 4 PAGES ARE PRINTED.
710.4 PRINT CHARACTER SET (STARTING ADDRESS=506)
710.4.1 THE CHARACTER SET IS PRINTED AND KIPPLES
SUCH THAT AFTER 64 LINES EACH PRINT
HAMMER HAS PRINTED EVERY CHARACTER OF
THE SET.
710.5 ZONE PRINT OPTION (START ADDRESS=507)
710.5.1 IF THE OPERATOR FAILED TO TYPE A "Y"
FOR THE ZONE SELECT OPTION THIS TEST
WILL NOT BE EXECUTED.
710.5.2 THIS TEST PRINTS A PAGE WITH A (1) IN
THE FIRST POSITION OF ZONE 1. A PAGE
WITH A 2 IN THE FIRST POSITION OF
ZONE 2, ETC.

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FORMAT CONTROL OPTION (START ADDRESS=510)
IF THE OPERATOR FAILED TO TYPE A "Y"
FOR THE FORMAT OPTION THIS TEST WILL
NOT BE EXECUTED.
THIS TEST USES THE FORMAT CONTROL
OPTION FOR VERTICAL PAPER MOTION. A
LINE INDICATING THE NUMBER OF LINES
TO BE SLEWED IS PRINTED ON THE LINE
PRINTER. THE OPERATOR MUST COUNT
THE NUMBER OF LINES FROM THE PREVIOUS
LINE TO CHECK THE SLEWING. THE
SECOND PART OF THE TEST SLEWS AS
A FUNCTION OF THE FORMAT CONTROL
TAPE. THE OPERATOR MUST CHECK
THE PRINTER OUTPUT WITH THE HOLES
PUNCHED IN THE FORMAT TAPE.

NOTE: TO RUN THE FORMAT CONTROL PORTION OF
THE TEST, A PUNCHED FORMAT TAPE IS NEEDED.
THE TAPE NEEDS CHANNEL 1, (TOP OF FORM),
CHANNEL 12, (BOTTOM OF FORM), AND CHANNELS
2-7, (SINCE AT PRESENT THE DIAGNOSTIC DOES
NOT CHECK CHANNELS 8-11).
IF ANY OF THE CHANNELS 2-7 ARE NOT PUNCHED
THE DIAGNOSTIC WILL CAUSE A PRINTER ALARM
WITH THE "FORMAT" AND "TAPE" LIGHTS LIT.

KEYBOARD ECHO ON PRINTER (START ADDRESS=511)
THIS ROUTINE PERMITS THE OPERATOR TO
INPUT A STRING OF CHARACTERS VIA THE
TELETYPE TO BE OUTPUT ON THE PRINTER.
CHARACTERS ARE STORED IN MEMORY AND
SENT TO THE PRINTER UPON RECEIPT OF A
(CNTL Z) CHARACTER. THE TYPED LINE
WILL BE ECHOED ON THE PRINTER
UNTIL ANOTHER TELETYPE KEY IS STRUCK.
A (ESC) KEY WILL CAUSE
A CARRIAGE RETURN AND LINE FEED TO
BE PRINTED ON THE TELETYPE BUT
NOT SENT TO THE PRINTER.
STARTING THIS PROGRAM AT LOCATION 200
WILL CAUSE ALL OF THE PREVIOUSLY
MENTIONED TESTS, EXCEPT THE KEYBOARD
TEST, TO BE REPEATEDLY EXECUTED.

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OCTAL DEBUG TOOL (ODT)
THE DIAGNOSTIC IS EQUIPPED WITH A BUILT IN ODT WHICH CAN
BE ACCESSED BY HITTING CONTROL 0 ("O") AT ANY TIME DURING
THE EXECUTION OF THE PROGRAM (AFTER SETTING THE PARA-
METERS).
ON ENTERING ODT THE ADDRESS OF THE LOCATION HAVING THE
NEXT INSTRUCTION TO BE EXECUTED WILL BE TYPED-OUT.
CONVENTIONS AND SYMBOLS
THE FOLLOWING CONVENTIONS ARE USED BY THE ODT:
? PUNCHED WITH A "7"
@ ODT IS READY AND AT YOUR SERVICE.
COMMAND STRUCTURE
AN ODT COMMAND HAS THE FOLLOWING FORMAT:
[ARGUMENT] [COMMAND]
"EXP" AN OCTAL EXPRESSION CONSISTING OF OCTAL NUMBERS
SEPARATED BY PLUS (+) OR MINUS (-) SIGNS. LEAD-
ING ZEROS NEED NOT BE TYPED.
"ADR" AN ADDRESS IS THE SAME AS AN EXPRESSION EXCEPT
THAT BIT 0 IS NEGLECTED.
A COMMAND IS A SINGLE TELETYPE CHARACTER
ODT COMMANDS
THE LOCATIONS THAT CAN BE EXAMINED AND MODIFIED BY THE
USER ARE CALLED CELLS. THESE CELLS ARE OF TWO TYPES:
INTERNAL CPU CELLS AND MEMORY LOCATIONS.
OPENING INTERNAL CELLS
THE COMMAND TO OPEN ONE OF THE INTERNAL REGISTERS IS OF
THE FORM "NA" WHERE N IS ANY OCTAL EXPRESSION BETWEEN
0 AND 7
0-3 FOR ACCUMULATORS 0-3
4 FOR PC OF THE NEXT INSTRUCTION TO BE EXECUTED IN
THE EVENT OF A "P" COMMAND.
5 CPU AND TIO STATUS
BIT INTERPRETATION
15 STATUS OF TIO DONE FLAG
14 STATUS OF INTERRUPTS (IOW FLAG)
13 STATUS OF CARRY BIT
6 ADDRESS OF THE LOCATION HAVING THE BREAK POINT (IF
ANY)
7 INSTRUCTION AT THE BREAK POINT LOCATION
OTHER COMMANDS TO OPEN CELLS ARE:
"ADR/" OPEN THE CELL AND PRINT ITS CONTENTS
"/" OPEN THE CELL CURRENTLY POINTED TO BY THE POINTER
AND PRINT ITS CONTENTS
"+ADR/" AND "ADR" TO THE POINTER, OPEN THE CELL
AND PRINT ITS CONTENTS.
"-ADR/" SUBTRACT "ADR" FROM THE POINTER, OPEN
THE CELL AND PRINT ITS CONTENTS.
"CR" THE RETURN KEY IS USED TO CLOSE THE OPEN CELL
WITH OR WITHOUT MODIFICATION.
"LF" LINE FEED IS USED TO CLOSE THE OPEN CELL WITH OR

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1 WITHOUT MODIFICATION AND TO OPEN THE SUCCEEDING
2 CELL.
3 CLOSE THE OPEN CELL WITH OR WITHOUT MODIFICATION
4 AND OPEN THE PRECEDING CELL
5 CLOSE THE OPEN CELL WITHOUT MODIFICATION, AND
6 OPEN THE CELL POINTED TO BY ITS CONTENTS.
7 + "ADR"/ CLOSE THE OPEN CELL WITHOUT MODIFICATION, AND
8 OPEN THE CELL POINTED TO BY ITS CONTENTS + "ADR".
9 - "ADR"/ CLOSE THE OPEN CELL WITHOUT MODIFICATION, AND
10 OPEN THE CELL POINTED TO BY ITS CONTENTS - "ADR".
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**00000 TOTAL ERRORS, 00000 PASS 1 ERRORS

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11.3.2 MODIFICATION OF A CELL
2 ONCE A CELL HAS BEEN OPENED ITS CONTENTS CAN BE MODIFIED
3 BY TYPING THE NEW VALUE THE CELL IS TO CONTAIN IN THE
4 FORM OF AN OCTAL EXPRESSION FOLLOWED BY "CR" OR "LF".
5 IF A + OR - IS TYPED AS THE FIRST CHARACTER OF THE EX-
6 PRESSION THEN THE VALUE OF THE EXPRESSION IS ADDED TO OR
7 SUBTRACTED FROM THE OLD CONTENTS OF THE CELL. THE
8 ADDRESS ITSELF OR AN EXPRESSION RELATIVE TO THE ADDRESS
9 CAN BE DEPOSITED BY TYPING A "." OR "+"/-OCTAL EXPRESS-
10 ION". A RUBOUT COMMAND GIVEN RIGHT AFTER OPENING A CELL
11 ALLOWS THE MODIFICATION OF ITS CONTENTS AS IF THEY WERE
12 TYPED IN JUST BEFORE THE COMMAND WAS ISSUED.
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11.3.3 OTHER ODT COMMANDS
2 RUBOUT THIS KEY IS USED TO DELETE ERRONEOUSLY TYPED
3 DIGITS. EACH TIME THE KEY IS PRESSED THE RIGHT MOST
4 DIGIT IS DELETED AND ECHOED ON THE TERMINAL. IF
5 THE RUBOUT KEY IS PRESSED RIGHT AFTER OPENING A
6 CELL THEN IT DELETES THE RIGHT MOST DIGIT OF THE CELL
7 CONTENTS. THIS ALLOWS THE MODIFICATION OF THE CELL
8 AS IF ITS CONTENTS WERE TYPED IN JUST BEFORE THE
9 KEY WAS PRESSED.
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"ADR" INSERT A BREAK POINT AT LOCATION "ADR".
ONLY ONE BREAK POINT CAN BE INSERTED AND ANY
ENTRY TO ODT AFTER EXECUTING A BREAK POINT WILL
CAUSE IT TO BE DELETED.
D DELETE THE BREAK POINT IF ANY.
P RESTART THE EXECUTION OF THE PROGRAM AT LOCATION
POINTED BY "A".
"ADR" START EXECUTING THE PROGRAM AT "ADR" AFTER AN
IO-RESET.
K KILL THE STRING TYPED SO FAR. THE ODT RESPONDS
WITH A "?" AND THE OPEN CELL IS CLOSED WITHOUT
MODIFICATION.
= PRINT THE OCTAL VALUE OF THE INPUT ONLY.
THIS WILL CLOSE ANY OPEN CELLS WITHOUT
MODIFICATION AND WILL NOT OPEN A CELL

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NOTE: IN PROGRAMS WHICH RELOCATE THEMSELVES THE
THE USER SHOULD PLACE BREAK POINTS ONLY IN THE
ORIGINAL PROGRAM AREA. IF A BREAK POINT IS
PLACED OUTSIDE THIS AREA THE RESULTS WILL
BE UNPREDICTABLE.

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S2APD 000050 MC 3/01