This manual is a supplement to the LAP6-DIAL
Programmer's Reference Manual, DEC-12-SE2D-D.

TABLE OF CONTENTS

1.0 NEW FEATURES

DIAL[1]-MS has been modified[2] to provide:

    a. support for 4 RK8 disks

    b. use of an LPØ8 line printer

    c. chaining of sources for assembling

    d. bootstrapping from RFØ8 or RK8 disk

    e. multiple card deck input.

These features facilitate user interaction with DIAL-MS and expand the range of supported peripherals.

2.0 SYSTEM IMPROVEMENTS

2.1 RK8 Disks

From 1 to 4 RK8 disks may be accessed by DIAL-MS. The acceptable unit numbers to be used for addressing PDP-12 storage devices for DIAL-MS commands are:

device	unit numbers	logical disk units
1 RSØ8 disk	1Ø-11	Ø-1
2 RSØ8 disks	1Ø-13	Ø-3
3 RSØ8 disks	1Ø-15	Ø-5
4 RSØ8 disks	1Ø-17	Ø-7
1 RK8 disk	1Ø-15	Ø-5
2 RK8 disks	2Ø-25	$6-13_8$
3 RK8 disks	3Ø-35	$14-21_8$
4 RK8 disks	4Ø-45	$22-27_8$

For example, to save the program JACK on the second of 2 RK8 disks, acceptable commands are

    →SP JACK,22   (1Øth logical disk unit)

    →SP JACK,24   (12th logical disk unit)

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[1] LAP6-DIAL is referred to as DIAL in this document.

[2] This document is a supplement to the LAP6-DIAL Programmer's Reference Manual, DEC-12-SE2D-D.

For a PDP-12 configuration with more than 1 RK8, disk $\emptyset$ (units $1\emptyset$-15) should be the last disk accessed before doing any operation requiring pressing the I/O PRESET key (as in restarting DIAL). An error will occur if DIAL-MS is not on the last disk accessed before the I/O PRESET and in most systems DIAL-MS resides only on unit $\emptyset$. This condition will arise primarily if a program is loaded by the LO command from disk units $2\emptyset$-45. Loading the program USER1 from unit 43, for example, by the command →LO USER1,43 and then calling DIAL-MS (after USER1 is loaded) by pressing I/O PRESET, setting the Left Switches to $\emptyset7\emptyset1$ and the Right Switches to $731\emptyset$, pressing DO and then START $2\emptyset$ will propagate an error. Call DIAL-MS again to rectify the situation.

Addressing non-existent RK8 disks halts the system. DIAL-MS must be reloaded to continue.

For a system with RS$\emptyset$8 disks, use unit numbers $1\emptyset$-17. Values from $2\emptyset$-47 are interpreted as $1\emptyset$-17 by DIAL-MS on such a configuration.

2.2 LP$\emptyset$8 Printer

In addition to the 132 column printer supported by DIAL-MS, the $8\emptyset$ column LP$\emptyset$8 line printer may be interfaced to the system. To use the printer, the only requirement is that it be in the "ready" status when DIAL-MS (or PIP) is loaded.

3.0 PIP

3.1 Card Decks

PIP has been modified to permit entry of more than one card deck at a time. The message calling for more tapes is now

    MORE CARDS OR TAPES

    n--no more tapes

    r--read more input

Type the appropriate reply, as before.[1]

If an attempt is made to access a non-existent disk via PIP, the message NO DISK appears on the screen. Type CTRL/P to return to PIP or CTRL/D to return to DIAL. If the RK8 disk is not functioning properly, the message DRIVE NOT WORKING is displayed. Exit as above and check the disk.

3.2 Rebootstrapping

For a PDP-12 system with at least 8K of core and one RSØ8 or RK8 disk, PIP returns directly to DIAL-MS without having to read from tape, thereby greatly increasing the speed of this return. If DIAL-MS is not on the disk and a return to DIAL-MS on tape is desired, type a carriage RETURN as the first character after PIP is loaded by the procedure in section 5.1 of the LAP6-DIAL manual to activate the LINCtape bootstrap.

4.0 ASSEMBLER

4.1 CHAIN

A new pseudo-op, CHAIN, has been added to facilitate assembling large programs. A CHAIN statement in the form

    CHAIN "NAME" UNIT

placed at the end of one program will call the NAMEd file from the specified UNIT. Assembly of the current program is terminated and that of the called program is initiated. Note that the file NAME must be enclosed in quotes. A program which was called for assembly by a CHAIN statement can include another CHAIN statement, thus placing no limit on the number of files that can be assembled together. If a UNIT is not specified, the assembler will look for the indicated program on the same unit as the program currently being assembled.

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[1] Note that a response of A (read another tape), an acceptable reply for previous versions of PIP, is properly interpreted by this version of DIAL-MS for the user's convenience.

If the program currently being assembled is in the working area, rather than saved on tape, and no unit is specified, the assembler looks for the called program on unit 1∅.

When a CHAIN statement is encountered during assembly, the mode is reset to LINC mode and the line number counter is reset to zero so that the line numbers in the called program will match the scope line numbers. For this reason, there will be more than one section in the listing with the same line numbers.

To facilitate debugging, the assembler prints the message "CHAINING name" on the output device, where "name" is the file which is starting to be assembled. The message is printed on both passes of the assembler. Consider the following output.

```
                      CHAINING LNCN
                      CHAINING BWDN
         ∅∅37 US
                      CHAINING TNNY

         ∅∅45 IR
         ∅∅67 IR
                      CHAINING MNSF
```

In this example, 5 programs (the initial one, plus LNCN, BWDN, TNNY, and MNSF) have been assembled as one file. The errors encountered were an undefined symbol at line 37 of program BWDN and illegal references at lines 45 and 67 of program TNNY.

If an error occurs in the CHAIN statement itself, the message CH (chain error) is printed and assembly is terminated.

The CHAIN pseudo-op obsoletes the SAVSYM and LODSYM pseudo-ops for systems using DIAL-MS.

5.0 EDITOR

5.1 Formatting

The automatic formatting feature of the DIAL Editor has been expanded
to accommodate programs that require repression of tag field formatting.
For example, the FPP (Floating Point Processor) Assembler uses a comma
to distinguish between the core address and the index register field
in a memory reference instruction. Sense Switch $\emptyset$ now controls format-
ting by the Editor. When SSW$\emptyset$=$\emptyset$, the standard DIAL formatting is imple-
mented; when SSW$\emptyset$=1, the new formatting is activated. Specifically,
when SSW$\emptyset$=1, a tab can be typed between the instruction and the core
address which when a comma is typed after the core address causes no
shift into the tag field or movement of the slash for the comment field.
For example

Typed		Displayed		
SSW$\emptyset$=$\emptyset$	FLDA(space)2$\emptyset\emptyset$,2	FLDA 2$\emptyset\emptyset$,	2	
SSW$\emptyset$=1	FLDA(space)2$\emptyset\emptyset$,2	FLDA 2$\emptyset\emptyset$,	2	
	FLDA(tab)2$\emptyset\emptyset$,2		FLDA 2$\emptyset\emptyset$,2	
	DIS,FLDA(tab)2$\emptyset\emptyset$,2	DIS,	FLDA 2$\emptyset\emptyset$,2	

5.2 Cursor

Users familiar with the previous version of DIAL-MS will notice that
with this version the cursor flickers on the scope. This feature was
implemented to facilitate locating the cursor in a lengthy display.

6.0 SYSTEM INITIALIZATION AND SYSTEM BUILD

These 2 procedures (described in sections A.3 and A.2, respectively, of
the LAP6-DIAL manual) no longer require that an EXIT command be issued
to preserve the Editor's pointers. DIAL-MS commands and statements can
be accepted directly.

7.0 CORRECTIONS

The following is a list of corrections to LAP6-DIAL Programmer's Reference Manual, DEC-12-SE2D-D.

Page 2-3   For the example in section 2.4 the input typed should be

JMP ENT (not SET 12)

Page 3-3   Note that the letters I and U cannot be used as user-defined symbols (Section 3.2.1-b)

Page 3-9   When using the LISTAPE pseudo-op to output to a mass storage device, the next sequential logical disk unit will be used if the requested unit becomes full.

Page 4-12   When exiting to the User's Monitor Command, the extended operations buffer remains in extended address mode.

Page A-3   The illustrations for the Right Switches for System Initialization and System Startup are reversed. The correct Right Switches settings for System Initialization are:

↓↓↓ ↑↓↓ ↑↑↓ ↑↑↑

The correct Right Switches settings for System Startup are:

↓↓↓ ↑↓↓ ↑↑↑ ↑↑↑

Page B-1   An error message has been added

C M   Comma Mistake - a comma was used illegally.