



DN92 REMOTE STATION USER'S GUIDE

AA-5711A-TB

April 1978

OPERATING SYSTEM: TOPS-10 Version 6.03

SOFTWARE: DN92 Version 1
NETLDR Version 2A(110)

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PREFACE

This guide is intended for users and station operators who are at remote sites, distant from the DECsystem-10. Everyone at a remote site should read Chapter 1, "Introduction"; operators should read Chapter 2, "DN92 Operator Procedures" and Chapter 3, "Station Peripherals"; systems programmers, software installers and software maintenance personnel can benefit from Chapter 4, "Trouble Shooting". The appendixes contain specifics on certain DN92 registers and the hardware error messages.

Supporting Documentation

If not all the DECsystem-10 Software Notebooks are available, the remote station user should have at least:

Getting Started with DECsystem-10	[DEC-10-XGSDA-A-D]
DECsystem-10 Operating System Commands Manual	[AA-0916C-TB]
DECsystem-10 Networks Programmer's Guide and Reference Manual	[DEC-10-ONPGA-A-D]

Additionally, the following documents are referred to in this manual:

DECsystem-10 Galaxy Operation and System Programming Procedures and its update	[DEC-10-OGBOA-A-D] [DEC-10-OGBOA-A-DN1]
DECsystem-10 Software Notebook 10, Functional Specifications	

Information on installation of network software can be found in:

DECsystem-10 Networks Software Installation Guide	[AA-5156B-TB]
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Information for DECsystem-10 operators can be found in:

DECsystem-10 Operator's Guide and its update	[DEC-10-ODOGA-B-D] [DEC-10-ODOGA-B-DN1]
DECsystem-10 Operator's Guide (KL Series) and its update	[AD-5104A-TB] [AD-5104A-T2]

CHAPTER 1
INTRODUCTION

A DECsystem-10 network contains both local (directly attached to the host DECsystem-10 processor) and remote processors. Within the network, each processor is called a node. One DECsystem-10 is typically the host for several remote processors, but several DECsystem-10's can be interconnected in a single network. Connections between nodes are called links. Figure 1-1 illustrates a DECsystem-10 network with a multilink configuration.

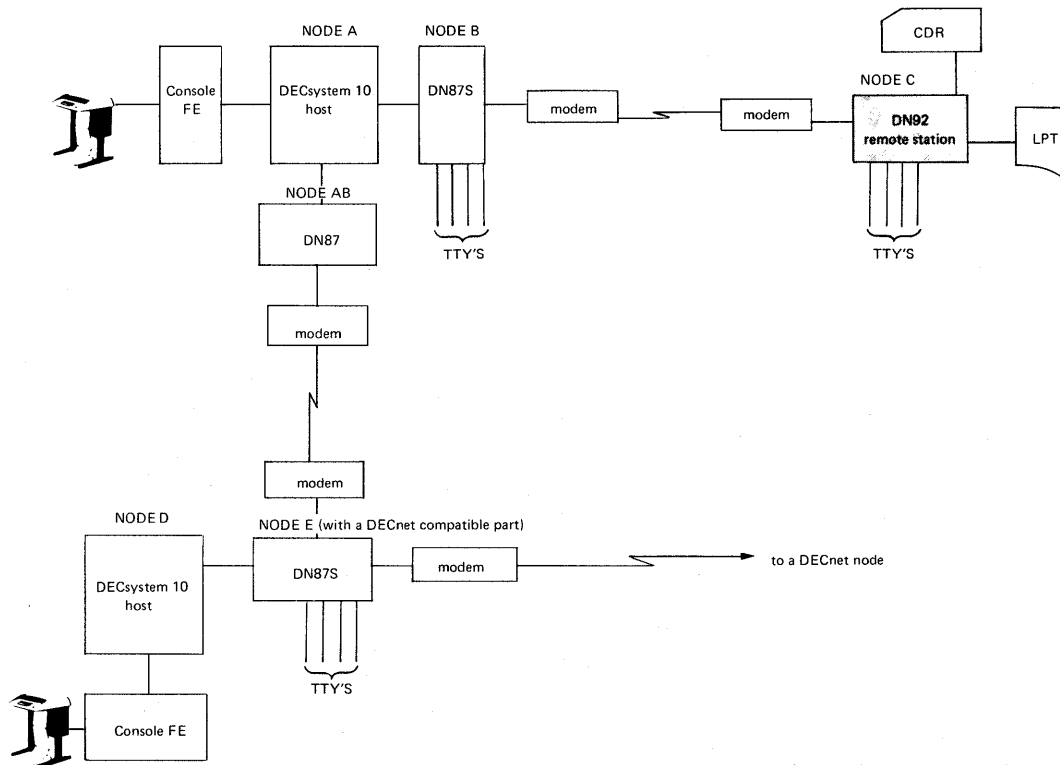


Figure 1-1 A DECsystem-10 Multilink/Multinode Network

Within a DECsystem-10 network, all communication between nodes is done using the DDCMP¹ and NCL² protocols; when a DECsystem-10 node communicates with a DECnet node, the DDCMP and NSP³ protocols are used (the DECnet compatible port software takes care of the

¹ DDCMP: Digital Data Communications Message Protocol
² NCL: Network Control Logic
³ NSP: Network Services Protocol

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translation between NCL and NSP). Thus DIGITAL processors of various types can be connected in many ways to provide flexible networking arrangements.

In a network containing remote stations and multiple DECsystem-10 hosts, the

SET HOST

command can be used to specify the host that any user terminal connects to and where commands and programs are executed (for more information on these aspects of networking, see the "DECsystem-10 Networks Programmer's Guide and Reference Manual").

If you are the user at a remote station in a DECsystem-10 network, you must learn how to operate your equipment and what to do in case things go wrong. Some problems may originate at your station and can perhaps be corrected there. Other problems may occur at the node to which you are connected. These problems may cause your station to cease operations. If your host processor goes down, you may have to wait for it to come back up again (in a multihost network you may be able to "SET HOST" to another processor).

For a remote station to communicate with its DECsystem-10 host, the required network software must be installed at the DECsystem-10 host. Once this task has been completed, the remote station can be loaded. When the station is turned on, it sends (from a bootstrap ROM or when its operator presses some keys) a "request-to-load" message over the line to the DECsystem-10. This message asks the DECsystem-10 to downline load the installed software into remote station memory. When the load process has been completed, a message of the following form is displayed or printed at the remote station operator's console:

```
[INITIALIZING NETWORK ... V... NODE...]
```

Once loading has been successful, the standard identification message (with a system number and period prompt) from the DECsystem-10 host appears. (If loading is not successful, the INITIALIZING and identification messages do not appear.) After this message appears, users can log in and start running their programs or processes. For example, at a DN92 remote station, the following sequence occurs at startup time:

- The operator/user turns on the station power and the operator's console terminal; a % (percent) sign appears and the cursor blinks on the screen.
- The ROM bootstrap at the station starts automatically and sends a load request to the remote host.
- The octal display registers on the operator's console change as loading occurs.
- The message:

```
[INITIALIZING NETWORK DN92 V0.7 NODE "DN92"]
```

appears on the operator's console when loading is complete (the node name that appears may be different from that in the example).

- A successful software load is followed by execution of SYSCHK, a hardware diagnostic program. Hardware problems are indicated by appropriate error messages (see Appendix B). For

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example, if certain devices are not attached at the remote station, the bell/buzzer of the terminal sounds and a message of the following type is displayed:

```
%%TTY10 NO XMT FLAG
```

These NO XMT FLAG messages can be ignored if the devices are not needed.

Hardware problems must be resolved by field service personnel. Once the loading of software from the host has been completed and SYSCHK has been successfully run, the node comes on line and the DECsystem-10 sends the usual signon message, for example:

```
RS300 KL10 SYS#1026 14:37:36
```

The user can then log in and get started on his own tasks.

Log in to the host processor in exactly the same way as if you were at a local terminal connected to the DECsystem-10. For example, when the above prompt indicates that your terminal is ready for login enter LOGIN ; the system prompts for your ppn (project, programmer number) with a sharp (#):

```
.LOGIN   
JOB 61 RL340A KL10 SYS#1026 TTY211  
#
```

Enter your ppn . The system asks for your password:

```
#27,5117   
Password:
```

Enter your unechoed password . A time-date-day is displayed:

```
Password:   
1016 07-NOV-77 Mon
```

An important feature of the TOPS-10 operating system, particularly valuable to the user at a remote station, is the HELP command. It provides brief descriptions of many TOPS-10 commands and programs at the user's terminal. To use this command, type:

```
HELP * 
```

A list of all commands and programs for which HELP files are available are output. To have the HELP file for a particular command displayed at your terminal, enter

```
HELP command 
```

For example, to obtain the HELP file for the QUEUE command, enter:

```
HELP QUEUE 
```

The syntax and switches for the command are output.

For more information on all DECsystem-10 commands, see the Operating System Commands Manual.

CHAPTER 2

DN92 OPERATOR PROCEDURES

The DN92 is a PDP-8A based remote station for the DECsystem-10. It can exist in a number of different configurations and can contain a card reader, a line printer and several user terminals (TTY's). An operator's console is always part of the configuration. For example, Figure 2-1 illustrates a typical DN92 configuration.

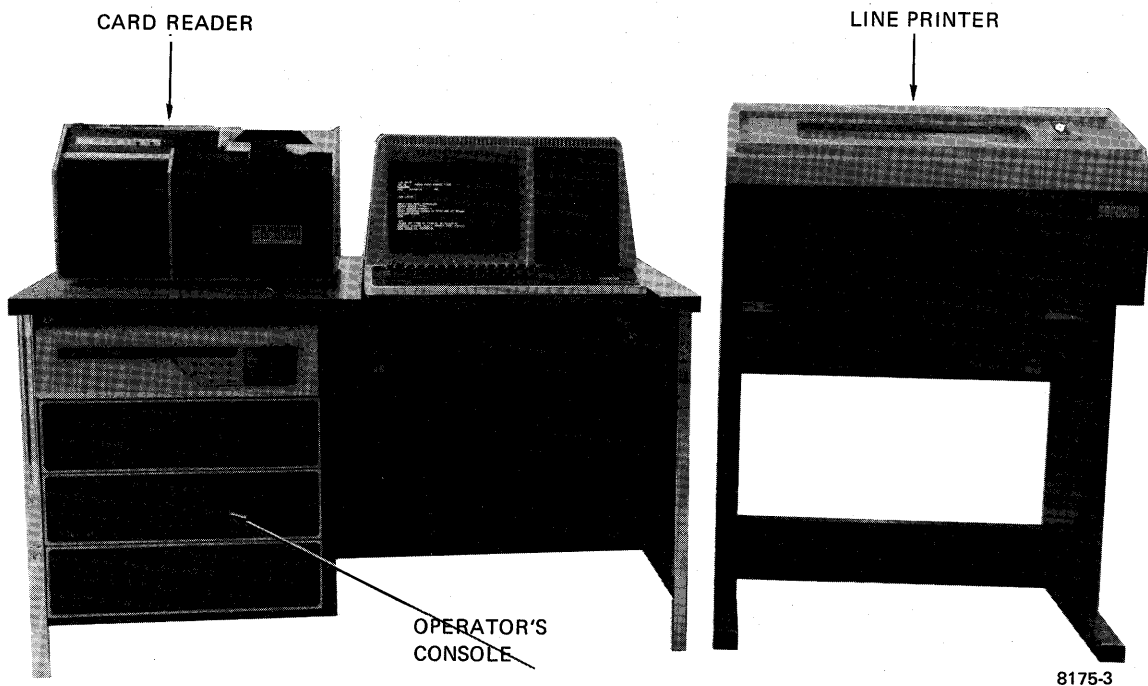


Figure 2-1 A Typical DN92 Configuration

If neither a card reader nor a line printer is used in the configuration, up to 16 asynchronous lines for TTY's can be used with the DN92. If either a card reader or a line printer is used, but not both, up to 12 asynchronous lines can be used. If both a line printer and a card reader are included, up to 8 asynchronous lines can be used. Each asynchronous line can be attached to a single user terminal.

The DN92 can have only one synchronous link to its adjacent node, and it cannot be used by other remote stations for routing messages. Therefore, the DN92 is only a boundary node in the DECsystem-10

DN92 OPERATOR PROCEDURES

network; it is always "at the end of the line". For example, Figure 1-1 illustrates a network containing a DN92 Remote Station.

2.1 STARTING THE DN92 REMOTE STATION

To start the DN92 Remote Station, turn on the power at the operator's console (see Figure 2-2). Both power switches must be on and the power lamp (on the back of the operator's console) should be lit. Additionally, turn on the power for your terminal.

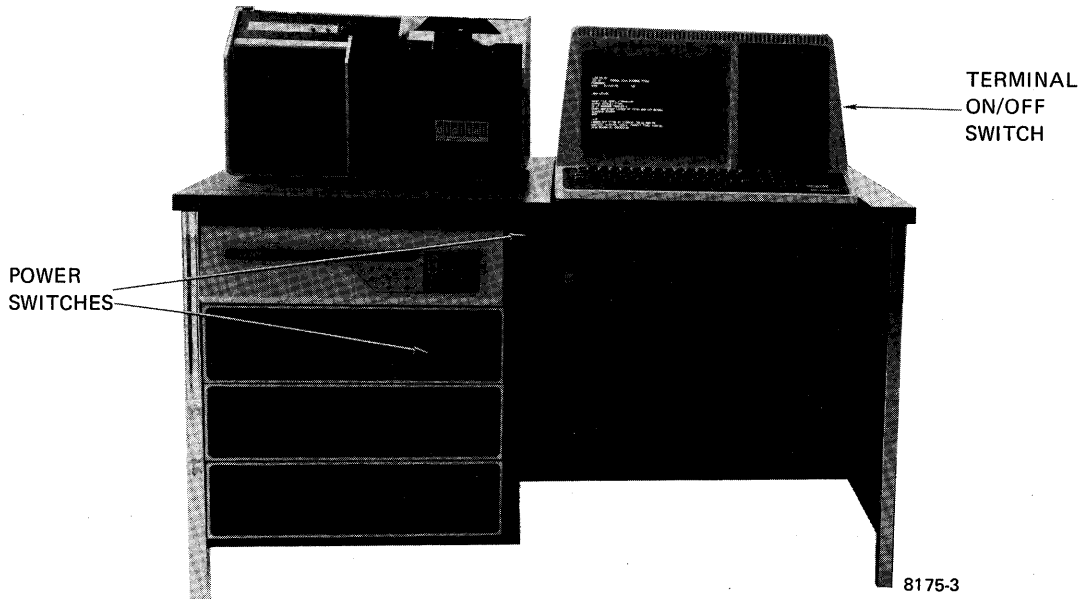


Figure 2-2 The DN92 Operator's Console

Once the power is on, the cursor appears on the screen and the bootstrap ROM starts up automatically, sending its request-to-load message to the host DECsystem-10. Once the ROM is running, a % sign appears on the operator's console. (This is the default action after one minute, if you enter no NETLDR commands at the operator's console, and the appropriate entry appears in the NETLDR.INI at the DECsystem-10 host.) As the host loads remote station memory, the ADDR5 and DISP lamps on the operator's console are altered.

Once loading has successfully completed, the SYSCHK program is automatically executed at the remote station. During its execution, a message of the following form is displayed:

```
[INITIALIZING NETWORK DN92 V0.7 NODE "name"]
```

(The displayed node name is assigned at network installation time on the DECsystem-10 host.)

Execution of SYSCHK takes about one minute. Successful completion of SYSCHK is indicated by the display of the DECsystem-10 host message for login; for example:

```
RS300 KL10 SYS#1242 14:37:26
```

DN92 OPERATOR PROCEDURES

2.2 CHECKING THE HARDWARE WITH SYSCHK

SYSCHK checks the components of the DN92 remote station to isolate any hardware problems.

NOTE

SYSCHK is executed only when the remote station is downline loaded; SYSCHK is not executed if the station is manually restarted (see Section 4.1).

SYSCHK issues messages to indicate station and line status. Messages which can be displayed during SYSCHK execution are listed in Appendix B. These messages indicate important hardware problems particularly with the DP8E modem controller; if they occur, contact your field service representative. (The DP8E is a synchronous modem interface that provides a high-speed facility for modem control.)

2.3 PROVIDING THE STATION WITH OPERATOR PROGRAMS

To support a line printer and/or card reader at the remote station, the remote station operator can run the appropriate spoolers manually or, more typically, use the OPSER program. (For more information on OPSER, see the "DECsystem-10 Galaxy Operation and System Programming Procedures" and the "DECsystem-10 Operator's Manual".)

To set up OPSER to run a line printer and a card reader, run OPSER manually with the following parameters (as the remote station operator, you normally log in under ppn [100+nn,2], where nn is your node number).

```
.LOGIN          login
Job    RS...   host message
#172,2        operator ppn at node number 72
Password:
.R OPSER      run OPSER
*:SLOGIN     log in job for line printer, suppressing login
              chatter (:LOGIN can also be used)
*:DEFINE L=   define L as the name for the current subjob
*L-R LPTSPL  run LPTSPL under subjob L to activate remote
              station line printer
*L-START     start the LPTSPL job for LPT720:
*:SLOGIN     log in job for card reader
*:DEFINE C=   define C as the name for the current subjob
*C-R SPRINT  run SPRINT to activate remote station card reader
*C-START     start the SPRINT job for CDR720:
*:MONITOR    EXIT to monitor
```

NOTE

L- and C- do not need to be repeated for each command once they have been defined.

DN92 OPERATOR PROCEDURES

To have these commands executed automatically, the remote operator login can be done when INITIA is run at the DECsystem-10 and the OPSEER commands can be placed in the .ATO file. To do this, create a file in your operator's file area with the name OPR.ATO. Place in it all the commands to use OPSEER and the necessary LPTSPL and SPRINT subjobs (as in the above example). (For a description of INITIA, see the "INITIA" specifications in Notebook 10.)

CHAPTER 3
STATION PERIPHERALS

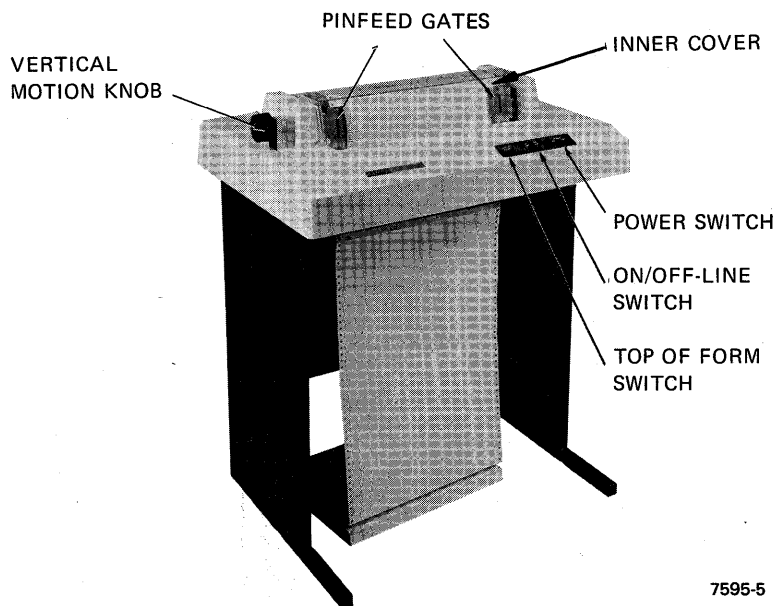
The typical DN92 station can contain a line printer and/or a card reader. These units are briefly described in this chapter and in supporting hardware documents that are provided with your equipment.

3.1 PRINTERS

The printer available at your DN92 remote station can be either an LA180 (a dot matrix printer that operates at a speed of 180 characters per second) or an LP05 (a drum printer that operates at a speed of 300 lines per minute). Both of these printers can print a 132-character line. To operate these units, you must know how to change and adjust paper and ribbons, turn the equipment on and off and put it on- and off-line. Vertical paper motion such as line feed, vertical tab and form feed on DN92 station printers is controlled by the DN92 software.

3.1.1 The LA180 Dot Matrix Printer

The LA180 can print both upper- and lowercase characters on full width pin-feed paper. It uses a 7 x 7 dot matrix to form individual characters and can handle multipart paper.



7595-5

Figure 3-1 The LA180 Dot Matrix Printer

STATION PERIPHERALS

To load paper or change forms in the LA180:

1. Be sure power is off (POWER rocker switch in OFF position).
2. Lift small inner cover of printer.
3. Open pin-feed tractor gates.
4. Feed paper from below through slot and up over tractors (be sure paper is level; adjust distance between tractors if necessary by loosening right tractor hold-knob and pushing tractor along the guide rod).
5. Close tractor gates.
6. Close cover, feeding paper through the slot behind cover window.
7. To adjust paper vertically to Top-of-Form, rotate the knobs (at right or left) to advance paper appropriately.

To change a ribbon in the LA180:

1. Be sure power is off (POWER rocker switch in OFF position).
2. Lift small inner cover of printer.
3. Examine ribbon installed in the printer, making careful note of the feed route. Note that the ribbon route is shown on a label inside the cover.
4. Remove the old ribbon saving one spool on the post.
5. Insert the new ribbon, being careful to thread it properly and to wind the metal grommet near the end of the ribbon onto the reel. This grommet must not pass the ribbon guide.
6. Close the printer cover.

To operate the LA180:

1. Press POWER switch to ON position.
2. To eject paper to TOP OF FORM, press TOP OF FORM switch.
3. Press ON/OFF LINE switch to ON-LINE position.

STATION PERIPHERALS

3.1.2 The LP05 Drum Printer

The LP05 is either an uppercase-only or an upper/lower case line printer (see Figure 3-2). It uses full-width pin-feed paper, has a rotating character drum, and controls for adjusting ink density, paper width, horizontal and vertical alignment and forms thickness.

Each printer is provided with a small booklet, an "OPERATORS GUIDE", which describes in detail how to load paper and change ribbons.

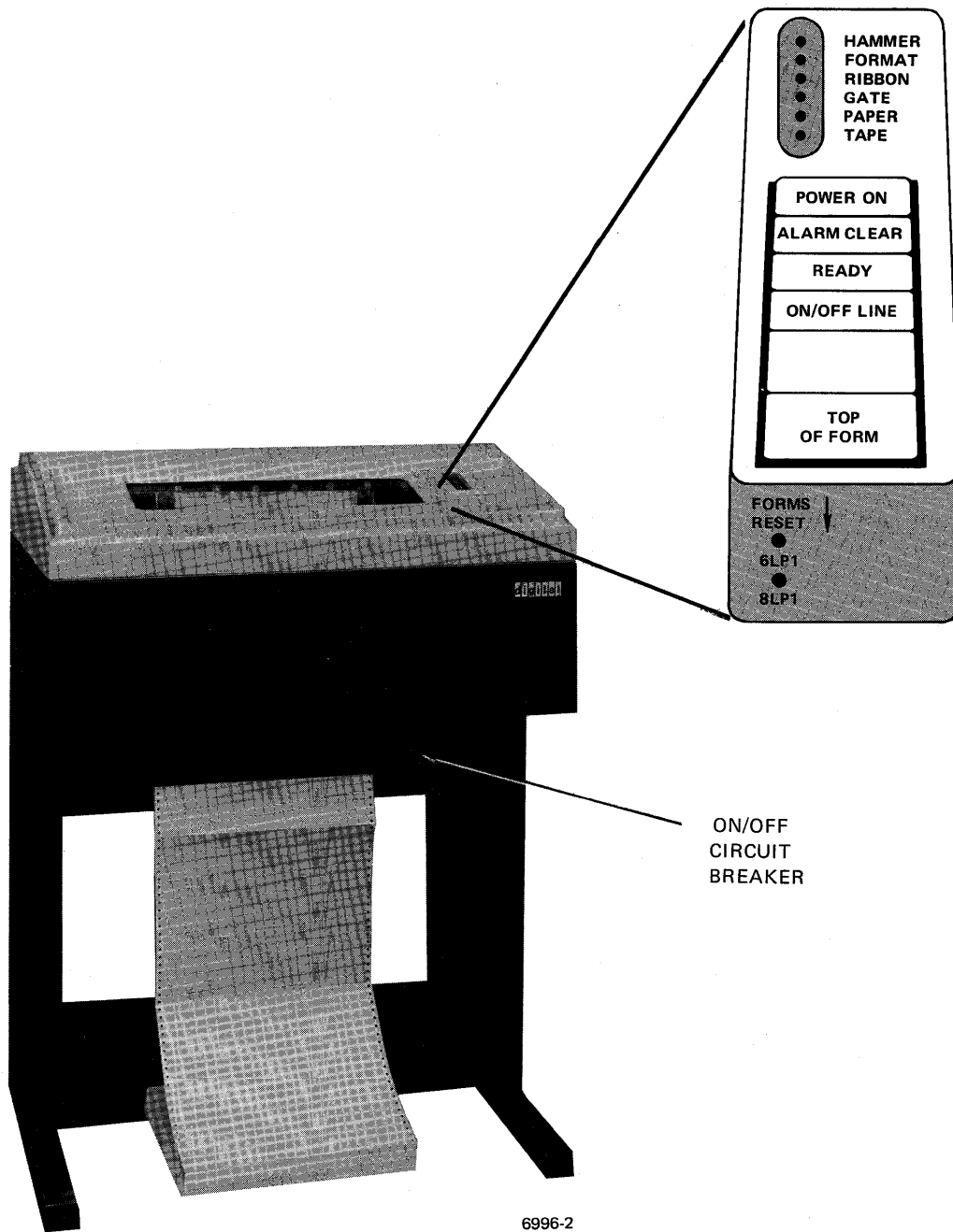


Figure 3-2 The LP05 Drum Printer

STATION PERIPHERALS

This booklet can be found in the pocket provided for it inside the cover (lift the cover; the pocket is on the right side of the drum gate). Once paper and ribbon have been installed, you are ready to operate your line printer.

To operate the LP05:

1. Push power circuit breaker (beneath main printer mechanism) to ON position.
2. The power lamp on the operator's control panel should light up after a few seconds.
3. Press ON LINE switch. It should light up. This places the printer on-line so that it can receive data for printing.
4. Make fine adjustments for paper or ink density, if necessary (refer to your OPERATORS GUIDE booklet for these procedures).

If the ALARM lamp is lit, a malfunction has occurred, and the printer halts and generally goes off-line. To restart operations, you must determine the cause, correct the problem, press the CLEAR switch (the ALARM lamp must go out) and press the ON LINE switch. The ON LINE switch must be lit for the printer to operate.

When the ALARM lamp is lit, lift the printer cover and examine the lamps above the control panel. The lamps and corrective action to take are listed in Table 3-1, "LP05 Alarm Indicators" (lamps are listed in order of appearance).

STATION PERIPHERALS

Table 3-1
LP05 Alarm Indicators

Lamp	Indicates	Corrective Action after pressing CLEAR
HAMMER	A print hammer has malfunctioned (the print buffer is cleared).	If the lamp fails to go out or reappears, contact Field Service.
FORMAT	A mechanical malfunction has caused too many line feeds. Printer goes off-line.	Position paper, press FORMS RESET switch (under control panel).
RIBBON	A ribbon jam or snag has occurred. Printer goes off-line.	Correct ribbon feeding.
GATE	Drum gate is not latched; buffer is empty.	Latch gate properly.
PAPER	Paper jam, paper out or paper runaway condition. Printer goes off-line.	Fix paper condition.
TAPE (optional)	Either a parity error in VFU memory or an invalid tape channel command has occurred. Printer goes off-line.	Reload VFU tape and correct it, if necessary.

3.2 CARD READER

The card reader at a DN92 remote station reads 80-column punched cards at a rate of 285 cards per minute. It contains an input hopper (upper right), an optical card reading station, an output hopper, switches to control its operation and indicator lamps.

Toggle switches on its back panel are used to turn on and set up the card reader (see Figure 3-3).

STATION PERIPHERALS

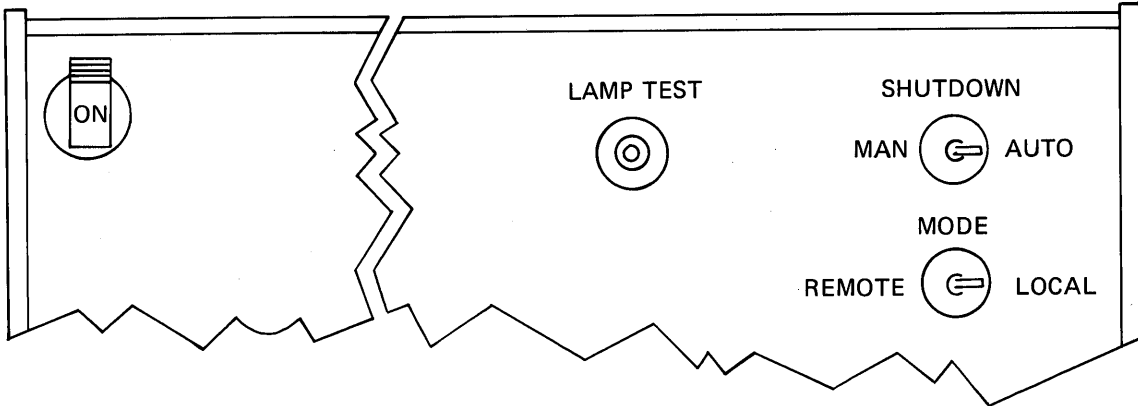


Figure 3-3 Card Reader Back Panel

These switches have the following uses:

Table 3-2
Card Reader Back Panel Switches

Switch	Use
POWER	Raise to turn on card reader.
LAMP TEST	Press to light indicators on front panel (checks for faulty lamps).
SHUTDOWN	Set to specify operation of input hopper blower: at MANUAL to operate blower continuously; at AUTOMATIC to shut blower off when not reading cards.
MODE	Selects on-line or off-line reader operation: REMOTE to place reader on-line under program control when RESET is pressed. LOCAL to use RESET, STOP switches to operate the reader off-line for testing.

The front panel of the card reader contains switches and lamps that are used during normal operation of the card reader to control activity and report error conditions (see Figure 3-4).

STATION PERIPHERALS

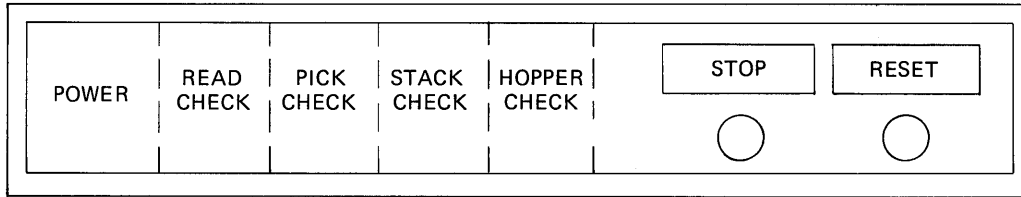


Figure 3-4 Front panel of the Card Reader

Table 3-3
Front panel Switches on the Card Reader

Switch	When lit, indicates	Corrective Action
POWER	Power is on.	None.
READ CHECK	Card just encountered may be damaged.	Remove (and repunch) faulty card and press RESET. Reread the card.
PICK CHECK	Card just encountered may be damaged, deck may be warped or reader may need cleaning.	Correct card or condition and press RESET. Reread the card.
STACK CHECK	Card just read may be damaged, or there may be a card jam.	Clear jam or repunch damaged card. Press RESET and reread the last card.
HOPPER CHECK	Either: input hopper is empty and no EOF card has been encountered, or output hopper is full	Reread the last card followed by an EOF card. Empty the output hopper and press RESET to continue Reread the last card read.
STOP switch and red lamp		Press to stop reading cards. Red lamp is lit, RESET green lamp goes out.
RESET switch and green lamp		Press to light green lamp, start blower and start reading cards.

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To operate the card reader, perform the following steps:

1. Turn on card reader power.
2. Load input hopper with cards (face down, column 1 to left); up to 550 cards can be accommodated at one time.
3. Place the card weight on top of the cards in the hopper.
4. Press RESET.

You can load and unload cards continuously while the reader is in operation.

3.2.1 Cleaning the Card Reader

If your card reader is used almost continuously, it should be cleaned once a week. Wipe the exterior with a soft cloth and use a vacuum cleaner to clear card dust out of the card path (turn off the power, blow out the path from the input hopper to the stacker, and vacuum it).

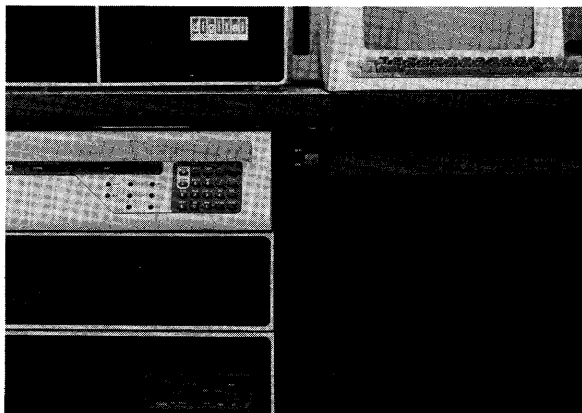
CHAPTER 4
TROUBLE SHOOTING

4.1 RESTARTING DN92 SOFTWARE AT THE REMOTE STATION

Once the DN92 has been downline loaded from the host DECsystem-10, it can be restarted manually by the remote station operator if necessary. This may be needed after the station has been powered down or if there have been problems at intermediate nodes. The procedure for manually restarting the station uses the DN92 operator's console.

Core memory in the DN92 (a PDP-8/A) is divided into four memory fields (each field contains 4096 words). Fields are numbered from 0 to 3, and within each field, the 4096 locations are numbered from 0000 to 7777 (octal). Thus complete specification of location 0 in field 0 is 00000, of location 20 in field 3 is 30020. The ROM is in field 7. Each word in DN92 memory contains 12 bits. (For more information on the PDP-8A, see the "PDP8/A Miniprocessor User's Manual" and the "PDP8/A Minicomputer Handbook" that come with your equipment.)

The DN92 operator's console contains a number of keys and lamps (see Figure 4-1). The ADDR8 lamps contain the address of the location to be accessed next. The lamps display the contents of the three-bit EMA (extended memory address) and the 12-bit MA (memory address) registers. The DISP lamps display the contents of the register that has been selected for display.



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Figure 4-1 Keys and Lamps on the DN92 Console

These keys are briefly explained in Table 4-1. In the table, keys are presented in order of appearance on the console, from top left to bottom right.

TROUBLE SHOOTING

Table 4-1
Console Keys

Label	Function
THIS D	Deposit this: loads contents of entry into MB register and into register specified by CPMA (central processor memory address) register.
BOOT	Boot: pressed twice, causes the BOOT program to begin execution.
DISP	Display: pressed after another key, displays contents of specified registers.
LSR	Load Switch Register: loads Switch Register with entry.
LA	Load Address: loads address into CPMA register and enables next processor-cycle FETCH state.
NEXT D	Deposit next: loads contents of entry into MB register and into register specified by CPMA register; increments PC, CPMA registers.
STATE*	State register: pressed before DISP key, displays State Condition; STATE lamp is lit.
MD	Memory Databus: pressed before DISP key, displays data on Memory Databus.
LXA	Load Extended Address: loads rightmost digit into Data Field (DF) register; next digit into Instruction Field (IF) register.
THIS E	Examine this: loads contents of address in CPMA register into MB register.
BUS	Bus: pressed before DISP key, displays contents of Data Bus (data 0 to 11) at Time State 1; Bus lamp is lit.
STATUS*	Status register: pressed before DISP key, displays contents of STATUS register; Status lamp lit.
SR	Switch register: pressed before DISP key, displays contents of switch register; SR lamp lit.
INIT	Initialize: generates INIT pulse, clears AC, LINK, I/O device flags and registers, and all interrupt system flip-flops.
NEXT E	Examine next: loads contents of address in CPMA register into MB register; increments CPMA and PC.

*For information on the contents of this register, see Appendix A.

TROUBLE SHOOTING

Table 4-1 (Con't.)
Console Keys

Label	Function
AC	Accumulator: pressed before DISP key, displays contents of AC at Time State 1; AC indicator is lit.
MQ	Multiplier Quotient: pressed before DISP key, displays contents of MQ register; MQ lamp is lit.
HLT/SS	Halt/single step: halts a running system; executes one cycle in a stopped system.
RUN	Run: generates Mem Start L signal, sets RUN flip-flop, program starts executing at address in CPMA register; RUN lamp is lit.

NOTE

Entries within angle brackets <> are key names.

To load data into a register, enter an octal number with the numeric keys, then use the appropriate key for the register to be loaded. For example, to load the octal value 7000 into the switch register and display it, press:

```

7000 <LSR>    loads 7000 into SR
<SR>          press SR
<DISP>        and DISP to display the contents of SR.
                7000 appears in the DISP display.
    
```

DN92 software can be restarted with the ROM by using the following keys:

```

<HLT/SS>      Halts processor.
<INIT>        Performs initialization steps.
70 <LXA>      Loads extended address 70 (Instruction Field 7, Data
                Field 0).
0 <LA>        Loads address 0 into CPMA register.
<INIT>        Reinitializes.
<RUN>        Starts program execution. Run lamp is lit; console
                registers display changing digits; % appears on
                console screen.
    
```

TROUBLE SHOOTING

This sequence copies the contents of the ROM (1024 12-bit words located in field 7, starting at location 0) to memory field 3 and executes from there. Restarting in this manner sends the usual INITIALIZING message to the screen after a few seconds followed by the "Restarting" message:

```
%%Restarting DN92 NODE "name"
```

("name" is defined in the C.PAL file at installation time on the DECsystem-10 host). When the restart is complete, the ADDR5 and DISP registers contain changing digits; the RUN and MQ lamps are lit.

When difficulties occur at a remote station, a number of error messages can appear; they give important information concerning station and system status. If more information is needed, the remote trouble-shooter can examine remote station memory directly, use DDT92, or obtain a core dump to examine the situation.

4.2 STATION ERROR MESSAGES

At station startup time SYSCHK is run (its error messages are documented in Appendix B of this manual). At other times the error messages in Table 4-2 may occur (messages in the table are listed in alphabetical order).

TROUBLE SHOOTING

Table 4-2
System Error Messages

Message	Meaning
BAD MESSAGE TYPE	Unrequested data was received from the host or intermediate node.
CARRIER BACK	Carrier between synchronous modems had been lost, but has returned. Operations can be resumed.
CARRIER LOST	Carrier between synchronous modems has been lost.
DN92 CRASH PC=n	A fatal software error has occurred; program counter (PC) is given. After such an occurrence, the DN92 automatically starts up the ROM after a few seconds and sends the default load request to the host. By restarting the station at location 201, the operator can dump core.
DN92 INT ERROR	An unknown device is holding down the interrupt bus. Either the DN92 configuration file used at installation time did not fit the configuration or a hardware failure has occurred. If the configuration file is correct, contact Field Service.
DP8E BUS ERROR	A malfunction occurred in the modem receive or transmit clock.
LPT NOT...	Line printer is not properly connected to station; either malfunctioning or off.
LPTTRBL	The line printer has timed-out unexpectedly and may be malfunctioning (contact Field Service).
	<div style="border: 1px solid black; padding: 10px; margin: 10px auto; width: fit-content;"> <p style="text-align: center; margin: 0;">NOTE</p> <p style="margin: 0;">This LPTTRBL message can appear only if the configuration file used at installation time contained the FTTRBL parameter (see the DECsystem-10 Networks Software Installation Guide).</p> </div>
RDCHK-REFEED CARD	A punched card being read by the card reader produced a READ-CHECK. The card must be reread; if it is damaged, it must be replaced.
TTY NOT CONNECTED	Either the DECsystem-10 or an intermediate node is down. If the terminal is running when the node goes down, a buzzer sounds and the message is displayed. If the node is down when the terminal is turned on, the message is displayed.

TROUBLE SHOOTING

4.3 EXAMINING REMOTE STATION MEMORY

You can examine individual locations in memory manually so long as the station is running and on-line to the DECsystem-10 host. This examination is done by using the keys on the operator's console to place the contents of a given location in the MQ register and then displaying this register. You use the SR (switch register) to specify the address of the location you wish to examine. The DN92 software reads the specified location and places its contents in the MQ register. In specifying an address, you must give both the memory field and the location within that field. For example, to specify and display the contents of location 10020 (field 1, location 20), press the following keys:

```
7771 <LSR>          Load the SR with 7770+n, where n is the
                    desired field.
0020 <LSR>          Load the SR with the location within field 1.
<MQ>               Press these two keys.
<DISP>
```

```
ADDRS 7722 DISP 6041  The address and value of the specified
                    location are displayed.
```

To specify and display the contents of location 10150 immediately after the previous example, press the following keys:

```
0150      <LSR>      Load the SR with the location which is in
                    field 1 (since the field is the same as in
                    the previous example, it does not need to be
                    reentered).
<MQ>      <DISP>     Press these two keys.

ADDRS...  DISP...    The address and value of the specified
                    location are displayed.
```

NOTE

You cannot examine the last eight locations in each memory field.

4.4 USING DDT92

The version of DDT which is provided for use at DN92 remote stations is called DDT92 and has version number 3B(7)-1. DDT92 does not recognize symbols, so for useful work, a CREF listing of the DN92 code must be available. With that restriction, DDT92 operates with the same commands as DDT11. The distribution tape contains the source file DDT92.MAC which must be compiled and linked on the DECsystem-10. This process creates the DDT92.EXE file which can be used to examine remote station memory. For example, to compile DDT92, use the EXECUTE command with the /COMP switch:

TROUBLE SHOOTING

```
.EXECUTE DDT92.MAC/COMP
```

This creates DDT92.REL and then runs the linker LINK:

```
.EXECUTE DDT92.MAC/COMP      use the EXECUTE command
MACRO: DDT11
LINK: Loading
[LNKXCT DDT11 Execution]
DDT11 3(7)-1
INPUT: ^Z                    (CTRL/Z) to exit
EXIT
.SSAVE DDT92                 create the DDT92.EXE file
DDT92 saved
```

This creates and saves the executable DDT92 file.

To run this version of DDT, use the RUN command:

```
.RUN DDT92                    run DDT92
DDT11 3(7)-1=DDT92
Input: /N:24/8                specify node number and PDP-8.
```

NOTE

The node number you specify when at the DN92 is SELF; to examine another node, specify the node number of the node to look at.

If you press some illegal combination of characters in response to the "INPUT" prompt, the following error message is displayed:

Respond with file spec and/or switches.

Legal switches are: /11/8/BINARY/CORE/DTELDL/DUMP/GO/LA36
/LINE/MERGE/NODE/PATCH/PDP8/PDP11/PORT/SYMBOL/VT52

This program is further described in the DDT92.HLP file.

APPENDIX A

STATE AND STATUS REGISTERS

Individual bits in these two 12-bit registers indicate the state and status conditions of the communications link and the Omnibus. The settings of the 12 bits are reflected in the octal DISP register; the octal values must therefore be interpreted to determine the settings of the individual bits.

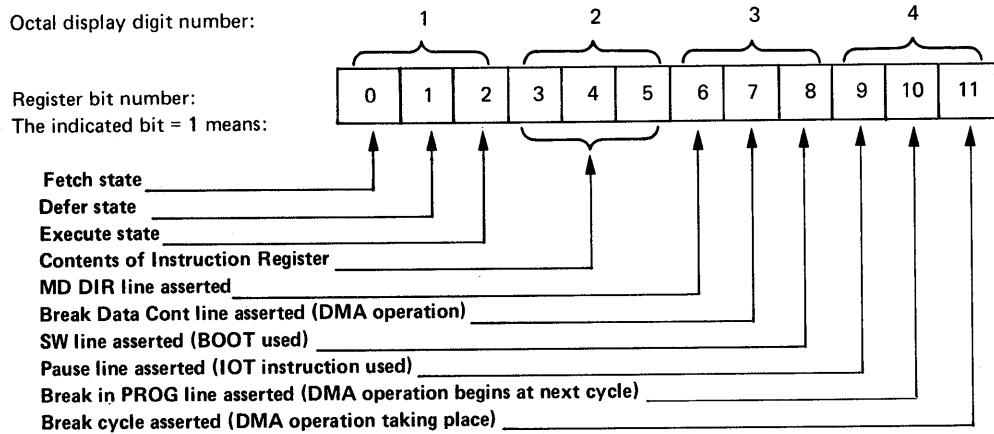


Figure A-1 Bit Settings of State Register

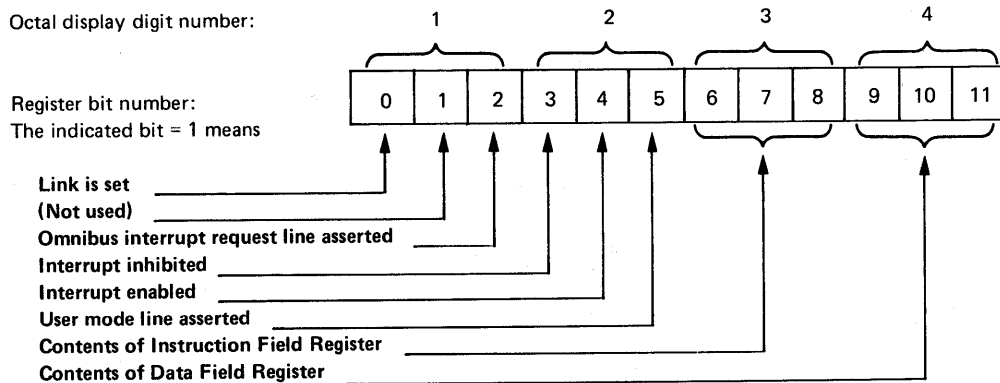


Figure A-2 Bit Settings of Status Register

APPENDIX B

SYSCHK ERROR MESSAGES

<u>Message</u>	<u>Indicates</u>
DKC8 CLOCK ERROR	Either the DKC8 clock is not present, is malfunctioning, or the processor speed is incorrect. This is a fatal hardware error. (SYSCHK measured line frequency-clock speed against the time taken for an instruction loop and found them incompatible.)
DN92 WON'T RUN ON A PDP8-I	A test for the existence of the BSW instruction indicates a PDP8I.
DP8E CHAR DETECT SKIP FAILED	There is a hardware problem in the DP8E controller (SYNC flag did not come up).
DP8E FIELD SELECT FAILED	Either no DP8E is installed or there is a hardware failure (a Load Field instruction did not execute).
DP8E FLAG WON'T CLEAR	A flag was not properly cleared.
DP8E AT 9600 BAUD	Connecting link is faster than 9600 baud; the DN92 cannot transmit faster than 9600 baud. If the DN92 is used on such a link, performance may be impaired.
DP8E IS IN LOOPBACK MODE	Probably a modem is in loopback mode (SYSCHK sent a pattern and received it back). Correct the condition and either reload the station or restart the program at location 200 (see restart procedures, Section 2.5).
DP8E MODEM NOT READY	Use of a Read Status 1 instruction indicates a modem not ready. Check the modem; it must be connected to the line and turned on.
DP8E NO CARRIER	Use of a Read Status 2 instruction indicates carrier/AGC not present. Check modems and links to isolate the problem.

SYSCHK ERROR MESSAGES

<u>Message</u>	<u>Indicates</u>
DP8E NOT CLEAR TO SEND	A Read Status 2 instruction indicates clear-to-send not present or up. Check modem power and Ready status.
DP8E NOT RECEIVING	SYSCHK waited a suitable interval, but received no SYNC characters (line interface and modem are ready).
DP8E RCVD xx	SYSCHK received non-SYNC characters (xx) from the synchronous line. SYSCHK will loop until it receives SYNC characters.
DP8E READ CHAR DETECTED y RIGHT 3	This indicates a hardware problem. After receiving a SYNC character, SYSCHK performs a Read Character Detected Instruction. In this case the instruction returned y instead of 3 (3 is the correct value).
DP8E TERM NOT READY	Hardware failures are indicated. SYSCHK used a DP8E Load Control instruction to put the terminal in Ready status, but when checking status with a DP8E Read Status 2 instruction, status was indicated as Not Ready.
DP8E WC OR CA WRONG	This indicates a hardware problem in the DP8E. SYSCHK sent and received data but found unexpected values in the data-break (WC,CA) registers.
DP8E XMT NOT READY	A modem is not clocking correctly.
LPT FLAG WON'T CLEAR	Probable hardware failure in line printer interface (SYSCHK unable to clear line printer flag).
TTYnn IS IN LOOPBACK MODE	The specified TTY is in loopback mode (for testing). The condition must be corrected by Field Service.
TTYnn IS RUNNING OPEN	The specified TTY is receiving a continuous stream of null characters. This condition is undesirable and should be corrected by Field Service.
TTYnn NO XMT FLAG	Indicates either that no terminal has been installed on the specified line, or that the specified terminal has a hardware failure.

SYSCHK ERROR MESSAGES

<u>Message</u>	<u>Indicates</u>
TTYnn RCV FLAG WON'T CLEAR	This is a fatal hardware error. (SYSCHK read but could not clear the keyboard flag).
TTYnn XMT FLAG WON'T CLEAR	This indicates a hardware problem (SYSCHK could not clear the Transmit Done flag).

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