DR NET INSTALLATION MANUAL

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INTRODUCTION

This manual has been written to aid you in your installation of Gifford Computer System's implementation of the DR Net network operating system, which runs in conjunction with Multiuser Concurrent DOS (MC-DOS), Gifford's implementation of Digital Research's Concurrent DOS (Concurrent CP/M).

DR Net enables you to network together two or more computer systems (referred to as nodes), either with a coaxial cable or with a hub connector and a coaxial cable, depending on the proximity of the nodes and the number of nodes to be networked together. The relative terms "local" and "remote" are used to describe nodes.

A **local node** is a node to which a user's terminal is directly attached. All other nodes on a network are **remote nodes**. To add a third node to a network requires a hub. By networking these separate nodes together, any of the workstations on the local node has the ability to access any of the resources on a remote node.

The DR Net network operating system requires three hardware components to set up a network with two nodes: network controller boards which physically interface each computer to the network; two clear plastic connectors to interface the network controller boards to a coaxial cable; and a coaxial cable to connect the two nodes to each other. You will also be supplied with the hardware manual for your network controller boards, along with DRI's CONCURRENT CP/M OPERATING SYSTEM USER'S GUIDE, Gifford's DR NET USER'S MANUAL, and Gifford's MULTIUSER CONCURRENT DOS USER'S MANUAL.

This manual documents all of the procedures that are necessary to install your DR Net network operating system. **Sections 1.0** and **2.0** provide instructions for every aspect of hardware set-up, including cable connections, switch and jumper configurations, and installing your network controller boards. **Section 3.0** explains how to test whether your MC-DOS operating system is operating properly, and then how to copy your new system files onto your hard disk. **APPENDIX A** documents the possible network error messages that can occur during the initialization sequence, and their probable causes.

USER'S GUIDE TO THIS MANUAL

Gifford Computer Systems has written this user's manual to conform to certain stylistic conventions for your reading convenience. They are as follows:

1) System prompts and any messages that appear on your screen are in **boldfaced** lettering, e.g. **0A>**.

2) The status of any toggle switch is in UPPER CASE lettering, e.g. "The terminal must be turned ON."

3) System commands are in UPPER CASE lettering, e.g. "Type DIR I:."

4) Single keystroke commands are encased in parentheses, e.g. "Type (Y)."

5) File names and file types appear in UPPER CASE lettering, e.g. EXAMPLE.TXT.

6) References to any other sections of this manual appear in **boldfaced** lettering, e.g. "Refer to **Section 3.0**"

7) References to any other manual will appear in UPPER CASE lettering and underlined, e.g. "Refer to your MULTIUSER CONCURRENT DOS USER'S MANUAL."

TABLE OF CONTENTS

1.0 HARDWARE SET-UP

Your DR Net network operating system will come supplied on a diskette labelled DR NET NETWORKING DISK. To effectively implement your DR Net network operating system, you will need a minimum of two Gifford computer systems. The maximum distance between the two systems is 2000 feet if you are only using a coaxial cable, and 200 feet if you are using a passive hub connector. The two systems can be connected directly to each other with a coaxial cable and two clear plastic connectors. The sample configuration below illustrates two separate Gifford systems networked together, each with five individual workstations.

1.1 ARCS100 Switch Settings

If you are using ARCS100 network controller boards, check that none of the switch settings were disturbed during shipping by verifying the switch settings with the ones displayed below.

Switch 1		Switch 2		Switch 3		Switch 4	
Off	On	Off	On	Off	On	Off	On
	==	==			==	==	
	==	==			==		==
	==	==			==	==	
	==		==		==	==	
==		==			==		==
==			==		==	==	
==		==			==	==	
==		==			==	==	

The ARCS100 switch configuration for Switch 5 will vary from system to system.

System 00   **System 01**
Switch 5   Switch 5

Off   On   Off   On

═══   ═══
═══   ═══
═══   ═══
═══   ═══
═══   ═══
═══   ═══
═══   ═══
═══   ═══

Refer to **Appendix B** to determine the correct switch settings for Switch 5 for each node attached to the network.

1.2 ARCS100 Jumper Configurations

For the ARCS100 jumper configuration, the following slide jumpers are the <u>only</u> ones that should be installed:

JUMPER	FUNCTION
JP14	COM 9026 INTR = S100 Vectored Int line 6
JP22	S100 POC = ARCS100 POC
JP23	ARCS100 MREQ = S100 PHANTOM
JP26	ARCS100 WAIT = S100 XRDY

1.3 LANS100 Jumper Configurations

If you are using LANS100 network controller boards, check that none of the jumper configurations were disturbed during shipping by verifying them with the ones displayed below:

```
                                           IO PORT                              *LANC ID
                                            ADDR                                ---------
                                          ---------                            | o    o |
                                         1| o    o |   ON BOARD                | o    o |
                                         2| o = o  |     ADDR                  | o    o |
                                         3| o    o |   ---------               | o    o |
                                         4| o    o | 1| o    o |               | o    o |
                             ENABLE      5| o = o  | 2| o    o |               | o    o |
                             EXTND       6| o = o  | 3| o    o |               | o    o |
    PHANTOM                  ADDR        7| o = o  | 4| o = o  |               | o    o |
    ---------                -----       8| o = o  | 5| o    o |               ---------
   1| o = o |2              1| o |        ---------   ---------
    ---------                | | |
                            2| o |
                             -----

    READY         VI
    SELECT       SELECT           EXTND ADDR
    -----       ---------        ---------
   1| o |      1| o    o |      1| o = o |
    |   |      2| o    o |      2| o = o |
   2| o |      3| o    o |      3| o = o |
    | | |      4| o    o |      4| o = o |                RESET
   3| o |      5| o    o |      5| o    o |                SELECT
    -----      6| o    o |      6| o    o |                -----
              7| o = o  |      7| o    o |                    | o |
              8| o    o |      8| o    o |            ----- | |
               ---------        ---------            | o    o |
                                                     ----- |
                                                         | o |
                                                          -----

                        ---------
                       1| o = o |2   SIXTN PU
                        ---------
```

*   The node ID on the LANC ID jumper will change for each board.
    Refer to **APPENDIX B** to determine which jumpers should
    be installed for each node attached to the network.

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2.0 INSTALLATION

Section 2.0 guides you through the steps of booting your
MC-DOS operating system, making backup copies of your MC-DOS
system diskettes, installing your network controller boards, and
making your cable connections.

2.1 Booting Your MC-DOS System

Boot your MC-DOS system as you normally do, so that it is up
and running. Log in to your system and format three blank
double sided diskettes with the MC-DOS FORMAT program (documented
in Section 2.5-FORMAT in your MULTIUSER CONCURRENT DOS USER'S
MANUAL). Format these diskettes for 1024 byte sectors, the third
option. You will need these formatted diskettes to make backup
copies of your new MC-DOS diskettes.

2.2 Making Backup Copies of Your New System Diskettes

It is crucial that you make backup copies of every one of
the diskettes that is supplied with your new MC-DOS operating
system. To do this, use the MC-DOS CPY program that is fully
documented in Section 2.5-CPY in your MULTIUSER CONCURRENT DOS
USER'S MANUAL. Copy the files from all four of the new
operating system diskettes onto your newly formatted blank
diskettes. After you have made all of the backup copies, store
your master MC-DOS system diskettes in a safe place, and use your
backup copies as your working diskettes. After you have
completed the backup procedure, power down both systems and
remove the six phillips screws that secure the cover of the
computer enclosure on each system, and remove each cover.

2.3 Installing Your Network Controller Boards

Before you insert your network controller boards into each computer enclosure, be sure that the system is powered down and the power cords are not plugged in to any power outlets. Never work on the inside of the enclosure when the system is plugged in. Your network controller board should be seated in a slot that is as close as possible to the clear plastic connector that you have inserted into the back panel of your enclosure. The reason for this is that you will be plugging the red and green cable that extends from the connector into your network controller board.

2.4 Cable Connections

Your DR Net package will come with two clear plastic connectors that are to be inserted, through the inside of the enclosure, into one of the two larger available slots that are located on the back panel of your enclosure. Be sure that you follow the instructions on the following page for setting up both of the nodes that you intend to network together. The illustration at the top of the following page shows you the cable connections that you should make from above your system enclosure.
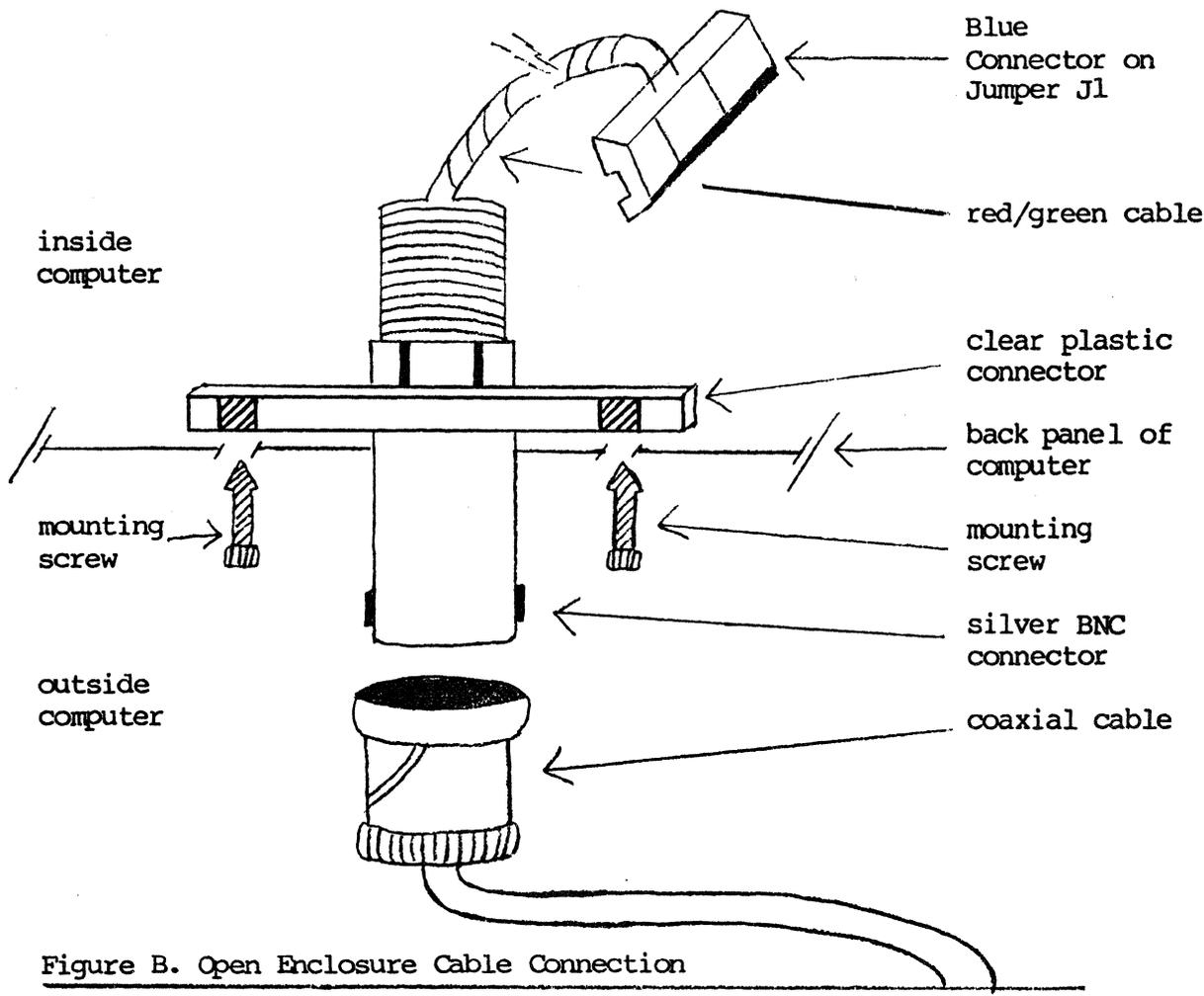
Figure B. Open Enclosure Cable Connection

The illustration above shows you, from above your computer enclosure, which way the cable that is attached to the connector is to be facing, where to attach that cable, and where to attach your coaxial cable. The clear plastic connectors that you receive from us are to be inserted, from the inside of the enclosure, into one of the two larger slots on the back panel.

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The connector should easily slide into any one of these
designated slots. Be sure that when you insert the connector
into the slot, the red and green cable that extends from the
connector is facing the inside of the enclosure, and does not
extend beyond the back of the enclosure. Remove the mounting
screws that are provided with the connector. Line up the two
holes in the slots with the two holes in the connector and insert
the mounting screws. Tighten the screws, making sure that you
don't tighten them too much; otherwise you'll break the
connector.

Now take one of the coaxial cables that were supplied with
your DR Net network operating system, and plug each end into the
silver BNC connector located in the middle of the clear plastic
connector that you have just inserted into the back panel of each
system. Make sure that each end of the cable is securely
inserted.

Now take the red and green cable that extends from the
connector into the inside of the enclosure and insert it into the
blue connector on Connector J1 of your network controller board.

3.0 COPYING YOUR MC-DOS OPERATING SYSTEM

It is important that before you copy your new system files
onto the hard disk, you test your version of the new MC-DOS
operating system by booting your system with your working copy
of the MULTIUSER CONCURRENT DOS SYSTEM DISK, and then using the
NET STATUS NODES command (fully documented in Section 2.3 of
Gifford's DR NET USER'S MANUAL), to determine the status of your
node. If you successfully boot your system using the MC-DOS
floppy diskette and are able to determine the status of your node
using the NET STATUS NODES command, you are ready to copy your
new MC-DOS operating system onto the hard disk with the new PIP
program.

3.1 Testing Your MC-DOS Operating System

To test your new operating system, you must boot your system
with the MC-DOS system diskette. Before you turn ON your system,
make sure that all terminals and printers are turned ON. Also,
make sure that the floppy disk drive(s) are empty when you turn
ON the power to prevent power surges from affecting data on the
disks. Hold in the RESET button on the front of the system
enclosure, and turn ON the power by pressing the top portion of
the red power switch on the front panel. Release the RESET
button. Now insert your diskette labelled MULTIUSER CONCURRENT
DOS SYSTEM DISK in the left-hand floppy disk drive, close the
drive door, and wait for the system prompt to appear on your
screen. As the computer is reading the tracks on the MC-DOS
system diskette, look carefully at your screen for any network
error messages.

If a network error message was displayed on your screen,
look up that error message in **Appendix A** and remedy any problem.
If no network error messages appeared on your screen during the
boot process, then you are ready to use the NET command
(fully documented in Section 2.0 in Gifford's DR NET USER'S
MANUAL), to make a quick check of the network. To do this, you
must run the NET program off of your DR NET NETWORKING DISK. In

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this example, we will assume that drive G: is the drive that
holds the network diskette. Type the following:

0A>G:
0G>NET STATUS NODES

and a listing similar to the one below will be displayed on your
screen:

NETwork status for console 1 on node named SYSTEM_A node number 00

NET nodes status:

Name	Number	Up	Users
SYSTEM_A	00	1:07	+ 1
SYSTEM_B	01	0:30	1

   If a list similar to the one displayed above appears on your
screen, the NET STATUS NODES command has successfully gone across
the network to determine the number of users on each node. You
are now ready to copy your new operating system onto the hard
disk. If the word "down" is displayed in the column with the
heading "Users," either that particular node is not running DR
Net or the hardware link to that node is broken. First check
that all of your cable connections are secure. If the problem
persists, call your nearest Gifford dealer.

3.2 Using the New PIP Program

   If you have successfully tested your new operating system
using the NET STATUS NODES command, you are ready to start
copying your new system files onto your hard disk, with the
MC-DOS version of the PIP program.

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Your new DR NET NETWORKING diskette will have on it copies of the DR Net program files necessary to configure your system for networking. The next thing that you must do is copy all of your new MC-DOS system files onto your hard disk. **It is important that you do your copying from whatever drive contains your new MULTIUSER CONCURRENT DOS SYSTEM DISK.** The reason for this is that you must use the new Concurrent DOS PIP program to copy the files, and not the old MP/M 8-16 PIP program that's already on the hard disk. In other words, don't access drive A: when you copy the files. Instead, be sure that you access drive G: or whichever drive contains your new MC-DOS system diskette. If you fail to do this, the PIP process will appear as though it has completed, but the files that you have copied will be missing valuable data. For our example, we will assume that your MC-DOS floppy diskette is in drive G:. To be sure that you're using the Concurrent DOS version of the PIP utility by typing:

OG>PIP

from the drive that contains your MC-DOS floppy diskette. The system should respond with the following message:

CONCURRENT CP/M-86 PIP VERSION 3.1.

The message that is displayed above will be followed by an asterisk prompt. Next to the asterisk prompt, type:

* A:=*.*[VROW]

Notice that the first asterisk is the PIP prompt, and not a wildcard. By typing the command above, you will have copied your MC-DOS system and program files onto your hard disk. After the PIP process is complete, press the RETURN key to return to the system prompt (OG>). Once the new Concurrent PIP program has been copied onto your hard disk, then it will be safe for you to use PIP as you normally would.

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To copy all of your DR Net program files onto your hard disk
follow the same procedure that you used to copy your MC-DOS
system files. Place your diskette labelled DR NET NETWORKING
DISK in a floppy drive and use the PIP program to copy of all the
files contained on that diskette onto user area 0 of drive A:.

Suppose that your DR NET NETWORKING DISK is in drive G:. To
copy the DR Net files onto user area 0 of drive A:, type:

0G>PIP A:=*.*[VROW]

3.3 Copying Your MAIL and AP Program Files

Mail and calendar program files are always kept on user area
15 of drive A: on the system node. Therefore, it is crucial that
you use the new PIP program to copy the MAIL.CMD and AP.CMD
program files to user area 15 of drive A: of the system node. To
do this, log in to a terminal and access user area 15 of drive
A:, by typing the following command:

0A>USER 15

Now copy the MAIL and AP program files from the current node
to 15A> of the system node by typing the following commands:

15A>NET P: = A: 00
15A>PIP A: = P:*.*[V]
15A>NET OFF
15A>LOGOUT

After you have copied your MAIL and AP program files onto
user area 15 of drive A: of the system node, you are ready to
start using your DR Net network operating system. Operating
procedure instructions are documented in the manual entitled DR
NET USER'S MANUAL.

APPENDIX A

Network Error Messages

The network I/O system (NIOS) may display error messages during the initialization (boot) phase. These error messages are in addition to the ones specified in Gifford's DR NET USER'S MANUAL. Here is a list of possible messages and their causes.

Network Error: Can't run SETNET.CMD

The NIOS tries to run the SETNET command from user area (0) of the system drive during system initialization. This message will be displayed if, for any reason, SETNET was not executed. The most likely reason for this error is that the SETNET command does not exist on the system drive. Another possibility is that there is not enough free memory to load the program. In either case, the NIOS will configure a minimal network system using the following CONFIG.NET values:

node	read from network controller board
default	0
servers	2
requesters	2
rct	2
buffers	2
timeout	10

Also, if SETNET is run, but encounters an error in the CONFIG.NET file, then these same minimal values will be used.

Network Error: Not enough memory for the static buffer
Network Error: Not enough memory for the dynamic buffer

These two messages are similar. Try reducing the CONFIG.NET parameters to the minimal values given in the table above. This should reduce the static buffer size. If the "Not enough memory" messages are still displayed when the system is rebooted, you will have to install more memory in the computer (at least 128K).

Network Error: No network controller installed

     If this message persists after a network controller has been installed, the switch settings should be verified with the settings documented in this manual.

Network Error: Network controller initialization failed

     The most likely cause of this message is a broken network controller.

APPENDIX B

The table below displays the switch settings for the ARCS100 network controller board and the jumper configurations for the LANS100 network controller board. This information has been provided for up to 64 nodes attached to the DR Net network.

ARCS100 Board:

0 = switch should be depressed to the left   (OPEN)
1 = switch should be depressed to the right (CLOSED)

Rightmost character in table below corresponds to position 1 of switch 5. Leftmost character in table below corresponds to position 8 of switch 5. Switch 5 is located on the right side of the ARCS100 board.

LANS100 Board:

0 = jumper should be not be installed
1 = jumper should be be installed

Rightmost character corresponds to the bottom pair of prongs on LANC ID jumper. Leftmost character corresponds to the top pair of prongs on LANC ID jumper.

The bottom prong of the LANC ID jumper location is labelled MSB for "most significant bit." Ignore this label. Gifford actually uses the opposite prong (the top prong) for the most significant bit.

Node:	0	00000000	Node:	14	00001110
Node:	1	00000001	Node:	15	00001111
Node:	2	00000010	Node:	16	00010000
Node:	3	00000011	Node:	17	00010001
Node:	4	00000100	Node:	18	00010010
Node:	5	00000101	Node:	20	00010100
Node:	6	00000110	Node:	21	00010101
Node:	7	00000111	Node:	22	00010110
Node:	8	00001000	Node:	23	00010111
Node:	9	00001001	Node:	24	00011000
Node:	10	00001010	Node:	25	00011001
Node:	11	00001011	Node:	26	00011010
Node:	12	00001100	Node:	27	00011011
Node:	13	00001101	Node:	28	00011100

Node:	29	00011101	Node:	47	00101111
Node:	30	00011110	Node:	48	00110000
Node:	31	00011111	Node:	49	00110001
Node:	32	00100000	Node:	50	00110010
Node:	33	00100001	Node:	51	00110011
Node:	34	00100010	Node:	52	00110100
Node:	35	00100011	Node:	53	00110101
Node:	36	00100100	Node:	54	00110110
Node:	37	00100101	Node:	55	00110111
Node:	38	00100110	Node:	56	00111000
Node:	39	00100111	Node:	57	00111001
Node:	40	00101000	Node:	58	00111010
Node:	41	00101001	Node:	59	00111011
Node:	42	00101010	Node:	60	00111100
Node:	43	00101011	Node:	61	00111101
Node:	44	00101100	Node:	62	00111110
Node:	45	00101101	Node:	63	00111111
Node:	46	00101110			

EXAMPLE:

Suppose that you have six nodes attached to the DR Net
network. For node number 4, refer to the table on the preceding
page, and you'll notice that the number to the right of node
number 4 is 00000100. This means that if you have an ARCS100
network controller board, your switch settings should look like
this:

Switch 5

Off   On

1   ==
2   ==
3   ==
4   ==
5   ==
6   ==
7   ==
8   ==

If you have a LANS100 network controller board, your jumper
configuration should look like this:

LANC ID

```
O    O
O    O
O    O
O    O
O    O
O =  O
O    O
O    O
```