

DR NET INSTALLATION MANUAL

Revision 4.0

September 1984



Gifford Computer Systems
P.O. Box 1917
San Leandro, CA 94577

(415) 895-0798
TELEX: 704521

DISCLAIMER

Gifford Computer Systems believes that the information presented in this manual is accurate and reliable, but takes no responsibility for any consequences arising out of the use of this manual. Gifford Computer Systems also reserves the right to revise the contents of this publication without obligation to notify any person of such revisions.

Questions or comments regarding this manual should be directed to Gifford Computer Systems.

TRADEMARKS

Concurrent DOS is a trademark of Digital Research Inc.
ARCS100 is a registered trademark of Standard Microsystems Corporation.
MP/M 8-16 is a joint trademark of CompuPro and Digital Research Inc.
WordStar is a registered trademark of MicroPro International Corporation.
MP/M-86 is a trademark of Digital Research.
Multiuser Concurrent DOS is a trademark of Gifford Computer Systems.
DR Net is a trademark of Gifford Computer Systems.
LANS100 is a trademark of Intercontinental Microsystems.

COPYRIGHT NOTICE

No part of this publication may be reproduced, transcribed, translated, or stored in any type of media retrieval system in any form without prior written permission from Gifford Computer Systems.

Copyright ©1984 by Gifford Computer Systems.

All rights reserved.

Printed in the United States of America.



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. OA>.
- 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

INTRODUCTION.	i
USER'S GUIDE TO THIS MANUAL	ii
TABLE OF CONTENTS	iii
1.0 HARDWARE SET-UP.	1
1.1 ARCS100 Switch Settings.	1
1.2 ARCS100 Jumper Configurations.	2
1.3 LANS100 Jumper Configurations.	3
2.0 INSTALLATION	4
2.1 Booting Your MC-DOS System	4
2.2 Making Backup Copies of Your New System Diskettes.	4
2.3 Installing Your Network Controller Boards.	5
2.4 Cable Connections.	5
3.0 COPYING YOUR MC-DOS OPERATING SYSTEM	8
3.1 Testing Your MC-DOS Operating System	8
3.2 Using the New PIP Program.	9
3.3 Copying Your MAIL and AP Program Files	11
APPENDIX A	
Network Error Messages.	12
APPENDIX B	
Additional Switch Settings and Jumper Configurations.	14
ILLUSTRATIONS	
A. Open Enclosure Cable Connection	7

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 only 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:

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

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

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.

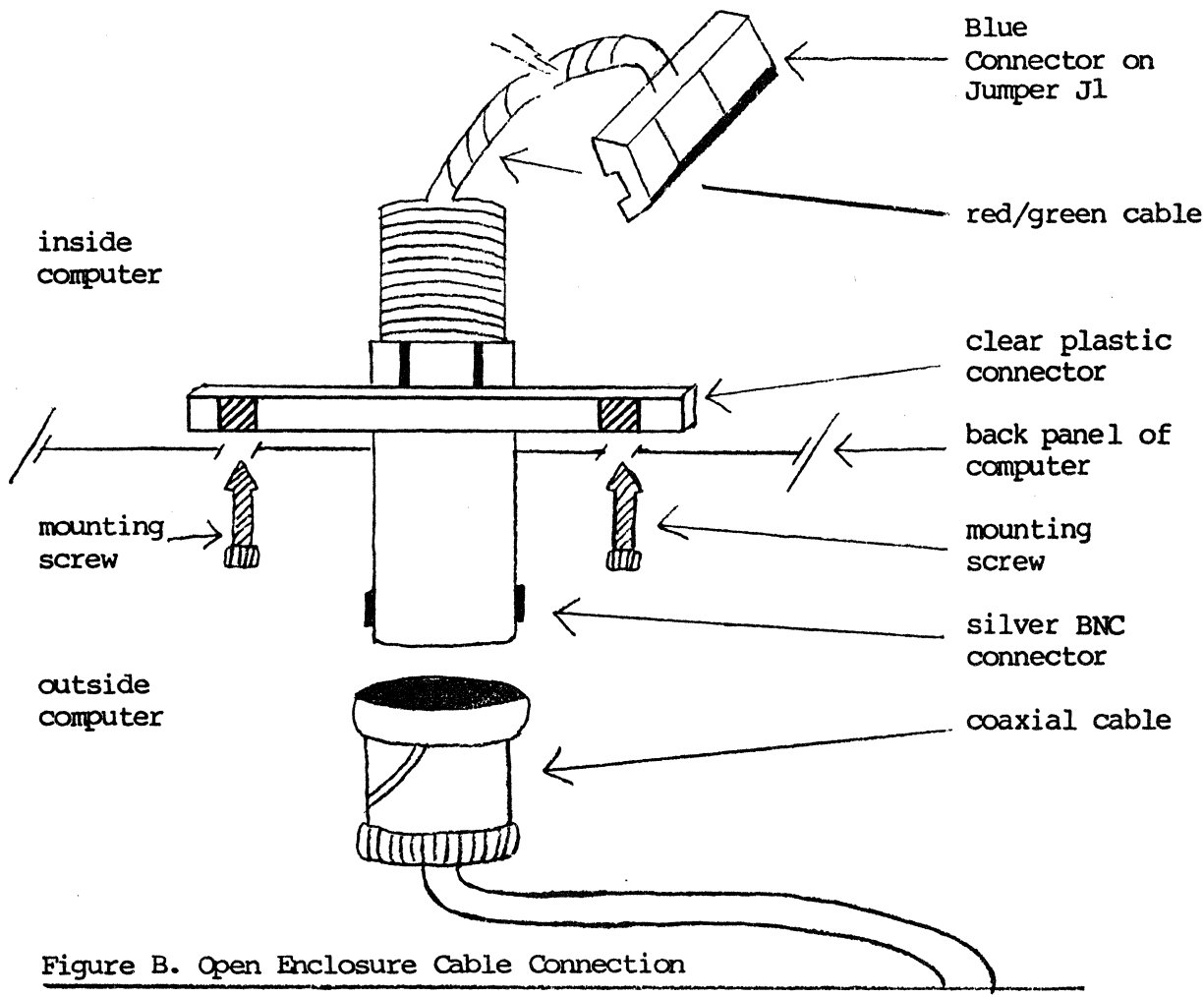


Figure B. Open Enclosure Cable Connection

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.

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

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.

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 MULTUSER 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.

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:

```
OG>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 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	==	

