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Software Installation and Operating Manual

for

DigiCHANNEL COM/Xi™
SCO UNIX System V/386
Releases *3.2.0 - 3.2.2*
SCO XENIX 286 and 386
Releases *2.2.3 through 2.3.3*
DBI 92000045D

Table of Contents

Be sure to read the *Release Notes* that may be included with this software device driver. The *Release Notes* contain information not available at this manual's press time.

Introduction

The DigiCHANNEL device driver software for the DigiCHANNEL COM/Xi is an installable device driver; the software development system is not required to create a new kernel. The link kit, however, must be installed.

Before installing the device driver software, you must first have set the your board's jumpers and installed the board in your computer system, according to the instructions in the DigiCHANNEL COM/Xi Board Installation and Reference Manual.

The **Jumper Setting Information** section on pages 6-15 will give you the Memory Start Address and I/O Port Address information you need for setting your board's jumpers to work with SCO UNIX System V/386 or SCO XENIX 286/386.

Once you have completed the Hardware (Board) Installation instructions in the main DigiCHANNEL COM/Xi manual, you may proceed with these software device driver installation instructions. You may also wish to read the instructions for DigiPrint™ transparent printing (page 61) and DigiScreen™, DigiBoard's multiple screen utility (page 66).

Jumper Setting Information

This section contains the information the main COM/Xi manual asks for when setting the jumpers to work with the device driver software.

Note that these are recommended settings, and that you can set the Memory Start Address and I/O Port Address to any legal setting, as long as you install the device driver software with those same values.

Use the device driver options if possible

While the jumpers on the COM/Xi can be set to any legal setting and the device driver installed to match those settings, you'll be able to streamline the SCO UNIX device driver software installation procedure by choosing one of the four pre-selected option groups. These options are:

Option 1.	Memory Start Address = D8000h I/O Port=320h
Option 2.	Memory Start Address = D0000h I/O Port=300h
Option 3.	Memory Start Address = C8000h I/O Port=220h
Option 4.	Memory Start Address = C0000h I/O Port= 120h
Option 5.	Custom or multiple board installation.

NOTE: Pictorial representations for setting the jumpers according to these options begin on page 11.

Single Board Users:

For installing a ***single board, you*** may choose one option group (1 through 4) from the option list, and then set the jumpers on your board to the memory start address and I/O port address ***in that group.*** (If you mix addresses between option groups, you won't be able to take advantage of the streamlined software installation procedure.)

Choose Option 5 above if you wish to install your COM/Xi with any combination of Memory Address and I/O Port Address not found in the first four options.

Multiple Board users:

(For installing two, three, or four boards. Note that only one board can be installed in 286-based systems.)

If you have chosen your Memory Start Address(es) and I/O Port address(es) from under the same option in the preceding list, you may now proceed to set the jumpers on your board, as described in the main manual. Also see pages 11 through 14, which show diagrams on how to set the jumpers to the different configurations.

Otherwise, the rest of these instructions are for choosing "custom" Memory Start Addresses and I/O Port Addresses that are not included together as an option in the preceding option list.

Memory Start Address

This address refers to the start of the dual-ported RAM used both by your system and by the COM/Xi.

The following addresses are available: C0000h, C8000h, D0000h, and D8000h. (Addresses are listed in hexadecimal notation.)

Choose an address from the above list and set your COM/Xi board to that Memory Start Address, using the instructions in the Hardware Installation section of the main manual.

If you are installing more than one board, each board must have a *unique* address.

Remember which Memory Start Address(es) you choose, as you will have to inform the software of it later during the device driver software installation procedure.

Memory Start Address

Board 1: _____

Board 2: _____

Board 3: _____

Board 4: _____

I/O Port Address

Each COM/Xi board installed must have its own *unique* I/O Port address, and each I/O Port address you choose must not be used by any other device in your computer.

The seven I/O Port address choices are: 100h, 1 10h, 120h, 200h, 220h, 300h, and 320h.

Choose one of the above addresses for each COM/Xi board you are installing, and set your COM/Xi board to that I/O Port Address, using the instructions in the Hardware Installation section of the main manual.

Remember which I/O Port Address(es) you choose, as you will have to inform the software of it later during the device driver software installation procedure.

I/O Port Addresses

Board 1: _____

Board 2: _____

Board 3: _____

Board 4: _____

When you are finished, you may proceed to the device driver software installation instructions beginning on page 16 (XENIX) or page 37 (UNIX).

Setting the Jumpers to Match the Four Option Groups

Option Group 1:

Memory Start Address: **D8000h**
I/O Port: **320h**

Make sure that the Memory Window jumpers J15, J16 and J17 are set for D8000h as shown:

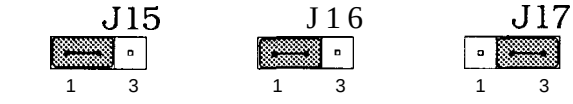


Figure shows jumpers (gray boxes) set to give a memory start address of D8000h.

To select the required I/O Port address of 320h, make sure the I/O Port jumpers J2, J3 and J4 are set as shown:

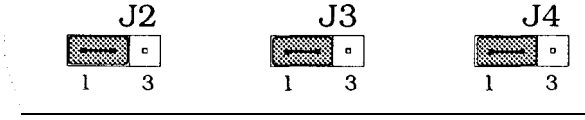


Figure shows jumpers (gray boxes) set to give a memory I/O Port address of 320h.

Option Group 2:

Memory Start Address: **D0000h**
I/O Port: **300h**

Set the Memory Window jumpers J15, J16 and J17 for D0000h as shown:

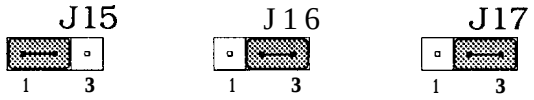


Figure shows jumpers (gray boxes) set lo give a memory start address of D0000h.

To select the required I/O Port address of 300h, make sure the I/O Port jumpers J2, J3 and J4 are set as shown:

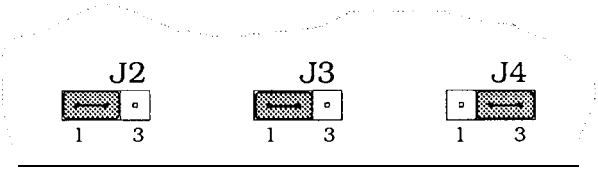


Figure shows jumpers (gray boxes) set to give a memory IO Port address of 300

Option Group 3:

Memory Start Address: **C8000h**
I/O Port: **220h**

Set the Memory Window jumpers J15, J16 and J17 for C8000h as shown:

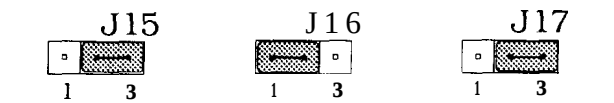


Figure shows jumpers (gray boxes) set to give a memory start address of C8000h.

To select the required I/O Port address of 220h, make sure the I/O Port jumpers J2, J3 and J4 are set as shown:

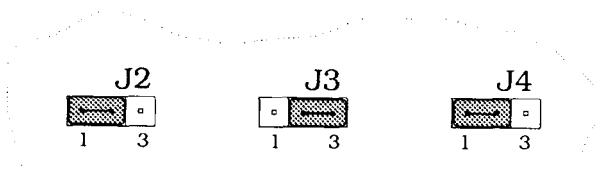


Figure shows jumpers (gray boxes) set to give a memory I/O Port address of 220

Option Group 4:

Memory Start Address: C0000h
I/O Port: 120h

Set the Memory Window jumpers J15, J16 and J17 for C0000h as shown:

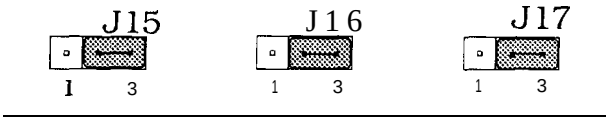


Figure shows jumpers (gray boxes) set lo give a memory start address of C0000h

To select the required I/O Port address of 120h, make sure the I/O Port jumpers J2, J3 and J4 are set as shown:

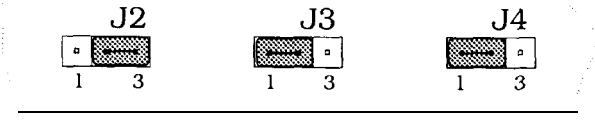


Figure shows jumpers (gray boxes) set to give a memory I/O Port address of 120h

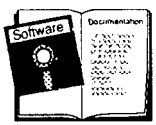
When you are finished setting the jumpers, you may proceed to the device driver software installation **instructions beginning on page 16 (XENIX) or page 37 (UNIX).**

Software Installation SCO XENIX

(SCO UNIX users go to page 37.)

Installation of the device driver software for SCO XENIX 286 and 386 is a four-part procedure. In **Part One,** a new kernel is linked. In **Part Two,** new devices for the serial ports are made in the **/dev** directory, and these devices are added to **/etc/ttys**. In **Part Three,** a back-up copy of the current kernel is made and the new kernel is copied into the root directory. Finally in **Part Four you** boot the new kernel and enable the communications ports for use with a terminal.

Follow the instructions starting on page 17 to install the device driver software on the hard disk and start the installation procedure.



Software changes more rapidly then printed documentation can keep up. For this reason, some of the screens or prompts may not appear exactly as shown.

Part One: Linking a New Kernel

Step 1. Log onto the console as super-user (root).

Step 2. Insert the DigiWARE diskette, and type:

custom [Press ENTER]

Step 3. The system will now display the Custom Menu. If the device driver has been previously installed, the Custom Menu lists **DigiWARE**. If not, select *Option 4* to add a supported product. The system displays:

```
Installing custom data files...
Insert distribution volume 1 and press <Return> or enter q to
 quit:
```

Step 4. Press <Return> and the system displays the following menu:

```
1.      Install one or more packages
2.      Remove one or more packages
3.      List the available packages
4.      List the files in a package
5.      Install a single file
6.      Select a new set to customize
7.      Display current disk usage
8.      Help

Select an option or press q to quit:
```

Select *Option 1* to install DigiCHANNEL Software. The system displays:

```
Name      Inst    Size    DigiWARE for COM/Xi packages
-------------------------------------------------------
COMXI     NO      800     DigiCHANNEL COM/Xi async driver V4.4.0
```

(Note that the "size" in the above display can vary from release to release.)

The system will then display:

```
Enter the package(s) to install or enter q to return to the
  menu:
```

Type:

```
COMXI                                    [Press ENTER]
```

The system will then display:

```
Insert DigiWARE package volume 1 and press <return> or enter
  q to return to the menu:
```

Volume 1 should still be in the disk drive. Press <Return>. The system will then display:

```
Extracting files...
```

Step **5.** You must now answer a series of questions about the installation. In each case, options will be presented and/or examples will guide you in answering the questions. The driver may be installed by using one of four pre-configured versions, or may be installed in any other configuration. You will see the screen:

```
The DigiCHANNEL COM/Xi driver may be installed using one of
the four suggested configurations listed below, or you may
choose to create your own custom configuration.

1) I/O Port=0x320, Memory Address=0x000D8000
2) I/O Port=0x300, Memory Address=0x000D0000
3) I/O Port=0x220, Memory Address=0x000C8000
4) I/O Port=0x120, Memory Address=0x000C0000
5) Custom or multiple board installation.
6) Exit installation procedure.

Please enter selection (1-6)?
```

When asked, select your configuration from the above list (l-6).

Note that options 1 through 4 are for installing *single boards only!* If your are installing two, three, or four boards, or wish to set up one board with parameters different from those above, choose **#5**.

For any of the versions selected, the corresponding jumpers on the COM/Xi board *must* be set to match the parameters listed in the configurations above.

Note: If you selected **Option 5,** the next prompts you will see will be for **Custom Configuration Instructions.** If you answered 1 through 4, skip to **Step 11** on page **25.**

Step 6. The software displays:

```
Each DigiCHANNEL COM/Xi board requires an I/O port address
and a 32K block of memory. Please select these to avoid
conflicts with other boards you may have installed in your
system.

How many DigiCHANNEL COM/Xi boards do you wish to install
(1-4)?
```

Type in the number of COM/Xi boards you are installing.

Instructions 7, 8 and 9 are repeated for each of the boards you specified in Step 6.

Step 7. You must select a ***Port Address*** for each board The software displays the Port Address options.

```
The I/O port address choices, in hexadecimal, are:

      1) 100 3) 120 5) 220 7) 320
      2) 110 4) 200 6) 300

Please enter selection (1-7)?
```

Enter your selection by typing in one of the numbers shown above.

Step 8. The next item requires the selection of the *host* starting address of the board's dual-ported memory. *Each board must have a unique Memory Address.* The software lists the available Memory Address options.

```
The memory address choices, in hexadecimal, are:

        1)      0x00d8000
        2)      0x00d0000
        3)      0x00c8000
        4)      oxoocoooo

 Please enter selection (1-4)?
```

When asked, enter your selection (l-4).

Step 9. The software asks:

```
Please indicate number of ports on board (4 or 8)?
```

Answer 4 or 8 as appropriate for the number of channels on the DigiCHANNEL board you are installing.

Step **10.** The software will now show you what you have chosen. (The following is an example screen; yours may be different.)

```
You have selected the following configuration:

      Board    I/O Address    Memory Address      Ports
      ------------------------------------------------
        1         0x320          0x000D8000         8

Is this configuration acceptable (y or n)?
```

If the information is correct, answer "y." Otherwise, answer "n" and the software will let you start over again with Step 5.

Step 11. Finally, you need to select the Altpin setting. This allows alternate wiring of the RJ-45 modular connectors. The default for altpin is OFF, giving you the standard DigiBoard RJ-45 pinouts. Setting altpin to ON enables the alternate RJ-45 pinouts. (This is useful for 8-pin RJ-45 connectors. See the main COM/Xi manual for more details, as well as page 58 of this manual.) The software asks:

```
The default setting for altpin is off.
Is this acceptable (y or n)?
```

Answer y or **n** as appropriate.

Step 12. Installing DigiScreen

DigiScreen is DigiBoard's multiple screen utility that allows a single physical terminal to be connected to several virtual terminal sessions (screens) at one time. The software installation script gives you the option of installing it.

If you *have already installed DigiScreen with another DigiBoard product, there is no need to install it again, unless you wish to change the number of DigiScreen devices.*

Note: DigiScreen is not available for the 286 XENIX operating system.

The software asks:

```
Do you wish to install DigiScreen (y or n)?
```

If you answer **"n,"** proceed to page 25, *Device Nodes.*

Step 13. The software continues:

```
Each session under DigiScreen requires a DigiScreen device.

How many DigiScreen devices do you wish to have installed
(max.is 256, default is 32): ?
```

Answer with the number of DigiScreen devices you think will be adequate for all connected terminals. Note that the default value will change according to the number of previously created DigiScreen devices you may have.

Step 14. At this point, the operating system asks:

```
Do you wish to make new device nodes(y or n)?
```

Most users will need to create the new devices at this time, and should answer "**y**" and proceed to **Part Two, Creating New Devices.**

However, if you are an experienced XENIX user, you ***do*** have the option of skipping Part Two, the creation of new devices. If you answer "n" you will proceed to **Part Three: Installing the New Kernel.**

Part Two: Creating New Devices

This portion of the installation procedure creates devices in **/dev** and edits **/etc/ttys**, giving XENIX the information to use these additional ports. By default, these ports are installed with device names **ttyill** through **ttyi18**, **ttyi21** through **ttyi28, ttyi31** through **ttyi38,** and **ttyi41** through **ttyi48.**

The DigiCHANNEL driver will support up to four boards, for a maximum of 32 asynchronous ports.

Step 1. The software displays:

```
This script also installs the information needed by XENIX to
use these additional ports.  The DigiCHANNEL COM/Xi async
driver will support up to four boards for a maximum of
thirty-two asynchronous serial ports.

By default, the ports are installed as ttyill through ttyi48.

Ports with modem control are installed as ttyI11 through
tty148.

DigiPrint ports are installed as pri11 through pri48.

DigiPrint ports with modem control are installed as prI11
through pr148.

Is this acceptable (y or n)?
```

"Yes" Answer "y" if the default device names listed above (and on your console screen) are acceptable. You may then proceed to Part Three: Installing the New Kernel, as the remainder of this step asks for new names for the nodes and the DigiPrint ports.

"No" If you answered "n" to the preceding question, enter the name you wish when the systems responds:

```
Device names will be a base name followed by an i for base
  tty ports, or I for modem control ports, with the board
number (l-4) and the port number (l-8) appended.
Please enter base name to use:
```

The default printer names are **prill** through **pri48.** The installation program will now ask for an alternate name:

```
Please enter DigiPrint name to use:
```

Step 2. The software displays:

```
Do you wish to update /etc/ttys and /etc/ttytype (y or n) ?
```

For a new installation, answer "y" (yes). For updates, answer "n" to preserve the current setup. If you aren't sure, answer y."

At this point, you may proceed to Part Three: Installing the New Kernel.

Format used for port names:

tty Base name. You may select a different one. (Another default that you may change is **pr** for DigiPrint ports.) The base name is followed by a lowercase "**i**" for ports without modem control, and by an uppercase "**I**" for ports with modem control.

b Board number (1 through 4 possible, depending upon the number of boards installed.)

p Port number on the individual board (1-8 for an eight-port COM/Xi board.)

Example 1: If "crt" was the base name, Port 4 on the third eight port board would be **crti34**.

Example 2: **ttyI11** indicates that the first port on the first board has modem control enabled.

Part Three: Installing the New Kernel

The device driver software installation is now complete, and the new kernel must be installed.

Step 1. **You** will see:

```
The new kernel with driver modifications is in
/usr/sys/conf/xenix.

Do you want this kernel to boot by default (y or n)?
```

If you type "y" you will see:

```
The old kernel is installed in /xenix.old

The new kernel is installed in /xenix

Enter the following command to reboot your system and
activate the new kernel:

haltsys     <cr>
```

If you type "n" you will see:

```
Changes will not be reflected unless
  /usr/sys/conf/xenix is copied to /xenix.
```

Step 2. The system displays:

```
1.      Install one or more packages
2.      Remove one or more packages
3.      List the available packages
4.      List the files in a package
5.      Install a single file
6.      Select a new set to customize
7.      Display current disk usage
8.      Help

Select an option or enter q to quit:
```

Enter **q**.

Step 3. If you choose to have the new kernel boot by default, enter the following command to boot the new kernel:

shutdown 0 [Press ENTER]

Step 4. When the computer reboots, you should see messages which indicate the board is functioning. Your screen might appear to look something like this:

```
device      address     vector  dma   comment
-------------------------------------------------------
%comxi      0x3200                    mem=0x000D8000
                                      ports=8
                                      COM/Xi V4.x.0
```

Part Four: Enabling the New Ports

Step 1. With the cables connected to the terminals (using a null modem, if necessary), test the connections to each terminal by typing in the following for each port added:

```
date > /dev/ttyi11
```

(Assuming the terminal is connected to **ttyill.)**

(Please note that in the above, the "date" command is used as a simple test, to provide text output that can be redirected; there is no other significance to "date" in this test!)

- If the date appears on the terminal's screen, the device is properly connected.
- If the date *does not* appear on the terminal's screen, then that terminal is not receiving data; check the power, cables, connections, etc.
- If nonsense characters are printed on the terminal's screen, check the baud rates, data bits, stop bits, and parity setting on your terminal. (XENIX default parameters are 9600 baud, 8 data bits, 1 stop bit, and no parity.)

Once you can redirect output to a terminal with the test above, you can continue the following step to enable that port.

Step 2. To activate a port for use with a terminal, type the following command:

```
enable ttyill
```

(If you've assigned a new base name, replace the "tty" above with the name you chose.)

The above command will cause a login prompt to be sent to the terminal connected to **ttyill.** To activate the other ports, repeat the enable command with the appropriate port name.

Un-Installing the SCO XENIX Device Driver

The DigiBoard DigiCHANNEL device driver software can be ***removed*** from the kernel by using the program **custom.** Again, the Development Kit is not required, although the link kit must be installed.

Removing the driver from the kernel is a two-part process. First, the driver references are removed from the system configuration files. Secondly, a new kernel is linked, and copied to the root directory.

Enter the following commands to ***un-install*** the device driver software:

Step 1. Log onto the console as super-user (root), and enter the following command:

```
custom                    [Press ENTER]
```

Step 2. Enter the proper number for the DigiWARE for COM/XI device driver software.

Step 3. The system displays:

```
   1.      Install one or more packages
   2.      Remove one or more packages
   3.      List the available packages
   4.      List the files in a package
   5.      Install a single file
   6.      Select a new set to customize
   7.      Display current disk usage
   8.      Help

:  Select an option or enter q to quit:
:
```

Select *Option 2* to remove the driver. The system will display:

```
Name      Inst    Size    DigiWARE for COM/Xi Packages
-------------------------------------------------------
COM/Xi    YES     800     DigiCHANNEL COM/Xi async driver V4.x.0
```

(Note that the "size" in the above display can vary from release to release.)

Step 4. The system will then display:

```
: Enter the package(s) to remove or enter q to return to the
:  menu:
:
```

Type:

```
COMXI                                    [Press ENTER]
```

Step **5.** Next, the software asks:

```
Do you wish to remove DigiScreen devices (y or n)?
Removing DigiScreen devices will affect ALL DigiBoard Drivers.
```

Step 6. You will see:

```
The new kernel with driver modifications is in
/usr/sys/conf/xenix.

Do you want this kernel to boot by default (y or n)?
```

If you type “y” you will see:

```
The old kernel is installed in /xenix.old

The new kernel is installed in /xenix

Enter the following command to reboot your system and ac-
tivate the new kernel:

haltsys      <cr>
```

If you type “n” you will see:

```
Changes will not be reflected unless
 /usr/sys/conf/xenix is copied to /xenix.
```

Step 7. The system displays:

```
1.      Install one or more packages
2.      Remove one or more packages
3.      List the available packages
4.      List the files in a package
5.      Install a single file
6.      Select a new set to customize
7.      Display current disk usage
8.      Help

Select an option or enter q to quit:
```

Enter q to quit.

Step 8. Remove the perms file:

```
rm /etc/perms/comxi          [press ENTER]
```

Step 9. If you choose to have the new kernel boot by default, enter the following command to boot the new kernel:

```
shutdown 0                   [Press ENTER]
```

(SCO XENIX users go to page 16.)

Installation of the device driver software for SCO UNIX is a four-part procedure. In **Part One,** a new kernel is linked. In **Part Two,** the new devices are created. In **Part Three,** a backup copy of the current kernel is made and the new kernel is copied into the root directory. Finally in **Part Four you** boot the new kernel and enable the communications ports for use with a terminal.

Software changes more rapidly then printed documentation can keep up. For this reason, some of the screens or prompts may not appear exactly as shown.

Follow the instructions below to install the device driver software on the hard disk and start the installation procedure:

Part One: Linking a New Kernel

Step 1. Log onto the console as super-user (root).

Step 2. Insert the DigiWARE diskette, and type:

```
custom                                    [Press ENTER]
```

Step 3. When the operating system menu asks, choose **INSTALL.**

Step 4. Select **A NEW PRODUCT.** (Note that if you are *re-installing* a previously removed device driver, you would still have to choose New product at this point.)

Step 5. When prompted again, select **ENTIRE PRODUCT.** The operating system will ask you to repeat many of your choices (just to make sure you really want to do it.)

Step 6. When asked to insert the distribution disk, insert the DigiBoard-supplied device driver software disk for SCO System V/386.

Step 7. When the system asks, type "C" to continue the installation.

Step 8. **You** must now answer a series of questions about the installation. In each case, options will be presented and/or examples will guide you in answering the questions. The driver may be installed by using one of four pre-configured versions, or may be installed in any other configuration. You will see the screen:

```
The DigiCHANNEL COM/Xi driver may be installed using one of
the four suggested configurations listed below, or you may
choose to create your own custom configuration.

1) I/O Port=0x320, Memory Address=0x000D8000
2) I/O Port=0x300, Memory Address=0x000D0000
3) I/O Port=0x220, Memory Address=0x000C8000
4) I/O Port=0xl20, Memory Address=0x000C0000
5) Custom or multiple board installation.
6) Exit installation procedure.

Please enter selection (1-6)?
```

When asked, select your configuration from the above list (l-6).

Note that options 1 through 4 are for installing ***single boards only!*** If your are installing two, three, or four boards, or wish to set up one board with parameters different from those above, choose **#5**.

For any of the versions selected, the corresponding jumpers on the COM/Xi board ***must*** be set to match the parameters listed in the configurations above.

Note: If you selected **Option 5,** the next prompts you will see will be for **Custom Configuration Instructions.** If you answered 1 through 4, skip to Step 14 on page 42.

Step 9. The software displays:

```
Each DigiCHANNEL COM/Xi board requires an I/O port address
and a 32K block of memory.  Please select these to avoid
conflicts with other boards you may have installed in your
system.

How many DigiCHANNEL COM/Xi boards do you wish to install
(1-4)?
```

Type in the number of COM/Xi boards you are installing.

Instructions 10, 11 and 12 are repeated for each of the boards you specified in Step 9.

Step **10.** You must select a ***Port Address*** for each board. The software displays the Port Address options.

```
The I/O port address choices, in hexadecimal, are:

    1) 100 3) 120 5) 220 7) 320
    2) 110 4) 200 6) 300

Please enter selection (1-7)?
```

Enter your selection by typing in one of the numbers shown above.

Step **11.** The next item requires the selection of the host starting address of the board's dual-ported memory. ***Each board must have a unique Memory Start Address.*** The software lists the available Memory Address options.

```
The memory address choices, in hexadecimal, are:

        1)    0x00d8000
        2)    0x00d0000
        3)    0x00c8000
        4)    oxoocoooo

 Please enter selection (1-4)?
```

When asked, enter your selection (l-4).

Step **12.** The software asks:

```
Please indicate number of ports on board (4 or 8)?
```

Answer 4 or 8 as appropriate for the number of channels on the DigiCHANNEL board you are installing.

Step 13. The software will now show you what you have chosen. (The following is an example screen; yours may be different.)

```
You have selected the following configuration:

Board   I/O Address   Memory Address     Ports
------------------------------------------------
  1        0x320         0x000D8000        8

Is this configuration acceptable (y or n)?
```

If the information is correct, answer "y." Otherwise, answer "n" and the software will let you start over again with Step 5.

Step 14. Finally, you need to select the Altpin setting. This allows alternate wiring of the RJ-45 modular connectors. The default for altpin is OFF, giving you the standard DigiBoard RJ-45 pinouts. Setting altpin to ON enables the alternate RJ-45 pinouts. (This is useful for 8-pin RJ-45 connectors. See the main COM/Xi manual for more details, as well as page 58 of this manual.)

The software asks:

```
The default setting for altpin is off.
Is this acceptable (y or n)?
```

Answer y or **n** as appropriate.

Step 15. Installing DigiScreen

DigiScreen is DigiBoard's multiple screen utility that allows a single physical terminal to be connected to several virtual terminal sessions (screens) at one time. The software installation script gives you the option of installing it.

If you have already installed DigiScreen with another DigiBoard product, there is no need to install it again, unless you wish to change the number of DigiScreen devices.

The software asks:

```
Do you wish to install DigiScreen (y or n)?
```

If you answer "**n**," proceed to page 44, *Device Nodes.*

Step 16. The software continues:

```
Each session under DigiScreen requires a DigiScreen device.

How many DigiScreen devices do you wish to have installed
(max. is 256, default is 32): ?
```

Answer with the number of DigiScreen devices you think will be adequate for all connected terminals. Note that the default value will change according to the number of previously created DigiScreen devices you may have.

Step 17. **Device Nodes**

At this point, the operating system asks:

```
Do you wish to make new device nodes (y or n)?
```

Most users will need to create the new devices at this time, and should answer "y" and proceed to Part **Two: Creating New Devices.**

However, if you are an experienced Unix user, you ***do*** have the option of skipping Part Two, the creation of new devices. If you answer "n" you will proceed to **Part Three: Installing the New Kernel.**

Part Two: Creating New Devices

This portion of the installation procedure creates devices in **/dev** and edits **/etc/ttys**, giving UNIX the information to use these additional ports. By default, these ports are installed with device names **ttyill** through **ttyi18**, **ttyi21** through **ttyi28, ttyi31** through **ttyi38,** and **ttyi41** through **ttyi48.**

The DigiCHANNEL driver will support up to four boards, for a maximum of 32 asynchronous ports.

Step 1. The software displays:

```
This script also installs the information needed by UNIX to
use these additional ports.  The DigiCHANNEL COM/Xi async
driver will support up to four boards for a maximum of
thirty-two asynchronous serial ports.

By default, the ports are installed as ttyill through ttyi48.

Ports with modem control are installed as ttyI11 through
ttyI48.

DigiPrint ports are installed as pril1 through pri48.

DigiPrint ports with modem control are installed as prI11
through prI48.

Is this acceptable (y or n)?
```

"Yes" Answer "y" if the default device names listed above (and on your console screen) are acceptable. You may then proceed to Part Three: Installing the New Kernel, as the remainder of this step asks for new names for the nodes and the DigiPrint ports.

"No" If you answered "n" to the preceding questior enter the name you wish when the system respond:

```
  Device names will be a base name followed by an i for base
tty  ports,  or I for modem control ports, with the board
number (l-4) and the port number (1-S) appended.
 Please enter base name to use:
```

The default printer names are **prill** through **pri4** The installation program will now ask for an alte nate name:

```
Please enter DigiPrint name to use:
```

Step 2. The software displays:

```
Do you wish to update /etc/ttytype (y or n) ?
```

For a new installation, answer "y" (yes). F updates, answer "n" to preserve the current setu If you aren't sure, answer y."

At this point, you may proceed to Part Three: Installing t New Kernel.

Format used for port names:

tty Base name. You may select a different one. (Another default that you may change is **pr** for DigiPrint ports.) The base name is followed by a lowercase "**i**" for ports without modem control, and by an uppercase "**I**" for ports with modem control.

b **Board** number (1 through 4 possible, depending upon the- number of boards installed.)

p Port number on the individual board (f-8 for an eight-port COM/Xi board.)-

Example 1: **If** "crt" was the base name, Port **4** on the third eight port board would be **crti34**.

Example 2: **ttyI11** indicates that the first port on the first board has modem control enabled.

Part Three: Installing the New Kernel

The device driver software installation is now complete, and the new kernel must be installed.

Step 1. You will see:

```
Do you want this kernel to boot by default (y or n)?
```

If you type "y" you will see:

```
The old kernel is installed in /unix.old
The new kernel is installed in /unix
```

If you type "n" you will see:

```
Changes will not be reflected unless
/etc/conf/cf.d/unix is copied to /unix.
```

Step 2. The system displays:

```
Do you want the kernel environment rebuilt?
```

Answer "**y**" (yes). You will see:

```
The kernel has been successfully linked and installed. To
activate it, reboot your system.
```

Step 3. Enter the following command to boot the new kernel:

```
shutdown -y -g0          [Press ENTER]
```

Step 4. When the computer reboots, you should see messages which indicate the board is functioning. Your screen might appear to look something like this:

```
  device      address     vector  dma   comment
-------------------------------------------------------
  %comxi      0x3200                    mem=0x000D8000
                                        ports=8
                                        COM/Xi V4.x.0
```

Part Four: Enabling the New Ports

Step 1. With the cables connected to the terminals (using a null modem, if necessary), test the connections to each terminal by typing in the following for each port added:

```
date > /dev/ttyi11
```

(Assuming the terminal is connected to **ttyill.)**

(Please note that in the above, the "date" command is used as a simple test, to provide text output that can be redirected; there is no other significance to "date" in this test!)

- If the date appears on the terminal's screen, the device is properly connected.
- If the date *does not* appear on the terminal's screen, then that terminal is not receiving data; check the power, cables, connections, etc.
- If nonsense characters are printed on the terminal's screen, check the baud rates, data bits, stop bits, and parity setting on your terminal. (Unix default parameters are 9600 baud, 8 data bits, 1 stop bit, and no parity.)

Once you can redirect output to a terminal with the test above, you can continue the following step to enable that port.

Step 2. The Terminal Control Database must be updated to include the new devices. Add the DigiCHANNEL device information using the following SCO UNIX **sysadmsh** command sequence:

```
Accounts→Terminal:Create
```

Fill in the required information on the form displayed.

Step 3. To activate a port for use with a terminal, type the following command:

enable ttyill

(If you've assigned a new base name, replace the "tty" above with the name you chose.)

The above command will cause a login prompt to be sent to the terminal connected to **ttyill.** To activate the other ports, repeat the enable command with the appropriate port name.

Un-Installing the SCO Unix Device Driver

The DigiBoard DigiCHANNEL device driver software can be *removed* from the kernel by using the program custom. Again, the Development Kit is not required, although the link kit must be installed.

Removing the driver from the kernel is a two-part process. First, the driver references are removed from the system configuration files. Secondly, a new kernel is linked, and copied to the root directory.

Enter the following commands to *un-install* the device driver software:

Step 1. Log onto the console as super-user (root), and enter the following command:

custom [Press ENTER]

Step 2. When the operating system menu asks, choose REMOVE.

Step 3. Select DigiCHANNEL COM/Xi Software. The software will respond with:

```
Removing DigiCHANNEL C/X intelligent async serial driver.
```

Step 4. Next, the software asks:

```
Do you wish to remove DigiScreen devices (y or n)?
Removing DigiScreen devices will affect ALL DigiBoard Drivers.
```

Step 5. When asked if you wish to create a new kernel, answer "y" (yes).

Step 6. You will see:

```
Do you want this kernel to boot by default (y or n)?
```

If you type "y" you will see:

```
The old kernel is installed in /unix.old
The new kernel is installed in /unix
```

If you type "n" you will see:

```
Changes will not be reflected unless /etc/conf/cf.d/unix is
copied to /unix.
```

Step 7. The system displays:

```
Do you want the kernel environment rebuilt?
```

Answer "y" (yes). You will see:

```
The kernel has been successfully linked and installed. To
activate it, reboot your system.
```

Step 8. Remove the perms file:

rm **/etc/perms/comxi** (Press ENTER

Step 9. Enter the following command to boot the new kernel:

shutdown -y -g0 [Press ENTER]

Setting Terminal Options with Ditty

Ditty is a utility program that sets and displays the terminal options for the DigiCHANNEL asynchronous serial boards PC/Xe, PC/Xi, MC/Xi, and COM/Xi.

The format is:

ditty [-a][-n *ttyname*][*option(s)*][ttyname . . .]

With no options, **ditty** displays all DigiBoard special driver settings, modem signals, and all standard parameters displayed by **stty(1)** for the tty device referenced by standard input.

Command options are provided to change flow control settings, set transparent print options, force modem control lines, and display all tty settings. Any unrecognized options are passed to **stty(1)** for interpretation.

The options are:

-a Display all of the unique DigiBoard option settings, as well as all of the standard tty settings reported by **stty -a.**

-n *ttyname* Set and display options for the given tty device, instead of standard input. This option may be specified multiple times to perform the same operation on multiple ttys.

ttyname Set and display options for the given tty device, instead of standard input. This form can be used with a tty pathname prefixed by **/dev/** or with a simple tty name beginning with **tty.** This option may be used on a modem control line when no carrier is present.

The following options specify transient actions to be performed immediately:

break Send a 250 MS break signal out on the tty line.

flush Immediately flush (discard) tty input and output.

flushin Flush tty input only.

flushout Flush tty output only.

The following options specify actions which are not "sticky," meaning that the changes are reset when the device is closed, and that the device will use the default values the next time it is opened.

stopout Stop output exactly as if an **xoff** character was received.

startout Restart stopped output exactly as if an **xon** character was received.

stopin Activate flow control to stop input.

startin Release flow control to resume stopped input.

[-]dtr Raise (drop) the DTR modem control line, unless DTR hardware flow control is selected.

[-]rts Raise (drop) the RTS modem control line, unless RTS hardware flow control is selected.

The following options are "sticky"-the effects continue until the system is rebooted or until the options are changed.

[-]fastcook Perform cooked output processing on the intelligent card to reduce host CPU usage, and increase raw mode input performance.

[-]fastbaud Alter the baud rate tables, so 50 baud becomes 57600, 75 becomes 76800, and 110 becomes 115200 baud.

[-]rtspace Enable RTS hardware input flow control, so RTS drops to pause remote transmission.

[-]ctspace Enable CTS hardware output flow control, so local transmission pauses when CTS drops.

[-]dsrpace Enable DSR hardware output flow control, so local transmission pauses when DSR drops.

[-]dcdpace Enable DCD hardware output flow control, so local transmission pauses when DCD drops.

[-]dtrpace Enable DTR hardware input flow control, so DTR drops to pause remote transmission.

[-]forcedcd Disable carrier sense, so the tty may be opened and used even when carrier is not present.

[-]altpin Switches the function of the DSR and the DCD inputs on the modular connector, so that DCD is available when using an 8-pin RJ-45 connector instead of the IO-pin RJ-45 connector.

startc c Sets the XON flow control character. The character may be given as a decimal, octal, or hexadecimal number.

stopc c Sets the XOFF flow control character. The character may be given as a decimal, octal, or hexadecimal number.

astartc c Sets auxiliary XON flow control character. The character may be given as a decimal, octal, or hexadecimal number.

astopc c Sets auxiliary XOFF flow control character. The character may be given as a decimal, octal, or hexadecimal number.

[-]aixon Enables auxiliary flow control, so that two unique characters are used for XON and XOFF. If both XOFF characters are received, transmission will not resume until both XON characters are received.

maxcps *n* Sets the maximum Characters Per Second (CPS) rate at which characters are output to the transparent print device. The rate chosen should be just below the average print speed. If the number is too low, printer speed will be reduced. If the number is too high, the printer will resort to flow control, and user entry on the CRT will be correspondingly impaired. Default is 100 CPS.

maxchar *n* Sets the maximum number of transparent print characters the driver will place in the output queue. Reducing this number increases system overhead, increasing this number delays operator keystroke echo times when the transparent printer is in use. Default is 50 characters.

bufsize *n* Sets the driver's estimate of the size of the transparent printer's input buffer. After a period of inactivity, the driver bursts this many characters to the transparent printer before reducing to the maxcps rate selected above. Default is 100 characters.

onstr *s* Sets the CRT escape sequence to turn transparent print on. An arbitrary octal character xxx may be given as **\xxx**.

offstr *s* Sets the CRT escape sequence to turn transparent print off. An arbitrary octal character xxx may be given as **\xxx**.

term *t* Sets the transparent printer on/off strings to values found in the internal default table. Internal defaults are used for the following terminals: **adm31, ansi, dg200, dg210, hz1500, mc5, microterm, multiterm, pcterm, tvi, vp-a2, vp-60, vt52, vt100, vt220, wyse30, wyse50, wyse60,** or wyse75. If the terminal type is not found in the internal default table, then **ditty** reads the **termcap** file and sets transparent print on/off strings to values given by the **po/pf** attributes found there.

Also see **stty(1), ioctl(2), termio(4),** and **termcap(5).**

DigiPrint" Transparent Print Option

Description and Theory of Operation

Most terminals have an auxiliary port that can be connected to a serial printer. These terminals support two print modes, Auxiliary and Transparent. If both print modes are OFF, data received by the terminal is simply displayed on the screen. With Auxiliary print mode ON, data received by the terminal is displayed on the screen, and is also transmitted to the printer. With Transparent print mode ON, the terminal transmits data received directly to the printer, without displaying it on the screen.

DigiPrint allows you to use your terminal in a normal manner, while information is also being sent over *the same serial connection from the host* to the printer connected to the terminal's auxiliary printer port. This is "transparent printing." The DigiPrint software determines whether packets of data are bound for the screen or for the printer, and precedes data bound for the printer with the Transparent Print Mode ON command, and follows it with the Transparent Print Mode OFF command.

Data for the terminal screen has the highest priority, and DigiPrint sends data to the printer only if there is a break in information being sent to the screen. If continuous data is being transmitted to the terminal device, nothing gets sent to the printer.

Whenever an auxiliary printer port is used, flow control to the printer becomes an issue. If the printer falls behind and invokes flow control, output to both the printer and the terminal is stopped: this is aggravating to the terminal user. The **ditty** command provides three parameters to limit printer output and avoid this situation. (See *Setting Terminal Options with Ditty* on page 55 for a complete description of the **ditty** command.)

The parameter **maxcps** limits the maximum printer port character-per-second data rate. This number should be set to the minimum character rate the printer can sustain in typical use.

The parameter **maxchar** limits the number of characters queued to the printer ahead of terminal output. Lower numbers increase system overhead, higher numbers result in keystroke echo delays. A value of 50 is generally a good compromise at 9600 baud.

The parameter **bufsize** should be set to a value just below the printer's buffer size. After a period of inactivity, the driver will burst up to this many characters to the printer to fill the print buffer before slowing to the max CPS rate.

The printer on/off strings are also set using **ditty.**

DigiPrint will be available for use after the DigiCHANNEL device driver software for your operating system is installed, and the transparent print options are activated with the **ditty** program.

A cable must be connected between the auxiliary port of the terminal and the printer. The baud rate on the terminal auxiliary port and the printer must be the same, and the printer and the auxiliary port of the terminal must use the same handshaking mode. The auxiliary port must also be enabled. If your terminal is not one of those directly supported, you must know the escape sequence of your terminal.

Refer to your terminal and printer manuals for connection information, escape codes, and to see what handshaking modes are supported (i.e. xon/xoff, busy/ready, rts/cts, etc.).

Printer devices **(prill,** etc.) must not be in either the **/etc/inittab** or **/etc/ttys** files, and must not be enabled.

Transparent Print Activation

DigiPrint is activated with **ditty. The ditty** program configures the DigiCHANNEL tty device driver for transparent print options. (See *Setting Terminal Options with Ditty* for a complete description of the **ditty** command.) The **ditty** command must be run each time the machine is booted. Usually, the best way to do this is by adding **ditty** commands to your **etc/rc** system initialization file. (See your System Administrators Guide for details.) Alternately, you may include the **ditty** command sequence in your **.login** or **.profile** files, to ensure that DigiPrint is activated when you log in. Your System Administrator can help you edit these files. The pathname for **ditty** is **/usr/bin/ditty**.

DigiPrint transparent print Options are set using the **ditty** program in the following manner:

```
ditty [ -a ][ option(s)   1 port
```

The command line options are:

maxcps *n* Sets the maximum Character Per Second (CPS) rate at which characters are output to the transparent print device. See *Setting Terminal Options with Ditty* (page 55) for more information.

maxchar *n* Sets the maximum number of transparent print characters the driver will place in the output queue. See Setting Terminal Options with Ditty for more information.

bufsize ***n*** Sets the driver's estimate of the size of the transparent printer's input buffer. See *Setting Terminal Options with Ditty* for more information.

onstr ***s*** Sets the terminal escape sequence to turn the transparent printer on. An arbitrary octal character xxx may be given as **\xxx**.

offstr ***s*** Sets the terminal escape sequence to turn the transparent printer off. An arbitrary octal character xxx may be given as **\xxx**.

term ***t*** Specifies the terminal type. See *Setting Terminal Options with Ditty* for more information.

port Specifies the tty device.

Now data can be sent to your printer via the printer devices **(prill - pri48).**

Example: `cat` *`filename`* `> /dev/pri11`

DITTY Examples

Example 1:

The following command configures the DigiPrint options for a Dec VT100 terminal connected to **/dev/ttyi11**. (Note that the printer uses **/dev/pri11**). **Maxcps, maxchar** and **bufsize** are left to defaults. Type:

```
ditty term vt100 /dev/ttyi11
```

Example 2:

The following example uses **onstr** and **offstr** arguments. (This sets the terminal to use ANSI Standard.) Again **maxcps, maxchar**, and **bufsize** are defaults. Type:

```
ditty onstr "\033[5i" offstr "\033[4i" /dev/ttyi11
```

("033" is the ESC character in octal.)

Example 3:

This example command sets the DigiPrint option for a WYSE30 terminal, with **maxcps** of 75, a **maxchar** of 100, and a printer buffer size, **bufsize**, of 1000. Type (all on one line, with a carriage return at the end only):

```
ditty term wyse30 maxcps 75 maxchar 100 bufsize
1000 /dev/ttyi11
```

dscreen

(Also see ***dsinfo*** on page **70.)**

Description and Theory of Operation

DigiScreen is a utility that allows a single physical terminal to be connected to several virtual terminal sessions ***(screens)*** at one time. It is mainly intended for use with terminals that have two or more pages of screen memory. With such terminals, switching between virtual screens will also switch between physical terminal screen pages, allowing each virtual screen's image to be saved and restored. On terminals without multiple pages of screen memory, DigiScreen can still be used to switch among virtual screen sessions, although the appearance of the screen will not be maintained when switching screens.

Note: For full support of DigiScreen, your terminal must be able to switch internal screen pages on command ***and must remember the cursor position for each page.*** While DigiScreen will work on both smart and dumb terminals, screen images are not saved during screen changes on dumb terminals. DigiScreen also supports terminals connected to two or more computers through separate serial ports.

Options

DigiScreen is called with the following format:

dscreen [**-i** *infofile*][**-t** *termtype*]

If *infofile* is specified, it will be used as the source of terminal configuration information. Otherwise, if the environment variable **DSINFO** is defined, it specifies the name of the tile to be used as the source of terminal configuration information. If neither *infofile* nor **DSINFO** is specified, the configuration information is read from the file **/etc/dsinfo**. This option is used to define a different set of keys to be used with DigiScreen, e.g. when the originally defined DigiScreen keys conflict with an application one wishes to use.

The terminal type is used to select which entry in the *infofile* (default **/etc/dsinfo**) is used to describe the terminal. If the desired terminal type does not match the setting of the **TERM** environment variable (again, for alternate key mappings), it can be specified as ***terrntype*** with the **-t** option.

Using DigiScreen

When DigiScreen is run, it starts up one virtual screen. Some of the keys on the terminal keyboard will not be passed through to the virtual screen; instead, DigiScreen will intercept these keys and perform certain actions when they are pressed. The actions include **select** a specific screen, **block** all input and output, start a **new** screen, **end** DigiScreen (exit code 0), **quit** DigiScreen (exit code 1), switch to the **previous** screen, and **list** the DigiScreen keys and what they do. Which function each key performs is dependent upon the terminal and the terminal description in the *dsinfo* file.

When a new virtual screen is created, it is assigned to a **select** key. When this key is pressed, DigiScreen will switch the physical terminal to the video page associated with the particular virtual screen and direct all input and output to go between the physical terminal and the virtual screen. Each virtual screen must have a **select** key; once all of the select keys defined in the dsinfo file have virtual screens assigned to them, no more screens may be created. Individual screen sessions will end when the original shell process exits, and this will free the associated **select** key for use with another virtual screen. DigiScreen exits when there are no more active screens.

Block keys can be used to stop output (in a fashion similar to ^S when using "ixon" flow control). However, the true purpose of these keys is to allow for transparently setting up terminal sessions on two computers using a terminal that has two serial ports. See ***dsinfo*** (page 70) for more information.

Pressing a **new** screen key will create a new screen and assign it to one of the **select** keys, unless one of the necessary resources is exhausted. Each new screen requires a **select** key as defined in the ***dsinfo*** file, a DigiScreen pseudo terminal device, enough memory for the various structures used to keep track of the screen, and a process to run the shell from. If any of these are not available, the new screen operation will fail and print a message indicating the reason for the failure.

Pressing an **end** key will send a SIGHUP signal to all the screen sessions, clean up, and exit with a status of 0. Pressing a **quit** key will perform the same actions, but will exit with a status of 1.

Pressing a **previous** key will switch the terminal to the screen that was last displayed.

Pressing a **list** key will cause a list of the keys recognized by DigiScreen and their actions to be printed on the terminal. When DigiScreen starts a new screen, it will print the message "Press KEY for help" (where KEY is the name of the **list** key) if there is a list key defined,

Dynamic Screen Assignment

Normally, the terminal description entry in the **dsinfo** file will have the same number of screen selection keys as the terminal has physical screen pages. However, if more screen selection keys are defined than the number of physical screen pages defined, DigiScreen will dynamically assign physical screen pages to virtual screens. When a virtual screen that doesn't have an associated page of screen memory in the terminal is selected, DigiScreen assigns the least recently used physical screen to the virtual screen. When this occurs, some sort of indication is given that the physical screen is connected to a different virtual screen; for instance, the screen may be cleared. Using a terminal that has only one physical screen is the simplest case of this; the one screen is shared between all virtual screens.

Notes:

You shouldn't switch screens when the screen is being written to; you may cut an escape sequence "in half' and leave the terminal in an unknown state.

Even if your terminal saves the cursor position for individual screens, it may not save other states such as insert mode, inverse video, etc. If this is the case in your situation, make sure you are not in any such mode when you switch screens.

DSINFO DigiScreen Information File

/etc/dsinfo

Terminal descriptions for DigiScreen multiple screen utility.

Description

dsinfo is a database of terminal descriptions used by *dscreen* (DigiScreen). The information in the descriptions include what keys are to be used by DigiScreen and what functions they perform, how many pages of screen memory the terminal has, and what code sequences are sent/received to use these features.

Entry Format

Entries in *dsinfo* consist of a number of comma separated fields. The first field is a list of alternate names for the terminal, separated by "I" characters.

The remaining fields are strings describing the capabilities of the terminal to DigiScreen. Within these strings, the following escape codes are recognized:

\E,\e	escape character
\n,\l	newline (a.k.a linefeed) character
\r	carriage return
\t	tab character
\b	backspace character
\f	formfeed character
\s	space character
nnn	character with octal value *nnn*
^*x*	control-x for any appropriate *x*

Any other character preceded by a backslash will yield the character itself. The strings are entered as *type=string*, where *type* is the type of string as listed below, and *string* is the string value.

String Types

The string types are as follows:

dskx A string type that starts with "dsk" describes a key. The type must be four letters long, and the fourth letter x indicates what action is taken when the key is received. The key types are:

Type	Action
dsks	Switch Screens
dskb	Block Input and Output
dske	End DigiScreen
dskq	Quit DigiScreen (non-zero exit status)
dskc	Create New Screen
dskp	Switch to Previous Screen
dskl	List Keys and Actions

Any other key type (a string type dsk*x* that doesn't end in s, b, e, q, p, or 1) will cause no internal **dscreen** action, but will show up in the key listing and will be recognized and acted upon (see below). A type of **dskn** (n for No Operation) is guaranteed not to be used for any function in future versions; it is recommended that this be used when no internal **dscreen** action is desired. The value string for each key has three substrings, which are separated by "I" characters (use 'II" to include the "I" character in one of the substrings). The first substring is the sequence of characters that the

terminal sends when the key is pressed. The second substring is a label for the key that is printed when a list of the keys is presented (for example, "Shift-F1"). The third substring is a sequence of characters that DigiScreen sends to the terminal when this key is pressed, before performing the action this key requests.

dsp

A string type of "dsp" describes a physical screen in the terminal. One dsp string should be present for each physical screen in the terminal. The value string for each physical screen has two substrings, which are separated by a "I" character (again, use "\I" to include the "I" character in one of the substrings). The first substring should be the sequence of characters to send to the terminal to display and output to the particular physical page on the terminal. The second substring is sent to the terminal any time the page is used for something new. This second substring is usually set to the clear screen sequence. It is sent under two conditions. The first condition is when a new virtual terminal session is being created. The second condition occurs when the user is running more virtual terminals than there are physical screens; if the user selects a virtual terminal such that DigiScreen has to re-use one of the physical screens, it will send this sequence to the screen to indicate to the user that the screen contents don't match the output of the virtual terminal connected to. Note that running with more virtual terminals than physical screens can be quite confusing and is not particularly recommended; it can be avoided by defining no more screen selection keys ("dsks=...") than physical screens ("dsp=...") in the dsinfo entry.

dst

A string with a type of "dst" adjusts DigiScreen's input timeout. The value of the string should be a decimal number. The timeout value is in tenths of a second, and has a maximum value of 255. The default timeout value is 1 (or .1 seconds). When DigiScreen recognizes a prefix of an input key sequence but doesn't have all the characters of the sequence, it waits for more characters. If the timeout occurs before more characters are received, the characters are sent on to the virtual screen and DigiScreen will not consider these characters as part of an input key sequence. It may be necessary to raise this value if one or more of the "keys" DigiScreen is to trigger on is actually a number of keystrokes (i.e. assigning **Ctrl-Z** 1, **Ctrl-Z** 2, **Ctrl-Z 3,** etc. for screen selection, **Ctrl-Z N** for new screen and so on).

Example 1

The following example entry is for a Wyse 60 with three screens:

```
wy60|wyse60|wyse model 60,
    dsks=^A`^M|Shift-F1|,
    dsks=^Aa^M|Shift-F2|,
    dsks=^Ab^M|Shift-F3|,
    dskc=\200|Ctrl-F1|,
    dske=\201|Ctrl-F2|\Ew0\E+,
    dskl=\202|Ctrl-F3|,
    dsp=\Ew0|\E+,
      dsp=\Ew1|\E+,
      dsp=\Ew2|\E+,
```

With this entry, **Shift-F1** through **Shift-F3** are used for selecting screens 1 through 3, respectively. **Ctrl-F1** will create a new screen, **Ctrl-F2** will send "ESC w 0 ESC +" to the screen (switching to window 0 and clearing the screen) and then end **dscreen**, and **Ctrl-F3** will list the keys and their functions. The three physical screens are displayed by sending "ESC w 0", "ESC w 1", and "ESC w 2." Each time a physical screen is used for a new screen, the sequence "ESC +" will be sent to the terminal, which will clear the screen.

Example 2

This example is, again, for a Wyse 60 with three screens, but one of the screens is on a second computer communicating through the second serial port on the terminal:

```
wy60-1|wyse60-1|wyse model 60 - first
serial port,
    dsks=^A'^M|Shift-F1|,
    dsks=^Aa^M|Shift-F2|,
    dskb=^Ab^M|Shift-F3|\Ed#^Ab\r^T\Ee9,
    dskc=\200|Ctrl-F1|,
    dske=\201|Ctrl-F2|\Ed#\201^T\Ew0\E+,
    dskl=\202|Ctrl-F3|,
    dsp=\Ew0|\E+,dsp=\Ew1|\E+,

wy60-2|wyse60-2|wyse model 60 - second
serial port,
    dskb=^A'^M|Shift-F1|\Ed#^A'\r^T\Ee8,
    dskb=^Aa^M|Shift-F2|\Ed#^Aa\r^T\Ee8,
    dsks=^Ab^M|Shift-F3|,
    dskc=\200|Ctrl-F1|,
    dske=\201|Ctrl-F2|\Ed#\201^T\Ew0\E+,
    dskl=\202|Ctrl-F3|,
    dsp=\Ew2|\E+,
```

For this setup to work, DigiScreen must be run on both computers, with terminal type wy60-1 on the first computer and terminal type wy60-2 on the second computer (using the **-t** option to DigiScreen). The wy60-1 entry will be examined first.

The first two key entries are unchanged from the original wy60 entry. The third key, however, has type "dskb," which means block both input and output. When this key is pressed, the sequence "ESC d # Ctrl-A b CR Ctrl-T ESC e 9" is sent to the terminal; after this output is blocked and DigiScreen continues scanning input for key sequences but discards all other input.

The effects caused by the sequence sent to the terminal contain the real magic here. The sequence "ESC d #" puts the terminal in "Transparent Print Mode," which echos all characters up to a Ctrl-T out the other serial port. The characters "Ctrl-A b CR" are sent out the other serial port, informing the **dscreen** process on the other computer that it should activate the window associated with the Shift-F3 key. The "Ctrl-T" takes the terminal out of the Transparent Print mode, and the sequence "ESC e 9" tells the terminal to switch to the other ("AUX") serial port for data communications.

At this point the other computer takes over and sends an "ESC w 2" to switch to the third physical screen, and then resumes normal communication.

The wy60-2 entry follows the same general pattern for keys Shift-F1 and Shift-F2: switch to transparent print mode; send function key string to other computer; switch transparent print off; and switch to the other serial port. The end key (Ctrl-F2) works the same for both computers; it sends the end key sequence to the other computer through the transparent print mechanism, switches the terminal to window 0, clears the screen, then exits.

Note: The portions of the following error messages given in *italics are* example numbers, and will change according to the actual error conditions.

Error Message:	`***WARNING*** No board found at port 0x320, check switch settings`
Means:	The board doesn't respond to reset.
Action(s) to Take:	- Make sure the board is fully seated in the slot - Make sure the board jumper settings and the device driver settings match (most common reason for error) - Potential hardware problem

Error Message:	*****WARNING*** Board** *1* **failed in diagnostics** *****WARNING*** Board 1 not executing**
Means:	The driver encountered an error executing on-board BIOS
Action(s) to Take:	- Make sure the jumpers are in their proper positions - Make sure there is no memory contention with other devices - Potential software problem - Potential hardware problem

Error Message:	*****WARNING*** Driver memory allocation failed at port** *0x320*
Means:	The operating system would not allocate memory to the driver
Action(s) to Take:	- Adjust kernel resources

Error Message:	`***WARNING*** Board 1 failed in memory test`
Means:	The driver could not read dual-ported memory
Action(s) to Take:	- Make sure the board is fully seated in the slot - Make sure the board jumper settings and the device driver settings match - Make sure the jumpers are in their proper positions - Make sure there is no memory contention with other devices - Potential hardware problem