Software Manual

Digi EPC/X, C/X, Xem and SmartPort Systems

SCO XENIX System V Rel. 2.3

DigiPRINT™, **DigiSCREEN**™, **Digi Port Authority**™, **Xem**™, **EPC/X**™, **EPC/CON-16**™, **C/X**™, **C/CON-16**™, **C/CON-8**™, **C/CON-16 Rack**™, **PORTS/16em**™, **Ports/8em**™, **PORTS/8emp**™, **SmartPort**™ and the Digi logo are trademarks of Digi International Inc. All other brand and product names are the trademarks of their respective holders.

Digi International Inc.	Phone	(800) 344-4273
11001 Bren Road East		(612) 912-3444
Minnetonka, MN 55343	FAX	(612) 912-4952
	BBS	(612) 912-4800
Digi International GmbH	Phone	+49 221 920520
Domkloster 1	FAX	+49 221 9205210
50667 Köln	BBS	+49 221 9205211
Germany		
Digi International Asia Pte Ltd	Phone	+65 732 1318
13-06 Tower 'A'	FAX	+65 732 1312
391A Orchard Road	BBS	+65 292 7163
Ngee Ann City		
Singapore 0923		

Information in this document is subject to change without notice and does not represent a commitment on the part of Digi International.

Digi provides this document "as is", without warranty of any kind, either expressed or implied, including, but not limited to, the implied warranties of fitness or merchantability for a particular purpose. Digi may make improvements and/or changes in this manual or in the product(s) and/or the program(s) described in this manual at any time.

This product could include technical inaccuracies or typographical errors. Changes are periodically made to the information herein; these changes may be incorporated in new editions of the publication.

Table of Contents

Introduction

The Digi device driver software for SCO XENIX is an installable device driver; the software development system is *not* required to create a new kernel. The link kit, however, must be installed.

This manual also contains instructions for the following features:

- DigiPRINT transparent printing (page 36)

- DigiSCREEN, Digi's multiple screen utility (page 40)

Once you have completed the Hardware Installation instructions in the main Digi hardware *Installation Guide*, you may proceed with the software device driver installation instructions starting on the following page.

Important!	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.

Software Installation

Installation of the device driver software for SCO XENIX 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 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 terminals, modems, etc.

Note: Software changes more rapidly than 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

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

2. Insert the DigiWARE diskette and enter:

    custom

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

```
Installing custom data files...

Insert distribution volume 1 and press <Return> or enter q to quit:
```

4. Press <Enter> and the system will display:

```
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 the Digi software. The system will display:

```
Name   Inst   Size   DigiWARE for EPC, CX, Xem and SmartPort packages
------------------------------------------------------------------
EPCA   NO     992    Digi async driver V5.x.x


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

Enter:

```
epca
```

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 diskette drive. Press <Enter>, and the system will display:

```
Extracting files...
```

5. You will see the following screen:

```
     Copyright (c) 1988-96 Digi International Inc. All Rights Reserved
RESTRICTED RIGHTS LEGEND: Use, duplication, or disclosure by the Government
is subject to restrictions as set forth in subparagraph (c)(1)(ii) of the
Rights in Technical Data and Computer Software clause at DFARS 252.227-
7013.  Digi International Inc., 11001 Bren Rd East, Minnetonka, MN 55343.

This script installs the Digi EPC/X, CX, Xem and SmartPort driver for:

        SCO XENIX System V Release 2.3

This script also installs the information needed by XENIX to use
these additional ports.  This driver supports up to 4 asynchronous
serial boards.

By default, the ports are installed with the basename "tty".
DigiPRINT ports are installed with the basename "pr".

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

If you answer "no" to the question, you will be prompted for new base names to use. In either case, the installation script will then scan the **/dev** directory to find out what port names have already been defined, to avoid conflicts with existing nodes.

6. The system displays:

```
For C/X, EPC/X and Xem products:
--------------------------------
The port names will look like:  /dev/ttya01

where `tty' is the basename you picked above, `a' is an ID letter
that can be different for each port box, and `01' is the port number.

Systems with a large number of ports may need to use some letters more
than once.  When this occurs, the first box to use an ID letter will
get port numbers 01-16, the second box to use that letter will get
port numbers 17-32, and so on.

For SmartPort products:
-----------------------
The port names will look like:  /dev/tty3a

where `tty' is the basename you picked above, `3' is the number of the COM
channel, and `a' is the letter designation the individual port on the
board.  Letters `a' through `x' designate Ports 1 through 24.  For 32 port
boards, add `y' and `z' for Ports 25 and 26, then `aa' through `ff' for
ports 27 through 32.

Please hit the <CR> key to continue:
```

then:

```
For C/X, EPC/X and Xem products:
--------------------------------
You can have the install script pick ID letters for you, assigning
letters consecutively (a,b,c,d,...) and starting over from the
beginning when it runs out of letters; or you can choose them manually.
Manual ID selection is recommended for larger systems, where it can be
used to help keep port names more organized.

For SmartPort products:
-----------------------
The install script will automatically assign the number (3-6) of the COM
channel for each board.  Please answer `y' to the following question.

   Do you want ID letters picked for you (y/n)?
```

If you answer "**y**", ID letters will be automatically picked. If you answer "**n**", you will be asked (later in the procedure) to specify an ID letter for each PORTS module.

7. Now the system will ask:

```
How many boards do you wish to install (1-4)?
```

Enter the number of boards you have installed in your computer.

Steps 8-12 will be repeated for each EPC/X, C/X, Xem or SmartPort adapter installed in your system.

8. You will see the display:

```
Configuring board 1.

   Boards supported:

   ISA Boards                           (PC/AT Compatible Bus)
          1) PC/Xem (or PC/Xm)
          2) ISA C/X Host Adapter
          3) ISA EPC/X Host Adapter
          4) ISA SmartPort
   EISA Boards
          5) EISA/Xem (or EISA/Xm)
          6) EISA C/X Host Adapter
          7) EISA EPC/X Host Adapter
   MC Boards                            (IBM PS/2 Micro Channel Bus)
          8) MC/Xem (or MC/Xm)
          9) MC C/X Host Adapter
         10) MC EPC/X Host Adapter

   What type is board 1?
```

Choose the applicable board type.

Note: If you chose option 4 (SmartPort) above, you will be asked to further identify the board as:

1) SmartPort 4
2) SmartPort 8
3) SmartPort Plus 8
4) SmartPort Plus 16
5) SmartPort Plus 24
6) SmartPort Plus 32

9. (*ISA boards only—EISA boards skip to Step 10; Micro Channel boards skip to Step 11*)

You will now be asked to specify the I/O port address for the board being configured. You will see the something like this (the exact screen will vary slightly, depending on which product you are installing):

```
 Configuring board 1.
 Board type is ISA EPC/X Host Adapter.

Selecting the I/O port:
 The I/O port choice must match the setting of the dip switches on the
 board, and must not conflict with other devices in the system.
 Problems with the I/O port selection should be checked for if your
 system fails to find the board or your system locks up.

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

         108     208     308
         118     228     328
         128

    Please enter selection (108-328):
```

Select the address that corresponds to the setting of the DIP switches on your board (see the *Installation Guide* for your board).

10. (*EISA and ISA boards only; Micro Channel boards skip to Step 11.*)

ISA Boards (see following page for EISA boards):

Next, you need to specify a starting address for the dual-ported memory on your board. If you are installing multiple boards, the same address may be used for all boards that are supported by this driver. You will see the screen:

```
 Configuring board 1.
 Board type is PC/Xem.
 I/O port is 104.

Selecting the memory address:
 The memory address choice must not conflict with other devices in the
 system.  Problems with the memory address selection should be checked
 for if your system fails to find "board memory" or your system
 locks up.

       The memory address choices, in hexadecimal, are:

   *80) 0x00080000 *A0) 0x000A0000  C0) 0x000C0000  E0) 0x000E0000
   *88) 0x00088000 *A8) 0x000A8000  C8) 0x000C8000  E8) 0x000E8000
   *90) 0x00090000 *B0) 0x000B0000  D0) 0x000D0000  F0) 0x000F0000
   *98) 0x00098000 *B8) 0x000B8000  D8) 0x000D8000  F8) 0x000F8000

       *NOTE: selections 80-98 usually conflict with system memory.
               selections A0-B8 usually conflict with video boards.

       Please enter selection code (80-F8):
```

Enter the two-digit code to the left of the address you wish to use.

*NOTE—Although there are 16 choices offered for memory start addresses, a limited number of these choices are likely to be available. Of the 16, the best choices are probably **D0** and **D8**. Systems with 512K of base memory (instead of 640K) may be able to use the options **80-98**. See the appendix on memory conflicts in your Digi hardware* Installation Guide *for more information.*

EISA Boards (see previous page for ISA Boards):

Next, you need to specify a starting address for the dual-ported memory on your board. If you are installing multiple boards, the same address may be used for all boards that are supported by this driver. You will see the screen:

```
 Configuring board 1.
 Board type is EISA EPC/X Host Adapter.

Selecting the memory address:
 The memory address choice must not conflict with other devices in the
 system.  Problems with the memory address selection should be checked
 for if your system fails to find "board memory" or your system
 locks up.

        The memory address choices, in hexadecimal, are:

  *80) 0x00080000 *A0) 0x000A0000  C0) 0x000C0000  E0) 0x000E0000
  *88) 0x00088000 *A8) 0x000A8000  C8) 0x000C8000  E8) 0x000E8000
  *90) 0x00090000 *B0) 0x000B0000  D0) 0x000D0000  F0) 0x000F0000
  *98) 0x00098000 *B8) 0x000B8000  D8) 0x000D8000  F8) 0x000F8000

        *NOTE: selections 80-98 usually conflict with system memory.
               selections A0-B8 usually conflict with video boards.

 F000) 0xF0000000  F400) 0xF4000000  F800) 0xF8000000  FC00) 0xFC000000
 F100) 0xF1000000  F500) 0xF5000000  F900) 0xF9000000  FD00) 0xFD000000
 F200) 0xF2000000  F600) 0xF6000000  FA00) 0xFA000000  FE00) 0xFE000000
 F300) 0xF3000000  F700) 0xF7000000  FB00) 0xFB000000  FF00) 0xFF000000

        Please enter selection code (80-F8 or F000-FF00):
```

Enter the two or four digit code to the left of the address you wish to use (the four digit codes yield addresses in the fourth gigabyte). The address must be the one you specified when you ran the EISA configuration program.

*NOTE—Although there are 16 choices offered for memory start addresses below 1 megabyte, a limited number of these choices are likely to be available. Of the 16, the best choices are probably **D0** and **D8**. Systems with 512K of base memory (instead of 640K) may be able to use the options **80-98**. See the appendix on memory conflicts in your hardware* Installation Guide *for more information.*

11. This step is different depending upon whether you are installing Xem or (EP)C/X boards. Follow the appropriate procedure for your board.

Note: Skip this step for SmartPort boards. Proceed to Step 12.

Xem—for C/X and EPC/X, follow the procedure on the following page.

If you are installing an Xem host adapter, you will now be asked for the number of PORTS modules to be connected to the board:

```
 Configuring board 2.
 Board type is PC/Xem.
 I/O port is 104.
 Memory Addr. is 0x000D0000.

PORTS/16em or PORTS/8em(p) modules:
 This board can have 1 to 4 modules connected.

        How many modules are connected to this board (1 - 4)?
```

Select the appropriate number for your installation.

If you answered "**n**" to the question "**Do you want ID letters picked for you?**" back in Step 6, you will also be prompted at this time for the ID letters to be assigned to each of the PORTS modules.

You will also be asked for the number of ports (8, 9 or 16) on each PORTS module. Answer "**8**" for PORTS/8em modules, "**9**" for PORTS/8emp modules or "**16**" for PORTS/16em modules.

Now proceed to Step 12, on page 18.

C/X, EPC/X host adapters—for Xem host adapters, follow the procedure on the previous page.

If you are installing a C/X or EPC/X host adapter, you will be asked for configuration information for the two synchronous lines. This determines how the host adapter will communicate with the attached concentrator(s).

There are two methods for setting the line configuration: *basic* and *custom*. In the basic configuration, the sync lines are set to 8-wire direct and either 1228K bps or 10M bps (10M bps is applicable only to the EPC/X host adapter). The custom configuration allows you to select the wiring method and data rate for each sync line. You will see:

```
 Configuring board 1.
 Board type is ISA EPC/X Host Adapter.
 I/O port is 108.
 Memory Addr. is 0x000D0000.

Line Configuration:
 The sync lines may be configured two ways.  The basic method has all
 connections wired "8 wire direct" at a speed of either 1228K bps or
 10M bps, and can be used for quick set-up for most situations.  The
 custom method allows you to choose speeds and wiring methods
 individually.

       Do you want to use the basic installation method (y/n)?
```

Basic Configuration *(for Custom Configuration, see page 17)*

11a. If you are installing an EPC/X host adapter, you will see the following screen (if you are installing a C/X host adapter, skip to Step 11b):

```
 Configuring board 1.
 Board type is ISA EPC Host Adapter.
 I/O port is 108.
 Memory Addr. is 0x000D0000.

Basic Configuration:

 One of two line speeds must be chosen for the basic configuration
 method.  The choices are 1228K bps and 10M bps.  Running the sync
 lines at 1228K bps maintains compatibility with C/CON-16
 concentrators.  Running the sync lines at 10M bps allows higher
 performance, but is not compatible with C/CON-16 concentrators and
 restricts the length of the sync cable.  For more information, see
 the manual.

        1) 1228K bps
        2) 10M bps

 Which speed do you wish to run the sync lines at?
```

Important!

Select 10M bps *only* if:
- all attached concentrators are EPC/CON-16 concentrators, and

- the *cumulative* length of all daisy chain cables on either sync line is 30 feet or less.

See the EPC/CON-16 *Installation Guide* for more detailed information about data rates versus cable lengths.

11b. Now you will be asked how many concentrators are attached to each sync line. For EPC/X host adapters, you will also be asked how many EBI modules are attached to each concentrator (this refers to PORTS/16em, PORTS/8em or PORTS/8emp modules connected to the "EBI Out" port of EPC/CON-16 concentrators), and how many ports (8, 9 or 16) are on each EBI module (answer "**8**" for PORTS/8em modules, "**9**" for PORTS 8emp modules and "**16**" for PORTS/16em modules).

[Important!]

EPC/CON-16 and newer C/CON-16 Concentrators

EPC/CON-16 and newer C/CON-16 concentrators (which have a plastic case) must have their node numbers set manually at installation (see the concentrator *Installation Guide* for instructions). When asked for the number of concentrators, enter the *node number* of the last concentrator in each sync line (which may be different from the actual number of concentrators). Normally concentrator node numbers are assigned sequentially, beginning with 1; however, if you are planning to add more concentrators later, and want to configure the driver and create the devices in **/dev** to support the future concentrators, you may skip node numbers to allow for later insertion of concentrators. For example, if you have three concentrators attached to a sync line, but are planning to add three more, the node number of the last concentrator in the chain should be set to "6", and you should enter "6" for the number of concentrators (it is important that these numbers match, because the driver uses them to set the communication mode of the last concentrator to enable it to return data to the host adapter).

Older C/CON-16 Concentrators

Older C/CON-16 concentrators (which have a metal case) are always assigned node numbers sequentially, beginning with 1. If all of the concentrators on a sync line are older models, enter the actual number of concentrators (which will correspond to the node number of the last concentrator in the chain).

Mixed Older and Newer Concentrators

When mixing older and newer concentrators on a sync line, the older concentrators must be attached closest to the host adapter, and newer concentrators must be at the end of the chain. In this case, use the *node number* that has been set in the last concentrator in the chain (which may be different from the actual number of concentrators).

Custom Configuration

The custom configuration requires you to specify the wiring method and the data rate for each host adapter synchronous line. The wiring options are:

1) 4-wire direct
2) 8-wire direct
3) 8-wire synchronous modem
4) EIA-232 synchronous modem

The supported data rates are:

4-wire direct

1) 230K	2) 460K	3) 921K*	4) 1843K*

8-wire direct

1) 2400	5) 38.4K	9) 230K	13) 1843K*	17)10M*
2) 4800	6) 57.6K	10) 460K	14) 2458K*	
3) 9600	7) 76.8K	11) 921K	15) 3686K*	
4) 19.2K	8) 115K	12) 1228K	16) 7373K*	

8-wire synchronous modem (EIA-422)

1) 2400	6) 38.4K	10) 460K
2) 4800	7) 57.6K	11) 921K
3) 9600	8) 76.8K	12) 1228K
4) 14.4K	9) 115K	
5) 19.2K	10) 230K	

8-wire EIA-232 synchronous modem

1) 2400	4) 14.4K	7) 57.6K
2) 4800	5) 19.2K	8) 64.1K
3) 9600	6) 38.4K	9) 76.8K

* Rates with an asterisk are incompatible with C/CON-16 concentrators. These data rates can only be used if *all* concentrators on a given sync line are EPC/CON-16 concentrators. Also, see *Restrictions on Cable Lengths* in the EPC/CON-16 *Installation Guide*.

12. You will now be asked to confirm the configuration for the board:

If you have installed an Xem host adapter with four PORTS modules, you will see something like this:

```
You have selected the following configuration for board 2:
        Board Type:     PC/Xem. I/O address:    104.
        Memory address: 0x000D0000.


        Module  Port Names
        --------------------------
           1          ttym01 - ttym16
           2          ttyn01 - ttyn09
           3          ttyo01 - ttyo08
           4          ttyq01 - ttyq16

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

If you installed an EPC/X host adapter, you will see something like this:

```
You have selected the following configuration for board 1:
   ISA EPC Host Adapter. I/O address: 108. Memory Address: 0x000D0000.

          Connections     Speed   Cabling             Port Names
          -----------------------------------------------------------
            Line 1
          Concentrator 1    10M      8 wire direct      ttya01 - ttya16
              EBI Module 1                              ttyb01 - ttyb08
              EBI Module 2                              ttyc01 - ttyc09
              EBI Module 3                              ttyd01 - ttyd16
          Concentrator 2    10M      8 wire direct      ttye01 - ttye16
            Line 2
          Concentrator 1    9600     EIA-232 modem       ttyf01 - ttyf16
          Concentrator 2    9600     8 wire direct      ttyg01 - ttyg16
              EBI Module 1                              ttyh01 - ttyh16
          Concentrator 3    9600     8 wire direct      ttyi01 - ttyi16
          Concentrator 4    9600     8 wire direct      ttyj01 - ttyj16

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

If you installed a SmartPort adapter, you will see something like this:

```
You have selected the following configuration for board 2:
 Board Type:      SmartPort Plus 16
 I/O Address:     100
 Memory Address: 0x00D0000
 Port Name:       /dev/tty4a - /dev/tty4p

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

If you accept the configuration, Steps 8-12 will be repeated for each additional board specified in Step 7. Otherwise, you will be returned to Step 8 (page 9) to re-enter the configuration for the current board.

13. Next, 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 Digi RJ-45 pinouts. Setting **altpin** to ON enables the alternate RJ-45 pinouts. (This is useful for 8-pin RJ-45 connectors. See the *Installation Guide* for your board, and page 32 of this manual for more details.)

The software asks:

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

Answer **y** or **n** as appropriate.

Note that answering "**n**" here activates the **altpin** configuration for *all* ports. Individual ports can be set with **ditty** (see page 32).

14. Installing DigiSCREEN

DigiSCREEN is Digi'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 Digi 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 21, *Creating New Devices*.

15. 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. See page 40 for a complete description of the DigiSCREEN multiple screen utility.

16. Finally, the software asks:

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

For a new installation, answer "**y**" (yes). For updates, answer "**n**" to preserve the current setup. If you are not sure, answer "**y**".

/etc/ttys will also be updated if you answer "**y**" above.

Part Two: Creating New Devices

This portion of the installation procedure creates devices in **/dev**, giving XENIX the information to use the additional ports.

The Digi driver will support up to four EPC/X, C/X, Xem and/or SmartPort adapters.

C/X host adapters can have up to eight concentrators attached.

EPC/X host adapters can each have up to fourteen concentrators and/or PORTS modules attached. The maximum number of concentrators per synchronous line is eight. PORTS modules may be attached to the concentrators, as long as the total number of boxes (concentrators and PORTS modules) does not exceed fourteen.

Xem host adapters can each have four PORTS modules attached.

The devices are named according to the following conventions:

Format used for port names (C/X, EPC/X, Xem)

tty   Default base name. You may have defined a different one (in Step 5 of Part 1).

pr   Default base name for DigiPRINT transparent printing.

a-z   Concentrator or PORTS module letter I.D. Legal letters are a-z; ports (tty or printer) with modem control are identified by a capital letter A-Z.

01-96   Port number on the individual concentrator or PORTS module.

For example, if "**tty**" is the base name, Port 4 on concentrator or PORTS module "**b**" will be **ttyb04**. The same port with modem control enabled would be named **ttyB04**.

Format used for port names (SmartPort)

tty   Default base name. You may have defined a different one (in Step 5 of Part 1).

pr   Default base name for DigiPRINT transparent printing.

3-6   SmartPort Board ID.

a-z, aa-ff

      Port ID. Legal letters are a-z and aa-ff; ports (tty or printer) with modem control are identified by capital letters A-Z and AA-FF.

For example, if "**tty**" is the base name, Port 4 on SmartPort board "**3**" will be **tty3d**. The same port with modem control enabled would be named **tty3D**.

Part Three: Installing the New Kernel

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

1. You will see:

```
Kernel with driver modifications is in /usr/sys/conf/xenix.

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

If you enter "**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:

shutdown 0    <cr>
```

If you enter "**n**", you will see:

```
Changes will not be reflected unless

/usr/sys/conf/xenix is copied to /xenix.
```

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 press q to quit:
```

Enter "**q**".

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

```
shutdown 0
```

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

```
device     address      vector   dma        comment
------------------------------------------------------------
%epca  0x0204-0x0204     -        -       mem=0x000D0000
                                          Ports=64
                                          ISA PC/Xem V x.x.x
```

After multi-user mode has been entered, you will see this message (it may scroll by too quickly to notice):

```
Digi software download started.
```

If there is a problem with the board or the driver configuration, you may see error messages after this screen—see page 49 for explanations of the error messages that may occur.

Watch for error messages for up to a minute after this screen appears—if there is a memory contention with some other device, such as a SCSI controller, it may not manifest immediately (it will only show up when both devices attempt to access the same memory addresses at the same time). See the appendix on memory conflicts in the appropriate Board hardware *Installation Guide* for more information about memory problems.

If no errors are detected, C/X and EPC/X host adapters will proceed to download the operating software to the C/CON-16 and/or EPC/CON-16 concentrators. Once the concentrators are running, their displays will show "**AC**".

Now proceed to Part Four, beginning on the next page, to enable the new ports.

Part Four: Enabling the New Ports

1. Connect terminals to the ports (using a null modem, if necessary) and test the connections to each terminal by entering the following command for *each* port added:

```
date > /dev/ttya01
```

(Assuming the terminal is connected to **ttya01**.)

(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).

Another test you can perform will verify that a port can both transmit and receive data:

Connect the port's transmit and receive lines together (pins 2 and 3 of a DB-25 connector, or the middle two pins of an RJ-45 connector), and enter the following commands:

```
cat </dev/ttya01 &
cat /etc/termcap > /dev/ttya01
```

The first command runs in the background, and directs all input from **ttya01** to **stdout** (your screen). The second command transmits the **termcap** file to **ttya01**. If the port is working, the data is sent out the port, received back by the same port and displayed on your screen.

If the port fails, check another port. If more than one port fails, the problem is probably due to memory contention, rather than defective hardware. Try reinstalling the device driver with a different memory start address.

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

Important! If the port tests above work, but you still can't respawn a **getty**, it is probably because DCD is not asserted.

Remember that modem controlled ports (where the concentrator ID is a capital letter; e.g. **ttyA01**) must have Data Carrier Detect (DCD) asserted before they can function. If DCD is not connected to an active output line of the peripheral device, it must be defeated, either by "tying it high" (e.g. connecting it to the same port's DTR line) or by issuing the command **ditty forcedcd ttyA01** (assuming that the port in question is **ttyA01**).

Another way to bypass the DCD requirement is to use non modem control devices (where the concentrator ID is a small letter; e.g. **ttya01**). Non modem control devices function identically to modem control devices, except that they do not require DCD to be asserted in order to function.

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

    enable ttya01

(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 **ttya01**. To activate the other ports, repeat the enable command with the appropriate port name.

Serial Printers

To prepare a port for connection to a printer, enter the following command:

ditty printer [*baud rate and flow control options*] **ttya01**

This command forces the specified port to stay open, thus preserving any "non-sticky" options (see *Setting Terminal Options with ditty*, beginning on page 30, for complete descriptions of all **ditty** parameters) for that port.

This command is recommended for any port that has a printer connected to it.

The command may be placed in **/etc/rc.d/8/userdef** so that it is automatically executed whenever the system is booted.

EXAMPLE:

The command shown below results in 9600,8,1,N, with software flow control.

ditty printer ixon opost onlcr ttya01

Un-Installing the SCO XENIX Device Driver

The Digi 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:

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

> **custom**

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

3. Select **epca**.

4. Select the Digi driver. The software will respond with:

```
Removing Digi EPC, CX, Xem and SmartPort intelligent async serial driver.
```

5. Next, the software asks:

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

Answer "**y**" or "**n**".

6. The software asks:

```
Do you wish to remove Digi EPC, CX, Xem and SmartPort entries from
/etc/ttytype (y or n)?
```

Answer "**y**" if these entries are no longer needed (or if you are in doubt), or answer "**n**" if you wish to preserve the old entries.

---

7. You will see:

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

Answer "**y**". The system displays:

```
Do you want the kernel environment rebuilt (y or n)?
```

Answer "**y**". You will see:

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

8. Remove the **perms** file:

   rm /etc/perms/epca

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

   shutdown 0

Setting Terminal Options with ditty

ditty is a utility program that sets and displays the terminal options for the Digi concentrators and/or PORTS modules.

The format is:

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

With no options, **ditty** displays all Digi 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 Digi option settings, as well as all of the standard tty settings reported by **stty -a**.
-p	Interpret the port as a parallel printer port. This flag should only be used for the ninth port of a PORTS/8emp module.
-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** (or the basename you selected during installation, if different). 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.

[-]printer   Forces port to stay open so that non-sticky parameters such as baud rate and flow control are not reset to default values.

[-]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 57,600 baud, 75 baud becomes 76,800 baud and 110 baud becomes 115,200 baud. *Not valid for SmartPort boards.*

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

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

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

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

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

[-]forcedcd   Disable [re-enable] 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 interface connector, so that DCD is available when using an 8-pin RJ-45 connector instead of a 10-pin RJ-45 connector.

startc *c*   Sets the XON flow control character. The character may be given as a decimal, octal or hexadecimal number. Octal numbers are recognized by the presence of a leading zero, and hexadecimal numbers are denoted by a leading "0x". For example, the standard XON character, <CTRL-Q>, can be entered as "17" (decimal), "021" (octal) or "0x11" (hexadecimal).

stopc *c*   Sets the XOFF flow control character. The character may be given as a decimal, octal, or hexadecimal number (see **startc**, above, for format of octal and hexadecimal numbers).

astartc *c*   Sets auxiliary XON flow control character. The character may be given as a decimal, octal, or hexadecimal number (see **startc**, above, for format of octal and hexadecimal numbers).

astopc *c*   Sets auxiliary XOFF flow control character. The character may be given as a decimal, octal, or hexadecimal number (see **startc**, above, for format of octal and hexadecimal numbers).

[-]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.

[-]2200flow   Use 2200 style flow control on the port. The 2200 terminals support an attached printer and use four flow control characters: terminal XON (0xF8), printer XON (0xF9), terminal XOFF (0xFA) and printer XOFF (0xFB).

[-]2200print

The **2200print** flag determines how these flow control characters (see **2200flow**, above) are interpreted. If **2200print** is set, run independent flow control for terminal and transparent print devices. Otherwise, terminal and printer flow control are logically tied together, so if either XOFF character is received, all output is paused until the matching XON character is 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 terminal 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 terminal escape sequence to turn transparent printing on. The string *s* can be composed of standard ASCII printing and non-printing characters; control (non-printing) characters must be entered by their octal values, and must consist of three digits preceded by a back-slash ("\") character. For example, the "Escape" character <Esc>, 33 octal, should be entered as "**\033**". Thus, if transparent printing is turned on by the string "**<Esc>[5i**" (ANSI standard), *s* should be entered as "**\033[5i**".

offstr *s*   Sets the terminal escape sequence to turn transparent printing off. See "**onstr**", above, for the format of the string *s*.

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 **terminfo** entry for the terminal type and sets transparent print on/off strings to values given by the **mc5**/**mc4** attributes found there.

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

Using the ditty Command with Parallel Ports

The **ditty** command features a special mode for use with the parallel port on Digi PORTS/8emp modules. When the **-p** flag is included in the **ditty** command, certain flags and functions are interpreted differently than for serial ports. Following is an example of the output of the command **ditty -p ttye09**:

```
parallel output port
pulse width 0.8 us -noack hupcl
BUSY-  IP0+  IP1-  IP2-  OP+
-opost -olcuc -onlcr -ocrnl -onocr -onlret
```

Pulse Width defines how long the data is strobed; the default is 0.8 microseconds, which is the fastest supported strobe. To change the strobe length, use the **ditty** command as follows:

```
    ditty 1 ttya09
```

The above example sets a 1.0 microsecond pulse width.

Valid pulse widths are: **0.8**, **1**, **1.2**, **1.6**, **2**, **3**, **4**, **5**, **10**, **20**, **30**, **40** and **50**.

The "baud rate" of the port is used to control the pulse width—9600 baud or faster translates to 0.8 microseconds; 4800 baud is 1 microsecond, 2400 is 1.2 microseconds, etc. The **-p** flag is implied, and need not be included in the command.

[**-**]**noack**

When **noack** is specified (**ditty noack ttya09**), the device driver will not wait for an ACK pulse from the receiving device before transmitting another character; only the BUSY signal will stop data transmission.

When **noack** is turned off (**ditty -noack ttya09**), an ACK pulse is expected after each character is transmitted.

The **dsrpace** control is mapped to **noack** for parallel ports. The **-p** flag is implied, and need not be included in the command.

hupcl has the usual meaning: "hang up on close". Since DTR is mapped to the parallel port's SELECTIN line (**OP**; see below), dropping and raising DTR (which happens when a port is closed and then opened again) will have the effect of strobing the RESET line of the parallel device connected to the port. **-hupcl** prevents the device from being reset when it is reopened.

BUSY shows the state of the BUSY line. **BUSY** is not asserted (**-**) when the input device can accept data, and asserted (**+**) when it cannot. BUSY is mapped to DSR for parallel ports.

IP0, **IP1** and **IP2** are device dependent inputs. They provide information only, and do not affect the flow of data. They are typically used for signals like Paper Out, On/Off Line, etc. IP0, IP1 and IP2 are mapped to CTS, DCD and RI, respectively.

OP is the SELECTIN line, which is mapped from DTR. When OP changes from LOW to HIGH, the parallel port's RESET line is strobed. Normally, the RESET function is handled by the driver; however, a RESET can be forced by issuing the command "**ditty OP- ttya09**" followed by "**ditty OP+ ttya09**", or by the command "**ditty reset ttya09**". The **-p** flag is implied, and need not be included in the command.

[**-**]**opost**, [**-**]**olcuc**, [**-**]**onlcr**, [**-**]**ocrnl**, [**-**]**onocr**, [**-**]**onlret**

These flags have the usual meaning (see **stty**(1)).

DigiPRINT Transparent Printing

Description & 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 30 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 maxcps rate.

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

DigiPRINT will be available for use after the Digi 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 (**pra01**, 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 Digi 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. (Put them in a text file in the directory **/etc/rc.d/8**—See your System Administrators Guide for details.) Alternatively, 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)*] *port*

The command line options are:

maxcps *n*   Sets the maximum Characters Per Second (CPS) rate at which characters are output to the transparent print device. See *Setting Terminal Options with ditty* (page 30) 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.

Example: **cat** *filename* **> /dev/pra01**

ditty Examples

Example 1:

The following command configures the DigiPRINT options for a DEC VT100
terminal connected to **/dev/ttya01**.   (Note that the printer uses
/dev/pra01). **maxcps**, **maxchar** and **bufsize** are left to defaults. Type:

```
ditty term vt100 /dev/ttya01
```


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/ttya01
```


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/ttya01
```

DigiSCREEN Multiple Screen Utility

(Also see **dsinfo**, on page 44.)

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 (e.g. by placing a command like **DSINFO=/etc/my_infofile** in **.profile**), it specifies the name of the file 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 *termtype* with the **-t** option.

Command Line Examples:

```
dscreen
dscreen -i /etc/my_infofile -t tvi925
```

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 <Ctrl-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 44) 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. 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 displayed on the terminal. When DigiSCREEN starts a new screen, it will display 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:

- Avoid switching screens when the screen is being written to; you may interrupt an escape sequence 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

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 "**|**" 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*	<Ctrl-*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:

dsk*x*   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 **l**) 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 "**|**" characters (use "**\|**" to include the "**|**" 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 "**|**" character (again, use "**\|**" to include the "**|**" 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 to which it is connected. 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 echoes 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.

Error Messages

The following error messages are generated by the driver:

`WARNING Driver memory allocation failed for EPC/X Host Adapter at port 0x0108`

What it means:

> The operating system would not allocate memory to the driver.

Action to take:

> Adjust kernel resources.

`WARNING PC/Xem at port 0x0104 not resetting, check switch settings`

`%epca - board 1 not found`

`%epca - no host adapters found`

What it means:

> The board doesn't respond to reset, or, in EISA and Micro Channel machines, cannot be detected. Board may not be installed, or may be installed incorrectly.

Action to take:

> Make sure the board is fully seated in the slot. Make sure the board settings and the driver settings match. Potential hardware problem.

`WARNING No memory at 0xd8000 for PC/Xem at port 0x0104, check configuration`

What it means:

> The driver cannot read the board's dual ported memory.

Action to take:

> Make sure the board is fully seated in the slot. Make sure the board settings and the driver settings match. Make sure there is no memory contention with other devices. Potential hardware problem.

`WARNING C/X Host Adapter at port 0x0108 failed diagnostics`

What it means:

The driver encountered an error executing on-board BIOS.

Action to take:

Make sure there is no memory contention with other devices. Potential software problem. Potential hardware problem.

`WARNING FEPOS for EPC/X Host Adapter at port 0x0108 not functioning`

What it means:

The driver encountered an error executing on-board FEPOS. Seen after system goes into multi-user mode.

Action to take:

Make sure there is no memory contention with other devices. Potential software problem. Potential hardware problem.

`WARNING PC/Xem at port 0x0104 failure`

What it means:

The driver discovered the FEPOS has encountered non-recoverable errors. Seen after boot time, during normal operation of the system.

Action to take:

Make sure there is no memory contention with other devices. Potential software problem. Potential hardware problem.

Reboot the machine. If the host adapter has suffered a catastrophic error, it will probably fail diagnostics during reboot.

If the problem is transient, the board may function correctly for a period of time before this message recurs. Please make a note of the conditions that cause this error and report them to Digi Technical Support.

```
xxevent (000000) cmd 00000000, port 00000002, b0 00000000,
b1 00000000

epcaassert line=nnnn *various messages*
```

What it means:

> The driver has encountered a situation that is not supposed to be possible.
> Possible hardware problem. Possible software problem.

Action to take:

> Write down the exact error message, and call Digi Technical Support.

Digi Support Services

The Digi Bulletin Board System

Digi provides an electronic bulletin board service (BBS) for our customers. This bulletin board provides general and technical information about Digi's products.

The Digi BBS allows users to download software drivers as soon as they become available. There is also a feature to allow users with problems or questions about Digi products to leave messages to Digi Technical Support.

Using the Digi BBS is easy. Simply dial **(612) 912-4800**. In Europe, dial **+49 221 9205211**; in Asia, dial **+65 735 2460**.

The recommended modem communications parameters are 8 bits, no parity and one stop bit (**8 N 1**). Other settings may also work.

Download protocols include Zmodem, Xmodem, Ymodem, Kermit and others.

Internet FTP Server

Digi has set up an Anonymous FTP server for those with access to the Internet network. The address is **ftp.dgii.com**. Log in as **anonymous**, and enter your E-mail address when asked for a password. Drivers and installation tips are located in the **/drivers** directory. A text file, **download.doc**, gives information on uncompressing the files after downloading. Tip: Be sure to enter "**bin**" before downloading, to ensure binary transfer of files.

World Wide Web Server

Product information, manuals, new product announcements, programs, application stories and more can be obtained through the World Wide Web. Our address is **http://www.dgii.com**.

DigiFACTs FaxBack Server

Manuals and technical information can also be obtained by FAX. To use the FaxBack server, simply call (612) 912-4990 on a touch tone phone.

Information About Your System

Serial number of your Digi product: _____

Make, model and clock speed of your computer: _____

How much RAM does your computer have? _____

Hard disk controller: Type: _____   Memory addressed at: _____

     I/O port used: _____   IRQ: _____

LAN card: Type: _____   Memory addressed at: _____

     I/O port used: _____   IRQ: _____

Other: Type: _____   Memory addressed at: _____

     I/O port used: _____   IRQ: _____

Operating system: _____   Version: _____

Digi device driver version: _____

Technical Support

At Digi, we are proud of our products, and support them. Our dealers and distributors are fully trained on our product line, so that they can help you on a technical level should assistance be needed.

Your first level of support is your Digi dealer, the place where you purchased your Digi product. Your dealer has the training to help you with any installation questions or difficulties you might have.

If you still experience difficulties (after contacting your first level of support), Digi has a staff of Technical Support Specialists that can assist you. They can be reached at **(612) 912-3456**. In Europe, call **+49 221 920520**, and in Asia, call **+65 732 1318**. FAX numbers are: (612) 912-4958 (USA), +49 221 9205210 (Europe) and +65 732 1312 (Asia).

When you call Digi Technical Support, please call from a position where you can operate your system. Also, please fill out the form on the preceding page before calling, so your Technical Support representative can have a clear picture of your system and any potential conflicts between devices.

Digi Technical Support can also be reached via Internet E-mail. Please send correspondences to **support@dgii.com**, and include your voice and FAX phone numbers.

Customer Service

Digi also has a staff of Customer Service representatives to help you with software and documentation update requests, as well as Returned Merchandise Authorizations (RMAs) in case you need to return your Digi product for repair (see page *56*). They may be reached at **(612) 912-3456**. Digi Customer Service may be contacted by FAX at (612) 912-4959.

Digi Customer Service can also be reached via Internet E-mail. Please send correspondences to **cust_serv@dgii.com**, and include your voice and FAX phone numbers.

Return Procedures

All Digi products have a five-year parts and labor warranty, and we are ultimately responsible for any defective parts, according to the limits specified in the warranty. However, many of the reported problems are due to factors other than defects in the product itself. To save you time and possibly additional cost, Digi asks that you *first* try to resolve any difficulties by contacting our Technical Support representatives at **(612) 912-3456.**

Important! *Be sure to have the serial number of your Digi product at hand before calling Technical Support.*

Returns should be directed to the dealer or distributor from whom you purchased the product. If you need to return your Digi product for repair, it is first necessary to obtain an RMA (Returned Merchandise Authorization) number from Digi, by speaking to a Digi Customer Service representative. Authorized returns should be shipped to Digi International, 10000 West 76th Street, Eden Prairie, MN 55344. The RMA number should appear on the shipping carton, on or near the address label.

Note: *Products received without an RMA number clearly marked on the outside of the package will be returned, unopened, to the sender*