

NXP1000 User's Guide

Documentation Conventions

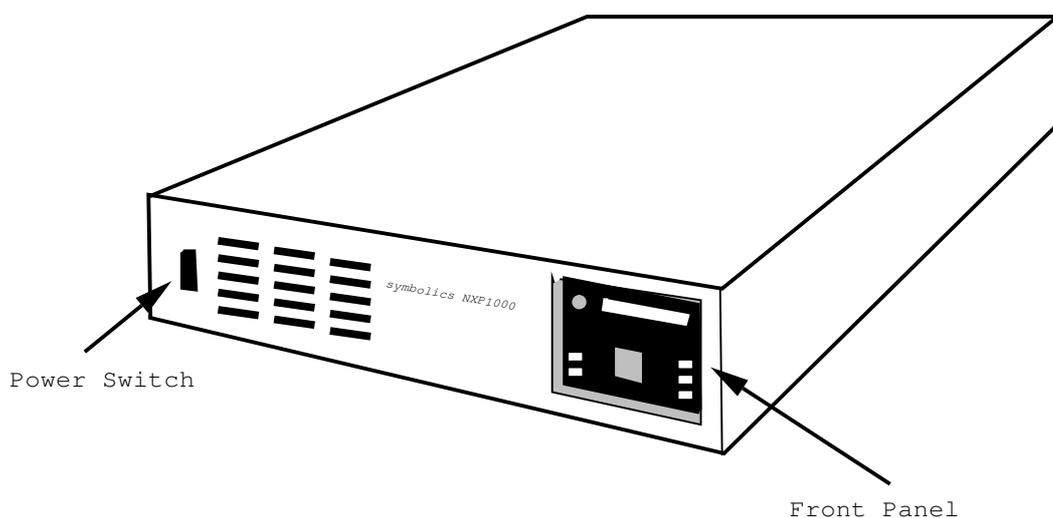
This documentation uses the following notation conventions:

cond , zl:hostat	Printed representation of Lisp objects in running text.
RETURN, ABORT, c-F	keys on the Symbolics Keyboard.
SPACE	Space bar.
login	Literal typein.
(make-symbol "foo")	Lisp code examples.
(function-name arg1 &optional arg2)	Syntax description of the invocation of function-name .
<i>arg1</i>	Argument to the function function-name , usually expressed as a word that reflects the type of argument (for example, <i>string</i>).
&optional	Introduces optional argument(s).
Show File, Start	Command Processor command names and Front-end Processor (FEP) command names appear with the initial letter of each word capitalized.
m-X Insert File, Insert File (m-X)	Extended command names in Zmacs, Zmail, and Symbolics Concordia appear with the m-X notation either preceding the command name, or following it in parentheses. Both versions mean press m-X and then type the command name.
[Map Over]	Menu items. Click Left to select a menu item, unless other operations are indicated. (See the section "Mouse Command Conventions".)
Left, Middle, Right	Mouse clicks.
sh-Right, c-m-Middle	Modified mouse clicks. For example, sh-Right means hold down the SHIFT key while clicking Right on the mouse, and c-m-Middle means hold down CONTROL and META while clicking Middle.

The Symbolics NXP1000

The Symbolics NXP1000 provides a compact Lisp Development Environment, the complete power of Genera in a small package. It can inhabit your network, interoperating with other machines on the network. It is accessed via an X Terminal or other X Server.

The NXP1000 allows you to take advantage of Genera's powerful rapid prototyping and system building capabilities, and allows you to deliver your applications on PCs, Macintoshes or UNIX systems.



NXP1000 External Switches and Controls

The NXP1000 provides indicator lights on the front panel to signal its state.

Heartbeat	Flashes once a second when Genera is running. When the NXP is in the Front End Processor (FEP), it flashes once every .5 or .25 seconds. This allows you to tell if Genera is running or if the machine has crashed.
E-Net	Indicates ethernet activity.
Fault	Indicates that the machine has halted.
Reset	Indicates that the Reset button has been pushed and the machine is reloading the FEP.
Power	Indicates there is electrical power to the machine.

In addition, it has three switches to control it.

NMI button	Puts you into the FEP. The button is recessed in the hole to prevent pressing it accidentally. The NMI button takes the place of h-c-FUNCTION on other Symbolics machines. To press the NMI button, use a slender object, such as a pencil.
Debug Switch	With the Debug Switch in the Normal position, if you enter the FEP or the Cold Load stream, the NXP attempts to recover automatically. With the switch in the Debug position, you can attach a serial terminal to the serial port and inspect the state of the cold load stream or the FEP.

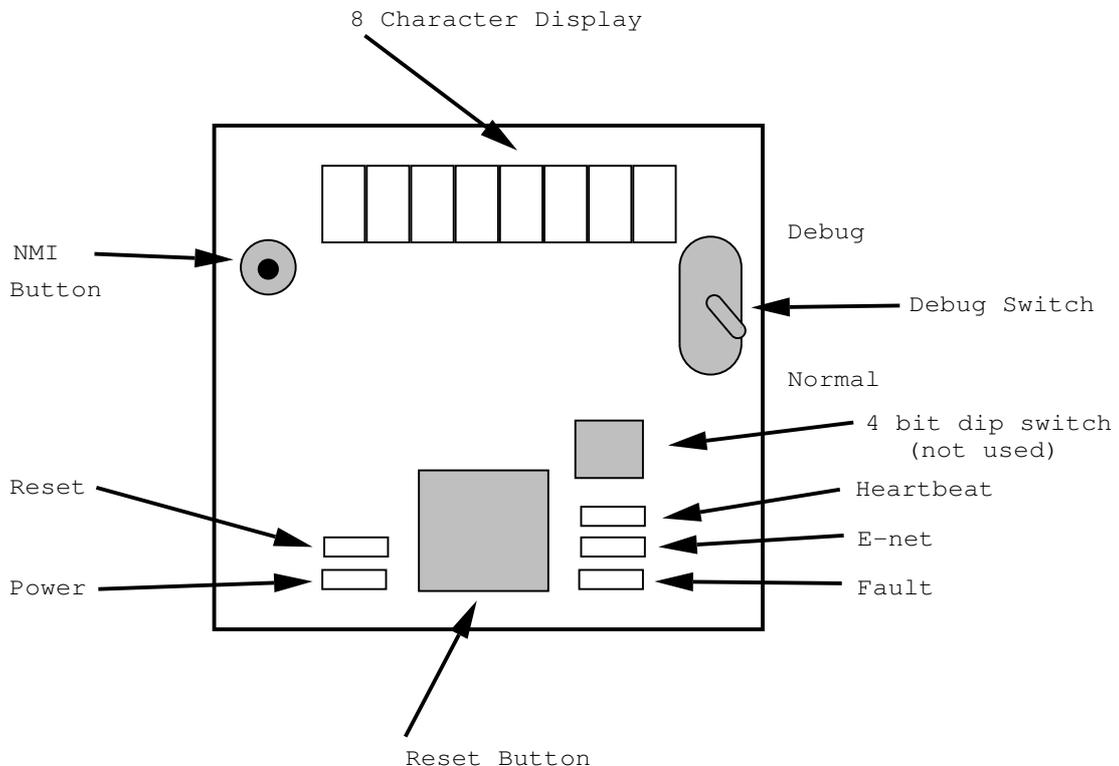


Figure 105. The Front Panel of the NXP1000

Reset Button Reloads the FEP and goes through the power-up sequence, just as on other Symbolics machines.

The rear panel contains the connectors for the ethernet and peripheral devices, the power cord, and a cooling fan.

Note that the NXP serial port can only be used for a serial terminal. Printers, modems, and other serial devices are not supported by Genera 8.2 NXP.

Accessing Your NXP1000 Using an X-Terminal

Starting an X Screen to Your NXP1000

The preferred way to start an X screen to your NXP is to use the X Display Management Protocol (XDMCP), configuring an X-terminal to use the NXP as its XDMCP server. In this setup, the X-terminal will automatically ask the NXP for an X-window connection.

Other ways to start an X screen to your NXP include:

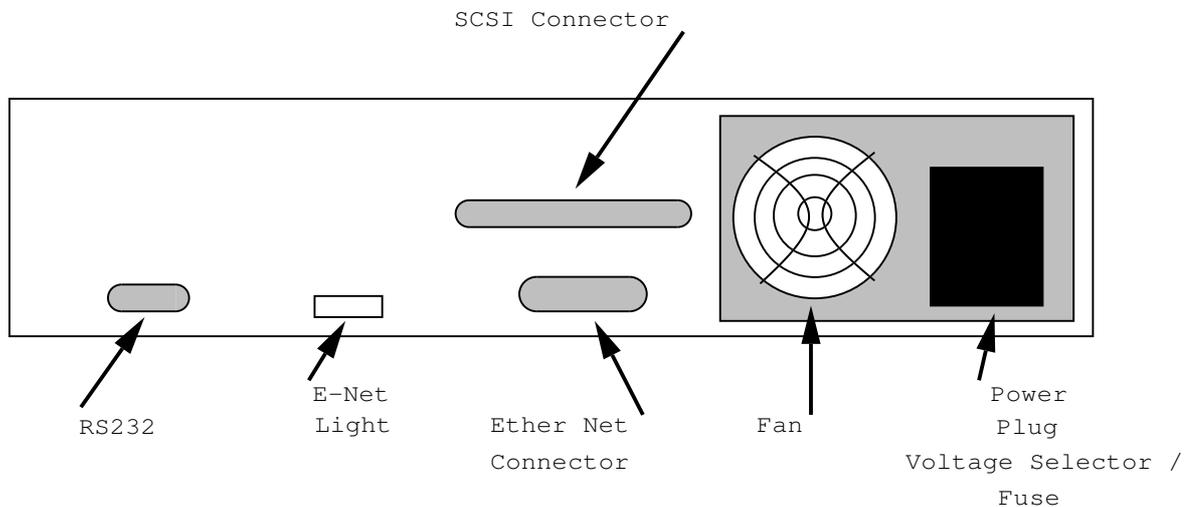


Figure 106. The Rear Panel of the NXP1000

1. From a Lisp machine, use the Genera Telnet program (SELECT-T). Telnet to the NXP, then use the Start X Screen command. For example,

```
Start X Screen x-server-name :Protocol TCP
```

Note that if the NXP is running a distribution world, you must specify the X Server's internet address (INTERNET|A.B.C.D), rather than its name. (Start X Screen in an NXP distribution world gives an error, Host does not support X-WINDOW-SYSTEM service. Select the proceed option to Use protocol X-WINDOW-SYSTEM on medium TCP).

2. From UNIX, use either rsh or UNIX telnet.

When using rsh, send the Start X Screen command to an NXP. For example,

```
% rsh nxp-name "Start X Screen x-server-name :Protocol TCP"
```

(Note: Do not use rsh to start an X screen when the NXP is running a distribution world. Using rsh, you would be unable to proceed from the Start X Screen error which occurs in the NXP distribution world.)

When using telnet, open a telnet connection to the NXP, then use the Start X Screen command. For example,

```
Start X Screen x-server-name :Protocol TCP
```

Note that when the NXP is running a distribution world, you must specify the X Server's internet address (INTERNET|A.B.C.D), rather than its name. Start X Screen in an NXP distribution world gives an error, Host does not support X-WINDOW-SYSTEM service. Take the proceed option to Use protocol X-WINDOW-SYSTEM on medium TCP. We recommend redefining your telnet escape

character to something other than `c-]` before telnetting to an NXP distribution world, since you need `c-]` (the ASCII key sequence for `SUPER`) to get past the error.

3. Sites which have a Symbolics UX Family machine can use the `genera` UNIX program to start an X screen from a Sun workstation. For example:

```
# genera -display x-server-name nxp-name
```

Keyboard Support in the Genera X Client

Genera was designed for use with a keyboard that includes a rich selection of modifier keys (`CONTROL`, `META`, `SUPER`, and so on) and a number of special-function keys (`HELP`, `COMPLETE`, `ABORT`, `SUSPEND`, `RESUME`, and so on). This keyboard is exemplified by the one shipped with Symbolics workstations. With the advent of remote console support, such as the X Window System, Genera is increasingly used from consoles with other, widely varying, types of keyboards.

Genera accommodates various other keyboards by translating keystrokes from the physical keyboard into its own abstract set of keystrokes. The Genera X client requires that the X server support the following keystrokes (which might be synthesized by the X server if they are not present on the physical keyboard): full alphanumeric keys, control, meta, and alt modifiers, separate `DELETE` and `BACKSPACE` keys, separate `RETURN` and `LINEFEED` keys, and twelve general-purpose function keys. Every Genera keystroke may be specified using any keyboard that meets these minimum requirements; the general-purpose function keys are translated into the following Genera keystrokes:

<i>Function Key</i>	<i>Value without Shift Key</i>	<i>Value with Shift Key</i>
F1	Select	Square
F2	Network	Circle
F3	Function	Triangle
F4	Suspend	Mode Lock
F5	Resume	
F6	Abort	
F7	Super (modifier)	
F8	Hyper (modifier)	
F9	Scroll	Page
F10	Clear Input	Refresh
F11	Complete	End
F12	Help	

Some keyboards have more convenient locations for some of these keys. For example, many keyboards have a `HELP` key somewhere. The Genera X client recognizes

certain popular keyboards, and customizes the keyboard layout for them. The customization is done only by making copies of the keystrokes on the function keys, never by moving them. So, on a keyboard with a HELP key, Genera's Help gesture may be invoked by pressing either HELP or F12. The "Show Keyboard Layout Command" will display the actual keyboard layout on the screen.

The Symbolics X Client software recognizes the Sun Type-3 and Type-4 keyboards, and will customize the keyboard layout for them. See the section "Sun Keyboards".

Utilities provided with the X Window System running on your X Server (for example, a UNIX machine or an NCD X Terminal) may be used to customize the keyboard layout. The Show X Keyboard Mapping command provides detailed information about the translation of X keycodes to Genera keystrokes.

See the section "Show X Keyboard Mapping Command". Note that the recognition algorithm tries to accommodate a certain amount of customization by the X server, but heavily customized keyboards may cause the keyboard not to be recognized, in which case only the standard function key mappings will be available.

Note: The customized keyboard layouts used by the Genera X client are not used in the Symbolics UX cold load stream, only the standard function key bindings are available. See the section "ASCII Keyboard Mappings".

The Symbolics keyboard control facility can be used by the Genera X Client. To access it, use the Select Activity command from a Lisp Listener, specifying the argument Keyboard Control.

Some keyboards contain interesting keys that aren't in the standard Genera character set. These keys are translated into a special character set called the Keyboard character set, so that commands may be attached to them. See the section "The Keyboard Character Set".

Sun Keyboards

The Symbolics X Client software recognizes the Sun Type 3 and Type 4 keyboards, and will customize the keyboard mapping for them as shown in ! and ! .

Note: On a UX with a Type 4 keyboard, Genera uses the F11 key as the COMPLETE key. However, the cold load window uses the R2 key for COMPLETE.

Default NCD N-101 to Symbolics Keyboard Mappings

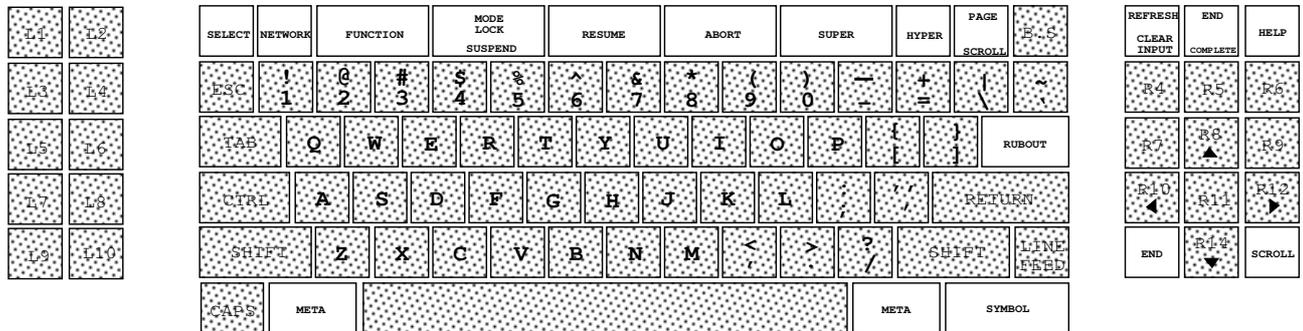


Figure 107. General Interpretation of the Sun Type 3 Keyboard

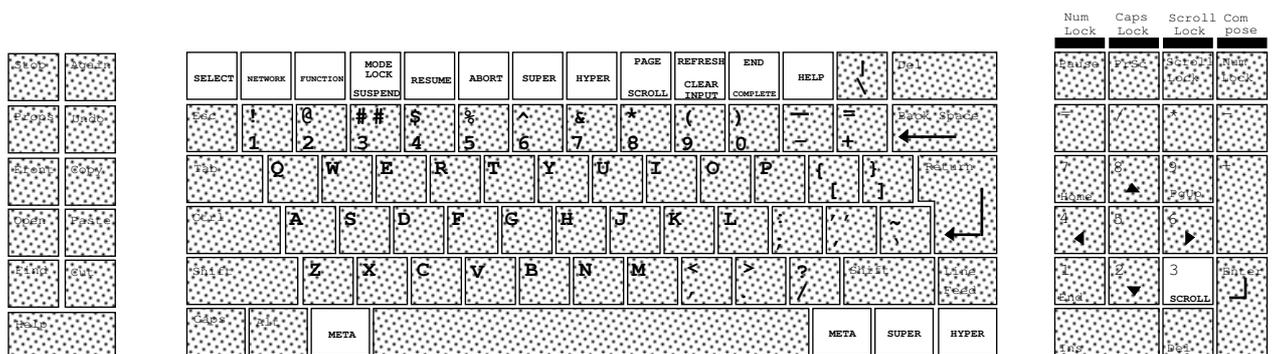


Figure 108. General Interpretation of the Sun Type 4 Keyboard

Show Keyboard Layout Command

Show Keyboard Layout *keyboard-layout keywords*

Graphically displays the key mappings for the specified keyboard.

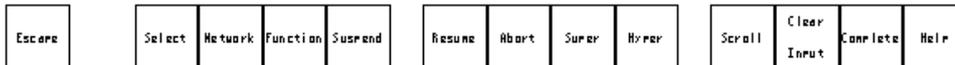
keyboard-layout The type of keyboard to display. Recognized keyboards are:

- Apple
- Mac Portable ISO
- Apple Extended
- NCD N-101
- Apple ISO
- SGI Iris
- Apple ISO Extended
- Sun Type 3
- Mac 512K
- Sun Type 4
- Mac 512K International
- Symbolics
- Mac Plus
- Mac Portable

Standard Function Keys:



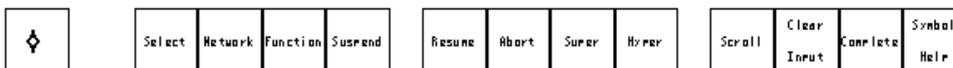
Symbolics Key Mapping:



With the SHIFT key down:



With the SYMBOL key down:



With SHIFT SYMBOL down:

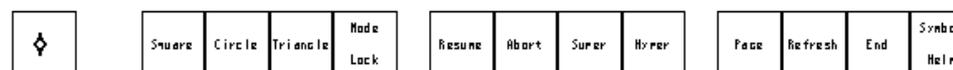


Figure 109. Function keys

- keywords* :Include Codes, :Include Legends, :Include Mappings, :More Processing, :Output Destination
- :Include Codes {No, Octal, Decimal, Hex} Includes hardware mapping codes. The default is No.
- :Include Legends {Yes or No} Includes a page of the actual keytop legends. The default is Yes.
- :Include Mappings {Yes or No} Includes pictures of the variously shifted mappings. The default is Yes.
- :More Processing {Default, Yes, No} Controls whether **More** processing at end of page is enabled during output to interactive streams. The default is Default. If No, output from this command is not subject to **More** processing. If Default, output from this command is subject to the prevailing setting of **More** processing for the window. If Yes, output from this command is subject to **More** processing unless it was disabled globally (see the section "FUNCTION M").

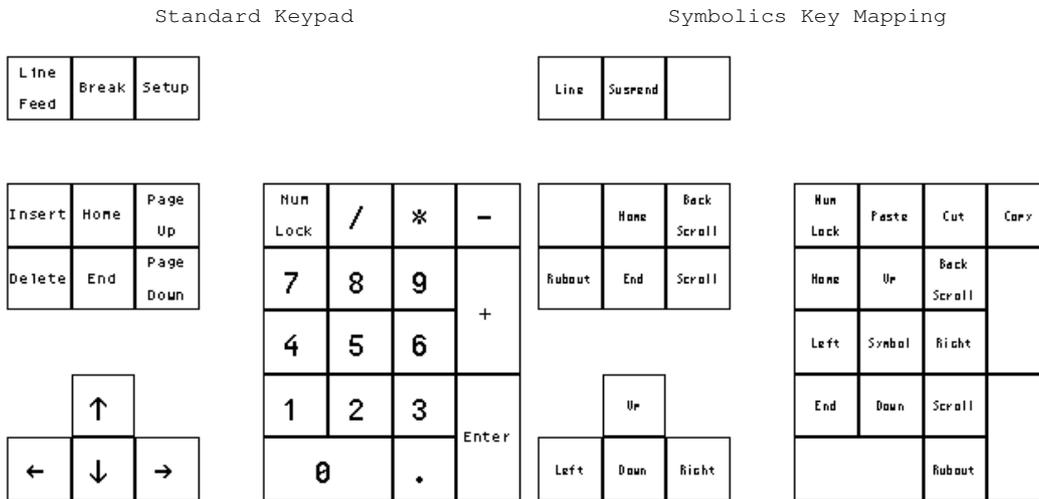


Figure 110. The Keypad

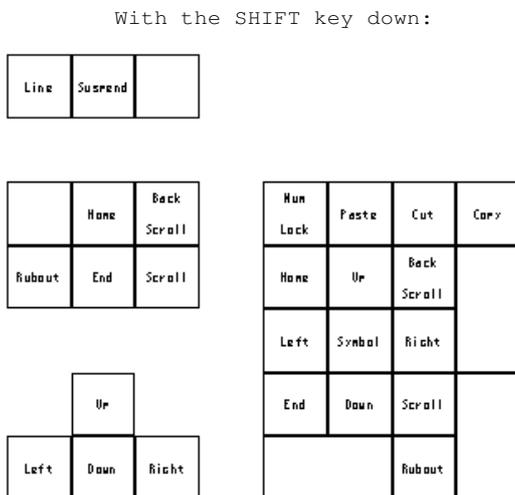


Figure 111. The Keypad with the Shift Key as Modifier

:Output Destination{Buffer, File, Kill Ring, None, Printer, Stream, Window}
 Where to redirect the typeout done by this command. The default is the stream ***standard-output***.

Hardcopy Keyboard Layout from the Keyboard Control Activity (Select Activity

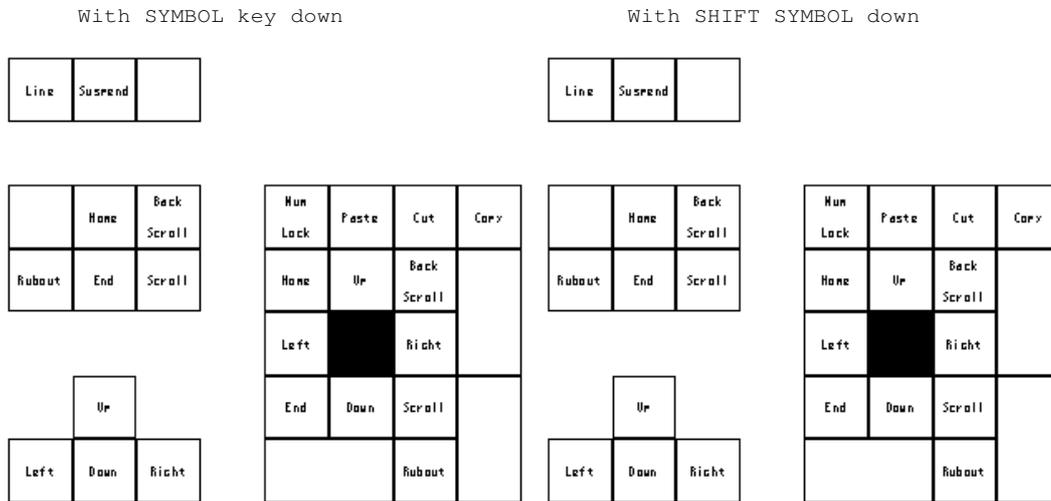


Figure 112. The with the Symbol Key as Modifier

Keyboard Control) permits landscape printing. This is a simple way to make a keyboard template.

Show X Keyboard Mapping Command

Show X Keyboard Mapping *screen keywords*

Displays detailed information about the translation between X Window System keycodes and Genera keystrokes.

screen Specifies the screen.

keywords :All, :Match

:All Shows all mappings, instead of just the nontrivial ones.

:Match Shows mappings for the Genera keystrokes matching the specified substring.

The Keyboard Character Set

Some keyboards contain interesting keys that aren't in the standard Genera character set. For example, the Sun Type 4 keyboard contains keys labeled Undo, Cut, Copy, Paste, and arrow keys. These keys and others are translated into a special character set called the Keyboard character set, so that commands may be attached to them. Characters in the keyboard character set may be referred to using the `#\Keyboard` syntax (for example, `#\Keyboard:Cut`). This mechanism is used to

support the arrow keys in Dynamic Windows and Zmacs, to make the Undo, Cut, Copy, and Paste keys perform their respective operations using the Cut Buffer feature of the X Window System, and to connect the PrintScreen key to the screen hardcopy feature.

The keyboard character set currently contains the following characters:

Cut	Paste	Copy	Undo
Again	Find	Print	
Left	Right	Up	
Back-Scroll	Home	Down	

If your NXP1000's Internet address was not set up during manufacturing, you have to change the Internet address for some reason, or your boot file has become corrupted by an invalid command, you must connect a serial terminal to the NXP serial port and boot the machine manually by typing directly to the FEP. See the section "Accessing Your NXP1000 FEP Using the Serial Port".

For keyboard mappings when using a serial terminal to the FEP, see the section "ASCII Keyboard Mappings".

Accessing Your NXP1000 FEP Using the Serial Port

You can connect a simple serial terminal, a PC/Mac running a communications package, or a Symbolics 3600 or XL Family machine to the NXP serial line to interact with the FEP. If you intend to use a Symbolics machine on the serial line, see the section "Using a Symbolics Machine for Serial-Pseudonet".

The NXP serial port is configured for 9600 baud, 8 data bits, 1 stop bit, and no parity. The debug switch must be in the on or "up" position in order to use the serial terminal. In this mode, the serial terminal behaves exactly like the FEP except that the keyboard mappings are for an ASCII terminal (that is, `c-_A => ABORT`). This terminal also displays the cold-load stream, if necessary.

ASCII Keyboard Mappings

The following characters may be used to access the Symbolics character set from an ASCII keyboard:

The character CONTROL-UNDERSCORE (`c-_`, that is, hold down the CONTROL key while pressing the UNDERSCORE, then release) is a prefix that causes the following character to be interpreted as follows:

A = ABORT	N = NETWORK
B = BACK-SPACE	Ø = NULL
2 = CIRCLE	P = PAGE
I = CLEAR-INPUT	F = REFRESH
C = COMPLETE	R = RESUME

```

E = END          SPACE = SCROLL
X = ESCAPE      @ = SELECT
# = FUNCTION 1  = SQUARE
H = HELP        S = SUSPEND
L = LINE        3 = TRIANGLE
c-?             displays this table

```

```

c-^ = Toggle the Control bit      c-] = Toggle the Super bit
c-[ = Toggle the Meta bit         c-\ = Toggle the Hyper bit
c-@ = Toggle the Shift bit

```

Note: The toggling takes effect for the next character typed.

c-__ is the prefix for symbol characters (which print as their symbol-shifted key, highlight-ed).

Using a Symbolics Machine for Serial-Pseudonet

A Symbolics 3600 Family or XL Family machine may be used as a serial terminal for the NXP1000 FEP by setting up a serial pseudonet and connecting to the NXP via the Genera terminal program.

Use a null modem cable to connect the NXP RS232 port to a serial port on the 36xx or the XL. The serial-pseudonet address is the number of the 36xx or XL serial port. As an example, an XL has one bulkhead serial port, which is serial unit 1. Set up a Network namespace object for the serial network, and edit the 36xx or XL namespace object, adding the appropriate attributes for a serial-pseudonet. For a description of serial-pseudonet attributes, see the section "Using the Terminal Program with Hosts Connected to the Serial Line". Note that the serial parameters must be set for 9600 baud, 8 bits, and no parity.

To connect to the NXP FEP, use the Genera terminal program (SELECT-T). Specify the name of the serial pseudonet and the appropriate serial unit number. When the NXP's debug switch is on (up), it will send output to (and accept input from) the serial line. For the sample serial-pseudonet described by the namespace objects below, you would type:

```
Connect: LOCAL-SERIAL|1
```

A sample network namespace object for a serial-pseudonet network named LOCAL-SERIAL:

```
Site: SMBX
Type: SERIAL-PSEUDONET
```

A sample host namespace object for an XL which will use the serial-pseudonet named LOCAL-SERIAL through its bulkhead serial port:

```

Site: SMBX
Nickname: XL
Machine Type: XL1200
System Type*: LISPM
Address: CHAOS 24455
Address: INTERNET 128.81.41.45
Address: LOCAL-SERIAL 1
Service: BAND-TRANSFER TCP BAND-TRANSFER
Service: CHAOS-STATUS CHAOS-SIMPLE CHAOS-STATUS
Service: CONFIGURATION CHAOS CONFIGURATION
Service: FILE TCP TCP-FTP
Service: FILE TCP NFILE
Service: LISPM-FINGER CHAOS-SIMPLE LISPM-FINGER
Service: LOGIN TCP SUPDUP
Service: LOGIN TCP TELNET
Service: LOGIN TCP 3600-LOGIN
Service: NOTIFY CHAOS-SIMPLE NOTIFY
Service: SEND TCP CONVERSE
Service: SEND TCP SEND
Service: SEND TCP SMTP
Service: SHOW-USERS TCP ASCII-NAME
Service: STARTUP UDP STARTUP-PROTOCOL
Service: TIME CHAOS-SIMPLE TIME-SIMPLE
Service: UPTIME CHAOS-SIMPLE UPTIME-SIMPLE
Peripheral: SERIAL-PSEUDONET UNIT 1 BAUD 9600 TERMINAL-TYPE
              VT100 NUMBER-OF-DATA-BITS 8 NUMBER-OF-STOP-BITS 1

```

For more information on using another Symbolics machine as a serial terminal, see the section "Using the Terminal Program with Hosts Connected to the Serial Line" in Document Examiner (see the section "Reading Online Documentation").

Miscellaneous Notes on the NXP1000

FUNCTION-SUSPEND and the Emergency Break Activity in the System menu are inoperative unless the debug switch is in the DEBUG (that is, up) position.

Notifications behave differently from other Symbolics systems on the NXP1000. On other systems, if a notification is generated before the system's console is available, the notification is delivered to the cold load stream. On the NXP1000, the notification is held until the console is available and then delivered. The Show Notifications CP command can be used when in the cold load stream to display any pending notifications that are waiting for the creation of a console.

An incompatibility was inadvertently introduced that makes it impossible to netboot an 8.2 world from an 8.1 Netboot Server. This incompatibility is resolved by a patch for Genera 8.1 netboot servers. This patch for Genera 8.1 is included in Genera 8.3 distribution.