3780Link

Multi-Platform 3780/2780 RJE Emulation

User’s Guide

Serengeti Systems Incorporated

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For use with 3780Link Release 4.0 or later

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Notational Conventions

Various fonts, type styles, and notations are used throughout this manual to make it more understandable. The conventions used are shown below.

3780Link	Refers to the 3780Link program in general
3780Link GUI	Refers to the menu driven version
3780Link SO	Refers to the *script only* version
3780Link CFG	Refers to the 3780Link configuration utility
<**ENTER**>	Reference to named keys on your keyboard
Continue? (y/n)	Text displayed on your console
3780so -v -l	Example of a user-entered command
filename	Command parameter value or text to be supplied by the user
printer or punch	Refers to generic 2780/3780 printer or punch device
Appendix A	Reference to other sections in this manual
Main menu	Reference to a 3780Link screen or menu
ssifind	Specific program or process name
"standard.cnf"	Specific file, directory, or other unique name
'+'	Represents a literal character
/on | /off	Use one of the parameters separated by '|'
[/a]	Optional parameters are enclosed in brackets

1. INTRODUCTION TO 3780Link

3780Link is a full featured IBM 3780/2780 RJE data terminal emulator with a modern, easy-to-use user interface and one of the most extensive script languages available for unattended operation.

The 3780Link GUI allows you to interactively initiate a communication session with the host computer through menu options such as Auto Dial or Direct Connect. Once connected, data can then be sent through menu options such as Send File or Send Message; in interactive mode, incoming data is automatically received by 3780Link if the line is connected. To terminate an interactive session, the Disconnect menu option is used.

For automated operations and unattended sessions, 3780Link incorporates a powerful script language. Script files can be executed directly from the operating system command line, a batch file, a parent process, or from a 3780Link GUI menu selection.

A detailed log file can be activated to record the events of your communication sessions. Each log file entry is stamped with the system date and time. The log can be activated during both menu-driven and script file sessions. Each log entry is immediately written to the log file so it is always up to date – even if your system loses power or crashes.

3780Link includes a smart phone directory with up to 25 entries. Each entry includes a description, telephone number, and complete set of configuration parameters. This permits each entry to be tailored specifically for the host it calls. To support auto-dial modems, phone number modifiers can be added to entries so that long distance access codes and trailing extension numbers are automatically included along with the phone number. 3780Link also maintains a message directory containing up to 25 of your most frequently sent messages.

3780Link Features

General Features

- Menu-driven or script file driven interface
- Auto-dial & auto-answer with supported modems
- “Hot reader” feature for automatic file transmission
- Up to 56K bps over dial-up or leased lines
- Optional EBCDIC/ASCII translation
- Built-in text editor and file viewer (UNIX)
- Direct Notepad (or any other editor) access (Windows)
- Complete session log with date and time stamps
- Host selectable console for operator messages
- Built-in line trace for monitoring and diagnostics
- Multiple simultaneous BSC sessions from a single system
- Console message detection and display
- BSC↔async protocol conversion via a COM port
- Support for Hayes AutoSync 2 modems – sync connection via an async COM/TTY port

Script Language Features

- Execute script files from the command line, batch file, or 3780Link GUI menu
- Perform completely unattended sessions
- Call scripts from within scripts
- Time activated commands
- Execute an external process and return
- Parameter substitution from menu or command line
- Accept commands from another process via inter-process communication

Supported Standard BSC Protocol Features

- IBM 3780 & 2780 point-to-point emulation
- Vertical Forms Control (VFC) recognition
- Device selection recognition
- Space compression/expansion (3780 only)
- Space truncation (2780 only)
- WACK, RVI & TTD support
- Handling of EBCDIC New Line (NL) character
- Transparent text mode
- Terminal identification

- Transmit & receive double buffering
- CRC-16 block checking

Supported NON-Standard BSC Protocol Features

- Binary mode for sending & receiving non-text files
- Optional stripping of VFC & device selection sequences
- Variable communications buffer sizes up to 4200 bytes
- Configurable ASCII↔EBCDIC translation tables
- Configurable in-bound record separators
- Optional suppression of inter-record separators

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2. USING 3780Link

There are two versions of 3780Link. The 3780Link GUI is a complete menu-driven environment for interactive operation. The *script only* version, 3780Link SO, is used primarily for running script command files during unattended sessions. All versions of 3780Link SO, except Windows, also support an optional user command mode that allows a user to enter script commands directly from the keyboard. The information in this manual applies to both versions unless otherwise noted.

Getting Started

3780Link is available for numerous operating systems. Because the user interface is nearly identical for each version, this user's guide applies to all versions unless noted otherwise. We use the name Windows when referring to Windows 98/NT/2000/XP. Likewise, we use the name UNIX when referring to any of the Unix variants for which 3780Link is available. For operating system specific information please consult the read me first file for up-to-date release notes (either "readme.1st" or "README" files).

Loading 3780Link

To load 3780Link from the command line, type the program name followed by any optional parameters. If you type the program name followed by a '?', the proper command line syntax is displayed. The command line syntax is:

Windows:

w3780lnk [-c*file*] [-l[*file*]] [-t] [-p*x*[:*y*]] [-x*file*] [-n*msg*]

w3780so -s*file* [-c*file*] [-l[*file*]] [-p*x*[:*y*]] [-t] [-x*file*] [-n*msg*]
[&*sub-parm*& | %*sub-parm*%]

UNIX:

3780link [-c*file*] [-i*smid*] [-l[*file*]] [-m|-b] [-p*x*[:*y*]] [-x*file*] [-n*key*]

3780so -s*file* -u [-b] [-c*file*] [-d] [-i*smid*] [-l[*file*]] [-p*x*[:*y*]] [-v] [-x*file*] [-n*key*]
[&*sub-parm*& | %*sub-parm*%]

Within the UNIX environment these commands actually invoke a shell script that loads the **emubsc** background process (when appropriate) and then loads the executable binary for 3780Link GUI or 3780Link SO.

When using the SmartSync/DCP adapter within the Windows or UNIX environments, you must ensure that the "amxbsc.bin" module has been downloaded to the adapter prior to running 3780Link.

The following paragraphs describe the command line switches in detail:

3780Link GUI:

-b Force monochrome mode and eliminate background (UNIX only)

The **-b** switch forces 3780Link GUI to eliminate the background pattern from the display and to use monochrome display attributes regardless of the type of display in use. This switch may be used to speed up the display and eliminate incompatible line drawing characters, especially when using a UNIX terminal.

-m Force mono mode (3780Link UNIX only)

The **-m** switch forces 3780Link GUI to use monochrome display attributes regardless of the type of display in use.

3780Link SO:

-b Run 3780Link SO as a background process (UNIX only)

The **-b** switch must be used if you wish to run 3780Link SO as a background process (i.e. 3780Link SO is loaded with the & directive.)

-d Debug mode (UNIX only)

The **-d** switch activates the debug mode. The debug mode writes internal debug information to the log file during script processing. This switch is used to generate diagnostics to be interpreted by a Serengeti technical support engineer only.

-s *file* Execute script file

The **-s** switch specifies the script file to be loaded and executed. Pressing the **<Esc>** key cancels script file execution (it may be necessary to press **<Esc>** several times). The Windows version of 3780Link SO also supports a "drag and drop" method of specifying script files for execution. Script files can also be executed from within 3780Link GUI via the **Run Script** selection on the **Transfers** menu.

-u User command mode (UNIX only)

The **-u** switch enables interactive user prompting when running all but the Windows version of 3780Link SO. Script commands are prompted from the terminal, instead of being read from a script command file.

When the **–u** switch is used, the **-s** and **-v** switches are ignored since commands must be entered at the terminal. The log file is automatically enabled and defaults to "**3780link.log**", "**portX.log**", or "**portXY.log**" unless otherwise specified.

The command prompt appears as **CMD>**. Any script command except conditional and branching commands (IF, IFERRORxx, GOTO, LOOP, etc.) can be used. In this mode, the **<Esc>** key does not exit back to the operating system. Pressing **<Esc>** terminates a pending script command if one is in progress and returns control to the

CMD> prompt. You must use the QUIT or SUSP commands to exit 3780Link SO user command mode.

You may recall and edit up to 15 previous commands with the following keys:

<Up Arrow>	Recall previous command
<Down Arrow>	Advance one command
<Page Up>	Go to top of command buffer
<Page Down>	Go to bottom of command buffer
<Home>	Move cursor to beginning of current line
<End>	Move cursor to end of current line
<Delete>	Delete character at cursor
<Insert>	Toggle between insert and overstrike mode
<Backspace>	Erase character to the left of cursor
<Esc>	Switch to **vi** command editing (see below)

Certain UNIX terminals may not support all of the above commands. For keyboards without these extended keys, press the **<Esc>** key to exit command entry and activate **vi**-like command editing (**vi** is a standard UNIX text editor). The following editing commands are available:

<A>	Append to end of line
<h>	Move cursor one position left (Left Arrow)
<j>	Advance one command (Down Arrow)
<k>	Recall previous command (Up Arrow)
<l>	Move cursor one position right (Right Arrow)
<R>	Replace characters from cursor to end of line
<r>	Replace only the character at the cursor
<x>	Delete character at cursor
<i>	Enter insert mode
<$>	Move cursor to end of current line
<^,0>	Move cursor to beginning of current line
<Ctrl B>	Go to top of command buffer
<Ctrl F>	Go to bottom of command buffer
<Esc>	Exit to type commands (you'll hear a beep)

-v Display verbose messages (UNIX only)

The **-v** switch displays verbose status messages when running 3780Link SO. This allows you to monitor a session's progress. If the **-v** is omitted, nothing is displayed during script processing. The **-v** is ignored if the user command mode (**-u** switch) is used. The Windows version ignores the **-v** switch.

&*sub-parm*&
– or -
%%*sub-parm*%% **Perform parameter substitution**

Parameters delimited by & or % are substituted into script files that use the **% *n*** script command. If you are running 3780Link SO from a MS-DOS .BAT file file use "%%sub-parm%%" form rather than "&sub-parm&". See **Section 4** for more information on script commands and parameter substitution.

3780Link GUI and 3780Link SO:

-c *file* **Load configuration file**

The **-c** switch loads the specified file as the default configuration file. If this switch is omitted 3780Link first attempts to open a configuration file named "**defaultX.cnf**" or "**defaultXY.cnf**", where *X* is the port number or *XY* is port and board number as defined with the **-p** switch. If 3780Link cannot find "**defaultX.cnf**" or "**defaultXY.cnf**", it then attempts to open "**standard.cnf**". With 3780Link SO, if "**standard.cnf**" does not exist then internal defaults for all configuration parameters are used and a file named "**standard.cnf**" is created. Additionally, if the **-p** switch was specified, "**defaultX.cnf**" or "**defaultXY.cnf**" are created.

User defined configuration files can be created within 3780Link GUI or the 3780Cfg configuration utility after modifying parameters from any of the **Settings** menus and saving the new configuration from the menu that automatically pops up when you exit a **Settings** menu. These custom configuration files may be selected at load time with the **-c** switch.

-i *xxx* **Set shared memory ID (UNIX only)**

The **-i** switch applies to the UNIX version only and is used to change the default shared memory ID used to communicate with the **emubsc** background process. The default value is 311h. This switch is used to match the value passed to **emubsc** only if the **-i** switch was used when **emubsc** was loaded.

-l [*file*] Enable log file

The **-l** switch activates the log and specifies the name of the log file. All activity performed by 3780Link is logged to this file. If this switch is omitted the default log file is "**3780link.log**" unless the **-p** switch was specified, in which case the default log file is either "**portX.log**" or "**portXY.log**".

3780Link SO automatically activates the log during every session. Log files can also be controlled from the **Files** menu and with the LOG script command.

-n*msg* Console message identification string

The **-n** switch permits you to define the console message identification string of up to 20 characters in length. When this string has been defined, 3780Link scans the first record of each inbound printer data stream for an occurrence of this string. If the string is found, the entire first record is redirected to the console rather than being written to the current printer file. Subsequent records are directed to the current printer file. This feature permits the remote system to directly address the console fundamentally for the purpose of sending operator messages.

-p *x:y* Port:Board number (multi-port only)

The **-p** switch identifies the BSC port associated with this 3780Link session in a multi-port installation. For the SyncPCI adapter, the port is synonymous with the adapter and is numbered beginning with **–p1**. For a single SmartSync/DCP adapter installation, this refers to the port on the adapter with **–p1** being the first port. The second digit is used only in an installation with multiple SmartSync/DCP adapters; for example, **-p3:2** specifies port 3 of board 2.

-t Performance improvement (Windows NT only)

This switch increases the process priority of 3780Link. In the Windows NT environment the **-t** switch may improve transmission speed, especially when running multiple 3780Link sessions. Performance of other processes in your system may suffer when the **-t** switch is used.

-x *file* **Load translation table**

The **-x** switch loads the specified file containing an EBCDIC↔ASCII translation table. Your 3780Link installation includes a file named "xlat.tbl" which is a copy of the default table used by 3780Link. The **newxlat** program is provided for modifying an existing table (see **Appendix B**) or creating an entirely new one.

Configuring 3780Link

You can configure 3780Link for a variety of 2770/2780 or 3780 environments. 3780Link uses files "**standard.cnf**", "**defaultX.cnf**", or "**defaultXY.cnf**" as the default configuration file. In single port environments (where the **-p** command line switch is not used), 3780Link always uses "**standard.cnf**". Otherwise, "**defaultX.cnf**" or "**defaultXY.cnf**" are used, and *X* is the port number (i.e., "**default2.cnf**" contains the default settings for port 2 of SmartSync/DCP board 1), or *XY* is the port and board number (i.e., "**default82.cnf**" contains the default settings for port 8 of SmartSync/DCP board 2).

This file is automatically read by 3780Link each time it is executed unless you specify an alternate file via the **-c** switch. When 3780Link is reloaded after being suspended, the configuration before the suspend is automatically restored.

Configuration files can be modified within 3780Link GUI menus, or by using the 3780Link CFG which is typically used to prepare configuration files for use by 3780Link SO.

Configuration information is also kept in the phone directory within 3780Link GUI. Each entry in the phone number directory has its own set of configuration parameters. The current settings are stored in the phone directory each time you add a new phone number. You can reconfigure a given directory entry's parameters as necessary to match the requirements of each remote system. A directory entry's parameters are loaded when you select it for dialing; they remain in effect until you dial a different number or issue an auto-answer or direct connect command. In these cases, 3780Link restores and uses the defaults read from the original configuration file.

3780Link GUI Command Menus

The following sections describe each of the 3780Link GUI menus and the underlying commands they control.

Connections Menu

The **Connections** menu supports commands to connect with and disconnect from a remote system. The connection options are:

Auto-Dial	Auto-dial to a remote system (with supported modem); access and configure the Phone Number Directory.
Auto-Answer	Set supported local modem into answer mode; wait for an incoming call.
Manual Dial	Manual dial operations for calling a remote system.
Direct Connect	Immediate connection through a leased line or modem eliminator.
Disconnect	Normal line disconnect from a remote system.
Forced Disconnect	Cancel any pending I/O (input/output) operation and disconnect the line.

The **Connections** menu commands are described in more detail in the following paragraphs:

Auto-Dial

Short Cut Key: Ctrl D

This command prompts you for a number to dial and the time-out period in seconds. You also have the option of changing the current configuration settings. It is important to note that when a phone number is loaded from the phone directory, the configuration settings particular to that phone number are used.

Phone Number:

Enter the phone number to dial. Under Windows, you may select a phone number from the Phone Number Directory by clicking on the Directory button. Under Unix this is done by pressing the <**SPACE**> bar. You can add, modify, and delete entries as needed. When you have selected the number to dial, press <**ENTER**>.

New numbers entered into the directory retain the current configuration settings which may be changed and saved as desired. Previously entered numbers selected in this manner use the corresponding configuration settings saved in the Phone Directory.

Dial Time-out:

Default: 30
Range: 0 to 999

The dial time-out is the period of time in seconds that 3780Link GUI waits for a connection to be established after dialing begins. It may be necessary to increase this time-out when making long distance calls or when using pulse dialing. If 0 is specified, 3780Link GUI waits indefinitely. See the **Settings** menu section for a detailed description of configuration menus that may be activated from the **Auto Dial** menu.

Change Terminal Settings?

If a phone number was selected from the Phone Number Directory, any changes made to these settings are applied solely to the corresponding phone directory entry; otherwise, the changes apply to the current configuration settings.

Change Link Settings?

If a phone number was selected from the Phone Number Directory, any changes made to these settings are applied solely to the corresponding phone directory entry; otherwise, the changes apply to the current configuration settings.

Change Hardware?

In UNIX versions, the menu displayed from Settings? within the **Auto Dial** menu is not the complete menu available from the **Settings** menu bar selection – here you are simply allowed to modify the dial mode (tone or pulse) and speaker mode of your modem. If a phone number was selected from the Phone Number Directory, any changes made to these settings are applied exclusively to the corresponding directory entry; otherwise, the changes apply to the current configuration settings.

Change Transfer Settings?

If a phone number was selected from the Phone Number Directory, any changes made to these settings are applied exclusively to the corresponding phone directory entry; otherwise, the changes apply to the current configuration settings.

Auto-Answer

Short Cut Key: Ctrl A

This command prompts you for a time-out period in seconds, then waits for an incoming call. 3780Link GUI automatically sets the modem into auto-answer mode if necessary. When a ring is detected, 3780Link GUI answers the line and attempts to establish a connection.

Answer Time-out:

Default: 30
Range: 0 to 999

The answer time-out is the period of time in seconds that 3780Link GUI waits for a connection to be established once the auto-answer command is issued. If 0 is specified, 3780Link GUI waits indefinitely.

Manual Dial

Manual dialing allows you to dial the phone by hand. This is necessary if your modem does not support auto-dialing. After you have dialed the phone and hear a tone from the telephone receiver, select **[OK]** and press <**ENTER**>. Depending on the modem you are using, you may also be prompted to switch your modem from TALK to DATA to establish a connection. 3780Link GUI then proceeds to complete the connection.

Direct Connect

Short Cut Key: Ctrl O

This command prompts you for a time-out period in seconds. After you press **[OK]**, 3780Link GUI attempts to establish a connection. This command is used when two systems are connected directly via a leased line or a modem eliminator.

Connect Time-out:

Default: 30
Range: 0 to 999

The connect time-out is the period of time in seconds that 3780Link GUI waits for a connection to be established once the direct connect command is issued. If 0 is specified, 3780Link GUI waits indefinitely.

Disconnect

Short Cut Key: Ctrl X

This command disconnects and hangs up the phone line. There are two selectable options that affect how you disconnect.

Leave DTR On?

If selected, the Data Terminal Ready (DTR) modem signal remains high after disconnecting. This has the effect of shutting down the communications link but leaves the physical connection with the remote system intact. This is also called a suspended session.

Suppress DLE-EOT?

> If not selected and 3780Link GUI is configured for switched line operation, 3780Link GUI sends a DLE-EOT disconnect sequence before it disconnects the line. This informs the remote system that the line is being disconnected. If selected or 3780Link GUI is configured for leased line operation, nothing is sent before the line is disconnected.

Forced Disconnect

A forced disconnect aborts any pending send or receive operation that may be in progress and then disconnects and hangs up the phone line. There is one selectable option that affects how you disconnect.

Leave DTR On?

> If selected, the Data Terminal Ready (DTR) modem signal remains high after disconnecting. This has the effect of shutting down the communications link but leaves the physical connection with the remote system intact.

Transfers Menu

The **Transfers** menu supports commands to send and receive data after a connection is established. Briefly the commands are:

Send File	Select and transmit one or more files and control transmis sion mode.
Send Message	Transmit pre-defined or user typed message and control transmission mode.
Printer Setup	Select **printer** file or device and receive options.
Punch Setup	Select **punch** file or device and receive options.

Kill I/O Terminate the currently active send or receive operation (referred to as I/O).

Run Script Execute a script file you select.

The **Transfer** menu commands are described in more detail in the following paragraphs:

Send File

Short Cut Key: Ctrl F

This command prompts you for the directory and file name of the file(s) to send. Multiple files from the same directory can be transmitted by separating file names with a plus sign (+) or an ampersand (&). Files separated by plus signs are terminated by ETXs and appear as separate files to the remote system. Files separated by ampersands are terminated by ETBs and appear as one file to the remote system. Under Windows, the method by which multiple files are to be sent is selected through the "Concatenation Options" button. This button is disabled until there is a filename in the "File Name" field.

The three additional options are explained below.

Select Punch?

> If selected, 3780Link GUI includes a punch selection sequence in the outbound data stream to direct the transmitted data to the remote system's **punch**.

Transparent?

> If selected, the outbound stream is transmitted using EBCDIC transparency. Some remote systems may require transparent data under specific conditions; however, binary mode (described below) is more frequently used in PC to PC environments.

Binary?

If selected, the outbound stream is transmitted using binary mode. In this mode, the transmitted data is not translated from ASCII to EBCDIC before it is sent. This mode is used to transmit files that do not contain ASCII text, e.g. executables, encrypted data, or files that are already encoded with the EBCDIC character set. The receiving system must have the equivalent mode enabled when 3780Link GUI transmits a binary file. Always use this mode when sending executable files (i.e. .EXE or .COM files).

Send Message

This command prompts you for a message to send to the remote system. Type in the message you wish to send; or under Windows, click on the Directory button to select a previously saved message you want to send, otherwise press the <**SPACE**> bar to pop up a directory of previously saved messages. Within the **Message Directory** menu you can add, modify, and delete messages as needed.

Select Punch?

If selected, 3780Link GUI includes a punch selection sequence in the outbound data stream to direct your message to the remote system's **punch**.

Transparent?

If selected, your message is transmitted using EBCDIC transparency. Some remote systems may require transparent data under specific conditions; however, binary mode (described below) is more frequently used in PC to PC environments.

Binary?

If selected, your message is transmitted using binary mode. In this mode, the transmitted data is not translated from ASCII to EBCDIC before it is sent. The receiving system must have the equivalent mode enabled when 3780Link GUI transmits a binary message.

Printer Setup

Short Cut Key: Ctrl P

This command prompts you for the device name or directory and file name of the **printer** which is the primary receive device of a 3780 terminal. Inbound data can be directed to one of the six destinations described next:

File

This choice results in inbound data being written to a disk file. You must specify the file name beginning with the Directory field.

LPT1, LPT2, LPT3

This choice results in inbound data being written to the referenced printer, i.e., the logical name that you assign to one of your system printers within the **Assign Printers** menu – this can be a physical printer or a disk file.

TTY1, TTY2

This choice results in inbound data being written to the referenced serial port, i.e., the logical name that you assign to one of your system serial ports within the **Assign TTY ports** menu.

CON

This choice results in inbound data being displayed in the 3780Link GUI Console window.

NULL

This choice permits inbound data addressed to the printer to be received by the 3780Link GUI and discarded.

The Printer Setup options are described below:

Printer ON?

If not selected, 3780Link GUI disables the **printer** device and all incoming data bound for the **printer** is refused.

Send To:

Default: File

Choices: File, LPT1, LPT2, LPT3, TTY1*, TTY2*, CON, NULL

* Available only in Windows versions.

In this field, UNIX users may press the <**SPACE**> bar to pop up a **printer** selection pick list. The six choices are described at the start of this section. The following fields are active only if "File" is selected for the Send To field.

Directory:

Default: Current directory

Choices: Any valid directory

Type the subdirectory name where you wish the inbound data file to reside. This choice is not available under Windows.

File Name:

Default: printer.001 or printer*X*.001, printr*XY*.001

Choices: Any valid file name

Type the name of the file to receive the inbound **printer** data stream. Alternately, UNIX users may press the <**SPACE**> bar to display a **Files** selection menu. You may choose the **printer** file from the list on your screen. Unless auto-naming is enabled, all inbound data is written to this single file. If the **-p** command line switch has been used to specify a port number, the default **printer** file name is printer*X*.001 or printr*XY*.001, where *X* is the port number or *XY* is the port and board number.

Append?

If selected and the file specified already exists, data received is appended to the end of the file. If the file does not exist, this option has no effect. If not selected and the file specified exists, it is overwritten. If the file does not exist, a new file is created.

Binary?

If selected, binary mode is enabled and if a transparent inbound data stream is detected, 3780Link GUI skips the EBCDIC to ASCII translation and data is written unchanged to the **printer** file. Binary mode should be enabled when you expect to receive a binary file from the remote system; enabling binary mode does not preclude the reception of non-binary and non-transparent files.

Auto Naming?

Default: YES
Choices: YES, SKIP, or NO

If YES or SKIP is selected, 3780Link GUI automatically creates a new file for each separate **printer** file received from the remote system. 3780Link GUI takes the root file name, discards any extension you may have typed in, and creates files in sequential order, beginning with numeric extension ".001". For example, if auto-naming is enabled and the file name you typed in was "rcvfile.sx", the first **printer** file created would be named "rcvfile.001", the second "rcvfile.002", etc. If SKIP is selected, 3780Link GUI checks for the existence of a file before a file name is selected. For example, if "rcvfile.001" exists, the file is "skipped" and the **printer** file is set to "rcvfile.002".

Punch Setup

Short Cut Key: Ctrl U

This command prompts you for the device name or directory and file name of the **punch** which is the secondary receive device of a 3780 terminal. These and several options are explained below:

Punch ON?

If not selected, 3780Link GUI disables the **punch** device and all incoming data bound for the **punch** is refused.

Send To:

Default: File

Choices: File, LPT1, LPT2, LPT3, TTY1*, TTY2*, CON, NULL
* Available only in Windows.

In this field, UNIX users may press the **SPACE** bar to pop up a **punch** selection pick list. The six choices are the same as those described for the **printer**. The following fields are only active if "File" is selected for the Send To field.

Directory:

Default: Current directory

Choices: Any valid directory

Type the subdirectory name where you wish the inbound data file to reside. This choice is not available under Windows.

File Name:

Default: punch.001 or punch*X*.001, punch*XY*.001

Choices: Any valid file name

Type the name of the file to receive the inbound **punch** data stream. Alternately, UNIX users may press the <**SPACE**> bar to display a **Files** selection menu. You may choose the **punch** file from the list on your screen. Unless the auto-naming is enabled, all inbound data is written to this single file. If the **-p** command line switch has been used to specify a port number, the default **punch** file name is punch*X*.001 or punch*XY*.001, where *X* is the port number or *XY* is the port and board number.

Append?

If selected, and the file specified already exists, data received is appended to the end of the file. If the file does not exist, this field has no effect. If not selected and the file specified exists, it is overwritten. If the file does not exist, a new file is created.

Auto Naming?

Default: YES
Choices: YES, SKIP or NO

If YES or SKIP is selected, 3780Link GUI automatically creates a new file for each separate **punch** file received from the remote system. 3780Link GUI takes the root file name, discards any extension you may have typed in, and creates files in sequential order beginning with numeric extension ".001". For example, if auto-naming is enabled and the file name you typed in was "rcvfile.sx", the first **punch** file created would be named "rcvfile.001", the second "rcvfile.002", etc. If SKIP is selected, 3780Link GUI checks for the existence of a file before a file name is selected. For example, if "rcvfile.001" exists, the file is "skipped" and the **punch** file is set to "rcvfile.002".

Kill I/O

Short Cut Key: Ctrl K

Selecting **[OK]** from this command cancels any inbound or outbound file transfer that is currently taking place. There may be a delay of several seconds or more while the transfer is being killed.

Run Script

Short Cut Key: Ctrl R

This command prompts you for the path, file name, and arguments to a script to run. For UNIX users, pressing the <**SPACE**> bar at the file name prompt displays a pop-up pick list of all files with the extension ".s". Windows users can browse for a script file by pressing the **Browse** button.

For UNIX users, the script commands are echoed to the Console window if it is enabled (see Settings Menu, Window Settings below). Under Windows, if the **Silent** option is not selected, the script commands are echoed in the 3780Link Server window, which will restore itself to normal size while the script is running. If you wish to review the script execution after it has completed, double-click on the 3780Link Server icon and use the scroll bar to review.

Pressing the <**ESC**> key cancels a currently executing script command and exits script processing.

Directory:

Default: Current directory
Choices: Any valid directory

Type the directory name where the script file resides. This choice is not available under Windows.

File:

Default: None
Choices: Any valid file name

Type the name of the script file to run. Alternately, UNIX users may press the <**SPACE**> bar to display a **Files** selection menu. You may choose the script file from the list on your screen.

Arguments:

Default: None
Choices: Any argument delimited by & or %

The optional arguments to the script file must be delimited by ampersands (&) or percentage signs (%). These arguments replace a ***%n*** string in a script file, where *n* is an integer between 1 and 9 inclusive. The first argument in the list replaces %1, the second argument replaces %2, and so on.

For example, entering

```
&1-512-555-1212&  &SEND newjcl&
```

in the argument field would cause the following script file:

```
:top
DIAL %1
PTR con
%2
```

```
DISC
QUIT
```

to be executed as if it looked like:

```
:top
DIAL 1-512-555-1212
PTR con
SEND newjcl
DISC
QUIT
```

Files Menu

The **Files** menu supports commands to delete, view, edit, copy and print files, plus Log file control. Briefly the commands are:

Delete File	Delete specified file from disk*.
Rename File	Rename specified file*.
View File	View contents of specified file in a scrollable display window*.
Edit File	Edit specified file.
Copy File	Copy individual files*.
Print File	Print specified file in background.
Log Control	Turn log file on and off.

* Not available under Windows.

The **Files** menu commands are described in more detail below:

Delete File

This command prompts you for the directory and file name of the file you want to delete. The Delete File menu item is not available under Windows.

Rename File

This command prompts you for the directory, old (current) file name, and new file name for a file you want to rename. The Rename File menu item is not available under Windows.

View File

This command prompts you for the directory and file name of the file you want to look at. A pop-up view window is displayed with the selected file where you can view a file of up to approximately 64,000 characters. The View File menu item is not available under Windows.

Shown inside the bottom window frame are the keys you use to move around the file and how to pop-up a text search menu. Press **<Esc>** to exit the view window.

Edit File

For Windows:

> Choosing this command will display a browse dialog which you may use to specify which file you want to edit. The editor used will be the one specified in the Windows Registry (Windows Notepad by default).

For UNIX:

> This command prompts you for the directory and file name of the file you want to edit. If the file name you enter does not exist, it is created for you. A pop-up edit window is displayed with selected file for editing where you can edit a file of up to approximately 64,000 characters.
>
> The **<F1>** key displays a list of editing keys. Press **<Esc>** to exit the editor. If the file has been modified when you exit, you are given a choice to save the changes or not.
>
> The 3780Link GUI editing keys are summarized in **Appendix D**.

Copy File

This command prompts you for the source and destination directory and file name(s) of a file you wish to copy. The following two prompts also appear:

Replace?

Default: YES
Choices: YES or NO

If YES is selected, and the destination file already exists, it is overwritten. If the destination file does not exist, a new file is created.

Append?

Default: NO
Choices: YES or NO

If YES is selected, and the destination file already exists, the source file is appended to the end of destination file.

The Copy File menu item is not available under Windows.

Print File

For Windows:

Choosing this command will display a browse dialog which you may use to specify which file you want to print. The file will be printed to the specified logical LPT device which may be assigned through the **Settings | Assign Printers** menu item.

For UNIX:

This command prompts you for the directory and file name of the file you want to print. You are prompted for the destination printer port. Pressing the <**SPACE**> bar pops up a pick list of the available printers.

The printing occurs in the background so you can continue with other activities within 3780Link GUI. Printing can be canceled with the **Cancel Print** selection from the **Other** menu. Inbound data cannot be directed to the same destination printer port while printing (and vice versa).

Log Control

Through this command you control the 3780Link log file. When enabled, the log file is constantly updated with the results of operations as they are completed by 3780Link. The log file is most useful when running a script file in an unattended environment so the results of the session can be examined. The log file is opened and closed for each transaction so it is always up to date, even in the event of a system failure. In addition to the name and path of the log file, the following option appears:

Log Open:

If selected, all commands and responses are written to the specified log file. The default log file name is "**3780link.log**", "**portX.log**", or "**portXY.log**," with *X* or *XY* corresponding respectively to port number and port / board number in multi-port systems. If not selected, no log file is created.

Settings Menu

The **Settings** menu supports commands to configure 3780Link GUI. Briefly the commands are:

Link Settings	Change buffer and record sizes, retry limits, time-outs, and pre- and post- dial command strings.
Terminal Settings	Change emulation, line and station types, duplex, define a terminal ID, and set up **printer** and **punch** defaults.

Hardware Settings Initialize MS-DOS only hardware parameters such as hardware port, IRQ, and type. Specify the type of modem in use and the modem speaker mode.

Window Settings Set the ATTENTION box display duration, turn the Console window on or off, and specify its size and location. Also, specify the status (on or off) and location of the Reader Status window. This command option is not available under Windows.

Transfer Settings Set record sizes, turn space compression on and off, control record separators and vertical forms control (VFC) even while connected to the remote system.

Restore Settings Restore the original default configuration settings read from "**standard.cnf**", "**defaultX.cnf**", or **"defaultXY.cnf**" (or the current default file loaded with the **-c** switch) when 3780Link GUI was loaded – the original values are restored even if you have saved another configuration in the mean time.

Assign Printers For Windows or UNIX systems, assign logical printer names LPT1 through LPT3 to a resource.

Assign TTY Ports For Windows systems only, assign logical asynchronous port names TTY1 and TTY2 to a local asynchronous (COM) port.

Of all of the "Settings" menus, only **Transfer Settings** can be displayed once a connection has been made with the remote system. Changes to **Transfer Settings** are permitted whenever 3780Link GUI is neither sending nor receiving.

The **Settings** menu commands are described in more detail in the following paragraphs:

Link Settings

This command allows you to change buffer and record sizes, retry limits, time-outs, and pre- and post- dial command strings. Each of these configuration parameters is described below:

Transmit Buffer Size:

Default: 512
Range: 10 to 4200

This is the size of the buffer used to store data before transmitting it as a block. It is also referred to as the transmit block size. Typically the size should be 512 for 3780 emulation and 400 for 2780 emulation. The transmit buffer size must never exceed the receive buffer size of the remote system.

Receive Buffer Size:

Default: 524
Range: 10 to 4200

This is the maximum size in bytes of a data block that can be received from a remote system. This buffer must be larger than the remote system's transmit block size which is normally 512 for 3780 emulation and 400 for 2780 emulation. The default receive buffer size is sufficiently large to handle normal 2780 and 3780 blocks, and most specialized environments.

Reader Record Size:

Default: 80
Range: 1 to Transmit Buffer Size

This is the maximum size in bytes of each data record that is copied into a buffer for transmission. In non-transparent 3780 operation, this setting may be any size large enough to accommodate the largest record that may be sent; however, in transparent or 2780 operation, the exact size becomes important as both the transmitting and receiving stations must agree to the record size to facilitate the correct deblocking of received records.

For non-transparent 3780 operation the reader record size is usually not required, so we recommend setting it to some arbitrary value larger than the largest record on any file you are likely to transmit. For example, if the largest record size is 150, you may wish to set the reader record size to 200.

If 2780 emulation is selected and Compress Spaces is not selected, 3780Link pads all outbound records with spaces so all records are of this size.

Records Per Block:

Default: 0
Range: 0 to 999 (normally 0, 1, 2, or 7)

This allows automatic transmission of a data block upon buffering the specified number of records. A value of 0 instructs 3780Link to transmit when a buffer is full. Depending on the configuration of the remote system, rules of 2780 emulation may restrict the number of records per block to a maximum of two or seven.

Printer Record Size:

Default: 132
Range: 1 to Receive Buffer Size

This is the maximum size in bytes of each data record contained in a data block from the remote system that is destined for the **printer**. In non-transparent operation when the inbound data stream is formatted with record separators, set the printer record size equal to the receive block size to insure correct **printer** data formatting. For transparent operation, this size must agree with the transmitting station's reader record size to facilitate the correct deblocking of received records.

Punch Record Size:

Default: 80
Range: 1 to Receive Buffer Size

This is the maximum size in bytes of each data record that can be received in data blocks from the remote system destined for the **punch**.

In non-transparent operation, when the inbound data stream is formatted with record separators, set the **punch** record size equal to the receive block size to insure correct **punch** data formatting. In transparent operation, this size must agree with the transmitting station's reader record size to facilitate the correct deblocking of received records.

Bid Retry Limit:

Default: 15
Range: 0 to 999

This value represents the number of line bids that 3780Link transmits in an attempt to initiate a transmission. Although it is not recommended, a value of 0 instructs 3780Link to send Line Bids indefinitely.

ENQ Retry Limit:

Default: 6
Range: 0 to 999

This value represents the number of ENQ's that 3780Link transmits in an attempt to solicit a response after sending a data block or while waiting for an ACK after a WACK was received from the remote system during a transmission. Although it is not recommended, a value of 0 instructs 3780Link to send ENQ's indefinitely.

NAK Retry Limit:

Default: 6
Range: 0 to 999

This value represents the number of times 3780Link retransmits a data block to which the remote system has responded with a NAK. Although it is not recommended, a value of 0 instructs 3780Link to retransmit indefinitely.

No Activity Time-out:

Default: 60
Range: 0 to 999

When processing a script file, this value, in seconds, specifies the maximum period of time that may pass without any communications line activity before 3780Link returns a time-out error. A value of 0 instructs 3780Link to disable this time-out. This time-out is not active in interactive mode. In practice, a time-out of less than 20 seconds is not recommended.

Inter-Character Time-out:

Default: 5

Range: 5 to 999

This value, in seconds, specifies the maximum period of time 3780Link should allow for a single character to be transmitted or received before reporting an error. Changing this time-out from five seconds is not recommended. The occurrence of an inter-character time-out generally indicates a hardware failure.

Connect Time-Out:

Default: 30

Range: 0 to 999

This value, in seconds, specifies the default maximum period of time 3780Link waits for a dial, auto-answer or direct connection to complete. This time-out can be overridden by fields in the applicable pop-up menus or script command. A value of 0 instructs 3780Link not to time out.

Pre-Dial Command String:

Default: None

Choices: Application dependent

The pre-dial string is for commands to be sent to your telephone system before the phone number is dialed, to provide data such as long distance codes, billing codes, outside line access, etc. The pre-dial string is most useful when used in conjunction with the phone directory.

Post-Dial Command String:

Default: None
Choices: Application dependent

The post-dial string is sent after the phone number has been dialed. An example of its use is to access an extension. The post-dial string is most useful when used in conjunction with the phone directory.

Terminal Settings

This command allows you to change emu lation mode, line type, station type, and duplex settings. It also allows you to define a terminal ID and set up **printer** and **punch** defaults. Each of these configuration parameters is described below:

Emulation:

Default: 3780
Choices: 2780 or 3780

This parameter selects the desired type of BSC protocol. This must match the protocol used by the remote system. If you wish to emulate a 2770 terminal, select 2780 emulation.

Line Type:

Default: Switched
Choices: Leased or Switched

This parameter informs 3780Link whether the connection to the remote system is through a dial-up (switched) line or through a leased (or direct) connection. If a switched line is indicated, 3780Link by default recognizes and sends DLE-EOT disconnect sequences when a communication session is terminated.

Station Type:

Default: Primary
Choices: Primary or Secondary

This parameter is used to determine whether 3780Link or the remote system yields first in a contention situation for control of the line. To avoid potential problems when both systems try to transmit at the same time, make one system primary and the other secondary. The primary station bids for line once a second while a secondary station bids once every three seconds – this difference prevents continuous bid collisions.

Duplex:

Default: Half
Choices: Half or Full

This parameter instructs 3780Link to operate in full-duplex (4-wire or constant carrier) or half-duplex (2-wire or switched carrier) mode. In full-duplex mode 3780Link does not wait for the Clear To Send (CTS) modem signal prior to transmitting – this effectively eliminates line turn-around delays and thus increases data throughput. The duplex parameter you specify *must* be appropriate for the modem you are using.

Transmit Terminal ID?

If selected, 3780Link includes a Terminal ID string in the first line bid or positive bid acknowledgment of a communication session. If not selected, the Terminal ID field is ignored.

Terminal ID:

Default: None
Choices: Up to 20 characters

The Terminal ID may be required by some remote systems. It consists of a string of up to 20 characters. The Terminal ID is only used if "Transmit Terminal ID?" is selected.

Printer Time-Out:

Default: 60
Range: 0 to 999

The printer time-out applies to local printing operations when inbound **printer** or **punch** data stream is being printed directly to a printer. If the printer is off-line or if 3780Link cannot otherwise print for a period of time exceeding this time-out, an error is reported and the operation is terminated.

Auto Page Eject?

If selected, 3780Link ends each print operation bysending a form feed to position the printer to top-of-form so it will be ready for the next print operation. If the inbound data stream contains vertical forms control or the printer is a network printer, it may not be necessary for 3780Link to perform a page eject; in that case, do not select this option.

Hardware Settings

This command allows you to initialize hardware parameters. Each of these configuration parameters is described below:

(SmartSync/DCP and SyncPCI only under Windows, all versions under UNIX)

Modem Type:

Default: None
Choices: AT Command Set

(e.g., Hayes, UDS V3225) AutoSync (UNIX only) UDS SADL Compatible (i.e., 201 or 208 mode) SADL Compatible (i.e., Sync Auto Dial Language) V.25bis Compatible Other external (i.e., manual dial) None (i.e., modem eliminator) Other External (i.e., manual dial) Not Selected

(Windows AutoSync only)

COM Port:

Default: COM 1
Choices: COM 1, COM 2, COM 3, COM 4, COM 5, COM 6, COM 7, or COM 8

In the Windows AutoSync environment, this value defines the async COM port in your system where 3780Link will find the necessary AutoSync 2 compatible modem.

When configured to use an external modem, this value tells 3780Link the type of modem attached to the hardware adapter.

Check the "readme.1st" (Windows) or "README" (UNIX) file on your distribution media for additional information on modems.

Dial Mode:

Default: Tone
Choices: Tone Pulse

If tone dialing is not available in your area, select the pulse dialing mode. Otherwise, select tone dialing mode.

Speaker Control:

Default: Not Supported
Choices: ON Until Carrier, Always ON, Always OFF, Not Supported

This parameter controls the speaker on your modem if one is present. The speaker is useful to determine if the modem is dialing correctly and when a connection is established. Consult your modem's user's manual to determine if it supports a speaker.

(UNIX only)

AT Modem Speed:

Default: 9600 baud
Choices: 9600 baud, 19200 baud, 38400 baud

This parameter controls the speed at which 3780Link sends modem commands to an external AT command set modem. If an external AT command set modem is not being used, this parameter is ignored. If you are having trouble dialing your external AT command set modem, try using a different modem speed setting.

AT Modem Name:

This parameter specifies the type of AT command set modem being used. The modem names presented are obtained from the "modems.ini" file. If the "modems.ini" file is not present, this field will not be displayed. If an external AT command set modem is not being used, this parameter is ignored.

The Windows versions have an <Options…> button that opens a dialog box with the following controls. This button is only enabled when "Modem Type" is configured as "AT Command Set." This button is always disabled under AutoSync.

AT Modem Name:

This parameter specifies the type of AT command set modem being used. The modem names presented are obtained from the "modems.ini" file. If the "modems.ini" file is not present, this field will not be displayed. If an external AT command set modem is not being used, this parameter is ignored.

AT Modem Speed:

Default: 9600 baud
Choices: 9600 baud, 19200 baud, 38400 baud

This parameter controls the speed at which 3780Link sends modem commands to an external AT command set modem. If an external AT command set modem is not being used, this parameter is ignored. If you are having trouble dialing your external AT command set modem, try using a different modem speed setting.

Window Settings

For UNIX users, This command allows you to turn the Console window on or off, and to specify its size and location. You also specify the on or off status and location for the Reader Status window and Printer/Punch Status window. This command is not present in the Windows version of 3780Link GUI. Each of these configuration parameters is described below:

Console Window:

Default: ON
Choices: ON or OFF

If ON is selected, the Console window is activated. The Console window displays the inbound data stream when the **printer** or **punch** is set to CON, or when the remote system sends an operator message (see **-n** switch). Script file commands are also echoed to the Console window as they are executed. Press the <**F1**> key to clear the console window.

Upper Left Row:

Default: 3
Range: 1 to 24

Upper Left Column:

Default: 2
Range: 1 to 80

Lower Right Row:

Default: 19
Range: 1 to 24; must be greater than upper left row

Upper Right Row:

Default: 78
Range: 1 to 80; must be greater than upper left column

The previous four fields define the position and size of your Console window.

Reader Status Window:

Default: ON
Choices: ON or OFF

If ON is selected, the Reader Status window is displayed when transmitting a file to the remote system. The window displays the name of the current reader file, the percentage of the file read, and the number of records and blocks transmitted during a session.

Upper Left Row:

Default: 16
Range: 1 to 24

Upper Left Column:

Default: 12
Range: 1 to 80

The above two fields define the position of the Reader Status window.

Ptr/Pun Status Window:

Default: ON
Choices: ON or OFF

If ON is selected, the Printer/Punch Status window is displayed whenever 3780Link detects an inbound data stream. The window displays the name of the active receive file or device, and the number of records and blocks received.

Upper Left Row:

Default: 16
Range: 1 to 24

Upper Left Column:

Default: 12
Range: 1 to 80

The previous two fields define the position of the Printer/Punch Status window.

Attention Box Delay:

Default: 4
Range: 1 to 60

The length of time, in seconds, that an ATTENTION box remains displayed before it is automatically removed.

Transfer Settings

This command allows you to set record sizes, turn space compression on or off, control record separators and vertical forms control (VFC) even while connected to the remote system. These settings may be changed when 3780Link is not actively sending or receiving. Each of these configuration parameters is described below:

Reader Record Size:

Default: 80
Range: 1 to Transmit Buffer Size

Same as described under the **Link Settings** menu.

Printer Record Size:

Default: 132
Range: 1 to Receive Buffer Size

Same as described under the **Link Settings** menu.

Punch Record Size:

Default: 80
Range: 1 to Receive Buffer Size

Same as described under the **Link Settings** menu.

Compress Spaces?

If selected while in 3780 mode, 3780Link compresses strings of spaces into space compression sequences when data records are transmitted. Do not enable this option unless the remote system supports space expansion and it is turned on.

If selected while in 2780 mode, space truncation is enabled and 3780Link removes trailing spaces from outbound data records. (In 3780 mode, trailing spaces are always removed.)

Expand Spaces?

If selected while in 3780 mode, 3780Link searches for and expands received space compression sequences when data records are copied from a receive buffer. This parameter applies to 3780 mode only.

Send IRS Separators?

If selected, 3780Link inserts an inter-record separator (IRS) after each logical record within the outbound data stream. If not selected, nothing is inserted and the remote system must use some other method to deblock logical records. This parameter applies to 3780 mode only.

IRS Before ETB/ETX?

This parameter determines whether 3780Link inserts an IRS at the end of the last logical record inserted into an outbound transmission buffer. Most 3780 systems accept the end of block character (either ETB or ETX) in place of an IRS in this situation. If your remote system does not, select this parameter and 3780Link will insert an IRS immediately before any ETB or ETX.

Send EOF Markers?

In the Windows environment, text files may be terminated by an end-of-file character (hexadecimal byte 1A). 3780Link normally removes this byte from the outbound data stream. If you wish to send the end-of-file byte as data, select this parameter.

Add VFC on ETB/ETX?

If selected, the appropriate vertical forms control (VFC) character(s) (typically a CR/LF under Windows or LF under UNIX) are appended to the last record in each inbound data block when the ETB or ETX is found. You'll probably want to select this option if the remote system does not send IRS's immediately prior to an ETB/ETX. See the table below under "Decode VFC" for a list of VFC sequences supported by 3780Link.

If not selected and a record is terminated by an ETB or ETX (the IRS character is absent), 3780Link assumes that the record is incomplete and is continued in the next data block.

Add VFC on IRS/IUS?

When selected, the appropriate VFC sequence is inserted into the inbound data stream when an IRS or IUS is recognized. See the table below for a list of VFC sequences supported by 3780Link.

If not selected, 3780Link ignores any VFC sequence that may precede an inbound record terminated by an IRS or IUS, and no carriage control is appended to the record.

Recognize NEWLINEs?

If selected, 3780Link recognizes the EBCDIC New Line (NL or hexadecimal byte 15) character as a record delimiter in the inbound data stream and 3780Link translates each NL character to CR/LF. If not selected, NL characters are treated as normal data bytes.

Decode VFC?

If selected, 3780Link recognizes and converts received vertical forms control (VFC) characters to ASCII carriage control characters. Conversion is not performed if the Decode VFC parameter is not selected. If VFC is not decoded, 3780Link defaults all records to a single CR/LF (single space). The following VFC sequences are recognized:

Esc T – triple space
Esc S – double space
Esc / – single space
Esc M – suppress space
Esc A – top of form

Strip Unknown VFC:

If selected and **Decode VFC?** is not selected, 3780Link discards received vertical forms control (VFC) characters from the inbound data stream. If both **Decode VFC?** and **Strip VFC?** are not selected, the VFC sequences are passed intact to the **printer** or **punch**.

Restore Settings

This command restores the original default configuration settings read from "**standard.cnf**", "**defaultX.cnf**", or "**defaultXY.cnf**" (or other configuration file loaded with the **-c** switch) when 3780Link GUI was loaded.

Assign Printers

This command is available when running the Windows or UNIX version of 3780Link. It allows you to assign the logical names LPT1, LPT2, and LPT3 to the desired printer device or file. These logical names are used to direct the output in the PRINT command and in the Printer and Punch Setup.

LPT1:

Default: None
Choices: File or printer path

LPT2:

Default: None
Choices: File or printer path

LPT3:

Default: None

Choices: File or printer path

Under Windows, you are presented with each of the printer devices that are currently configured. Under UNIX, these fields allow you to type the UNIX stream that 3780Link associates with the corresponding device name. For example, under UNIX, you may choose to assign your system printer **/dev/lp** to LPT1.

Assign TTY ports

This command is available when running the Windows version of 3780Link. It allows you to assign the logical names TTY1 and TTY2 to the desired asynchronous (COM) port and to specify other characteristics of the COM port. These logical names are used to direct the inbound data to the TTY*x* port or read outbound data from the TTY*x* port. These are not to be confused with the COM port used by the AutoSync version.

TTY1:

Default: None
Choices: COM1 – COM8

TTY2:

Default: None
Choices: COM1 – COM8

Baud Rate:

Default: 9600
Choices: 300 – 115200 bps

Data Bits:

Default: 8
Choices: 4, 5, 6, 7, 8

Parity:

Default: None
Choices: None, Odd, Even, Mark, Space

Stop Bits:

Default: 1
Choices: 1, 1.5, 2

Flow Control:

Default: None
Choices: None, RTS / CTS, Xon / Xoff

Read T/O:

Default: 30
Range: 0 – 32767

Write T/O:

Default: 30
Range: 0 – 32767

The Read and Write time-outs set the amount of time in seconds **3780Link** waits if it is unable to read from or write to the asynchronous device. If this time-out expires it usually means that the attached device is not functioning properly.

Stats Menu

The **Stats** menu supports commands to display and reset statistics that 3780Link GUI accumulates during a communications session. These commands are:

Show

Short Cut Key: Ctrl S

This command displays the Link Statistics window. The Link Statistics window is a dynamic display that is updated once per second with the accumulated statistics about the current session.

Reset

This command resets all the statistics to zero.

Other Menu / Trace Menu

The **Other** (UNIX) / **Trace** (Windows only) menu supports commands to control the 3780Link GUI line trace feature and to cancel local printing (if not Windows). These commands are:

Line Trace

3780Link supports a powerful built-in line trace feature. This feature dramatically reduces the need for a protocol line analyzer to troubleshoot communication line problems. The most recent inbound and outbound traffic is saved in an internal buffer and can be written to a file for later examination.

Line Trace:

> If selected, the trace function is enabled. Once enabled, if trace is later turned off, the contents of the trace buffer remains intact for later dumping if so desired.

Buffer Size:

> Default: 8000
> Range: 512 to 32,000 bytes
>
> This field specifies the maximum amount of trace information that can be retained at one time by 3780Link. The trace buffer acts as a FIFO (first-in, first-out) buffer and when trace information exceeds the buffer space available the oldest information is overwritten. This is to say that 3780Link always retains the most recent 8000 bytes (or your specified size) of trace information. This parameter is ignored if you are using 3780Link with the SmartSync/DCP adapter.

Reset:

> If selected, the trace buffer is cleared. This parameter is ignored if you are using 3780Link with the SmartSync/DCP adapter.

Dump to File?

When you are ready to save the contents of the trace buffer, select this option and specify a file name to write to. Users of the SmartSync/DCP version of 3780Link must turn the trace on from within 3780Link, but the actual dumping of the trace buffer is performed by a separate utility named **dcptrace** that runs concurrently with 3780Link.

Directory:

Default: Current Directory
Choices: Any valid directory

This field defines the directory to contain the new trace file. This field is not available under Windows.

File Name:

Default: None
Choices: Any valid file name

This field defines the file name to which to write the trace information.

Quit Menu

The **Quit** menu provides commands to terminate 3780Link GUI. These commands are:

Quit

Short Cut Key: Ctrl Q

This command closes any files and terminates 3780Link GUI. You cannot quit 3780Link GUI without disconnecting the communications link. You cannot quit or suspend 3780Link GUI while I/O is in progress – you must issue a **Kill I/O** command first. A local print operation is immediately abandoned when 3780Link GUI terminates.

Disconnect?

> If selected, the line is disconnected prior to exiting 3780Link GUI. This is necessary when the line is connected at the time you wish to quit.

Suspend

This command allows you to exit 3780Link GUI but retain the link to the remote system. This permits you to exit to the operating system to perform any necessary task and then resume your communications session at a later time.

3780Link GUI saves the current configuration parameters to a temporary file named "**suspend.cnf**", "**suspendX.cnf**", or "**suspndXY.cnf**" upon suspension, where *X* is the port number and *XY* is the port/board number. This file is read in place of the default configuration file (or any file specified with the **-c** switch) and then deleted when 3780Link GUI is reloaded.

Note that there is no response if the remote system attempts to transmit to your computer while 3780Link GUI is suspended. If this causes the remote system to disconnect or to experience other undesired consequences, you may choose to avoid using this command.

Notes

USING 3780Link CFG

The 3780Link CFG configuration utility is a stand-alone program that allows you to load, modify, and save 3780Link configuration files typically for use with the *script only* version 3780Link SO. Most of its functionality is also included in 3780Link GUI menus.

The primary advantage of configuring with 3780Link CFG versus using 3780Link GUI is that it allows you to configure multiple files easily.

To run 3780Link CFG , type the program name followed by any optional command line parameters. If you type the program name followed by a '?', the proper command line syntax is displayed. The command line syntax is:

```
3780cfg  [-cfile]  [-m | -o | -b] [-px[:y]]
```

The Windows version of 3780Link CFG, named **w3780cfg**, is loaded by clicking its icon in the 3780Link for Windows group.

-b Force mono mode and eliminate background (except Windows)

The **-b** switch forces 3780Link CFG to eliminate the background pattern from the display and to use monochrome display attributes regardless of the type of display in use. This switch may be used to speed up the display especially when using a serial terminal.

-c *file* Load configuration file

The **-c** switch tells 3780Link CFG to use the specified file as the default configuration file. If this switch is omitted, 3780Link CFG attempts to open "**defaultX.cnf**" (where *X* is the port number, see **-p** switch), "**defaultXY.cnf**" (where *XY* is the port and board number), or "**standard.cnf**". If no file exists, internal defaults for all configuration parameters are used.

-m Force mono mode (except Windows)

The **-m** switch forces the 3780Cfg configuration utility to use monochrome display attributes regardless of the type of display in use.

-o Force color mode (except Windows)

The **-o** switch forces the 3780Cfg configuration utility to use color attributes regardless of the type of display in use. This switch should be used if the 3780Cfg configuration utility fails to recognize the presence of a color adapter and displays in monochrome.

-p *x:y* Port:Board number (multi-port only)

The **-p** switch may be specified to ensure the 3780Cfg configuration utility looks for the proper default configuration file for a given port and, optionally, for a specific SmartSync/DCP adapter. For example, **-p2** results in the 3780Cfg configuration utility attempting to open "**default2.cnf**" to find current configuration values; **-p3:2** results in "**default32.cnf**" for port 3 of board 2.

Files Menu

Within 3780Link CFG, **Files** handles the saving, retrieving, and printing of configuration files.

Open

This command prompts you for the name and path of an existing configuration file and then loads that file for editing.

New

This command prompts you for the name and path of a new configuration file, and loads the default configuration parameters for editing.

Save

This command saves the current parameters to the current configuration file.

Save As

This command prompts you for a new name and path where you want to save the current configuration parameters.

Print Cfg

This command prompts you for the output device to which you want to print the current configuration parameters. If you specify “File”, then you are prompted for the path and file to print to.

Settings Menu

The 3780Cfg configuration utility **Settings** menu is identical to the one in 3780Link GUI with the exception of the item listed below:

Quit! Menu

The **Quit!** menu prompts you for the name of the output configuration file if you have made changes without saving them and then allows you to exit from the 3780Cfg configuration utility.

SCRIPT LANGUAGE

To accommodate automated and unattended operations, 3780Link provides an extremely powerful script language.

There are corresponding script commands for most of the menu items available in the menu-driven 3780Link GUI. There are numerous additional commands to manage error checking, error recovery, looping, and branching.

Script files can be executed directly from the command line by running 3780Link SO or from within 3780Link GUI using a menu selection. In addition, the Windows version supports a "drag-and-drop" method of specifying script files. You must use the **-v** switch when running 3780Link SO if you want to view the log file entries on your terminal display. In some cases, you may wish to use the **-u** switch when running 3780Link SO so that you may type script commands directly from your terminal (UNIX only).

Script files are produced with any ASCII text editor. The UNIX version of 3780Link GUI also has a built-in editor for this purpose. Unless otherwise specified, script files are assumed to have an extension of ".s".

Script Commands

The following section describes all the commands available for script processing. Commands are shown in uppercase for legibility but are case-insensitive.

% Syntax: %*n*

This command variable is replaced by a parameter delimited by either & or % on the command line to 3780Link SO or in the Arguments field of the **Run Script** menu of 3780Link GUI. *n* must be an integer between 1 and 9 inclusive. The first parameter is substituted for %1, the second parameter is substituted for %2, and so on. For example, running 3780Link SO as shown:

```
3780so  -sscript1.s &1-512-555-1212&  &SEND newjcl&
```

would cause the following script file:

```
:top
DIAL  %1
PTR  con
%2
DISC
QUIT
```

to be executed as if it looked like:

```
:top
DIAL  1-512-555-1212
PTR  con
SEND  newjcl
DISC
QUIT
```

%lastfile% Syntax: %lastfile%

This command variable is replaced by the path and file name of the last file received by 3780Link. If no file has been received, the value of %lastfile% will be “NULL”.

For example, if the last file received was called “printer.002”, the following command:

```
DEL %lastfile%
```

would be interpreted as:

```
DEL printer.002
```

%nextfile% Syntax: %nextfile%

With 3780Link v3.0 or later, this command variable is replaced by the file name of the file obtained by the GETNEXTFILE command. If no file has been obtained, the value of %nextfile% will be "NULL".

For example, if the file obtained by the GETNEXTFILE command was called "jcl.txt", the following command:

```
SEND %nextfile%
```

would be interpreted as:

```
SEND jcl.txt
```

; or * Syntax: ;*text*
**text*

Lines beginning with a semi-colon or asterisk are comment lines. The entire comment line is ignored. Use the semi-colon if you wish to start a comment past the first column of a particular command line.

: Syntax: :*label*

Sets a marker in the script file to be used by LOOP, GOTO, IF, and IFERRORxx commands.

ANS Syntax: ANS [/t=*x*]

Suspends execution to wait for an incoming telephone call. The optional switch, **/t=***x*, results in a wait of *x* seconds for a call. If *x* is zero, 3780Link waits indefinitely. If this switch is not present, this time defaults to the Connect Time-Out, which is configured in the Link Settings menu.

APPEND Syntax: APPEND *source_file dest_file*

Appends source_file to dest_file.

CALL Syntax: CALL *filename* | /d[=x]

Temporarily transfers control to another script file. When the called script file exits, control returns to the original script file at the statement immediately following the CALL statement.

The **/d** option waits for a file to be dropped from Windows Explorer. 3780Link will wait *x* seconds for a file to be dropped (default is zero, which means wait indefinitely). The dropped file is then called.

CHAIN Syntax: CHAIN *filename* | /d[=x]

Transfers control to the specified script file, but control does not return to the original script file.

The **/d** option waits for a file to be dropped from Windows Explorer. 3780Link will wait *x* seconds for a file to be dropped (default is zero, which means wait indefinitely). The dropped file is then chained.

COMPRESS Syntax: COMPRESS /on | /off

Turns space compression on or off by specifying **/on** or **/off** following the command.

CONN Syntax: CONN [/t=*x*]

Allows for a direct connection via a leased line or modem eliminator. The optional parameter, **/t=***x*, specifies to wait *x* seconds for a connection. If *x* is zero, 3780Link waits indefinitely. If this switch is not present, this time defaults to the Connect Time-Out, which is configured in the Link Settings menu.

COPY Syntax: COPY *source_file dest_file*

Copies source_file to dest_file.

DEL Syntax: DEL *filename*

Deletes the specified file.

DIAL Syntax: DIAL *number* | "*number*" [/t=*x*]
DIAL @"*name*" [/t=*x*]
DIAL #*nn* [/t=*x*]

Passes the phone number argument to the modem auto-dialer and waits for a connection. There are three options for the phone number argument:

1. *number* is the telephone number to dial. Modem command modifiers, dashes, parentheses, etc. are permitted without need for quotation marks, but quotation marks are required to send a '#' to the modem.
2. @"*name*" causes 3780Link to search the Phone Number Directory file for a matching *name* and dial the corresponding number. Only the first word of the Phone Number Directory entry should be used. For example, if an entry is named "Serengeti Systems", use DIAL @"Serengeti".
3. #*nn* causes 3780Link to dial entry number *nn* in the Phone Number Directory.

The optional parameter, **/t=***x* specifies to *x* seconds to wait for a connection. If *x* is zero, 3780Link waits indefinitely. If this switch is not present, this time defaults to the Connect Time-Out, which is configured in the Link Settings menu.

DISC Syntax: DISC [/l] [/s]

Disconnects the line. By default, a DLE-EOT disconnect sequence is sent and DTR is dropped. The **/l** option leaves the DTR modem signal on. The **/s** option suppresses the transmission of the DLE-EOT disconnect sequence.

ENDPIPE Syntax: ENDPIPE

Closes a pipe that was previously created with the PIPE command.

ENDPIPE should be used in conjunction with PIPE, WAITSIG, and SIGNAL. Pipes are not available under MS-DOS.

For an example script file and client program, please see **Appendix E.**

EXEC Syntax: EXEC [/c] [/e] *filename* [*parameters*]

Suspends execution of the script file and executes the specified command with optional parameters. When execution is complete, the program's exit value is returned to the script file and script file execution resumes. Under Windows, if *filename* is a Windows GUI application program (as opposed to a MS-DOS or console application), no exit value is available.

The **/c** switch causes the display to clear before and after execution of the program (not available with the Windows version). This switch may be necessary when executing a program from the 3780Link GUI windowed interface rather than from 3780Link SO.

The **/e** switch causes the return code from the last script command to be passed as the first argument to the executed process. Note that the **/c** and **/e** switches are mutually exclusive and must precede *filename*, otherwise, it will be interpreted as a parameter to the executable program. For example:

```
EXEC /c child.exe arg1 arg2
```

The program called "child.exe" is executed with arguments 'arg1' and 'arg2'. You must specify the full pathname of the process to be executed.

As another example, suppose you have a program called "password .exe" which checks for a valid password file, and returns 0 if the password is valid and 1 otherwise. The following script file would verify a password and then send a file to the caller only if the caller has sent an acceptable password.

```
PTR login
ANS /t=0
;; wait to receive 'login' file
RCV
;; check for valid password in file 'login'
```

```
EXEC  password.exe  login
;; don't send if invalid password
IFERROR  disconnect
;; send the file
SEND  file1
:disconnect
DISC
QUIT
```

EXPAND Syntax: EXPAND /on | /off

Turns space expansion on or off during execution of a script file by specifying **/on** or **/off**.

GETNEXTFILE Syntax: GETNEXTFILE ["]*file*["] [/t=*x* | /m=*x*]

This command waits for the existence of *file*, and then loads the filename into the %nextfile% variable. The use of this command creates what is sometimes referred to as a "hot reader" function where 3780Link can be made to automatically send files when they are placed in a known location.

A wildcard expression may be used to specify *file*. The expression must be enclosed in quotation marks. For example:

```
GETNEXTFILE "*.txt"
```

This command waits indefinitely for any file(s) with a .txt extension to be created in the current directory. Once a file exists, its path and name will be loaded into the %nextfile% variable and script execution will resume.

The optional parameter, **/t=***x* specifies the number of **seconds** to wait for the presence of a file before resuming command processing. The optional parameter, **/m=***x* specifies the number of **minutes** to wait for the presence of a file before resuming command processing. If *x* is zero or not specified, 3780Link waits indefinitely.

GOTO Syntax: GOTO *label*

Directs the flow of execution within a script file to *label*. Even though script file labels begin with a colon, the colon is omitted in the GOTO (and other branching) commands. For example:

```
:loop
.
.
GOTO  loop
```

IF Syntax: IF *label1* [, *label2*]

Checks the result of the previous command and performs a conditional branch to *label1* if the command failed. If there is a second label, control branches to *label2* if no error is encountered. If LOOPCOUNT is non-zero, the error path is taken LOOPCOUNT times. If the error condition persists after taking the error path the specified number of times, then the command immediately after the IF is executed. For example, in the following script file segment the dial command is repeated up to three times or until successful (whichever comes first):

```
LOOPCOUNT  3
:retry_dial
DIAL  1-555-1212
IF  retry_dial,  connect
;; Dialing failed
QUIT
:connect
```

IFERROR*xx* Syntax: IFERROR= [*nnnn*] *label*
IFERROR< [*nnnn*] *label*
IFERROR> [*nnnn*] *label*
IFERROR<=[*nnnn*] *label*
IFERROR>=[*nnnn*] *label*
IFERROR!= [*nnnn*] *label*
IFERROR [*nnnn*] *label*

Checks the result of the previously executed command to see if "IFERROR*xx* [*nnnn*]" is true. If so, the script file branches to *label*, otherwise execution continues with the next command. The symbol [*nnnn*] represents an optional numeric value associated with result codes returned by commands such as DIAL, SEND, and RCV (a

description of these codes appear in **Appendix A**). Any successful operation returns a value of 0.

If [*nnnn*] is omitted, a value of 1 is assumed, which tests for any error condition. The following variations are allowed: IFERROR= (equal to), IFERROR< (less than), IFERROR> (greater than), IFERROR<= (less than or equal to), IFERROR!= (not equal to), and IFERROR or IFERROR>= (greater than or equal to). For example:

```
IFERROR>  1046  next
```

This is interpreted as, "if result code is greater than 1046 then branch to label 'next', else continue with the next line".

Note

No space is permitted to the left of the '=', '<' or '>' signs and a space is required to the right of these signs.

IFFILE Syntax: IFFILE filename label

Checks for the existence of *filename* and branches to *label* if the file exists.

IFNFILE Syntax: IFNFILE *filename label*

Checks for the existence of *filename* and branches to *label* if the file does not exist.

LOG Syntax: LOG [*filename*] | [/on | /off]

Creates a new log file called *filename* and activates the log option. The **/on** and **/off** options turn the log on and off after a log file has been created.

LOOP Syntax: LOOP *label*

Branches execution back to *label*. Used with LOOPCOUNT to execute a command or sequence of commands more than one time. See example below.

LOOPCOUNT Syntax: LOOPCOUNT *nn*

Sets the number of times a command sequence is repeated. A command sequence is defined with the LOOP or IF commands, but not with the IFERROR command. For example, the following script file segment unconditionally transmits the message "Wow!" three times.

```
LOOPCOUNT 3
:many_tries
SEND "Wow!"
LOOP many_tries
```

NATO Syntax: NATO *x*

Sets the no activity time-out to *x* seconds. Time-out is also set at configuration time, but this command overrides that value. You should avoid using no activity time-outs of less than 20 seconds; short time-outs can interfere with other time-outs and normal processing times and may result in unexpected no activity time-out errors.

PAUSE Syntax: PAUSE *hh:mm*
PAUSE *#x*

Suspends the execution of a script file until *hh:mm* o'clock (expressed in military time). The second form pauses for *x* seconds. PAUSE simply delays execution of the script file (as opposed to RCV which allows incoming data to be received).

PIPE Syntax: PIPE [*pipename*]

Creates a bi-directional named pipe through which 3780Link may communicate with another process (a client process).

For Windows, you must use DDE poke transactions to implement pipes. The following three-level naming scheme is used:

	Service Name	Topic Name	Item Name
read:	*pipename*	ReadPipe#	Result
write:	w3780so	WritePipe	Command

The # represents the port number (the default is 1).

See your third-party product documentation for more information on DDE, Service Names, Topic Names, and Item Names. Note that some environments, like Visual Basic, refer to "Service Name" as "Application Name".

Windows Example:

PIPE client

On port 1, the client would write commands to 3780Link SO using the DDE service called "w3780so", the topic called "WritePipe1", and the item called "Command". The client would read results from 3780Link SO using the DDE service called "client", the topic called "ReadPipe1", and the item called "Result".

On port 2, the client would write commands to 3780Link SO using the DDE service called "w3780so", the topic called "WritePipe2", and the item called "Command". The client would read results from 3780Link SO using the DDE service called "client", the topic called "ReadPipe2", and the item called "Result".

IMPORTANT

This functionality was changed with 3780Link v3.0 for Windows. This change is not backwardly compatible. If you have a client application written for an earlier version of 3780Link, it must be updated for use with 3780Link v3.0.

For UNIX, two one-way pipes are created (one for reading and one for writing). If *pipename* is specified, these pipes are named as follows:

read: *pipename*.#.r
write: *pipename*.#.w

If *pipename* is not specified, the pipes are assigned default names as follows:

read: /tmp/3780link.#.r
write: /tmp/3780link.#.w

UNIX Example:

```
PIPE  /tmp/my_pipe
```

On a multi-port UNIX machine using port 2, the client would read from 3780Link using the named pipe "/tmp/my_pipe.2.r" and it would write to 3780Link using the named pipe "/tmp/my_pipe.2.w".
PIPE should be used in conjunction with WAITSIG, SIGNAL, and ENDPIPE.

For an example script file and client program, please see **Appendix E.**

PRINT Syntax: PRINT *filename ptr*

Prints *filename* to a printer named *ptr*.

PTR Syntax: PTR [*filename*| *ptr*] [/n | /s] [/a] [/b]
PTR /on | /off

Assigns file or device *ptr* (e.g. LPT1) to receive inbound data from the host. The **/n** and **/s** options enable auto-naming mode so multiple files can be accepted. For example, the first file would be "filename*X*.001", then "filename*X*.002", etc. The **/s** option instructs 3780Link to skip existing, non-empty files that it may find when creating an auto-named file. For example, if "filename*X*.001" exists and is larger than zero bytes, 3780Link skips over it and the **printer** file is assigned to "filename*X*.002". The **/n** and **/s** options cannot both be used in the same printer definition. In multi-port Windows, UNIX, and OS/2 environments, *X* is replaced by the port number specified with the **-p** switch. The **/b** option sets 3780Link to receive a binary file (non-transparent data is automatically recognized). The **/a** option appends received data to an existing file. The **/on** and **/off** switches are used to

enable and disable the **printer**. When disabled, all transmissions from the remote system designated for the **printer** are refused.

Windows users can specify a TTY port to which to write the data received. The file specifier must be set to either "TTY1:" or "TTY2:". 3780Link waits the period of time specified in the Write or Read Timeout for the attached asynchronous device to accept data. If no data is accepted in that time-period, the RCV command fails.

PTRRL Syntax: PTRRL *nnn*

Sets the maximum size of printer records written to the **printer** to *nnn* characters. This parameter is set at configuration time, but can be overridden with this command.

PUN Syntax: PUN [*filename*| *ptr*] [/n | /s] [/a] [/b]
PUN /on | /off

Assigns file or device *ptr* to receive punch data from the remote system. The **/n** , **/s**, **/a**, and **/b** options are the same as they are for PTR. The TTY port option is available as well for punch data. The **/on** and **/off** switches may be used to enable and disable the **punch**. When disabled, all transmissions from the remote system for the **punch** are refused.

PUNRL Syntax: PUNRL *nnn*

Sets the maximum size of punch records written to the **punch** to *nnn* characters. This parameter is set at configuration time, but can be overridden with this command.

QUIT Syntax: QUIT [/f] [/x=*nn*]

Ends script processing. The **/f** option performs a "forced quit" that terminates any I/O in progress and disconnects the line prior to exiting. The **/x=***nn* option defines your own program exit code to be passed back to the operating system or calling process. In the Windows environment, the **/*x*** option terminates the 3780Link SO window after script processing is complete.

RCV Syntax: RCV [/t=*x* | /s=*x*]

Suspends execution of the script file to wait for an inbound transmission from the host. The optional parameter, **/t=***x* specifies the number of **minutes** to wait before resuming command processing. The optional parameter, **/s=***x* specifies the number of **seconds** to wait before resuming command processing. If *x* is zero, 3780Link waits indefinitely.

RDRRL Syntax: RDRRL *nnn*

Sets the maximum size of reader records to *nnn* characters. This transmit parameter is set at configuration time, but can be overridden with this command.

RECSBLK Syntax: RECSBLK *nn*

Sets the number of reader records packed into a communications buffer before it is transmitted. This transmit parameter is set at configuration time, but can be overridden with this command.

RENAME Syntax: RENAME *filename1 filename2*

Renames filename1 to filename2.

SEND Syntax: SEND *file1*[+*file2*]...[&*filen*] [/p] [/t | /b]
[/d[=*x*]] (Windows)
SEND [[**t**] | [**b**]]*file1*...[+ | &] [[**t**] | [**b**]]*filen*
SEND "*msg*" [/p]

Sends a file, multiple files, or a single line message. To send multiple files that appear as one transmission to the host (files delimited by ETXs), separate file names in the SEND command with the plus '+' character. To send multiple files that appear as one transmission and one file to the host (files delimited by ETBs), separate file names with the ampersand '&' character. Sending a message is useful to send logins and passwords. The **/p** option selects the remote **punch**, the **/t**

option sends the data using EBCDIC transparency, the **/b** option sends the data in binary mode (no ASCII↔EBCDIC translation performed).

Windows users can specify a TTY port from which to read the data to be sent. The file specifier must be set to either "TTY1:" or "TTY2:". 3780Link waits the period of time specified in the Read T/O for the attached asynchronous device to send data. If no data is received in that time-period, the SEND command fails.

To intermix transparent and binary files in the same SEND command, precede the corresponding file with **[t]** to designate the following file is to be sent using EBCDIC transparency, or with **[b]** to designate the following file is to be sent in binary mode. Do not use the **/b** or **/t** options in this case. For example, the following command sends a text file, a transparent file, a binary file, and finally another text file:

```
SEND signon+[t]data1+[b]data2+signoff
```

The **/d** option waits for a file to be dropped from the File Manager or Explorer (Windows only). 3780Link will wait *x* seconds for a file to be dropped (default is zero, meaning wait indefinitely). The dropped file is then sent. For example:

```
SEND /d=100
```

SENDL Syntax: SENDL *file1*[+*file2*]...[&*filen*] [/p] [/t | /b] [/d[=*x*]]

SENDL [[**t**] | [**b**]]*file1*...[+ | &] [[**t**] | [**b**]]*filen*

A variant of the SEND command allows the use of long file names under Windows. File names with embedded spaces must be enclosed with double quotes. All options are functionally equivalent to the SEND command.

SIGNAL Syntax: SIGNAL ["*msg*" | *msg*] [/t=*x*] [/a]

Writes to the named pipe which was previously created using the PIPE command and awaits a reply. If no message is specified, the return code from the last script command executed is sent; otherwise the optional message is sent. If there are spaces in the message, enclose the entire message in quotation marks.

The optional parameter, **/t=***x*, specifies to wait *x* seconds for the operation to complete. If *x* is zero, 3780Link waits indefinitely. If the **/t=***x* parameter is omitted, the default value of 30 seconds is used.

The optional parameter, **/a**, specifies that 3780Link not wait for a reply after a write to the pipe. Waiting for a reply ensures proper synchronization between 3780Link and the client process using the pipe and is therefore the recommended method. The reply should be a numeric value in the range of 0 to 9999. This value becomes the return code from the SIGNAL command, allowing the result to be tested with an IFERROR script command.

SIGNAL should be used in conjunction with PIPE, WAITSIG, and ENDPIPE.

For an example script file and client program, please see **Appendix E.**

SPEAKER Syntax: SPEAKER /on | /off | /on-carrier

Controls the speaker mode of an internal or external modem which includes a speaker. The options correspond to Always ON, Always OFF, and ON Until Carrier respectively.

STATS Syntax: STATS

Prints a formatted list of communication line statistics. This command is typically used to help troubleshoot a communications problem.

SUSP Syntax: SUSP

Suspends a communication session by exiting script processing while leaving the DTR modem signal high. The session automatically resumes the next time you run 3780Link. I/O cannot be in progress when a suspend command is issued.

TDUMP Syntax: TDUMP *filename*

Dumps the contents of the trace buffer to *filename*. Do not use the TDUMP command with the SmartSync/DCP version of 3780Link. Instead, use the **dcptrace** utility.

TRACE Syntax: TRACE /on | /off [/b=*nnnn*]

Enables or disables the internal line trace feature with **/on** or **/off**. The **/b=***nnnn* option specifies the size of the trace buffer (up to 32000 bytes). If omitted, the default size is 8000 bytes. The **/b** switch is ignored when running 3780Link with the SmartSync/DCP adapter.

VFCONETB Syntax: VFCONETB /on | /off

Controls whether ETB/ETX are translated to a CR/LF sequence in received data.

VFCONIRS Syntax: VFCONIRS /on | /off

Controls whether IRS/IUS are translated to a CR/LF sequence in received data.

WAITSIG Syntax: WAITSIG [/t=*x*] [/a]

Reads for and executes a script command from a named pipe which was previously created using the PIPE command. The command is sent to 3780Link by your client process.

The optional parameter, **/t=***x*, specifies to wait *x* seconds for the operation to complete. If *x* is zero, 3780Link waits indefinitely. If the **/t=***x* parameter is omitted, the default value of 30 seconds is used.

The optional parameter, **/a**, specifies that 3780Link not reply after a read from the pipe. Writing a reply ensures proper synchronization between 3780Link and the client process using the pipe and is therefore the recommended method. The reply is the return code from the piped-in script command just executed.

WAITSIG should be used in conjunction with PIPE, SIGNAL, and ENDPIPE.

For an example script file and application program, please see **Appendix E.**

Sample Script Files

The script file shown below attempts to dial up to three times, defines the **printer** to be a file named “testptr”, and sends a file named ‘login’. If the send file completes normally, the script waits for a single file from the remote system and then disconnects and exits.

```
LOOPCOUNT 3
:dial_loop
DIAL 1-555-1212
IF dial_loop, connect
QUIT
:connect
PTR testptr
SEND login
IF sendfail
RCV
:sendfail
DISC
QUIT
```

This example script file dials a phone number and checks for numerous possible result codes. If the dial is successful, two files are transmitted consecutively and a RCV is executed to await the remote system’s reply. The line is then disconnected.

```
:top
DIAL 1-512-555-1212
;; check for dialer not responding
IFERROR= 1045 top
;; check for line busy
IFERROR= 1051 top
;; check for no dial tone
IFERROR= 1048 no_tone
```

```
;; unknown dial error occurred
IFERROR  exit
PTR  con
;; send two files in a row
SEND  login.dat
;; check for Bid Retry Error
IFERROR=  102  no_host
SEND  newjcl
;; define auto-naming printer file
PTR  newdata  /n
;; wait for host reply
RCV
DISC
:exit
QUIT
:no_tone
**ATTENTION: Phone Line Not Connected
QUIT
:no_host
**ATTENTION: Host Not Responding
QUIT
```

Also, see the sample script file named "ssitest.s" on your 3780Link distribution media. See **Appendix E** for a sample script for accepting commands from a client application.

Appendix A. RETURN CODES AND MESSAGES

The following describes all numeric error and return codes that can occur during the execution of 3780Link. In normal use, you are insulated from interpreting numeric values in error messages since 3780Link translates all of the common values to English phrases.

When running a script file, you may want to take advantage of the IFERRORxx command that allows you to test for specific events. In this case, use the numeric values shown below in the command. When writing to the log file, 3780Link includes the numeric value at the end of the English phrase for all events that can be tested for. This makes it easier to verify the correct operation of your script files.

Be aware that these tables are complete listings of all errors and conditions produced both internally and externally by 3780Link, and it is unlikely you will encounter more than a few of them.

Group I Codes

The return codes are grouped into two categories. The first are error or return codes produced by the 3780Link user interface and script processor. These values begin at 1.
The following codes result from errors immediately after 3780Link is loaded. These codes are returned as exit codes only and can be examined as supported by the operating system (e.g., using the MS-DOS ERRORLEVEL value).

Code	Description
1	Invalid command line option
2	Cannot initialize terminal
3	Unable to install new translation table
4	Cannot write to log file during start up
7	Could Not Open/Create STANDARD.CNF
8	Could Not Read STANDARD.CNF
9	Could Not Write STANDARD.CNF
10	Invalid STANDARD.CNF
40	XBSC Device Driver not installed or responding

The remaining codes result from error conditions, in progress messages and completion messages. Typically the English phrase you see appears in an ATTENTION box and may also be written to the log file. The four digit value is the corresponding numeric value used internally by 3780Link and may be used in IFERRORxx commands in your script files.

Some rare error conditions do not have a specific message of their own. In these cases generic messages are used and the offending Group II code is included in the message (for example: "Receive Error [36]").

When writing script files, keep in mind that 3780Link always returns a zero result code if the requested command is completed successfully. For example, while code 1036 corresponds to "Line successfully connected", 3780Link internally translates it to zero. Your script file need only check for a non-zero return code to determine if an operation failed. But by checking for specific return codes, you have much more flexibility in recovering from errors.

Code	Description
1005	File Open Error
1006	File Write Error
1007	Could Not Open/Create STANDARD.CNF
1008	Could Not Read STANDARD.CNF
1009	Could Not Write STANDARD.CNF
1010	Invalid STANDARD.CNF
1011	Could Not Open/Create MESSAGES.CNF
1012	Could Not Read MESSAGES.CNF
1013	Could Not Write MESSAGES.CNF
1014	Invalid MESSAGES.CNF
1015	Could Not Open/Create PHONEDIR.CNF
1016	Could Not Read PHONEDIR.CNF
1017	Could Not Write PHONEDIR.CNF
1018	Invalid PHONEDIR.CNF
1021	Invalid File/Path Name
1027	File Could Not Be Renamed
1028	File Could Not Be Deleted
1029	File Could Not Be Copied
1030	Must Specify File Name
1032	File Too Large To Be Edited Or Viewed
1033	Directory Empty/Not Found
1034	Internal List Directory Failure
1035	Internal Disconnect Error
1036	Line Is Connected
1037	Cannot Set Configuration
1038	Cannot Configure While Connected
1039	Cannot Configure While I/O In Progress
1040	Cannot Install BSC Driver
1041	Cannot Quit – Line Is Connected
1044	Dialing Error
1045	Dialer Not Responding
1046	Invalid Phone Number
1048	No Dial Tone Detected
1049	No Answer Tone Detected
1051	Line Is Busy
1054	Line Successfully Connected
1056	Manual Dial
1057	Unknown Modem Reply
1058	Line Disconnected
1059	Unable To Answer

1060	Connect Error
1062	Dialing Canceled
1063	Line Not Connected
1064	Cannot Send Blank Message
1065	Edit Buffer Full
1066	Cannot Open Reader File
1067	Cannot Open Printer File/Device
1068	Cannot Open Punch File/Device
1069	I/O In Progress
1070	File Read Error, Canceling Transmission
1071	Cannot Send Transparent File To Punch
1072	Receive In Progress, OK To Interrupt?
1075	Reader Record Truncated
1076	Transmit Error [code]
1077	Partial Read Error, Canceling Transmission
1079	Transmission Canceled
1080	Cannot Open Next File, Transmission Canceled
1081	Internal Disconnect Error
1083	Received DLE-EOT Disconnect Sequence
1084	Abnormal Line Disconnect
1085	No I/O In Progress
1087	Trace Buffer Exceeds 32K
1088	Cannot Allocate Trace Buffer
1089	Cannot Initialize Trace Buffer
1090	Trace Already Off
1091	Trace Turned On
1092	Trace Turned Off
1094	Trace Already On
1095	Trace Buffer Reset
1097	Trace Dump Canceled
1098	Must 'Reset' To Change Buffer Size
1105	Receive In Progress
1106	Printer/Punch Already Turned On
1107	Printer Is Ready
1109	Printer Offline/Not Ready
1110	Punch Is Ready
1115	Printer Turned Off
1116	Punch Turned Off
1117	Receive Error [code]
1120	Receive Canceled
1121	Cannot Open Auto-Named Printer/Punch File
1123	No Buffers Available, Cannot Open File

1124	Cannot Allocate Comm Buffers
1125	Must Reload 3780Link To Change Comm Buffer Sizes
1126	Cannot Open/Read Local Print File
1127	Printer Failure
1128	Printing Completed
1129	Local Printing In Progress
1130	Printing Canceled
1131	Not Printing Locally
1132	Printer Time-Out
1136	Cannot Write To LOG File
1137	LOG File Ready
1138	LOG File Closed
1139	LOG File Not Open
1140	Cannot Move Console Window As Requested
1141	Cannot Move Status Window As Requested
1143	Script File Open Failed: file
1144	Script File End-of-File
1145	Normal Exit From Script File
1146	Script Canceled By User
1147	Unknown Command: <cmd>
1148	Invalid Argument(s)
1149	Invalid Label
1150	Script File Label Not Found
1151	Too Many Labels
1152	Duplicate Label
1153	Too Many Arguments
1154	Cannot Position Script File
1155	Quit Script
1156	Session Suspended
1157	Wait Command Timed Out
1158	Cannot Locate Phone Number
1159	Search / Replace Strings Not Same Length
1160	Cannot Determine Modem Type
1161	Cannot Set Modem Type
1163	Cannot Open Called Script File
1164	Script File Chain Failed: file
1165	Chained To Script File: file
1166	Command Ignored
1167	Script File Read Error
1169	Inbound Data Received But Printer/Punch Not Ready
1171	Hardware / Modem Type Mismatch
1172	Modem Does Not Have Speaker

1173	Modem Speaker Initialization Not Accepted
1176	Hardware Has Not Been Configured
1178	Hardware Not Supported
1179	Cannot Begin Script Processor
1180	Trace Cannot Be Dumped From Within 3780Link
1181	Background BSC Process Not Running
1182	Exec Command Failed
1190	Pipe Command Failed
1191	Could Not Open Pipe
1192	Pipe Open Time-Out
1193	Could Not Read From Pipe
1194	Pipe Read Time-Out
1195	Could Not Write To Pipe
1196	Pipe Write Time-Out
1197	Invalid Pipe Protocol (no newline found or empty command found)
1198	Multiple Writes On Pipe – Command Ignored
1199	No Timers Available

Group II Codes

Group II codes are produced at a lower level and are more closely tied to events on the communications line, with the modem and auto-dialer, and the hardware.

Device Driver Codes:

Code	Description
1	Duplicate install
2	No hardware found at configured I/O port
3	Invalid hardware I/O port
4	Invalid hardware interrupt
5	BSC Driver not installed
6	Invalid opcode
7	Not open
8	Port is open (on uninstall)
10	Specified I/O not in progress
11	Operation time-out
12	I/O aborted
13	Read/write already in progress
14	XBSC driver owned by another process
19	Hardware not supported
20	Already open
21	Open in progress
22	Cannot load **emubsc**
23	modem still online (V.32 training down)
24	Invalid BSC port number
25	CTS lost
26	DSR lost
27	Zero read/write count specified
28	Invalid modem type
29	Unrecognized Sync-Up modem type
36	Receive characters lost
37	FIFO overflow (on receive)
99	Unknown error

BSC Protocol Level Codes:

Code	Description
100	BSC not open
101	Transmit initiated but no buffers ready to transmit
102	Bid retry error
103	DLE-EOT received
104	No activity time-out occurred
105	RVI received
106	ENQ retry error
107	NAK retry error
108	Forward abort / transmitter error
109	Abnormal receive termination
110	No buffer ready on conversational reply
111	Received a conversational reply
112	Received an EOT instead of ACK
113	Transmission complete
114	DLE-EOT transmitted
115	Receive successfully aborted
116	Receive completed successfully
117	Received SYN as data in normal text
118	Receive buffer overflow
119	Unable to send line bid
120	Read for 1st bid timed out
121	Transmit successfully aborted
122	Printer not ready
123	Punch not ready
124	Received ENQ response to bid
125	Too many consecutive WACKs sent
126	Receive buffer under-run
127	Too many consecutive TTDs sent
128	EOT transmitted
129	Read enable error
130	No free buffer available on received bid

Record Manager Dialer Codes:

Code	Description
180	Ringback tone detected
181	Busy signal detected
182	Dial tone detected
183	No dial tone or no answer back tone
184	Got answerback tone
185	Modem command error
186	Dialer time-out
187	Dialer aborted
188	Dialer operation complete
189	Modem command not supported
190	Unknown modem error
191	Cannot auto-answer

Record Manager Codes:

Code	Description
200	Duplicate open call
201	Open in progress
202	Open previously completed
203	Read in progress (on transmit call)
204	Write in progress (on receive call)
205	Bad subopcode
206	Write not in progress
207	No transmit buffers available
208	Transmit buffer overflow
209	Reader record overflow
210	Spanning not allowed in 2780 mode
211	Spanning not allowed in transparent mode
212	Read not in progress
213	Abort in progress
214	No I/O in progress on abort, status call
215	I/O in progress
216	Transmit aborted
217	Receive aborted
218	Possible invalid control block structure
219	WARNING: some parameters not accepted because driver is installed

220 Trace is enabled
221 Trace buffer too small
222 Trace not enabled
223 Trace buffer empty
224 trace buffer too large
225 BSC process fails to respond
226 cannot allocate shared memory
227 cannot detach shared memory
228 cannot kill I/O on forced disconnect
229 Invalid serial number found

Configuration Codes:

Code	Description
230	Possible invalid parameter block structure
231	Invalid configuration options
232	Invalid hardware port
233	Invalid hardware interrupt
234	Invalid transmit buffer size
235	Invalid receive buffer size
236	Reader record size cannot exceed transmit buffer size
237	Printer record size cannot exceed receive buffer size
238	Punch record size cannot exceed receive buffer size
240	Possible invalid statistics block structure
241	Receive FIFO smaller than receive buffer size
242	Communications buffer pointer is NULL
251	Translation table space too small

Appendix B. TRANSLATION TABLE PATCHER

The **newxlat** program is used to modify an existing ASCII↔EBCDIC translation table file. A copy of 3780Link's internal defaults is contained in the file "xlat.tbl". You should use this file as a starting point to create your custom translation table.

WARNING: Make a backup copy of this file before using it with **newxlat**!

The following description of the **newxlat** program applies only to the UNIX versions. The Windows version does not accept command line switches; instead, menu options are used to edit the translation tables. The following is a description of the UNIX version. After that is a brief description of the Windows version.

The program is loaded with the following command:

newxlat [-d] [-i*file*] [-o*file*]

The program accepts the following switches:

-d Dump to text file

The **-d** switch produces a printable file from the input translation table.

-i *file* Input table from file

The **-i** switch specifies the input translation table file name.

-o *file* Output table to file

The **-o** switch specifies the output translation table file or the printable file if the **-d** switch is used.
If either the **-i** or **-o** switches are omitted, **newxlat** prompts for the required file names. The following is a sample session to patch the default table so that an ASCII 0x20 is translated to an EBCDIC 0xaa:

- Type newxlat -ixlat.tbl -onewxlat.tbl and press <**ENTER**>. The screen displays:

```
SSI Translation Table Patcher v#.#.#
Copyright (C) 1991-2002 Serengeti Systems
Incorporated
ALL RIGHTS RESERVED.

Select ASCII to EBCDIC or EBCDIC to ASCII table.
No table currently selected.

Select table (a/e/q):
```

- Type **a** to select the ASCII to EBCDIC table and press <**ENTER**>. The screen displays:

```
Enter two digit hexadecimal value (e.g. 2a)
Press 'q' to quit.

ASCII code:
```

- Type **20** as the ASCII code you wish to changed and press <**ENTER**>. The screen displays:

```
Current translation: 40
New EBCDIC code:
```

- The program is requesting the new EBCDIC translation for an ASCII **20**. As per our example, type **aa** and press <**ENTER**>. The screen displays:

```
ASCII code:
```

- At this point the program is asking for the next ASCII value to change – you could continue by typing another ASCII code, pressing <**ENTER**> for the next sequential ASCII code (in this example the next translation would be for 0x21), or by typing **q** and pressing <**ENTER**> to quit. Assuming you type **q**, the screen displays:

```
Select ASCII to EBCDIC or EBCDIC to ASCII table.
```

```
ASCII to EBCDIC table currently selected.
Select table (a/e/q):
```

- Type **q** and press **<ENTER>** to exit. You could type **e** and proceed to patch the EBCDIC to ASCII table in an identical manner as shown above. Assuming you type **q**, the screen displays:

```
Save tables (y/n)?
```

- This prompt only appears if you made at least one patch. To save your patches, type **y** and press **<ENTER>**. To discard your patches, type **n** followed by **<ENTER>**.

To use a new translation table, load 3780Link with the **-x** switch.

In the Windows version of **newxlat**, both the ASCII to EBCDIC and the EBCDIC to ASCII translation tables are shown. To edit the ASCII to EBCDIC table, choose the **Edit | ASCII® EBCDIC** option and a dialog box will ask you for the ASCII code and the corresponding EBCDIC translation. When you select **OK** the tables will be updated on the screen. To save the table to a file, select the **File | Save As** option, and specify the new name for your modified translation table.

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Appendix C. POP-UP MENU SHORT-CUT KEYS

The following table summarizes the menu short-cut keys supported by 3780Link. The short-cut keys are active from the **Main** menu bar and from any of the drop-down menus.

<Ctrl D>	Auto-Dial	
<Ctrl A>	Auto-Answer	(not available with AIX)
<Ctrl O>	Direct Connect	
<Ctrl I>	Disconnect	(not available with UNIX)
<Ctrl F>	Send File	
<Ctrl P>	Printer Setup	
<Ctrl U>	Punch Setup	
<Ctrl K>	Kill I/O	
<Ctrl R>	Run Script	
<Ctrl S>	Show Statistics	(not available with UNIX)
<Ctrl Q>	Quit Session	(not available with UNIX)

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Appendix D. TEXT EDITOR COMMAND KEYS

The following table summarizes the command keys available within the 3780Link Edit window on systems that support a PC-style keyboard such as some versions of UNIX. The Windows version uses the Notepad (or any other configured editor) rather than an internal editor, so Windows users may skip this Appendix.

Extended Edit Keys

<Esc>	Quit editing
<Up Arrow>	Cursor up one row
<Down Arrow>	Cursor down one row
<Right Arrow>	Cursor right one column
<Left Arrow>	Cursor left one column
<Home>	Cursor to beginning of line
<End>	Cursor to end of line
<Ctrl Home>	Cursor to first line
<Ctrl End>	Cursor to last line
<PgUp>	Move up one page
<PgDn>	Move down one page
<Ctrl PgUp>	Move to first page
<Ctrl PgDn>	Move to last page
<Ctrl M>	Mark area by rows
<Ctrl C>	Mark area by columns
<Gray +>	Copy marked area
<Gray ->	Cut marked area
<Ctrl P>	Paste copied/cut area
<Ins>	Toggle INSERT/OVERWRITE modes
<Del>	Delete character under cursor
<Ctrl Y>	Delete line
<Ctrl S>	Search for string
<Ctrl R>	Search/replace string

The table below summarizes the command keys available within the 3780Link Edit window on most UNIX systems.

Standard Edit Keys

<Esc>	Quit editing
<Ctrl e>	Cursor up one row
<Ctrl x>	Cursor down one row
<Ctrl d>	Cursor right one column
<Ctrl s>	Cursor left one column
<Home>	Cursor to beginning of line
<End>	Cursor to end of line
<Ctrl Home>	Cursor to first line
<Ctrl End>	Cursor to last line
<Ctrl b>	Move up one page
<Ctrl f>	Move down one page
<F3>	Move to first page
<F4>	Move to last page
<Ctrl m>	Mark area by rows
<Ctrl c>	Mark area by columns
<F5>	Copy marked area
<F6>	Cut marked area
<Ctrl p>	Paste copied/cut area
<Ctrl v>	Toggle INSERT/OVERWRITE modes
<Ctrl g>	Delete character under cursor
<Ctrl y>	Delete line
<Ctrl s>	Search for string
<Ctrl r>	Search/replace string

Appendix E. CLIENT-SERVER EXAMPLE

If you wish to incorporate 3780 emulation into your own applications, 3780Link SO may be used as an RJE server application. 3780Link GUI itself is a client to 3780Link SO in this very way. Two example programs, a fully functional one written in C and C++, and a very simple one written using Microsoft FoxPro, are included with 3780Link. The FoxPro program, client.prg, is very simple and will not be discussed here.

The C and C++ client sample, named client, was written using Microsoft Visual C++ and the Microsoft Foundation Classes and it utilizes the Dynamic Data Exchange Management Library (DDE). Studying the source code for this example program provides guidance in how to write your client application.

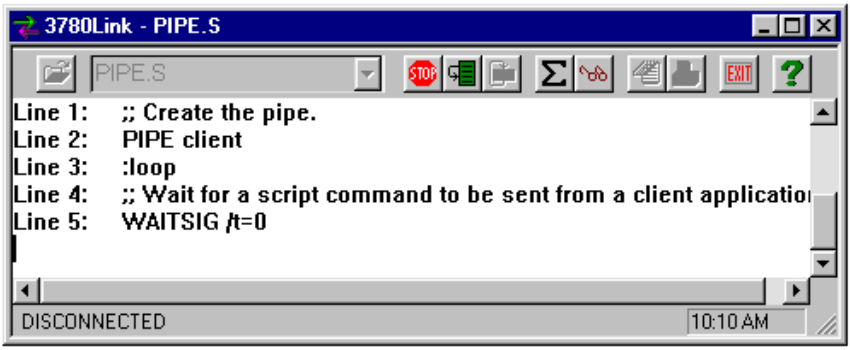
The client program provided gives a degree of direct manual control when used in conjunction with 3780Link SO and a specially prepared script file. The following paragraphs describe the use of the client program.

The client program automatically loads 3780Link SO (using a command line of w3780so -s"pipe.s") if it's not already loaded. When operating as an RJE server, 3780Link SO must be run with the following specially prepared script file provided with 3780Link. This file is named "pipe.s".

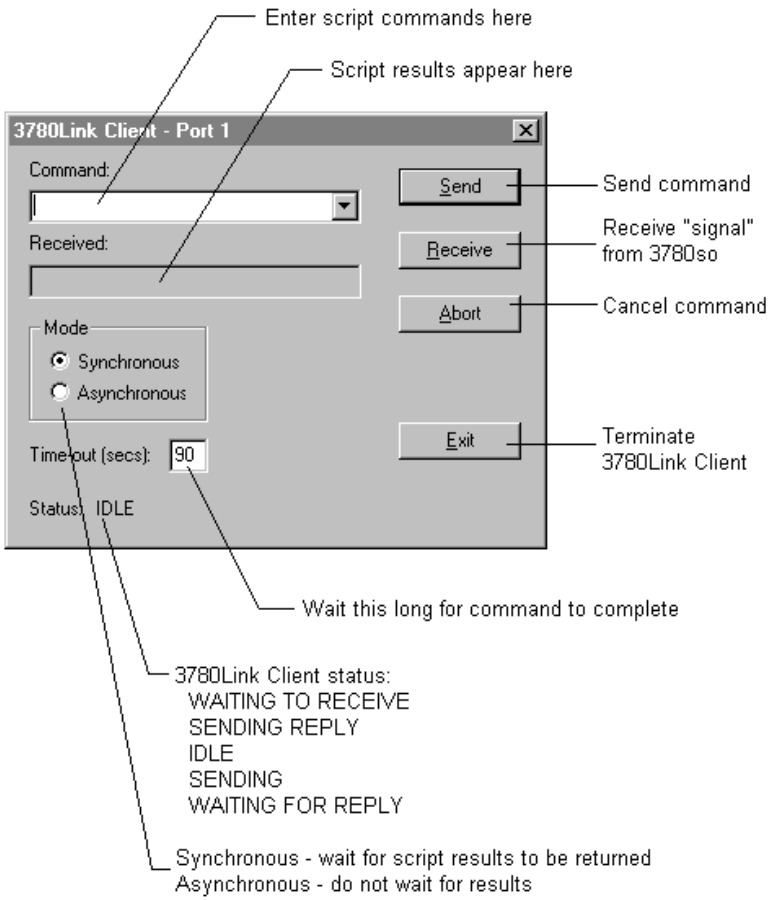
```
;; create a pipe using default name
PIPE
:loop
;; wait indefinitely for a command
WAITSIG /t=0
GOTO loop
```

When 3780Link SO executes this script, it halts at the WAITSIG and waits to receive a script command from the default pipe. The received command is then executed as if it was in the script file in place of the WAITSIG command. When the command completes, WAITSIG pipes the result code back to client program and 3780Link SO continues by executing the next script command (GOTO loop in this case).

When you run client, you'll see the following 3780Link SO window.



The client program window looks like this.



The client program can be used to exercise limited interactive control over a 3780Link SO session. This program allows you to enter script commands from the keyboard and have them executed by 3780Link SO. The results of each command are returned and displayed.

Caution

The client program is provided as an example program demonstrating how commands may be piped to 3780Link SO from another program. It is not intended for

production use and you may experience difficulties if you attempt to use it in such a manner.
As you enter commands via the command prompt, you can watch as they execute in the 3780Link SO window.

Note

The time-out parameter must be long enough for 3780Link SO to complete the requested command. For example, if you ask 3780Link SO to send a large file and the time-out is too short, the client program will not be able to receive the results of the SEND command from 3780Link SO. You may set the time-out to zero to prevent the client program from timing out.

Some important things to consider when creating a client application of any type are:

- The client program must set itself up as a DDE client for writing script commands to 3780Link SO using DDE Poke transactions.
- The client program must set itself up as a DDE server for receiving result codes back from 3780Link SO using DDE Poke transactions.
- The client program must have a DDE callback function and must process the appropriate messages from the operating system.
- In order for 3780Link SO to act as a server, it must be running the "pipe.s" script file which endlessly waits for script commands to be sent to it and executed.

Appendix F. KILLBSC – Terminate EMUBSC

This program is used to properly terminate the **emubsc** daemon. It should be run at the end of any shell scripts that load a BSCLIB application. You may also run it directly from the command line to kill the daemon and remove it from memory. The optional command line options for **killbsc** are described below.

-f Forced kill

The **-f** switch may be used to force the termination of **emubsc** when it is not in the idle state.

-b **board Board number [1-6] (SmartSync/DCP only)**

The **-b** switch specifies which SmartSync/DCP associated with the BSC process to be killed. You must indicate the board number, 1 through 6, as appropriate. The board number corresponds to the order in which they were configured. If omitted, the default is board 1.

-p ***port*** **Port number [1-8]**

The -p switch specifies the port associated with the BSC process to be killed. If omitted, the default is port 1.

-s Silent mode

The -s switch suppresses all output to the terminal with the exception of error messages.

-i *id* **Alternate shared memory ID (Unix only)**

The **-i** switch must be used to pass the alternate shared memory identifier if one was used when **emubsc** was loaded.

Appendix G. EMUBSC – BSC Protocol Handler Process

The **emubsc** process is the background BSC protocol handler for applications using AutoSync or SyncPCI communications adapters. It is not applicable to SmartSync/DCP installations. The process is automatically started by the BSCLIB INSTALL function. On Unix, the program file is expected to be found in BSCLIB install directory.

Under certain conditions Serengeti Technical Support may instruct you to start **emubsc** manually using the following command or by simply clicking on the program icon in Windows:

```
emubsc -d -v
```

The **emubsc** command line options are described below:

-p *port* **Port number [1-8]**

The **-p** switch specifies the port associated with the BSC process to be killed. If omitted, the default is port 1.

-d Debug mode

The -d switch activates the debug option which writes internal debug information to a file named "emubsc.1".

-f *path* Alternate path to abscdrvr executable (Unix only)

The -f switch is used to specify an alternate path to the **abscdrvr** executable if it is not in the default **/usr/lib/bsclib** directory.

-i *id* Alternate shared memory ID (Unix only)

The -i switch is used to specify an alternate shared memory identifier when the default value of 311 is used by another process. In such cases, your application must specify the same shared memory ID specified with the -i switch.

-m *size* **Maximum size of emubsc.1 file**

By default, when **emubsc** is writing to **emubsc.1** the file is not allowed to grow larger than approximately 100K bytes. The -m switch changes the maximum size of **emubsc.1.** For example, -m50 sets the maximum file size to 50K bytes.

-s **Silent mode (Unix only)**

The -s switch suppresses all output to the terminal with the exception of error messages. Use this switch if you run your BSCLIB application from the same terminal used to load **emubsc**.

-t **Block response time-out**

The -t switch is provided to change the time-out used when waiting for a reply to a transmitted data block. The BSC protocol defines that this time-out be three seconds, but the -t switch enables you to change this time-out if necessary within your environment. For example, -t5 changes the block response time-out to five seconds.

-v **Verbose mode**

The -v switch must be used in conjunction with the -d switch to cause debug messages to be output to the display in addition to the debug file.

Appendix H. DCPLOAD – Load Process on DCP

This program is used to initialize each SmartSync/DCP co-processor and download the **amxbsc.bin** file. The **amxbsc.bin** file is expected to be found in the current subdirectory. The optional command line switches for **dcpload** are described below:

-b *board* **Specific board number to load [1-6]**

The **-b** switch specifies which SmartSync/DCP adapter **dcpload** is to access. You must indicate the board number, 1 through 6, as appropriate. The board number corresponds to the order in which they were configured. If omitted, **dcpload** loads all boards found.

-f *name* **Path/File to download**

The **-f** switch specifies the full path name of **amxbsc.bin** if it is not in the current subdirectory. For example:

```
dcpload -f /MyApp/amxbsc.bin
```

-v **Verbose load (Unix only)**

The **-v** switch causes **dcpload** to display detailed information during downloading. Use this switch the first few times you download **amxbsc.bin** to become familiar with the process and observe **dcpload** in operation.
Unix systems can be configured to automatically initialize SmartSync/DCP adapters during system startup. Below is an example of how to configure a Linux system by adding the following commands to the end of the **/etc/rc.d/rc** system file. If you are also activating the SmartSync/DCP device driver in the **rc** file, make sure that the **dcpload** command is after the **insmod**.

```
/sbin/insmod –f /usr/lib/dcplib/driver/xdcpdrvr.o
/usr/lib/dcplib/dcpload -f /usr/lib/dcplib/amxbsc.bin
```

Appendix I. DCPPEEK - DCP Process Status

This program is used to "peek" at each SmartSync/DCP and verify that the various processes running in the co-processor are active. This utility is intended primarily for trouble-shooting purposes, but can be run at any time to check the status of BSC processes. The optional command line switch for **dcppeek** are described below:

-b *board* **Specific board number to peek at [1-6]**

The **-b** switch specifies which SmartSync/DCP **dcppeek** is to access. If you indicate the board number specify 1 through 6, as appropriate. The board number corresponds to the order in which they were configured. If omitted, **dcppeek** displays status of all boards found.

On Windows, **dcppeek** opens a GUI Window. On Unix, results are output to the current display. The following is an example of output from **dcppeek** on Unix after running **dcpload**:

```
SmartSync/DCP Peeker v4.x.x
Copyright (C) 1993-2002 Serengeti Systems Incorporated.
ALL RIGHTS RESERVED.

Total of 1 SmartSync/DCP adapter(s) found:

    Ports Available: 8
Memory Installed: 1024K
    Board Address: bfff7800
 Window Address: 80104000

BSC Emulation Downloaded

BSC Task Monitor Running
BSC Interrupt Clock Running

BSC Process #1 Not Running
BSC Process #2 Not Running
BSC Process #3 Not Running
BSC Process #4 Not Running
BSC Process #5 Not Running
```

```
BSC Process #6 Not Running
BSC Process #7 Not Running
BSC Process #8 Not Running
```

The results are repeated for each SmartSync/DCP found unless the -b switch is used to specify a specific board.

The BSC Processes can have the following states: Not Running, Running in IDLE State, Running in XMT State, Running in RCV State, and Not Running in IDLE State (this is an error state).

The BSC Task Monitor and Interrupt Clock should always be 'Running' during normal operation. If the BSC Task Monitor or Interrupt Clock is ever in the 'Not Running' state, you can run **dcpload** to reinitialize the SmartSync/DCP board. This is also true if one the BSC Processes is hung in one of the 'Running' states (i.e., **killbsc** is unable to return it to the 'Not Running' state).

Appendix J. DCPDUMP - Dump DCP Debug

This program is used to access the onboard memory and registers of SmartSync/DCP. This utility is strictly for diagnostic purposes and should only be used under the direction of Serengeti Technical Support.
There are no command line options for this utility program.

Appendix K. DCPDEBUG - DCP Debug

This program is used to access debug messages generated by SmartSync/DCP BSC processes. This utility is used strictly for diagnostic purposes and should only be used under the direction of Serengeti Technical Support.

The debug messages obtained by **dcpdebug** are automatically written to both the screen and a file. If you've configured one SmartSync/DCP, the default file name is **debug.***x* where *x* is the port number. If you've configured more than one, the default is **debug.***xy* where *x* is the port number and *y* is the board number. By default the output file is reset when it reaches 100,000 bytes. This enables **dcpdebug** to run continuously without overflowing disk storage. The optional command line switches for **dcpdebug** are described below:

-b *board* **Board number to debug [1-6]**

The **-b** switch specifies which SmartSync/DCP **dcpdebug** is to access. You must indicate the board number, 1 through 6, as appropriate. The board number corresponds to the order in which they were configured. If omitted, **dcpdebug** defaults to board 1.

-p *port* **Port number to debug [1-8]**

The **-p** switch specifies which of the SmartSync/DCP ports to monitor for debug messages. You must indicate the port number, 1 through 8, as appropriate. If omitted, **dcpdebug** defaults to monitor port 1.

-f *name* **Alternative debug file name (Unix only)**

The **-f** switch specifies a file, other than the default, to record debug messages.

-a *name* **Append to debug file name (Unix only)**

The **-a** switch appends debug messages to an existing file.

-m *size* **Maximum size of debug file (kilobytes)**

The **-m** switch changes the default maximum output file size. By default the debug file is reset when it exceeds 100,000 bytes. To change this default, specify the maximum file size in kilobytes (1,024 bytes).

-s Silent mode

The **-s** switch prevents **dcpdebug** from echoing debug messages to the screen.

-l Priority mode (Windows only)

The **-l** switch causes **dcpdebug** to run at a higher priority level. If the message "DEBUG TRACKING MESSAGES LOST" appears on the screen or in your debug output file when running **dcpdebug**, first try using silent mode. If silent mode does not prevent the messages from appearing, use priority mode. When using priority mode, be sure to run **dcpdebug** in the background to lessen the effect on other running processes.

Appendix L. DCPTRACE - DCP Trace Dump

This program is used to access the line trace buffers updated by SmartSync/DCP BSC processes. This utility is strictly for diagnostic purposes and should only be used under the direction of Serengeti Technical Support.

In other versions of BSCLIB, reading the trace buffer is done through a BSCLIB function call. With the SmartSync/DCP dumping of the line trace information is handled by running **dcptrace**. Your program is still responsible for initializing the trace buffer and turning the line trace on.

The trace data retrieved by **dcptrace** is automatically written to both the screen and an output file. If you've configured one SmartSync/DCP, the default file name is **trace.***x* where *x* is the port number. If you've configured more than one, the default is **trace.***xy* where *x* is the port number and *y* is the board number. By default the output file is reset when it reaches 100,000 bytes. This enables **dcptrace** to run continuously without overflowing disk storage. The optional command line switches for **dcptrace** are described below:

-b *board* **Board number to trace [1-6]**

The **-b** switch specifies which SmartSync/DCP **dcptrace** is to access. You must indicate the board number, 1 through 6, as appropriate. The board number corresponds to the order in which they were configured. If omitted, **dcptrace** defaults to board 1.

-p *port* **Port number to trace [1-8]**

The **-p** switch specifies which of the SmartSync/DCP ports to monitor for trace data. You must indicate the port number, 1 through 8, as appropriate. If omitted, **dcptrace** defaults to monitor port 1.

-f *name* **Alternative trace file name**

The **-f** switch specifies a file, other than the default, to record trace data.

-a *name* **Append to trace file name (Unix only)**

The **-a** switch appends trace data to an existing file.

-m *size* **Maximum size of trace file (kilobytes)**

The **-m** switch changes the default maximum output file size. By default the trace file is reset when it exceeds 100,000 bytes. To change this default, specify the maximum file size in kilobytes (1,024 bytes).

-s **Silent mode**

The **-s** switch prevents **dcptrace** from echoing trace messages to the screen. On Windows, this option will decrease CPU utilization of the program. Also on Windows, this option can be enabled by unchecking the “Echo to Screen” checkbox under the “Options” menu.

Appendix M. XRESET – Reset SyncPCI Device Driver

This utility only applies to applications on Unix using the SyncPCI adapter. When an unexpected termination of **emubsc** leaves the XBSC Device Driver in an unresponsive state, use the **xreset** utility to close all devices associated with BSCLIB and reset the internal line trace buffer. This usually restores the XBSC Device Drivers to a working state.

WARNING: Running **xreset** will disconnect all active BSCLIB sessions.
The optional command line switches for **xreset** are described below:

-f Forced reset

The **-f** switch forces a driver reset when xreset indicates the driver is in use.
If you encounter XBSC Device Driver related errors when loading your BSCLIB application, run **xreset** and then reload you application. If the problem persists, reboot your system.

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