

**amuw**

<b>COLLABORATORS</b>
----------------------

	<i>TITLE :</i> amuw		
<i>ACTION</i>	<i>NAME</i>	<i>DATE</i>	<i>SIGNATURE</i>
WRITTEN BY		July 25, 2024	

<b>REVISION HISTORY</b>
-------------------------

NUMBER	DATE	DESCRIPTION	NAME

# Contents

<b>1</b>	<b>amuw</b>	<b>1</b>
1.1	Multilink Documentation . . . . .	1
1.2	Mlink/Description . . . . .	2
1.3	Multilink/Installation . . . . .	2
1.4	Multilink/Configuration . . . . .	3
1.5	Multilink/Operation . . . . .	5
1.6	Multilink/Menu options . . . . .	5
1.7	Multilink/ARexx port . . . . .	6
1.8	Multilink/Interface options . . . . .	6
1.9	Multilink/Advanced options . . . . .	7
1.10	Multilink/Troubleshooting . . . . .	8
1.11	Multilink/TODO . . . . .	10
1.12	Multilink/History . . . . .	11
1.13	Multilink/Shareware . . . . .	14
1.14	Multilink/Napsaterm . . . . .	15
1.15	Multilink/Disclaimer . . . . .	15
1.16	Multilink/Author . . . . .	15
1.17	Multilink/Credits . . . . .	16

# Chapter 1

## amuw

### 1.1 Multilink Documentation

Multilink

by Ezra Story

(Release 1 Copyright (c) 1994, 1995)

Introductory information.

Description	Mlink? Whats that?
Disclaimer & License	Don't look at me...
Shareware	Pizza money.

How to get started.

Installation	Building it.
Configuration	Setting it up.
Operation	Using it.

Oodles of options.

Menu options	Decisions, decisions.
User interface options	Aw, how cute.
Advanced options	For the tweakers.
ARexx port	For script writers

Common complaints and problems.

Troubleshooting	Problems?
-----------------	-----------

Supplied programs and utilities

Napsaterm	Shell
-----------	-------

Random comments and information.

Contacting the Author	Ezril? Ezic? Erza?
In the future	To do.
In the past	Was done. :-)

Credits

Helpful people...

## 1.2 Mlink/Description

What is Multilink?

=====

Multilink (or Mlink) is a package which simulates a direct connection to the internet. If you have an account on a UNIX machine connected to the internet, you can run Multilink on the UNIX machine and your Amiga, and Multilink will allow you to use all those wonderful Amiga networking applications such as Grapevine, DaFTP, telnet and Amosaic without having to have a real SLIP or PPP connection. Multilink emulates both AS225 and Amitchp, so you do not need to run either of these protocol stacks to use multilink.

Multilink requires at least AmigaDOS 2.1 and an account on a UNIX host connected to the internet.

Note: Multilink works at the presentation layer, not at the transport layer of TCP/IP. That means if you are currently using AS225 or AmiTCP to network an Amiga to other machines locally, Multilink won't work with it (although it will work along side of it -- see the advanced options section.) This is one case where I recommend either TIA or a real IP connection.

## 1.3 Multilink/Installation

Installation procedure

=====

You need to install one half of multilink on the UNIX host you dial into and the other half on your Amiga.

On the Amiga:

Put "mlink" and "mlink.info" somewhere where you can find them.

On your UNIX host:

If it's not there already, upload "mlink.tar.gz" to your UNIX host.

Type "gunzip mlink.tar.gz" to uncompress the tape archive.

Type "tar -xvf mlink.tar" to extract the files from the archive.

(If your host has GNUtar, you can substitute "tar -zxvf mlink.tar.gz" for the above two steps.)

Build the UNIX-side executable by entering the newly created

"mlink" directory ("cd mlink") and typing "sh buildmlink".

It should churn for a bit, print lots of stuff and eventually pump out an "mlink" executable in that directory. This executable is the only thing you need for the UNIX side. You may delete the rest after it has compiled.

If for some reason it failed to build the mlink executable, please refer to the troubleshooting of this document.

Once everything is in its proper place, you need to configure Multilink to work properly with your particular setup.

## 1.4 Multilink/Configuration

### Configuration

=====

The easiest way to configure Multilink is to edit the tooltypes in its icon. However, if you wish, you can also specify these options on the commandline when starting Multilink from the CLI.

The first thing you need to take care of are the parameters for the serial port. Load up the preferences editor (sys:prefs/serial), and make sure the settings are the same as what you normally use in your terminal program. If you use a bps rate greater than what preferences allows, don't worry, just set it to 19200. Make sure everything else is correct however. Then edit Multilink's tooltypes:

#### DEVICE

The name of the serial device you use. Multilink defaults to using "serial.device".

#### UNIT

The unit of the serial device to use. Multilink defaults to 0.

#### BAUD

The bps rate to use on the serial port. Multilink defaults to using the rate you set in sys:prefs/serial.

#### CTSRTS

If this is specified, Multilink will use CTS/RTS handshaking. Again, by default, Multilink will use it if you have set it in sys:prefs/serial as well.

#### HISPEED

If you're using 8bit no parity, you should probably turn this on. It activates a lower-overhead mode in the C= serial.device for 8n1 ports.

#### FORCECD

If you have a wierd wiring on your serial port (ie. direct connect) you may need to set this option to make Multilink ignore the state of the carrier line on the port.

---

Then you have to tell Multilink about the characteristics of the data path from your Amiga to the UNIX host.

#### CPS

Set this the the average characters per second you typically get over your connection to the UNIX host on a Zmodem download or upload. This is an important option! Set it too low, and your speed will suffer. Set it too high, and interactive response will suffer. As an example, the typical setting for a 14.4kbps v42bis link is about 1500 or 1600. If you leave this unspecified, Multilink will default to 3840 (which is probably wrong for you :-)).

#### ESCAPE

This option tells Multilink what bytes NOT to send over the link. This is intended to support connections which are not "8bit clean" -- that is, they cannot send all the characters 0-255 across the link. The parameter is formatted as follows:

A colon (:) follow by a two digit hexadecimal number specifies a single character which is not to be sent over the link. ie `":1b:41"` tells mlink not to send the characters `^["` and `'A'` over the link.

A dash followed by a two digit hexadecimal number specifies a range of characters that Multilink is not to send. The range extends from the previously specified character to the character currently indicated. ie. `":1b:41-45:7f"` tells Multilink not to send `^["`, `A` thru `E` or the `DEL` character over the link.

A single asterisk (\*) as the parameter enables a special mode which can be used on connections which only allow the printable character range to be sent over them. This mode is used by default if you use Multilink over a 7-bit connection.

A single zero (0) as the parameter tells Multilink that the line is perfectly 8bit clean. Multilink will be able to send all characters from 0 to 255 over the link. This mode is the default if Multilink is used over an 8bit connection.

Note that the more characters you escape, the slower Multilink becomes.

Then you have to tell Multilink how to start "mlink" on the UNIX side.

#### UNIXSTARTUP

This should be set to the command line you would use to start mlink on the UNIX host. ie. If you keep mlink in your home directory, it should be `"~/mlink"`, or if you keep it in a bin directory in your account it might be `"~/bin/mlink"`. Multilink defaults to using just `"mlink"`, which will usually work if the mlink executable is in your search path on the UNIX host.

---

## 1.5 Multilink/Operation

Operation  
=====

Assuming you have installed and configured Multilink properly, starting it is a breeze. Simply login to your UNIX host, quit your terminal program and start Multilink. After a few seconds, its status window should pop up.

Note: if your modem hangs up on you when you exit your terminal program, you need to set it to ignore DTR before calling your host. For Hayes modems, the command is "AT&D0". It is recommended that you save this as your default configuration in the modem.

After Multilink is started, you can use almost any AS225 or AmiTCP application you want. I recommend that you install the AmiTCP package however. Although you will not need to run AmiTCP, some AmiTCP applications require files and libraries from the AmiTCP distribution.

## 1.6 Multilink/Menu options

Menu options  
=====

Multilink has a small menubar with one menu -- "Mlink".

About Multilink..

A small about requester pops up showing version and copyright information.

Iconify (Amiga-I)

This will reduce the Multilink status window to an icon. Double-clicking on the icon will bring the window back again.

Disconnect Clients

This will disconnect all the sockets that Multilink has open. It is a quick way to "unstick" any clients which may have become stuck on a socket. If you need to be more specific, look into using the DISC command on Multilink's Arexx port.

Quit Multilink (Amiga-Q)

This is the same as clicking on Multilink's close gadget. It

---



will attempt to shutdown Multilink.

## 1.7 Multilink/ARexx port

ARexx port  
=====

When Multilink starts, it opens an ARexx port named "MLINK" where it can accept a set of commands.

STAT

This command puts a "netstat"-like status output in the ARexx RESULT variable with each socket and its status.

DISC [socket number]

This command allows you to disconnect specific sockets. The socket number comes from the status display output by STAT.

REQOFF

This turns off all of Multilink's requesters. The default action will be taken in all cases.

REQON

This turns Multilink's requesters back on.

QUIT

This is the same as the Quit menu option, or the close gadget on Multilink's window. It will cause Multilink to attempt to exit, putting up the confirmation requester.

QUITNOW

This is the same as QUIT except it will not attempt to confirm the quit using a requester, but will just forcibly quit instead. Watch out, if you have clients running, Multilink will pull the libraries right "out from under them" so to speak.

For a couple of examples of ARexx scripts which use Multilink's ARexx port, check the Rexx directory in the Multilink archive. "Mlstat" is a script which uses the STAT command to get a status display of open sockets. "Mldisc" is a script which allows you to selectively disconnect sockets in Multilink.

## 1.8 Multilink/Interface options

Interface options  
=====

Multilink has several tooltypes which allow you to alter minor aspects of its user interface.

WINTOP

---

**WINLEFT**

Use these to specify the starting position of the Multilink status window.

**PUBSCREEN**

Set this to the name of the public screen you want Multilink's window to open on. Multilink defaults to opening on the default public screen.

**ICONIFY**

Specify this if you want Multilink to start up iconified.

**MINIMIZE**

Specify this if you want Multilink to start up with just a titlebar (minimized).

## 1.9 Multilink/Advanced options

### Advanced options

=====

You can use these tooltypes to alter various lowlevel aspects of Multilink's behavior. I suggest that if you're not sure what these are for or what they do, that you do not mess with them. Most of them are not going to make Multilink any faster. In fact, most of them will make it slower, and are intended for special circumstances.

**UNIXCPS**

This is exactly the same as the CPS option except it refers only to the speed of data from the UNIX host to your Amiga. Multilink defaults to using the same pacing speed in both directions. If you need to have a differing speed in each direction, then use CPS for Amiga->UNIX and UNIXCPS for UNIX->Amiga.

**TIMEOUT**

Sets the timeout period for packets. The default is based on the pacing speed you use. If you're getting a lot of resent packets, it might behove you to set the timeout to a high value. If recovery after a bad packet takes a long time, you might want to set it lower.

**PACKETSIZE**

Sets the maximum packet size. The default and true maximum is 2047. You may set the packet size anywhere from 1 to 2047.

**SERVFILE**

Specifies a file from which to look up inet service names before asking the UNIX host. Multilink defaults to just asking the remote UNIX host for the names and ports. This option is used to allow custom service names, so that one can run daemons launched by inetd with Mlink.

**NOREQ**

Equivalent to the ARexx command. This turns off all of Multilink's requesters.

**NOAS225**

Makes Multilink NOT add the AS225 socket.library emulation to the system.

**NOAMITCP**

Makes Multilink NOT add the AmiTCP bsdsocket.library emulation to the system. This and the above option are used if you happen to have a real protocol stack setup, and want to use it at the same time as using Multilink. Specifying both of these options makes Multilink completely useless.

## 1.10 Multilink/Troubleshooting

**Troubleshooting**

=====

This is a list of common problems encountered with Multilink, and (perhaps) solutions to those problems. :-)

**Compilation of the Multilink UNIX side**

- \* The build fails with errors in the include files such as "sys/types.h:62 syntax error before char".

Edit the makefile and remove "-traditional" from the "CC=gcc" line, then type "make". That might coax it to work.

- \* The build fails with any other error.

Email me with the name of the UNIX you're using, a copy of the output of the build and a copy of "make.err".

**Startup problems**

- \* The UNIX Multilink is "not responding" according to the Amiga Multilink.

The tooltype UNIXSTARTUP is probably set wrong. Make sure it points at the mlink executable on the UNIX side. Another possibility is that you serial settings for sys:prefs/serial in combination with the ones you have for multilink are not the same as what you normally use in your telecommunications program.

- \* It aborts at "Getting remote info...".

That's usually the result of a bad line. See "Problems with the serial line" further on in this section.

- \* It puts up a requester complaining that no serial carrier was detected.
-

Your modem (or cable) may not be asserting the CD line on carrier detect. The quick way to solve this is it to use the FORCECD tooltype to make Multilink think carrier is always on. However, you should change your modem's settings so that it makes the CD line on your serial line follow the true state of the carrier. The standard hayes command is AT&C1.

- \* It tells me "Invalid arguments".

You've either specifcied the wrong tooltype or command line argument. Check the arguments or tooltypes in the icon and try again.

#### Shutdown problems

- \* I started the UNIX MLink manually by accident, or the UNIX MLink was still running on my system when I quit the Amiga MLink. How do I quit it without hanging up?

Send it about 6-10 @'s in a row. (@@@@@@@@@@)

#### Problems with the serial line

- \* I get tons of resends and bad packets from Multilink. What can I do to correct this?

The most likely problem causing this is that your line is not 8-bit clean. To find out whether this is the case, try using "ESCAPE \*" as an option. If your problems clear up, you need to either find out which characters specifically are being eaten by your line and use the ESCAPE tooltype as described in the configuration section to take them out, or alter the settings of your terminal server to give you an 8bit clean line.

Common commands to terminal servers to put them in an 8bit clean mode include "terminal download" or "set session passall". You will have to check the online help for your server at the server prompt to find out exactly how to do it. Some servers support using either the telnet or rlogin protocol to connect the UNIX host. You may want to experiment with trying each of these transport protocols in order to get an 8bit clean connection.

If "ESCAPE \*" doesn't clear it up, then what also may be happening is that your terminal server may not be able to handle the bidirectional load that Multilink puts upon it. Try adjusting the CPS parameter to a slower pacing rate and see if that helps the problem any.

#### Common ESCAPE settings:

for unix telnet	:1d:9d
for unix rlogin	:7e:fe
^^	:1e:9e
^x	:18:98

DEL :7f:ff

- \* The Multilink shell client, rlogins or telnets seem really slow and jerky.

Some jerkiness is to be expected. But if you're experiencing more than a second of lag between when you type and when text pops up on the screen, you may need to adjust your CPS value down a bit so that Multilink is pacing the speed properly.

#### Problems with clients

- \* When I attempt to use "rlogin" with Multilink, I just end up in my account. Why?

Rlogin can never be supported directly by Multilink because rlogin requires that you have a real IP connection for it to work. Therefore, Multilink does the best that it can, and redirects any attempted connections to rlogind to its own internal shell client.

- \* I've been trying to use Multilink with Grapevine, an Amiga IRC client, but every server I try to connect to boots me off. Why?

You must use your real username and host address in the network configuration options in Grapevine. If you do not, IRC servers which use identd to verify you will fail to authenticate you, and kick you off.

- \* Ncftp for AmiTCP doesn't work.

This is either a bug in Multilink (most likely) or an undocumented assumption ncftp is making about AmiTCP. I haven't figured it out yet. Meanwhile, grab the old version of ncftp off of Aminet (aminet:comm/tcp/AmiTC\_ncftp156.lha) and use that.

- \* I tried using <insert AmiTCP app here> and it asks for "usergroup.library". Where is it?

usergroup.library is part of the AmiTCP distribution. You can grab it by getting the complete AmiTCP 4.0 distribution from aminet.

## 1.11 Multilink/TODO

TODO

====

These are things I may gradually add to Multilink over time. Some of them are easier to add than others, and may end up being moved from here into the History list :-).

Bugs I need to fix

---

The newer ncftp's for AmiTCP fail to work.

HP/UX, IRIX ptys sometimes fail to work.

Noone's gotten an inetd launched ftpd to work.

The unix side eats WAY too much cpu for my taste..

#### Internal protocol & API

Autoadjustment of both the CPS pacing rate, and the packet timeout constants.

Fix up the current error correction scheme to be even more robust -- add more checks for headers, acks and data.

Give user a way to turn off a lot of the error correction (if they've got a real good connection) to get rid of the overhead.

Allow abort of inprogress connection attempts

Allow mlink amiga to take itself off the serial line, keeping the clients attached, then reinitialize itself and the unix mlink when put back on.

Implement sendmsg & recvmsg

#### User interface stuff

##### Localization

Where's that listview! :-) A list of all active clients, sockets they have open, and all sorts of stats. Allow disconnection of individual clients and perhaps individual connections.

rlogin.device for serial clients.. someone want to write this? It would be useful to more than just mlink users.

a dialin script language and/or simple terminal program

#### Pie in the sky

An internal SANA-II device for mapping raw TCP/IP to the mlink protocol. This will probably never happen for Multilink in its current state however. If I did that, you would be better off running a real protocol stack.

## 1.12 Multilink/History

### History

=====

0.194 - 9/6/94

---

AmitTCP emulation. UNIX side now does connect() asynchronously so clients won't hang everyone else.

0.195 - 9/7/94

fixed longstanding bug in s\_(Host/Serv)By(Addr/Name/Port) which made clients like ftp bug out and connect to localhost (and sometimes hit) if an invalid hostname was supplied.

0.200 - 9/7/94

added SIGIO support. (napsaterm is now much more responsive)

0.203 - 9/7/94

now checks for socket descriptors values which are out of range. misc cleanup on the unix side. fatal errors in the pty client fixed (it would core dump the whole unix side)

0.204 - 9/10/94

now does an automatic line check for bad characters on startup. Might be slow for 2400 users, but its worth it. :-) MLINKPARMS has now become UNIXSTARTUP (still works the same way however)

0.206 - 9/11/94

automatic line check removed (it only worked on good lines -- pretty lame huh?). the syntax for ESCAPE has changed drastically, please see the README file.

0.212 - 9/11/94

Now does Obtain/Release/CopyOfSocket properly, including nonunique "port" numbers. Now does FDcallback() for Amitcp 3.0. NOW WORKS WITH AMITCP3.0 PROGRAMS! (yeah! :-)). The only thing you need is usergroup.library.

0.213 - 9/15/94

Small internal bug fixed related to s\_close(CloseSocket()). Solaris bug fixed!!! yah! :-)

0.233 - 11/20/94 (yes, I've been busy)

Errno codes for 0 disconnect on read. Write fdbit not set until socket is connected (or is a dgram socket).

Error correction changed to ACK'ing packet based protocol. A tad slower than the previous protocol, but it should recover MUCH better.

The window now zips to a titlebar.

couple minor bug fixes on the UNIX side. Including a fix to the CPU time delay and a possibly incomplete write to the tty.

---

0.236 - 12/15/94

Recovery bug in ACK'ing protocol fixed.

0.237 - 1/23/95

Added TIOCSCTTY to openpty.  
New window position tooltypes (WINLEFT, WINTOP)  
Now reports specific packet errors on amiga side  
Dup packets are now ack'ed if they correct  
packet window increased to 16  
unistd.h added to include list  
packet markers changed to complements  
zipped mlink window is smaller

0.238 - 1/29/95

openpty now chdir's to the home dir  
packet window size checks were wrong, fixed  
new keyword for setting unix side output rate (UNIXCPS)  
new keyword for manually setting packet timeout (TIMEOUT)  
stupid error in rawdofmt output fixed  
uninitialized accept() data size in ptyclient.c fixed  
connections attempted to an rlogin port on the remote host  
will be vecotred to the ptyclient. (was in here earlier, but  
I forgot to mention it).

0.243 - 2/12/95

ok, rlogin REALLY works now :-)  
added an extra error message for excessive garbage data  
new tooltype for maximum packet size (PACKETSIZE)  
added minimal hack that might make dcc.send work better  
now has a minimal menu strip...  
some load reducing methods added to unix side  
requester format and order changed somewhat..WATCH OUT!

0.246 - 3/1/95

rewrote portion of writetask code in hopes of fixing dcc  
freeze bug.  
added bytes display in mlink titlebar  
window now opens in center of screen by default  
added -traditional to cflags for gcc

0.248 - 3/7/95

EINVAL bug fixed on sysv machines  
connect now uses a REAL timeout (fixes above bug)  
remote errno's now mapped to amiga ernnos (gack!)

0.254 - 3/10/95

PUBSCREEN tooltype added  
window postion tooltypes fixed (they were broken in 246)  
iconification

---



ICONIFY tooltype added for iconification on startup  
some misc unix side compilation fixes.

0.257 - 3/11/95

Abort of "Getting remote info..." now works.

1.1 - 3/14/95

Release. (gack, and still there's things to fix :-))

1.30 - 4/22/95

The ptyclient now supports the rlogin resize protocol.  
MSG\_PEEK support added  
Should compile ok on linux systems now  
major bug in inet\_addr fixed  
major bug in gethostbyaddr fixed  
beginnings of status report added  
fix for rebound sockets & reuseaddr  
dcc freeze bug fixed! (I hope :-))  
bug relating to icon/window management between takss fixed  
OSF/1 job control in pty restored.. osf pty "bug" found..  
detects a few more things in buildmlink script  
better dir layout -- installer!  
an attempt was made to reduce cpu usage on the unix side...  
arexx port  
extra checks for cd on startup  
ptyclient incorporated into main loop, no more unix domain sockets  
a start at SCO compat  
removed one copy step, a bit faster

1.32 - 4/23/95

The send window was too large in the packet ec routines

## 1.13 Multilink/Shareware

### Shareware Information

=====

Multilink is uncrippled shareware. That means if you like the package, and use it, you have to send me \$25. If you hate the thing, and hardly ever touch it, you don't.

The fee gives you a clear conscience, a higher priority status when it comes to support and my undying gratitude. You'll also be notified of new revisions by email when they are released. (Sorry, I ran out of pens & keychains :-))

The fee is 25 US dollars in the form of US currency, a bank or postal money order drawn in US funds, or a certified check drawn in US funds. I cannot accept personal checks, sorry.

Send the fee, along with your full name and email address to the

---

address listed in the Author section of this document. You will receive an email message from me as a receipt.

## 1.14 Multilink/Napsaterm

Napsaterm  
=====

Included in the Multilink archive is a version of napsaterm modified by Osma Ahvenlampi to use Multilink's internal shell client. With the supplied configuration file 'napsaprefs', simply starting napsaterm should open up a shell in your account through Multilink.

## 1.15 Multilink/Disclaimer

Legal Mumbo Jumbo  
=====

The Multilink package is Copyright (c) 1994, 1995 by Ezra A. Story. The package is freely redistributable subject to the following limitations. The package may not be distributed in any form other than the original archive released by the author, the package may not be distributed as part of a commercial distribution package of freely distributable software. Distribution of this software which violates this license is prohibited without the prior written permission of the author.

This software is provided "as is". No warranties are made, either expressed or implied, with respect to the reliability, quality, performance, or operation of this software. The use of this program is at your own risk. The author assumes no responsibility or liability for any damage or losses resulting from the use of this software.

## 1.16 Multilink/Author

If you want to contact me, just use one of the methods given below. If you email me about Multilink, be sure to put "mlink" or "multilink" in the subject header, otherwise you may never hear back from me. (I get a LOT of email)

EMAIL  
ezy@panix.com

IRC  
Ezy

SNAIL MAIL  
Ezra Story  
P.O. Box 741  
JAF Building

New York, NY 10116

## 1.17 Multilink/Credits

Acknowledgements

=====

Of course, I must thank my beta testers (in no particular order):

Heikka Kantola

Osma Ahvenlampi

Timothy Aston

Seth Harman

Darren Eveland

Ken Krebs

Robert Reiswig

uhm.. and lots of other people.

(if you were a beta tester, and want to be in this list, email me :-))

(yes, my bookkeeping sucks... :-))

The program icon & the napsaterm port are by Osma Avenlampi.

The archive layout and extra icons are by Ken Krebs

The installer script is by Robert Reiswig