magplip

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Chapter 1

magplip

1.1 magPLIP

magPLIP – SANA II device driver parallel IP – Written by Marius Gröger.

This software requires AmigaOS 2.0 (V37) or higher.

INTRO

    Upgrade Information   PLEASE READ THIS IF YOU'RE UPGRADING
    Description   Why You need it!
    Features   All in one glance
    Requirements   What you need

GETTING STARTED

    Installation   What's needed to be done
    Wiring   The hardware side

OPTIONS

    Configuration   Options offered by the configuration file

PROBLEMS, QUESTIONS AND CAVEATS

    Caveats   Caution!
    Troubleshooting   Doesn't it work properly?
    Bugs   Known Bugs

LAST WORDS

    Future plans   Things I should perhaps lay my hands on
    History   What's been done already
    Copyright / Authors   Legal stuff, credits, my addresses

1.2 magPLIP - Upgrade Information

Upgrade Information

Please read this section carefully if you have some older revisions of PLIP
or magPLIP installed. Especially users who currently work with magPLIP 37.2
or older should take care for some configuration changes.

PLIP 38.xx users should read the complete document from it's top to the end.

 Upgrading from the old PLIP
 Upgrading from ParNET
 Upgrading from magPLIP releases 37.1 or 37.2
 Upgrading from magPLIP releases 37.3 or 37.4

1.3   magPLIP - Upgrading from the old PLIP

Upgrading from the old PLIP

There might be a little confusion about the various PLIPs floating around.
magPLIP was derived from PLIP 38.12 and has virtually been completely
rewritten. Today both packages are in no way compatible, only the cable
wiring is identical. So you may switch between both networks and check out
which one suits your needs at best. If can't make up your mind, I would
like to recommend magPLIP to you:

·~it is updated quite regularly

·~the work of several people coordinated by one guaratees a high level of
  functionality and fittness for it's purpose

· it is extensively documented

Don't worry about version numbers. On the Amiga, device driver version
numbers should reflect the operating system requirements. As a SANA-II
device only needs a 2.04 system, magPLIP sticks to a 37.x version number. I
really don't know why the original version used 38.x.

Both the old PLIP and magPLIP retrieve some of their run-time configuration
from a preferences file located in the drawer "ENV:Sana2". To avoid any
confusion with the old PLIP, I renamed not only the device's name to
magPLIP but also the name of this configuration file. Thusly, magPLIP
will only try to read the file "ENV:Sana2/magPLIP.config".

1.4   magPLIP - Upgrading from ParNET

Upgrading from ParNET

ParNET is a stand-alone minimal network that allows to mount remote devices
such as floppys, harddisks, etc. on a local machine.

It has nothing to do with any PLIP version ever been made for the Amiga.

ParNET's cable wiring differs from magPLIPs! Don't use ParNET cables
with any PLIP version, or your computer's parallel port may be damaged!

I highly recommend to de-install ParNET and to install a TCP/IP package
such as AmiTCP/IP or AS225R2 and magPLIP. This will also let you do
ParNET-style remote device mountings, and in addition it will give you the
full power of the world of internet.

1.5 magPLIP - Upgrading from magPLIP releases 37.1 or 37.2

Upgrading from magPLIP releases 37.1 or 37.2

The configuration file format has slightly changed with release 37.2 regarding
the meaning of the TIMEOUT parameter. Additionally, the old parameter
ARBITRATIONDELAY is still supported but not longer used.

The TIMEOUT is now a real time value to be given in micro-seconds. This
gives the user a better control over the device's timeout behaviour as
well as making configuration file copying to other machines easier.

1.6 magPLIP - Upgrading from magPLIP releases 37.3 or 37.4

Upgrading from magPLIP releases 37.3 or 37.4

No problems should occur if you already use magPLIP 37.3 or 37.4. The
configuration file format has not changed. The documentations has undergone
some minor changes, reaching from correcting spelling errors to adding a
few new sections. Read it if you have the time to do, ignore it if you are
already happy with your set-up.

Note that release 37.4 introduces the ability to use MTUs higher than 8192.
The maximum MTU (no pleonasm :-) is now 128KBytes.

1.7 magPLIP - Description

Description

What is PLIP ?

PLIP means Parallel Line IP, and means to run an IP network over the
parallel port of a computer. However, IP is only the most popular sort
of network which PLIP may be used for. In fact, as all other SANA II
devices it is not bound to a particular protocol stack, and it is quite
imaginable to run an Internet protocol and, for instance, an Appletalk
protocol over the same line.

To avoid confusion with other PLIP releases which can be found on Aminet
I named my version magPLIP, referring to the initials of my name.

1994 saw the last release of the original Amiga PLIP device, which was
written by Oliver Wagner and Michael Balzer. I was not fully satisfied
with this last release, and so I was happy to have the source code and

started rewriting it. The deeper I crept into the source, the more of
the original code was thrown out. magPLIP is compatible to the
original regarding the cable wiring. However, it is not compatible in
the sense that it can communicate with machines that have the old PLIP
installed. You need to replace older PLIP-software in order to
successfully run magPLIP.

The original documentation of the plip.device published by Oliver Wagner
and Michael Balzer reads:

> "PLIP is a network device driver conforming to the
> SANA2 standard. It allows linking of two Amigas using their
> parallel ports. [...] The complete low level transfer
> protocol is integrated in the device driver, including port
> arbitration handshaking and interrupt driven reads.
> Although the transfer process itself is cpu intensive, the
> device needs no cpu resources when no transfer is in
> progress.
>
> PLIP is intended as a low-cost networking solution, since
> the capabilities of the parallel hardware are somewhat
> limited. However, it gives much better results than SLIP
> and leaves the serial port free."

This gives a quick impression what PLIP and magPLIP are intended for.

Support for slow Amigas

My version of PLIP has been written also keeping an eye on the employment
of slow, MC68000 based Amigas. (I believe I'm not the only person who
wants to blow again a bit of life in his old computer.) It seems to me
that the other PLIP releases had some difficulties in this field, mainly
arising out of badly chosen system thread priorities.

Starting with release 37.2, the low-level transfer routines are written
in assembly language. This gains another 25% speed improvement. The
conversion to assembly was done by Jan Kratochvil and Martin Mares.

1.8 magPLIP - Features

Features

· Much more line security through machine independent timeout handling

· Compatible with original wiring

· MTU configurable up to 128KBytes

·~Works fine also with 68000 based systems

· Slightly changed protocol, allowing to be more flexible and extensible

· Option to omit CRC checks

· Much better configurable then the original

· Major code cleanup, including the removal of assembler fragments,
  globals, errors

· Several protocol stacks may use magPLIP simultaneously

·~Distributed as Freeware, complete source code is supplied

1.9   magPLIP - Requirements

Requirements

· AmigaOS Release 2.04 or better

·~A networking package using the SANA-II network device interface. Suitable
  network packages include AmiTCP/IP, Envoy, and AS225R2.

·~2 Amiga computers to be connected via magPLIP. A PC will NOT do as an
  network node, see here why.

1.10   magPLIP - Installer Script

Actions taken by the Installer-script

Copy the device code to the proper place:

    AmigaShell> copy DEVS/Networks/magplip.device AMITCP:DEVS/Networks/

Then copy the configuration file to it's places:

    AmigaShell> copy ENV/Sana2/magPLIP.config ENVARC:Sana2/
    AmigaShell> copy ENV/Sana2/magPLIP.config ENV:Sana2/

Finally, you may want to copy the documentation somewhere. Simply drag
it's icon where you want to.

1.11   magPLIP - Installation

Installation

Installing network drivers is really no fun, as you might already know.

Rather than writing an installer script with artifical intelligence I
decided to split the installation procedure into the installation of the
binaries and a manual part.

The first part is best done by the supplied installer script. If you
still want to do the installation manually then follow the steps
described herein.

The second part must be done by hand. As I guess the only hands around
currently are yours, follow these steps:

I explain here what to do if you want integrate magPLIP in an AmiTCP/IP
Release 4 based network. Other network packages and older AmiTCP/IP
releases will require similar actions to be done. Please consult the
according user manual to find out what you should do in such cases.

On both systems you want to connect, load the file AMITCP:db/interfaces
into you favorite text editor. Add the following lines:

```
    magplip0 DEV=AMITCP:DEVS/Networks/magplip.device UNIT=0 P2P NOARP ...
                                            WRITEREQ=32 IPREQ=32
    magplip1 DEV=AMITCP:DEVS/Networks/magplip.device UNIT=1 P2P NOARP ...
                                            WRITEREQ=32 IPREQ=32
```

Don't type in the ellipsis, instead concatenate the lines to one.

This tells AmiTCP/IP that there are two PLIP devices, only one of which
you will actually use, however.

To tell AmiTCP/IP which interface you want to use, load the file
AMITCP:bin/startnet into you favorite text editor. Search the
line where the default value for the parameter "IFACE" is set. It should
look like this:

```
    .def IFACE slip0
```

On one of your systems, change this line into

```
    .def IFACE magplip0
```

On the other system, change this line into

```
    .def IFACE magplip1
```

It is of absolutely no matter which one you assign which magplip unit.
The only really important thing is that you must use both units, if you
use the standard PLIP wiring as introduced by the orignal
authors, and which I recommend for compatibility reasons and safety.

It is possible that PLIP doesn't immediately work correctly ith your
system configuration. If this is the case, please read the
 Configuration section. There you will find a lot of items you may
use to adapt PLIP to your system.

1.12   magPLIP - Wiring

Wiring

In order to establish the physical connection between your Amigas, you
will have to create a special wire. Do this very carefully, as a little
fault may destroy your parallel port hardware.

On all Amiga models except the Amiga 1000 you need a male DB25

connector.

On an Amiga 1000 you need a female connector.

The cable length should not exceed 4 meters.

```
    System 1         System 2
    ----------------------------
    D0-D7            D0-D7
    BUSY             BUSY
    POUT             POUT
    GND              GND
    ACK              STROBE
    STROBE           ACK
```

You can look up the pin assignment in your Amiga User Manual, Appendix A.
Note that this cable differs from ParNet ! Double check before
using!

You may also cross the BUSY and POUT lines, in this case you must use the
same magPLIP unit on both sides. However I don't recommend this,
as you gain nothing by this.

1.13   magPLIP - Configuration

Configuration of magPLIP

After being started, magPLIP reads it's configuration file located in
ENV:Sana2/magPLIP.config. This file should consist of a single line on
which the following standard AmigaDOS template is applied:

```
    TIMEOUT/K/N,PRIORITY=PRI/K/N,MTU/K/N,BPS/K/N,RETRIES/K/N,
        SENDCRC/S,CD=COLLISIONDELAY/K/N,AD=ARBITRATIONDELAY/K/N
```

TIMEOUT (optional keyword argument / number)
   PLIP polls the parallel port while transmitting or receiving any data
   byte. This value lets you specify after how much micro-seconds any
   transfer should be considered to be failed. magPLIP will abort it
   immediately and report a line error to the upper network layer (e.g.
   AmiTCP/IP). This parameter is good toy for peoply tracking down
   network errors.

   Defaults to 500000 $\mathrm{\mu}$s = ½ s.
   Minimum is 500 $\mathrm{\mu}$s.
   Maximum is 999999 $\mathrm{\mu}$s.

PRI=PRIORITY (optional keyword argument / number)
   Priority of the PLIP server task. A high value will decrease response
   times for communication. On 68000 based systems this should be a
   higher value than 20, otherwise some intuition actions such as window
   movement could make the driver miss packets.

   Defaults to 0.
   Minimum is -128.
   Maximum is 127.

MTU (optional keyword argument / number)
    Maximum-Transfer Unit. Must be the same for both communication ends!
    This value is the largest packet size which can be transmitted in one go.

    It is important to understand the role of the MTU correctly. The upper
    network layer (typically an Internet Protocol), is responsible to
    create a series of packets out of the data which has to be
    transmitted. Therefore, IP ``knows'' the MTU of the network interface
    and creates appropriate packets. Choosing the ``right'' MTU depends in
    some way of your intended application. Simple internet services such
    as telnet, rsh or ping won't be affected by a large MTU, because the
    packets which are used for these protocols all fit into 1 or 2
    KByte-Packets.

    However, if you use one system, say, as a file-server using NFS, the
    Amiga netfs, FTP, or an HTTP server, there will be the need to transfer
    larger blocks of data. A higher MTU is in this case recommendable.

    Defaults to 1024.
    Minimum is 256.
    Maximum is 128KB.

BPS (optional keyword argument / number)
    A dummy Bit-Per-Second value reported to SANA-2 user when being asked
    for it. Quite useless, I guess, but left for compatibility.

    Defaults to 100000.
    Minimum is 1.
    Maximum is 2^32-1.

RETRIES (optional keyword argument / number)
    Number of repeations when a arbitration error is detected.

    Defaults to 32.
    Minimum is 1.
    Maximum is 127.

SENDCRC (Switch)
    If you want to send the packets over the line with a CRC checksum,
    you should set this flag on the side which's packets you want to
    check. This may be only one both sides. I personally don't use the
    CRC feature, as all the problems I got so far came due to timeouts,
    if at all. Don't sending with CRC brings a little speed improvement.

    Please note that the TCP/IP protocol provides an own checksuming of
    their data, so only the small frame header added by magPLIP will be
    transferred without checksum. The chance of data corruption is in my
    opition quite small.

CD=COLLISIONDELAY (optional keyword argument / number)
    If accidently both sides want start sending at the same time, this
    situation is considered as a collision. In such cases, both sides
    stop their attempts to obtain the line. Instead, they will wait a
    specific time and try again. This parameter lets the user tell the
    device how long this time should be, measured in micro-seconds. If
    you experience line errors, you may play a bit with this parameter in

```
    order to fix them. It is important to mention that the collision
    delay time should be different for the both peer systems, otherwise
    there would a higher chance for further timeouts. The default values
    take care for this.

    Defaults to 0 $\mathrm{\mu}$s for unit 0, 2000 $\mathrm{\mu}$s for unit 1.
    Minimum is 0 $\mathrm{\mu}$s.
    Maximum is 999999 $\mathrm{\mu}$s.

 AD=ARBITRATIONDELAY/K/N (optional keyword argument / number)
    This parameter is supported but has no more functionality. You should
    omit it and don't be bothered by this.
```

1.14   magPLIP - Caveats

```
  Caveats

  This section tries to address some known problems.

  I will always try to give the user the necessary technical background to
  understand the problem and, if possible, to include a work-around.

  If any user has found a similar problem which is not mentioned in this
  document, he or she should contact  me  in order to append it to this
  section.

  magPLIP and intuition

    On slow, 68000 based systems the magPLIP server should run at a
    higher priority than the input task. This way you loose a bit
    intuition speed during transfers, but you don't get line errors when
    just moving a window.
```

1.15   magPLIP - Troubleshooting

```
  Troubleshooting

  This section will try to give some answers to the user, who failed to get
  magPLIP working with any special hardware- or software-setup.

   Why can't I use my 3rd party I/O-card?
   Why can't I connect to Linux/i386 and NetBSD/i386?
   I get line errors while moving windows!
   I permanently get line errors!
   I can't get this damn think to work at all!
```

1.16   magPLIP - 3rd party I/O-cards

Why doesn't magPLIP work with my 3rd party I/O-card (Multiface
Card, GVP I/O Extender, ...)?

magPLIP accesses the Amiga's parallel port hardware directly. Although this
is not the preferred Amiga-way, it is still a legal thing and well
supported by the operating system. Should there ever be built a new Amiga,
and should it furthermore no longer have a CIA chip inside, the new adapted
Kickstart wouldn't grant magPLIP access to a non-existent CIA. The
counterpart to direct hardware access is using a standardized Amiga device,
parallel.device in this case. Unfortunately the parallel.device is not
flexible enough regarding full control over data transfer direction and
interrupts. It has never been designed for the purpose of a computer link.
So I can't write version that supports any parallel.device. 3rd party
I/O-cards usually come with a replacement for the parallel.device in order
to embed the card in the system transparently for other software. However,
as magPLIP doesn't use the parallel.device it can't work with the extender
card.

1.17   magPLIP - Why can't I connect to Linux/i386 and NetBSD/i386

Why doesn't magPLIP work with my PC Linux-Box or NetBSD system?

A lot of email has reached me asking why magPLIP doesn't work with Linux or
NetBSD. I appreciate this engagement of the users highly.

The situation on the PC side is as follows: Linux offers also a PLIP
network device. This device supports also the printer ports of some older
PC systems, which were only able to write data on the port but not to read
it. The Linux PLIP works around this problem by abusing some non-data lines
normally used for control and handshake purposes as data lines. This
solution is quite nasty but guarantees usability on all PCs.

The NetBSD OS doesn't yet support any PLIP (correct me if I'm wrong). I
have been toying with porting magPLIP to NetBSD/Amiga, but--if this would
be done at all--it would still require porting it to NetBSD/i386.

The Amiga PLIP development has been taken a completely different approach,
because every Amiga offers a fairly good (means: bidirectional) parallel
port.

The questions are:

· It is not desirable to change magPLIP's wiring and operation
  generally to the Linux's way; it is however conceivable to have a
  special magPLIP version.

· Another solution is to modify the Linux/i386 PLIP to operate in
  magPLIP mode.

· A far more interesting question is however: Who will do this? Few
  people have already signalled their interest in doing the job. Contact
  me if you want to join this group, and I'll supply you with further
  information.

1.18   magPLIP - Line errors when moving windows

```
I get heavy line errors when dragging windows or screens!

    See caveats.
```

1.19   magPLIP - Permanent line errors

```
I get heavy line errors all the time!

    There are a lot parameters which influence transmission timing.
    You find an explanation of the in the  configuration  section.

    -> Especially the TIMEOUT value's setting is likely to be the key to
       your problem.
    -> If you changed the COLLISIONDELAY parameter by hand instead of using
       the default values, did you properly assign different values for both
       peer systems?

    If you use AmiTCP/IP, it may also help to increase the pool of read-
    and write requests in the file AMITCP:db/interfaces by altering the
    values assigned to the WRITEREQ and IPREQ keywords.

    If you use the AmiTCP/IP package, you should use the ping command to
    track down the error:

        AmigaShell> ping [host]
    or
        AmigaShell> ping -f [host]

    The -f option means "flood" and generates as much packets as
    possible. Invoked simultaneously on both sides reveals almost any
    error.
```

1.20   magPLIP - General failure

```
I can't get this damn think to work at all!

    -> Check your  wiring .
    -> Did you use both units, magplip0 and magplip1 ?
    -> Did you update both systems ?

    See also :  Installation
                Usage
```

1.21   magPLIP - Known Bugs

```
Known Bugs
```

·~The arbitration is currently not as secure as it should be. If there
   is anyone interested in things like this, he/she is invited to
   get in touch with me in order to work it out.

If you know further bugs, contact me .

1.22   magPLIP - Future plans

```
Future plans
```

Perhaps I will implement some more features:

· Some people are currently modify the Linux/i386 PLIP interface driver
   to provide a magPLIP compatibility mode

· Complete interrupt driven transfer
      Probably this slows down the thing...

· Online configuration tool
      What's up, you GUI/Ys out there?
      Anybody volounteering for this task?

If you have further suggestions, contact me .

1.23   magPLIP - History

```
Development history of magPLIP
```

```
Release 37.5
```

   · on early startup time the MTU reported to protocol was not yet
      the customized value but the default setting; At least Envoy
      had problems with this bug

   · Frame buffer handling is now done dynamically, MTU can be set to
      values up to 128K. A large MTU increases performance for large
      data transfers such as in a file-server system.

   · Code more robust against initialization errors

   · ENV: settings are better checked for validity

```
Release 37.4
```

   · Some documentation changes

   · minor changes in the transfer code

```
Release 37.3
```

- Timeout handling is now system independent and gives a great
  improvement to configuration and line security

- ARBITRATIONDELAY no longer used, but supported for old config-files

Release 37.2

·~Performance has been significantly improved due to the transfer routines
 being rewritten in assembly language

- internal code cleanups

Release 37.1

·~initial release

Technical history of magPLIP

For more technical details, please refer to the source code. In the
header section of each source file, you find the pseudo-keyword
$HISTORY: after which follows the complete revision history of this
file.

1.24   magPLIP - Copyright / Credits / Legal stuff / Contacting

Copyright and author information

magPLIP is

(C) Copyright 1993-1994 Oliver Wagner, Michael Balzer
(C) Copyright 1995 Jan Kratochvil & Martin Mares
(C) Copyright 1995 Marius Gröger
    All Rights Reserved.

Credits

Surely magPLIP would not be what it is today without so much support of a
lot of people. Their questions, discussions, critics and personal
improvements have helped making magPLIP today's most stable and fast
parallel port SANA-II driver.

Oliver Wagner and Michael Balzer have written the original PLIP device,
introducing it to the Amiga. At this point my thanks go to these guys
particularly for that they supplied the Amiga community with the source
code, too. Even though the current source magPLIP has nearly nothing in
common with the original, magPLIP would hardly exist without having been
able to peek at the original.

I also want to thank Jan Kratochvil and Martin Mares. They wrote the
low-level transfer routines from scratch in assembly language. This way
they could shorten magPLIP's round trip times by about 25%.

The technical idea behind the timer.device controlled timeout handling
as introduced with release 37.3 is the idea of Martin Mares. Thanks a

lot.

The MTU bug has been pointed out by John Hendrikxs. Some of his
questions inspired me also to rewrite the frame buffer handling.

Finally I wish to thank all those who are not mentioned here but
supported me with kind comments, questions and critics.

Again, I ask everyone who has suggestions to magPLIP's implementation or
even modified versions of magPLIP to tell me, so that I can incorporate
them into the distribution.

Legal stuff

This software is freeware. It is provided as-is and is subject to
change; no warranties are made. All use is at your own risk. No
liability or responsibility is assumed.

It's strictly forbidden to include this archive in any kind of software
collection except Fred Fish's AmigaLibrary, Meeting Pearls CD's, Aminet,
Aminet CD's and BBS fileareas.

Contact

If you like this software, or have any suggestion how to improve it, or
just want to complain about it, feel free to contact me:

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