

Using AGWPE's TCP/IP driver for RF packet operation **- Instructions for use with Windows 98/NT/2000 -**

(Mike G7RAZ Gave Permission to G4APL for this Document to be published on
gb7cip.ampr.org Web page.)

TCP/IP over radio has often had a bad press. Many amateurs have criticised the supposed need to abandon the Windows environment in favour of a command-line programme (eg. JNOS). There have been many complaints about the perceived difficulty of setting it up, and regret at the diminishing amount of IP activity in their neighbourhood. However, for those who are within reach of IP stations and who wish to experiment seriously, various Windows-based options have long been available - and their number continues to increase.

Certain solutions have been around for a while, often relying on a Windows PC being connected via ethernet to a DOS PC which acts as the main IP server. More recently G3ZFR has brought out an eprom image for the PacComm Tiny-2 which enables the tnc to be seen by Windows as a dialup adapter (see <http://www.g3zfr.freemove.co.uk>). These hardware solutions allow native Windows TCP/IP applications to be used over radio.

Perhaps the best known of the few software solutions is the AGW Packet Engine, developed by SV2AGW. It has a W95 version but recently a better version was produced which is designed for Windows 98, NT and 2000. AGWPE also supports certain AX25 applications (such as WinPack) at the same time, making it an attractive option for the packet user – especially one who wishes to use Windows applications for packet radio. However it is often seen as something of a challenge.

This is partly because AGW's own instructions are brief, optimistic (and translated from his native Greek), partly because there are very few other help resources which are easily accessible, but also partly because of the widely-held belief that there are many amateurs out there who have tried to set it up and couldn't get it working.

In an attempt to help those packet users who are daunted by this challenge, I have written a Help File. This document – divided into 7 sections for ease of reference - aims to assist those who genuinely wish to "have a go", and who are not too proud to be told in some detail how to do some occasionally quite basic routines! It only refers to the TCP/IP driver designed for Windows 98 and later, although users of W95 may find some of the notes helpful when attempting to set up the W95 Dialup version.

It derives its information firstly from SV2AGW's own help files, secondly from notes written by a range of other amateurs (notably G4APL, IW3HXN and IR3MP) and lastly from my own, very limited experience with W98.

If you use this document and find it useful, I should be glad to hear from you. Should you spot any errors, or wish to suggest improvements, I would also be pleased if you would get in touch.

73, Mike Wager, G7RAZ

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(Written: April 2002)

1. Obtaining & loading the required AGW files

A. Obtain copies of the latest AGW software

If searching on the internet, there are two main websites:

- For Europe <http://www.raag.org/sv2agw>
- For North America <http://www.elcom.gr/sv2agw>

The required files are:

- agwpe.zip - the packet engine (currently version 2002.10)
- drivers.zip - the driver files
- agwmonitortcp.zip - a monitor program
- arpagw.zip - a utility for creating a static arp
- agwtermtcp.zip - a terminal program

B. Extract all the files into a suitable directory (eg C:\AGW)

Drivers.zip contains two further zip files

- agwtcpip.zip - for W98/NT
- tcpip2000.zip - for W2K

Unzip the files appropriate to your situation. Note that agwpe.zip also creates a sub-directory for HTTP files.

C. Load the TCP/IP adapter files onto a floppy disk

The files required are:

- AGWTCP.INF - for W98/W2K
- OEMSETUP.INF - for NT
- AGWTCPIP.SYS

Note there are two AGWTCPIP.SYS files. Be sure to load the one supplied in association with the appropriate .INF file.

2. Installing & Configuring the TCP/IP adapter

(Note: These are mainly SV2AGW's notes with minor changes and a few extra observations)

Installing the adapter:

1. Put the floppy disk with the files AGWTCPIP.INF (or OEMSETUP.INF for NT) and AGWTCPIP.SYS into the A: drive
2. From Control Panel double click [Network]
3. Press [Add] button
4. Select [ADAPTER] and Press [ADD] button
5. Press [Have Disk] button
6. AGWTCPIP.INF should be found. Press [OK] to install

Configuring the adapter:

1. From Control Panel double click [Network]
2. Scroll down to the SV2AGW TCP/IP Adapter. (Don't confuse this with the SV2AGW Network Adapter further up). Select it and press [OK]
3. At this point Windows may possibly ask for the installation CD
4. Select from the list TCP/IP -> SV2AGW TCP/IP Adapter and press [Properties]
5. Check "Specify an IP address" and enter your IP address. In the "Subnet Mask" enter the value 255.255.255.0 (some commentators advise 255.0.0.0)
6. Go to the WINS Configuration tab and check "Disable WINS Resolution"
7. Go to the Gateway tab and enter the address of the IP station you link to (either a router/node or a hub/BBS. Enter nothing if you are going to be a Gateway station.
8. Go to the DNS Configuration tab and check "Enable DNS". Enter the details of your nearest domain name server. If, for example, it is "gb7oip.ampr.org", type "gb7oip" in the Host field and "ampr.org" in the Domain field. Then enter the IP address into the DNS Server Search Order field and click on Add. Please note however that I have operated quite happily with DNS disabled. This may be to do with having set up the HOSTS and AGWROUTE.BAT files (see later). You may wish to experiment here.
9. Go to the Bindings tab and check "Client for Microsoft Networks" (only)
10. Go to the Advanced tab and check that it is empty or that values are set to "No".
11. Go to the NETBIOS tab and ensure that NETBIOS is disabled.
12. Press [OK] to complete the configuring of the adapter.

Finally press [OK] to complete configuring the Network.

Windows will encourage you to restart the computer. You don't need to do so until later.

3. Configuring Windows routing

This is to enable Windows to route AGW's packets not only towards the nominated gateway, but also (and especially) towards stations beyond the gateway.

- a. Double click on AGWARP.EXE (the ARP utility). It will ask for a Callsign.
- b. Type the AX25 address of your gateway station (eg GB7WIS-8)
- c. For RadioPort, type 1 (let's assume your first AGW port will be number 1)
- d. Enter the gateway's IP address (in my case: 44.131.168.242)
- e. Make a (carefully-written) note of the command line in brackets
- f. Press Return to close the window and repeat the above for as many other stations you wish to link up with (eg my hub/BBS is GB7WIS-5, 44.131.168.246)
- g. Open an MS-DOS window and type "EDIT AGWROUTE.BAT"
- h. The first line will be the first ARP command you wrote down. However, you should use hyphens (-) not colons (:) to separate the hex characters at the end (see example)
- i. On the second, type "ROUTE ADD 44.0.0.0" then your gateway's address
- j. A third line might be the second ARP command you wrote down (eg. My BBS)
- k. A fourth might be something like "ROUTE ADD 44.131.168.246 44.131.168.242" (which ensures that packets to the BBS (246) are routed via the gateway (242)).

For illustration, my AGWROUTE.BAT looks like this:

```
ARP -s 44.131.168.242 8e-84-20-84-4c-76  
ROUTE ADD 44.0.0.0 44.131.168.242  
ARP -s 44.131.168.246 8e-84-22-84-4e-74  
ROUTE ADD 44.131.168.246 44.131.168.242
```

Save the file into the folder where all the AGW files are stored. Then test the file by double clicking on it and checking no error messages occur.

There is also a file in the Windows directory called HOSTS (no extension). I cannot say with certainty that it is useful to have it configured, but I have entered into it details of my gateway, my BBS and a couple of other local IP stations. My understanding is that this enables me to quote their (domain) name rather than their (numeric) address when attempting to connect to them. The format is explained in the sample file HOSTS.SAM, and therefore making additions of your own should be straightforward. For illustration, this is an extract of my HOSTS file:

```
# home/node/bbs calls  
44.131.168.128 g7raz.ampr.org  
44.131.168.242 gb7wi.ampr.org  
44.131.168.246 gb7wis.ampr.org  
# local amateurs  
44.131.63.34 m0cke.ampr.org  
44.131.174.18 uhf.g4wsz.ampr.org  
# nodes and mailboxes  
44.131.174.2 news.gb7oip.ampr.org  
44.131.174.3 mail.gb7oip  
44.131.174.73 gb7oip.ampr.org
```

4. Loading & configuring AGWPE

Run AGWPE.EXE - this will install the program into the windows task bar. Right click this icon to bring up the configuration screen. Select "Properties" and click on "New Port". After clicking "OK" you will need to configure the port according to your circumstances – mainly depending on what type of TNC you are operating and how your PC is connected to it. Once this initial configuration is complete, close and restart AGWPE, following these instructions:

1. Run AGWPE.EXE configured properly with tnc(s) attached
2. Right click on its icon and select "TCPIP over radio setup"
3. Select "Enable TCPIP (Recommended method)". You can ignore the "Setup Routes" as this is covered by our AGWROUTE.BAT file
4. Enter your registration number. If you don't then TCPIP will work for only 45 minutes (enough for tests) after which you'll have to restart AGWPE.
5. Select the desired radio port for default routes. (Probably "All Ports USE")
6. Enter your callsign for TCPIP operation (eg. G7RAZ-5, following UK convention)
7. The "Via path" setting is unclear – I believe it may be the (AX25?) call of a digipeater you use to get to your gateway.
8. The "Pass all ip traffic ..." box is usually unchecked, unless your computer is acting as a router. Some commentators advise having it checked, however. It seems to make few odds.
9. The "Allow broadcast messages...." box should be unchecked too, otherwise you will tx "ugly" broadcast messages. You can enable it for network testing (if you wish to see other computers in the Network Neighborhood"), but since it will send out a lot of long packets which are unhelpful on a 1200Baud link, it is best left unchecked.
10. Set the desired Paclen (it is actually the MTU or MSS). The optimum value for 9600 is 576. This produces packets about 520-530 bytes long. For 1200 use a smaller value since it is possible for Baycom users to lose synchronisation when receiving large frames. A value of 256 is quite good, especially if working into a BPQ or unmodified x1j4 node . This value is added in the registry and is controlled by the driver.
11. Click OK, but don't restart the program just yet.

Right click on the icon again and select "Start up programs". Using "Add" and then "Browse" select the following three programs to be automatically started when AGWPE is run:

- AGWTERMTCP.EXE & AGWMONITORTCP.EXE (from the AGW directory you set up)
- AGWROUTE.BAT (from wherever you saved it to)

If you are going to have people make HTTP connections into your machine, have a look at the "Setup Interface" section in the icon bar menu. I have no information about its configuration available, but certain items are obvious. Note that this configuration appears not to be necessary for your own use of Internet Explorer for outward connections (see next section).

Exit the program and restart the computer. When the PC is ready, load AGWPE. There may be some issues about configuring AGWTERMTCP and AGWMONITORTCP – I couldn't ever get them to work under W95, for example – but they can be put to one side for the time being. As long as you have the AGW icons (in the form of tnc's in your icon tray) you are ready to start testing Windows applications over radio.

5. Testing Windows applications

Ping, Telnet and FTP

To ping another IP station, open an MS-DOS window and type "ping 44.131.168.242", amending the IP address to your intended target. Windows will send four test "pings" to the target and will report on what comes back. Note that pings to more distant IP stations may appear to be lost as Windows IP is impatient and times out rather quickly on slow links.

For telnetting other stations, first load the program (C:\WINDOWS\TELNET.EXE). Click "Connect" and then "Remote system". Enter the address of the first IP station you might connect. Hopefully you should be connected and be able to proceed as with other telnet connects. You may wish to set up a batch file to enable you to simplify these instructions. Type the line "C:\WINDOWS\TELNET.EXE 44.131.168.242" (again amending the IP address to your intended target) and save the file somewhere sensible, creating a shortcut to it on the desktop. By double-clicking on the shortcut not only will the program be run, but also the telnet request will be sent.

For FTP testing, you can use the basic Windows FTP.EXE. From an MS-DOS window type "FTP 44.131.168.242" (again amending the IP address to your intended target) and you will hopefully be connected and then proceed to log in. Remember, other FTP client programs are available.

Internet Explorer (HTTP)

By typing in the address in the URL box (for example: <http://44.131.174.73>), you should be able to make an HTTP connect to an IP address, too. Amend the Connection settings within IE's properties, selecting "Never dial a connection". Some commentators advise configuring a proxy server via the LAN, but I found this unnecessary, with connects being directed correctly. I would like to think that this was due to AGWROUTE.BAT and the HOSTS file having informed Windows where to send RF-intended (ie 44.x.x.x) packets.

Outlook Express (SMTP, POP3, NNTP)

Assuming you already have Outlook Express on the PC and have configured it for internet access, make a new identity for your amateur radio mail/news, using File > Identities > Add New Identity.

Use the wizard to create a mail account (Tools > Accounts > Add ... Mail). Your name could be your callsign or your real name. Your address should be similar to g7raz@g7raz.ampr.org. Liaise with your sysop about the names he uses for the incoming and outgoing mail servers. The account name will usually be your callsign, and the password should be the password agreed with your sysop (often your first name).

Once the account is created, add some final settings by double clicking on the account name. Under General, add "Amateur Radio" as the Organization, and your "Reply address" should repeat the address mentioned above. Most importantly, under Connection, find "Local Area Network" and check "Always connect to this account

using...". Under Advanced you may wish to lengthen the "server timeouts", if the link to your mail server is likely to be slow.

Use the wizard in the same way to create a news account. Configure the final settings also as above. Hopefully Outlook should now function on RF exactly as it does on the internet.

6. Troubleshooting

I cannot be alone in finding that nothing works first time on a PC...!

The most obvious suggestion, when the TCP/IP side of things doesn't work (even with PING) is to retrace your steps and check the configuration settings. Perhaps double-check the ARP codes in AGWROUTE.BAT file especially. Otherwise here are a few hints which may point you in the right direction.

The best form of diagnosis is by means of observation. By checking what is happening to the IP packets, some clue may be gained as to where problems lie. Monitoring can be achieved either with the TCP version of AGW MONITOR or, more simply, in the monitor window of Winpack, which runs very happily on AGW. Of course you need to be familiar with how IP packets interact, but even if you aren't, any fellow IP enthusiasts, whose helpful advice you ask for, may well find a trace of packet exchanges to be useful in pinpointing problems.

Some commentators I have read have found WINIPCFG to be useful for identifying wrong adapter settings. From Start, click on "Run", type WINIPCFG and press Return. Use the pull-down menu to locate the "SV2AGW TCP/IP Adapter" and examine the "Adapter Address". This has been derived from the callsign you entered as MyCall in AGWPE's "TCPIP over Radio Setup" configuration. You will need to check the table in the Appendix to see if your call is correctly reported. See also that your IP address, sub net mask and gateway address are correctly reported. If not you should remove and re-install the TCP/IP adapter in the way already described.

I have found, however, that my setup works despite a wrongly reported code. I have entered G7RAZ-5 as the IP MyCall. This is 7 characters, but only 6 Hex codes are permitted, and if I read this aright, it looks as though the SSID (-5) is ignored, and in its place "00" is tacked on, giving 83-6e-73-2c-92-00. The inconsistency is with the "R" which the table lists as 71 and the "Z" which should be 90. Nonetheless my setup works, so any discrepancies you find may not be critical either.

Also suggested as a check is the registry settings of callsign and MTU. The registry is accessed by clicking Start, then Run and typing "regedit" and pressing return. Work your way down the directory structure thus: HKEY_LOCAL_MACHINE > System > CurrentControlSet > Services > Class > Net. Check the contents of files 0000, 0001, etc, until you find the one referring to the "SV2AGW TCP/IP Adapter". You will see the references to MyCall (format as above) and PacLen. Ensure that these are correct. Mind you, editing these values is a tricky thing and you would do well to do this only if you know what you are doing... Fortunately my settings were as I expected.

Finally, you can always call on the help of the packet community. The bulletin field AGW or AGWPE can be written to with requests for help. More fruitful, however, might be putting out requests to the Yahoo group set up by SV2AGW, provided you have internet access. But then, if you're interested in running IP applications like Internet Explorer, it's surely because you already use them on the internet...

7. Appendix – Ethernet adapter address codes

This is the table of codes I found published by an Italian AGW user to show how the conversion between your call and this hyphenated Ethernet adapter address is done. The introductory explanation is my translation...

“Let’s take as our example the callsign IK5ABC. The first 2 bytes of the code correspond to the letter I, which is in initial position and is 92 in hex. Then K in second position is 96. Number 5 in third position is 19. Letter A in fourth position is 2C. Letter B in fifth position is 30 and letter C in sixth position is 34.”

000000	60	60	05	04	04	04
111111	62	62	09	08	08	08
222222	64	64	0D	0C	0C	0C
333333	66	66	11	10	10	10
444444	68	68	15	14	14	14
555555	6A	6A	19	18	18	18
666666	6C	6C	1D	1C	1C	1C
777777	6E	6E	21	20	20	20
888888	70	70	25	24	24	24
999999	72	72	29	28	28	28
AAAAAA	82	82	2D	2C	2C	2C
BBBBBB	84	84	31	30	30	30
CCCCCC	86	86	35	34	34	34
DDDDDD	88	88	39	38	38	38
EEEEEE	8A	8A	3D	3C	3C	3C
FFFFFF	8C	8C	41	40	40	40
GGGGGG	8E	8E	45	44	44	44
HHHHHH	90	90	49	48	48	48
IIIIII	92	92	4D	4C	4C	4C
JJJJJJ	94	94	51	50	50	50
KKKKKK	96	96	55	54	54	54
LLLLLL	98	98	59	58	58	58
MMMMMM	9A	9A	5D	5C	5C	5C
NNNNNN	9C	9C	61	60	60	60
OOOOOO	9E	9E	65	64	64	64
PPPPPP	A0	A0	69	68	68	68
QQQQQQ	A2	A2	6D	6C	6C	6C
RRRRRR	A4	A4	71	70	70	70
SSSSSS	A6	A6	75	74	74	74
TTTTTT	A8	A8	79	78	78	78
UUUUUU	AA	AA	7D	7C	7C	7C
VVVVVV	AC	AC	81	80	80	80
WWWWWW	AE	AE	85	84	84	84
XXXXXX	B0	B0	89	88	88	88
YYYYYY	B2	B2	8D	8C	8C	8C
ZZZZZZ	B4	B4	91	90	90	90

[gb7cip.ampr.org information]

gb7cip.ampr.org 44.131.244.1

same address for DNS POP3 NNTP SMTP TIME HTTP FTP Servers

GB7CIP-4	70,3125Mhz	1200bd	44.131.244.1
GB7CIP-6	50.650 Mhz	1200bd	44.131.244.1
GB7CIP-7	432,675Mhz	1200bd	44.131.244.1
GB7CIP-8	433.625Mhz	1200bd	44.131.244.1
GB7CIP-9	432.625Mhz	9600bd	44.131.244.1
GB7CP	144.8875Mhz	1200bd	44.131.244.11
GB7CP	50.670Mhz	1200bd	44.131.244.11

Hope this helps some of you get going on TCP/IP using the windows platform
Look forward to any feed back and corrections de Paul G4APL October 2002