GET STARTED WITH ECHOLINK!

If you want to chat with amateurs in far off lands regardless of propagation or the shortcomings of your radio installation, EchoLink could be the choice for you. Steve Richards, G4HPE, takes us through the steps to setting up and operating over this world-shrinking network.

WHAT IS ECHOLINK?

Echolink is a free computer program designed in 2002 by Jonathan Taylor, K1RFD. It allows radio amateurs to connect to each other using their home computers through the use of Voice Over Internet (VoIP) software. At its basic level, private QSOs take place from computer to computer with both speech and text facilities made available. Very large 'Addressing Servers', strategically located all over the globe, handle the connections. Echolink also emerges onto the amateur spectrum in thousands of locations, with more experienced operators interconnecting their computer to radio equipment such as their own personal links or community repeaters. There are currently about 200,000 registered users of Echolink, representing at least 160 countries. The audio quality can be very good – 5kHz bandwidth is commonly perceived. With Echolink, you can still connect up to your local repeater and chat to your fellow amateurs, even if you are a long way from home and nowhere near a radio! Figure 1. shows a typical Echolink network.
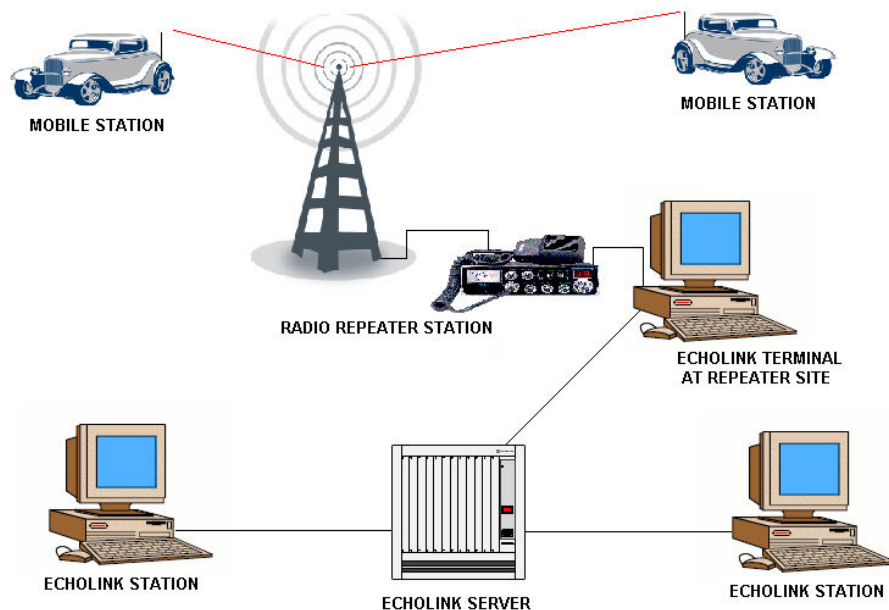
Figure 1. A typical Echolink network. All connections are bi-directional.

BUT IS IT AMATEUR RADIO?

Purists may say that communicating over the Internet is not amateur radio and will only accept modes that are entirely in the RF domain. Of course, one would never wish to see traditional on-air operation being replaced by a cabled version. However, many see VoIP systems as a valuable addition to the hobby that greatly enhances the capability of their station.

Because Echolink is so extensively interconnected with 'real' radio ports, the communication path is often only partially in the cyber-domain. It is this fact that leads to Echolink being available *exclusively* to licensed amateurs only. Therefore, operating via Echolink adopts very similar conventions to those used on-air. Full identification is both verbal and electronic, with conversations taking place on ham-related subjects in a secure and polite environment.

WHAT DO I NEED TO GET GOING?

One of the helpful features of Echolink is that it is simple and intuitive to use as a beginner. The software actually has some very advanced features, but these are initially tucked away until you feel ready to unleash them! You don't need to be a computing

genius either; on first running the program the user is guided through the basic set-up by answering a series of simple questions. The on-screen help files are clear and concise.

In terms of hardware, you will need:

* A PC running anything from Windows 95 up to the latest version of Windows XP. Although the software has been seen to run on an old 486 machine, the ideal is a 133MHz Pentium or better. Only 5MB of disc space is required for the program and RAM usage is negligible by modern standards. Versions of Echolink for Macintosh computers, and for the Linux operating system, also exist.

* A microphone, loudspeaker (or more ideally, headphones) plugged into the PC.

* An Internet connection to the PC. Standard home broadband DSL or ISDN are preferable, but the system will work over a telephone dial-up quite adequately at connection rates as low as 24 kilobits per second.

The next step is to go to the official Echolink Internet site [1].
This is a great place for more background to the world of Echolink and you will want to go back to this site regularly for advice and information. But for now the purpose is to follow the links to download your own copy of the set-up program. During the download process, you'll be asked to register your callsign and provide an email address. This is one stage of the authentication process that protects Echolink from abuse. Your email address is never published; it is simply for the benefit of the Echolink administrators, in case they need to contact you.

SETTING UP YOUR SYSTEM

When you install and run the downloaded Echolink set-up program for the first time, a SET-UP WIZARD guides you through the process during which you are asked to enter some basic information about your station. There are two MODES of Echolink operation, SINGLE-USER and SYSOP. It is strongly recommended that beginners start in SINGLE-USER mode, which gives full functionality but does not overwhelm the newcomer with unnecessary and advanced controls. SYSOP mode is described more fully below and can be switched to at any time, once the operator has built up a little expertise.

When in SINGLE-USER mode, you enter your callsign without any prefix or suffix. Once you have done this, a process of validation takes place over the Internet. This may take a few minutes or several hours. The reason for this is that each new user is validated individually by hand, something which may seem irritating but actually adds hugely to the secure nature of Echolink. You may even be asked to provide a scan or photocopy of your licence document. You shouldn't take offence at this; again, it is all

part of protecting the network against unauthorised use, as traffic is likely to be radiated onto amateur frequencies in countries all over the world. While the validation process is progressing, the Echolink program screen will look somewhat barren. When complete, the screen will burst into life with lists of interesting callsigns and locations!

FIREWALLS AND ROUTERS

Quite correctly, everyone is wary of nasty things like computer viruses and worms. Echolink itself will not introduce such horrors to your computer, as it has no file transferring capability. In fact, the chances are that Echolink will not immediately work if you have a firewall installed on your computer (and possibly a separate one in your modem/router). This is a good thing because it indicates that your general Internet protection is working properly, but it also leads to what is probably the trickiest part of getting Echolink up and running.

Echolink uses three specific 'ports' to communicate with the outside world via the Internet. Making these available is usually additional to the standard set-up of your firewalls and you need to open these ports manually by making some minor configuration changes. For Echolink to work, you need your firewalls to 'allow' the following ports:

UDP (source port any, destination ports 5198 and 5199) from INTERNET to PC
UDP (source port any, destination ports 5198 and 5199) from PC to INTERNET
TCP (source port any, destination port 5200) from PC to INTERNET

Most importantly, do NOT switch your firewall systems completely off as a quick fix to connection problems. You will then have opened the viral floodgates into your computer and this is highly undesirable. Instead, follow these instructions. It's a good thing to be getting on with while you're awaiting your access validation!

1. SETTING UP YOUR COMPUTER FIREWALL
   Access your computer's firewall control page (for example, it can be found in the Security Centre options within Windows XP). There will be a facility for allowing 'exceptions' to the blocking of ports that your firewall is protecting. Search for Echolink in the list of programs and set it as an exception.

2. SETTING UP YOUR MODEM/ROUTER FIREWALL
   To do this, you need to access the modem/router control page from your computer web browser. This is usually done by typing in an IP address (provided by the router manufacturer). Navigate to the firewall settings page and 'allow' the two UDP and one TCP ports detailed above.
   As there are so many types of modem/router, there is a very useful website that will almost definitely have detailed instructions on this process for your specific model. Go to the PortForward website [2] and select the ROUTERS link on the home page. Then click on your model of router. You will then be offered a large list of computer programs. Search out ECHOLINK and click on that. You will

then find a list of step-by-step instructions on how to access your router and set it up for Echolink.

It is quite difficult to provide comprehensive advice in overcoming firewall problems in an article of this nature, but the Echolink website [1] has excellent information on this matter. An 'Echolink Trouble-shooter' program can be downloaded from there, which is able to tell you which of your firewall parameters has not been correctly set. The Echolink Users' Forum [3] is attended by many experienced operators who will gladly offer their assistance.

WHAT YOU SEE ON THE SCREEN

The Echolink screen is divided into several segments. Figure 2. shows a typical screen. To the upper left is a box showing the stations that are currently active worldwide. Each station has a 'node number' but there is no need to remember these for day-to-day operation!

Figure 2. The Echolink screen

In INDEX VIEW, every station is listed alphabetically. There are four types of stations on the Echolink network:

No suffix These are general users – just like a normal amateur station. Figure 3.

Station		Stat	Time	Location	Node
S56RCE		On	14:24	JN76LM Kotlje Slovenia	242459
SK2AU		Busy	14:22	Skellefteå	87649
SM3OSM		On	14:21	Gavle, QRV SK3GW-R	248467
SM5BVU		On	14:25	NE Stockholm-SE- QCWA	4037
SM6XNO		On	14:24	Gothenburg, Sweden	258950
SV1EAG		On	15:24	Aspropyrgos	103197
SW1EIG		On	15:24	greece axarnai	245331
SW2JQG		Busy	15:22	busy	311534
SW4LGM		On	15:25	Trikala	272291
SW7MTK		On	15:23	qth xanthi	311510
T77NM		On	14:25	San Marino (3)	134145
TA2IH		On	15:21	Istanbul/Turkiye-kn41na	94557
TA2MHW		On	15:25	ali	269999
TA3AL		On	15:22	In Conference *TURKIYE*	298957
TA4CGA		On	15:24	kütahya/ EROL	292707
TA4EV		On	15:19	In Conference *TURKIYE*	270437
TA5B		On	08:21	In Conference *TURKIYE*	77984
TA7CA		Busy	15:24	In Conference *TURKIYE*	291135
TB1CEN		On	14:22	OP:Neset DL/Leverkusen	286216
UT2HI		On	15:22	In Conference *RUSSIA*	238622
UT5UCR		On	15:23	Kiev, ÊÎ50ÎÎ	301310
VA1CDB		Busy	09:20	on a call or busy	10108
VA2PP		On	08:21	Mont Laurier, Nord Mtl	206889
VA3LW		On	08:25	St.Catharines/Niagara	215023
VA6MDA		Busy	06:19	In Conference *FREE-DX*	268622
VE0FC		Busy	21:22	Belnan. N.s. Canada	26239

Figure 3. Some general users

-R suffix These stations are connected to RF REPEATERS, usually in the VHF to SHF range. Most are traditional frequency-pair repeaters, with wide coverage and supporting fully radio-based communications too. For example, GB3OK-R is the 145.7125MHz repeater in London. You can connect and chat with mobile stations there, just like a normal RF user. But if you fancy something more exotic, try AC0Y-R located within Walt Disney World and chat to hams having a day out there. Figure 4.

Station		Stat	Time	Location	Node
DS4QPV-R		Busy	21:15	6m0kk~ÀúÁÖ 144.500	309784
DU9DWV-R		Busy	20:20	Mindanao, Philippines.	286854
DX1ARM-R		Busy	20:19	In Conference *DX1ARM*	125838
DX1FLR-R		On	20:20	144.400Mhz PL 88.5	50173
DX1MK-R		On	22:49	Laguna, PHILIPPINES	42685
DX1PAR-R		Busy	19:38	Pasig City	249866
DX2IL-R		On	20:15	In Conference *PBI*	299962
DX4CAR-R		On	20:27	In Conference *MRILP-MB*	189170
E20WTD-R		Busy	19:17	www.e20wtd.tk	212042
E21QIY-R		On	19:16	www.e21qiy.tk (2)	275530
E22NR-R		Busy	19:16	In Conference *THAILAND*	266195
EA1URO-R		On	14:17	Ourense-Galicia-Spai (1)	77525
EA2CRA-R		On	14:16	In91wb (1)	170412
EA3CWQ-R		On	14:17	COSTA BRAVA 144.515 Mhz	6957
EA3FXZ-R		On	14:20	Girona Catalunya 145300	258863
EA8AJC-R		On	13:20	La Gomera R5	55492
F1FRE-R		On	14:20	Baie de Somme-80	238470
F4CEP-R		On	14:17	Melun 430.550 + 9.4	165199
F6GLS-R		On	14:00	PARIS Montparnasse (2)	172106
GB3AI-R		On	13:18	Amersham, Bucks	4969
GB3AR-R		On	13:15	Caernarfon, North Wales	206003
GB3BN-R		On	13:17	Bracknell, Berkshire	1938
GB3BY-R		On	13:14	Kidderminster 6M R50-1	6624
GB3CM-R		On	13:19	Carmarthen, W.Wales. UK	219698
GB3DC-R		On	13:17	Derby www.gb3dc.co.uk	92369
GB3DV-R		On	13:18	EchoIRLP, Maltby UK [0/4]	120618
GB3DX-R		On	13:21	In Conference *ENGLAND*	7125
GB3EK-R		On	13:20	Margate www.GB3EK.co.uk	48360
GB3EH-R		On	13:18	Nr Axbridge, Somerset UK	228585

Figure 4. Some repeater stations

-L suffix   These are simplex RF LINK stations, usually connected to a transceiver idling on a quiet amateur radio frequency. Anyone within range of the transceiver can chat with someone connected via Echolink. Many hams set these up for their own personal use, allowing them to wander within range of their base station so that they can use the power of their Echolink connection from their handheld. Some link stations are connected to transceivers that allow you to select and work on HF frequencies, even if the actual RF installation is on the opposite side of the globe. Figure 5.

Station		Stat	Time	Location	Node
VK4MOD-L		On	22:15	Bundaberg & Coral Coast	274569
VK4PKT-L		On	22:15	Brisbane Qld 147.950	284321
VK4VSH-L		On	22:21	Maryborough, Qld.	281323
VK5IRL-L		On	21:18	Adelaide's Happy Valley	96527
VK5SX-L		On	21:48	Adelaide S.Aust.146.550	20043
VK5TRM-L		On	21:45	Riverland RPTR 147.925	8471
VK5ZBR-L		On	21:48	In Conference *ORLANDO*	28300
VK5ZDX-L		On	07:20	Bryan, TX	28502
VK6AMS-L		On	20:18	Karratha	23212
VK6NQE-L		On	20:18	Perth WA	6121
VK7AX-L		On	22:18	Ulverstone,Tasmania	100478
VK7HBR-L		On	22:15	Launceston 146.475Mhz	311574
VK7VKK-L		On	22:18	Hobart. 147.200 Mhz	165881
VK8ZMA-L		On	21:18	EchoIRLP Darwin AUS [0/2]	8913
VO1AV-L		On	09:41	Corner Brook, NF VO1MO	296584
VR2VOI-L		On	20:15	Hong Kong	306700
VU2UFG-L		On	17:42	Kochi, Kerala (1)	250795
VU3RSB-L		Busy	17:52	Hyderabad	251206
W0COX-L		On	06:15	Roswell, NM (1)	283400
W0DET-L		On	12:19	Rifle,colorado	26731
W0KAD-L		On	05:18	Green Valley, AZ 145.270	308062
W0NWA-L		On	05:18	Phoenix, AZ	228624
W1CDO-L		On	06:15	Roswell, NM	193364
W1EAV-L		On	08:18	Marion, MA 445.500	45688
W1GRE-L		On	08:15	Summerville,SC 147.505	66540
W1HHO-L		On	08:18	In Conference W1IMD-L	208767

Figure 5. Some link stations

* NAME *   Stations with an asterisk to either side of their name are CONFERENCES. These facilities allow many Echolink users to chat together, as if sitting around a table. Some conferences have been established as a focus for people with a common interest. Conferences can also interlink, creating extremely powerful servers that can accommodate very high levels of traffic flow. This can be a boon for emergency communications, for example. Some may be interested in listening to the * USA * conference, that sometimes relays audio of space shuttle communications. The * WX_TALK * conference can be monitored for Hurricane Watch activities and the * IRESC * conference interfaces Echolink with amateur radio to provide global links between disaster zones and agencies where help can be provided. Figure 6.

Station		Stat	Time	Location	Node
GREECE		On	16:18	Elliniko kafeneio [12/100]	281005
G5ARC		On	05:18	Northern California [1/15]	46989
HAKODATE		On	21:18	Hakodate-city. [2/50]	311176
HAM-CU		On	19:18	Trang [1/20]	304439
HAMLINUX		On	15:18	ARI Limbiate [0/30]	208460
HAMSHACK		On	05:18	Pacifica, CA. [1/50]	297680
HAMSIAM		On	19:18	hamthailand.com [1/200]	303186
HAMTHAI		On	19:18	hamthailand.com [23/200]	267491
HAPPYHAM		On	19:18	(*HAPPYNET*)Thailand [0]	304202
HOKKAIDO		On	21:18	Hokkaido-conf,JAPAN. [5/50]	255902
HS0AC		On	19:18	Thailand [1]	106509
I-SICILY		On	15:18	Conf.Sicily (Italy) [0/500]	273808
IDOBATA		On	21:18	^äŒËĨ Net/FreeRoom [0/60]	256037
IRELAND		On	05:18	Ireland. Donegal. [2/500]	160469
IRESC		On	14:18	Global Emergency [1/1000]	278173
ITA-LINK		On	14:18	Conf.<<<<ITALIANA>>>>	266914
ITALIA		On	11:18	Aripalermo [2/50]	309711
ITALY		On	14:18	Italian Reflector [8/500]	1005
JA-DXNET		On	21:18	Japan DX Network. [0/300]	97521
JAPAN		On	21:18	Japanese Reflector [0/20]	62841
JAPAN-NE		On	21:18	Free Talk Room(FC5) [2/30]	256107
JH6RLY		On	21:18	Kagoshima Ohara-Net [3/30]	272383
JK1ZRW		On	21:18	Saitama,JAPAN [0/100]	277208
JN1WGL		On	21:18	- - Tomarigi - Net - - [14]	255900
JO1ZFF		On	21:18	Bike Freind-Net. [0/30]	282468
JOTA-D		On	14:18	Jamboree on the Air [0/33]	138202

Figure 6. Some conferences

You can always check on the status of every single Echolink station by going to the website maintained by Mark Haworth G4EID / KM8H [4]. Once you have registered as an Echolink user, you will find that your own station has a dedicated page on Mark's website!

Other screen views allow you to enter favourite stations or set an alarm if a friend becomes available on the Echolink network.

In the bottom right hand corner of the screen is a text box. While you are chatting with another station, you can also type text to them in this box. This can be handy for cutting and pasting website addresses, for example, where trying to articulate them can sometimes be awkward. In more advanced applications, the text box can also be used to send instructions to the remote computer or radio, or to control various attributes of the conference you are connected to.

LET'S GET GOING!

You are nearly ready to talk to the world! Just before you do, it is advisable to check your audio by making a trial connection which won't be heard by anyone else. One of the conferences on Echolink is called * ECHOTEST *. This test server records any transmission you make and plays it back for your own personal assessment purposes. Once you have found this in the list, click on the name. After a short pause you will be connected and will hear a welcome message. As the message plays, you will notice that an audio level meter has appeared to the bottom left of the screen. Figure 7 shows this. To transmit, hit the space bar on your computer keyboard (this is the default 'PTT' method, but you can change it later if you wish). As you speak into the microphone, you should see good audio level on the screen meter, ideally just touching the yellow part of

the display on speech peaks. When you hit the space bar again, you return to receiving and what you have just said will be played back to you.
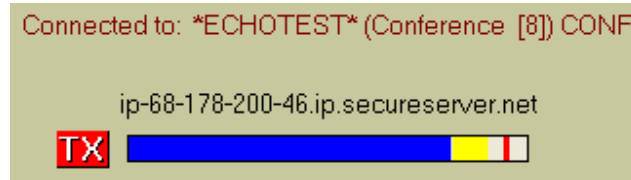

Figure 7. The Echolink audio level meter

If you saw no meter reading but were sure you were transmitting, the problem may lie in the recording source your computer is selected to. On the Echolink screen, pull down the TOOLS menu and select ADJUST VOLUME. This should take you to the recording mixer that Echolink is using. Ensure that the microphone input is selected and that the volume slider is up.

If the meter moves when Echolink is receiving audio but you do not hear any sound, it may be necessary to check the setting on the replay mixer by following the same technique.

Once you are happy with your audio, you can proceed to click on any station you like and after that you simply need to think of something to say! Remember that you may hook up to people all over the world whose command of your own language may not be great. Some stations may not have paid too much attention to their audio level or quality – be accommodating. You'll soon enjoy a contest-free, static-free, pile-up-free style of communication where the concept of a rubber-stamp QSO is definitely not the norm. Always bear in mind that your audio may be being relayed onto an amateur frequency via a repeater or private link.

When you connect to another station, your will hear a 'plonk-plink' series of tones in your own loudspeaker that confirms this. You will notice that some text appears towards the top right hand side of your screen, usually with useful information about the station you've connected to. The operator may well verbally respond to your connection – if not, give a call to them. A typical station welcome text is shown in Figure 8.

```
Station A47RS-R     145.600-

WELCOME !

Royal Omani Amateur Radio Society
P.O. Box 981
Postel Code: 113
Email:roars@omantel.net.om

This is located in Muscat, Capital Of
Sultanate of Oman
With approximately 50 watts the
Repeater
covers a large portion of North Oman.


Please give your callsign and call
"CQ, CQ".  Thanks!
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Figure 8. Typical station text

After your QSO, you can disconnect using the red 'break link' button at the top left of the screen. You hear a 'plink-plonk' to confirm your action.

If you hear an unexpected 'plonk-plink' when you've dozed off at the computer screen, it is probably someone connecting to you! Look at the bottom left hand side of the screen to discover their callsign, and give them a welcoming call.

As you gather pace with Echolink, you will want to customise your station. The way to do this is to pull down the TOOLS menu and work through the SETUP and PREFERENCES options. Most will be optimally set already, but you can't do too much damage if you want to experiment. However, do not change your callsign or select SYSOP mode (under SETUP-MY STATION) as to do so will cause a new round of validation to occur and may not have been what you intended!

Another parameter to be clear about is the ability to allow your station to act as a conference facility (under PREFERENCES-CONNECTIONS). This controls how many stations can simultaneously connect to your station and share a QSO. When several stations connect, it will make much higher demands on the processing power of your computer. So be wary of setting the permitted number of connections to too high a number. Generally speaking, it is better to meet up with a large number of friends by moving to an Echolink conference as previously described, letting the much more powerful server there do all of the number-crunching.

SYSOP MODE AND INTERFACING

When you have got used to operating Echolink as a single user, you may decide to move to the next level of complexity which provides all of the facilities to interconnect your computer to your amateur radio transceiver. You can change to System Operator status by going to the TOOLS-SETUP-MY STATION menu and selecting Sysop mode. As well as doing this, you will need to decide whether you want to act as a repeater station (add –R to your callsign) or a simplex link (add –L to your callsign). Once these

changes have been made, you will probably need to wait a few moments for the change of status to be registered with the Echolink central servers. You will also notice that the TOOLS menu now has an additional option, called SYSOP SETUP.

The SYSOP SETUP menus allow you to arrange how the computer will interact with your transceiver. The subject of interfacing computers to radios, both for audio exchange and transmit-receive switching, is a whole subject of its own. However, if you are already using a similar arrangement for working with modern data modes then you're already most of the way there!

In brief, there are two forms of interface: ASCII and DIRECT-CONTROLLED. The first type is designed to work with a proprietary Echolink interface unit that communicates with the computer via ASCII commands, providing all of the means to control the radio equipment in one comfortable operator's unit. The second type assumes that the user will hard-wire audio and transmit-receive control between the radio and PC, therefore options to control commonly used pins of the computer serial port are provided. The latter may be cheap and cheerful, but is perfectly adequate and can be knocked up in an afternoon using items from the junk-box. Alternatively, both types of interface can be purchased commercially [5, 6 and 7]. For example, a well-known interface unit is the RIGblaster from West Mountain Radio. Figure 9.

Figure 9. The RIGblaster computer / radio interface

In other areas of the SYSOP SETUP, the operator may select a variety of different station identification regimes. These can use the internal synthesised voice (a bit 'Hollywood' for some!) or play audio files that the operator has previously recorded.

ADVANCED FEATURES

The Echolink program has been very well thought-out, anticipating many advanced features that would be required by the experimenter who can see the considerable potential of relaying amateur radio traffic over the Internet.

There are strong security features at all levels that can control access, limit connections to certain types and react intelligently depending on the prevailing situation. The secure nature of Echolink means that there should be no concern regarding inappropriate radiation of audio from an amateur radio station onto the RF bands. Over the years that the author has been operating daily on Echolink, not a single instance of abuse has been witnessed.

Echolink features a simple recording facility. This can be triggered at will by the operator or set to automatically record under predetermined circumstances. The facility only writes to the computer memory when an audio signal is actually present, meaning that the files remain manageably small because periods of silence are ignored. The recordings may be played back at a future date and can aid the logging process.

It is possible to have more than one 'profile' on Echolink. For example, you can effortlessly change between acting as a Sysop station and a Single-User. If your station is used for different purposes at different times for your Echolink activities, the profiles you create for these tasks will retain all of the specific settings you have made for each one.

Echolink interfaces with most packet radio TNCs to allow connections via APRS. It also allows remote control. The programming interface is freely available meaning that software writers can create programs that deeply integrate with Echolink to enhance its facilities still further. Examples that are available include systems for very complex repeater control and identification, streaming audio to websites and remote proxy operation.

If you are waiting for that dead band to open up (or worse you're waiting for a more favourable year in the sunspot cycle!) why not fill in the hours by having a look around on Echolink? It's another great facet to amateur radio!

REFERENCES

[1]   The official Echolink website: www.echolink.org

[2]   PortForward website: www.portforward.com

[3]   Echolink Users' Forum: http://www.echolinker.com/forums/index.php

[4]   Echolink status pages from G4EID: http://echolink.g4eid.co.uk/status_pages.htm

[5]   RIGblaster: http://www.westmountainradio.com/RIGblaster.htm

[6]   WB4REM & G4CDY interface: www.ilinkboards.com

[7]   PC Interfaces: www.pcinterfaces.co.uk

WEBSEARCH

Echolink for Macintosh: http://dogparksoftware.com/EchoMac.html