

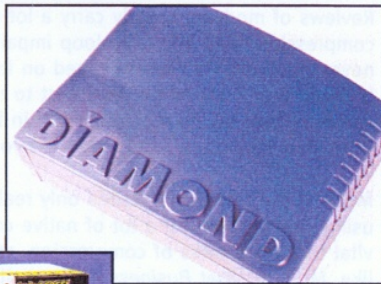
V.90 Modems: EXPOSED

By Graham Stewart



3Com 56K Voice
FaxModem -V.90/X2

Diamond
SupraExpress
56e - V.90/K56Flex



Boca 56K
Multimedia Modem

MultiTech
MT5600ZDX - V.90



Pace 56 Voice
External
V.90/K56Flex

Zoom 56K
Dualmode
V.90/K56Flex



Predictions put the number of modems to be sold in the years following 2000 at around 75 million per year. The bulk of those will be V.90 modems. It is also predicted that V.90 will be the last speed standard for analogue modems. More on the reasons for that in a moment.

In the meantime think of what capturing the lion's share of the projected market could mean, even in such a supposedly low margin operation as modem construction. The realisation of the size of this potential market is probably what drove the two 56K camps - K56Flex and X2 - into the arms of the V.90 standard. But then again I may be overly cynical.

WHAT IS V.90?

The previous standard - V.34 - worked on the assumption that connections at either end of a communication link were analogue. This meant that digital data was converted to analogue and then back to digital. This process made speeds of 33Kbps the likely maximum to be achieved.

The new standard manages to increase the speed of downstream data transfer by assuming that the connection between your ISP and your modem has only one analogue end. A large part of that link may very well be digital now, especially the section between the ISP and the telephone network.

Instead of modulating the downstream data as would be done under V.34, V.90 encodes the data in digital form. On the digital part of the network this equates with about 64Kbps. When it reaches the analogue end that connects the telephone network to your humble abode or office a digital to analogue converter (DAC) creates an analogue waveform for the final leg. This is where speeds drop to 56Kbps.

Any upload, however, even with a V.90 modem, will still be conducted at V.34 rates because there is still an initial digital to analogue conversion for the first part of the connection and then an analogue to digital conversion for the rest of the link.

As long as there are analogue sections of the network it is hard to see where any increased speed can come from. In all likelihood, therefore, this is the end of the line for analogue speeds.

WHAT TO LOOK FOR

So you've decided you need a new modem and that V.90 is obviously the standard you need. Should you wait for further improvements? I don't think so. One of the first things to insist on when buying your new modem is that it can be updated for performance improvements or for increased compatibility. If that

As Fast as it Gets?

a review of six V.90 modems by **Graham Stewart**

Modem futures

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What to look for in a V.90

So you've decided you need a new modem and that V.90 is obviously the standard you need. Should you wait for further improvements? I don't think so. One of the first things to insist on when buying your new modem is that it can be updated for performance improvements or for increased compatibility. If that is the case there is really nothing to stop you getting a modem now and updating as enhancements become available. It goes without saying that these enhancements should be provided as free downloads from the manufacturer's site unless we're talking something that creates a whole new modem.

So, you need a modem that incorporates Flash ROM. The memory is what controls the modem and if it is Flash it can be updated. Plain ROM is forever as it was and will be. All of the modems included in this review can be upgraded via their Flash ROM.

It's all very well of course to ensure your modem can be upgraded but you don't then want to find out that the company making the modem has quit the business shortly after you install the thing. In the recent past we have seen Motorola closing its modem operations and then Hayes filing for bankruptcy, leaving a communications standard with no product of its own to support it. So longevity must also be something to take into account when selecting a modem. Will the company be around to honour its warranty and to provide the upgrades you might need?

There is a general debate on the respective merits of internal and external modems. For what it's worth I prefer the external models. This is mainly to do with the ease with which a new one can be installed (try testing half a dozen internal modems on the same PC in a short space of time!) but I also like lights and being able to watch my modem working. My modem until now has been a Diamond SupraFAXModem 288 (which I upgraded by Flash to 33.6K). The beauty of this modem is that it has a digital display that shows me, in letters, what the modem is doing. That means I don't have to memorise the placement of a series of LED indicators. When the modem is ready it tells me: OK. None of the modems I review below included this simple and elegant solution. Not even the Diamond. So get your spectacles ready for peering into the dimness under your desk to determine which lights are flickering.

Find out what your ISP uses as its 56K standard. If it hasn't yet switched to V.90 you may need to start wondering about the ISP. But if you're stuck with the ISP and it still runs K56Flex or X2 you can simply make sure you get a modem that handles both V.90, for when the ISP finally switches, and whichever other standard is currently in place. This limits you a little if the ISP is an X2 shop. Only the 3Com offering below can handle X2 as well as V.90, which is hardly surprising as X2 is a proprietary 3Com protocol.

The modems

Reviews of modems usually carry a lot of technical detail about compression rates and local loop impairment testing. Having never yet chosen a modem based on its local loop impairment testing I feel it would be dishonest to refer to such testing in this review. Where my own opinions are in blatant disagreement with published laboratory tests I shall let you know.

Much of the technical detail is only really relevant if you are using your modem for a lot of native comms work where it is vital to control rates of compression, error correction, and the like. Most Internet Business readers will be looking for a modem that provides a speedy connection to the internet and which, additionally, can send and receive faxes. Whatever the increase in data rates faxes will still ping around the telephone network at 14400bps.

How I tested them

If you're presented with a collection of modems that conform to the criteria listed above how do you differentiate between them? In the years I have been using the internet, in a number of geographical locations and through a variety of modems, I have never been unduly troubled by lost connections or

very noisy lines. I would expect all the leading manufacturers represented by the modems below to be able to produce a modem that will, at the bare minimum, maintain this record of success. It all comes down to what you expect of your modem.

I want one that will install easily, allow me to monitor and troubleshoot problems should they occur, one that will increase my return on using the internet, and which provides value for money. Many of the modems come with communication software and extras. In most cases this adds less than it might first appear. It may not be the case that you want your modem to handle your voicemail and video links and faxing. If the modem fails where does that leave you? I would always recommend separate lines for your internet and voice lines anyway, and if you are a heavy internet user your line is going to give out a busy tone a lot of the time if it is also your main business line.

Look and feel

Straight out of the box you get a sense of the effort that has gone into designing the modem with a user in mind. It's not simply about appearance but the position of the LEDs, the on/off switch, the modem's solidity, the sockets on the back, that sort of thing. You want to feel that some effort has gone into making the modem easy to use above and beyond its internal components.

Installation

Installation is obviously something you hope to have to do only the once. This does not mean, however, that it should be a time-consuming or complicated affair. I was looking for the installation process to be as close as possible to the ideal of plug and play, with little or no choices to be made by me during the process. The installation should automatically select settings and drivers for the optimum connection for my machine.

Browsing

I was hoping to see perceptible improvements while browsing. To test that more specifically I chose a couple of sites I know to be slow to load, thanks to either their graphical content or to retrieval of data from a number of sources.

I subscribe to an e-mail newsletter called Netsurfer Books. The e-mail comes with an attached HTML page. This, when opened, makes calls to on-line sites. With my existing Supra it could take as much as 3 minutes to open the latest copy. In addition to that I used the Remedi Project site at www.remedi.com. This site links to a number of projects by artists, each of which contain plug-in calls and heavy graphics. The repeated loading of these pages at different times formed my test of page loading speeds.

Of course, before any browsing can be done, connection has to be made to the ISP. I wanted to see if connection was quicker overall using the V.90 modems and if there were significant differences between the modems themselves. I also kept a record of the recorded speed of the link at the time of connection This is the ISP test.

Download

One thing I do that wastes a lot of my time is download demos of games, usually from Software Express. It tends to be a waste of time because I never get round to unzipping and playing, as it were. I selected a couple of demos of recent games, one of around 5MB and one around 400K, and

downloaded them repeatedly at different times of the day.

Extras

On the whole I ignored the extras supplied with the modems. By this I mean that I didn't try to install or use any of the software supplied for faxes or communications. My main area of interest is in the connection to the internet. I have fax software that I am happy with and I am unlikely to change simply because new software is bundled free with a modem. I realise that some people will need such software if they are new to modems. All I would say is, don't buy a modem for the software.

Value for Money

I tend to use Simply Computers (www.simply.co.uk) for buying anything computer related, short of a whole system. All of the modems on review bar the Boca can be found there. When comparing prices and calculating value for money I used the latest 'street prices' quoted by Simply. This will generally be a bit less than the recommended retail prices set by the manufacturers or distributors.

3Com 56K Voice FaxModem - V.90/X2

The 3Com modem is about twice the size of my 3Com Pilot III, comes in the same shade of dark grey, and weighs about the same. It is hard to think of something so seemingly insubstantial being the focus of my connections to the internet but then I remember when modems could be the proverbial blunt instrument in a murder enquiry.

There are a series of 8 lights along the front of the unit. As noted above I would prefer a digital display and I'm sure it would not have interfered with the sleekness of the thing. Failing that I would like the lights on the top of the unit and the letters designating the function of the lights to be more easily discernible. I keep my modem sitting on top of my mini tower, under my desk. If I want to read the lights I have to perform a sort of upper body limbo dance to get my face level with the front of the modem. This is not, of course, a problem limited to the 3Com modem but I used that one first so it must suffer the consequences.

Installation of the modem was simplicity itself. I switched off the PC, unplugged my trusty Supra, attached the cable for the 3Com, put in the phone line, plugged in the power for the modem, switched it on via its accessible side push button and switched on the PC. Windows 95 detected the new modem and asked for the drivers. I slipped in the provided diskette and it was installed in a few seconds more. I created a new Dial-Up-Networking entry and was connected to the internet in a couple more minutes. From switching off my PC to connecting to my ISP with the new modem was less than five minutes. A large plus score for the 3Com.

My first connection came in at only 46666Kbps. Subsequent connections merited a rather more impressive 50666Kbps. Average download times were on a par with the fastest modems reviewed but it didn't match them on the page loading.

There is a volume control on the side of the modem which seemed to have no effect on the level of sound emitted during connection. To use the speakerphone requires attaching powered speakers with cables **not** supplied by 3Com. A nice touch, that.

I felt the 3Com was a solid enough performer but I felt the overall package left something to be

desired. The manual was basic and not very user-friendly.

The real disappointment for me was that I could not honestly feel that my browsing was faster than with my Supra. To be fair to the 3Com, it has to be said that this impression held true for all the modems. Speed gains, when they came, tended to be in the area of file downloads rather than in accessing pages, however graphics heavy they might be.

On to the next.

Diamond SupraExpress 56e - V.90/K56Flex

The Diamond comes in a sort of manly blue and resembles a large plastic soap dish. It looks as though you could grip it safely in the shower. The bathroom accessory motif is continued in the sporty shower-gel look of the large embossed letters spelling out 'Diamond' across the top. First looks, then, were not promising.

There are the obligatory eight lights on the front, with explanatory letters below. This would definitely be a case of memorising their placement. Gone, of course, is the digital display that had me choosing my previous Diamond.

Installing after the 3Com I was hoping just to swap over the serial cable. But no. The 3Com's port was a 25 pin, the Diamond's a mere 9. Diamond supply, predictably enough, a 9 pin to 9 pin connector. This is not good enough for me because I don't have any spare male 9 pin ports on my PC. I hunted out an old 25 pin to 9 pin cable adapter (borrowed from my Palm Pilot Hotsync cradle) and used that because, as Diamond helpfully say in their 'Getting Started' booklet, a 25-to-9-pin adapter is 'not included in your package'.

There's a bit more clicking and selecting necessary with the Diamond installation process, including a country-specific part. Then you have to close Windows again. The first connection took longer to establish than with the 3Com. The worst part of that, though, was the caterwauling emanating from the modem. Do not use this modem in the vicinity of pets. There is no volume control so every time you connect you and a declining number of friends will suffer the noise.

The power switch is a small plastic square that has to be moved up and down. This can be fiddly to get to as it is placed on the back of the modem close to the socket for the power cable.

Apart from the slim 'Getting Started' booklet all the documentation for the modem is on a CD. This is all very well but it doesn't beat having a manual at your elbow to turn to in the event of trouble. You can always print it out but you've just shelled out good money and may feel a little aggrieved about having to spend time and more money getting hold of basic information in a handy format. Then again there is a lot of technical information on the CD, much more than was contained in the 3Com booklet (it doesn't really merit the term 'manual'), and it is all presented in a fairly intuitive manner through your browser.

Initial connection speed with the Diamond was consistently slower than with the 3Com. Its page loading was, however, quicker but it suffered on the longer file downloads, coming in an average four minutes slower over 5MB.

The Diamond is prepared for Shotgun, a proprietary technology. This allows you to connect the Diamond to any other modem and a second phone line to achieve greater download speeds. This may well be useful if you have an old modem and an abundance of free phone lines.

I didn't like the aesthetics, I didn't like the noises, and I wasn't impressed by the speeds. This was a disappointment because I had hoped it would turn out to be a worthy successor for the Supra 288 that has served me well for almost three years. There's no room for sentiment in this game. Just ask Hayes and SyQuest.

In a spirit of openness I have to tell you that c|net, in a round up of V.90 modems, gave this as an 'Editor's Choice'.

On to the next.

Boca 56K Multimedia Modem

This is a name new to me, although I'm aware they have a good reputation in the States. I didn't find the modem listed in the Simply catalogue so perhaps they are a recent entry into the UK market.

The modem has a satisfying solidity and appears to be mainly metal, as opposed to the two plastic modems reviewed above. There is an immediate confidence that this can handle a heavy job in bad weather. The old 8 lights are there again, with their explanatory letters underneath in white against the business-like black of the modem's body. The only bad thing here is the rather tacky '56K INTERNET MODEM' that runs above the lights.

The power switch for the Boca is an old-fashioned metal pivot switch. It is at the back of the device and, like the Diamond, next to the socket for the power cable. The fact that it protrudes from the case makes it more easily accessible than the Diamond's plastic button but there is an air of fragility about it. If you wiggle the switch from side to side it is possible to move the whole internal chassis of the modem. That has a certain entertainment value but I'm not sure of its effect on the modem's working.

There is no socket on the modem for a telephone to be connected. And, unlike Diamond, Boca do not see fit to provide a pass-through adapter on the main line to the wall. This is no hardship for me but if you want to use your modem in your normal phone socket then that is something to think about.

Installation was quick and easy with only a minor glitch when I was told that a file could not be copied from the diskette and to press retry. I did, and it worked. There was no lengthy country-specific process to go through and I was clicking 'connect' in good time.

The 3Com churn and dong tones are still the most attractive out there unless you are seriously into comms screech. The Boca managed to connect with less animality than the Diamond but it still wasn't music.

Time to log-on to the ISP was as close as makes no difference to the previous two modems. There was a difference, however, in the connection speed. Over 80% of my connections using the Boca achieved a connection speed of 115200 bps. The first series of tests for page loads and file transfer also racked up faster times. The Boca was looking good.

The speakerphone can be used by connecting a cable from a socket on the front of the modem to the

line-in socket of your sound card. This cable, surprise, surprise, is not supplied.

The Boca manual has extensive technical information and the modem comes with a variety of software, including TRIO DataFax/Voice 5.3 and Boca's own video broadcast software.

MultiTech MT5600ZDX - V.90

This is a very old-fashioned looking modem. It comes in a shade of hospital fawn plastic and is as light and seemingly insubstantial as the other plastic modems on review. Its first plus feature is that the front of the modem slopes upwards so the lights are visible clearly from above. This modem was designed by someone with neck problems or who thinks that a modem may not be the best thing to have on your desk top. This alone wins it high marks for look and feel.

These marks are almost immediately negated by the silly wee on-off button at the side. Years of training in martial arts may give your fingers the sensitivity required to feel this button first time as you run your hand along the modem's side. Those of us, however, with more normal feeling in our fingers will be engaged in an awkward struggle. How irritating this is will depend on how often you turn your modem on and off.

Installation was possibly the quickest of the modems on review. Windows found the new modem - and labelled it correctly - and the drivers on the MultiTech diskette were copied without pause in a few seconds.

The modem makes little clicking sounds as it performs checks and switches its LEDs on and off. This is like someone knocking two bits of wood together in the distance and adds a Zen-like feel to the business of logging on to the internet. The comms yells and howls are subdued, which is as well, as the speaker volume seems to be set at high when you configure the modem for a dial-up connection. There is no physical volume control on the modem itself.

The LEDs, in addition to being well-placed, are a bright red. There is no doubt which lights are on. Using the modem outside could attract insects.

The first connection was a disappointment. It was within the normal time for connections but the speed matched the lowest figure that the Diamond produced. In subsequent tests the MultiTech consistently returned the lowest connection speeds and its figures on the page load and download tests reflected that.

MultiTech supply a meaty little booklet as manual and TRIO DataFax/Voice 5.3 software on CD. This is the same CD as supplied by Boca, with a variety of other bits and bobs that will do little in the way of enhancing your life.

Pace 56 Voice External V.90/K56Flex

The Pace is one of the two largest modems I looked at, the other biggy being the Zoom, and it manages to combine lightness with an air of business-like solidity. It doesn't look like a strong draft from an open window will send it falling from your desk top. It has fashionable charcoal grey colouring and subdued lettering that Diamond could learn from.

The ten LEDs along its front are not identified by letters but by plain English text. This is a nice touch but possibly only useful until you get to know the modem anyway. The on/off switch is a button push on the back of the unit, easily found and easily used. I liked the way that the serial cable socket was at one end of the back plate, allowing easy access to all the more fiddly sockets for the lines and power. Pace also include a 25-to-9-pin adapter in the box. They also include a stereo cable for connecting the modem to a sound card. It's the little touch that means so much.

Look and feel, then, was good. Already I wanted to own this modem and I hadn't used it yet. Time for installation.

That went smoothly, with Windows detecting the modem and naming it and then copying the drivers from the diskette in a matter of moments. I created my new dial-up entry and clicked 'Connect'. The modem has a slider volume control on the side which actually affects the noises within. These were of the more pleasant bell and crackle variety but it always pays to have a means to mute that as much as possible.

Time to connect was very much in the same area as all the other modems. Connection speed, however, was the lowest yet. This was a disappointment. Now I know that the connection speed is merely an indicator of the modem's belief in the quality of the connection at that time and that other operations will be speeded up because of compression but this was a slower connection than I usually get with my existing Supra 288. The first two page load tests reflected the slower speed. Not by much but enough to make me worry that the Pace was all look and no punch.

Subsequent connections and page loads recovered much of the lost ground and the file downloads matched the Boca, even edging it out slightly on the shorter download because of its ability to rack up a faster speed more quickly.

As well as working as a standard answering machine and multiple voice mail centre in conjunction with your PC you can also use the modem as a speakerphone with no connection to the PC. All these features are useful or not, depending on you own personal circumstances but it does seem the Pace gives you the opportunity of turning the modem into a small office communications hub.

The user guide is thin on technical details but seems to have been well-designed as far as selecting likely areas of problems, especially for users new to modems and comms software.

Zoom 56K Dualmode - V.90/K56Flex

The Zoom has an array of indicators that would shame a small airliner. Like the MultiTech, the modem features a sloped front that allows easy viewing of the LEDs from above. The Zoom is standard PC plastic in colour and its size matches the Pace but with the narrow end being the front as opposed to the Pace's wider-edge-forward look.

The on/off switch is carefully camouflaged to turn the occasional reviewer into a babbling idiot. After days of push buttons and wee buttons on the side and back the last thing I expected was a large panel to depress on the front of the modem!

There were no speaker or microphone sockets and the operation of the modem is almost completely silent. This needs to be an option because it is hard sometimes to see if your modem is working: A

little noise can be reassuring.

Installation was straightforward but for the selection of the proffered names of drivers. None on the list matched exactly the name on the modem itself or its packaging. I plumped for as educated guess as I could make and hoped that when I tried to connect I would be told if I'd chosen the wrong one.

Initial connection speeds were better than the Pace but less than either the 3Com or the Boca. However, the page load and transfer tests put it behind the Pace, if only because it would seem that the Pace's times over most tests seemed to depend less on initial connection times than any of the other modems.

The Zoom was a steady performer but there was something about its look and the whole package that I found less than inspiring. The Zoom's documentation is adequate and there is an accompanying CD with a version of PaintShop Pro. Make of that what you will.

Conclusion

The Boca, the Pace, and the Zoom all turned in fast times. In normal browsing conditions the difference over my existing Supra 288 was not very noticeable. However, real gains can be seen when trying to download large files and an upgrade to V.90 would be worth it for that alone.

The Boca wins for consistency of fast connection, the Pace on the quality of the overall package, and the Zoom on its low price.

The Boca, however, is not easy to get hold of. The main Boca Research site on the web lists no British distributors and I could find no local on-line retailers stocking the modem. This may have some bearing on the level of support you might receive until Boca increase their market penetration here.

The British Pace is the best looking of all these modems and matched the Boca for speed when it connected at the top rate. At only £10 more than the Zoom it comes with a better collection of extras and cables and it is a modem designed specifically for the UK market so there are no adapters for phone sockets etc.

So there you have it. My choice, and the modem that I will keep attached to my PC, is the Pace. My one gripe, and something to add to a wish list for changes, is the placement of the LEDs.

The Test Results(All marks out of 5)

<i>Test</i>	3Com	Diamond	Boca	MultiTech	Pace	Zoom
<i>Look & Feel</i>	3	2	3	3	4	3
<i>Installation</i>	5	3	4	5	5	4
<i>Pages</i>	2	3	4	2	3	3
<i>ISP</i>	4	2	5	2	4	3
<i>Download</i>	4	2	4	2	4	4
<i>Extras</i>	2	1	3	2	4	3
<i>Documentation</i>	2	3	3	3	3	2
<i>Value</i>	3	2	4	3	4	3
TOTAL	25	18	30	22	31	25

Technical Specifications

	3Com	Diamond	Boca	MultiTech	Pace	Zoom
Street Price	£85	£67	£??	£92	£95	£85
Dimensions (HxWxD)mm	35 x 154 x 109	40 x 100 x 140	34 x 140 x 125	25 x 106 x 146	40 x 156 x 129	40 x 135 x 165
Volume Control	yes	no	no	no	yes	no
Serial Connector	25-pin	9-pin	25-pin	25-pin	25-pin	25-pin
Compression	V.42bis, MNP 5	V.42bis, MNP 5	V.42bis, MNP 5	V.42bis, MNP 5	V.42bis, MNP 5	V.42bis, MNP 5
Error Correction	V.42, MNP 2-4	V.42, MNP 2-4	V.42, MNP 2-4, 10EC	V.42, MNP 2-4	V.42, MNP 2-4	V.42, MNP 2-4, 10, 10EC
Internal Microphone	yes	no	no	no	yes	no
Voice/Speaker Phone Support	yes	yes	yes	yes	yes	yes

Indicator lights

LED	3Com	Diamond	Boca	MultiTech	Pace *	Zoom
OH	x	x	x	x	x	x
AA	x	x	x			x
RD	x	x	x	x	x	x
TD				x		x
TR	x	x	x	x		x
CD	x	x	x			x
CS	x					x
EC				x		x
DC						x
V34						x
28				x		
14				x		
56K				x		x
FAX	x			x	x	x
MSG						x
MR						x
DATA					x	
VOICE					x	
VIDEO					x	
SPEAKER					x	
MUTE					x	
PWR		x			x	
TM			x			
SD	x	x	x		x	
HS		x	x			

* **NB.** All Pace LEDs marked in plain English