

USING BROADBAND BOOSTERS/ACCELERATORS WITH COMREX ACCESS

INTRODUCTION

Comrex ACCESS is a device that allows real-time, point-to-point, high quality audio transmission over Internet services. Often, it is not terribly convenient to install an Internet drop like a DSL or cable modem in a particular location for use exclusively by the codec. ACCESS will generally be installed on a LAN which allows several users to share Internet bandwidth. The fear when sharing Internet bandwidth with audio codecs is that a large user will “hog” most of the bandwidth, throttling data to and from the codec, resulting in drop-outs and increasing delay. This paper introduces the concept of devices coined *Broadband Boosters* or *Broadband Accelerators*, which are designed to ease the congestion caused to real-time devices like ACCESS on a shared LAN. We’ll introduce the theory and the products, followed by our test results when used with ACCESS.

THE CONCEPT

These products are designed for users of Voice-over-IP equipment and on-line games in a home LAN environment. The concept is to place these products upstream from both the Internet surfers and the real-time devices as shown in Fig 1.

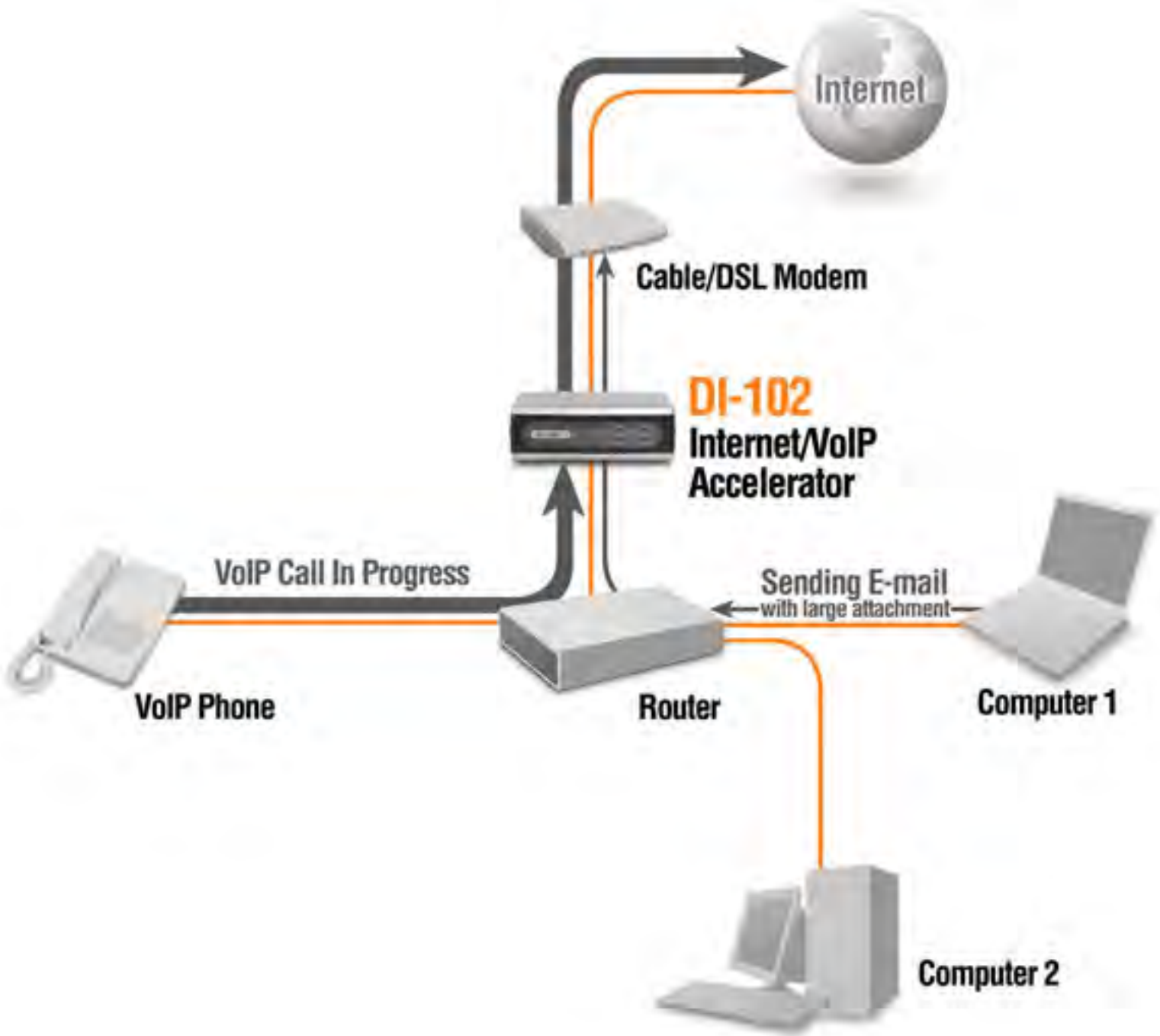


FIG 1- CONNECTION OF BOOSTER/ACCELERATOR DEVICE

The Booster/Accelerator device monitors the entire upload data stream of the network and determines which applications within that stream require real-time priority and which don't. When the Internet pipe gets full, the device prioritizes the packets for the real-time application and delays the non-real time packets, preventing the throttling that might occur if each

stream is left unaltered. It's important to note that these devices only work on the upstream side of the link— and this is not a design flaw. Since the Internet Service Provider is the one funneling data into the download side of the link, it alone can determine priority on that side. The manufacturers claim that use of these devices can help with congestion on the download side by reducing the amount of queuing buffer in the system as a whole. We'll leave this claim for further study.

THE PRODUCTS



Two products were tested with nearly identical results. They are available from many of the same locations (including Newegg and Amazon) at around the same price:

1) **Hawking Technology HBB1 Broadband Booster:** Ignore the marketing claim of boosting the speed of your Internet Connection by 400%. Not much bigger than a computer mouse (and shaped like one), this device has a wall-wart power supply, two Ethernet jacks, and some status LEDs

2) **D-Link DI-102 Broadband Accelerator:** This device is almost identical to the Hawking except for the more conventional shape. It's rectangular and about the size of a Gameboy.

It wasn't a surprise that these devices performed almost identically— opening their chassis revealed almost identical hardware. An input and output Ethernet controller sandwiched the same router IC in each case. This IC is the Ubicom IP3020 processor, delivered by a company that claims to specialize in "StreamEngine" technology. Examining the hardware,

the only discernible difference between the devices was that the D-link product seemed to have a larger power supply section, as well as a “reset” button available.

Since our results on these products were so similar, we will discuss tests performed only on the Hawking product.

THE TEST

Before connection of the HBB1, an ACCESS codec and computer were connected to separate IP addresses on an otherwise un-utilized 1.5M/384K Verizon DSL Line. Before making any connection on the ACCESS, we tested the line using DSLReports.com on-line test utility. The results are shown in Fig 2.

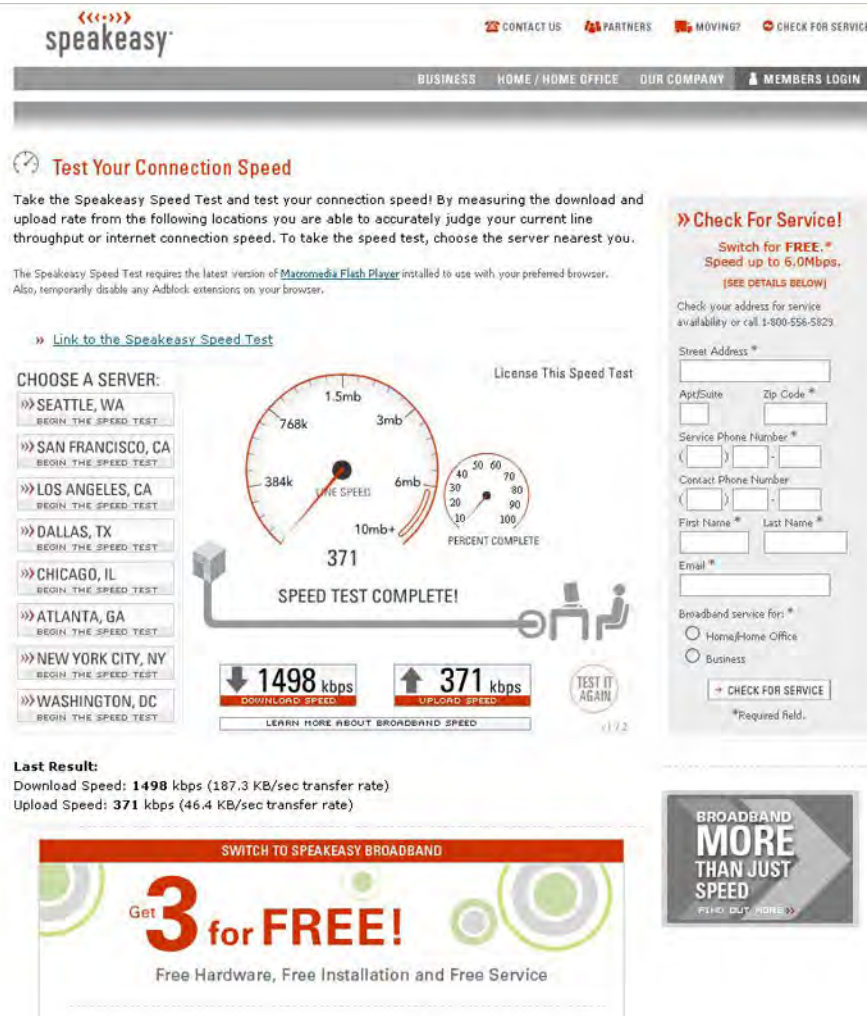


FIG 2- DSLREPORTS SPEED TEST RAW

As shown, the test reports a speed (1.49M/371K) very close to the Verizon specification.

Next, we tested the same link in the same environment with the Hawking HBB1 in the link. As shown in Fig 3, the device did account for a small reduction (20Kb/s) in the upload bandwidth, but had no affect on the download side (repeated tests verified this 20K reduction):

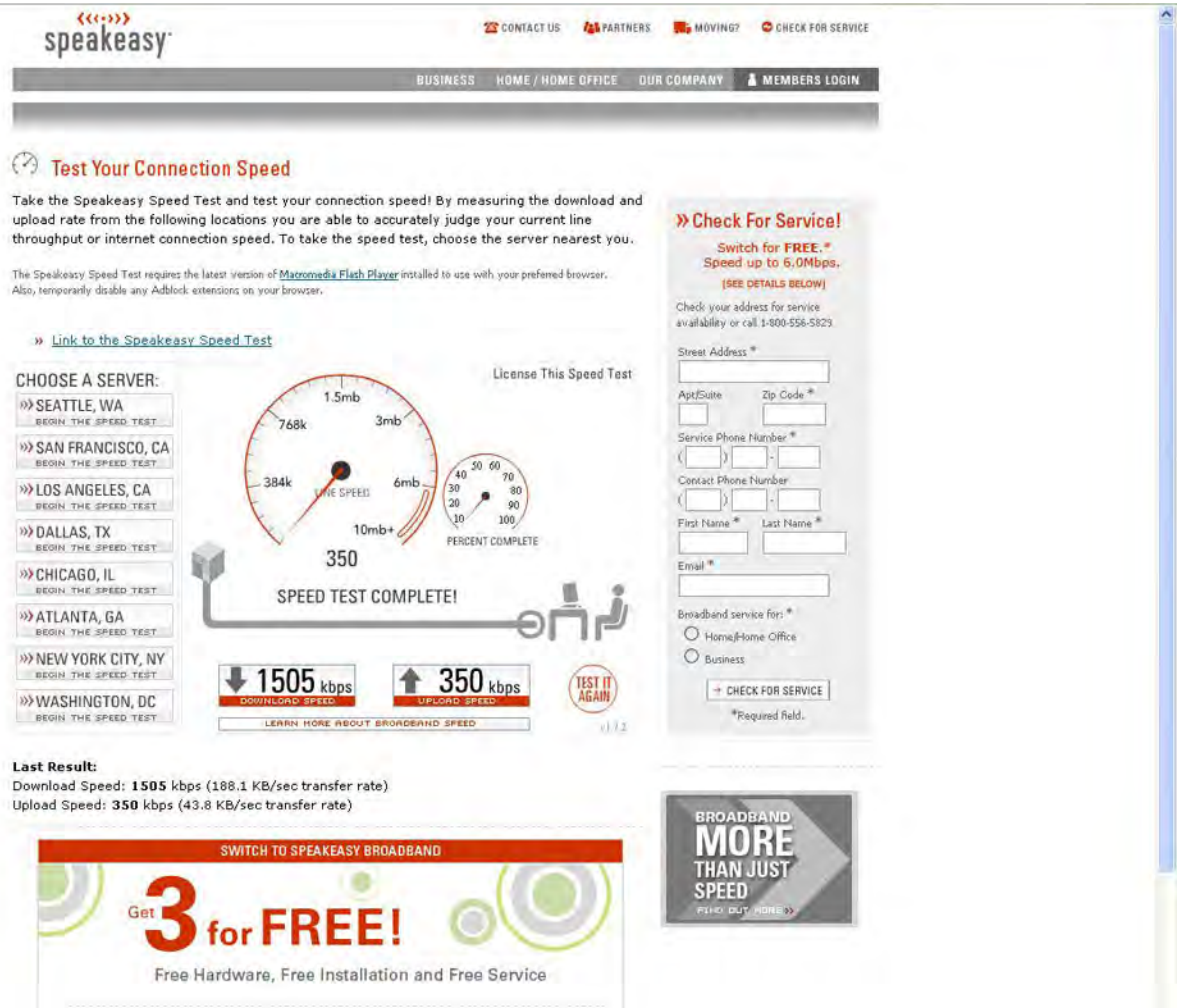


FIG 3- DSLREPORTS SPEED TEST WITH HAWKING HBB1 IN-LINE

Next came time to test the capability of the upload management function. To do this, we made an ACCESS connection from our Massachusetts lab to our UK dealer, Vortex, using the HQ1 stereo algorithm in both directions. In this mode, ACCESS uses around 60kb/s of bandwidth (including 30kb/s coding data and 30kb/s Internet packet headers). Because ACCESS delivers all its statistics information via web page, we were able to take a real-time snapshot of the incoming data quality in the UK. We monitored the UK codec on a completely separate Internet connection so as not to impact the bandwidth of the test line. Finally, while audio was transferring, we used the computer to upload a 2 MB folder of photos to our local FTP server and watched the fun.

THE RESULTS

Without the Hawking device in-line, the effect of the FTP transfer is shown quite dramatically on the statistics page of the London codec:

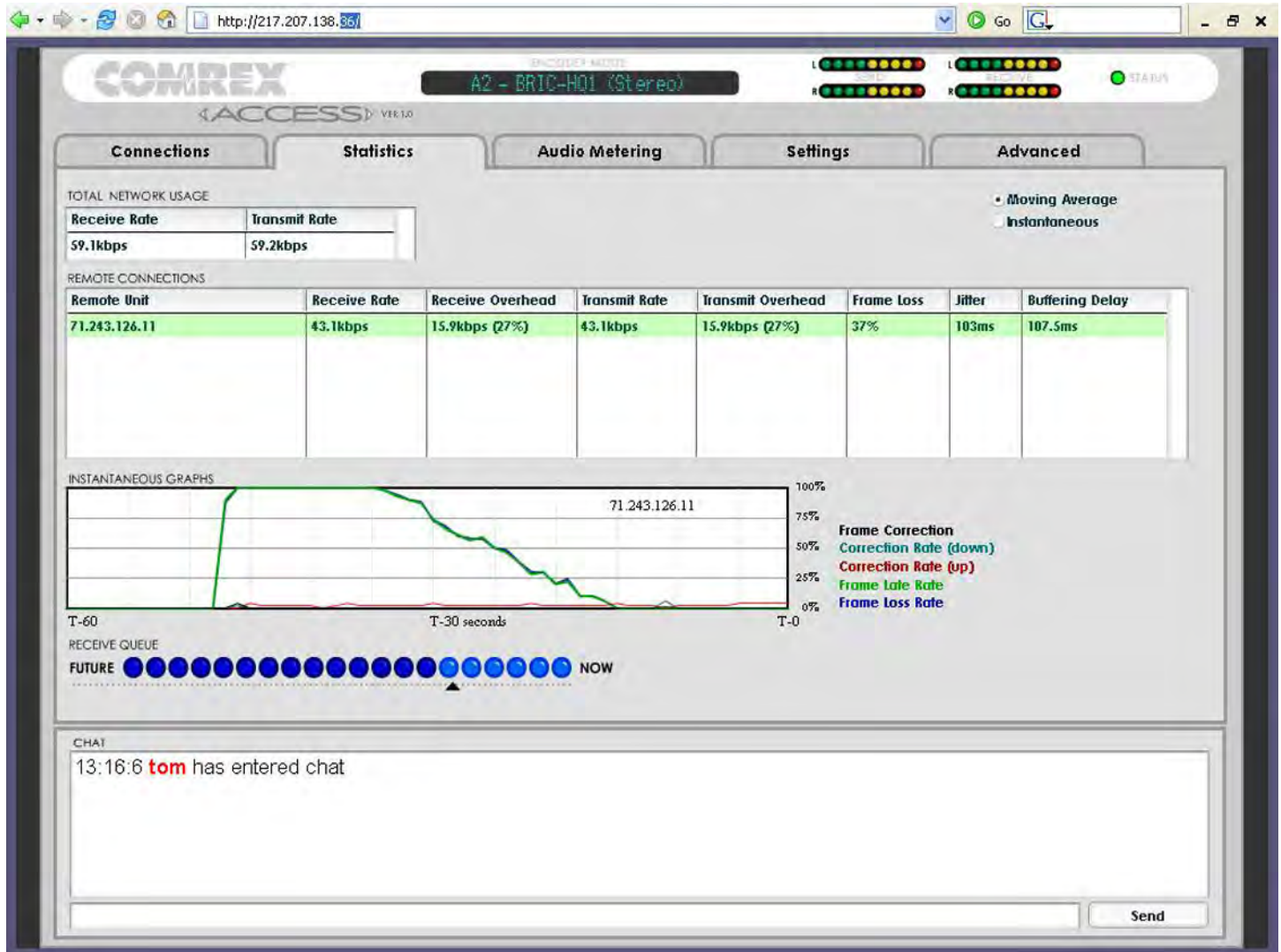


FIG 4- STATISTICS WITHOUT HBB1

The page shows a large frame late/loss spike (green/blue line on the chart) extending for the duration of the file transfer, with a decreasing amount of loss over time as the decoder buffer on the ACCESS dynamically increases. By the time the file transfer has completed, the ACCESS had increased the decoder buffer by around 250 mS to compensate for the rise in jitter.

The same test was performed with the HBB1 upstream from both the ACCESS and the upload computer and the results were quite different, as shown in Fig 5:

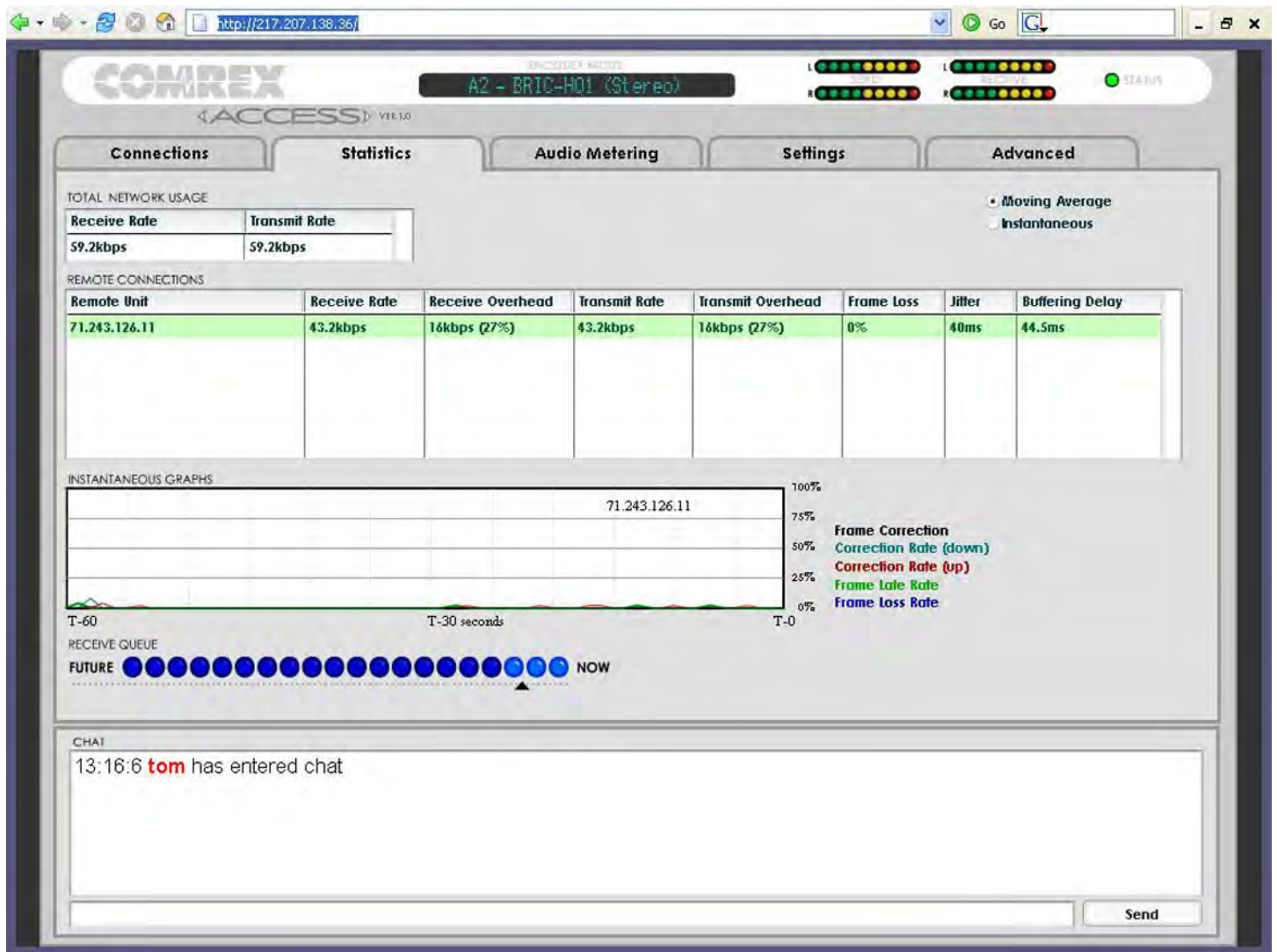


Fig 5- Statistics page during upload using HBB1

The statistics page showed no spikes in late or lost packets, and the decoder buffer was not required to compensate for any additional jitter during the transfer. The overall jitter averaged 44 mS before, during, and after the “data dump”, which is quite reasonable for an overseas connection.

SUMMARY

In our tests, these devices made a dramatic difference in performance on a shared LAN during a “bandwidth hogging” event. Use of the device did result in a 5% reduction in overall upload speed, even when no real-time transmission was occurring. Still, we recommend that anyone using ACCESS in environments subject to upload contention consider using one. Because of their size and simplicity, they could easily be inserted in line with any available router, even those being used for publicly available Wi-Fi or other links.

NOTES

Although both of these devices claim to be “plug and play” in that they will automatically detect the parameters of your Internet pipe, we found this not to work on either one when attached to our DSL. But manually configuring the upload speed and Internet type took about 30 seconds via the web paged served from each unit. And it is important that the device be aware of these things in order to work properly, so this may be a concern when carting the device from one Internet jack to the next.

It’s vital that the device be placed at a point in your network where all traffic will flow through it—putting it only in front of a computer or a codec will not help at all. If your Internet modem and your router are separate devices it’s easy to insert the device between them. If the functions are integrated on your network you may require the addition of a switch downstream from the Booster/Accelerator in order to fan-out your multiple network devices.

Finally, one more reminder that these devices will only help an ACCESS *encoder* avoid LAN contention. They don’t actively affect the data coming to a local decoder, so they won’t do much for audio being heard at the output of the local ACCESS (although the manufacturers claim there is some anecdotal benefit in this direction as well).