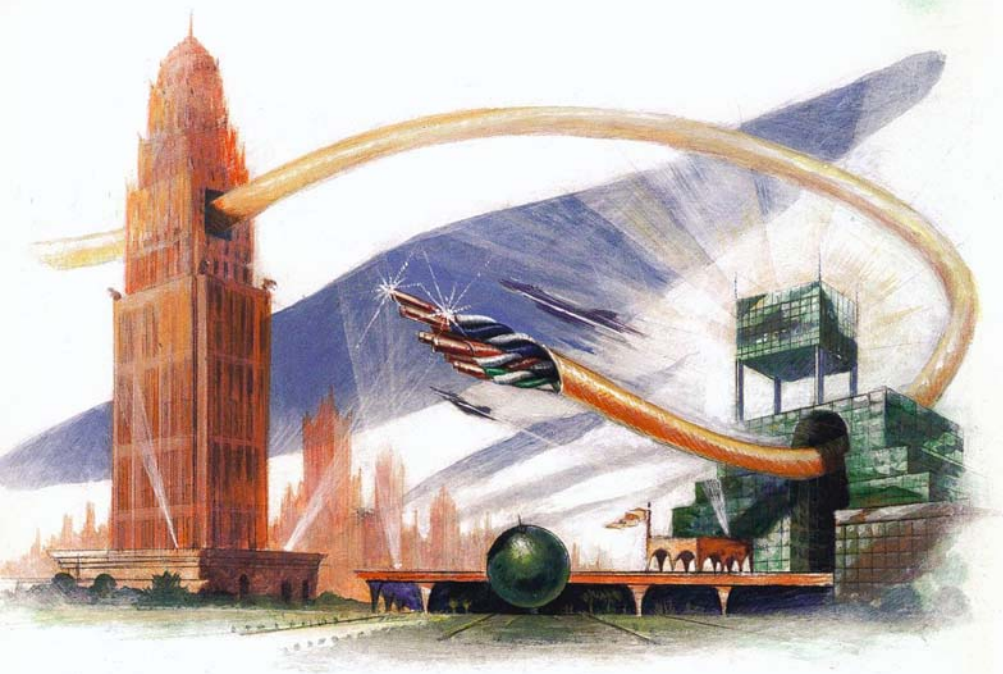


Lucent Technologies
Bell Labs Innovations



The SYSTIMAX[®] GigaSPEED[®] Solution

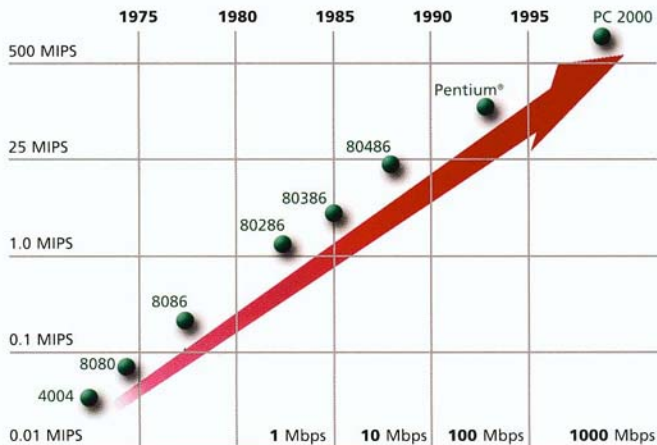
Making Gigabit Ethernet
Less Expensive and More Reliable

BANDWIDTH means business in the markets of today. And every five years another zero must be added to your LAN data rate, just to stay competitive.

It's just happened again. 100BASE-TX has suddenly become 1000BASE-T. Can your network handle it?

Possibly not, if you're relying on minimally compliant Category 5e to ramp your network up to gigabit speeds. In this bulletin — the first of our Tech 2k series — we'll explain why.

There is a better way. Soon it will be called Category 6. Now it's called the SYSTIMAX GigaSPEED solution.



LAN data rates: Add a zero every five years.

Gigabit application with Cat 5e installation Cost per user: \$1,620



Hub electronics
\$690

Category 5e cabling
\$240

LAN card
\$690

Gigabit application with GigaSPEED Solution Cost per user: \$1,280



Hub electronics
\$500

GigaSPEED cabling
\$280

LAN card
\$500

[†]Estimated costs, projected as of January 1999. Savings will vary depending on actual costs at time of purchase.

Higher performance at lower cost

Expensive electronics are required to squeeze gigabit performance out of Category 5e cabling. With far more robust cabling, Lucent's GigaSPEED solution eliminates the need for complex and costly LAN electronics — and gives you all the headroom you'll need when you're ready for Cat 6.

Gigabit Ethernet is coming to copper. But at what cost?

Yes, the Category 5e standard will improve data performance on Cat 5 4-pair UTP cabling. But not much.

The new Cat 5e specs recognize the performance margin originally built into Cat 5 cabling by many manufacturers. And, yes, it is possible to get gigabit performance on standard Cat 5e cabling. But be aware that you'll pay for it in three ways:

- 1- **No more headroom:** Cabling that's pushed to perform beyond its design specification has nothing left to give.
- 2- **Uncertain reliability:** To achieve gigabit performance on Cat 5e cabling, every component must be installed perfectly, every environment must be pristine.

There is no room for error, anywhere in the channel.

- 3- **High cost:** Very expensive LAN electronics are required to squeeze gigabit performance through cabling designed for much lower speed applications.

The good news is a GigaSPEED® solution

We understand these problems, because most of today's cabling standards were based on our research.

We understand the solution, too, because we invented it. It's called the GigaSPEED solution — a network infrastructure so robust that it will almost certainly exceed new Category 6 standards soon to be completed.

*Category 5 Economics:
Are you getting all
you're paying for?
Probably not. In fact,
almost certainly not.*

Attempting gigabit applications with a Category 5e solution is not only expensive. It's risky. Demand better performance for less money.

A GigaSPEED solution doesn't just give you certified gigabit performance. It also gives you headroom to spare, and proven reliability.

How much could all this cost? On average, about **20% less** than you'll probably spend on that Cat 5e solution you may be considering.

Would you spend a dollar to save \$9.50?

The arithmetic is so simple you don't need a calculator.

To move your network into the gigabit era on copper, you'll have two choices. Let's look at both, using the cost of one average user as a rough guide.

Assuming two 50m cable drops (one used), here's an example of the two choices you might have:

Category 5e installation:

\$240	Cat 5 cabling
\$690	Hub electronics*
\$690	Network interface card*
\$1,620	Approximate cost/user

GigaSPEED solution:

\$280	GigaSPEED cabling
\$500	Hub electronics*
\$500	Network interface card*
\$1,280	Approximate cost/user

*Estimated projected costs

By spending \$40 more on cabling, you can save \$380 on electronics. In other words, spending an extra dollar can save \$9.50.†

As you know, electronics prices drop quickly, and this cost differential might be smaller if you wait a year or two. But even then a Cat 5e system will almost certainly cost more than a GigaSPEED solution.

And our GigaSPEED solution gives you a nice bonus — enough extra headroom to easily accommodate Category 6 applications when they're available.

A fatter pipe is better than a bigger pump.

Category 5e achieves gigabit speed in much the same way that a high-pressure pump can double the output of a common garden hose.

The problem is that this pump is expensive. And not always reliable. Especially when you consider the tremendous load it places on the hose.

Very sophisticated LAN electronics are required to achieve gigabit performance on Cat 5e cabling. Impairments caused by echoes and crosstalk must be removed from the data signal — both at the hub and at the network interface card.

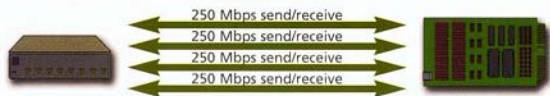
This filtering is a task that requires about **one million** transistors. That's why these cards are so expensive. Half of those million transistors do nothing but error correction — to make up for the fact that Cat 5e cabling was never designed to support gigabit performance.

That's why we invented a fatter pipe. Our GigaSPEED cabling can drastically reduce your cost, by making LAN electronics about 50% less complex. Here's how:

Echo cancellation: 1000BASE-T sends and receives data on all four pairs of Cat 5e cabling at the same time. This causes signal "echoes" that can corrupt data if not filtered out by complex circuitry. Sending the signal on two pairs and receiving on the other two avoids echo concerns. **Result: about 300,000 fewer transistors in each LAN card.**

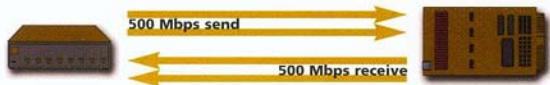
Crosstalk: Pushed to gigabit speeds, data signals begin to "leak" and interfere with one another on Cat 5 cabling. The resulting crosstalk must be eliminated by a real-time cancellation process. GigaSPEED cabling reduces crosstalk so dramatically — **433%** to be exact — that no crosstalk filtering is needed. **Result: about 200,000 fewer transistors in each LAN card.**

Cat 5e signal transmission for gigabit applications



When each wire pair must carry signals both ways, extensive data correction is necessary. Because the Cat 5e standard requires testing only to **100 MHz**, performance and reliability are uncertain.

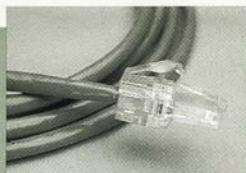
SYSTIMAX GigaSPEED signal transmission for gigabit applications



The GigaSPEED solution dedicates wire pairs to one direction, which dramatically reduces data errors and expense. Because your GigaSPEED solution is certified to **250 MHz**, performance and reliability are greatly improved.

A closer look at a better solution

Category 5 cabling was never intended to support gigabit speeds. To attempt it, the Cat 5e standard was developed. It forces all four wire pairs to send signals in both directions. This introduces errors that must be corrected by costly electronics on each end. Our GigaSPEED solution dedicates two wire pairs to each task — as most cabling was originally designed to operate. The result: lower cost, greatly improved reliability, and plenty of headroom for expansion to higher speed applications.



The little cord that can make a big difference

If you're trying to push Cat 5 cabling up to gigabit speeds, problems can crop up just about anywhere. When you start troubleshooting, look first at your patch cords.

Many networks use patch cords from different vendors — often the generic cords provided with network interface cards. But those cords can seriously degrade network performance.

Specifications for standard patch cords allow attenuation 20% to 50% higher than 4-pair horizontal cabling. And Bell Labs testing has found that patch cords can often cause excessive return loss or reflected signals when added to a network.

These problems can take you by surprise, because most cabling is tested without patch cords in place. And these are only a few of many problems you may encounter when trying to piece together a Gigabit Ethernet channel.

There is a better alternative. It's called the GigaSPEED solution. To avoid nasty surprises, we test everything — including the patch cords — for complete end-to-end performance and reliability.

Don't worry. You're covered for 20 years.

Certified SYSTIMAX GigaSPEED installations are backed by a **20-year warranty**. And our Extended Product Warranty goes far beyond parts and labor coverage.

Our unique **Applications Assurance** covers everything from simple voice, data and video applications to complex building management systems installed by some of the world's leading manufacturers.

The SYSTIMAX SCS Performance Specification will give you a written summary of those applications, detail the performance you can expect from each, and warrant that those specifications will not only be met but actually exceeded for the entire 20-year life of your warranty.

We build solutions. For companies, for people, for you.

The innovations mentioned in this brochure have only touched the surface of the options now available. Since Bell Labs pioneered the telecommunications field (with more than 25,000 patents so far, averaging 3 patents per day since March 1996) we may have a few more ideas that you can put to immediate use.

If you'd like to learn more, please contact your Lucent Technologies representative. We'll be glad to explain how we've surpassed the expectations of companies large and small, at home and abroad. And how quickly, easily and inexpensively we can do the same for you.

For more information on SYSTIMAX Structured Connectivity solutions, please contact your Lucent Technologies Sales Representative, Authorized Distributor or Authorized Reseller. Call 800-344-0223 (outside the U.S., call 314-536-1886).

For information on other Lucent Technologies products and services, call 888-4-LUCENT.

To learn more, please visit our web site at <http://www.lucent.com/netsys/systemax>



† All costs are estimates projected as of January 1999. Savings will vary depending on actual costs at time of purchase.

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