

## Time To Buy

**W**hat's an investor to do this summer, tiptoeing through the Telecom, along the cliffs of crude, through the valley of the Damoclean dollar, juggling an array of high tech small caps and microchip plays that are said to be moving out of phase with the market?

Don't buy the market. The market is always muddled by the politicians. Buy the shares of companies that are aligned with the prevailing paradigms of progress in technology.

Charlie Burger points to one obvious winner: the field programmables, **Altera** (ALTR) and **Xilinx** (XLNX)—or perhaps just Altera. That way, it doesn't matter what the cockamamie customers turn out to want, you can supply it on the fly, as code in a fast static RAM (random access memory). In principle, field programmable gate arrays (FPGAs) could perform most of the functions on the *GTR*'s "Telecom Technologies" list, from **Advanced Micro Devices** (AMD) microproces-

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I would clutch the constellation of *Life After Television* stocks, such as Broadcom, Sigma, Qualcomm, Zoran, National Semiconductor, and Ikanos. All have a defensible edge in the coming era.

### FEATURED COMPANY: Finisar (FNSR)

The world's number two optical components supplier behind **JDSU** (JDSU), **Finisar** (FNSR) looks better all the time. Following its eleventh consecutive quarter of sequential revenue growth, the last seven of which set new records, the company raised its revenue guidance for fiscal year 2007 (which began in May) by \$15m to about \$445m or 22% over fiscal 2006. Excluding non-cash charges, earnings from operations are expected to hit \$0.15, up from \$0.03 last year. Management now believes revenue will rise 22% annually for the next several years compared to its older forecast of 20% growth.

Finisar generates some 90% of its revenue from optical transceivers. Driving the company's ascent recently have been sales of 4 gigabit per second products for storage area networks. These products now draw 40% of the company's storage and local network business. By the end of the calendar year Finisar expects sales of 4-gig products to surpass those of 2-gig fibre channel. Also at that time, next-generation 8-gig storage networks are expected to launch. Finisar will be there.

Insecure investors, slipping and sloshing in the quagmire of quarterly minutiae, appear to be missing the big picture with this company. The day following last week's conference call, the stock fell 25% to \$3.36 for a forward PE of 22, matching forecast revenue growth. Possibly worrying these folks is gross margin, undergoing slight short-term weakness as a result of the rapid rise of lower-margin storage and enterprise products. Also pressuring margins are capital expenditures for increasing fab capacity—the Malaysian plant is being expanded by 50%, and the advanced optical components division in Texas is moving to a new facility in Allen, where capacity will more than double.

All these "concerns" are actually good news. Oddly enough, when investors became euphoric several months ago, we were a bit worried that Finisar might not be able to handle explosive growth gracefully. In particular, **Cisco** (CSCO) is cutting its optics suppliers to seven next year and has warned Finisar, already Cisco's largest optical supplier, that it will have to ship "a lot more" products beginning then. Also, Finisar supplies about three quarters of the 4-gig storage market, where capacity is reportedly constrained, and is a leader in pluggable transceivers, also in short supply. Becoming increasingly popular, pluggable transceivers give systems houses greater flexibility in designing line cards as compared to the traditional method of soldering in components supplied by a potpourri of vendors.

But management is now confident that current construction will easily meet these demands, and that capex, which peaked last quarter at \$9.2m, will actually drop to \$20m for the coming fiscal year, down noticeably from \$24m last year. After the latest expansion, Finisar should be able to support many times today's revenue simply by adding and adapting equipment. With its factories already running 24/7, added equipment provides a quick payback; every new dollar of business generates 40% to 50% in incremental gross margin.

Thus, the company expects to hit its long-term model of 15% operating margin during the second half of the fiscal year, up by half from this quarter's projected 10%. Good news, no?

And there's more good news. Unlike many firms that are increasing income through cost-cutting, Finisar's challenges are a result of upside pressures and opportunities: Cisco is beating down the door. Ascending online applications such as banking, trading, and file backups are sending storage networks into orbit—**Brocade** (BRCD), **EMC** (EMC), and **QLogic** (QLGC) told Finisar they plan to double the size of their facilities this year and continue to add at an annual rate of 70% thereafter.

These same online applications are also pushing 10-gig Ethernet into enterprise and metro networks. The market for 10-gig transceivers and transponders was \$300m in 2005 and growing 30% per year. Compare that to Finisar's current annual run-rate of \$20m in 10-gig revenues and the opportunity becomes obvious. Finisar is now betting a good portion of its research allowance on 10-gig, helped in part by the recent acquisition of the 10-gig transceiver line from **Big Bear Networks**.

Today, two methods are used to transmit at 10 gig. Serial transceivers use one 10-gig laser and one photodetector. Parallel transceivers use four 2.5-gig lasers and four photodetectors. Finisar has done some work on four wavelength solutions, but most of the company's efforts have gone into serial devices. Long-term, the company believes serial devices will be a lot more

efficient, more compact, more cost effective, and lower power than 4-laser devices. Finisar claims "many" design wins in serial 10 gig in both networking and telecom equipment. However, Cisco has few serial designs, being slow to migrate to that form factor. Thus Cisco presents a big opportunity for Finisar in 10 gig.

In addition to the 90% of revenue from transceivers, the other 10% of Finisar's sales comes from tools that monitor storage and enterprise data centers. Struggling with flat-to-down revenues here, the company is about to introduce products designed for high-speed storage networks that will begin deploying later this year. Finisar is working closely with key customers and expects sales of network tools to start growing again soon.

More challenging has been the optical mouse project, which is based on a unique and very complicated semiconductor structure in which Finisar grows VCSELs (vertical cavity surface emitting lasers) on top of a photodetector, allowing for precise readings and low power. Finisar has identified some fundamental manufacturing problems, and they'll correct these soon. But margins will still need to be raised yet more. Demand for this product far exceeds what Finisar can supply, and **Logitech** (LOGI) has committed to shipping every VCSEL the company makes.

If Finisar merely hits its long-term sales and margin guidance (which we think is conservative), this time next year management will be projecting a 47% increase in earnings to \$0.22 for fiscal 2008, with a bonus of no tax penalty—the company has accumulated \$350m of operating losses. Assuming a reasonable growth PE of 30, the stock would be looking at \$6.60 and climbing. For big-picture investors who understand Finisar's potential and appreciate great management, the latest dip provides a good buying opportunity.

— Charlie Burger, June 13, 2006

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sors to **EZchip** (LNOP) net processors, from **Sigma Designs** (SIGM) codecs to **Qualcomm** (QCOM) one-chip modems. The industry could end up making just one chip with nearly infinite volume and give it away free, making you pay for the software that customizes it.

I say go with Charlie. But remember that high-end FPGAs now cost close to a thousand bucks apiece, take acres of silicon, and you still have to plow and harrow them and seed them with programs. And no one is fertilizing their product with government green as they do for **Archer Daniels Midland's** (ADM) ethanol, which is far more wasteful of silicon and energy. So for all their long-term inexorability in the Moore's law cascade, FPGAs will not take over right away. (With that reservation in mind, I must remember to remind my children to put their IRAs in Altera and Xilinx. So should you.)

Even though Xilinx has portentously introduced a field programmable traffic manager that is theoretically usable in slots everywhere from the access to the metro, you should stick with EZchip, the network processor star with now going on 90 design wins. Among a number of exciting recent

breakthroughs, those wins now include the first ones for the next generation, NP3, which provides an entire line card on a chip.

As fiber optics moves massively into the local loop, unleashing a protocol zoo and multi-play in the neighborhood, every network node has to change. Legacy processor based routers such as the Cisco 7500 with ordinary embedded microprocessors or layer 2 switches based on fixed application-specific integrated circuits (ASICs) or legacy SONET (synchronous optical NETWORK) boxes at the telco central office cannot handle the onrush of video, voice, and data schemes with different prioritizations and reservations, aggregation policies, unicast and multicast, TCP (transfer control protocol) and UDP (user datagram protocol), virtual private networks (VPNs) and MAC (media access controller) to MAC tunnels and every flavor of digital subscriber line (DSL) interface. Driven by the potential terabits of fiber optics, the new networks all require specialized network processors to groom and shuffle the flood of packets at wirespeed.

To get a glimpse of the EZ future, look at Japan, where

fiber has already been deployed for some 15 million subscribers over the last three years on the way to 40 million. There, broadband Internet links do between 10 megabits per second and 100 megabits per second. They run such services as video streams, multiplayer games, HDTV downloads, cell phone TV, VPNs, karaoke, 3G CDMA wireless backhauled, and downloads to handsets faster than U.S. wireline broadband.

To bring these flows together, **KDDI**, Japan's second largest carrier, is rebuilding its entire network around 10 gigabit per second carrier class Ethernet boxes, for what they call "triple play" Hikari Plus: voice-over-IP (VoIP), Internet, video on demand, Pay TV, and karaoke. Maybe karaoke and TV don't count or maybe "Hikari" means quintuple play.

In any case, don't bet against KDDI. It has bet the farm on new technologies twice in recent years. Once was on CDMA 2000 and EV-DO (evolution-data optimized) from Qualcomm. That made KDDI the fastest growing wireless carrier in the world. For this new national 10 gigabit Ethernet deployment, KDDI went with a small Israeli company called Corrigent Systems, now owned by **Orckit** (ORCT). Corrigent offers CM100, a 10-gigabit carrier grade Ethernet layer 2-3 switch, which enables all the quintuple play services and which is driven by a super secret "packet engine" with a set of features that around the *GTR* we recognize as the signature of EZchip.

Japan may be first, but broadband is coming soon to a central office near you. EZchip will be in the neighborhood. No, it is not a sure thing. Competition is heavy and the market is still somewhat sluggish. Things could still go wrong. The politicians still think they should be permitted to yank the telcos and cable companies to and fro in exchange for campaign contributions. You know the riff—neutralize this, rip open that, trap door the transceiver, franchise all the wiggle room from DC to infrared, universalize service by taxing it like tobacco. It's a hard environment.

Signs accumulate, however, that EZ is entrenching itself in nearly all the major box companies. If you name a name, perhaps not **Alcatel** (ALA), which recently spent \$150 million on NPU designer TiMetra, the answer is probably yes. As sure as video streams and multiplayer games and digital images advance across the network, network processors are being forced ever more widely into its nodes and edges. EZ took the lead four years ago, defined the most scalable and adaptable architecture for all seven layers of the networking stack, and is now ready for a future of ubiquitous IP and Ethernet. The market for the network processors that it now spearheads should rise to around \$200 million over the next two years and may eventually top out at around a billion dollars.

Driving the transition to network processors is

the transformation of household communications. Eschewing the analog channels of TV and telephony, households now have multiple brands of voice, video and data to shuffle around the neighborhood nearly all of it Internet Protocol (IP). Therefore, having set aside a trove of EZ chip, I would seriously contemplate the coming IPO of **Wintegra**, which dominates the market in access network processors and is lowering its price relentlessly as I write. I would also clutch the constellation of *Life After Television* stocks. The living room TV set is giving way to computers, entertainment centers, digital video players, multiplayer game machines, digital cameras and camcorders, color printers, video phones, all wirelessly linked and controlled by the customers rather than by the broadcasters.

This digital paradigm will ultimately take nearly all the revenues currently collected by analog broadcast television and analog telephony. TV is rapidly becoming merely another option for display of digital information. Telephony is a form of data. Though it may be impolite to say it, what is happening is the replacement of a rather degenerate top-down lowest common denominator culture with a "long tail" culture of first choices.

## Signs that EZ is entrenching itself in nearly all the major box companies are accumulating.

Winners in the new world include **Broadcom** (BRCM), virtuoso of cable and networking standards across the board, wireline and wireless; **Sigma** (SIGM), the master of media processors with all the video decoders for IPTV, which is coming slowly but surely; Qualcomm, the broadband MediaFlo wireless titan ahead of most of the wireline players in bandwidth; **Zoran** (ZRAN), the maker of digital imager chips for cameras, printers, digital TVs, DVD players, personal video recorders, and portable video players; **National Semiconductor** (NSM), high speed interface and analog paladin for "gigabits at milliwatts" (you need analog to link to the world); and **Ikanos** (IKAN), the VDSL2 (very high-speed digital subscriber line) champion moving into residential gateways. All have a defensible edge in the coming era and all are unjustifiably in the dumps.

But do I sound like some old baby boom fogey still on a Telecom jag? The Telecom, sneer the sages, is so *1990s*. Why shouldn't we all plunge into oil, corn, and copper futures with millennial Jim Rogers, the Commodity Dirt Biker, or into gold with the bullion flake doomsters, or into Yen and Euros with Warren Buffett's "Squanderville" chorus? Bet against America at War. That's the play of the day.

<b>Advanced Micro Devices</b>	(AMD)
<b>Altera</b>	(ALTR)
<b>Analog Devices</b>	(ADI)
<b>Broadcom</b>	(BRCM)
<b>Broadwing</b>	(BWNG)
<b>Cepheid</b>	(CPHD)
<b>Corning</b>	(GLW)
<b>Energy Conversion Devices</b>	(ENER)
<b>Equinix</b>	(EQIX)
<b>Essex</b>	(KEYW)
<b>EZchip</b>	(LNOP)
<b>Finisar</b>	(FNSR)
<b>Flextronics</b>	(FLEX)
<b>Ikanos</b>	(IKAN)
<b>Intel</b>	(INTC)
<b>Microvision</b>	(MVIS)
<b>National Semiconductor</b>	(NSM)
<b>NetLogic</b>	(NETL)
<b>PMC-Sierra</b>	(PMCS)
<b>Power-One</b>	(PWER)
<b>Qualcomm</b>	(QCOM)
<b>Semiconductor Manufacturing International</b>	(SMI)
<b>Sigma Designs</b>	(SIGM)
<b>Semitool</b>	(SMTL)
<b>Sprint Nextel</b>	(S)
<b>Synaptics</b>	(SYNA)
<b>Taiwan Semiconductor</b>	(TSM)
<b>Texas Instruments</b>	(TXN)
<b>Xilinx</b>	(XLNX)
<b>Zoran</b>	(ZRAN)

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**Note:** The Telecom Technologies list featured in the Gilder Technology Report is not a model portfolio. It is a list of technologies that lead in their respective application. Companies appear on this list based on technical leadership, without consideration of current share price or investment timing. The presence of a company on the list is not a recommendation to buy shares at the current price. George Gilder and Gilder Technology Report staff may hold positions in some or all of the stocks listed.

## Cepheid (CPHD)

PARADIGM PLAY: MICROELECTRONIC MACHINES FOR DNA IDENTITY

JUNE 14: 8.91; 52-WEEK RANGE: 5.83-11.21; MARKET CAP: 486.1M

Cepheid makes systems that perform real-time genetic analysis using bio-microarray chips such as those supplied by industry leader Affymetrix, which claims to pack up to 500k DNA receptors on a single sliver of silicon. Now ten years old, Cepheid has never made a penny, but a buoyant management still expects to cross over to a quarterly operating profit later this year. Threatening the arrival of these long-awaited earnings are swelling operating expenses, now 132% of sales.

Cepheid has been increasing spending on research, manufacturing, and marketing to accelerate development and delivery of clinical products, without which profits will remain elusive. As clinical trials proliferate in coming months, operating expenses may increase still further. In addition, fees and royalties to pay for licenses with Applera and Roche have depressed gross margin into the low 40s over the past year. Going forward, the company plans to use yet more technology licenses (required for many of the new offerings). So don't expect gross margin to rise back to the upper 40s or operating margin to climb to the promised land of profits until new products start selling into the ascending clinical marketplace.

Among the hopeful innovations are CE IVD assays for BCR/ABL and Group B Strep on GeneXpert, recently released in Europe. For industrial customers, Cepheid launched Smart Cap, which allows real-time PCR (polymerase chain reaction) to be run on SmartCycler, and began the open cartridge program, which permits select labs to develop their own assays for GeneXpert. A product that simultaneously tests for anthrax, *Y. pestis*, and *F. tularensis* was released to the biothreat community. And marketing of the new 16-module GeneXpert system will began last month in Orlando at the meeting of the American Society of Microbiology.

Coming later this year should be releases of products in Europe for routine clinical diagnostics, including Enterovirus meningitis on GeneXpert and Epstein-Barr virus and cytomegalovirus on SmartCycler. The GeneXpert MRSA/MSSA assay, now in domestic trials, will simultaneously identify Methicillin sensitive and resistant strains of *Staphylococcus aureus* (SA) and confirm that a detected strain of MRSA is carrying the MEC A gene, which confers Methicillin resistance. This should avoid false positives—detecting Staph strains that are not carrying the MEC A gene and, therefore, are not resistant to treatment with Methicillin.

Sounds impressive, doesn't it? But if it's Greek to you, you probably shouldn't be investing in Cepheid, which competes against established companies such as Roche, Applied Biosystems, and Bio Rad in the ascending market for molecular diagnostics. Cepheid's trump card, GeneXpert, may be the world's only fully-integrated and automated genetic-analysis system; it adds automated sampling to SmartCycler's rapid genetic analysis. Cepheid believes its products are easy to use, fast, and highly sensitive—all critical parameters in healthcare diagnostics.

For instance, patients infected with Staph that is resistant to certain antibiotics such as Methicillin should be isolated quickly to keep the life-threatening infection from spreading through the hospital. That's bad news for culture-based diagnostic methods, which take some two days to complete, and good news for real-time molecular diagnostics from Cepheid. If no Staph is present, GeneXpert shuts down in about 45 minutes. If Staph is detected, the system then determines if it is Methicillin resistant. If so, it then self-confirms that the MEC A gene is there and that you have a true clinical positive. This three-step process, unique to GeneXpert, will be accomplished on one cartridge and sold into a global MRSA test market of some \$1b.

Another potential winner for Cepheid is its ASR (analyte specific reagent) for Flu A/B detects virus strains associated with avian flu and thus may help trace potential human infection. The USDA now routinely uses the ASR as *the* lab reagent for avian flu and is making it available to a national network of labs involved in testing poultry and migratory water fowl.

With concerns about terrorism and global pandemics on the rise, investors are likely valuing Cepheid at a premium in anticipation of long-term success in the infant biothreat, life sciences, and clinical genetic assessment markets. At around \$9 per share, the company is going for an enterprise value (capex minus net cash) of 4.2x projected sales for the year. To earn its current market cap at a growth PE of 30, Cepheid must take \$16.4m to its bottom line; for a double to \$18, earnings must reach \$32.8m.

Thus, Cepheid is for buy-and-hold investors and entails significant risk from competitors and cash burn; last year, the company consumed over \$24m in operations, capex, and licensing fees. But huge markets (\$1b alone for MRSA tests) could send Cepheid into the stratosphere. To tide it over until earnings begin, Cepheid sold 11.4m shares (27% dilution) for gross proceeds of \$92m, boosting cash and receivables to \$119.9m or \$84.5m more than current liabilities of \$35.4m. — CB

**Online Bonus Material:** For additional analysis on **Analog Devices (ADI)**, **Essex (KEYW)**, **Sigma Designs (SIGM)**, and **Semitool (SMTL)** logon with your GTR subscriber ID at [www.Gildertech.com](http://www.Gildertech.com). Visit [www.TelecosmConference.com](http://www.TelecosmConference.com) today to register for Gilder/Forbes Telecoms 2006, October 4 - 6 in Lake Tahoe, and receive half-off the Forbes.com registration price.



## Kessler's New Bio-chip Paradigm

If the gurus are getting you down on the Telecosm and you want to diversify, Andy Kessler has a better idea. At Gilder/Forbes Telecosm 2006, in October, he will give us a new paradigm in a scintillating speech and panel based on his new book titled *The End of Medicine* (Collins, July 2006). Since the nation currently spends \$1.8 trillion on health care and is on a trajectory to spend \$3 trillion, this is where the money is going and growing.

According to Andy, it is also where the technology is moving, to prop up and prosthetize the boomers in a newly dynamic dotage. I can't wait. He warns, though, that this field is regulated even more fully than telecom is. Also you still die and face a death tax to pay the bills. I knew there was a downside.

In general, Kessler does not favor the usual run of biotech stocks, which he finds have no systematic or predictable way of developing new products. ("Biotech investing is like buying Willy Wonka bars to get the golden ticket"). But he was intrigued with a company called **PDL BioPharma** (PDL) (formerly Protein Design Labs) that creates anti-cancer antibodies for humans based on information gleaned from mice. Designer mice generate antibodies that can be adapted or "humanized" for medical applications. As Kessler explains: "Mice...reproduce like rabbits and don't have much else to do.

"Of course," he concedes, "they all want to grow up to be rats and live in the N.Y. city subway system....

"But don't we all?"

Watching the kindred mice being injected, inspected, sliced and diced, Kessler toughed it out for the good of the cause. He discovered a series of promising anti-cancer strategies. But he became a little squeamish upon discovering that PDL BioPharma has a market cap of \$3 billion despite having lost money for 19 years straight, running through a total of some \$270 million, without yet getting any drugs through the FDA gauntlet.

Kessler sought a more promising paradigm than mouse farms:

"I'd spent 20 years on Wall Street analyzing and investing in whatever was the latest and greatest technology.... I stuck my nose anywhere I could find costs that continually dropped.... It works like magic. I made a career out of riding these waves. I wondered if I could find them in medicine. It wasn't so obvious."

Here Kessler begins his exploration of the new frontiers of medical care, looking for companies on a Moore's law curve.

"This is how Silicon Valley works. Every year, the cost of every chip, gate, transistor, function drops by 30%—it halves every two years. If nothing else hap-

pened, Silicon Valley would shrink into oblivion. But elasticity kicks in—SCALE. Put simply, every time costs decline, some new application opens up to take advantage of the cheaper functionality and you sell three times as many. Or 10 times as many.

"I've seen it with PCs, cell phones, TiVo, routers, DVD players, electronic engine controllers in autos, and video games. 3-D graphics live on this learning curve, providing more and more photorealistic animations. And just like that, because of new technology, entire careers disappear...Silicon is cheaper than people....Were doctors next? I secretly hoped so.

"[But] will we see doctors on soup lines or selling pencils out of tin cups on street corners? Are you kidding me?...When the PC kicked mainframe [butt], tech jobs went up by a factor of a thousand."

Kessler sees a similar upheaval hitting the medical world. But his paradigm is a long-term commitment. The initial companies seem to be either private or mega-corporate. An exception is **Advanced Medical Optics** (EYE), which provides systems and services for LASIK, the laser vision correction technique. Although Andy does not endorse the company, he enthusiastically describes the system.

"*'Ka-ching,'* said [Andy's wife] Nancy, after undergoing the procedure in one eye for \$900 and contemplating another \$900 on the next." Kessler comments: "The lease on the half-a-million dollar machine and a couple of hundred dollars in royalties for each laser blast means [the doctor] clears more than every cardiologist and brain surgeon in this hospital....

## In line with Kessler's paradigm is Cepheid, maker of systems that perform real-time genetic analysis using bio-microarray chips such as those supplied by Affymetrix.

"But it's more than that isn't it. If [the doctor] is blasting a hundred eyes a day, that's got to be millions of dollars a year out of the pockets of optometrists and ophthalmologists and folks at Pearle Vision Centers, let alone drying sales of Bausch & Lomb saline solution. A new piece of equipment in the hands of a specialized doctor could mean literally dozens of other doctors out of a job—the bank tellers of a new era."

This technology has scale and it benefits all its customers, both providers and patients. But it is already in the public eye. Andy was looking for more far-reaching

and less well known technologies that could put the world of medicine on the Moore's law learning curve.

One area of silicon advance is 3-D scanning. Here the leaders are **GE Healthcare** (a division of GE), **Toshiba**, **Philips Medical Systems** (a division of PHG), **Siemens Medical Solutions** (a division of SI), **iCAD** (ICAD), and the private **TeraRecon**, **Vital Images**, and **R2**.

## PDL BioPharma is an intriguing company that creates anti-cancer antibodies for humans based on information gleaned from mice.

Kessler's real target is the convergence of silicon and biology in new kinds of chips that can convert medicine from its current strategy of massive retaliation, marked by X-ray bombardment, triple bypass operations, and kyphoplastic dorsal disk jobs. He prefers a strategy of early detection and refined targeting using ever higher resolution bio-chips, sensors, and integrated 3-D imagers. He seeks Moore's law price elasticities (better, faster, cooler, cheaper) that build exponentially growing markets from microcosmically shrinking and improving devices. He discusses **Affymetrix** (AFFX) as the current leader in bio-chips implanted on glass, but prefers new long term projects for inscribing biochips on silicon, possibly using nanotubes, as the director of Stanford's molecular imaging program, Sam Gambhir, proposes.

The trouble is that still "today it is cheaper for your symptoms to show up in real life—clutching, can't breathe, life flashing in front of your eyes—than [to detect them ahead of time] in a few gigs of a virtual scan." A million cardio bypass operations for \$15 billion looks like a bargain compared to \$20 billion for scanning the hearts of 200 million Americans at \$100 apiece.

The goal is "bleed to read": one blood sample quickly sorted into a DNA signature and disease marker. It's coming, but slowly. Andy's book is a shrewd, learned, uproarious, and trenchant way to get started.

In the field of early detection and 3-D scanning, our favorite company remains **Essex** (KEYW), still a compelling buy, specializing in battlefield radar and imaging (and congrats may be due on the Zarqawi hit, by the way). But more in the Kessler line is **Cepheid** (CPHD), which makes systems that perform real-time genetic analysis using bio-microarray chips such as those supplied by Affymetrix, which is moving down a Moore's law cascade to a claimed 500 thousand DNA receptors on a single sliver of silica. Cepheid came to our list as

part of a campaign, spearheaded by Nick Tredennick, to extend the Microcosm paradigm to bioMEMS—micro-electronic machines. (For the current details on CPHD, see page 4.)

Nearly all technology stocks are currently in the soup, though.

The basic problem, as usual, is leadership. From both political parties, the hoagies and heroes elected to lead us are instead consulting us, while the media chase the tail of their own polled opinions, calling it "news," and wag the poodles of their own images of the world. Seeking guidance from public opinion hierophants, the politicians nullify any possible hope of leadership, consistency, or correct policy. Leaders who follow public opinion polls earn the sure contempt of the public.

I have been reciting this riff since the days of *Wealth & Poverty* (1981), when President Reagan read the book and actually grasped the point that leaders should form public opinion rather than follow it. I will continue to recite the Reagan theme until his successors also learn this most crucial lesson of democratic politics. With leaders following what Walter Lippmann called the "phantom public," the nation blunders on a random walk through the world and no one can invest effectively. *Markets* can capture the wisdom of crowds, but polls cannot, since the act of polling falsely aggregates the ignorance of the group and misses its diffused knowledge.

## Kessler sees upheaval hitting the medical world. But his paradigm is a long-term commitment.

The second key lesson of the day is that leaders who consult bi-coastal Ivy League economists end up bashing the dollar, always the deadly peril for stocks. It doesn't seem to matter much whether the Ivy Leaguers pretend to be Republican or Democrat, from Adam Blinder and Paul Krugman to Martin Feldstein and Larry Lindsay, they all believe in autonomous national economies with trade and money in balance. With the trade gap simply the inevitable converse of capital flows to the U.S., the only way to create this global balance is to keep the money out, by trashing American financial markets (that colossal trove and attractor of wealth, nearly 50 percent of the global total, which skews all the numbers). If the politicians keep up their assaults on Wall Street, they may finally get a trade balance for the first time since that golden year of 1979. Since 2000, when 90 percent of the dollars raised by non-U.S. companies in public stock offerings was done in the U.S., runaway litigation and Sarbanes-Oxley pettifoggery has pushed 90 percent of this activity overseas. Good job, guys.

The Ivy Leaguers also subvert the Telecosm, tending to think of telecom as a perpetual problem: a natural monopoly, an anti-trust peril, a free speech filter, and a forensic circus. Their bright idea of the moment is “net neutrality,” a concept at once so vague and demanding—like global balance, “universal service,” or “open access”—that its penumbra could be litigated in fifty states and up-and-down the federal court system until all our Internet traffic has to be diverted through **Equinix** (EQIX) centers in Seoul and Beijing merely to avoid lawyer spam. By any name, as Larry Darby points out in an important recent paper, “net neutrality” means price controls on some of the most complex many-sided markets in all industry and thus is sure to do for the rollout of broadband what Sarbox has done for IPOs.

So at a time when the world economy is in a massive and positive disequilibrium caused by the juggernaut of American communications technology and enterprise, we have experts eager to put telecom in “neutral” and the world economy in “balance.” This is the reality behind the market angst. If Federal Reserve Chief Ben Bernanke thinks the dollar is too strong, obviously we should follow Buffett and all scramble out of the U.S. stock market and other squanderville markets denominated in dollars. If Google and co. manage to rig a new set of regulations for the Internet, just as broadband begins to limp into the loop at last, the Telecosm will continue to slump.

Bernanke and his friends seem to think that inflation has something to do with growth or capacity utilization rather than with previous monetary looseness. As David Malpass puts it in his latest note from Bear Stearns: “This creates an unfavorable environment for equities, implying either a slowdown, inflation or both. We think a better anchor for monetary policy (rather than the core PCE deflator, which has a deep lag) would be the value of the dollar.”

But the obtuseness of policy still does not countervail the general thrust of good news. The economy is booming; “net neutrality” cannot even be defined, let alone legislated; the dollar is beginning to revive; and the war is going better. The supply-side tax cuts on capital gains and dividends have yielded far more revenue than they “cost,” cutting back sharply on the federal deficit and flooding state and local coffers (check it out), while igniting an economic boom (a 5.3 percent growth rate at last report). This growth includes a 36-month expansion of manufacturing output, the longest in 16 years. As Malpass totes up the results, American households, still by far the world’s largest *creditor* group, increased their net worth by \$1.4 *trillion* in the first quarter, with rapid growth in all kinds of savings. Financial net worth, including mortgage debt but *excluding* the value of housing, is \$27.6 trillion, up 7.4 percent since March 2005.

Yes, household debt has doubled in relation to

income over the last 25 years. (So what else is new?). But debt should be measured not against income but against assets. You cannot borrow without collateral. As Malpass points out, that debt/income trend reflects the amazing and unprecedented 68 percent of U.S. households owning their own homes as collateral. Nor is all or even most of the wealth in real estate. “While total household liabilities rose \$1.3 trillion in the four quarters through Q1 2006, households added \$3.2T of financial assets and \$2.8T of housing assets.” Inflation remains a threat if the dollar bashers prevail, but the idea that our economy is teetering on a tide of debt is preposterous.

## If Bay Microsystems goes public now, fending off Cavium, Raza Micro, Wintegra, and Greenfield, the GTR will be intrigued.

With most of the bad news wrong, this is a time to buy stocks. We’ll have supply-side Nobel laureate Bob Mundell, Steve Forbes, Mike Milken, John Rutledge, and an array of other sages to explain it all at Gilder/Forbes Telecosm X, in Tahoe in October. (See [www.TelecosmConference.com](http://www.TelecosmConference.com))

Meanwhile, even in the face of the current doldrums, the *GTR* list has outperformed the NASDAQ for the last ten years by a factor close to two, for the last four years by a factor of three, and so far in 2006 (with the NASDAQ losing value) by a factor of ten or so over S&P. (See the Sears’ [www.GTIndex.com](http://www.GTIndex.com) for many fascinating details.) Even when I’m not juggling as I jog, though, I always have trouble typing and patting my back at the same time without spraining my brain stem and other medial metaphors, which form key Telecosmic ganglia between the thalamus and the settop box. This is the sensitive *Life After Television* region where the backbone core on the couch connects to the **Verizon** (VZ) vestibular PONS or the “Lightspeed” **AT&T** (T)/Ikanos VDSL2.

With network processors, security chips, codecs, high-speed interfaces, A-Ds, and transceivers, these interconnect spaces can be as treacherous as they are profitable. But don’t pay any more attention than you must to such misadventures as transceiver king **Finisar** (FNSR) losing a third of its value after a blowaway successful quarter. That’s called a buying opportunity. (See page 1 *Featured Company*.) More relevant, and possibly spooky for our EZchip, is **Bay Microsystems**, pre-announcing a next-generation 40 Gbps network processor with special ATM (asynchronous transfer mode) wirespeed SAR (segmentation and reassembly) and an amazing array of traffic managers and other capabilities that used to be

restricted to EZchip. Who *are* these guys?

They turn out to be old favorites of the *GTR*, Rick Bleszynski and Man Trinh, authors of a stream of formidable network devices climaxed by the Gigablade at SoftCom (covered in the late 90s). Launched in January 2000 six months after EZ, Bay brings together a formidable bunch of ingenious designers with a telecom orientation who have specialized in ATM. Invented in the mid-1980s by the Bells, ATM fused multimedia and voice by chopping them all into 53 byte “cells” (with some fiercely fast and intricate SAR required).

Bleszynski and Trinh began by inventing the ATMizer communications processor family at **LSI Logic** (LSI). They followed up by building up the SONET and ATM processor company IgT and selling it to **PMC-Sierra** (PMCS), which always had a soft spot for Bell Labs legacies. Then they created SoftCom with its formidable Gigablade, enabling PCs to link to gigabit networks. They sold SoftCom to **Intel** (INTC) in 2000.

Projected to take over the world by its Bell Labs authors, however, ATM underestimated the power of Ethernet in a broadband world where “cells” were simply otiose. With the bandwidth of fiber, these 53-byte chunks of data create a processing hurdle and a “cell tax” without reducing latency or jitter. Still lots of ATM remains out there, in old SONET and even DSL systems. Some big switches need to handle it and Bay may win those.

Bleszynski and Trinh started Bay providing machines for complex legacy government networks. Their 250-watt ABEX 2020 combines ATM with SONET, Infiniband, Fibre Channel, Ethernet, IPv6, MPLS (multiprotocol label switching), and deterministic security. A swiss army switch and blade and kitchen data sink partly financed by the CIA no less, it gives multiple meanings to a multi-service device and made Bay profitable nearly from the beginning. Moving up to a 40-gig NPU now is impressive, and Bay will undoubtedly put it in another government box. But as a stunt, 40 Gbps NPUs have been performed already by Xelerated and Cisco.

A 40-gig processor is not more promising than a more produceable 10 Gbps device from EZ that also

does operations at seven layers. EZ will probably have a 40-Gig device when it is needed. And ATM is nearly irrelevant at 10 gigabits per second, which was pretty much impossible when the standard was created. If Bay goes public now, fending off **Cavium**, **Raza Micro**, **Wintegra**, and **Greenfield Networks**, the *GTR* will be intrigued.

But a chip company wins on volume. Bay’s Chesapeake processor is enormously complex, goes in low run rate boxes, and may well be costly to produce. EZ simplified its business plan by focusing on new networks from the outset, with MPLS, ATM withers on the vines of the old network. EZ’s NP2 is out there and NP3 is beginning to get design wins. Still six months behind EZ, Bay has forced its way into consideration as a significant player. But it does not bother us any more than usual as we watch EZ forge ahead.

The most serious competition for EZ is undoubtedly Broadcom. With its network processor acquisition, Sandburst, it now adds an at least partly programmable processor to its dominant SGX line of fixed-function ASICs for Ethernet switches. Sandburst attracted Broadcom by winning a Juniper slot alongside EZchip’s several reported wins with **Juniper** (JNPR). The market, however, can probably accommodate more than one player. The other Ethernet switch ASIC star is Marvell (MRVL), which is likely also seeking a network processor partner. EZ is the most likely choice.

We concede that the Telecosm has been forward error correcting at a pace that can curl your chips and **Synaptics** (SYNA). Having gone on a buying spree two months ago, I know well what has happened to such favorites as Ikanos, PMC-Sierra, Intel, **NetLogic** (NETL) and **Microvision** (MVIS). We still like these companies, none of them on the list five years ago. But what have they done for you lately? They just lie out there pleading, ever more persuasively, to be bought.

You should consider buying them all.

– George Gilder, June 14, 2006

## Got Questions?

Visit our subscriber-only discussion forum, the Telecosm Lounge, with George Gilder and Nick Tredennick, on [www.gildertech.com](http://www.gildertech.com)

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