


Telecommunication Stocks – Investment SIG

Minnesota Futurists by Dave Keenan, Duane Carlson, Roger Rydberg, Earl Joseph
 (www.mnfuturists.org)
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AREA	SUBJECT	21 st CENTURY DIRECTIONS & FUTURES																																								
BACK-GROUND	<ul style="list-style-type: none"> DEFINING THE ISSUES 	<ul style="list-style-type: none"> Even though the Technology Sector is in the doldrums, Telecommunication Stocks have moved off the bottom of IBD's 197 list <table style="width: 100%; border-collapse: collapse; margin-top: 10px;"> <thead> <tr> <th style="width: 40%;"></th> <th style="width: 15%;">29 Nov</th> <th style="width: 15%;">22 Nov</th> <th style="width: 15%;">29 Oct</th> </tr> </thead> <tbody> <tr> <td>Industry Group</td> <td></td> <td></td> <td></td> </tr> <tr> <td>Fiber Optic Components</td> <td>13</td> <td>60</td> <td>194</td> </tr> <tr> <td>Telecom Equipment</td> <td>16</td> <td>33</td> <td>118</td> </tr> <tr> <td>Telecom Svc Foreign</td> <td>36</td> <td>34</td> <td>64</td> </tr> <tr> <td>Telecom Svc Domestic</td> <td>90</td> <td>99</td> <td>123</td> </tr> <tr> <td>Fiber Optic Networks</td> <td>135</td> <td>197</td> <td>197</td> </tr> </tbody> </table> <div style="margin-top: 10px;"> <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 15%;">169.37</td> <td style="width: 15%;">Change: ▲ +3.93</td> <td style="width: 10%;">Open: 165.48</td> <td style="width: 10%;">High: 170.36</td> <td style="width: 10%;">Low: 164.85</td> <td style="width: 10%;">Volume: n/a</td> </tr> <tr> <td></td> <td>Percent Change: ▲ +2.38%</td> <td>Yield: n/a</td> <td>P/E Ratio: n/a</td> <td colspan="2">52 Week. Range: 105.57 to 395.93</td> </tr> </table> <p style="font-size: small; margin-top: 5px;">3-month Daily Chart of the Dow Jones U.S. DJ Wireless Communications Ind... IndexSM</p>  <p style="font-size: x-small; margin-top: 5px;">http://bigcharts.marketwatch.com/industry/bigcharts-com/indchart.asp?bcind_ind=CTS&bcind_sid=171519&bcind_period=3mo</p> </div>		29 Nov	22 Nov	29 Oct	Industry Group				Fiber Optic Components	13	60	194	Telecom Equipment	16	33	118	Telecom Svc Foreign	36	34	64	Telecom Svc Domestic	90	99	123	Fiber Optic Networks	135	197	197	169.37	Change: ▲ +3.93	Open: 165.48	High: 170.36	Low: 164.85	Volume: n/a		Percent Change: ▲ +2.38%	Yield: n/a	P/E Ratio: n/a	52 Week. Range: 105.57 to 395.93	
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Wireless – GSM vs WiFi 802.11 vs Bluetooth vs Ultra Wide Band vs Satellite vs Telepathy

- GSM = **G**lobal **S**ystem for **M**obile **C**ommunication (cell phones)
- Wireless Telecommunications has evolved from 1G (analog) to 2G (digital) to 3G (always-on, faster data rate) since 1980 with a possible trend to 4G by 2006 (any info, anywhere, any time, moving or stationary)¹
 G = generation
- **WiFi** (Wireless Fidelity) is IEEE Standard 802.11
 - 802.11b – 2.4GHz, 11 Mbit/sec, 300 ft range **LEADER TODAY**
 - 802.11a – 5GHz, 5x faster than –b, not backward compatible
 - 802.11g – 2.4GHz, 5x faster than –b, compatible **NEXT** Cisco will introduce hardware in 2003
 - HomeRF – predates 802.11, 2000 used by 45% of home users, 2001 dropped to 30%, 2002 still **FADING**
 - Security issues – must use passwords and/or encryption to resist “partyline problem”
 - Who makes WiFi?
 - WiFi alliance members include **3Com, Acer, Agere, AMD, Apple, Dell, Epson, Ericsson, Fujitsu, Gateway, Hitachi, HP, Hyundai, IBM, Intersil, Intel, Lucent, Microsoft, Motorola, National Semiconductor, NEC, Nokia, NTT, Palm, Phillips, Rf Micro Devices, Ricoh, Samsung, Sharp, Siemens, Sony, Sprint, TI, Toshiba, US Robotics** and many more

- [An answer to Wi-Fi's discontents](#) - News.com 11Dec02
 No single company is in position to build out the wireless Internet infrastructure, but a small tech start-up in Texas "has developed a technology that it says can help break the logjam." **Transat Technologies'** software lets carriers mesh advanced cellular networks with independent, local Wi-Fi hot spots into a cohesive data network. If it works, it would let cellular carriers offer nationwide notebook PC roaming. **Intel** has invested in the company, founded by alumni from **Nokia, Bell Labs** and **Pacific Bell Wireless**.
- **TechTitans Launch WiFi Company** CNET 05Dec02 IBM, Intel, and AT&T and investors Ajax Partners and 3i formed **Cometa Networks** (fka Project Rainbow) to deploy 20,000 hot-spot access points around the US. Cometa will act as wholesaler, selling access to carriers and large companies. Designed to work with same sign-on procedures, e-mail addresses, IDs, and passwords we use today.
- At 802.11 Planet Conference 04Dec02, **InterSil's** Dennis Eaton predicted \$2 billion in 802.11b product sales for 2002 and expect to grow 30% per year through 2006 vs Budweiser (\$5B).
- He noted that Wireless PC cards price is dropping from \$100-\$200 to about \$50-\$75.
- And he criticized companies that jump ahead of standards...
- **Linksys** is jumping ahead of 802.11g standard approval to launch its "Instant Wireless-G" devices including \$80 cards for laptops, \$140 radio transmitters, and \$150 routers. Compatible with the 6 – 8 million wireless networks in the field today.
- Instat/MDR projects 55 million wireless networks by 2005
- **InterSil** and **Atheros Communication** will launch 802.11g products for '03. **InterSil** has been arguing points with **TI**.
- The 802.11g standard is not expected before Jun/Jul 03 but FCC has approved for use 100m from home.
- **Bluetooth** – compete/coexist with WiFi (transmitter/receiver sets)
 - IEEE 805.15 Std for Wireless Personal Area Networks WPAN
 - Operates in the globally available 2.45 GHz ISM 'free band'
 - Low-cost, low power, robust, secure, efficient, high capacity, ad hoc voice and data networking of up to 1 Mb/sec, in a range of 10 meters. Not suited for heavy traffic loads.
 - Bluetooth as a technology was conceived by **Ericsson in 1994** and in 1998 the Bluetooth SIG trade association was founded by **Nokia, Ericsson, IBM, Intel and Toshiba**. The specifications and IPR for Bluetooth belong to the SIG. Today the Bluetooth SIG has **over 1900 members**.
 - Harald Bluetooth was king of Denmark in the 10th century
 - Application examples from Dec 10 Developer Conference
 - **Audi** will offer first car with Bluetooth-enabled GSM car phone and cordless handset this month in Europe and Asia, hardware from Cambridge Silicon Radio. In addition to rechargeable phone, users can connect Bluetooth-enabled laptops and PDAs
 - **Motorola** MOT unveiled its 2nd Generation Bluetooth wireless headset with longer talk and standby time, up to 10 meter range www.motorola.com/ship/btheadset suggested retail price of \$149.99
 - **Ericsson** added two new sets to its Bluetooth chipset menu tailored to wireless headsets and PC mice
 - **Agilent (A)** introduced new test equipment for Bluetooth gear
 - **National Semiconductor** rolled out a family of models called Simply Blue aimed at phones, digital cameras, set-top boxes, printers and scanners
 - **Toshiba** America announced development deals for embedded Bluetooth solutions
 - **Some companies offer Bluetooth and WiFi in same device.**
 - Vending equipment including Pharmaceuticals distribution
 - Automated Process Equipment – sends data to HQ, Maint, Engr
- **UWB – Ultra Wide Band** is like high speed Morse code at 40 million taps/sec, not spectrum limited, no

congestion, great security, very low power. Same technology as “Thru the wall” Radar

• Major Players in UWB

1. [Aether Wire & Location, Inc.](http://www.aetherwire.com) www.aetherwire.com
Developing small, low power transceivers that can be used for position location and low data-rate communication. Incorporates UWB technology. Many papers, list of patents available here.
 2. [Multispectral Solutions, Inc.](http://www.multispectral.com) www.multispectral.com
Industry leader in the development of ultra wideband (UWB) systems for communications, radar and geopositioning.
 3. [Pulse~Link, Inc.](http://www.pulselink.net) www.pulselink.net
Owns almost 40 patents pending, operational prototypes, complete laboratories, testing and development equipment and state of art technical facilities, software and equipment. First-generation chipsets approach market readiness.
 4. [Time Domain Corporation](http://www.time-domain.com) www.time-domain.com
Has developed an Ultra Wideband (UWB) wireless technology called PulsON that fuses communications, radar and tracking capabilities into a single chip set which has the potential to deliver significant performance improvements. CEO Ralph Petroff and Inventor Larry Fullerton – picosecond timer ASIC built by IBM on SiGe technology (way back in 1999!)
 5. [Wisair](http://www.wisair.com) www.wisair.com
Develops and markets a high performance wireless communication chipset solution, based on UWB (Ultra Wide Band) technology. 2001 Israeli company does UWB chips in Si technology – First funding round Apr 2002
 6. [XtremeSpectrum](http://www.xtremespectrum.com) www.xtremespectrum.com
Develops and markets fabless system semiconductor solutions, based on a unique and patented Ultra-Wideband (UWB) wireless transmission technology, for the wireless Personal Area Networking (PAN) market.
- **Equipment** – Handsets, devices, switches & routers, payphones
 - **Global demand** for handsets to climb 9.7% next year, or **434 million units**, up from this year's 2.1% growth. Factors driving sales: gradual economic recovery, growing interest in **camera-equipped handsets, color displays, games, polyphonic ring tones, instant messaging.**
 - **China 109 million , U.S. 46 million, Japan 42 million units.**
 - Videoconference equipment – **Polycom vs X10, LogiTech. Kodak**

	Sales	Mkt Cap	~ Price	Analyst Rec	EPS
NOK – Nokia #1			17	Neutral	0.56
MOT – Motorola			9	Neutral	-1.72
??? – Samsung					
ERICY – Ericsson/Sony			9.3	Hold	n/a

- Disposable phones

- **Optical and Electronic Hardware Equipment**

	Sales	Mkt Cap	~ Price	Analyst Rec	EPS
JDSU – JDS Uniphase			2.9	Positive	-5.9

AGRa – Agere (ex LU)

ANDW – Andrew Corp

– a world leader in antennas and cables, not glamorous, but...

ADCT – ADC Telecom

JNPR – Juniper			8.0	Neutral/Sell	-0.04
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CISCO – Cisco Systems

– “No IS manager ever got fired for buying Cisco hardware”

LU – Lucent			1.4	Positive	-3.5
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– what’s left

GLW – Corning

NT – Nortel

- **Wireless Service Providers**

- The battle for customers among wireless carriers intensified this holiday season, with companies now giving phones away and charging as little as \$0.02 per minute for their service. ³
- The market is nearing maturity and there just aren't that many new subscribers left. ³
- In the third quarter, the six major carriers reported net subscriber additions of 2.2 million, a 41 percent drop from Q3'01. [Sprint PCS \(PCS\)](#) and [Cingular \(BLS\)](#) had subscriber bases shrink. ³
- With fewer new subscribers to be had, carriers are focusing on **retaining existing customers, getting them to use more minutes, and luring users away from other carriers.** ³
- In the third quarter, revenue per minute for the major carriers dropped 21 percent over the prior year. ³
- "The introduction of large buckets of off-peak minutes has slowly given way to offers of more peak or "anytime" minutes at lower prices," Credit Suisse First Boston. "This is slowly working to reduce subscriber revenue and profitability, and the concern is uncertainty over when this behavior will stop." ³
- CSFB rates the wireless-services sector "market weight" and expects the challenging environment to continue for at least another year. ³
- [CIBC World Markets](#) thinks that average revenue per user (ARPU), a key measurement of the industry's health, will decline 4 percent next year after a modest 1 percent increase this year. ³
- Investors should look for the companies with the strongest balance sheets. [AT&T Wireless \(AWE\)](#) and [Verizon's \(VZ\)](#) wireless division may have the best liquidity positions, generating enough cash to fund their operating plans without tapping the capital markets. [Sprint PCS \(FON\)](#), [Cingular \(BLS\)](#), and [T-Mobile USA \(DT\)](#), all require ongoing assistance from their parent companies. ³
- [Nextel \(NXTL\)](#), perhaps the industry's closest approximation of a recent success story. Nextel has made substantial progress in deleveraging its balance sheet in Q3. RBC Capital raised 2002 and 2003 earnings estimates for the company after it turned in the best third- quarter performance of any wireless company,

beating consensus estimates with \$2.3 billion in revenues and \$0.14 earnings per share. NXTL also posted an industry-leading ARPU of \$71. RBC maintains an "outperform" rating on NXTL. ³

- AWE has also performed comparatively well. Its ARPU nudged up to \$62 in the third quarter, a dollar better than the prior quarter. Kaufman Bros. recently upgraded the stock from "hold" to "buy" based on Q3. Earnings of \$4.06 billion, up 4% over the Q2, and EBITDA of \$1.07 billion, a 5% jump from Q2. ³
- AWE is the only wireless company that rates a "buy" from [Prudential](#), who feels that the current price levels are not sustainable for a healthy industry. AWE's third-quarter results were well ahead of expectations, and believes the AWE is in position to benefit from a much-needed industry consolidation. ³
- Investors looking for widespread improvement in the wireless group, particularly in the pricing area, probably have to wait for that much-anticipated consolidation wave. Analysts generally agree that absent an M&A spree, the industry's crippling price war will likely continue. ³
- The industry needs a reduction from six national operators to three or four in order to attain healthy competition," says CSFB. ³

• **Wireline Services – Long distance, data, voice**

- Capital spending by Telecom Carriers fell off a cliff 2 years ago.
- **Market for optical components has bottomed** and should see growth in the range of 30% next year. But **30% of a small number isn't anything to get too excited about:** "We're bouncing off the bottom here." Prediction for **2003: \$2.1 billion in revenues** - still way off the **2000 \$9.1 B**. The industry could see a return to at least 2001 levels by 2005 or 2006.
- Weak end demand trends from major US telecom service providers in Q3'02 and projected extremely gradual recovery for telecom equipment sector next 18-24 months ².
- Data/IP revenue growth to decline first time ever in Q3'02 vs 16% Q3'01 due to lack of compelling applications, competition, and tough economy²
- Access line revenues down 3.8% due to wireless/broadband substitution and losses from UNE-P lines (1996 Telecom Act requires RBOCs to lease lines to competitors at wholesale prices determined by states – sometimes below cost to ILECs)
- FCC to decide by Q1'03 if UNE-P reqmt will be phased out, probably over 5 years, which could lead to new investment in networks due because of better ROI.
- **Wireline Services Foreign:**
 - Be aware of litigation affecting foreign telecom owners;
 - Licensees are issued two at a time,
 - one to telephone companies
 - one to non wire company
 - Carriers fear foreign ownership
 - Certain pending US legislation restricts foreign owners to less than 24%.

Sales	Mkt Cap	~ Share	Analyst Price	EPS Rec.
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Regional Bell Operating Companies

VZ – Verizon	105B	38		
Q - Qwest	7.2B	4.3		
SBC – SBC Communications	85.3B	26		
BLS - Bell South (Cingular)	48.6B	26		

Sales	Mkt Cap	~ Share	Analyst Price	EPS Rec.
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Global Players

VOD – Vodaphone	122B	18		
MBT – Mobile Telecom Ojsc	72B	38		
NTT – Nippon Telegraph &Tele	59B	18		
CHL – China Mobile HongKong	51B	13		
DT – Deutsche Telecom (T-mobile)	51B	12		
DCM – NTT DoCoMo	48B	19		
ILEC (Exchange Carriers)				
T - AT&T	21.5B	28		
WCOM - WorldCom/MCI		0.2	Sell	n/a
CLEC (Exchange Carriers)				
AWE - AT&T Wireless	18.0B	6.6		
FON - Sprint	12.9B	14		
NXTL – Nextel	10.6B	11		
AT – Alltel	15.8B	51		
QCOM – Qualcomm		40	Neutral	-0.4

ISPs (Internet Service Providers)

AOL
MSN
Earthlink
Juno/Netzero

Group: Put cell phones on national no-call list - Wireless Week - The National Association of State Utility Consumer Advocates (NASUCA) is lobbying the FCC to declare wireless phones off limits to telemarketing calls and to impose restrictions on the use of automated calling systems.

Survey: DSL growth hits record high - News.com 11Dec02 - New DSL subscriptions grew at the fastest rate ever, more than 5 million in Q3'02 up 20% from the previous quarter. Expect **36 million DSL subscribers by year's end** and **200 million by 2005**. **Cable modems still outnumber DSL service by 2:1 in the U.S.**, but DSL growing more rapidly globally. South Korea: highest percentage of people using DSL

- **CDMA (Code Division Multiple Access) vs TDMA (Time Division Multiple Access)**

Qualcomm QCOM– Irwin Jacobs co-founded in 1985, today it licenses CDMA to 115 telecom equip makers and cell phone companies popular in Japan & Korea for years now growing in US because it offers higher data rate for multimedia (such as color photos) QCOM – sales \$874M for Q4 30Sep02, up 34%
Expect sales up 15-22% growth for Q1 31Dec02 and 19-23% for 2003

- Verizon - VZ - #1 service provider uses CDMA
- Sprint PCS – FON uses CDMA
- Alltel – AT uses CDMA
- Motorola – Largest US cell phone maker – added CDMA this yr
- AT&T Wireless - AWE #3 service provider – not CDMA
- Cingular - #2 carrier – not CDMA
- NT – Nortel offers TDMA
- ERICY – LM Ericsson and Sony Ericsson Mobile Communications use them all!

3G - Third Generation Mobile Telephony

Third-generation mobile systems combine high-speed access with Internet Protocol (IP)-based services.

WCDMA-Wideband Code Division Multiple Access

The high-speed wideband radio technology provides data transfer rates in a wide range up to 2Mbit/s. WCDMA supports simultaneous use of different services with independent Quality of Service (QoS) such as advanced Mobile Internet and voice services.

MMS-Multimedia Messaging Service

MMS is a universally accepted standard that lets users of MMS supportive mobile phones send and receive messages with formatted text, graphics, photographic imagery and audio and video clips.

GPRS - General Packet Radio Service

The packet-based technology that enables high-speed (115 kilobit per second) wireless Internet and data communications.

EDGE - Enhanced Data for Global Evolution

The technology that gives GSM networks the capacity to handle 3G mobile telephony services. EDGE enables the transmission of large amounts of data at 384 kilobits per second.

Bluetooth wireless technology

Bluetooth short-range radio technology, developed by Ericsson and others, makes it possible to transmit signals over short distances between phones, computers and other devices.

VoIP - Voice Over Internet Protocol

The technology for transmitting ordinary telephone calls over the Internet using packet-linked routes. (Also commonly called IP telephony).

- Mobile Instant Messaging

- And   began on 12Dec02 – an on-line shopping search engine!

- Copper vs Cable vs Fiber Optic

Optical Solutions – local company fiber optic to home in rural MN - <http://www.opticalsolutions.com/main.shtml>
FTTH based on PON passive optical network, Reedsburg, WI, pop 8,000, installation in progress, also Kutztown, PA and Bristol, VA. The market traction is mostly in smaller communities, with independents, municipalities and utility companies and housing developers.

References:

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 - <http://cbs.marketwatch.com/news/newsfinder/default.asp?scid=0&siteid=mktw> CBS
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 - <http://www.wirelessweek.com> Reed Business – Wireless Week
 - <http://www.lightreading.com> Optical Telecom News
 - <http://www.opticallynetworked.com> Optical Network News
 - ¹ Brave New UNWIRED World – Alex Lightman with William Rojas
 - ² Credit Suisse/First Boston 29Oct02
 - ³ Multex Investor – Industry Watch 12Dec02
 - <http://wca.org/Year1999/laine/> UWB primer
 - <http://www.business2.com/webguide/0,1660,70525,00.html> Business 2.0 UWB links
 - <http://www.arcx.com/sites/CDMAvsTDMA.htm> CDMA vs TDMA (Wait til Jan!)

For more about Wireless Technology Futures – Come to Technology SIG – January 2003

LIGHT READING INDEX				12/13/02
Name	Last	Change	% Change	Vol
<u>Light Reading Index</u>	96.21	-3.57	-3.58%	246.37M
<u>Agere Systems</u>	1.29	-0.03	-2.27%	1.84M
<u>Agilent Tech</u>	17.20	0.02	0.12%	2.12M
<u>ADC Telecommunications</u>	1.81	-0.04	-2.05%	6.97M
<u>Alcatel</u>	4.81	0.05	1.05%	6.01M
<u>Applied Micro Circuits</u>	3.63	-0.28	-7.16%	5.73M
<u>Advanced Fibre Communic.</u>	16.41	0.10	0.61%	451.62K
<u>Avcid</u>	3.45	0.02	0.58%	22.00K
<u>Avanex Corporation</u>	1.06	-0.06	-5.36%	481.41K
<u>Brocade Communications</u>	4.85	-0.17	-3.39%	9.27M
<u>Coming Inc.</u>	3.76	-0.15	-3.84%	4.56M
<u>Corvis Corporation</u>	0.74	-0.02	-2.63%	1.69M
<u>Cisco Systems Inc.</u>	13.40	-0.71	-5.03%	61.66M
<u>Ciena Corporation</u>	5.87	-0.33	-5.32%	11.87M
<u>Digital Lightwave Inc.</u>	1.79	-0.11	-5.74%	97.52K
<u>Exfo Electronic</u>	2.95	-0.15	-4.84%	4.80K
<u>Extreme Networks</u>	3.44	-0.12	-3.37%	3.27M
<u>Foundry Networks Inc.</u>	8.04	-0.21	-2.56%	1.21M
<u>Finisar Corporation</u>	1.06	-0.12	-10.17%	1.99M
<u>JDS Uniphase Corporation</u>	2.72	-0.18	-6.10%	17.01M
<u>Juniper Networks Inc.</u>	8.07	-0.18	-2.18%	8.79M
<u>Harmonic Inc.</u>	2.64	-0.09	-3.44%	331.26K
<u>Lucent Technologies Inc.</u>	1.40	-0.08	-5.41%	18.08M
<u>MRV Communications Inc.</u>	1.39	-0.06	-4.14%	338.02K
<u>Marconi plc</u>	0.05	-0.02	-24.24%	229.80K
<u>Molex Inc.</u>	23.96	-0.24	-0.99%	1.17M
<u>Nortel Networks</u>	1.89	0.08	4.42%	34.19M
<u>New Focus Inc.</u>	3.51	-0.05	-1.40%	107.00K
<u>Newport Corporation</u>	12.25	-0.44	-3.47%	189.75K
<u>Optical Communication Products Inc.</u>	1.09	-0.04	-3.54%	42.86K
<u>PMC-Sierra Inc.</u>	5.74	-0.42	-6.82%	5.05M
<u>Redback</u>	0.98	-0.03	-2.97%	4.66M
<u>Riverstone Networks</u>	2.65	-0.12	-4.33%	1.74M
<u>Siemens Ag</u>	44.18	-0.73	-1.63%	228.20K
<u>Stratos Lightwave Inc.</u>	5.40	-0.43	-7.38%	14.30K
<u>Sycamore Networks</u>	2.90	-0.20	-6.45%	1.21M
<u>Tellabs Inc.</u>	6.92	0.03	0.44%	3.20M
<u>Tellium Inc.</u>	0.62	-0.05	-7.46%	278.50K
<u>Veeva Instruments Inc.</u>	11.55	-0.57	-4.70%	284.06K
<u>Vitesse Semiconductor</u>	2.42	-0.22	-8.33%	8.18M
<u>Xilinx Inc.</u>	20.37	-1.02	-4.77%	7.98M