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New Rec: PCTEL, Inc.	(PCTI - \$50.125)	April 10, 2000
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Position: Sell Target: \$25 Timing: 2 (1=aggressive; 5=cautious)

\$M	Q1 00e	Q2 00e	Q3 00e	Q4 00e	2000e	2001e
REVS	22,000	23,500	25,000	27,000	97,500	109,000
EPS \$	0.13	0.14	0.15	0.16	0.58	0.54
Y/Y %	33.1%	22.1%	19.3%	12.2%	20.7%	-6.0%
PE					86x	93x
PSR					8.9	8.0
Consen	0.12	0.14	0.22	0.25	0.73	0.90

Shares Out: 17.3M

Market Cap: \$870M

FYE: Dec.

Summary: PCTEL was an early entrant in the market for analog software modems for OEMs. Mainstream analog hardware modem manufacturers were reluctant to enter this market because they were interested in protecting the higher revenue hardware modem business and did not want to encourage the growth of software modems. This allowed PCTEL to capture about 60% of the software modem market in 1998, and 55% in 1999. Conexant entered the market in late 1998, and had about a 35% share of the market in 1999, but exited the year shipping 4-5 million modems per quarter, about the same rate as PCTEL.

Software modems are bundled with low price point computers. The reason high-end computers do not contain software modems is that they are less reliable than hardware and controllerless modems, and they degrade the computer's performance. A software modem runs DSP processes on the computer's CPU instead of on a discreet DSP, and use about 50-60 MHz of a Pentium II. The main reason for an OEM to use a software modem is low cost. Today, software modems cost OEM less than \$5 versus a controllerless modem cost of about \$8-\$9 and a hardware modem cost of about \$11-\$13.

We estimate that software modems captured about 35% of modems bundled with PCs in 1999. We think that the penetration rate can go to about 55% of modems bundled with PCs, but not much higher. High end PCs are unlikely to use software modems due to their inferior performance and their impact on the CPU. At 55% penetration of the market for PCs with modems, soft modem unit growth will be about 87% over 1999 when the market is saturated.

As a result, even if PCTEL were to maintain a 50% market share, and if the market reaches saturation at 55% of modems shipped with PCs as early as 2000, PCTEL's unit shipments would increase about 70%. Assuming a decline in average selling price of about 20%, to about \$4.30 per modem in 2000, PCTEL would do about \$101 M in revenue in 2000 versus the "street" revenue estimate of \$103M. We do not think that PCTEL can reach these numbers, but view them as the limit of our risk. Our estimate, which still seems generous, is \$97.5 M.

There are several problems with the "street's" rosy expectations for PCTEL. The market for software modems in PCs went from about 6 M units in 1998 to about 25M in 1999 and will go to about 45 M in 2000. The growth of the market has attracted a much higher level of competition. Conexant, Motorola, Lucent, Smartlink and ESS Technology are all now competing with PCTEL for a piece of the action. It is highly unlikely that PCTEL can maintain 50% market share in 2000 and beyond. This is especially true because the PCTEL modems have demonstrated reliability problems, which we discuss below, and are being replaced by competitors at some key accounts. For example, we think that PCTEL has been removed as a supplier to eMachines.

In particular, Conexant appears to be taking share from PCTEL. We think that Conexant sold only a few hundred thousand soft modems in 1998, but increased sales dramatically to about 9 M units in 1999, and exited calendar 1999 at a 16 M-20 M unit annual run rate, equal to PCTEL. This also means that PCTEL already had less than 50% share exiting 1999. Conexant appears to be growing software modem shipments faster than PCTEL, which is not surprising considering Conexant's historical position in the modem market.

It is important to understand that even if PCTEL were to maintain 50% market share, and even if it were to increase unit shipments by 70% in 2000, unit growth would slow in 2001 to the rate of growth of PC units overall. Soft modems would have reached their maximum penetration of the modem market. Therefore, even maintaining 50% share would result in unit growth of about 15%, in line with the PC market, and would probably result in no revenue growth

at all after 2000. Sometime in 2000 investors will look forward to 2001 and the multiple on PCTEL shares will decline to a far lower multiple, more in line with a slow or no growth modem company.

Bulls are hoping that this problem will be avoided by PCTEL entering the DSL modem market for PCs in the second half of 2000. We think they are wrong for several reasons. First, a software DSL modem such as PCTEL proposes has the same CPU utilization problem that the software analog modem has, only worse. PCTEL's "Lightspeed" G.Lite DSL software modem consumes about 500MHz of processing power. PCTEL claims that using an accelerator, which is a chip, it can have a quasi-soft modem that uses about 250MHz. This still uses 50% of a 500MHz machine, and is probably unacceptable.

Residential users spending \$40 per month on a DSL line will likely opt for a more reliable, less CPU hungry hardware modem, even if it costs a bit more. DSL modems as PC add-ons are already below \$100 on Compaq's PCs. Moreover, RBOCs and other DSL service providers currently subsidize and support modems of their choice in order to ensure compatibility and to avoid what is sure to be the RBOCs and other service providers biggest potential cost: servicing a residential customer with a modem problem. An internal modem that is not working is much more difficult to troubleshoot than an external modem. Is the DSL line, the computer or the modem that is the problem? It makes no sense for service providers to expose themselves to the problems of individuals trying to use a variety of low-end modems. As a result, we think the adoption of internal hardware DSL modems will be slow and quite limited, and the software internal DSL modem business will be extremely limited for a long time. It does not appear that PCTEL will be able to do business in this category in any meaningful way in 2000 and probably not in 2001 as well. This is contrary to "street" expectations.

Finally, PCTEL recently paid \$17 M in cash and stock to acquire a small contract design business, Voyager Technologies, that specializes in designing radio frequency devices for the home and small business, mainly for security (read burglar) devices and for cordless phones and short range two way radios. It is not clear that this purchase was necessary for PCTEL to get designs for RF modems, but it should accelerate the process since an engineering team comes with Voyager. Needless to say, the competition for small appliance RF designs is and will be intense and we don't see that PCTEL has bought a large advantage in this market.

PCTEL has a market capitalization of about \$870 M. Even if PCTEL could convert the entire market for modems bundled with PCs to software modems the total revenue opportunity would be about \$365 million, with potentially single digit growth into 2001. We forecast a total bundled modem market of 85 M, at a \$4.30 average selling price, slightly below PCTEL's current ASP. For a low margin modem maker, PCTEL's current valuation is clearly too high. We think fair value is \$20. Insiders have filed to sell 2.6 million shares

Discussion:

Background: PCTEL's revenue growth has been impressive. From 1998 to 1999, PCTEL increased revenues by 131%, and increased the number of modems shipped by approximately 285% from about 3.6 million to 13.8 million. PCTEL's strong performance is in contrast to the total market for analog modems. Industry observers estimate that though the number of modems shipped with PCs increased 74% from 1998 to 1999 to 73 million, revenues for the industry actually shrank due to the introduction of software modems and plummeting prices for traditional modems. The average sales price for an analog modem has fallen from about \$45 in 1997 to under \$9 today.

Analog Modems Bundled with PCs Market:

	1998	1999	2000e
Analog modem shipped with PCs	42 M	74 M	85 M
Y/Y		+76%	+15%

Several prominent modem manufacturers, including 3Com and Motorola, have recently announced their intention to exit the analog hardware modem business. PCTEL has been able to thrive in this competitive market by focusing on the low end of the market, which has been the fastest growing segment, and by offering a low cost modem with a minimal hardware component. However, this low cost solution comes at the price of versatility and reliability, despite claims that these modems work as well as their hardware brethren. Software modems are not offered in higher end systems. The recent popularity of sub \$600 PCs have driven OEMs to lower component costs as much as possible, while still offering a full-featured PC.

Consumers rarely understand that there are different types of "V.90" modems. The three basic types of analog modems on the market are hardware, controllerless, and software modems. Hardware, or "traditional" modems are the most expensive but provide the highest level of reliability. At the OEM level, hardware modems are priced about \$11-\$13. The entire processing load is performed by the DSP and controller silicon and modem communications do not compete with other applications for system memory or the CPU's processing power. "Controllerless" modems eliminate the controller chip and move the modem controller functions to software processed by the CPU, but rely on a dedicated DSP for data pump functions. Moving the controller functions to the CPU moderately decreases modem versatility, but results in significant cost savings. Eliminating the controller saves about \$5 per modem, placing the average sales price about \$8-\$9. This solution is predominantly used for internal motherboard designed systems.

Software modems, like PCTEL's, execute the data pump and the controller functions in software on the PC's processor, and therefore eliminate the majority of silicon from the modem. Software modems are thus the least expensive modem, but rely on the expensive CPU to process modem commands. Industry sources indicate that software modems now sell for about \$5 and less. We calculate that PCTEL's average sales price in 1999 was about \$5.30. Data pump functions are demanding, and consume about 50-60 MHz of a Pentium II's

processing power. Running a modem and other programs simultaneously therefore results in slower system performance for the other applications. Software modems may also experience performance problems if enough RAM is not available, lowering the modem's functionality.

Another disadvantage of software modems is that they are operating system dependent. This can confuse consumers, who can operate their modem in Windows, but then discover that their modem will not work under DOS. Software modem configuration can also be difficult, resulting in long technical support calls and frustrated consumers. Software modems only recently became a feasible modem option because of the increased speed of CPUs. Despite the performance disadvantage, but because of the cost savings, software modems are most often found on low end, sub \$600 PCs. Though the processor demands of software modems as a percentage of total processor speeds continue to decrease as processor speeds increase, software modems remain the least attractive modem option for multi-tasking users.

Discussion:

1. PCTEL argues that its software modem has several main advantages: 70% lower power consumption, up to 50% less space requirement, and 40% lower price. Indeed, though a software modem does consume less power, this fact is not particularly relevant in the desktop market, which represents the majority of PCTEL's sales. Lower power requirements are not particularly important in the laptop market either, because the modem must be connected to a wall jack to operate, a situation where a power cord would probably be used. PCTEL's argument about space savings is also irrelevant in the desktop market, and is a minor issue in laptops as well. This leaves the low cost of software modems as the key driver to their increase in popularity for OEMs.

2. The opportunity for software modems shipped with PCs is likely to remain at the lower price point end of the market for PCs. Since PCTEL's introduction of software modems the market for this type of device has grown quickly. We think the market quadrupled in 1999 over 1998. However, this growth rate can not last. Once software modems have reached their maximum penetration of the bundled modem market, PCTEL's growth will slow dramatically. This dramatic slowdown is, of course, not in current expectations for PCTEL's future "numbers".

3. Overview of PCs Shipped with Analog Modems

	1998	1999	2000e
Analog modems shipped w/ PCs	42 M	74 M	85 M
Y/Y		+76%	+15%
Software modems shipped w/ PCs	6 M	25 M	45 M
% Bundled Market	14%	34%	53%
PCTEL shipments	3.6 M	13.8 M	20 M
PCTEL share soft modems	60%	55%	44%

Source: Industry research reports, manufacturers and OWS.

In its recent prospectus, PCTEL claims that it had 85% of the 1999 software modem market, based on a market size estimate from Cahners In-Stat Group. However, based on our interviews of knowledgeable industry sources and based on other industry research reports, it appears that Cahners In-Stat underestimated 1999 software modem shipments. We think total shipment were about 25 M units. As a result, we estimate that PCTEL's share of the 1999 market was closer to 55%.

4. We estimate that the total software modem market was about 34% of the 74 M unit market for PCs with bundled analog modems in 1999. We think that the maximum penetration of bundled modems that software modems can reach will be about 55%, due to their performance limitations. We estimate that 85 million PCs will ship with analog modems in 2000. If software modem shipments increase 80% to 45 million, this will represent 53% of PCs containing modems. This will virtually exhaust the conversion opportunity for software modems. Software modems offer a cost advantage to OEMs of only \$3-\$4 versus controllerless and \$6-\$8 versus hardware modems, but software modems are inappropriate for many computer offerings.

5. PCTEL's average selling price was \$5.30 in 1999, and is probably now below \$5 per modem. At 55% of the 2000 market for PCs with modems, total units shipped would be 47 million modems. 47 million units sold at a 20% discount to PCTEL's average price in 1999 of \$5.35 translates into a \$200 million market. This would be PCTEL's maximum sales in 2000 even if it got 100% of the market for software modems shipped with PCs. This is in sharp contrast with PCTEL's \$870 M market capitalization.

6. PCTEL may have had an early lead in software modems, but major competitors significantly increased shipments in 1999. Conexant ramped software modem shipments dramatically in 1999, a fact that seems to have been missed by Cahners In-Stat. We understand that Conexant shipped about 9 million software modem units in 1999, and 4-5 million software modems in the December 1999 quarter. Conexant exited 1999 at about the same quarterly run rate as PCTEL. This run rate puts Conexant on track to ship at least 20 million

software modems in calendar 2000, similar to PCTEL's "street" estimates. In addition, Motorola announced that Intel is bundling its modems on its motherboards, and that Gateway is a significant customer. Smartlink also claims it will be significantly increasing software modem shipments this year. Moreover, Lucent has signaled it will become a more important player. Each of these companies forecast its individual growth will be greater than the market can apparently support. The supply of software modems appears set to substantially outstrip demand.

As a result, we think PCTEL will be unable to maintain last year's 54% share of the soft modem market. We estimate that PC-Tel can hold 45% of the market in 2000 at best.

7. Pricing pressure for modems continues. PCTEL indicates that its prices declined 28.5% from 1997 to 1998, and decreased 42% from 1998 to 1999. Hardware and controllerless modem prices also fell precipitously during 1998 and 1999, further lowering the pricing advantage of software modems. Industry sources indicate that software modem pricing has already dropped to the \$3-\$4 per modem range for some OEM business. With more competitors in the market this year, we expect pricing pressure to be intense. While we have assumed PCTEL's average price at \$4.30 in 2000, it could go lower because of increasing supply and increasing saturation of the market.

8. Market saturation is a major issue. 85% growth in software modem shipments over 1999 would mean saturation of the market potential. At 45 M units in 2000 software modems would represent 53% of all modems shipped with PCs, close to the maximum. Industry participants in the market do not think that penetration rates of the market for bundled modems can go much higher.

As a result, even if PCTEL is able to maintain a healthy market share beyond the year 2000, its unit sales growth must decline to the secular growth rate of the PC market, which should be no more than 15%. With software modems having reached saturation levels of the PC modem market, it is fair to assume that prices will continue to decline. If prices decline at the rate of 15% per year, PCTEL will be unable to grow analog software revenue at all after the year 2000.

9. PCTEL's dependence on a limited number of customers further calls into question the company's ability to maintain a leading market share. Most of PCTEL's impressive growth in 1999 was the result of one significant customer, Talent Trade Asia, better known as PC Chips. Excluding the increase from this one customer, which accounted for 47% of 1999 revenues, PCTEL's 131% year/year revenue growth would decrease to 22%. A review of significant customers demonstrates that the majority of PCTI's growth is concentrated in two customers.

Table: Estimate of Customer Revenue Breakdown:

(\$000s)	1997	1998	1999	1 H 99	Q3 99	Q4 99
Askey	960	3,996	9,918	1,983	2,423	5,127

Silicon Application	1,441	4,996	5,341	3,305	606	1,614
Customer C	4,322	3,996	2,289	991	1,211	159
Trigem	0	2,664	6,866	6,609	0	478
Talent Trade (PC Chips)	0	999	35,858	13,879	13,124	8,707
Customer F	4,802	1,332	1,526	330	404	0
BTC – related party	2,161	4,330	763	0	0	763

The strong increase in orders from Talent Trade Asia offset a drop-off in orders from Trigem in the second half of 1999. Increasing orders from Askey are concentrated in Q4 99, due to the new relationship with Compaq. Other major customers show little or declining growth despite the surge in the market for software modems. With the majority of PCTEL's concentrated in new accounts, and older accounts not growing, we wonder if PCTI has been losing existing customers to new competition.

10. Though PCTEL boasts an impressive customer list, our research indicates that PCTEL's software modem has experienced reliability problems, and may not be the most stable software modem. Indeed, the language in PCTEL's recent prospectus is telling, and appears to list past customers without regard to current customers. "Various original equipment manufacturers, including Acer, Compaq, Dell, eMachines, Fujitsu and Sharp, have integrated our soft modems into their products." Several of PCTEL's "marquee" customers appear to use PCTI's modems in only a limited number of products and some have even stopped using PCTEL modems.

11. Dell is listed as a customer but most of its computers are shipped with either 3Com or Xircom modems, and internal modems on several laptops are from ESS Technology. Dell's relationship with PCTEL appears to be limited to one notebook that Dell OEMs from Sharp that contains a PCTEL internal modem. A quick review of the technical support chat board reflects customer problems with the modem on this laptop series, including high drop rates and low connection speeds. The problem does not appear to be isolated. From our conversation with technical support this problem appears common. Dell has replaced the Latitude LT with the Latitude LS, which appears to have a Lucent modem.

12. eMachines (through motherboard supplier Trigem) is listed as a 8% customer in 1998 and a 20% customer in 1999, but industry sources indicate that PCTEL may have already lost this key customer. The order trends from Trigem in the table, above, confirm that Trigem has significantly reduced orders from PCTEL since 1H 99. Interestingly, we found several eMachine product reviews that reported receiving faulty PCTEL modems. A Network World article from September 1999 tells the story of a modem that "exploded" with a "loud pop" and the smell of "something burning." eMachine's president indicated in the same article that the company switched modem suppliers in June 1999 because of "isolated" problems.

When we asked eMachines about the modem problems a company representative told us that PCTEL modems are not in any of its computers shipped after 12/31/99. Instead, eMachine computers now ship with Conexant

software modems. This is significant because industry sources indicate that Conexant's modem might cost as much as \$2 more than PCTEL's. However, industry sources also indicate that Conexant's modem has greater stability. While it is uncertain if PCTEL has since fixed this problem, eMachines does not appear to be taking any chances.

13. Modem reliability is especially important in the sub \$600 computer category, where gross margins on computer sales are 4%-5%. Gross profit on a \$599 computer is about \$25. A call to technical support, on the other hand, costs manufacturers about \$15 to \$22 per call, according to Service Strategies. Just one service call can eliminate the profit margin on a PC. Modem problems can be especially costly because they prevent consumers from using low-cost web-based technical support sites.

14. PCTEL has minimized the loss of the eMachine account with the recent announcement that Compaq is currently using its modems in the Presario line of computers. However, PCTEL's V.90 is not the only modem offered on current Presario computers. For an extra \$99 consumers can select a Lucent DSL/56K modem. While the Presario "win" may seem to indicate that PCTEL has overcome the problems experienced with eMachines, proof will lie in PCTEL's ability to keep the business. Industry sources indicate that PCTEL won the contract by bidding very aggressively on price. If true, the low pricing will soon be reflected in declining margins. Shipments to Compaq started in Q4 99, but a press release was not issued until January 17, 2000. Not long thereafter, on March 15, 2000 PCTEL filed a registration statement for 3.4 million shares.

15. A review of PCTEL's quarterly results shows that the company's growth rate may already be de-accelerating. Y/Y quarterly revenue growth exceeded 174% in Q1 99, but fell to 99% in Q4 99. Consensus estimates for the first quarter of 2000 show Y/Y revenue growth slipping to about 42%.

PCTI quarterly financial performance:

(\$000s)	3/31/99	6/30/99	9/30/99	12/31/99	3/31/00E*
Revenue	15,156	17,890	20,190	23,057	21,500
Cost of Revenues	7,926	9,071	10,440	11,991	11,300
Gross profit	7,230	8,819	9,750	11,066	10,200
Gross margin %	47.7%	49.3%	48.3%	48.0%	47.4%
Research/Dev.	2,043	2,380	2,732	3,162	3,200
Sales/Marketing	2,298	2,647	2,625	2,969	3,000
General/Admin.	815	1,248	1,571	1,825	1,500
Total Expenses	5,156	6,275	6,928	7,956	7,700
Operating income	2,074	2,544	2,822	3,110	2,500
Operating margin %	13.7%	14.2%	14.0%	13.5%	11.6%

	3/31/99	6/30/99	9/30/99	12/31/99	3/31/00E*
Revenue Y/Y	174.8%	162.0%	122.8%	98.8%	41.9%
Operating income Y/Y	417.2%	646.0%	280.3%	-36.8%	20.5%

* "Street" est.

16. We think PCTEL's income statement is also reflecting the increasingly competitive environment for software modems. Gross margins have steadily declined, as have operating margins. While the "street" is suggesting there might be some seasonality to PCTEL's Q1 00 results, resulting in a sequential decrease in revenues and earnings, Q4 99 results do not appear to have benefited from an extraordinary seasonal surge.

17. Though PCTEL sells software modems, hardware is a significant cost of goods sold and will restrict gross margin improvement. In its recent registration statement, Silicon Laboratories notes that PCTEL was responsible for 62% of its 1999 revenues, or \$29 million. Subtracting the change in PCTEL's inventory from 1998 to 1999 shows that 65% of PCTEL's cost of goods sold is Silicon Labs DAAs. Although PCTEL is trying to qualify a second source supplier, the significant hardware component to cost of goods sold limits PCTEL's ability to increase gross margins.

	1999	%
PCTEL cost of goods sold	39,428	100%
Silicon Labs revenue from PCTI, less change in inventory	25,417	65%
Other PCTI CGS	14,011	45%

18. PCTEL's slipping revenue growth and margins is also somewhat ominous considering that the reported financials reflect the purchase acquisition of Communications System Division (CSD) from General DataComm in December 1998. CSD developed patents and licensed advanced modem and access technologies and its revenues consist of high margin licensing fees. Indeed, the CSD acquisition is the primary source of PCTEL's patent portfolio. Though CSD was a relatively minor acquisition, its financial model is attractive. Prior to being acquired by PCTI, CSD had 100% gross margins and operating margins of 57% in fiscal 1998 and 80% in 1997.

Income Statement:

Communications System Division prior to being acquired by PC-Tel

	Year ended September	
	1997	1998
License revenue	4,564	3,531
Expenses:		
G&A	83	135
S&M	146	174
R&D	685	1,209
	914	1,518
Pretax income	3,650	2,013
Income taxes	1,475	819
Net income	2,175	1,194

At the time of the acquisition, PCTEL expensed \$6.1 million in acquired in-process research & development, and recorded \$10.8 million in goodwill. This goodwill is being amortized on a straight line basis over five years, resulting in \$540,000 in goodwill amortization per quarter, which is included in cost of goods sold. At a historical \$3.5 to \$4.5 million annual run-rate, CSD potentially added \$1 million in revenue per quarter. With fixed cost of goods sold, licensing revenue from CSD may be offsetting margin pressures in PCTEL's analog modem business. The 10-K notes that revenues include high margin nonrecurring engineering and licensing fees, but does not disclose the amount.

Interestingly, the acquisition of CSD was completed in December 1998, but PCTEL did not recognize any revenue from CSD until the second quarter of 1999. The October 22, 1999 prospectus reads:

“In the fourth quarter of 1998, we acquired substantially all of the assets and selected liabilities of Communications Systems Division of General DataComm, Inc., for a total purchase price of \$17.0 million. We began to recognize revenues in the three months ended June 30, 1999 from licensing the patent portfolio that we acquired in this acquisition. These revenues are recognized based on confirmation from licensees of the royalty payments due to us.”

What happened to Q1 99 revenue? If it was deferred and recognized in later quarters, PCTEL may have reported a full year's revenues in the last three quarters, resulting in artificially high margins.

19. The relatively stable quarterly gross margins in 1999 do not reflect the wild swings in the components of cost of goods sold. On the balance sheet, we note the significant allowance for doubtful accounts in Q2 and Q3 99, which decreased substantially in Q4.

	6/30/99	9/30/99	12/31/99
Accounts Receivable	8,898	11,651	8,768
Doubtful Accounts	(3,382)	(5,603)	(2,213)
Net AR	5,516	6,048	6,555
Change in allowance		2,221	(3,390)
Revenue	20,190	23,057	21,500
DSO, gross	40	45	37
DSO, net	25	24	27

To PCTEL's credit, DSO is an impressive 27 days and has been stable. However, looking at the allowance for doubtful accounts leaves us wondering if PCTEL may have been over-reserving its allowance for doubtful accounts in the first nine months of 1999, or under-reserving in the Q4 99 quarter. Our concern is that gross profit margins may not be as stable as they initially appear.

Adjusted Gross margins:

	1H 6/99	9/30/99	12/31/99
Revenue	33,046	20,190	23,057
Cost of goods	16,997	10,440	11,991
Gross profit	16,049	9,750	11,066
Reported gross margin	48.6%	48.3%	48.0%
Cost of Goods	16,997	10,440	11,991
change in allowance AR	(1,693)	(2,222)	2,241
Change in inventory reserve	(525)	520	(1,116)
adj: Cost of goods	14,779	8,738	13,116
adj Gross profit	18,267	11,452	9,941
adj: Reported gross margin	55.3%	56.7%	43.1%

In the table above, we took PCTEL's reported cost of goods sold and compared it to cost of goods sold excluding the impact of allowances for doubtful accounts and changes in inventory reserves, taken from the cash flow statement. This analysis eliminates the impact of changes in the doubtful account provision from reported results. Instead of a steady picture of financial performance, gross profit margins in Q4 99 may actually be declining faster than investors realize.

20. Although PCTEL relies on analog modem products for the majority of its revenues, the "street" positions PCTI as a broadband play because the company is developing software DSL modems. The "street" expects that PCTEL's existing soft analog modem customer relationships will uniquely position the company to capture a leadership position in DSL modems. This DSL "shot in the arm" is expected to begin in 2H 2000, and the "street" estimates that this product roll-out will accelerate into 2001.

However, there appear to be several flaws in this thesis. First, deployment of xDSL services is controlled by the RBOCs, and not by DSL equipment providers. The market for G.Lite, a simplified version of ADSL, and PCTEL's initial area of focus, has been slow to emerge as RBOCs have preferred to deploy full rate ADSL service. Even in locations where DSL has been deployed availability is confined to a limited percent of the potential customer base. Second, while software xDSL modem technology is theoretically attractive, the technology is premature considering the hardware requirements to operate a soft DSL modem. We doubt that the technology and reliability issues will be overcome in the near future, and certainly not by 2H 2000.

21. The G.Lite standard was initially embraced as a simple way to deploy splitterless DSL technology that would allow customers to install their own DSL modem without a costly truck roll. While the G.Lite standard has enjoyed support from major industry participants including Compaq, Lucent, and Microsoft, RBOCs have been slow to deploy G.Lite. Instead, RBOCs are deploying full rate ADSL.

PCTEL has recently demonstrated its "LiteSpeed" G.Lite software modem, and the company also states that it is developing a software G.DMT modem to work with full rate ADSL services. Although "street" analysts are enthusiastic about PCTEL's DSL demonstrations, no performance benchmarks have been released. We note again that many users have trouble with connection speeds on software V.90 modems and often experience high dropped call rates. These problems are unlikely to be tolerated in the DSL world.

22. With software modem technology still proving its reliability in the V.90 world, we think that "soft" modem technology is very pre-mature for DSL. First, software DSL modems place a significantly greater burden on a computer's CPU than current V.90 modems. A software V.90 modem consumes about 50 MHz of a Pentium II system, and according to Lucent, the modulation-demodulation algorithms for DSL are approximately 20 to 100 times more demanding than those for an analog modem. PCTEL's "LiteSpeed" G.Lite modem reportedly consumes about 500 MHz of processing power. This is far in excess of the processor speeds of current "sub \$1000" PCs. PCTEL reports that with an accelerator the LiteSpeed modem will operate on a 500 MHz machine, but even then it will consume an unacceptable 50% of system resources. On a 1.2 GHz computer, a software DSL modem would still consume between 20%-40% of the CPU's cycles, and would potentially interfere with popular broadband applications such as on-line gaming or streaming media applications. Full rate ADSL would be 5 times as demanding as a G.Lite solution,

23. While a G.Lite software DSL modem reportedly would function on a 1.2 GHz system, the economics of buying an expensive high end system and installing a low end modem make little sense. PCs will undoubtedly continue to fall in price and a 1.2 GHz system will someday be offered in the sub \$1,000 category, but a better price/performance system will most likely be achieved with a hardware DSL modem.

24. The “value” proposition of a software DSL modem is also in opposition to the “premium” service of DSL. Today, DSL is an expensive provisioned service with monthly charges at about \$30-\$40. Service providers currently subsidize the cost of DSL modems to increase subscription rates. Prominent DSL companies such as Covad and US West currently subsidize the entire cost of a DSL modem. Likewise, Bell Atlantic subsidizes the majority of a DSL modem cost and sells the modems for \$99.

DSL service providers are focused on ease of installation as a way to speed DSL adoption rates. Moreover, a truck roll costs more than a current hardware modem. From a service provider’s perspective, bundled software DSL modems are the least attractive option because of reliability and troubleshooting problems. With a bundled solution a technician must check the connection, the modem, and the computer itself for problems. DSL is not a simple “plug and play” proposition, like a V.90 modem.

As a result, we think service providers will remain the main distributors of DSL modems in the foreseeable future. While some PCs are currently shipping with bundled DSL modems, most DSL service providers do not support these modems. Bell Atlantic, for instance, requires Westell modems, while Covad prefers Efficient Networks’ modems. Though US West has been an RBOC DSL pioneer, its web site clearly states:

“U S WEST MegaBit DSL service will only work with a U S WEST MegaBit modem, i.e., a Cisco 675, 605 or Intel 2100. U S WEST does NOT support dsl modems purchased through ANY SOURCE OTHER THAN U S WEST.”

These issues have already slowed the OEM adoption rate of DSL technology. PCTEL’s software technology will not even have a place in the DSL market until PC OEMs can safely embrace hardware solutions.

25. Distributing DSL modems at the retail level or bundled with a PC has also proven to be tough because DSL service availability remains scattered. The PC uptake of DSL modems remains slow. Often, a consumer has the choice of either DSL or cable broadband access, but rarely both. For this reason, a network interface card that can connect to either a DSL modem or a cable modem is more essential than a bundled DSL modem.

26. Though the “street” argues that PCTEL’s 2H 2000 release of its soft DSL product is well timed for growth in the market, PCTI’s competitors have long been winning designs and securing key positions with broadband equipment suppliers. Competition includes Infineon, Alcatel, Motorola, Analog Devices and others. Already industry observers have commented that there appear to be too many DSL suppliers and the market may already be primed for a shakeout. DSL chipsets are already rapidly falling in price, lowering PCTI’s potential advantage.

27. With the recent acquisition of Voyager Technologies, PCTEL claims to be expanding into Home RF and Bluetooth technologies. Yet, Voyager describes

itself as a “contract engineering company that develops spread spectrum wireless products for client companies”. The company professes to be a pioneer in spread spectrum design, though actual Voyager products appear limited to wireless RF sensors, and to technology that allows cordless phones to act like a personal radio. Despite the current high valuation multiples being paid for companies in the Home RF and Bluetooth sectors, Voyager was acquired for a modest \$2 million in cash and 267,687 shares of PCTI stock, for a total purchase price of \$15.9 million. Financial information was not disclosed, though one “street” analyst expects the transaction to be 6% accretive to PCTEL.

Surprisingly little information about Voyager Technologies is available despite the company’s formation 10 years ago in 1990. The primary commercial application for Voyager’s wireless sensors appears to be in home security settings. However, Voyager’s technology appears to operate in the unlicensed 900MHz and 2.4 GHz spectrums, the same spectrums used for cordless phones and garage door openers. Potential wireless interference problems could make Voyager’s products unreliable for high reliability applications such as home security.

While the Voyager acquisition allows analysts to further “hype” the PCTEL story it is unclear how Voyager will add meaningfully to PCTEL’s shareholder value. “Home Automation” and “Bluetooth” have become popular buzzwords but actual applications for these technologies are far away.

28. Insiders are selling. Though PCTEL’s IPO was in August 1999, and the “street” promises major success with the yet-to-be-released software DSL modem, insiders, especially the company’s backers, are eager to cash out. In the recently filed 3.4 million share secondary, 2.6 million shares will be sold by existing holders, including 600,000 by WK Technology Funds (31.3% of its shares), 86,540 shares by the company’s CEO Peter Chen (12.8% of his shares), and 72,876 by Han Chung Yeh, the Vice President of Technology (12.3% of his shares). Steel Su, a former director and former President of BTC, a significant customer in 1998 will sell 561,069 shares, or 96% of his stock. Ron Fraser, who recently acquired PCTI stock through the sale of Voyager, will also sell 28,209 shares, or 25% of his holdings.

29. At its recent price of \$50.125, PCTI is valued at \$870 million, or 11.4 times trailing revenues and 8.4 times consensus fiscal 2000 revenues. On a P/E basis, PCTI trades at 114 times 1999 results and 77 times 2000 estimates. Yet PCTEL’s top line growth is expected to slow to 35% in 2000 from 131% in 1999. This premium valuation is undeserved for a company whose revenue and operating growth rate are already slowing and whose future success is based on technology that is not proprietary. We think the probability of an earnings “miss” is high due to increasing competition in the commoditized software modem market, and the “street’s” expectation that DSL products will add meaningfully to the second part of 2000.

The “street” argues that PCTEL should be valued at multiples similar to leading broadband communication companies such as Conexant, Broadcom and

Globespan, or leading internet software companies, such as Vignette, Silknet and Real Networks. We think such comparisons are inappropriate and overlook PCTEL's current dependence on commodity analog modems, while also assuming success for PCTEL's technologically premature software DSL modems.

For comparable companies we think investors should consider AltoCom, recently acquired by Broadcom, and Ambient Technologies, recently acquired by Intel. Both of these competitors have significant software modem intellectual property, and have a "story" for future products.

In August 1999 Broadcom acquired AltoCom for \$170 million in stock. AltoCom was also a developer of software modem technology, but most of its design wins are in handheld and portable computers. Industry observers expect that this will be the next market for soft modem technology. AltoCom appears to have a lead over PCTEL in small form-factor markets. AltoCom's modems are in Compaq's and Philips handheld PCs, as well as in Sharp sub-notebooks. AltoCom appears to have a leadership position in markets where the stated advantages of smaller size and lower power consumption of software modems are important.

In February 2000 Intel announced it would acquire Ambient Technologies in a cash transaction valued at approximately \$150 million. Ambient was formed the previous year to acquire Cirrus Logic's modem IC business. The company has continued to develop host-based modems in addition to DSL technology. Ambient also has some interesting home networking technology that uses electrical wiring to deliver networking solutions. Ambient plans to put communication and control functions into each device's power supply. We think the combination of modem and alternative networking technology presents a fair comparable to the value of PCTEL's technology.

Valuing PCTEL to these two comparables places PCTEL's value at about \$150-\$200 million. Adding the company's cash balance of \$98 million, plus \$40 million from the filed secondary offering sums to a price of about \$300-\$350 million. At this price, PCTI's shares would trade at about \$20, or 27 times consensus 2000 EPS and 22 times consensus 2001 EPS, multiples we consider more than adequate for an analog modem supplier with a difficult transition to the broadband world.

30. Projections: \$000

Income Statement	3/31/99	6/30/99	9/30/99	12/31/99
Revenues	15,156	17,890	20,190	23,057
Cost of Revenues	7,926	9,071	10,440	11,991
Gross profit	7,230	8,819	9,750	11,066
Research/Development	2,043	2,380	2,732	3,162
Sales/Marketing	2,298	2,647	2,609	2,969
General/Administr.	815	1,248	1,571	1,825
Acquired R&D	0	0	0	0
Amortization def comp	16	148	287	339
Total Expenses	5,172	6,423	7,199	8,295
Operating income	2,058	2,396	2,551	2,771
Interest Expenses	(453)	(442)	(155)	(136)
Interest Income	116	187	0	1,154
Income Before Taxes	1,721	2,141	2,396	3,789
Income Taxes	516	642	717	1,139
Income After Taxes	1,205	1,499	1,679	2,650
EPS	0.10	0.12	0.12	0.14
Diluted Average Shs.	12,638	12,638	13,438	18,903

Percent	3/31/99	6/30/99	9/30/99	12/31/99
Revenues	100.0%	100.0%	100.0%	100.0%
Cost of Revenues	52.3%	50.7%	51.7%	52.0%
Gross profit	47.7%	49.3%	48.3%	48.0%
Research/Development	13.5%	13.3%	13.5%	13.7%
Sales/Marketing	15.2%	14.8%	12.9%	12.9%
General/Administr.	5.4%	7.0%	7.8%	7.9%
Acquired R&D	0.0%	0.0%	0.0%	0.0%
Amortization def comp	0.1%	0.8%	1.4%	1.5%
Total Expenses	34.1%	35.9%	35.7%	36.0%
Operating income	13.6%	13.4%	12.6%	12.0%
Interest Expenses	-3.0%	-2.5%	-0.8%	-0.6%
Interest Income	0.8%	1.0%	0.0%	5.0%
Income Before Taxes	11.4%	12.0%	11.9%	16.4%
Income Taxes	3.4%	3.6%	3.6%	4.9%
Income After Taxes	8.0%	8.4%	8.3%	11.5%

Income Statement	3/31/00E	6/30/00E	9/30/00E	12/31/00E
Revenues	22,000	23,500	25,000	27,000
Cost of Revenues	11,300	12,338	13,125	14,310
Gross profit	10,700	11,163	11,875	12,690
Research/Development	3,150	3,200	3,400	3,600
Sales/Marketing	3,000	3,100	3,300	3,500
General/Administr.	1,600	1,700	1,800	1,900
Acquired R&D	0			
Amortization def comp	339	339	339	339
Total Expenses	8,089	8,339	8,839	9,339
Operating income	2,611	2,824	3,036	3,351
Interest Expenses	0	0	0	0
Interest Income	1,106	1,458	1,436	1,413
Income Before Taxes	3,717	4,282	4,472	4,764
Income Taxes	1,115	1,285	1,342	1,429
Income After Taxes	2,602	2,997	3,130	3,335
EPS	0.13	0.14	0.15	0.16
Diluted Average Shs.	20,500	20,700	21,000	21,200
Percent	3/31/00	6/30/00	9/30/00	12/31/00
Revenues	100.0%	100.0%	100.0%	100.0%
Cost of Revenues	52.0%	52.5%	52.5%	53.0%
Gross profit	48.0%	47.5%	47.5%	47.0%
Research/Development	14.3%	13.6%	13.6%	13.3%
Sales/Marketing	13.6%	13.2%	13.2%	13.0%
General/Administr.	7.3%	7.2%	7.2%	7.0%
Acquired R&D	0.0%	0.0%	0.0%	0.0%
Amortization def comp	1.5%	1.4%	1.4%	1.3%
Total Expenses	36.8%	35.5%	35.4%	34.6%
Operating income	11.2%	12.0%	12.1%	12.4%
Interest Expenses	0.0%	0.0%	0.0%	0.0%
Interest Income	5.0%	6.2%	5.7%	5.2%
Income Before Taxes	16.9%	18.2%	17.9%	17.6%
Income Taxes	5.1%	5.5%	5.4%	5.3%
Income After Taxes	11.8%	12.8%	12.5%	12.4%
Y/Y	3/31/00	6/30/00	9/30/00	12/31/00
Revenues	45.2%	31.4%	23.8%	17.1%
Cost of Revenues	42.6%	36.0%	25.7%	19.3%
Gross profit	48.0%	26.6%	21.8%	14.7%
Research/Development	54.2%	34.5%	24.5%	13.9%
Sales/Marketing	30.5%	17.1%	26.5%	17.9%
General/Administr.	96.3%	36.2%	14.6%	4.1%
Acquired R&D				
Amortization def comp	NM	129.1%	18.1%	0.0%
Total Expenses	56.4%	29.8%	22.8%	12.6%
Operating income	26.9%	17.8%	19.0%	20.9%

Y/Y	3/31/00	6/30/00	9/30/00	12/31/00
Interest Expenses				
Interest Income	NM	NM	NM	22.5%
Income Before Taxes	116.0%	100.0%	86.6%	25.7%
Income Taxes	116.1%	100.1%	87.1%	25.5%
Income After Taxes	115.9%	99.9%	86.4%	25.8%

EPS	33.1%	22.1%	19.3%	12.2%
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Income Statement	3/31/01E	6/30/01E	9/30/01E	12/31/01E
Revenues	26,000	27,000	28,000	28,000
Cost of Revenues	13,910	14,445	14,980	14,980
Gross profit	12,090	12,555	13,020	13,020

Research/Development	3,800	3,900	3,900	3,900
Sales/Marketing	3,600	3,600	3,600	3,600
General/Administr.	2,000	2,000	2,000	2,000
Acquired R&D				
Amortization def comp	339	339	339	339
Total Expenses	9,739	9,839	9,839	9,839
Operating income	2,351	2,716	3,181	3,181

Interest Expenses	0	0	0	0
Interest Income	1,391	1,368	1,346	1,323
Income Before Taxes	3,742	4,084	4,527	4,504
Income Taxes	1,123	1,225	1,358	1,351
Income After Taxes	2,619	2,859	3,169	3,153

EPS	0.12	0.13	0.15	0.14
Diluted Average Shs.	21,400	21,600	21,800	22,000

Y/Y	3/31/01	6/30/01	9/30/01	12/31/01
Revenues	18.2%	14.9%	12.0%	3.7%
Cost of Revenues	23.1%	17.1%	14.1%	4.7%
Gross profit	13.0%	12.5%	9.6%	2.6%

Research/Development	20.6%	21.9%	14.7%	8.3%
Sales/Marketing	20.0%	16.1%	9.1%	2.9%
General/Administr.	25.0%	17.6%	11.1%	5.3%
Acquired R&D				
Amortization def comp	0.0%	0.0%	0.0%	0.0%
Total Expenses	20.4%	18.0%	11.3%	5.4%
Operating income	-10.0%	-3.8%	4.8%	-5.1%

Interest Expenses				
Interest Income	25.8%	-6.2%	-6.3%	-6.4%
Income Before Taxes	0.7%	-4.6%	1.2%	-5.5%
Income Taxes	0.7%	-4.6%	1.2%	-5.5%
Income After Taxes	0.7%	-4.6%	1.2%	-5.5%

EPS	-3.6%	-8.6%	-2.5%	-8.9%
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Income Statement	1998	1999	2000E	2001E
Revenues	33,004	76,293	97,500	109,000
Cost of Revenues	16,878	39,428	51,073	58,315
Gross profit	16,126	36,865	46,428	50,685
Research/Development	4,932	10,317	13,350	15,500
Sales/Marketing	5,624	10,523	12,900	14,400
General/Administr.	2,169	5,459	7,000	8,000
Acquired R&D	0	0	0	0
Amortization def comp	43	790	1,356	1,356
Total Expenses	12,768	27,089	34,606	39,256
Operating income	3,358	9,776	11,822	11,429
Interest Expenses	(25)	(1,186)	0	0
Interest Income	504	1,457	5,413	5,428
Income Before Taxes	3,837	10,047	17,235	16,857
Income Taxes	1,665	4,002	5,171	5,057
Income After Taxes	2,172	6,045	12,064	11,800
EPS	0.22	0.48	0.58	0.54
Diluted Average Shs.	10,012	12,617	20,869	21,714

Percent	1998	1999	2000	2001
Revenues	100.0%	100.0%	100.0%	100.0%
Cost of Revenues	51.1%	51.7%	52.4%	53.5%
Gross profit	48.9%	48.3%	47.6%	46.5%
Research/Development	14.9%	13.5%	13.7%	14.2%
Sales/Marketing	17.0%	13.8%	13.2%	13.2%
General/Administr.	6.6%	7.2%	7.2%	7.3%
Acquired R&D	0.0%	0.0%	0.0%	0.0%
Amortization def comp	0.1%	1.0%	1.4%	1.2%
Total Expenses	38.7%	35.5%	35.5%	36.0%
Operating income	10.2%	12.8%	12.1%	10.5%
Interest Expenses	-0.1%	-1.6%	0.0%	0.0%
Interest Income	1.5%	1.9%	5.6%	5.0%
Income Before Taxes	11.6%	13.2%	17.7%	15.5%
Income Taxes	5.0%	5.2%	5.3%	4.6%
Income After Taxes	6.6%	7.9%	12.4%	10.8%

Y/Y	1999	2000	2001
Revenues	131.2%	27.8%	11.8%
Cost of Revenues	133.6%	29.5%	14.2%
Gross profit	128.6%	25.9%	9.2%
Research/Development	109.2%	29.4%	16.1%
Sales/Marketing	87.1%	22.6%	11.6%
General/Administr.	151.7%	28.2%	14.3%
Acquired R&D			
Amortization def comp	1737.2%	71.6%	0.0%
Total Expenses	112.2%	27.7%	13.4%
Operating income	191.1%	20.9%	-3.3%
Interest Expenses	NM	NM	NM
Interest Income	189.1%	271.5%	0.3%
Income Before Taxes	161.8%	71.5%	-2.2%
Income Taxes	140.4%	29.2%	-2.2%
Income After Taxes	178.3%	99.6%	-2.2%
EPS	120.9%	20.7%	-6.0%