ORIGINAL

AT&T

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December 1, 1999

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FEDERAL COMMUNICATIONS COMMISSION
OFFICE OF THE SECRETARY

Ms. Magalie Roman Salas
Secretary
Federal Communications Commission
445 Twelfth Street, SW, Room TWB-204
Washington, D.C. 20554

RE: Ex Parte
In the Matter of Applications for Transfer of Control to AT&T Corp. of Licenses and Authorizations Held by MediaOne Group, Inc.
CS Docket No. 99-251

Dear Ms. Roman Salas:

At Kathryn Brown's request, the attached was provided to her by James Cicconi.

Two copies of this Notice are being submitted to the Secretary of the FCC in accordance with Section 1.1206 of the Commission's rules.

Sincerely,

Betsy J. Brady

cc: K. Brown

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T: UPGRADING TO BUY FROM NEUTRAL
07:47am EST 29-Nov-99 Salomon Smith Barney (GRUBMAN/MCMAHON 212-816-2877) T T.B

--SUMMARY:--AT&T--Telecommunications Services
*We are upgrading AT&T from a Hold to a Buy rating and establishing a 12-month price target of $75 per share based on a 26x multiple on our 2001 cash eps est. of $2.90. *Our price target is exclusive of the wireless business which will likely be spun-off in a separate wireless tracker. *We are upgrading AT&T after running extensive analysis which resulted in an increased comfort level with the economics and the technology of the cable upgrade and the fact that the stock is cheap at current prices NOT due to the formation of a wireless tracker. *Within this note we provide a detailed walk through of the real economics of the cable upgrade, lay out in detail the network architecture and discuss some of the myths that surround the cable architecture. *We also provide a look at proforma AT&T/TCI/UMG if all companies were together from 1999 forward.

--EARNINGS PER SHARE----------

	FYE		1 Qtr	2 Qtr	3 Qtr	4 Qtr	Year
Actual	12/98	EPS	$0.46A	$0.53A	$0.67A	$0.67A	$2.30A
Previous	12/99	EPS	$0.61A	$0.49A	$0.54A	$0.55E	$2.18E
Current	12/99	EPS	$0.61A	$0.49A	$0.54A	$0.55E	$2.18E
Previous	12/00	EPS	$N/A	$N/A	$N/A	$N/A	$2.10E
Current	12/00	EPS	$N/A	$N/A	$N/A	$N/A	$2.64E
Previous	12/01	EPS	$N/A	$N/A	$N/A	$N/A	$N/AE
Current	12/01	EPS	$N/A	$N/A	$N/A	$N/A	$2.90E

Footnotes: 2000 and 2001 are cash eps including UMG.

--FUNDAMENTALS----------

Current Rank.....:1M Prior:3-M
P/E Ratio 12/99.....:26.3x
P/E Ratio 12/00.....:21.8x
Return on Eqty 98...:N/A%
LT Debt-to-Capital(a)44.7%
Revenue (99).....:62.30bil
Shares Outstanding..:3334.0mil
Mkt. Capitalization.:191471.6mil
Price (11/26/99)....:$57.43
Target Price..:$75.00 Prior:53.00
Proj.5yr EPS Grth...:15.0%
Book Value/Shr(99)..:11.30
Dividend(99).....:$.88
Yield.....:1.5%
Convertible.....:No
Hedge Clause(s).....:#
Comments.....:(a) Data as of the most recently reported quarter.
Comments.....:

--OPINION----------

We are upgrading AT&T from a Hold to a Buy rating and establishing a 12-month price target of $75 per share based on a 26x multiple on our 2001 cash eps estimate of $2.90. For 2000, we have a cash eps estimate of $2.60 assuming UMG is part of AT&T for the last three quarters of the year and we believe AT&T's revenue growth will be roughly 8-9% in 2000 including wireless and about 5% without wireless. As with WCOM and, frankly, we believe will be true for all companies, we are exclusively looking at cash eps as the parameter on which to base valuation. Our price target is exclusive of the wireless business which most people know will likely be spun-off in a separate wireless tracker which will include both mobile and fixed wireless (we would guess an IPO first then a

distribution to AT&T shareholders).

We are upgrading AT&T after extensive analysis which has resulted in a strong comfort level with the economics and the technology of the cable upgrade and our belief that the stock is cheap at current prices (roughly 22x 2000 cash eps, 20x 2001 cash eps and 10x 2000 EBITDA). We are NOT upgrading AT&T due to the formation of a wireless tracker. In fact, in the past after AT&T spun off Lucent and NCR, the remaining AT&T was a dramatic underperformer, so trackers in and of themselves don't get us excited. We look at fundamentals, not financial engineering and we now believe AT&T has the ability to drive fundamental financial performance with its cable upgrade as well as what will be an on going change in revenue mix in AT&T's core businesses.

We have been bearish on AT&T for some time and in fact the stock has been a dramatic underperformer, underperforming the S&P 500 by 150 basis points year-to-date even after the past week of hype on the wireless tracker (prior to last week AT&T was underperforming YTD by well over 1,000 basis points). Since our downgrade in April 1995, AT&T has underperfomed the market by 1,840 basis points and since the Lucent IPO on April 4, 1996, AT&T standalone underperformed the market by 1,460 basis points (which is why knee jerk recommendations based solely on a wireless tracker are absurd).

We have been very outspoken about our issues surrounding AT&T over the last year. However, being outspoken does not mean that we are dogmatic and in fact, while we have been very outspoken regarding issues on the cable front, we have been doing work on trying to figure out the economics and technology. Our basic issue with AT&T has been the technological feasibility of upgrading cable plant, the scalability potential, the cost and what the true economic returns would be. In contrast, we have never disagreed with the strategic thrust of AT&T having a facilities-based solution in the consumer space. In fact, we argue often that in this industry there will be a handful of players which have scale and scope of facilities and connectivity and ubiquity to lots of customers. Those companies which have this scale and scope and customer connectivity, will be able to drive the most value (network + customer = value). This is because we believe that value creation is a function of geographic footprint and service potential which allows a carrier to offer a full suite of services to a large array of customer segments.

Our issue surrounding AT&T was whether or not the technological hurdles and economics of the cable undertaking were likely to result in shareholder value creation or not. After an exhaustive study of the technology (which you will see detailed in this note) and the real economics (which you will also see detailed in this note), we have come to the conclusion that AT&T can, in fact, create shareholder value by getting returns well in excess of its cost of capital.

Given that we believe the economics and technology work, we believe AT&T's ability to gain customers and drive revenues from multiple service offerings is quite high. AT&T has the ability to reach 30%-50% (depending on affiliations) of the homes in the U.S. with a facilities-based solution to deliver voice, data and video. Specifically, TCI/UMG passes 25 million owned and operated homes and UMG owns 25% of Time Warner Entertainment which passes an additional 18

million homes. We would expect AT&T and Time Warner to cut a deal where AT&T's ownership of TWE content declines to zero in return for AT&T's ownership of the TWE cable systems going up to 40%, giving AT&T more say in the telephony roll out on Time Warner cable systems. Other affiliates are likely to add anywhere from 4 to 10 million homes. Outside of AT&T's cable properties and affiliations, we expect AT&T will aggressively roll out a fixed wireless solution as well as some UNE-P to offer local telephony. This reach clearly puts AT&T in a position of size and scale equal to or greater than any other company on the consumer front. In fact, none of the RBOCs have more than one-third of the homes in owned and operated areas.

The bottom line is that over the past couple of years AT&T has dramatically diversified its asset base from assets which almost entirely supported voice long-distance to assets which give AT&T high bandwidth connectivity to roughly one-third of the consumers in the U.S. plus modern CLEC assets with Teleport and an IP-ready inter-city network which is currently being deployed. This diversification of assets drives diversification of revenues which should lead to an acceleration of AT&T's top-line growth especially beyond 2001 when the continued negative impact on growth from consumer long distance becomes less of a factor.

Our $75 price target is based on a 26x multiple of 2001 cash eps which basically values AT&T as essentially a market multiple on cash eps and is roughly 1.5x our estimate of its 5-year eps growth rate beginning in 2001. As we said up front, this price target is exclusive of wireless which we believe will be valued in the marketplace at roughly $45 to $50 billion of equity value (15-17x 2001 EBITDA assuming no debt) which equates to roughly $11-$13 per proforma shares of AT&T including UMG shares (one has to look at a per share value including UMG shares since the full spin-off of wireless cannot occur until after the UMG deal is closed). We will discuss the virtues of other tracking stocks for other AT&T businesses later in this note.

We always said that if we believed the cable upgrade technology was viable and the operations were scaleable, as well as the fact that the math worked from a return perspective, then we'd recommend the stock. Hence, our upgrade. We believe we are seeing the inflection point at AT&T's cable initiatives going from high risk with little visibility of execution to what we now feel is a very doable undertaking with the prospect of high return potential.

In this note we will walk through the real economics of the cable upgrade then lay out in detail the network architecture and discuss some of the myths that surround the cable architecture. We will also touch on the tracker issue which doesn't get us as excited as it does others, and we will end this note with a look at what proforma AT&T/TCI/UMG would look like if all companies were together from 1999 forward.

We believe AT&T (sans wireless) can grow revenue 7-8% per annum off of a 2001 base driven by growth in revenues from cable modems, local telephony, and data/IP which over time will over take continuing declines in consumer LD and essentially no growth in business voice LD. We expect eps growth to be in the 15%-17% per year range as the change in revenue mix, continued network efficiency and cost cutting, and deleveraging due to being past peak capital spending drive bottom line growth that is in excess of top line growth.

REAL ECONOMICS OF CABLE BUILD

Below we lay out a 3 part table which walks through the real economics of AT&T's cable telephony data initiative with the first part being a calculation of what the true net purchase price is for TCI and UMG, the second part being a walk through of the capital cost per home and the third part being a return on investment calculation. The return on investment is key and is a function of the true investment AT&T is making as well as the likely future cash flows. All of our analysis is done on a per home basis since network upgrades and marketing of services cover all homes, not just cable subscribers. This is especially true since over 90% of the homes passed have some type of relationship with AT&T and thus AT&T will target the totality of the homes for this suite of service offerings.

TABLE 1. REAL ECONOMICS OF CABLE/TELEPHONY/DATA INITIATIVE

PART 1: TRUE NET PURCHASE PRICE FOR TCI/UMG CABLE HOMES

		Notes
TCI Purchase Price	= $ 50 billion	
MediaOne Purchase Price	= $ 60 billion	
Total Gross Investment	= $110 billion	$70 billion equity, $40 billion debt
Subtract Value of Non-Cable Assets		
-International assets	= $ 18 billion	$14 billion already sold: $6 bil One-to-One $3 bil Telewest $3 bil AirTouch $2 bil European wireless $ 4 billion of value in remaining Asian, European & UK assets
-Privately held TCI Affiliates	= $ 4.4 bil	Roughly 3.5 mil subs w/TCI stakes ranging from 25-50% valued at $4,000 per sub & then subtracting $4.2 bil of prorata debt.
-Publicly held TCI Cable Holdings	= $ 6.5 bil	TCI owns 2.3 mil shs of Adelphia, 48.9 mil shs of CVC, 55 mil shs of Comcast, and smaller stakes.
-Stake in @Home	= $ 5.1 bil	TCI owns 94.5 mil shs
-UMG stake in Time Warner Entertainment and other programming assets	= $13.5 bil	UMG owns $800-900 mil of value in programming assets and $12.7 bil of value in TWE
-UMG stake in RoadRunner	= $ 3 billion	34.5% direct and indirect interest
-UMG other assets	= $ 4 billion	Combination of public (i.e., 32 mil shs of MSFT, 15 mil shs of TWTC) and

		private assets
Net Purchase price	= $55.5 billion	True Net paid for TCI and UMG homes in owned and operated systems
Number of homes passed	= 25 million	
Net purchase price/home	= $2,220	Price per home is valid metric since network upgrades span all homes not just cable subs and variable costs can be prorated per home based on penetration of given services.

PART 2: CAPITAL COST PER HOME (2000-04) OF BUILDOUT POST-MERGER

		Notes
Network backbone upgrade for two-way and 750 MHz	= $ 2.8 billion	TCI & UMG homes not upgraded at time of merger. Roughly 25% of TCI's homes and almost half of UMG's homes upgraded pre-merger and costs are embedded in purchase price. Assumes 80% of homes passed ultimately upgraded. This number includes fiber rings, hub sites, fiber nodes, switching & transport, and powering. This roughly comes to $235-$270 per home
Plus centralized network powering	= $ 0.4 billion	
	= $ 3.2 billion	
Customer location telephony equipment (30% penetration of cable subs)	= $ 2.5 billion	If telco penetration is above 30%, capital cost goes up but so does revenue and cash flow. Same holds if penetration below 30%, capital cost less as is revenue & cash flow. Assumes a 50/50 blend over time of circuit switch/IP telephony with this cost covering either the network interface unit (NIU) for circuit switch or BTI unit for IP plus data modem. This also includes prorata share of host digital terminal equipment and incremental switching and transport. All-in this comes to $550 per telephony subscriber.
Customer location Digital TV equipment (80% penetration of cable subs)	= $ 2.9 billion	DCT 5000 cost split between customer and AT&T
High speed data	= $ 0	Network cost embedded in upgrade cost or in BTI and customer pays for modem.
Total Post-Merger Capital Cost	= $8.6 bil	
Number of homes passed	= 25 mil	
Post-merger capital cost/home	= $344	Must look at capital cost spread

over 100% universe of homes.

PART 3: RETURN ON INVESTMENT CALCULATION (5 YEAR SCENARIO)

Total Investment	$ in billions
Net purchase price	$55.5
Post merger capital	8.6
Total investment	$64.1
Number of homes	25 million
Investment per home	$2,564

EBITDA Buildup to 2004	EBITDA ($billions)
1) Telephony at 30% penetration of cable subs with 1.5 lines/customer and 1.5 features per line. Assume 5.46 million subs by 2004 paying $60/month with 45% EBITDA margins.	$1.77
2) High speed data at 25% penetration of cable subs paying $30 per month with 50% EBITDA margins.	0.65
3) Digital TV at 80% penetration of cable subs paying $15 per month with 60% EBITDA margins.	1.56
4) Interactive Services at 100% penetration (by definition) of cable subs with $10 per month per sub coming from advertising revenues with 100% margins.	1.30
5) Basic cable at 65% penetration with $40 per month revenues and 45% EBITDA margins.	3.92
TOTAL 2004 EBITDA	$9.2 billion
Number of homes	25 million
2004 EBITDA per home	$368 vs $2,564 investment/home =14% unlevered cash on cash return vs 6.5% cost of debt
Per home NPV calculation using 15x EBITDA terminal multiple and 10% discount rate	$3,256
Investment per home	$2,564
Return on Investment	27% vs 10.5% cost of capital

THE REAL MATH ON THE PURCHASE PRICE

We believe that one of the largest issues surrounding the AT&T cable

initiatives has to do with the ability to make a reasonable economic return on the investment. We have spent a lot of time trying to figure out just what the real math is given all the numbers which have been thrown around. We now believe that with a reasonable amount of execution, AT&T should be able to earn returns which are more than twice their cost of capital over the course of a 5 year period.

The first thing to look at is the true investment. If one looks at the purchase price of TCI and Media One it totals roughly $110 billion of which $70 billion is equity and $40 billion of debt. This $110 billion is the number which has been thrown around by ourselves and others. However, to be fair, in order to judge the economic return of the cable/telephony/data initiative, one has to look at the investment being paid for those homes. In other words, there are assets which are owned either in whole or in part by TCI or UMG which either have been monetized already or have value unrelated to the purchased households for which network upgrades and new services are targeted.

We believe that the $110 billion gross investment translates to $55 billion net purchase price for the TCI and UMG cable homes. The difference (as outlined in part 1 of the table) is in several buckets. There are $18 billion of international assets ($14 billion of which has already been monetized) which were held by TCI and UMG, including One-to-One and Telewest in the U.K., a stake in AirTouch, European wireless and other assets.

If one looks at privately held cable affiliates of TCI, there are roughly 3.5 million subscribers with TCI owning stakes ranging from 25%-50%. Valuing these subs at $4,000 per sub and netting out debt gets a $4.0-$4.5 billion value. TCI has $6.5 billion of publicly held cable holdings in companies such as Adelphia, Cablevision, Comcast, etc.

The TCI stake in @Home is currently worth over $5 billion and UMG's stakes in Time Warner Entertainment, other programming assets and RoadRunner, etc. add up to roughly $20 billion.

Thus, we would argue that AT&T is truly paying about $2,220 per home for the 25 million homes they are buying. We believe that one has to look at all economic return calculations on a per home not per sub basis. This is because 90% of the households which AT&T is buying have some relationship with AT&T even though only 60% of these households are cable subscribers. In addition, AT&T is building network which passes virtually all these homes and will be attempting to sell services into all these homes, whether or not they are a cable subscriber. Thus, the investment (both the purchase price and the incremental capital) is going against the total 25 million homes as opposed to the 16-17 million subscribers which TCI and UMG have.

COST OF UPGRADES WELL DOCUMENTED

The second part of the economic calculation has to do with the incremental capital cost per home from 2000 through 2004. This is outlined in part 2 of the table. In this calculation, we are looking at what it will cost AT&T to upgrade the cable plant which has not already been upgraded at the time of purchase by TCI and MediaOne and in addition, the customer premise capital cost for delivering telephony and high-speed data.

The roughly 25% of TCI homes which were already upgraded at the time of the TCI close and we would guess about 40% of UMG homes which will be upgraded by the time of the UMG close are already reflected in AT&T's purchase price. In other words, the capital spending that TCI and UMG have already spent to upgrade the cable plant is reflected in the purchase price. Thus, the incremental capital cost per home is on a going forward basis.

The incremental capital cost per home is driven by several factors. First is the upgrading of the network backbone to roughly 750 megahertz with in most cases 2-way capability including centralized powering. This all-in will be roughly $3.2 billion to upgrade roughly 75% of TCI's homes and slightly more than half of UMG's homes. Actually, the number of homes being upgraded will end up to be slightly less since we doubt that much more than 80% of total homes passed will actually have networks upgraded. This number includes fiber rings, hub sites, fiber nodes, switching and transport, powering, etc. and comes to roughly $235-$270 per home. So far this year, AT&T has upgraded between 4 to 5 million homes at a cost of roughly $1 billion. AT&T has 102 active projects going on "as we speak" in terms of upgrading network segments and are running roughly 3%-4% below budget. Thus, we feel with over 50% of TCI's plant upgraded and 2-way ready and with the cost coming in below budget our cost estimates are reasonable.

The next cost item is customer location telephony equipment. This includes network interface units which go on the side of the house in a circuit switched telephony world or the so-called BTI unit which will give a home 4 phone lines plus data capabilities in an IP environment. Over time we assume a roughly 50/50 split between these two solutions and thus a blended cost per home of about $550-600 per telephony subscriber. The $2.5 billion we are assuming in part 2 of the table assumes a 30% penetration. Obviously, if this penetration is lower or higher that number goes down or up accordingly.

This number also includes the prorata share per subscriber of host digital terminal equipment and any incremental switching and transport. This number is a current look meaning that as cost of equipment comes down (which it is in a dramatic fashion), we would argue that AT&T will spend below $2.5 billion to get 30% penetration.

The other major cost item is customer location equipment for digital TV which basically is the DCT 5000 box for which the cost is split between AT&T and the customer. This cost item will run AT&T almost $3 billion since over 80% of subscribers are likely to get this box. It should be noted that cost at the home for high-speed data is already included in the network cost since it is embedded in the upgrade or is included in the BTI cost at the side of the house or the customer itself pays for the cable modem. All in, we believe that AT&T will spend roughly $8.6 billion over the next 5 years to upgrade its network to pass 80% plus of its homes and to provide local telephony to 30% of its current cable homes. This is a capital cost per home of roughly $345.

ROI LOOKS ATTRACTIVE

The third aspect of the economic calculation is the return on investment which is part 3 of the table. This is where the multiple revenue streams coming off the upgraded cable plant helps drives the returns. Furthermore, the clustering of AT&T's properties (95% homes in 25 MSAs) also drives capital efficiency. Looking at this on a per home basis, AT&T's investment per home is roughly $2,564 which is the net purchase price of $55 billion plus the post merger capital cost of $8.6 billion divided by 25 million homes. In order to calculate the return on investment one has to look at the 5 revenue streams which will be driven off the upgraded cable plant and the associated EBITDA.

We are assuming that over a 5 year period AT&T could get 30% penetration of cable subscribers for local telephony with 1.5 lines per customer and 1.5 features per line which will generate almost $1.8 billion of EBITDA assuming mid-40% EBITDA margins. We assume a 25% penetration of cable modem service generates another $650 million of EBITDA, with digital TV (which is getting huge take rates and will penetrate 80% or more of cable subscribers) generating another $1.6 billion of EBITDA. Digital TV offers multiple screens, pay TV and up to 120 programs and will have 1.8 million subs by year end 1999 and 2.8 million subs by year end 2000. Interactive services which is basically using the TV for interactive shopping, movies, e-mail, web browsing, community chat rooms, etc. will generate e-commerce transaction and advertising revenue. These interactive services revenues should contribute about $10 per month per sub paid by advertisers and e-commerce revenues (not end-users) and over time should generate $1.3 billion of EBITDA. In addition, basic cable (assuming no change in penetration) will generate almost $4 billion of EBITDA. Furthermore, the fiber backbone being built passes 65% of small (below 10 lines) business in a given market which means AT&T can leverage the upgraded cable plant to provide telephony to small business which are below the radar screen for Teleport. This potential revenue stream is not included in our ROI calculations and would be additive to the results.

Thus, in 2004, total EBITDA should be $9.2 billion or $368 per home. Looking at this EBITDA versus a $2,564 investment per home, this is a 14% cash on cash unlevered return. Another way of looking at this is capitalizing this 2004 EBITDA at roughly 15x, discounting it back at AT&T's cost of capital (which is roughly 10%) which gets a net present value per home of $3,256 versus an investment per home of $2,564 or a 27% IRR or return on investment versus AT&T's 10.5% cost of capital.

Thus, we believe the economics, in fact, are attractive (assuming of course that AT&T can execute to get the type of penetrations we are assuming which we believe are doable). The bottom line here is that one could clearly quibble about assumptions on the revenue and penetration side. However, we think that these penetration levels are quite achievable within a five year period. On the cost side, we have done a lot of due diligence with equipment manufacturers and as we have said, AT&T's experience this year in upgrading over 4 million homes suggests that the cost parameters are in fact correct.

The key is getting the true net purchase price right. We think that this is where the Street in general (including us) has been off because everyone just naturally talks about $110 billion investment when in reality it is half that for the homes being purchased. Therefore, we believe that if AT&T executes they can achieve unlevered returns in the mid-teens and a return on investment in the mid to high 20% range, both

of which would produce excess shareholder returns relative to AT&T's cost of capital.

DISCUSSION OF NETWORK ARCHITECTURE

The important part of our analysis, aside from the economics, is of course the network architecture. We have spent a lot of time drilling down on the details of AT&T's network build and in particular as will be seen in the table entitled "Network Engineering Calculus", we have spent a lot of time analyzing the exact bandwidth availability within this network architecture on a per home basis for telephony as well as high speed data. Our conclusion is that the network architecture actually looks more like a telephony network than an old fashion cable network. Secondly, we believe that the typical bugaboos of a cable infrastructure, namely one-way and shared-network, are addressed within this network architecture such that AT&T will have more than enough capacity to handle far more phone lines per home than it will ever get and deliver simultaneously digital TV as well as high-speed data both downstream and upstream.

As far as the network architecture itself is concerned, AT&T has completely overhauled the old Christmas tree architecture of cable which had many moving parts. This new architecture will be a very high fiber backbone pushing optical wavelengths deep into the network with the optical wavelengths replacing equipment and thus reducing potential points of failure. The construct of the network will have different levels of hub/nodal sites all connected via fiber to serve ultimately as little as 70 homes with an optical backbone. The beauty of the network architecture is that it uses fiber and dense wave division multiplexing wavelengths to robustly deliver services from the primary hub out to secondary hubs and then to fiber nodes. The use of fiber deep into the network dramatically reduces the number of locations where equipment needs to reside and thus it dramatically increases the efficiency and robustness of the network while making it far more reliable and secure. The use of lightwaves dramatically reduce the number of places in the network vulnerable to technical failure and the number of network sites per household is reduced while at the same time services are delivered transparently throughout the network using optical wavelengths.

Specifically, AT&T is going to have in each market fiber rings that have anywhere from 72 to 144 count fiber. There will be primary hubs on the rings within these markets and inside the primary hubs will be the CMTS equipment for the cable modem service, the host digital terminal that supports telephony, switching capabilities, DC powering that provides centralized powering for telephony with unattended emergency backup that is in the 100-200 hour range as well as video processing for interactive TV and digital TV services. On average, each primary hub will service 140-150,000 homes.

These primary hubs will be connected via fiber to cable head-ends which will allow for seamless connectivity between the cable head-end and the primary hub. In addition, there is fiber connectivity to Teleport 5ESS switches which resides in every cable market (AT&T will have 102 next year) to provide all local telephony features (think of Teleport as the local telephone factory for AT&T in both business and consumer). Furthermore, the AT&T primary hubs are also connected via fiber to the local exchange public switched network of the Bells as well as to the

AT&T long distance network. These primary hubs will be the centralized location for all intelligence in the network and all upgrades to services and advanced capabilities.

Moving deeper in the network, connected via fiber to the primary hubs will be approximately 7-8 secondary hubs per primary hub which will serve anywhere from 10,000 to 40,000 homes. These secondary hubs have full SONET ring redundancy with each other and the primary hub with complete fault tolerance. The secondary hub is a passive site that via DWDM, with anywhere from 8 to 20 wavelengths from the primary hub, are served the services from the primary hub.

Off of the secondary hubs via fiber connectivity (anywhere from 4 to 10 fibers) will be fiber nodes that on average will serve 350 homes. These fiber nodes are relatively small physical devices that simply convert optical wavelengths into electronic currents so that telephony and video and data can be delivered back and forth to the homes. If AT&T chooses to split nodes to further reduce homes per node that is simply a function of putting in a second optical transmitter in the fiber node that allows the fiber node to be split for upstream or downstream or both. Depending on the situation a node split will cost less than $5,000.

The extension of this network architecture is called Lightwire where the primary ring, primary hub, secondary hub and fiber nodes all remain as is except AT&T will put multiplexers in the fiber nodes and then expand the fiber nodes out via optical wavelengths to have mini nodes serving as few as 50-70 homes. This Lightwire architecture extends the use of DWDM to 350 home nodes and extends linear fiber to 50-70 home mininodes. Clearly, as AT&T pushes fiber deeper into the network it increases the bandwidth per home resulting in fewer customers per shared channel of megahertz which enhances network performance.

This network architecture can allow for complete 2-way fault tolerant telephony as well as high-speed data and video. In fact, on average AT&T will be serving roughly 20,000 homes per SONET ring which, in general, is a lower amount than most RBOC networks. What we mean is that in this network architecture there will be typically more fiber backbone per household than exists today in the vast majority of local exchange networks.

AT&T's network architecture has basically replaced all of the bridge taps and amplifiers with fiber. The old serial cable network construct has been replaced by fiber rings with fiber close to the home, thus there are much fewer repeaters than in an old cable system since wavelengths can be regenerated. Hence, the old Christmas tree type of cable network which existed where basically if one connection point on the network went down the whole network was in trouble, has been replaced by a network that looks much more like a telco network with centralized intelligence in the primary hub and functionality aggregated in secondary hubs and fiber nodes. This is similar to Bell networks which have central office switches with digital loop carrier systems and remote terminals in outlying neighborhoods.

In essence this network architecture has replaced equipment with fiber, thus using the capacity of the fiber with dense wave division multiplexing to deliver services very close to the home such that the typical home on the AT&T network will be within 1,000 to 2,000 feet of

the fiber backbone, with very little points of failure in the network.

NETWORK ARCHITECTURE ROBUST AND SCALEABLE

We believe the AT&T network architecture is the best architecture for supporting multiple revenue streams in a multi-media high-bandwidth world. This network architecture represents at least a 60%, if not 80%, reduction in active components relative to old cable plant. It dramatically simplifies the maintenance of the network. It improves performance because not only is AT&T increasing the RF bandwidth by upgrading to 750 MHz but by using fiber and optical wavelengths, as opposed to active moving parts throughout the network, AT&T increases the reliability and sustainability of high levels of performance.

Most importantly, this network is future proof. It allows (given the high level of bandwidth and the ability to move bandwidth closer to the customers at relatively low cost) a lot of flexibility between current and future provisioning of services. As demand increases due to higher penetrations and/or new applications, AT&T has three options for scaling the network: more RF channels, splitting nodes, and pushing fiber deeper in the network. In addition, this network clearly gives AT&T a contingency for "upside surprises" in the demand for broadband services. Of similar importance, this network is backward compatible to traditional existing architectures and clearly forward compatible for ultimately fiber to the home type of network architectures.

As far as the status of the network is concerned, AT&T will be 54% upgraded to 750 megahertz by year-end with about 51% 2-way. By the end of 2000, there will be 75% with 750 megahertz, another 25% with 450 megahertz and 85% of the network will be 2-way. In addition, 75% of the primary and secondary fiber rings have already been constructed and by mid-2000 100% of the primary and secondary fiber rings which connect all the primary and secondary hubs to each other will be completed.

The table below goes through in excruciating detail what bandwidth is available for telephony and high-speed data. Without question, the three things which we worried about regarding the network was, the old Christmas tree architecture of the cable plant and the fact that it had a lot of moving parts which we just addressed, and of course the two issues which everyone points to--the shared aspect of the network and the fact that 2-way capacity is required for telephony.

In the table below we walk through the downstream and upstream bandwidth in the cable network and give you an idea of what is available for telephony and high-speed data.

TABLE 2. NETWORK ENGINEERING CALCULUS ON DISTRIBUTION OF BITS
Downstream
750 MHz Backbone = 125 channels (1 channel = 6 MHz),
downstream capacity is 6 Mbps per 1 MHz
Allocation of downstream capacity by service:

Service	Channels	Total MHz	Notes
*Analog TV	80	480	
*Digital TV for 120 programs	15	90	

*High Speed Data for 38-114 Mbps	1-3	6-18	If 50% of homes take data and given that typically 13% of data subs are on simultaneously, this means that on average 22 homes will be sharing 1-3 downstream channels. This implies 1.67 to 5.01 megabit of downstream speed available per user.
Capacity left for telephony	25	150	1 DS0=0.08 MHz meaning 150 MHz can handle 1,875 telephone lines. Average node size is 350 homes, thus remaining downstream capacity for telephony can handle 5.36 lines/home assuming 100% of homes take telephony versus average RBOC lines/residence of 1.3. In addition, typical Bell traffic engineering aggregates 4:1 trunking, thus downstream capacity can handle 20 lines/home at 100% penetration.

Upstream
40 MHz of capacity is typically available upstream, upstream 1 Mbps = 1 MHz
Allocation of upstream capacity by service:

Service	Total MHz	Notes
*TV	0	Only one way
*Open frequency		*There will be 2-4 MHz reserved for seamless frequency hopping to insure no noise on the return path.
Capacity left for data/telephony	36-38	*Telephony is by definition symmetric, thus 0.08 MHz/line required. However, as with Bell networks there is 4:1 concentration of traffic engineering meaning for every 4 user lines there is one network path, thus only 0.02 MHz/line is required. If AT&T got 50% penetration of homes and each home took 1.5 lines, AT&T would need 5.25 MHz upstream (350 node size x 50% = 175 subs x 1.5 lines = 262 lines x 0.02 MHz/line = 5.25 MHz) *If above is correct, then there would be 31-33 MHz left for upstream data. If 50% homes take data (175 of 350) and 13% simultaneous use occurs(22 homes) that leaves 1.5 Mbps/user upstream capability. Even if 25% simultaneous use occurs, there would still be 750 Kbps of upstream speed available for each user.

PLENTY OF CAPACITY EXISTS PER HOME UP AND DOWNSTREAM FOR TELEPHONY AND DATA

If a network has 750 MHz of backbone capacity, that means that it has 125 channels of downstream capacity available. One channel equals roughly 6 MHz. On the downstream side, one can get 6 megabit of capacity for every 1 MHz of bandwidth. Now, a typical cable company will allocate roughly 80 channels for analog TV which is 480 megahertz of total spectrum. Digital TV (if we assume eventually 120 programs) will take up another 15

channels or 90 megahertz. High-speed data we believe will have at the beginning 1 channel and ultimately 3 channels of downstream capacity or 6 to 18 megahertz which means that there will be 38 to 114 megabit of capacity downstream available for high-speed data.

Now let us stop here for a moment. In a typical node size of 350 homes, if half the homes take cable modems (which by the way is double the penetration we are assuming in our ROI calculation) that means that 175 homes off of any node will be taking cable modem service. Typically, there is 13% simultaneous usage of Internet activity. That means that if AT&T were to get 50% penetration then 13% of those 175 homes (or 22 homes) at any given time will be sharing the 1 to 3 downstream channels. If there is one downstream channel for high-speed data, that would be 38 megabit or 1.67 megabit per home of downstream availability. If there are 3 channels dedicated to high-speed data (as we suspect) that means there will be over 5 megabit of downstream speed per home per user available for cable modem service (based on a 50% penetration rate). If we assume a 25% penetration rate, then there will be 10 megabit of downstream available.

As far as telephony is concerned, if AT&T allocates 80 channels for analog TV, 15 channels for digital TV, and we round up to 5 channels for high-speed data, there are 25 channels or 150 MHz of downstream capacity left for telephony.

Now on to what we love to dive into -- a look at the engineering calculus. One DS0 voice grade equivalent phone line = 0.08 MHz of capacity. This is a fact. This means that 150 MHz of downstream capacity can handle 1,875 telephone lines. If the average node size on the AT&T network is 350 homes, this means that the 150 MHz of available capacity for telephony downstream can handle 5.4 lines per home of telephony assuming 100% of the homes take local phone service from AT&T.

We should point out that the average household in America has 1.3 phone lines. On top of this, every phone company on the planet engineered its network for traffic engineering that aggregates anywhere from 4 to 10 lines per trunk coming out of the switch. All networks are based on statistical multiplexing for traffic engineering which statistically guesses traffic patterns and thus there never exists one network path for every one customer phone line. This concentration is either done at the digital loop carrier level or in concentrators inside of a switch or at a SLC 96 (SLC = subscriber line card). The point is that given your typical 4 to 1 (or more) trunking which occurs in a typical Bell network, this means that the AT&T downstream capacity can actually handle over 20 lines per home (at 100% penetration) with the remaining capacity it has for telephony. Obviously, this is not a constraint on AT&T's ability to grow its local telephony business. In fact, if AT&T were to use up all its downstream capacity left for telephony, its penetration rates would be such that the stock would probably be $1,000 per share.

On the upstream side, there is typically 40 MHz of capacity in a cable system. On the upstream side 1 MHz gets one 1 megabit. When one looks at the allocation of capacity upstream one should keep in mind that no capacity is allocated to television (since it is one-way) that means that all 40 MHz of upstream is left for data and telephony. Of this 40 MHz, roughly 2-4 MHz are left open to provide seamless frequency hopping. This is required to insure no noise on the return path since if a given

channel has interference, the call can automatically "hop" to another frequency without delay or noise on the line. Thus, there will be 36-38 MHz left for telephony and high speed data.

Telephony is by definition symmetric thus 0.08 MHz is required upstream as well as downstream for each phone line. As we said, every Bell network (or any other network in the world) tries to statistically guess when phone calls occur, thus there is at least 4 to 1 concentration in traffic engineering (meaning that for every 4 user lines there is only 1 network path). Therefore, in reality, one only needs 0.02 MHz for every phone line. If AT&T got 50% penetration of a 350 home node (well beyond what we are forecasting), and each home took 1.5 phone lines (roughly the national average), AT&T would need 5.25 MHz of upstream capacity. The math is as follows: 350 home node size x 50% = 175 telephony customers x 1.5 lines = 262 lines x 0.02 MHz per line = 5.25 MHz upstream needed.

This means that there will be roughly 32 MHz left of upstream capacity for data. If 50% of the homes took cable modem service, and we have a typical 13% simultaneous usage then that leaves 32 MHz or 32 megabit of capacity for 22 users at any given time or roughly 1.5 megabit of upstream capacity available. Even if the percentage of simultaneous usage on the Internet doubles over time there will still be 750 Kbps per unit of upstream speed available assuming 50% of all cable subscribers take cable modems. Using our assumptions of 25% cable modem penetration, at any likely level of simultaneous usage there will be upstream speeds available per user at any given time well above competing services in the market.

It should be noted that typically there is an 18:1 asymmetry between downstream vs upstream speed requirements. This is because Internet users are attempting to downstream lots of information off of web sites including ultimately full motion video whereas upstream, more often than not, Internet users are simply key stroking in commands to navigate the Internet which does not take up much bandwidth.

SHARED NETWORK AND RETURN PATH ISSUES TAKEN CARE OF

Therefore, even using what anyone would consider very aggressively optimistic assumptions about penetration, there is a ton of capacity available to offer 2-way symmetric telephony service as well as very high speed Internet service with at least a T-1 of capacity upstream and downstream. The shared aspect of the cable networks are taken into account when one looks at the node size in terms of homes when doing the division of bandwidth available and as we demonstrate there is plenty of bandwidth to go around. The return path is taken care of by the fact that telephony does not use very much of the upstream capacity and an insignificant amount of the downstream capacity.

Thus, we would argue that the AT&T network architecture is one which is not only elegant in its use of optical wavelength to deliver high bandwidth services with as few moving parts as possible, but as we have always said, "you can't coach bandwidth" just like "you can't coach height or speed", and the virtue of having the type of bandwidth available in this network allows for a simultaneous provisioning of a multitude of services without sacrificing reliability or performance.

AT&T LOOKS READY TO SCALE ITS LOCAL TELEPHONY OPERATIONS

As far as the more mundane but vital aspects of the telephony upgrade, namely OSS and provisioning. AT&T currently is provisioning customers within 5 days where a customer is taking its old number with them and is provisioning new numbers within 2 days with installation times averaging 2-3 hours. AT&T is spending several hundred million dollars on OSS systems and right now can provision roughly 500 orders per day, however new OSS systems are coming into operation in the middle of next year. These new OSS systems will allow 5,000 orders per day provisioning. These new systems will have complete follow-through from the order in the field to the provisioning and the billing records. In addition, the new automated flow-through system talks directly to the host digital terminals so that the network can (via automated processes) know where to send wavelengths down through the network architecture to the fiber nodes and then provision the capacity for the customer. The consolidation of switch/HDT provisioning has already begun and call centers, installers, etc. have been hired, all of which is allowing AT&T to ramp up field sales efforts.

As a result of these efforts as well as the network architecture, AT&T in its albeit early stage of telephony, is seeing remarkable grades of service. AT&T's toll grade quality, call set up time, round trip delay, bit error rate, noise, and other measures of network quality are all at or above local Bell quality standards. In fact, AT&T's benchmarking so far has shown that it can have round trip delay less than 10 milliseconds, dialtone delay less than 600 milliseconds, call set up time less than 3.5 seconds and grade of service that grades out to 97%, 100% of the time. Moreover, over 90% of the time a high speed connection of 56 Kbps will run at 50 Kbps versus only 40% in a typical Bell network.

AT&T is currently selling around 90 phone lines per day and installing roughly 50 phone lines per day. On average, AT&T is installing 1.6 lines per customer with the average customer spending $35 per month in local service inclusive of $10 worth of features with churn so far running less than 1% on a monthly basis. On the marketing front, AT&T is getting penetration rates between 10%-17% in the first four months in a given market and once AT&T is in a home, they are closing a sale over 50% of the time. AT&T offers equal access for long distance but 90% of the customers taking local are taking AT&T long distance. We expect that in the year 2000, AT&T is going to prove it can scale its local telephony operations. AT&T will target to close 2000 with some 600,000 telephony subscribers mostly concentrated in 4 or 5 markets particularly Dallas, Denver, Chicago and most likely Seattle or Salt Lake City. These markets in total have roughly 5 million households and about 3 million cable subscribers.

In general, AT&T in 1999 would have installed 1.2 million product units, roughly 20,000 digital TV boxes per week, roughly 2,000 cable modems per week and roughly 400 local telephony units per week. We expect AT&T to roughly double its installation of product units during 2000 to 2.2 million, with the difference between 2000 and 1999 being 60% due to ramp up in cable modems and 40% due to ramp up in local telephony with digital TV installs running constant. The point is that AT&T has really done much more to make the cable plant true 2-way, fiber rich, highly reliable plant. In fact, this is probably a major reason why the AT&T broadband cash flows have been quite a bit less than expected since we think the spending outside of the capital upgrades have been very heavy on the OSS

and provisioning side.

Importantly, 97% of AT&T's households passed have drops off its cable network, even though only 60%-65% are cable subscribers. Furthermore, 65% of small businesses in AT&T cable markets are passed by the fiber backbone which is being deployed since many less than 10 line businesses are in residential areas. Thus, AT&T can easily light up a drop or lateral off its fiber from a centralized location to sell local telephony to a residential or business customer who most likely is an AT&T long distance or perhaps wireless customer even if they are not a cable subscriber. The backoffice is close to being fully automated and the activation of new orders will completely flow through from the field to the network. Don't forget, Teleport which has switches in 93 markets going to 102 in year 2000, all of which match up with the cable markets, are what AT&T piggybacks on to offer all the local telephony features (which obviously further leverages the Teleport investment). Every one of AT&T's primary hubs are connected to a Teleport 5ESS switch via fiber to provide seamless flow through of all telephony features and functionalities.

One last thing to mention on the network architecture, AT&T is currently rolling out NIUs (network interface units) to the side of the house which can provide 4 lines of telephony and AT&T will provide cable modems for those customers which take high-speed Internet. Over time, this configuration will be replaced by a piece of equipment known as a BTI which can provide 4 phone lines as well as high speed data capabilities. The BTI unit streams out in packets to the hub site where then the IP packets will be converted into circuit-switched signals via line cards in the host digital terminal in contrast the NIU sends out constant bits which is what is used in a typical telephony network.

When IP is ready for prime time, the conversion from NIUs to BTIs will occur. We expect the timing on this is the next 2 to 3 years. The reality is that the cost of the equipment for the BTI is coming down so rapidly that it is already at or below the cost of the NIU and one gets high-speed data capabilities on top of the 4 phone lines.

The bottom line on the network architecture is that AT&T really has done an exhaustive amount of work and spent a lot of money to not only upgrade the physical network and take full advantage of the capacity potential but also to develop the systems and capabilities to provide true telephony service. The rest is up to them in terms of marketing, but we would suspect that AT&T certainly stands a good chance of taking its fair share of customers given its brand name and suite of services.

OTHER ISSUES TO THINK ABOUT APART FROM CABLE UPGRADES

There has been a lot of press regarding trackers lately and frankly we are not upgrading the stock because of the notion of a wireless tracker. In our view trackers only make sense if there is an operational reason for it, if one needs a currency, and if one can create true incremental value. The wireless tracker which has been written about in the press, which will also likely include AT&T's fixed wireless business, clearly qualifies. We think AT&T could be more aggressive in wireless (both mobile and fixed, both domestic and international) and having a currency makes sense. As we said, it could add $11-13 per share from the get go.

As far as any other tracker is concerned we would be hard pressed to believe that a tracker on any other part of AT&T's business would meet all three of the aforementioned criteria. In particular, if AT&T does too many trackers it runs the risk of isolating businesses which may actually be getting too much value within AT&T (potentially the consumer long distance business) and thus, the valuation on some of the other trackers would have to be so excessive to make up for what would be a terrible standalone value for some businesses. Thus on the tracker front we view it as nice but not the reason that we are becoming constructive on the stock.

Regarding AT&T's IP network, we believe AT&T is going to build a 12,300 mile, 5 conduit, 288 fiber overlay network (AT&T retaining at least 96 fibers) which was started in 1999 and will be complete by the end of 2001 (3,700 miles complete in 1999, a total of 7,800 lines by year end 2000, and all 12,300 completed miles by year end 2001). We expect almost 75% of the network will be done via swaps or with partners. This network will have 10 big rings and connect the top 30 markets in the U.S. where 80% of the demand for OC-192s, 70% of the demand for OC-48s, and 50% of the demand for OC-3s exist. The new 12,300 mile network will have its 10 large rings interconnecting with AT&T's existing 45,000 mile network which has 100 regional rings that obviously deploy services to all of AT&T's customers.

In general, terabit routes are pretty much among the top 30 cities which is why the 12,300 network construct makes sense. AT&T is building 26 web-hosting centers (1.6 million square feet) and it is ramping up its peering via its CerfNet acquisition (it actually has OC-3 peering with UUNET and other Tier 1 backbones). AT&T is dramatically increasing its OC-48 cross-sections in its network putting in almost 4,000 in 1999 and 8,000 in year 2000. (It takes three sections to provide a finished service). AT&T already has 30 GSR routers along with other high-speed ATM/IP type of infrastructure. Thus AT&T clearly is upgrading its backbone to provide a multitude of IP services.

Frankly, we think the onus is on the marketing and sales effort to get data/IP revenue growth that is much closer to the industry leader versus where AT&T is today. We estimate that AT&T's growth in data and IP services today is roughly half the rate of the industry leader. To address this, AT&T will collapse what is now four different product management groups to one for IP/data services to streamline time to market.

DISCUSSION OF CURRENT BUSINESS

Below is a table that shows AT&T's revenue and EBITDA streams by business category for 1999 through 2001, as if, TCI and MediaOne were part of AT&T for all of 1999, all of 2000, and all of 2001. We have 4 main buckets, business franchise which includes business long distance as well as data/IP, Solutions, local, and the AGNS (AT&T Global Network Services); broadband; consumer; and wireless. The business franchise, as we define it, is how we believe AT&T is going to reorganize itself. In particular, we believe global markets (top 600 accounts) will be under one umbrella (probably run by Rich Roscitt) which includes Solutions so that high end commercial customers get a single point of contact for all services. We expect to outsource global transport to the BT JV where the BT JV will outsource Solutions for global markets. It does remain to be

seen if the BT JV actually works since JVs have done nothing but fail in the global telecom arena.

Table 3. Proforma Revenue and EBITDA (in billions of dollars)

	1999	2000	2001	CAGR ('99-'01)
Business Franchise/a				
Revenues	$29.0	$31.7	$34.7	9.4%
EBITDA	9.4	11.9	14.0	22.0%
Broadband/b				
Revenues	$8.1	$9.2	$11.0	16.5%
EBITDA	2.3	3.2	4.0	31.8%
Consumer/c				
Revenues	$21.9	$20.8	$19.8	(0.5%)
EBITDA	8.6	8.9	8.9	1.7%
AT&T w/o Wireless				
Revenues	$59.0	$61.7	$65.5	5.4%
EBITDA	20.3	24.0	26.9	15.1%
Wireless/d				
Revenues	$7.7	$10.4	$13.6	32.9%
EBITDA	1.4	2.0	3.0	46.3%

Notes: a/Business Franchise includes long distance, Solutions, Global Network and local. b/Broadband is proforma for UMG & TCI included as of 1Q99. UMG's revenues are $2.6 bil. for 1999, $3.0 bil. for 2000, $3.5 bil for 2001. c/Consumer includes long distance, WorldNet and UNE-P. d/Wireless includes impact of fixed wireless rollout.

The business franchise category is growing 9%-10% with EBITDA growing faster than that as you can see in the table. The good news is that voice long distance which is 62% of this category in 1999, drops to roughly 50% by 2001. Of the $29 billion in business franchise revenue in 1999 we estimate voice long distance is $18 billion, local is $750 million, data is $6 billion, and Solutions/AGNS is roughly $4 billion. Embedded in these numbers is roughly $1 billion in wholesale revenue and pure IP revenue is still extremely small. By 2001 data and Solutions/global network services should each grow over 50% off of 1999 levels, local should almost triple with voice long distance staying flat. The bad news, in our mind, is that the data and IP businesses are growing on a blended average below 30% which we think is quite a bit below what other competitors are growing. Thus the challenge is to leverage the infrastructure being built to drive more growth in the data/IP space. Especially since business voice long distance is probably no better than a 2% grower.

The broadband category, assumes TCI and MediaOne for all of 1999, 2000, and 2001 thus these revenues and EBITDA figures do not port to the reported results. Media One represents about $2.6 billion in revenues in 1999, $3.0 billion in 2000, $3.5 billion in 2001. The dramatic pick-up in EBITDA from 1999 to 2000 is driven by synergies as well as, frankly, better operating performance at TCI. As everyone knows roughly 85% of the TCI and UMG homes are in clusters (that's the good news). The bad

news (on the TCI front) is that these clustered markets were a function of aggregating different operators over time and they still were running as multiple operations in a given market.

We believe that Dan Somers and his chief lieutenant, Pat Lombardi, are going to run these markets as a single market with consolidated operations in the home office. We believe that this alone can add 500-700 basis points to core EBITDA margin on the TCI side. What is driving the top-line growth through 2001 and beyond is the new services on top of basic cable: local telephony, cable modems, digital TV, and eventually interactive TV.

On the consumer side, as you can see, we believe that declines of 5% per year will continue. We also believe that the ramp up in EBITDA is pretty much over and that we will see a sideways movement in EBITDA going forward. This consumer line is primarily consumer long distance and does include some WorldNet and other operations. Obviously, the challenge for AT&T is to use consumer long distance for what it is--a cash cow generating almost $9 billion of EBITDA which can be deployed in faster growing areas.

The wireless line also includes fixed wireless which do shave a couple hundred million dollars per year off of the EBITDA. PCS shaves off another $800 million in EBITDA. The EBITDA would be $1 billion higher without the PCS and fixed wireless initiatives, but of course without PCS and fixed wireless the growth rates would also be lower. We should point out that on a net income basis for consolidated AT&T, the wireless business adds at most 5 cents per share of eps so it doesn't really change the cash eps which we are using for valuation purposes.

As can be seen by these trend lines, the issue for AT&T is quite obvious, it has to improve the growth rate of the business franchise, in particular in the data/IP area to come closer to the industry levels. The consumer voice business will continue to decline dramatically, and we think it will be a challenge to keep EBITDA flat so thus AT&T should use this EBITDA to fund other businesses as quickly as possible. Obviously, what could really be the difference between good and dramatically good revenue performance is how quickly AT&T can ramp up the new revenue streams on the cable plant which typically has very high margins associated with it and thus can really propel both revenue and EBITDA growth.

BEYOND 2001 GROWTH VISIBILITY IS HIGH

It is important to note that if one looks at 2001 revenues excluding wireless, it could be argued that 70% or more of the revenues are coming from areas--either the business franchise or broadband--that should to be able to sustain double-digit top-line growth. Thus, even with consumer continuing to decline, AT&T without wireless should be able to sustain 7%-8% top-line growth. Furthermore, peak capital spending will be behind AT&T in 2001, the start-up costs and losses associated with telephony, cable modems and other activities will also be behind them, and the consumer long distance business may, by the end of 2001, at least hit its low point in terms of declining growth. The aforementioned items along with continued cost cutting and efficiencies, should propel AT&T to be able to sustain 15% or more growth in cash eps off of a 7%-8% top-line growth given changing revenue mix, increasing efficiency of the network

and deleveraging below the line.

TIME TO END OUR FOUR YEAR BEARISHNESS

The bottom line is we have been a bear on AT&T for 4 years. To be blunt, the stock has underperformed the market for 4 years. Therefore, except for a few moments here and there we were happy with our rating during this time period. Over the last year, the overwhelming issue in our minds was the technological feasibility and economic return potential of the cable initiatives since have always felt strategically the cable initiatives are in fact the right thing to do. Thus, now that we have proven to ourselves that the technology works, that we think the operation is scaleable and that the return potential is there, on top of what AT&T is doing with its IP backbone, Teleport, its clear conviction on cost cutting and other areas of growth, we are ready to upgrade the stock with a Buy and a $75 price target (wireless tracker or no wireless tracker).

NET/NET: We believe AT&T clearly has the scale and scope of facilities, customer connectivity, and balance sheet to be one of the major telecom behemoths in the industry. Now that we are convinced of the technological feasibility, scalability and economics of cable initiatives, we are recommending the stock. We think this is an industry whose growth multiplier to the underlying economy will continue to expand and thus we think there will be a continued revaluation higher in particular on the market leaders which we think AT&T is now prepared to be one.

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