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VIDEOTEX MARKET FORECAST (1981-1990):

CONSOLIDATED NORTH AMERICAN PERSPECTIVE

date?

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EXECUTIVE SUMMARY

The purpose of this document is to provide a representative forecast of the North American videotex market through 1990.

The results are not based on any original market research, but rather represent a middle-of-the-road forecast synthesized from previously published literature and market forecasts.

Videotex is broadly defined as a user-friendly online information access and exchange service connecting alphanumeric/alphamosaic/alphageometric terminals to remote data services via appropriate transmission media. / See P 1-3

The North American videotex/teletext market for both residential and business services is forecast to be:

	1981	1985	1990
Installed base - units 000's	71	1200	19600
- 5 yr. growth		71%	56%
Revenue - $ million	$100M	$1500M	$13,400M
- 5 yr. growth		68%	44%

The report provides yearly figures for the installed base and revenue forecasts, and presents pessimistic, most likely, and optimistic scenarios.

The report makes the following observations and projections:

- recent backing of key standards bodies and corporations indicates that the current 76% market share of alphanumeric videotex services will gradually yeild to improving price/performance of alphageometric delivery.

- based on forecast per capital expenditures of $100 p.a. and $1600 p.a. for residential and business users respectively, the residential market will account for 61% of the installed base by 1990 but will generate less that 10% of the forecast $13.4 billion revenue.

- the residential market will lag the business market by 3-4 years and will not have appreciable economic impact until the latter half of the decade.

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1.0 INTRODUCTION

1.1 PURPOSE

The purpose of this document is to synthesize a representative, consolidated 10 year North American market forecast for videotex.

1.2 SCOPE

There is little doubt that videotex is a coming reality - be it a concept for the emerging electronic lifestyle and/or specific products. However, despite an estimated $500M worldwide expenditure to date and numerous market research studies, a great deal of uncertainty remains regarding market realities-product definition, market size, market penetration, market economics.

The order-of-magnitude differences and contradictions in current market forecasts present a confusing picture to many researchers. This document attempts to put the North American market into perspective by:

- presentation of comparative forecast data
- synthesis of a representative, middle-of-the-road forecast as a baseline reference.

The North American forecasts for the 1981-1990 timeframe include:

- installed terminal base
- revenue projections

1.3 METHODOLOGY

Available literature including market surveys, forecasts, newspaper articles were surveyed.

The prime information sources are:

- DOC (Department of Communication) reports
- Butler Cox Report Series
- LINK Report Series
- CONTEXT (CSP) Reports
- Newspaper references
- Videotex conference proceedings

"Representative" forecasts for the installed base are obtained by selecting and/or synthesizing median/average data. Revenue forecasts are derived from projected unit revenues per annum applied to installed terminal base. The results are compared against other

market forecasts. As this document is largely an exercise in synthesizing existing data sources, it makes no claim for methodological rigour. It does, however, claim to provide a representative median view of North American market potential.

1.4 CONSTRAINTS

The consolidated perspective presented herein is based on a comprehensive, but by no means exhaustive survey. Given the large variances in the definitional base and the resulting data, it is felt that additional effort expended in this area would yield marginal results at best.

The report investigates U.S. and Canadian markets only. Representative Canadian forecasts, under the usual ceteribus paribus assumptions, may be obtained by using 10% of the stated values (22); World forecasts may be approximated by factoring the data by 200-225%.

1.5 VIDEOTEX DEFINITION

Because videotex is still in its market infancy and hence, prone to the vagaries of "concept inflation" (R12), the definition of videotex is neither stable nor precise. Depending on the view, videotex may be defined as (R13):

- computer text-graphics data protocol (i.e."pregnant ASCII")
- evolving integrated digital service network
- "ideal information "appliance" of information society
- marketing concept designed to provide additional tier of information services to telephone subscribers. & cable

This report works within the broad definitions expressed by Butler Cox (R9) and CONTEXT (R14).

> In essence, videotex is defined as a user-friendly online information access and exchange service connecting conventional and/or graphics-enhanced terminals to remote data services via appropriate transmission media.

This generic definition encompasses one-way broadcast teletext and two-way interactive videotex.

2.0 TERMINALS FORECAST

2.1 1981 INSTALLED BASE

2.2 FORECAST SUMMARIES

2.3 CONSOLIDATED FORECAST

2.0 TERMINALS FORECAST

2.1 INSTALLED BASE

As of December 1981 there were an estimated 80,000 (9) - 90,000 (R15) videotex terminals installed worldwide.

Including alphanumeric services (eg. SOURCE, COMPUSERVE), the majority of videotex uses are located in North America:

VIDEOTEX TYPE	NORTH AMERICA	WORLDWIDE
* alphanumeric	68,500	70,300
alphamosaic	400	17,500
* alphageometric	2,100	2,200
TOTAL	71,000	90,000

2.2 FORECAST SUMMARIES

A summary view of various North American videotex/teletext forecasts is provided in figure 2.1. Inferences/extrapolations/interpolations have been made where required and possible (see footnotes).

The reader will immediately notice the wide forecast variations - even during the early 1980's. Figure 2.2 highlights the order-of-magnitude variations.

Even with liberal allowances made for normal forecast variations, the forecast variances must be viewed as abnormally large. The variances are largely attributable to two factors:

- definitional inconsistency
  - inclusion/exclusion of delivery medium (eg. cable, broadcast)
  - inclusion/exclusion of terminal configurations (eg. modified TV's only, personal computers with videotex adapters)
  - inclusion/exclusion of protocols (eg. alphanumeric videotex)

Figure 2.1: [redacted]otex/Teletext Forecasts (Installed Terminals in Thousands)

SOURCE	Methodology	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990
Strategic Inc. (R30, 23)											45,000
Payment Systems Inc.	Industry Interview					5000 (1)					
CSP International (R28)							1400				
Payment Systems Inc.	Penetration rates (2)					3250					17,500
McCann-Erickson Advertizing	Industry interview (R3)					2500					9,250
IRD (R28)							2800				
Foster Report (3)						870					
Grossman (4)				750		4000					25,000
LINK CIS (R27)	North American Teletext		1	72	222	450	1000				
Hickling & Johnston (R7)	Income and Expenditure - Likely	400	680	1140	2000	3500	6200	9550			
	- Optimistic	800	1360	2280	4000	7000	12400	19100			
	- Pessimistic	200	340	570	1000	1750	3100	4780			
LINK CIS (R27)	North American Videotex Dial-up	.5	2.4	48	156	350	550				
Hough (R2)	Historical analogy(5)	20	70	230	450	700	1150	2110	3090	4070	5,050
Strategic Inc (R28)											12,000
Hough (R2)	Income and Expenditures - pessimistic					130					
	- optimistic					1500					
IRD (12)											9,000
TAMEC	Historical analogy (7)	89				5585					21,010
IRD (R28)						12200					29,600
Butler Cox (8,13)						2000					11,500
AT&T (11)											7,300
CSP International	personal computer growth										
	curves - upper limit	26	67	170	390	830	1184	1689	2409	3435	4,900
	- lower limit	22	46	100	210	410	606	896	1325	1960	2,900
LINK (R11)			71	224	589	1222	2475	4540	7965	12935	19,570

Figure 2.2: Analysis of us Videotex/Teletext Terminals Forecasts* Worldwide

in 1000's

ITEM	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990
Maximum Forecast	800	1,360	2,280	4,000	12,200	12,400	19,100	21,000	33,000	45,000
Median Forecast	89	89	570	570	2,475	3,100	3,100	3,100	6,435	11,500
Minimum Forecast	20	46	100	300	500	606	896	1,325	1,960	2,900

* 1. Consolidated videotex modalities-individual modalities (eg. dial-up) ignored
2. Data ajusted to provide smoothed trend line and does not necessarily agree with individual year data in figure 2.1

- market definition

  - inclusion/exclusion of market segment (eg. home only, home and business)
  - inclusion/exclusion of applications areas (eg. electronic mail, teleshopping)

Briefly stated, the lack of a common, specific videotex definition precludes any meaningful comparative analysis of forecasts and must inevitably result in wide variance even among recognized experts. Butler Cox, for example, forecast 11.5 home terminals by 1990 with a U.S. total including business approaching 19M (R9); Link (R11) forecast over 19M terminals for the home market alone.

In broad terms the videotex market is seen to have the potential to grow to an installed U.S. home base of 7-20M terminals by 1990 with business terminals accounting for anther 7M units.

2.3 CONSOLIDATED FORECAST

A consolidated North American terminal forecast broken down by videotex market segment is presented in figure 2.3.

The data reflects a conservative middle-of-the road forecast synthesis from sources reviewed earlier.

The data is based on a modified and reinterpreted LINK forecast (R11) derived as follows:

- LINK data reinterpreted to cover both home and business market for North America inclusive
- 1981 data added based on section 2.1
- 1981 data (videotex dial-up and personal computers) adjusted by interpolation.

19.6 mill. terms. 1990 for NAm

The synthesized forecast is felt to be representative for the following reasons:

- 1990 forecast of 19.6M units falls within the 14- 27M range forecast
- forecast data for the personal computer videotex segment is conservative relative to other forecasts (R14)
- videotex dial-up and broadcast teletext forecasts are consistent with Hough historical anology (R2) forecasts which, in turn, relate most closely to current experience.

Why?

?

The synthesis lays no claims to mathematical rigour as it is intended to provide a representative median view.

Figure 2.3: Consolidated North American Videotex/Teletext Forecast of Installed Terminal Base (1981-1991)*
(in thousands of terminals)

	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
Videotex Dial-up	2.3	18	40	120	250	400	840	1,600	2,850	4,550	7,000
Two-Way Cable	0	2	9	34	100	250	540	965	1,560	2,400	3,000
Cabletext (one-Way)	.1	1	50	125	250	500	1,000	1,955	3,200	4,600	6,000
Broadcast Teletext	.1	1	10	60	125	250	540	965	1,640	2,700	4,500
Personal Computers	68	82	100	180	350	750	1,200	2,000	3,125	4,780	7,000
Transaction Terminals	.1	3	15	70	147	325	420	480	560	640	700
Total	71	97	224	589	1,222	2,475	4,540	7,965	12,935	19,570	28,200

* Modified and reinterpreted link data (R11)

are these categories
or some of them,
overlapping
— ie multifunctional

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The summary data of figure 2.1 suggests that most observers agree that videotex will have a substantial impact - the questions of when and how large remain a matter of speculation to within an order of magnitude. Accordingly, the penetration rates for the individual videotex modalities of figure 2.3 are subject to the same latitude of interpretation - eg. Yankee Group believes that there will be 7.5 million two way cable connections by 1985; CSP states a figure of 400,000 (R28), and the modified LINK of figure 2.3 shows only 100,000.

3.0 REVENUE FORECASTS

3.1 VIDEOTEX REVENUE PREDICTIONS

3.2 REVENUE FORECAST SYNTHESIS

3.3 COMPARATIVE ANALYSIS WITH OVERLAPPING MARKETS

3.0 REVENUE FORECASTS

Three approaches are utilized to obtain North American videotex revenue forecasts:

- "expert" prediction
- derivation from per capita usage forecasts
- comparative analysis with allied market segments

The following paragraphs develop residential and business forecasts of $6.7, 13.4, and 18.2 billion for pessimistic, most likely, and optimistic views of the market by 1990, with 10 year average annual growth exceeding 50%.

The results correspond to the widely held view that the market will exceed $10B by 1990.

Whereas residential users will account for 61% of the installed terminals by 1990, this segment is projected to account for only 9% of the revenue base. This serves to underscore the vital role of the business community in the videotex market.

3.1 VIDEOTEX REVENUE PREDICTIONS

Literature records the following predictions:

- "By the end of the decade, the videotex market in Europe and North America is likely to exceed $20 billion. Videotex services will be widely used in both business and homes as a source of information and for messaging, purchasing and financial transaction" (R17).
- "Michael of J. McLaughlin, a leading videotex consultant and a vide-president at Booz, Allen and Hamilton Inc. predicts ... a $5 billion (corporate videotex) market by 1990" (R18).
- "... Booz, Allen, and Hamilton has predicted hardware and software expenditures for home information systems by 1990 of $20 billion" (R28).
- "Canada...estimates (world videotex market) to be worth $10 billion by 1990" (R19).
- "Average consumer spending, inclusive of video games, home security services and electronic mail as well as videotex will reach $78 per month by the end of the decade when total (US) spending will exceed $9 billion" (R20).

- "Videotex Systems Market is expected to reach $3.7 B by 1990 and exceed $15 B by 2000" (R29). Institute of the Future 81

- "Strategic Inc. ... estimates that 45 million homes ... will have videotex services of some kind by the end of the decade. These homes... could own $19 billion worth of videotex equipment an spend $16 billion annually for these services." (R30) 1981

- "The 1990 forecast by Strategic Inc. sees 12 million homes generating $5 billion in service revenues" (R28) Videopress 81

- "The IRD report has 1991 videotex, electronic mail and timesharing revenues at $11.4 billion coming from 9.8 million homes" (R28)

- " ... Venture Development Corporation has predicted that the U.S. market for home video information systems and control electronics will grow from $7.8 billion today to over $28 billion by 1990". (R28)

- "According to some forecasts, 45% of all 45 homes will be served by videotex teletext by 1990. Videotext alone is seen as a $5-billion to $10-billion business by that year." (R40) Broadcasting 82

These quotations are indicative of the emerging consensus that videotex will mature into no less than a $10 billion North American market by 1990.

3.2 REVENUE FORECAST SYNTHESIS

N.Am ? World?

This section undertakes to corroborate the view that videotex will become at least a $10 billion home and business market by 1990.

The methodology utilized is based on projected per capita revenue forecasts applied to the forecast "likely" installed base for home and business usage. The underlying assumptions are:

- modified LINK forecast of installed terminals (figure 2.1)

- as per PRESTEL experience, residential users account for 10% of base in 1981 Where? UK!

- residential usage experiences slow growth to 1985 and has growth phase thereafter

- as per Butler Cox projections (13), residential users will account for 61% of installed base by 1990

- $100 p.a. average residential user revenue. This conservative value is consistent with results obtained from willingness-to-spend interviews (14, 15) and documented rates (R15)

- $1600 p.a. average business revenue (20,21)

- "pessimistic" forecast is 50% of "likely" scenario

- "optimistic" forecast assumes 3.5% annual growth rate in revenue and is based on Hickling Johnston prediction that incremental disposable income would exceed GNP growth rate by 3.5% (R7)

The results for pessimistic, most likely, and optimistic scenarios are portrayed in figure 3.1 and indicate that the 1990 North American market will be $6.7, 13.4 and 18.3 billion, respectively with corresponding compounded average annual growth rates of 54, 54 and 58%.

It can be seen that the model corroborates the expectations of a $10B market by 1990 for the stated set of assumptions.

The revenue stream analysis of figure 3.2 indicates that the residential market will account for a minor portion of the revenue inflow. Based on projected per capita annual expenditure $100 and $1600 for residential and business users respectively, the residential market will grow to less than 10% of the total revenue even through it will account for almost 2/3 of the installed terminal base. The data suggests that the residential market will lag the business sector by about 3.5 years in terms of take-off and will not have an appreciable market impact until the latter half of the decade.

3.3 COMPARATIVE ANALYSIS WITH OVERLAPPING MARKETS

At present there is no universally agreed upon definition of videotex. Indeed several authors predict that videotex will rapidly converge with other markets (eg. graphics, online database (R 23), office automation (R 24), conventional DP) and perhaps emerge as a concept rather than a specific product during the latter part of the decade.

As videotex overlaps so heavily with other evolving computer-related market services, "meaningful" videotex forecasts should correlate to market forecasts in allied functional areas - online data base services and business graphics in particular.

Figure 3.3, although not complete, is sufficient to indicate that the derived videotex forecasts are consistent with those in allied areas to within an order of magnitude.

Figure 3.1: North American Videotex/Teletext Revenue Forecasts

ITEM		1981	1982	1983	1984	1985	1986	1987	1988	1989	1990
p	% residential users	10	10	15	20	25	35	45	53	57	61
R_p	Annual Revenue per Terminal – pessimistic	725	725	688	650	613	538	463	403	373	343
R_1	Annual Revenue per Terminal – likely	1450	1450	1375	1300	1225	1075	925	805	745	685
R_o	Annual Revenue per Terminal – optimistic	1450	1501	1473	1441	1406	1277	1137	1024	981	934
T	Installed Terminal Base (000's)	71	97	224	589	1222	2475	4540	7965	12935	19570
Mp	Total Revenue – Pessimistic ($M)	52	71	154	383	749	1331	2100	3206	4819	6703
Ml	Total Revenue – Likely ($M)	103	141	308	766	1497	2661	4200	6412	9637	13405
Mo	Total Revenue – Optimistic ($M)	103	146	330	849	1718	3160	5163	8158	12687	18270 million

Note:

1. R_1 = [up + b (1–p)] where p is % residential users, u = $100 pa residential revenue, b = $1600 pa business revenue per terminal.
2. $R_p = .5\ R_1$
3. $R_o = (1+i)^t\ R_1$ where i = .035 annual growth of videotex usage
4. $M_l = TR_1$
5. $M_p = .5M_1$
6. $M_o = TR_o$
7. Installed Terminal Base as per modified LINK forecast
8. Includes alphanumeric, alphamosaic and alphageometric modes of videotex.

terminal cost ?

Figure 3.2: Projected North American Revenues for Residential and Business

ITEM	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990
% residential users	10	10	15	20	25	35	45	53	57	61
Installed terminal based (000's)	71	97	224	589	1222	2475	4540	7965	12935	19570
Revenue - residential	1	2	3	12	31	87	205	422	737	1184
- business	102	39	305	754	1466	2574	3995	5990	8900	12221
- Total	103	141	308	766	1497	2661	4200	6412	9637	13405
% of residential revenue	1	1	1	2	2	3	5	7	8	9

Note:

1. Assumes residential revenue = $100 p.a. business revenue = $1600 p.a. per terminal
2. Assumes "most likely" growth trajectory for installed base.

Figure 3.3: Comparative Analysis of North American Market Forecasts ($ billion)

MARKET SEGMENT	1980	1985	1990
Online Database Services (16)*	$ .3 - .8 B	$ 1.0 - 2.2 B	$ 2.1 - 7.5 B
Business Graphics (17)	$ .4 B	$ .8 B	$ 4.0 B
Audiographic Teleconferencing (19)	$ .01 B	$ .08 B	$ .3 B
VIDEOTEX (18)	$ .05 - .1 B	$ .7 - 1.7 B	$ 6.7 - 18.2 B

* excludes home usage

4.0 CONCLUSIONS

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Based on a review of major existing reference material, most forecasts of the North American videotex market for alphanumeric/alphamosaic/alphageometric services suggest:

- by 1985 the market will have experienced a 5 average year annual growth rate of 71% to attain in excess of 1 million terminals and $1 billion annual revenue.
- by 1990 the videotex market will have grown at a slower rate of 56% to reach an cumulative installed base approaching 20 million units and generating at least $10 billion annually.

Pessimistic, most likely, and optimistic scenarios are summarized in figure 4.1. In general, published 1990 revenue projections are within an order of magnitude; terminal projections, however, vary by more than an order of magnitude.

Although the current worldwide videotex base of 90,000 is dominated by alphanumeric services in terms of market share (78%) and market growth, the price/performance ratio will gradually shift towards alphamosaic (eg. CEPT) and alphageometric (eg. PLP) modes. Furthermore, the pending submission of PLP to CCITT and the public backing by big money such as AT&T, CBS, DEC, Tektronix and Time Inc. strongly suggest that alphageometric will emerge as the de facto and de jure standard. The timing will be influenced by several key factors:

- formal ratification of PLP by CCITT and/or FCC
- price/performance improvements in PLP through low-cost VLSI decoders and PLP software (eg. virtual terminal protocol) interfacing to conventional alphanumeric files
- market stance by IBM

Although lacking specifics, market forecasters are nearly unanimous in viewing videotex as a capital-intensive, long-term investment with little prospect of significant profits before the middle of the decade.

It is critical to note the residential market is projected to generate less than 10% of the gross revenue in 1990 even though it will account for 60% of the installed terminal base. If the underlying per capita annual expenditure assumptions of $100 and $1600 pa for residential and business users are true, this will dramatically influence the market penetration strategies of service providers. The misplaced optimisim in the residential market to

Figure 4.1: North American Videotex Market Forecast Summaries: 1981-1990

SCENARIO		1981	1985	1990
Pessimistic	- units (000's)	71	500	2,900
	- revenue ($ million)	52	750M	6,700M
Most likely	- units (000's)	71	1,200	19,600
	(5 year AAGR*)		71%	56%
	- revenue ($ million)	100M	1,500M	13,400M
	(5 year AAGR*)		68%	44%
Optimistic	- units (000's)	71	12,200	45,000
	- revenue ($ million)	100M	1700M	18,300M

* Average annual compounded growth rate

date will be replaced by concentration on the substentially more lucrative business sector. Under these circumstances, the residential market can be expected to lag the business market by 3-4 years. In practice, however, the underlying per capita revenue statistics will not go unchallenged and will continue to be tested well into the eighties. Knight-Ridder, for example, views $180-400 p.a. as a more appropriate revenue base for the residential market based on commercial transactional services (e.g. teleshopping, telebanking) in addition to information services (R40). In short, the evolution of the residential market will be paced by the rate of introduction of revenue-generating transactional services which will supplement the marginal economics of information services alone.

While few dispute the potential of videotex, market research to date has been a frustrating experience to both researcher and end user due to lack of common definition and market focus associated with any new concept or product. Both topics, however, have been the subject of intensive analysis during the past year which should lend to more consistent market research data. Firstly, videotex is evolving to a concept of a technologically - transparent, personalized integrated digital services network containing:

- reliable, user-friendly end-to-end services
- multi-modal transmission media (ie. cable, telephone, broadcast TV, satellite)
- multiple data base/service access
- multi-function terminals
- transmission protocol/gateway transparency

Secondly, while many technical issues remain, the focus of videotex analysis is shifting from the means to the end use. Videotex market research is focusing on and reinterpreting research in allied but specifically focused market segments such as online data bases, teleshopping, telebanking within a richer holistic framework that emphasizes economics as the fundamental reality.

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36. Telidon and Videotex: Publishing in an All-Electronic Environment, Seybold Report (Box 644; Media, Pa. 19063-C215) 565-2480), Vol. 11, No.6, November 23, 1981.

37. Feeley J., "Home Computing/Videotex: A North American Perspective", paper presented at World Computing Services Industry Congress III, Copenhagan, Denmark. 20-23 June, 1982.

38. Marsh R., "Network Applications in Canada", paper delivered at Videotex '82, New York, N.Y., June 28-30, 1982.

39. Computer Peripherals For the Home Infotainment Market, Report 1502, Stategic Inc. (San Jose, C.-A.), June 1982, 170 pages.

40. "Teletext and Videotex: Jockeying For Positions in the Information Age", Broadcasting, Special Report supplement, June 28, 1982.

CAVALIER

FOOTNOTES

1. Ref. 1, p. 13 "Infomart projects that by 1985 there will be 500,000 Canadian home videotext terminals".

2. Ref. 1, p. 14 "PSI's market penetration projections for residential use of all home terminal services, including videotex in the United States, are for 5-10 percent of households by 1985 and 30-40 percent by 1990. Assuming 8.7M Canadian households in 1985 (Ref. 2, p. 78) and assuming median estimate of 7.5% with 50% for videotex this implies 725,500 terminals in place in Canada by 1985. Assuming 35% penetration of 10.0M households in 1990 implies 1.75M terminals in place for 50% videotex base for home services. Canadian data scaled up by factor of 10 for North American forecast.

3. Ref. 4 "Videotex will reach only 1 percent of homes with television by 1985. Assuming 8.7 M Canadian households with 100% TV penetration implies 87,000 units in place.

4. Ref. 5 stated that Canadian market would have 400,000 sets in place and generate up to $750M/year by 1985, by 1990, 25% of U.S. homes will have videotex and $75B market will exist for residential telecommunications services. Teleguide alone will stimulate sale of 75,000 videotex terminals in domestic market by 1983. For 1990, assuming 100M families and 25% penetration suggests 25M units in place.

5. Hough (Ref. 2) data has been interpolated over ten year horizon using provided average annual growth rate for U.S. home and business services. Median value of forecast annual range used.

6. Hough (Ref. 2) reports 13K-150K Canadian users in 1985 assuming monthly videotex costs of $6.00 and $25.00 respectively.

7. Tamec (Ref. 8), Table 12-18. Forecast for 1980 has been shifted to 1981. Median point of optimistic and pessimistic scenarios used.

8. Butler Cox (Ref. 9, p. 33) forecast 2 million home videotex terminals installed world wide by 1986. Assume 50% in North America.

10. Ref. 9, p.4 as at Oct. 81.

11. Ref. 16. 7% of 103,795K forecast U.S. households in 1990 implies 7.3M units.

12. Ref. 9, p. 5. IRD assumes 10% penetration by 1991 which implies about 9.0M units by 1990.

13. Ref. 9, p. 5. Butler Cox forecast 11.5M and 7.3M installed base of residential and business users respectively by 1990. World? NAm?

14. Ref. 21, pp. 38.

15. Ref. 9, p. 30.

16. Adapted from Ref. 10, pp. 52-53. North American Market assumed to be half of world market. 1980-85 growth rates projected to 1990.

17. Adapted from Ref. 22 with relevant North American market assumed to be 50% of provided data.

18. From figure 3.1.

19. From Ref. 25. summary of Gnostic Concepts Videoconferencing forecasts.

20. From Ref. 21, Business user costs are derived at $1800 p.a.

21. Ref. 26 projects annual terminal revenue to be $1884 in 1981 and decline to $1188 by 1984.

22. Readers wishing a synopsis of Canadian Market Forecast studies are referred to The Telidon Book (R31). A similar synopsis together with a critical approisal of the Canadian effort is provided in the recent Doucette study (R32). Reviews of Telidon development, field trials, and issues are provided in R33-38.

23. Strategic Inc, 1981 forecast of 45 M units (R30) revised downward to 38 M units in 1982 (R39) - 14 million interactive videotex and 24 million teletext subscribers by 1991.

accurate assumption... but what abt 90-2000?