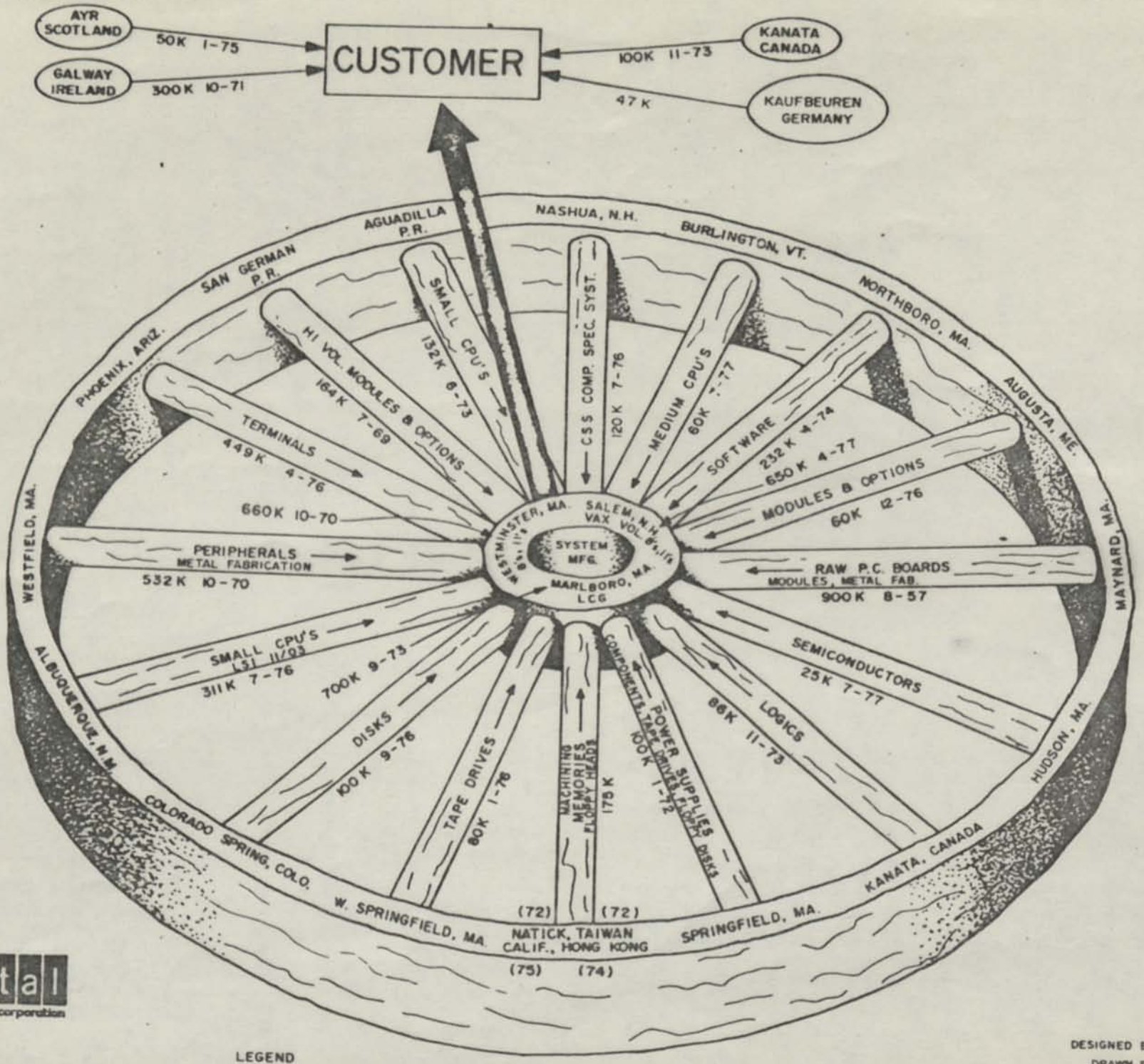
MANUFACTURING FACILITIES



digital
digital equipment corporation

LEGEND
K NUMBER = PLANT SQUARE FOOTAGE

DESIGNED BY : JOHN DENNIS
DRAWN BY : E. NOURIE
1/18/78

NI/W22

FY79 BUILDING ACTIVITY

			SIZE (000 SF)
A.	Total Available Space End of FY78		10,021 SF
B.	Facilities Added in FY79		
	Ayr, Scotland	213.2	
	Burlington, VT	189.3	
	Bedford, MA	75.1	
	Rockrimmon, CO	183.2	
	Holland	4.3	
	Boston Manufacturing	60.0	
	Costa Mesa, CA	33.6	
	Hudson, MA (LSI)	120.0	
	Santa Clara, CA	1.0	
	Lanham, MD	.7	
	Total Space Added	880.4	
C.	Facilities Deleted in FY79		
	Fountain, CO - Pilot	86.0	
	Fountain, CO - Warehouse	12.0	
	Garden Valley, CA	24.0	
	Elliott Building	46.3	
	Galway	38.4	
	Hong Kong	23.7	
	Hudson, NH	24.7	
	Leominster, MA	139.0	
	Mountain View, CA	24.0	
	Lake Street	31.4	
	Santa Ana, CA	19.7	
	Southampton	50.0	
	Steigers Building	35.0	
	W. Springfield	80.0	
	Worcester	21.4	
	International Consol. (WZ-1)	63.3	
	Total Space Deleted	718.9	
D.	Total Net Gain (B-C)		161.5
E.	Total Available Space End of FY79		10,182.5

10-06-78

FACILITY	MAIL CODE	OWNED/ LEASED	MFG.	NON-MFG.	VACANT	TOTAL
Albuquerque, NM	AB	L	239,504	10,288	73,621	323,413
Acton, MA - Plant	AC	L	108,269	3,015	-	111,284
Aquadilla, PR	AG	O	108,573	-	23,427	132,000
Acton, MA - Nagog	AK	L	-	23,400	-	23,400
Augusta, ME	AS	L	60,000	-	-	60,000
Ayr, Scotland	AY	L	46,805	-	-	46,805
Maynard, MA - St. Bridget's	BG	L	-	9,450	-	9,450
Marlboro, MA - Advanced Systems	BP	O	9,939	35,595	-	45,534
Burlington, VT	BT	O	133,960	756	135,186	269,902
Bedford, MA - Corp. Ed. Svcs.	BU	L	-	155,474	28,802	184,276
Boylston, MA	BY	O	-	23,310	17,957	41,267
Colorado Springs, CO - Plant	CX	O	168,470	11,857	251,411	431,738
Colorado Springs, CO - Disk Eng.	CZ	L	1,386	22,046	-	23,432
Derry, NH	DR	L	-	-	74,000	74,000
Manchester, NH - Computer Store	DS	L	-	4,436	-	4,436
East Springfield, MA - Whse.	EA	L	-	58,000	-	58,000
Galway, Ireland	GA	O	265,766	-	4,538	270,304
Hong Kong	HK	L	97,800	-	-	97,800
Bedford, MA - Hanscom Field	HN	L	-	26,500	-	26,500
Hudson, MA	HU	O	2,457	22,779	-	25,236
Kanata, Ontario	KA	O	115,575	114,372	44,053	274,000

FACILITY	CODE	LSA				
Fuchstal, West Germany	KB	L	-	-	47,495	47,495
Clonmel, Ireland	KL	L	23,821	-	23,054	46,875
Leominster, MA	LE	L	59,004	-	-	5^,004
Leominster, MA - C&T Whse.	LE	L	80,000	-	-	80,000
Manchester, NH - Grenier Field	MH	L	-	2,100	-	2,100
Merrimack, NH	MK	O	-	492,034	63,039	555,073
Maynard, MA - Mill Complex	ML	O	346,982	634,946	50,395	1,032,323
Marlboro, MA - Memory Products	MO	L	60,254	142	-	60,396
Marlboro, MA - Plant	MR	O	289,145	419,247	2,264	710,656
Maynard, MA - PMR	MS	O	-	112,550	2,007	114,557
Mountain View, CA	MV	L	20,219	3,781	-	24,000
Natick, MA	NA	L	48,372	-	-	48,372
Salem, NH - Plant	NI	O	647,230	598	4,090	651,918
Nashua, NH - TPL	NN	L	-	47,000	-	47,000
Nashua, NH - CMP	NP	L	-	30,817	-	30,817
Nashua, NH - Airport Bldg.	NQ	O	-	158,400	-	158,400
Northboro, MA	NR	L	168,339	64,061	-	232,400
Salem, NH - Coates Bldg.	NS	L	78,427	-	-	78,427
Nashua, NH - CSS	NU	L	-	119,995	-	119,995
Nashua, NH - Stellos Bldg.	NX	L	-	16,968	-	16,968
Phoenix, AZ - West. Area. Admin.	PJ	L	-	5,047	-	5,047
Maynard, MA - Parker St. Complex	PK	O	6,726	551,401	271	558,398

FACILITY	CODE	LEA				
Phoenix, AZ - Plant	PN	O	328,162	14,456	1,730	344,348
Phoenix, AZ - Warehouse	PN	L	30,000	-	-	30,000
Santa Ana, CA	SA	L	-	23,143	691	23,834
San German, PR	SG	L	254,095	-	-	254,095
Springfield, MA - Plant	SP	O	132,347	-	134,853	267,200
Springfield, MA - Steigers Bldg.	SP	L	35,000	-	-	35,000
Taiwan	TA	L	98,100	-	-	98,100
Tewksbury, MA	TW	L	1,907	182,475	-	184,382
Westboro, MA - LSI	WB	L	52,253	-	-	52,253
Westfield, MA	WF	O	531,532	148	-	531,680
Westminster, MA	WM	O	632,729	21,600	4,649	658,978
Woburn, MA	WO	O	-	225,000	-	225,000
West Springfield, MA	WS	L	80,000	-	-	80,000
Worcester, MA	WX	L	21,413	-	-	21,413
Westboro, MA - Internat'l Con.	WZ	L	63,177	79	-	63,256
Westboro, MA - Micro Products	WZ2	L	36,042	3,558	-	39,600
Westboro, MA - DCG Whse.	WZ3	L	20,822	25,978	-	46,800
Sub-Total Owned			3,719,593	2,815,739	721,913	7,257,245
Sub-Total Leased			1,785,009	861,063	265,620	2,911,692
Grand-Total			5,504,602	3,676,802	987,533	10,168,937

FP&E
FHN: 1/15/79

MANUFACTURING PLANTS

PROCESS PLANTS:

MAYNARD/ACTON, MA.	1350	METALS, BOARDS, MODU
SAN GERMAN, P.R.	2100	MODULES
NATICK, MA.	275	CORE, MEMORY, HEADS
HONG KONG	1665	STACKS, MEMORY MODU
TAIWAN	730	STACKS
SALEM N.H.	665	CROSS-PRODUCTS
MOUNTIN VIEW, CA.	50	DISKS, CARTRIDGES
AUGUSTA, ME.	150	MODULES
WORCESTER, MA.	210	SEMICONDUCTORS
WESTBORO, MA.	145	LSI TEST

PRODUCT PLANTS:

PHOENIX, ARIZ.	1200	TERMINALS
WESTFIELD, MA.	1880	DISK, TERMINALS
SPRINGFIELD, MA.	790	TAPES
AGUADILLA, P.R.	860	CPU'S, PDP-8, PDP-11
ALBUQUERQUE, N.M.	430	TERMINALS
COLORADO SPRINGS, CO.	290	PILOT DISKS
GALWAY, IRELAND	675	VOL. MFG. EUROPE
BURLINGTON/DERRY VT/N.H.	520	CPU'S
MARLBORO PLAZA, MA.	300	MEMORY SYSTEMS
ROXBURY	-----	

SYSTEMS PLANTS:

AYR, SCOTLAND	200	FA&T EUROPE
WESTMINSTER, MA.	1700	FA&T DOMESTIC
MARLBORO, MA.	450	DEC-10 SYSTEM
KANATA, CANADA	285	FA&T CANADA
GERMANY	------	FA&T GERMANY
SALEM, N.H.	1100	FA&T DOMESTIC

EUROPE

European Manufacturing Plants

Location	Activity
1. Galway, Ireland	Vol./FA & T
2. Clonmel, Ireland	Volume
3. Ayr, Scotland	FA & T
4. Reading, United Kingdom	CSS/F.S.
5. Hoofddorp, Holland	European Logistics & Repair Ctr.
6. Munich, Germany	CSS/F.S.
7. Kaufbeuren Plant West Germany	FA & T
8. Annecy, France	CSS/F.S.
9. Stockholm, Sweden	CSS/F.S.

FACILITY	GROSS SQ. FT.	OWNED/LEASED	MAIL CODE
Albuquerque, NM Plant	323,413	Leased	AB
Acton, MA Plant	111,284	Leased	AC
Aguadilla, PR Plant	132,000	Owned	AG
Acton, MA Nagog Square	23,400	Leased	AK
Augusta, ME Pilot Plant	60,000	Leased	AS
Ayr, Scotland Plant	46,805	Leased	AY
Maynard, MA St. Bridgets	9,450	Leased	BG
Burlington, VT Pilot Plant	60,000	Leased	BT
Burlingtin, VT Warehouse	20,000	Leased	BT
Bedford, MA	182,865	Leased	BU
Boylston, MA	41,267	Leased	BY
Fountain, CO Pilot Plant	86,000	Leased	CX
Fountain, CO Warehouse	12,000	Leased	CX
Colorado Springs, CO Disk Engineering	24,000	Leased	CZ
Derry, NH	74,000	Leased	DR
East Springfield, MA	50,000	Leased	EA
Salem, NH Elliot Building	46,260	Leased	EL
Galway, Ireland	308,740	Owned	GA
Hudson, NH	24,704	Leased	HD
Hong Kong Manufacturing	17,000	Leased	HK
Bedford, MA Hanscom Field	26,500	Leased	HN
Hudson, MA East. Area Admin.	25,236	Owned	HU
Kanata, Ontario Plant	178,000	Owned	KA
Kanata, Ontario Warehouse	14,687	Leased	KA
Fuchstal, West Germany	47,495	Leased	KB
Clonmel, Ireland	46,875	Leased	KL
Leominster, MA	59,004	Leased	LE
Leominster, MA C&T Warehouse	80,000	Leased	LE
Manchester, NH Grenier Field	2,100	Leased	MH
Merrimack, NH	555,073	Owned	MK
Maynard, MA Mill	1,027,857	Owned	ML
Marlboro, MA Memory Prod. I	45,534	Owned	MO1
Marlboro, MA Memory Prod. II	60,396	Leased	MO2
Marlboro, MA Plant	711,658	Owned	MR

Revision I
5/16/78

FACILITY	GROSS SQ. FT.	OWNED/LEASED	MAIL CODE
Maynard, MA PMR	114,577	Owned	MS
Mountain View, CA Plant	24,000	Leased	MV
Natick, MA 179 Pine St.	30,400	Leased	NA
Natick, MA 16 Huron Drive	7,500	Leased	NA
Natick, MA 3 Huron Drive	11,099	Leased	NA
Salem, NH Plant	651,918	Owned	NI
Nashua, NH TPL	47,000	Leased	NN
Nashua, NH CSS Mfg.	33,200	Leased	NP
Nashua, NH Airport Bldg.	158,400	Owned	NQ
Northboro, MA	232,400	Leased	NR
Nashua, NH Lake Street	31,375	Leased	-
Salem, NH Coates Bldg.	77,350	Leased	NS
Nashua, NH CSS	119,995	Leased	NU
Nashua, NH Stellos Bldg.	16,968	Leased	NX
Phoenix, AZ West. Area Admin.	5,047	Leased	PJ
Phoenix, AZ Plant	344,348	Owned	PN
Phoenix, AZ Warehouse	30,000	Leased	PN
Santa Ana, CA CSS	23,834	Leased	SA
Southampton, MA	50,000	Leased	SH
San German, PR	254,095	Leased	SG
Springfield, MA Plant	142,800	Owned	SP
Springfield, MA Steigers Bldg.	35,000	Leased	SP
Taiwan Manufacturing	78,372	Leased	TA
Tewksbury, MA	183,822	Leased	TW
Westboro, MA LSI	51,293	Leased	WB
Westfield, MA Plant	531,680	Owned	WF
Westminster, MA Plant	658,978	Owned	WM
Woburn, MA	229,000	Owned	WO
West Springfield, MA Plant	80,000	Leased	WS
Worcester, MA Plant	21,413	Leased	WX
Westboro, MA Internat'l Con.	63,256	Leased	WZ
Westboro, MA Micro Products	39,600	Leased	WZ2
Westboro, MA DCG Warehouse	46,400	Leased	WZ3
Maynard, MA Parker St.	561,397	Owned	PK

Revision 2
5/16/78

DIGITAL EQUIPMENT CORPORATION

OWNED & LEASED FACILITIES INVENTORY

END OF FY 1979

LOCATION	OWNED	%	LEASED	%	TOTAL	%
ARIZONA						
Phoenix (3)	344,348	4.59	35,047	1.21	379,395	3.65
CALIFORNIA						
Costa Mesa	-		77,000			
Mountain View	-		24,000	3.48	101,000	0.97
COLORADO						
Colorado Springs	424,641	5.66	-		424,641	4.08
MASSACHUSETTS						
Acton (2)	-		140,853			
Bedford (2)	-		235,552			
Boylston	41,267		-			
Hudson	25,236		-			
Leominster	-		59,004			
Marlboro (3)	756,190		60,396			
Maynard (4)	1,707,167		9,500			
Natick	-		48,372			
Northboro	-		232,400			
Springfield (4)	267,200		173,000			
Tewksbury	-		184,382			
Westboro (4)	-		201,509			
Westfield	531,680		-			
Westminster	658,978		-			
Woburn	225,000		-			
Worcester	-	56.07	21,413	47.05	5,579,099	53.56
NEW HAMPSHIRE						
Derry	-		74,000			
Hudson	-		24,704			
Manchester	-		2,100			
Merrimack	555,073		-			
Nashua (5)	158,400		214,812			
Salem (2)	651,918	18.18	78,427	13.57	1,759,434	16.89
NEW MEXICO						
Alburquerque	-		323,413	11.14	323,413	3.11
MAINE						
Augusta	-		60,000	2.07	60,000	0.58
VERMONT						
Burlington	269,902	3.60	-		269,902	2.59

LOCATION	OWNED	%	LEASED	%	TOTAL	%
CANADA						
Kanada	274,000	3.65	-		274,000	2.63
GERMANY						
Fuschstal	-		47,495	1.64	47,495	0.46
IRELAND						
Galway	270,304		46,875	1.62	317,179	3.05
Clonmel	-	3.60				
SCOTLAND						
Ayr	220,000	2.93	46,805	1.62	266,805	2.57
PUERTO RICO						
Aguadilla	132,000		-			
San German	-	1.76	254,095	8.75	386,095	3.71
FAR EAST						
Hong Kong	-		131,500			
Taiwan	-		98,000	7.91	229,500	2.21
TOTALS - END OF FY 79	7,513,304	100%	2,904,654	100%	10,417,958	100%

GEOGRAPHIC DISTRIBUTION

Massachusetts	53.6%
Other New England	20.0
Other U.S.	11.8
Foreign	14.6
	100.0%

Facilities Planning &
Engineering
September, 1979

(000's sq.ft.) Space History

MANUFACTURING SPACE:

	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977
Hill	140	200	321	411	389	217	217	267	267	352	349	347
Kanata	20	20	34	45	45	45	45	95	61	85	85	85
San German			12	23	23	97	157	157	164	164	228	164
Leominster				60	60	60	60	60	60	60	60	60
Westfield					260	260	290	550	520	530	530	530
Mt. View						24	24	24	24	24	24	24
Westminster						260	260	520	520	538	668	668
Galway							88	218	170	170	268	309
Springfield							13	100	100	115	140	100
Natick								73	90	78	78	78
Taiwan							30	30	38	38	50	50
Aguadilla									160	132	132	132
Marlboro									232	232	300	300
Hong Kong									14	17	17	17
Phoenix										54	186	449
Acton											111	111
West Springfield											80	80
Derry, NH											74	74
Salem, NH											73	119
So. Hampton											59	50
Ayr											24	48
Albuquerque												323
Augusta												60
Burlington, VT												60
Fountain, Colorado												80
Gardner												81
Mammoth Mart												45
Salem												650
SUB TOTAL	160	220	367	539	777	963	1184	2094	2420	2589	3536	5094

DIGITAL EQUIPMENT CORPORATION

(000's sq.ft.) Space History

ENGINEERING, PRODUCT LINE AND ADMINISTRATIVE SPACE:

	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977
Mill												
Parker Street	380	320	614	619	670	842	869	819	819	734	737	739
Marlboro							100	555	555	555	555	555
MR									480	480	412	412
Northboro									52	89	115	115
Santa Ana									102	102	227	227
Nashua, NH										25	25	25
Hudson, NH											48	204
Woburn												25
Hudson, MA												229
Boylston												25
												32
SUB TOTAL	380	320	614	619	670	842	969	1374	2008	1985	2120	2588
GRAND TOTAL	540	540	981	1158	1447	1805	2153	3468	4428	4574	5656	7682

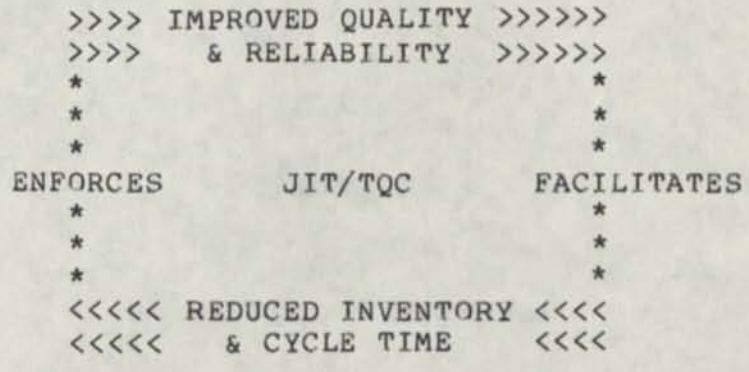
From: SHARE::MAGUIRE 25-NOV-1987 11:38
To: @STAFF, WILLEE::GANGI
Subj: FYI-JIT information

From: TOLKIN::JWISH "JIM WISH ....225-6112/296-5364.... 25-Nov-1987 1130" 25-
To: @JITSCO.DIS
Subj: JIT: DEC CORPORATE GUIDELINES FOR IMPLEMENTATION/MEASUREMENT

DIGITAL
EQUIPMENT
CORPORATION

JIT/TQC

APPRAISAL
GUIDELINES & STANDARDS



CORPORATE JIT/TQC
PROGRAM MANAGEMENT OFFICE
REVISION E
DRAFT DATE 10/05/87

DEFINITIONS

"Just In Time Manufacturing embraces a well defined set of philosophies and techniques based on an overall concept of continuous improvement and elimination of unnecessary activities."

DECWorld, Sept. 10, 1987

"Just In Time. This phrase is used in two ways:

1. Narrow sense: Just in time refers to the movement or transport of materials so as to have only the necessary material at the necessary place at the necessary time.

2. Broad sense: Just in time refers to all the activities of manufacturing which makes the just-in-time movement of material possible - i.e., stockless production."

Dr. Robert Hall, Zero Inventories

INTRODUCTION

THE "JIT/TQC APPRAISAL GUIDELINES and STANDARDS" incorporate world-class Just-In-Time Manufacturing practices as developed from internal Digital experience, other companies and the vast amount of published literature.

The Standards have been developed to address a number of diverse needs. For example, the Standards provide:

(1) A common Digital Equipment Corporation definition of Just-In-Time Manufacturing and related Total Quality Control Programs.

(2) A guideline for use in new product phase reviews and readiness reviews.

(3) A broad "needs assessment" to guide development of Education and Training Programs.

(4) A Corporate "position" on the subject of JIT/TQC with respect to suppliers and customers.

(5) A check list of progress for manufacturing plants as they migrate to Just-In-Time Manufacturing.

(6) A definition of a "JIT/TQC" Plant. Such a plant must:

  (a) Demonstrate widespread adoption of the techniques described in the Standards.

  (b) Demonstrate continual business improvements in the areas described in the "Results" section of the Standards.

If a plant's business practices deviate from the guidelines (resulting in a "NO" result being registered in a particular category), the plant does not necessarily need to change its practices. However, it needs to fully understand the basis for its practices and determine if they are truly as powerful as the world-class practices outlined in the guidelines.

It will be noted that this is NOT a point scoring process, but rather a self-check guideline. Identified deviations from the guideline practices should be regarded as highlighting potential opportunities for improvement. It is fully understood that local management sets plant standards and has the highest motivation for seeking improvement.

A plant looking for guidance on getting started should focus special attention on the "Commitment" and "Internal Pull Systems" Section. The Program Office shares the view of Dr. Robert Hall expressed in ZERO INVENTORIES that "Commitment" and "Pull Systems" are the two key milestones in JIT implementation. An area which must receive special attention is the "Results" section at the end of the appraisal. Based on truly comprehensive experience, if the practices recommended elsewhere in the guidelines are implemented there will surely follow very impressive results in Cycle Time, Quality, Inventory Turns and the other Manufacturing Metrics. If a plant believes that it has adopted the specific techniques yet the results do not reflect continuous and significant progress then the plant should re-evaluate its progress. The JIT/TQC Program Office can support the plant in this effort.

The JIT/TQC Program Office is staffed to assist plants and functions in such areas as: (1) Education,(2) Plant Workshops, (3) Training, (4) Hands-On Consulting and (5) Corporate Workshops.

Consulting resources include both dedicated full-time Corporate Consultants and a large number of Plant/Group Consultants with specific expertise. If internal skills are insufficient, the program office will assist in the identification of qualified external consulting resources.

As the JIT process contains the mechanism for continuous improvement, these guidelines will be updated periodically to incorporate the latest tools and proven breakthroughs.

Finally, although these standards are primarily intended for use in a Manufacturing plant, the basic thrust around Commitment, Education, Training and the various techniques and results incorporated here should be widely applied to many diverse operations. (For example, functional staff organizations (Purchasing, etc.), administrative operations, Field Service, Computer Special Systems Manufacturing Organizations, Product Business Units and Manufacturing Business Units).

Bob Parmelee
Corporate JIT/TQC Program Manager

TABLE OF CONTENTS

KEY FOR RESPONDING TO THE APPRAISAL

To each of the statements in the guidelines, the organization should respond "YES" or "NO". "NO" responses require further analysis.

COMMITMENT

THIS SECTION OF THE GUIDELINE IS CRITICAL. A YES RESPONSE TO ALL OF THE FOLLOWING POINTS IS REQUIRED FOR THE PROGRAM TO BE SUCCESSFUL.

* PLANT MANAGER AND PLANT MANAGEMENT PROVIDE VISIBLE, PUBLIC, CONTINUOUS AND CONSISTENT PARTICIPATION IN JIT MANUFACTURING, INCLUDING CONDUCTING REGULAR REVIEWS OF JIT/TQC ACTIVITY AND RESULTS.

* A PROGRAM FOCUS (e.g. A JIT PROGRAM MANAGER) HAS BEEN ESTABLISHED.

* A CROSS-FUNCTIONAL PLANT IMPLEMENTATION TEAM HAS BEEN IDENTIFIED AND MEETS AT LEAST MONTHLY TO REVIEW PROGRESS AND PROVIDE DIRECTION.

* AN IMPLEMENTATION PLAN HAS BEEN COMPLETED BY THE IMPLEMENTATION TEAM, APPROVED BY PLANT STAFF AND REGULARLY MAINTAINED.

* AN INTERNAL MANUFACTURING PILOT PROGRAM HAS BEEN IDENTIFIED OR COMPLETED.

* PLANT MANAGEMENT DEMONSTRATES PERSONAL COMMITMENT BY STRONG PARTICIPATION IN JIT/TQC EDUCATION AND TRAINING.

EDUCATION

* PLANT MANAGEMENT HAS RECEIVED THOROUGH OVERVIEW EDUCATION EITHER FROM APPROVED EXTERNAL EDUCATION OR FROM INTERNAL DIGITAL EDUCATION PROGRAMS.

* PLANT IMPLEMENTATION TEAM MEMBERS HAVE RECEIVED INTENSE IN DEPTH EDUCATION.

* ALL MANUFACTURING IL AND DL HAVE ATTENDED EDUCATION RECOMMENDED FOR THEIR POSITION BY EITHER CORP JIT EDUCATION PROGRAM TEAM (JITEPT) IN THE CASE OF CROSS PLANT JIT/TQC PROGRAMS OR BY THE PLANT IMPLEMENTATION TEAM IN THE CASE OF PLANT SPECIFIC PROGRAMS.

* A PILOT PROGRAM(S) HAS BEEN COMPLETED (INCLUDING STD JIT PULL MECHANICS, ETC.) WHICH PROVIDES A COMPREHENSIVE REPRESENTATION FOR THE PROBLEMS LIKELY TO BE FACED AND WHICH HAVE FULLY TESTED THE SPECIFIC PLANT PROCESSES FOR INCLUSION IN PLANT-WIDE TRAINING PROGRAM(S).

* ALL EDUCATION PROGRAMS FULLY EMPHASIZE THE BEHAVIORAL ASPECTS OF JIT/TQC AND PROVIDE BASIC TOOLS FOR CHANGE MANAGEMENT AND PROBLEM SOLVING.

* PROGRAMS ARE IN PLACE TO PROVIDE FOR ONGOING EDUCATION AND TRAINING BEYOND THE STARTUP PERIOD.

* PROGRAMS ARE IN PLACE TO EDUCATE AND TRAIN ALL NEW EMPLOYEES IN JIT/TQC TECHNIQUES.

TRAINING

* PLANT STAFF HAS RECEIVED AT LEAST ONE DAY OF TRAINING IN SPECIFIC PLANT PROCESSES AND GENERIC CORPORATE PROCESSES IN A "HANDS ON" WORKSHOP ENVIRONMENT.

* PLANT IMPLEMENTATION TEAM MEMBERS HAVE RECEIVED THOROUGH TRAINING IN BOTH PLANT SPECIFIC PROCESSES AND GENERIC CORPORATE PROCESSES TO SUCH AN EXTENT THAT THEY ARE QUALIFIED TO TRAIN OTHERS AND PERSONALLY DIRECT WORKSHOPS.

* ALL IL AND DL HAVE ATTENDED APPROPRIATE CORPORATE TRAINING PROGRAMS AND/OR PLANT SPECIFIC TRAINING.

* WHEREVER FEASIBLE, TRAINING PROGRAMS SHOULD BE HANDS-ON AND FOCUS ON " LEARNING BY DOING ".

INTERNAL PULL SYSTEMS

MATERIAL MOVEMENT USING PULL SYSTEMS IS ESSENTIAL TO ACHIEVING THE BENEFITS OF A JUST-IN-TIME ENVIRONMENT.

* MASTER SCHEDULES AND FINAL ASSEMBLY SCHEDULES HAVE BEEN LEVELED AS MUCH AS POSSIBLE TO PROVIDE AN EVEN DISTRIBUTION OF MATERIAL AND LABOR REQUIREMENTS ON A WEEKLY, DAILY OR (IDEALLY) HOURLY BASIS.

* PRODUCTION LINES HAVE BEEN CONVERTED FROM PUSH TO PULL PRODUCTION.

* MATERIAL FLOWS TO WIP LINES IS IN ACCORDANCE WITH PULL PROCESSES DRIVEN BY REAL CONSUMPTION, NOT "SCHEDULES". (POSSIBLE EXCEPTION: DELIVERIES FROM REMOTE VENDORS MAY, BY NECESSITY, HAVE TO BE SCHEDULED.)

  EXPLANATORY NOTE: BY DEFINITION ALL SCHEDULES, INCLUDING BATCH MRP SCHEDULES, ARE OBSOLETE INSTANTLY. TRUE "AS NEEDED" DELIVERIES TO A PRODUCTION LINE MUST BE ACHIEVED THROUGH CONSUMPTION PULL TECHNIQUES. "KANBAN" IS THE WELL KNOWN EXAMPLE AND IS STRONGLY RECOMMENDED.

INTERNAL "FOUR WALLS" PROCESS SIMPLIFICATION

* COUNTING HAS BEEN MINIMIZED THROUGH THE ELIMINATION OF KITTING AND THE USE OF STANDARD CONTAINERS.

* JOB ORDER KITTING HAS BEEN REPLACED BY COMPONENT PULLS OF STANDARD CONTAINERS DIRECTLY TO THE POINT OF USE.

* BOMS HAVE BEEN FLATTENED TO MAXIMUM EXTENT POSSIBLE AND MULTI-STAGE COMPLETION OR STATUS TRANSACTIONS ELIMINATED. (EXCEPTION: LONG CYCLE TIME OPERATIONS SUCH AS BURN-IN).

* AN ACTIVE SET UP REDUCTION PROGRAM (WITH SPECIAL EMPHASIS ON BOTTLENECK OPERATIONS) HAS BEEN ESTABLISHED.

* WORKCELLS AND GROUP TECHNOLOGY PROGRAMS ARE IN PLACE.

* POST-DEDUCT-BACKFLUSH HAS BEEN IMPLEMENTED.

* SCHEDULING OF SUB-ASSY OPERATIONS HAVE BEEN DISCONTINUED IN FAVOR OF FINAL ASSY PULL (OR PLANT TOP ASSY/OPTION MASTER SCHEDULE PULL).

* COMPONENT WIP INVENTORY LEVELS ARE ACTIVELY MANAGED BY VARYING KANBAN CARD (OR EQUIVALENT SYSTEM) AUTHORIZATION LEVELS.

* THE STOCKROOM HAS BEEN REDUCED BY AGGRESSIVE POINT OF USE STOCKING STRATEGIES. THE OBJECTIVE IS TO ELIMINATE THE STOCKROOM.

* CYCLE TIME RATIO ANALYSIS IS REGULARLY EMPLOYED TO IDENTIFY CYCLE TIME REDUCTION OPPORTUNITIES FOR INDIVIDUAL OPERATIONS, ENTIRE PRODUCTION LINES AND/OR RELATED ADMINISTRATIVE PROCESSES. (SEE RESULTS SECTION CONCERNING CYCLE TIME).

* DATA COLLECTION REQUIREMENTS HAVE BEEN MINIMIZED TO THE EXTENT POSSIBLE. REMAINING TRANSACTIONS ARE PERFORMED WITH OPTIMAL ACCURACY, EFFORT AND SIMPLICITY, E.G., THROUGH USE OF BARCODING.

* CAPITAL EQUIPMENT AND AUTOMATION INVESTMENT ARE REVIEWED ON THE BASIS OF VALUE-ADDED SIMPLICITY AND UNNECESSARY EQUIPMENT REMOVED, E.G., CONVEYORS USED FOR MATERIAL STORAGE ARE PRIME CANDIDATES FOR ELIMINATION.

INTERNAL SOURCING SIMPLIFICATION

* TOTAL SYSTEM LOGISTICS HAVE BEEN SIMPLIFIED TO THE EXTENT POSSIBLE VIA PHYSICAL VERTICAL INTEGRATION. (MAXIMUM NUMBER OF OPERATIONS POSSIBLE LOADED INTO REFERENCE PLANT.)

* REQUIRED INTERNAL PLANT SUB-ASSY OR COMPONENT SOURCING HAS BEEN ACCOMPLISHED IN THE LOCAL OR REGIONAL AREA ("LOCAL" IMPLIES SAME DAY DELIVERY POSSIBLE VIA MOTOR FREIGHT).

* INTERNAL SOURCING DECISIONS ARE DRIVEN PRIMARILY BY TOTAL COST AND SIMPLIFICATION GOALS, NOT BY PRE-DETERMINED PLANT "CHARTERS".

* FORECAST AND RELEASE PRACTICES IN PLACE WITH INTERNAL SOURCES ARE EQUIVALENT TO THOSE EMPLOYED IN EXTERNAL PURCHASING.

* IN A PARALLEL PLANNING MODE, SOURCE PLANT PERFORMS STAND-ALONE PLANNING FOR PRODUCTS UNDER ITS CONTROL WITHOUT WAITING FOR SERIAL ORDER PROCESSES.

EMPLOYEE INVOLVEMENT

* TRAINING IN BASIC PROBLEM SOLVING TECHNIQUES HAS BEEN CONDUCTED FOR ALL EMPLOYEES INVOLVED IN GROUP IMPROVEMENT ACTIVITIES.

* THE ESTABLISHMENT OF FORMAL "SMALL GROUP IMPROVEMENT ACTIVITY" OR QUALITY CIRCLES HAS BEEN OFFICIALLY ESTABLISHED BY PLANT STAFF IN INDIRECT LABOR AS WELL AS DIRECT LABOR AREAS WITH THE EXPLICIT UNDERSTANDING THAT:

  (1) SMALL GROUPS HAVE "THE FIRST CRACK" AT PROBLEM SOLVING. PROPOSED SOLUTIONS WILL BE IMPLEMENTED UNLESS CLEARLY CONTRARY TO OVERALL MANAGEMENT DIRECTION.

  (2) REGULAR PROBLEM SOLVING PERIODS HAVE BEEN ESTABLISHED FOR SMALL GROUP IMPROVEMENT ACTIVITY AS PART OF THE CORE WORK ACTIVITY DURING THE NORMAL WORK DAY.

* PROGRAMS HAVE BEEN ESTABLISHED TO MONITOR THE LEVEL OF IMPROVEMENT RECOMMENDATIONS OR SUGGESTIONS BEING GENERATED BY THE WORK GROUPS WHICH:

  (1) INCLUDE REWARDS AND RECOGNITION.

  (2) NORMALLY DO NOT REQUIRE FORMAL APPROVAL BEYOND THE LEVEL OF THE SMALL GROUP SUPERVISOR.

  (3) ARE MONITORED BY THE PLANTS WITH THE NUMBER OF RECOMMENDATIONS PROVIDED, NUMBER APPROVED, NUMBER IMPLEMENTED AND CREDIT FOR THE IMPROVEMENTS WELL PUBLICIZED.

PURCHASING

* AN MRP-DRIVEN 12 MONTH FORECAST IS PROVIDED TO VENDORS AS OFTEN AS MRP IS RUN. (NOTE: IN CERTAIN COMMODITIES, A COMPOSITE CROSS PLANT FORECAST WILL BE PROVIDED TO VENDORS BY CORPORATE OR AREA COMMODITY MANAGEMENT.)

* VENDOR FORECASTS AND RELEASES ARE PROVIDED ELECTRONICALLY.

* REMOTE VENDOR SHIPMENTS ARE DRIVEN VIA THE FORECAST AND AGREED SHIPMENT AUTHORIZATION WINDOWS. (FOR EXAMPLE: THE FIRST WEEK OF THE FORECAST BECOMES THE DELIVERY SCHEDULE.)

* LOCAL VENDOR SHIPMENTS ARE TRIGGERED BY CONSUMPTION USING A KANBAN PROCESS (OR EQUIVALENT) AND FLOW DIRECTLY TO POINT OF USE (POSSIBLE EXCEPTION: LOW BULK C ITEMS).

* PROCUREMENT APPROVALS ARE FOCUSED AT PRODUCTION PLAN OR MASTER SCHEDULE LEVEL. CONSISTENT USE IS MADE OF LONG TERM BLANKET ORDERS. PIECEMEAL INTERNAL PURCHASE REQUISITIONS, ORDERS OR RELEASE APPROVALS ARE NOT EMPLOYED.

* SUPPLIERS ARE MIGRATING TO JIT MFG AND TOTAL QUALITY THROUGH PROCESS CONTROL.

* WHERE NEEDED, PLANT, GROUP OR CORPORATE ASSISTANCE TEAMS ARE ACTIVELY HELPING VENDORS IN ADOPTION OF JIT AND TQC. (EXAMPLES ARE STATISTICAL PROCESS CONTROL, WORK GROUPS/CELLS AND PULL SYSTEMS).

* STRONG, EARLY SUPPLIER INVOLVEMENT (ESI) PROGRAMS ARE IN PROCESS FOR NEW PRODUCTS, ESPECIALLY PROVIDING FOR STRONG SUPPLIER INPUT TO DESIGN.

* LOCAL SOURCES OF SUPPLY ARE BEING AGGRESSIVELY ESTABLISHED (CONSISTENT WITH CORPORATE COMMODITY MGMT STRATEGY).

* LONG TERM CONTRACTS (FROM LIFE-OF-PRODUCT TO 2-4 YRS) ARE EMPLOYED WHERE APPROPRIATE (VENDOR PROPRIETARY DESIGNS, LONG MUTUAL DESIGN EFFORT, ETC).

* IN SOLE SOURCE ENVIRONMENTS, LONG TERM PRICING PROCESSES ARE DEVELOPED AND CONTRACTED IN ADVANCE OF VENDOR SELECTION, EG, EXPERIENCE CURVES.

* JOINT SUPPLIER/DIGITAL COST APPRAISAL BENCHMARKING PROGRAMS ARE IN PLACE.

* VENDOR SELECTION WILL BE MADE ON A "TOTAL COST" BASIS AND TAKE FULL RECOGNITION OF VENDOR PROCESS CONTROL, PPM QUALITY HISTORY, VENDOR JIT MFG PROCESSES, VENDOR EMPLOYEE INVOLVEMENT PROGRAMS AND HISTORICAL COST IMPROVEMENT CONTRIBUTIONS, ETC.

* SECOND TIER VENDOR MANAGEMENT SYSTEMS ARE IN PLACE WHICH ARE EQUIVALENT TO DEC VENDOR PROGRAMS.

* THE NUMBER OF ACTIVE VENDORS ARE MINIMIZED CONSISTENT WITH COMMODITY MANAGEMENT STRATEGY AND RESOURCES AVAILABLE TO MANAGE JIT/TQC BUSINESS PRACTICES.

* A FOCUS EXISTS ON THE NUMBER OF PART NUMBERS AND VENDORS WHICH HAVE ACHIEVED "SHIP TO POINT OF USE" STATUS. THE PERCENTAGE SHOULD BE INCREASING CONTINUALLY TOWARD 100%.

* VENDOR SELECTION REQUIRES CROSS-FUNCTIONAL APPROVAL AS WELL AS APPROVAL FROM BOTH NEW PRODUCT AND VOLUME MANUFACTURING ORGANIZATIONS.

DISTRIBUTION

* ALLOCATION OF DOCK DOORS, AND OF THE RECEIVING/SHIPPING FUNCTIONS, IS DONE SO AS TO MINIMIZE INTERPLANT MOVEMENT OF MATERIAL AND TO FACILITATE DIRECT SHIPMENT TO WIP.

* A SINGLE, BARCODED RECEIVING TRANSACTION UPDATES ALL SYSTEM REQUIREMENTS (INCLUDING ACCTS PAYABLE, INVENTORY AND PURCHASING).

* DISTRIBUTION COSTS ARE HEAVILY FACTORED INTO SOURCING DECISIONS (INCLUDING BOTH FREIGHT COSTS AND "HIDDEN" DISTRIBUTION COST, SUCH AS STORAGE, WAREHOUSING, AUTOMATED CAPITAL, ETC., CAUSED BY REMOTE SOURCING DECISIONS).

* SCHEDULED PICKUPS, MULTI-SITE SWEEPS, AND AGGREGATION PROCESSES ARE EMPLOYED WHEREVER POSSIBLE. REQUIREMENTS ARE INTEGRATED WITH THE NEEDS OF OTHER DIGITAL FACILITIES. OPPORTUNITIES FOR ACHIEVING VOLUME ECONOMIES OF SCALE BY COORDINATING WITH OTHER GROUPS ARE ACTIVELY SOUGHT.

* ALL SHIPMENTS ARE MADE VIA CORPORATE APPROVED ROUTING GUIDE CARRIERS. THE ROUTING GUIDE WILL REFLECT CROSS-PLANT JIT STRATEGIES.

* OPPORTUNITIES ARE PURSUED IN AREAS SUCH AS REUSABLE AND STANDARD CONTAINERS, SPECIALIZED PACKAGING, AND MATERIAL HANDLING EQUIPMENT WHICH WILL SUPPORT THE REDUCTION OF CYCLE TIME.

* AGGRESSIVE PROGRAMS EXIST TO OPTIMIZE AND ELIMINATE VARIABILITY OF DISTRIBUTION TRANSIT TIME FROM SUPPLIERS, BETWEEN PLANTS AND TO CUSTOMERS.

* AGGRESSIVE PROGRAMS EXIST TO ELIMINATE OR COMBINE DISTRIBUTION TRANSACTIONS AND PROCESSES WHICH DO NOT ADD VALUE TO THE PRODUCT.

DESIGN FOR MANUFACTURABILITY

* EARLY SUPPLIER INVOLVEMENT PROGRAMS ARE IN PLACE INCLUDING SUPPLIER SELECTION IN ADVANCE OF DESIGN AND FULL SUPPLIER PARTICIPATION IN DESIGN. (ALSO, SEE PURCHASING.)

* AN ONGOING PRODUCIBILITY ANALYSIS PROGRAM EXISTS WHICH INCORPORATES SUPPLIER PARTICIPATION.

* SPECIFICATIONS ARE EXPRESSED IN OPERATIONAL TERMS INCLUDING SPECIFICATION NUMBERS, TESTING METHODS AND A DESCRIPTION OF THE USE OF THE TEST RESULTS IN REACHING TEST DECISIONS.

* SPECIFICATION TOLERANCES ARE BASED ON THE OUTCOME OF PROCESS CAPABILITY STUDIES AND TAGUCHI LOSS FUNCTION ANALYSIS.

* SPECIFICATION SIMPLICITY AND CLARITY IS CONSISTENTLY ACHIEVED BASED ON ACTUAL SUPPLIER FEEDBACK.

* DESIGN ENGINEERING USES CAD AND CAM TOOLS EXTENSIVELY AND HAS ACHIEVED CAD LINKUP WITH KEY SUPPLIERS AND PLANTS.

* BASED ON PRODUCT ANALYSIS, THERE EXISTS STRONG DESIGN EMPHASIS ON THE USE OF STANDARD DESIGNS AND STANDARDIZED, COMMON COMPONENTS.

* BASED ON PRODUCT ANALYSIS, EFFECTIVE DESIGN PROGRAMS EXIST WHICH PROVIDE FOR HIGH VOLUME SIMPLE ASSEMBLY ADAPTIVE TO FLEXIBLE AUTOMATION AND ROBOTICS.

* ASSEMBLY OF UNITS IN DMT AND DVT ARE PERFORMED BY PERSONNEL FROM MANUFACTURING, MANUFACTURING ENGINEERING AND DESIGN ENGINEERING WITH AN AIM OF IDENTIFYING AND CORRECTING DESIGN FLAWS IMPACTING HIGH VOLUME PRODUCTION.

* A DESIGN FOR ASSEMBLY PROGRAM IS IN PLACE TO ASSESS PROCESS CAPABILITY STUDIES WITH REGULAR FEEDBACK OF RESULTS TO INFLUENCE DESIGN PRACTICES.

* PARAMETRIC DESIGN PROGRAMS(DESIGN FOR EXPERIMENTS,TAGUCHI, ETC.) ARE IN PLACE TO IMPROVE THE ROBUSTNESS OF PRODUCT OR PROCESS DESIGNS.

* A PROGRAM IS IN PLACE WHICH EVALUATES THE EFFECTIVENESS OF AUTOMATION AND ROBOTICS WITH PARTICULAR EMPHASIS ON COMPATIBILITY WITH JIT/TQC PRACTICES. INCLUDED ARE FLEXIBILITY, SETUP REDUCTION, SMALL LOT SIZES AND PRODUCT DESIGN SIMPLICITY.

TOTAL QUALITY CONTROL

* PROCESS CAPABILITY HAS BEEN REVIEWED AND CAPABILITY DEMONSTRATED FOR CRITICAL INTERNAL PROCESSES AND SUPPLIER PROCESSES.

* A PROGRAM IS ESTABLISHED TO INCORPORATE QUALITY AT THE SOURCE PHILOSOPHIES UTILIZING FAILSAFE METHODOLOGIES.

* COMPREHENSIVE STATISTICAL PROCESS CONTROL PROGRAMS ARE IN PLACE IN ALL PLANT WIP AREAS.

* COMPREHENSIVE AND STEADILY EXPANDING SPC PROGRAMS ARE IN PLACE IN THE SUPPLIER BASE.

* INCOMING INSPECTION HAS BEEN MINIMIZED/ELIMINATED.

* VENDOR PPM QUALITY DATA IS PROVIDED FROM LINE FALLOUT AND SOURCE INSPECTION REJECTS, NOT FROM INCOMING INSPECTION.

* ON GOING RELIABILITY ASSESSMENT AND CORRECTION/ IMPROVEMENT PROGRAMS ARE IN PLACE FOR VENDOR COMPONENTS AND PLANT FINISHED PRODUCTS.

* PRICE OF NON-CONFORMANCE (PONC) IS REGULARLY MEASURED AND IMPROVED.

* SUPPLIERS EMPLOY ADVANCED QUALITY ASSURANCE TECHNIQUES FOR ALL CUSTOMERS.

* INVENTORY IS REMOVED FROM THE SYSTEM TO EXPOSE AREAS REQUIRING QUALITY IMPROVEMENT.AS SOLUTIONS ARE ACHIEVED MORE INVENTORY IS REMOVED TO ENFORCE CONTINUED PROBLEM SOLVING.

* A FOCUS EXISTS TOWARD NATURALISTIC QUALITY IMPROVEMENTS AND ENFORCED PROBLEM SOLVING. ITEMS ARE BUILT ONE-AT-A-TIME AND IMMEDIATELY INSPECTED OR USED IN THE NEXT PROCESS. THE PROCESS STEPS ARE CLOSELY LINKED AND DEFECTS STOP THE LINE UNTIL A CAUSE IS IDENTIFIED AND FIXED.

RESULTS

CONTINUOUS (AT LEAST MONTH-ON-MONTH) IMPROVEMENT IS BEING ACHIEVED TOWARD THE FOLLOWING:

FY88 FOCUS

* PRICE OF NON-CONFORMANCE (PONC).PONC,AS DEFINED BY QBOD, IS THAT SET OF COSTS WHICH ARE DEFINED AS WASTE AND NEED TO BE ELIMINATED. THE OVERALL MANUFACTURING GOAL IS TO REDUCE PONC 20% PER YEAR.THE CURRENT (FY'88) DEFINITION FOR REPORTING PONC INCLUDE SIX ELEMENTS: SCRAP, REWORK/REPAIR, INSPECTION, TEST/DIAGNOSIS, EXCESS INVENTORY CARRYING COST AND OBSOLESCENCE PROVISION.

* ELIMINATION OF ALL UNNECESSARY FACTORY FLOOR CYCLE TIME LEADING TOWARD ESTABLISHMENT OF "N=1" CONDITIONS, WHERE:

$$N = \frac{\text{ACTUAL CYCLE TIME IN HRS.}}{\text{THEORETICAL CYCLE TIME IN HRS.}}$$

ACTUAL CYCLE TIME - MEASURED FROM POINT OF ENTRY OF KEY COMPONENTS TO THE PRODUCTION LINE AND CULMINATING WITH DELIVERY OF FINISHED ASSEMBLIES TO STOCK.

IN THE PLANT ENVIRONMENT ACTUAL CYCLE TIME CAN BE CALCULATED USING THE FORMULA BELOW:

$$\text{ACTUAL CYCLE TIME} = \frac{\text{AVG WIP INVENTORY}}{\text{AVG DAILY OUTPUT}} \times \frac{\text{MFG HRS}}{\text{PER DAY}}$$

THEORETICAL CYCLE TIME IS THE CYCLE TIME WITH ALL UNNECESSARY ACTIVITIES ELIMINATED. EXAMPLES OF "UNNECESSARY" ACTIVITIES: SET UP, MOVE, WAIT, QUEUE, REWORK, BURN-IN, INSPECTION, KITTING, COUNTING & TRANSACTION. EXAMPLES OF "NECESSARY" ACTIVITIES: MACHINE OPERATION TIME, OPERATOR VALUE ADDED OR HANDS-ON ASSEMBLY & FUNCTIONAL TEST.

* RAW AND WIP INVENTORY TURNS (JIT HAS MOST DIRECT EFFECT ON RAW AND WIP INVENTORY. EFFECT ON FINISHED GOODS IS INDIRECT, I.E., DUE TO REDUCED CYCLE TIME).RAW AND WIP INVENTORY TURNS ARE DEFINED AS:

$ ANNUALIZED TRANSFER COST OUTPUT (NOT INCLUDING BUYOUTS)
****
$ AVERAGE RAW AND WORK IN PROCESS INVENTORY

NOTE: FOR THIS MEASURE THE ONLY INVENTORY WHICH SHOULD BE OMITTED IS FINISHED GOODS.

* FINISHED GOODS TURNOVER: FGI TURNS ARE DEFINED USING THE FORMULA BELOW:

$ TOTAL TRANSFER COST OF OUTPUT (INCLUDING BUYOUT)
****
$ AVERAGE FINISHED GOODS INVENTORY

NOTE: FINISHED GOODS INVENTORY SHOULD NEVER BE REDUCED BELOW LEVELS REQUIRED BY EXISTING CUMULATIVE PRODUCT CYCLE TIME AND ESTIMATED FORECAST ERROR. BY DRASTICALLY SHORTENING CYCLE TIME, JIT MANUFACTURING ALLOWS HIGH LEVELS OF CUSTOMER SATISFACTION TO BE ACHIEVED WITH LOWER LEVELS OF FINISHED GOODS INVENTORY. HOWEVER, THE PRIME DRIVER OF FINISHED GOODS LEVEL IS THE INTEGRATED PRODUCTION PLANNING ACTIVITY, NOT JIT MANUFACTURING. IF SUFFICIENT FINISHED GOODS HAS NOT BEEN PREVIOUSLY MAINTAINED, "IMPROVEMENT" IN THE SENSE OF THESE STANDARDS MIGHT REFLECT AN ACTUAL INVENTORY INCREASE AND AN APPARENT DETERIORATION IN INVENTORY TURNS.

* PRIMARILY DESIGNED TO MEASURE PRODUCTION TIME IMPROVEMENT, THE GENERAL APPROACH OF CYCLE TIME RATIO ANALYSIS MAY BE EMPLOYED TO MONITOR AN ENTIRE PRODUCT CUMULATIVE CYCLE TIME, A TOTAL PLANT CYCLE TIME, OR A PARTICULAR MACHINE OPERATION OR A PARTICULAR ADMINISTRATIVE PROCESS,E.G, TECH EDIT OF CUSTOMER ORDERS. A GENERALIZED RATIO WHICH CAN BE EMPLOYED IN THESE CASES IS:

ACTUAL CYCLE TIME
****
WORK CONTENT

FOR MORE INFORMATION PLEASE REVIEW:
WORLD CLASS MANUFACTURING CASEBOOK
by RICHARD SCHONBERGER
FREE PRESS, 1987.

* SMALL GROUP IMPROVEMENT ACTIVITY (SGIA): THE NUMBER OF EMPLOYEES ENGAGED IN SGIA ACTIVITY, BOTH DL AND IL, THE GREATER THE BENEFITS THE PLANT WILL REALIZE. IT IS FOR THIS REASON THAT THIS PARTICULAR TECHNIQUE IS INCLUDED IN THE JIT/TQC METRICS.

FUTURE RESULTS FOCUS

* PONC: AS OUR PROFICIENCY IN COST COLLECTION IMPROVES WE WILL USE A BROADER "WORLD CLASS" DEFINITION TO INCLUDE SOME OR ALL OF THE FOLLOWING QUALITY COSTS:

  APPRAISAL COST - PRODUCT QUALITY AUDITS AND SURVEYS, INSPECTION, FIELD TEST SITES, ON-GOING RELIABILITY TEST AND DIAGNOSTICS.

  INTERNAL FAILURE - FAILURE ANALYSIS, INVENTORY VALUATION, REWORK, REPAIR, REINSPECT, MATERIAL REVIEW, INVENTORY CARRYING COST, EXCESS AND IDLE CAPACITY, ENGINEERING, CHANGE ORDERS AND OTHER PLANT SPECIFIC ITEMS SUCH AS OVERTIME, PPV, PRIORITY FREIGHT ETC.

  EXTERNAL FAILURE COST - FIELD CHANGE ORDERS, WARRANTY, RELIABILITY, CUSTOMER COMPLAINT PROCESSING, EXCESS INSTALLATION, RETURN AUTHORIZATIONS, MARKETING ERRORS, FIELD INVENTORY AND IN-HOUSE (CUSTOMER) REPAIRS.

* Ø PPM VENDOR QUALITY REJECT LEVELS AS DEFINED BY

  [DEFINITE PPM = _____

PPM MEASUREMENT INCLUDES ALL UNUSABLE PARTS FROM ALL SOURCES (INSPECTION, LINE PURGE, AT THE SUPPLIER AWAITING SOURCE INSPECTION, LINE FALL OUT, ETC.). THE TOTAL POPULATION OF PARTS IS INCLUDED IN THE FORMULA AS DEFINED BELOW:

$$\text{Ø PPM} = \frac{\text{TOTAL QTY OF VERIFIED UNUSABLE PARTS}}{\text{TOTAL PARTS USED \& VERIFIED UNUSABLE}} \times 1Ø6$$

* 1ØØ% DELIVERY FROM VENDORS AND FOR PLANT END PRODUCTS (SHOULD BE TO THE DAY/HOUR REQUESTED BY CUSTOMER BUT VPMS DATA PROVIDING DATA TO + OR - 1 DAY IS ACCEPTABLE INDICATOR).

* TOTAL ORGANIZATION PRODUCTIVITY BASED ON:

$$\text{T.O.P.} = \frac{\text{VALUE ADDED}}{\text{TOTAL ORGANIZATION HEAD COUNT}}$$

THE ABOVE METRIC DERIVES FROM THE OVERALL THRUST OF JIT/TQC TOWARD ELIMINATION OF ACTIVITIES WHICH DO NOT ADD VALUE TO THE PRODUCT. IN THE INSTANCE OF CLASSICAL MANUFACTURING OPERATIONS, THE FINANCIAL DEFINITION OF" VALUE ADDED"MAY BE SATISFACTORY.IN OTHER OPERATIONS,FOR EXAMPLE A NEW PRODUCT START-UP OPERATION,A BROADER INTERPRETATION OF THE TERM "VALUE ADDED" MAY BE REQUIRED. REGARDLESS OF THE APPROACH CHOSEN BY THE PLANT THE METRIC SHOULD BE CONSISTENTLY REPORTED .

FY'88 DEFINITION OF A JIT/TQC PLANT

(A) A "JIT PLANT" MUST DEMONSTRATE WIDESPREAD ADOPTION OF THE JIT/TQC TECHNIQUES DESCRIBED IN THESE STANDARDS

AND

(B) MUST DEMONSTRATE MONTH-ON-MONTH IMPROVEMENT IN THE FOLLOWING AREAS AS A MINIMUM.

1) PRICE OF NON CONFORMANCE.
2) PRODUCTION CYCLE TIME.
3) COMBINED RAW MATERIAL AND WIP TURNS.
4) FINISHED GOODS INVENTORY TURNOVER.
5) NUMBER OF PEOPLE IN SGIA.

THESE RESULTS SHOULD BE TRACKED AND POSTED IN A POSITION OF HIGH VISIBILITY IN THE PLANT.

NOTE:
THE BUSINESS RESULTS DEFINED ABOVE CANNOT BE MAINTAINED ON A CONTINUOUSLY IMPROVING BASIS WITHOUT WIDESPREAD ADOPTION OF THE TECHNIQUES DESCRIBED IN THE STANDARDS.

FY'88

PROCESS FOR CERTIFICATION OF A JIT/TQC PLANT

(1) THE PLANT JIT/TQC LEADER WILL EVALUATE THE PLANTS PROGRESS USING THE CRITERIA DEFINED ON THE PREVIOUS PAGE AND IF SATISFIED WILL PRESENT THE PLANT TO THE GROUP JIT LEADERSHIP FOR CONSIDERATION.

(2) A PEER REVIEW WILL BE CONDUCTED WITHIN THE GROUP TO ACHIEVE CONCURRENCE ON THE JIT/TQC DECLARATION.

(3) THE GROUP JIT/TQC PROGRAM MANAGER WILL REQUEST THE JIT/TQC PROGRAM OFFICE TO CONDUCT A PLANT CERTIFICATION.

(4) THE JIT/TQC PROGRAM OFFICE WILL CONDUCT THE CERTIFICATION REVIEW USING THE CRITERIA DEFINED ON THE PREVIOUS PAGE AND EITHER FORMALLY CERTIFY THE PLANT OR DEFINE THOSE AREAS REQUIRING ACTION. A RECERTIFICATION WILL BE SCHEDULED IF REQUIRED.

(5) ON AN ANNUAL BASIS THE PLANT JIT/TQC LEADER WILL REQUEST A RECERTIFICATION AUDIT DIRECTLY TO THE JIT/TQC PROGRAM OFFICE.

ANY CHANGES TO THIS CERTIFICATION PROCESS(E.G. THE INCLUSION OF ADDITIONAL RESULTS CRITERIA AS OUTLINED IN THE RESULTS FUTURE FOCUS SECTION) WILL BE DEFINED BEFORE THE FISCAL YEAR TO WHICH THEY APPLY.

THE ABOVE REVIEW AND CERTIFICATION PROCESS MAY BE REQUESTED AT ANY TIME DURING THE FISCAL YEAR. INDEED, SUCH A CONTINUOUS PROCESS IS ENCOURAGED.

PLANT APPRAISAL CHECKLIST

I. COMMITMENT	yes	no
Visible Commitment by Plant Mgt.....		....
JIT program manager assigned		....
Implementation team assigned		....
Implementation Plan completed		....
Pilot program identified		....
Plant Mgt attendance at educ/trng.....		....

II. EDUCATION	yes	no
plant staff overview received		....
implementation team training		....
all dl/il thru the program.....		....
pilot program completed		....
change management focus.....		....
ongoing programs in place.....		....
new employee programs in place.....		....

III. TRAINING	yes	no
plant staff training		....
implementation team qualified trainers ...		....
dl/il training for all.		....
focus on hands-on training.....		....

IV. PULL SYSTEMS	yes	no
master schedules leveled		....
final assembly leveled		....
lines converted to pull systems		....
material to wip driven by consumption		....
production driven by consumption		....

V. PROCESS SIMPLIFICATION	yes	no
inventory counting minimized		....
kitting replaced with component pulls		....
boms flattened		....
status transactions eliminated		....
set up reduction program established		....
workcells in place		....
group technology program in place		....
post deduct-backflush implemented		....
scheduling sub-assemblies discontinued ...		....
final assembly pull in place		....
wip levels managed by varying cards		....
stockroom reduced/eliminated.....		....
ratio analysis used.....		....
data collection minimized.....		....
capital equipment review in place.....		....

VI. INTERNAL SOURCING

	yes	no
vertical integration	....	....
regional sourcing program	....	....
make/buy decisions using total cost	....	....
forecast and release for internal sourcing	....	....
parallel planning for stand alone source	....	....

VII. EMPLOYEE INVOLVEMENT

	yes	no
problem solving training	....	....
SGIA established	....	....
SGIA opportunity to solve problems	....	....
SGIA problem solving time established	....	....
recommendation programs established	....	....
rewards and recognition program	....	....
recommendations monitored	....	....

VIII. PURCHASING

	yes	no
mrp forecast to vendor	....	....
remote vendor driven by forecast	....	....
local vendor triggered by consumption	....	....
blanket orders/boa used	....	....
Requisitions/change orders not used	....	....
piecemeal ordering eliminated	....	....
procurement approval at prod plan or msl	....	....
suppliers migrating to JIT/TQC	....	....
new prod supplier involvement program	....	....
local sources actively pursued	....	....
long term contracts pursued	....	....
sole source pricing program	....	....
supplier/DEC cost benchmarking program	....	....
sourcing based on total cost	....	....
selection process ways quality history	....	....
purchasing program	....	....
minimized vendors within business pract	....	....
monitor ship-to-point-of-use activity	....	....
cross functional vendor selection	....	....
electronic forecast/release transmission.	....	

VIII. DISTRIBUTION

	yes	no
receiving at closest dock	....	....
barcoded receiving transaction	....	....
distribution cost reviewed in sourcing	....	....
sweeps used	....	....
routing guides used	....	....
reusable containers/packaging	....	....
consistent transit time achieved	....	....
focus on reducing distribution process	....	....

IX. DESIGN FOR MFG

	yes	no
supplier participation in design	....	
specs in operational terms.....	....	
Taguchi loss function analysis.....	....	
supplier feedback on specification.....	....	
cad used extensively	....	
cad linkup to vendors	....	
supplier participates in producibility ...	....	
standard designs/ standard components	....	
simple assy designs can automate	....	
design mfg test program established	....	
design validation test established	....	
process capability study & feedback	....	
process evaluation basis to design.....	....	
parametric design programs in place.....	....	
evaluate designs for robotics	....	
evaluate designs for flexibility	....	
evaluate designs for set up	....	
evaluate designs for small lot sizes	....	
evaluate designs for simplicity	....	

X. TOTAL QUALITY CONTROL

	yes	no
process capability reviewed	....	
capability demonstrated	....	
Quality at the source program	....	
utilize fail safe methodologies	....	
SPC programs in place at plant.....	....	
SPC programs in place at vendor base.....	....	
incoming inspection minimized	....	
line fallout back to vendor ppm	....	
vendor reliability assessment prg	....	
vendor corrective action program	....	
price of non conformance improved.....	....	
supplies TQC for all customers.....	....	
vendor selection based on std process	....	
inventory removed to expose problems.. ...	....	
naturalistic quality problem solving.....	....	

XI. RESULTS

RESULTS FY'88

PONC improvement.....	....	
continuous improvement in cycle times N...	....	
theoretical cycle time for product A	....	
actual cycle time for product A	....	
cycle time N factor actual/theoretical ...	....	
theoretical cycle time for product B	....	
actual cycle time for product B.....	....	
cycle time N factor actual/theoretical....	....	

RESULTS FY'88 (Continued)

raw & WIP inventory turns..... ....

FGI inventory turns..... ....

SGIA activity # of people..... ....

RESULTS - FUTURE

PPM quality level..... ....

percent delivery 1 1 day..... ....

productivity (TOP)..... ....

DISTRIBUTION
FIVE YEAR PLAN

Albuquerque		Boston	
Chuck Baldridge	AB	Cheryl Bird	BO
Tony Ciorciari	AB	Ted Campbell	BO
Bill Doolan	AB	John Clarke	BO
Dave Ellis	AB	Jim DeAngelo	BO
Lyle Jordan	AB	John Harris	BO
Norm Kalat	AB	Jim Myers	BO
Ellen Karp	AB	Tony Neves	BO
Lloyd Powell	AB	Vic Pepi	BO
Marcellus Stamps	AB	Barbara Powell	BO
Tom Stockebrand	AB	Leroy Saylor	BO
Matt Tynan	AB		
Bill Woodard	AB		
Carl Wolfe	AB		

Phoenix		Westfield	
Geno Alissi	PN	Ron Cajolet	WF
Mike Barker	PN	Dave DeMoranville	WF
Frank Blake	PN	Dave Germano	WF
Barry Cioffi	PN	Phil Gorman	WF
Dave Elkins	PN	Roger Harris	WF
Herb Erbe	PN	Sue Holmes	WF
Les Goldman	PN	Edmundo Martinez	WF
Al Gordan	PN	Dick McBride	WF
Dave Gretton	PN	Paul McGaunn	WF
Bob Hagerty	PN	Bob Paul	WF
Bill O'Connell	PN	Curt Rawley	WF
Ed Petrozello	PN	Dale Reid	WF
Larry Stapp	PN	Ralph Seymour	WF
Ron White	PN	Jim Sompi	WF
		Steve Tocman	WF

Terminals Staff		PBOD	
Mark Abbett	ML1-5/B95	Gene Backmon	LJ
Chad Cutler	ML1-5/B95	Phil Burns	ML1-4/P14
Lou DiFinizio	ML1-5/B95	Jack Cranston	ML1-4/B21
Gora Dutta	ML1-5/B95	Dave Ehrman	ML1-5/B90
Vah Erdekian	ML1-5/B95	Bill Green	ML1-4/B34
Dick Esten	ML1-5/B95	Bill Lowe	ML1-5/B94
Fred Forsyth	ML1-5/B95	Jim Melvin	AC/E44
Dawn Greeley	ML1-5/B95	Charlie Polay	ML2
Dick Goonan	ML1-5/B95	Zoe Ray	ML1-5/B98
Bob Hopley	ML1-5/B95	Joe Rich	NR1
Mike Knowles	ML1-5/B95	Ed Schmid	ML1-4/P11
Ed Tompkins	ML1-5/B95	Mike Vocke	GE
George Wood	Ml1-5/B95		

DISTRIBUTION LIST (continued)

Manufacturing Staff

Henry Crouse	ML1-5/B95
Jim Cudmore	HL
Dick Clayton	ML12-2/E71
Bill Hanson	ML1-4/R14
Don Hunt	ML1-4/B21
Dan Infante	ML1-4/P14
Dave Knoll	ML1-4/P14
Ed McDonough	MO2
Greg Plakias	ML1-5/T33
Bob Puffer	ML1-5/B94
Jack Smith	ML1-4/A54
Will Thompson	LJ/D1
Dave Thorpe	ML1-4/P11
Abbott Weiss	ML1-4/P69
Dick Yen	TA

CSD

Si Lyle	ML12-1/T39

TPG

Art Campbell	MR2-2/M67
Jack MacKeen	MR2-2/M65

Terminals Engineering

Bill Picott	ML1-2/H26

TERMINALS MANUFACTURING GROUP

FY81 LONG RANGE PLAN

COMPANY CONFIDENTIAL

TABLE OF CONTENTS

TABLE OF CONTENTS (CONTINUED)

VI. ATTACHMENTS

THE MARKET CHALLENGE (BASE MANUFACTURING STRATEGIES)

PURPOSE

The purpose of this outline is to set down the major strategies within the Terminals Manufacturing Group governing the way the group will operate over the next 5 years. We are committed to improve our total performance via a better understanding of Marketing and Engineering strategies as well as the need to do more collaborative goal setting.

FORWARD

We believe that our survival is dependent upon a departure from "business as usual."

The departure does not discard the essentials of Manufacturing: Delivery, Quality, Cost, Asset Utilization, and Human Resources. Our base strategies contain all of these, but approaches them in a different way, attempting to interlock and balance.

We will be severely challenged in the market place in the future. Our base strategies are a positive response to that challenge.

This is a vision that spans over a longer period than five years and it is ONLY A BEGINNING.

We are beginning to paint a picture that our people can respond to. The HOW is ommitted on purpose.

The HOW is essential, but the vision must first be clear.

THE MARKET CHALLENGE (BASE MANUFACTURING STRATEGIES) continued

THE MARKET CHALLENGE

The development of DEC peripherals during the 70's has made the Company a major competitor in the teleprinter and video markets. LSI has provided the basis for a strong board level CPU market.

FY80 was the beginning of truly volume shipments of video, teleprinter, and board level micros - and ONLY A BEGINNING.

During the '80's, LSI technology will decrease the costs per function and increase the functionality capabilities of our circuit boards in teleprinters and videos and allow the development of intelligence and a wide range of bounded terminal/system products and disk system products.

Our products are excellent, our volumes are high, our market penetration deep - all of which makes us a very visible target for our competition.

The competition is formidable - ranging from I.B.M, H.P., and Exxon Conglomerates to the Visual Technologies types.

There are other competitors on the horizon: Toshiba, Fujuitsu, Matsushita etc.

The Market Challenge, simply stated, is to set five year base strategies that will enable us to continue to enjoy excellent products, higher than ever volumes, and deeper penetration of markets for Terminals, Micros, and Small Bounded systems.

The focus of our strategy is the Customer - lifetime customers who know that they will be delivered an excellent product when we promised, with a quality that is totally dependable and reliable and at a price that is very competitive.

THE MARKET CHALLENGE (BASE MANUFACTURING STRATEGIES) continued

PRODUCT AVAILABILITY

Having a quality product available when we said it would be available is an important step toward securing Lifetime Customers. Our vision is to have no customers disappointed with our delivery performance within lead times that are competitive.

Aggressive delivery goals have been set for FY81-85 for both top options and total options using 95% as both the minimum acceptable level and the departure point for the future.

To meet delivery goals and not compromise cost or inventory, internal quality improvement has been given an extremely high priority.

Consistent delivery performance is dependent upon a Master Schedule which we must establish with Marketing.

Time to market (new products) is vital to our future. We must be far more active in facilitating time to market assuring, that once to market, the availability and quality of the product are maintained.

We need to develop with Design Engineering a basic set of criteria for design completion and product readiness providing a base from which we can determine degree of risk and responsibility for its elimination.

Once we have a useable master schedule, we will have to provide Marketing with a degree of flexibility to ensure that we are properly serving our lifetime customers. There can be simple, clear, guidelines as to WHEN a mix can change, by HOW much, and with WHAT FREQUENCY. This can and will be managed so that we do not disrupt delivery performance or generate excessive incremental cost.

THE MARKET CHALLENGE (BASE MANUFACTURING STRATEGIES) continued

QUALITY

We have made excellent progress in quality through product certification and dock merge programs. We have a good base. From this base we will make improvements in product quality and achieve excellence in product availability, cost, and asset utilization.

We will reexamine our internal quality goodness standards (95%) in terms of their adequacy and the manner with which we achieve them. "Buying and building it right the first time" has got to become meaningful and real. Real in the sense that we know and understand how quality affects downstream processes and their cost/asset implications.

We will work with Engineering to develop standards for the design of quality components. We must be able to clearly and specifically identify when and where added initial cost will significantly reduce total cost.

Present metrics for measuring external quality must also be evaluated. A 95% goodness standard is not adequate for high volume products. We also must look beyond our traditional measures to include such things as: ease of use, aesthetics, the total package, and soft errors.

We must reexamine our thinking and expand the total spectrum of quality standards including customer satisfaction. We will, with the cooperation of Marketing, Sales, and Field Service, visit major customer sites to provide feedback as well as education. We will involve all levels of the organization in this program.

Our people will continue to be the focal point for any advance we make in quality. It is our task to relate the importance of quality to product availability, cost, and asset utilization. Much of the improvements we make will come from the people directly involved.

Quality and its importance to each task has to be expanded to the indirect, non-production functions if we are to reach organizational excellence.

THE MARKET CHALLENGE (BASE MANUFACTURING STRATEGIES) continued

COST

Terminals products are in a highly competitive market. The labor content of terminal products is continually shrinking while functionality is increasing. Big opportunities lie in the proper management of our resources in the Far East, quality and overhead. There are additional opportunities in how we manage asset utilization and product build in understanding competitive costs.

We will make our efforts to reduce product cost multi-dimensional: by making the larger contributors (e.g. quality and overhead) visible and understood. Emphasis will be placed on elimination and productivity.

A program to understand actual "cost of quality" is underway and will be completed by the end of FY81. The objective is to isolate "cost of quality" from general overhead costs and determine wasteful cost that can be eliminated and additional quality investments that must be made so as to return a lower product cost.

There has long been a belief in Volume Manufacturing that general overhead costs can be significantly reduced by a stable Master Schedule and the curtailment of whimsical flexibility. We will prove it.

To cover our bets, we will continue to improve our performance by increasing productivity quality in our overhead functions and by product cost reductions.

Our objectives are to develop new tools for greater understanding of our business and to inspire a different attitude and knowledge about the essentials of cost. We will emphasize which cost structures we must present to the market place to be competitive in the 80's. We will not allow annual adjustments in a "business as usual" posture. We will progress and succeed - not provide additional measures of our failures.

We will continue to utilize the Far East: building high-labor content components, sourcing material, and building complete low-end, low mix products when cost needs equate to survival. The Far East produces products of excellent quality and we can learn from them.

We recognize that the Far East is not a cost panacea, it is an effective stop-gap that gives us time to attack domestic cost and quality opportunities. It is up to us to take advantage of the situation.

THE MARKET CHALLENGE (BASE MANUFACTURING STRATEGIES) continued

COST continued

We will undertake to understand competitive costs and their relationship to quality and asset utilization. Each producing plant will obtain similar competitive products and study them; to learn about comparative costs and quality and to evaluate ease of use, performance, and reliability.

We will reexamine our split build policy in terms of incremental product costs. We have successfully used split-builds as a buffer against mix and demand shifts. A stable Master Schedule will all but eliminate the need for a split-build as a protective device.

ASSET UTILIZATION

Inventory represents 70% of our asset base. We have set ambitious goals for Inventory weeks for FY81-86 which will bring our Inventory down to 8.4 weeks in FY86.

Success with our goals for Product Availability, Quality, Material Handling, Process Automation, and Human Resource Utilization could enable us to bring our Inventory down to five weeks in FY86.

Quality improvement will allow us to make significant reductions in the amount of Inventory required to maintain product availability. For example, low repair volume coupled with short-cycle repair (hours) will improve throughput, reducing the amount of Inventory necessary to provide continuous flow. Superior quality yields will negate the necessity and temptation to have extra material in the pipeline to cover low quality.

A stable Master Schedule and reduction of product proliferation will make Inventory management three times easier.

We will pick one or two process automation projects and evaluate them in terms of lower cost, quality improvement and reduced Inventory.

We presently have two automated material handling projects underway that we will measure to determine: productivity improvement, cost, quality of operation, and reduced Inventory.

Space utilization will be improved in each plant over present levels by a factor of 1.5 in FY83 and 1.8 in FY85.

THE MARKET CHALLENGE (BASE MANUFACTURING STRATEGIES) continued

ASSET UTILIZATION continued

We will meet this objective by: increased utilization of second and third shifts, increased throughput (quality and automated handling) and the conversion of space now occupied by non-productive material. A prime example is packaging. By investing in package engineering and the consolidation of packages, we can convert a lot of space, now occupied by cardboard, to manufacturing use.

MIS is an asset that must be better utilized - we will require a measureable payback.

We will develop "analytical computing tools" that will aid us in improving our understanding of our business and our ability to manage it.

The development of advanced control systems are vital in order to stay in control of a fast moving, volume operation.

Programs and systems that have primary objectives of improving indirect productivity and making jobs more interesting are essential.

People are our most important asset.

We have people of all differences. Many of them are badly under-utilized. We can broaden our people's understanding of the importance of each facet of our business. Each job, task and function should be contributory and understood in its importance. We will make jobs more meaningful and interesting through MIS - achieving greater utilization of our people. They are key to our survival.

THE MARKET CHALLENGE (BASE MANUFACTURING STRATEGIES) continued

HUMAN RESOURCE UTILIZATION

Our human resources are our glue. The many different human resources that we have will be the deciding factor in the realization of our vision and our successful response to THE MARKET CHALLENGE.

To learn more about our business, we will have to provide an atmosphere for constructive and positive learning.

We must sponsor a continuous process of learning and education. As momentum builds, it will be critical that the learning is passed on.

We will develop competency models for jobs and individuals. Individuals own the motivation for their development. We will provide the vehicles for their growth and development, the standards to measure their progress and career paths to reward demonstrated competency.

New people are essential: to supply new ideas, different viewpoints and cultures, to prevent stagnation and to feed organizational growth.

To assure ourselves of a continuous flow of resources and their proper assimilation to support growth, we will develop a recruiting program based on individual and job competency.

If we are able to recruit competent and trustworthy individuals using improved competency models, then we will be able to make their assimilation into the organization less like an initiation into a tribe of Neanderthals and more like a proper transition into a unique, powerful, and competent organization.

We will be explicit on what we mean by standards of excellence for individuals and the organization. We need the specific standards to ensure uniform achievement.

Organizational structure should serve as an aid to human resource achievement and utilization.

We will continually scrutinize our structure asking ourselves:

> Is the structure of the organization an asset or a barrier?
> Are responsibilities clearly defined?
> Can decisions be made at appropriate levels without undue hassle?
> Can people develop within the organization?
> Are we responsive?
> Are our human resources being effectively and efficiently utilized?
> Is our vision clearly understood and are we responding to THE MARKET CHALLENGE?

EXECUTIVE SUMMARY

TERMINALS MFG. GROUP

Our FY82 output supports the reduction of total volume output from $1080M to $950M. Because of limited response time, this shows up as a considerable management adjustment. This adjustment will be incorporated into the plant resource plans during Q3 of this year.

VISION OF THE FUTURE

The Base Strategy Section of this plan envisions us as an efficient, high volume, competitive manufacturer of quality terminals products with an in-depth understanding of our assets and an appreciation for our customer needs. Our Base Strategies commit us to collaborative planning with Marketing and Engineering. Manufacturing, Marketing and Engineering plans will all tie together within the next two years.

MAJOR DIFFERENCES

> The FY81 LRP has a very strong focus on asset utilization. Inventory weeks, for instance, move aggressively down to 8.4 weeks as compared to leveling at 10.5 weeks.

> There have been considerable changes to output volumes as compared to the FY80 LRP.

> FY82 is now a flat year. Spending has been cut back and we hope to eliminate our product cost and variance exposure.

> Schedule slips for New Product introductions including: LA200, LA24, VT278, VT101, VT131. Many of these have slipped a year or more.

GOALS AND STRATEGIES

Delivery goals for both top options and total options will have 95% as the minimum acceptable level. We will work with Marketing to establish a master schedule to support these commitments. We will also work with Design Engineering to improve schedule predictability. We will ship 90% of the first six months commitment made during the New Product implementation Phase II and achieve product cost goals to within 5% of the estimate made at the completion of phase II.

Product quality will continue at a high level. Further we will focus inwardly to integrate quality as an efficiency tool for Manufacturing. We will develop a "cost of quality" model, illuminate our opportunities and reduce scrap and rework in a concentrated drive to build it right the first time. One plant will be modeled during FY81.

EXECUTIVE SUMMARY continued

GOALS AND STRATEGIES continued

We will achieve 3.44 asset turns per year by FY86. These will be accomplished via a multifunctional management of labor and overhead productivity gains. MIS will concentrate on improving asset utilization with various material handling and production systems in FY81 - FY83.

Manufacturing Engineering will work with Design Engineering to optimize new products for manufacturability and further improve productivity and quality through mechanization - with a major emphasis on material handling. We will achieve a 90% learning curve cost reduction on all major purchased products, prior to any relevant inflation adjustment, and we will double material flow asset turns by FY85.

These, as well as our other goals, require us to balance our group functional efforts. Our product and process steering groups along with our functional organizations (Finance, MIS, Engineering, Materials etc.) are all committed to an interdependent effort. The need for a mature, professional, far thinking workforce is paramount to our success. We are totally dependent on and are committed to the development of our Human Resources. We will participate with and support the Manufacturing College Relations efforts; maintain an awareness of our Affirmative Action goals and further develop our present resources by:

> fully identifying our needs
> analyzing our present strengths
> developing training programs as required

We should, thereby, greatly reduce our need to utilize external sources to fill top level management and technical positions.

RISKS/ISSUES/CONCERNS

> We are critically dependent on the development of workable, complimentary goal sets with Engineering and Marketing.

> Failure to produce a Master Schedule will make it difficult to achieve the above goals.

> Our goals are long ranged and depend on a balanced, multi-functional effort. Our concern is that overwhelming short-range needs may force us to get out of balance.

EXECUTIVE SUMMARY continued

RISKS/ISSUES/CONCERNS continued

> We are concerned about the small systems end of the business. Without the PDT 150, the VT278 and a strong word processing product, we are:

- o Facing a level year.
- o Anticipating a successful K.O.
- o Maintaining split builds longer than desireable.
- o Facing a possible delay in Far East sourcing due to the underutilization of our domestic plants in FY82 and FY83.

> During the 1980's our Human Resources will become less mobile and will function in a more disciplined environment:

- o Dual career families are becoming more prevalant.
- o Relocation costs are increasing.
- o Increased emphasis will be placed on in-place professional development and less on the job shifting, challenging assignments of the recent past.

> The keyboard market (e.g. VK100) may take off and find us stretched for the resources needed to meet the potential challenge for high volume, low cost output.

> Our confidence level in the plans for FY85 and FY86 is very low. The combined impact of our aggressive plans and the cutback in output make those projections very fuzzy.

ATTACHMENT A

TERMINALS MANUFACTURING GROUP RESOURCES

	FY80	FY81	FY82	FY83	FY84	FY85	FY86
GROUP OUTPUT $	293	389	413	583	733	919	1114
OPTION OUTPUT $	224	303	330	476	608	769	934
NON MAT'L SPD $	113	131	140	166	210	293	344
EXT MAT'L PURCH $	138	185	203	302	395	470	559
MAT'L ACQ. %	8.38	8.92	8.35	8.14	8.09	8.07	7.88
RECEIPTS VOLUME $ (OUTSIDE GRP)	67	101	94	123	165	186	224
INVENTORY $	86.1	107.0	120.0	122.8	148.6	166.2	192.6
WEEKS	10.9	12.4	10.8	10.2	9.9	8.8	8.4
CAPITAL SPENDING $	9	18	27	42	48	31	25
CAPITAL APPROP $	8	33	25	26	59	22	22
NET PP&E $	40	50	69	96	134	144	146
DL	2446	2595	2399	3073	3570	4212	4847
IL	2124	2255	2218	2522	2838	3089	3454
% OFF SHIFT	24	24	26	28	30	32	33
% SUB CONTRACT	1.6	1.3	.5	.9	1.6	2.5	2.5
SPACE: (K SQ.FT)							
MFG. AVAIL	1004	1116	1122	1201	1435	1512	1502
% UTIL	94	91	96	94	89	89	91
DIST. AVAIL	381	464	524	581	606	656	666
% UTIL	100	100	99	98	96	92	92
TOTAL AVAIL	1385	1580	1646	1782	2041	2168	2168
% UTIL.	96	93	97	95	91	90	91

ATTACHMENT B

PERFORMANCE METRICS

	FY80	FY81	FY82	FY83	FY84	FY85	FY86
$VA/PERSON	24.2	24.6	26.8	30.3	31.4	39.9	41.1
△%		+1.4	+9.1	+13.1	+3.8	+27.2	+3.0
$OUTPUT/PERSON	69.1	82.0	86.9	113.8	121.2	132.6	140.7
△%	+18.9	+5.9	+30.9	+6.5	+9.4	+6.2	
$OUTPUT/SQ.FT	221	264	259	344	396	474	563
△%		+19.3	-1.7	+32.6	+15.0	+19.8	+18.9
TOTAL SQ.FT/PERS.	290	304	345	303	289	266	238
△%		+4.8	+13.5	-12.2	-4.6	-8.0	-10.5
OUTPUT/AVER.ASSETS	2.52	2.76	2.39	2.86	2.93	3.11	3.44
△%		+9.5	-13.4	+19.7	+ 2.5	+6.1	+10.6
NON MAT'L SPD/ AVG. ASSETS	.97	.93	.81	.82	.84	.99	1.06
△%		-4.1	-12.9	+1.2	+2.4	+17.9	+7.1
OUTPUT/IL$	9.5	10.1	9.6	11.8	12.1	12.3	12.9
△%		+6.3	-5.0	+22.9	+3.0	+1.5	+4.4
T.C. STD. IMPACT	-	-	+19.4	+17.5	+17.7	+23.3	+34.8
CUM △% FROM FY81			+6.3	+3.8	+3.0	+3.1	+3.9
% INPUTS/OUTPUTS	104.2	102.7	102.2	102.5	100.1	102.1	100.7
DELIVERY GOAL	95%	95%	96%	97%	98%	99%	99.9%
% PROD CERTIF COMMITS MET	50%	100%	100%	100%	100%	100%	100%
% N.P. CERTIFIED	100%	100%	100%	100%	100%	100%	100%
% PROD DECERTIF.	0	0	0	0	0	0	0

ATTACHMENT C

PLANNING CONTEXT

	FY81	FY82	FY83	FY84	FY85	FY86
CORP NOR	3296	4340	5720	7560	9840	12775
CORP NES	2580	3400	4480	5920	7700	10000
CORP MLP	3007	3970	5220	6900	8970	11670
CORP TC	790	1040	1370	1810	2360	3060
PRODUCT MFG* OPTIONS TO FA&T MICROS/TERMS/IEG	845	950	1300	1807	2433	3190
% INFLATION ASSUMED	11%	10%	9%	9%	8%	8%

OTHER ASSUMPTIONS:

* The latest revision of output was handled through group management adjustment. Plant resource plans, steering group build plans and related cost projections are based on higher volumes. These will be reworked during Q3 so that the plants and steering groups tie to this group resource plan.

MISSION STATEMENT

Primary Missions

To supply and/or manufacture products in seven broad categories to support the corporate market objectives. This implies a complex of cost, quality and customer service objectives within the environment of good employee and community relations. The seven categories of product are:

Printer Products

Manufacture dot matrix printers
Supply buy-out daisy wheel printers
Supply buy-out drum printers
Supply buy-out band printers

Video Products

Manufacture black-white videos
Supply buy-out color videos
Supply buy-out graphic videos (high-end)

Bounded System Products

Manufacture some bounded box systems
Manufacture intelligent terminal systems
Manufacture intelligent bounded disk systems
Direct ship bounded systems to customers (no FA&T)

Micro-Processors

Manufacture board level C.P.U.'s

Q-bus Options

Manufacture options designed to operate with Q-bus

Enclosure Products

Supply and manufacture cabinets, stands, skins, and other product areas.

Other Input/Output Devices

Supply analog/digital devices, particularly to L.D.P.
Supply other I/O devices (e.g. card readers, badge readers, etc.)

MISSION STATEMENT (continued)

Secondary Missions

Most of our manufacturing activities are in support of the primary products listed above. Our long range goal is to direct these efforts in support of the Terminals Manufacturing Group needs as we move towards self sufficiency. Near term operating pressures affecting the timeliness of divesting and inheriting products must be balanced against our long-range goal of independence. In the meantime, these remain secondary missions:

Manufacture RK and H.P.T. disks in Westfield for the duration of the present products' lives which are currently planned to end in FY84. It is our intention not to introduce any new disk products into Westfield.

Manufacture and procure printed circuit boards for the Terminals Manufacturing Group.

Supply machined parts from Westfield primarily in support of the Mass Storage Group.

Supply selected sheet metal parts to other plants near Westfield.

Supply some MDC options from Westfield until the planning and implementation of the phase-over to Augusta is complete at the end of FY82. Accept no new MDC options into Westfield in the interim.

TERMINALS MANUFACTURING ORGANIZATION

Strategic

Base strategies are set by the Terminals Manufacturing Staff which is made up of the Operating Staff (Plant Managers) and the Functional staff (see Organizational chart). This group meets quarterly and reviews strategies in Q1 and Q3.

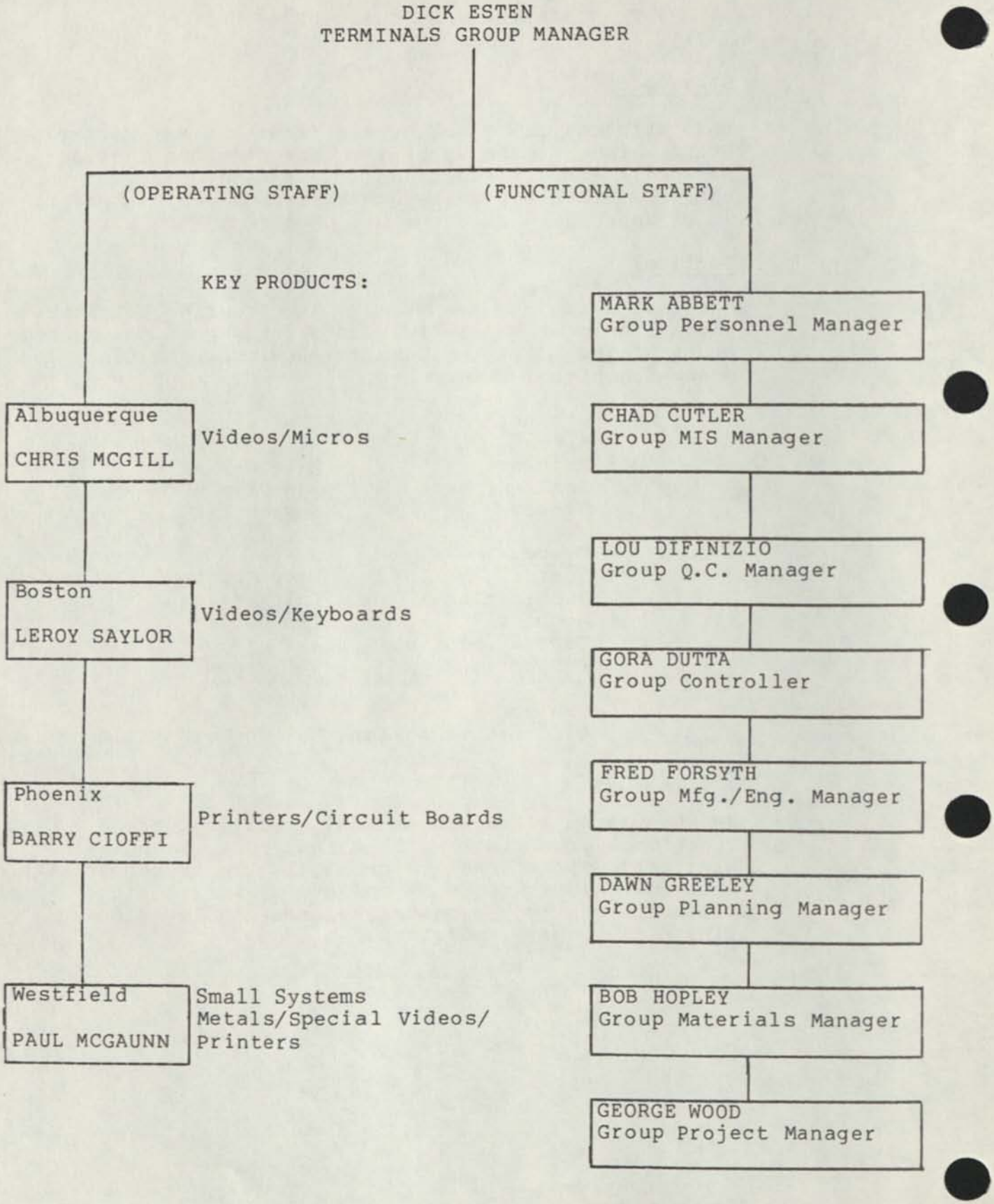
Tactical

Tactical decisions are made by the Steering Committees, which also meet quarterly. There are 4 product, 4 process and 1 project Steering Committees with cross-plant and cross-functional membership.

Product	Chairperson
Micros	Bill Woodard
Printers	Mike Barker
Small Systems	Ron Cajolet
Videos	Dave Ellis
Process	
Boards	Dave Gretton
Fabrication	Ralph Seymour
Modules	Les Goldman
Test & Incoming Inspection	Vah Erdekian
Project	
Affirmative Action	Dave DeMoranville

OPERATIONAL

In the Boston plant, day-to-day operations are run by a functional organization. In Albuquerque, Phoenix and Westfield, operations are primarily the responsibility of business groups within the plants organized either along product lines (eg. printers, videos) and/or along process lines (eg. boards, modules).


DICK ESTEN
TERMINALS GROUP MANAGER
(OPERATING STAFF)
(FUNCTIONAL STAFF)
KEY PRODUCTS:
MARK ABBETT
Group Personnel Manager
Albuquerque
CHRIS MCGILL
Videos/Micros
CHAD CUTLER
Group MIS Manager
LOU DIFINIZIO
Group Q.C. Manager
Boston
LEROY SAYLOR
Videos/Keyboards
GORA DUTTA
Group Controller
FRED FORSYTH
Group Mfg./Eng. Manager
Phoenix
BARRY CIOFFI
Printers/Circuit Boards
DAWN GREELEY
Group Planning Manager
Westfield
PAUL MCGAUNN
Small Systems
Metals/Special Videos/
Printers
BOB HOPLEY
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FUNCTIONAL STRATEGIES - INTRODUCTION

One of the key differences within the Terminals Manufacturing Group this year is the growing strength of our functional organization. This strength is reflected in the thoroughness of the attached functional goals and strategies which were developed in conjunction with the respective functional managers in each plant. It is our intention to continue to work these strategies and the related programs so that they will drive the resource planning process not parallel it. Although the focus of each functional plan is primarily within that function, we have started to identify strategies and programs which are interdependent and will be worked across two or more functions.

Included here are the major goals and strategies for each function within the Terminals Manufacturing Group. Specific program and additional data are available for your further interest. If you need further detail please contact the functional manager.

FINANCE FUNCTIONAL STRATEGIES

GOALS

I. Cost Reduction

OBJECTIVE: Average 7% product cost reduction per year by driving labor and overhead productivity, increasing emphasis on the procurement effort and value engineering, and optimizing use of the Far East and semiconductor technology/functionality.

II. Improved Asset Utilization

OBJECTIVE: ACHIEVE 3.44 ASSET TURNS BY FY86

III. Maintain complete and accurate records of financial results and report those results in a timely fashion in acordance with corporate guidelines.

STRATEGIES

I. Increase Financial Awareness of Operating Managers

A. Develop (with Corporate) a two day financial awareness seminar and present to all Terminals Managers and Supervisors by Q3,FY83.

B. Competitive analysis of one Terminals product once every 2 quarters.

C. Financial Awareness Program for workforce implemented by Q3 FY83.

II. Meaningful Financial Measurements

A. Develop and install cash flow statement for Group and Plant by Q2, FY82

B. Investigate and implement (if feasible) cost of capital as operating expense by Q1,FY82.

C. Standardize understandable financial reporting format for Terminals Group & Plants by Q3,FY81.

D. Volume/Non-Volume budgeting by Q3,FY82

FINANCE continued

E. Develop Cost Reduction and Asset Utilization measures which withstand annual standards change confusion.

F. Measure accomplishment of functional counterparts versus their asset and cost goals as hard evidence of improvement.

G. Measure and report major capital actual introduction dates versus budgeted dates.

H. Specific Cost/Asset efforts identified for inclusion in performance reviews.

I. Corporate and Terminals Financial goals linked by Q3 FY82.

III. Increased operational understanding of cost interdependencies (i.e. Field Service, TPG, etc.) to optimize P & L.)

IV. Cost of quality information developed and utilized in operating decision making (in conjunction with Quality) by Q4 FY83.

V. Common Financial Systems in Terminals

> Accounts Payable Q3 FY82
> General Ledger (MMS) Q1 FY82.

VI. Increase financial focus on the ever-increasing material segment of operations.

VII. Far East strategy reviewed - Is 25% of Terminals DL the right number?

A. Understandable Far East Cost advantage parameters developed by Q1 FY82

VIII. Increase financial acumen of Finance organization (review the basics)

A. Standard Setting Training package by Q4 FY81.

B. General Acounting Training package by Q2 FY82.

C. Budgeting/variance analysis training package by Q4,FY82.

D. One Terminals Finance Manager per year to advance management program.

FINANCE continued

IX. Finance Organization active in forward looking programs/projects/planning.

A. Each plant's Finance organization has strong and active ties with LRP by Q4,FY81.

B. Financial Analysts routinely spending 20% of their time 2 - 3 years out; 10% 4 - 5 years out by Q1 FY83.

C. Each plant's Finance group linked to Plant Steering Committee by Q3 FY81.

D. New Products Business Plans routines scrutinized by Finance well in advance of manufacturing capital commitment.

X. Establish Self-Audit teams in each plant by Q2,FY82.

XI. Human Resource Planning

A. Documented career development discussions happending in Finance every six months.

B. Each manager plots skill needs vs. available resources two levels down.

C. 2 "Training" slots created at Group level

D. College hire program at 40% of new hires by FY85

XII. Communication to disseminate information and receive feedback.

A. Each first line Finance supervisor meets with his/her employees at least once per month.

B. Second line supervisors/managers meet at least once every 2 weeks with immediate reports.

C. Every Finance manager meets with all department personnel at least once every quarter.

D. Managers meet "one-on-one" with all department personnel at least once per year.

E. Electronic mail between group and Plant Controllers in place by Q3 FY82.

FINANCE continued

XIII. Affirmative Action

A. Minority or female plant Controller by Q2 FY84

B. Plant Controller's Staffs exceed availability % for minority and female by Q4 FY83.

C. Terminals Finance meet or exceed availability % in professional categories by Q4 FY82.

XIV. Simplication/Clarification/Accurate Reporting

A. Established new, realistic signature authority levels throughout Terminals Group by Q1 FY82.

B. Implement Fixed Asset budgeting and control procedures by Q3 FY81 (in conjunction with ME).

C. Re-emphasize ethical role of Finance organization

D. Integrated budget/reporting schedules a reality by Q1 FY82.

OTHER FUNCTION COST/ASSET STRATEGIES

> See Asset and Cost sections of each of the TMG functions

> These strategies drive the goals outlined above.

MATERIALS FUNCTIONAL STRATEGIES

MISSION OF MATERIALS ORGANIZATION

The Materials organization in Terminals Manufacturing has the responsibility for procuring material, integrating the flow through manufacturing, and delivering to both DEC customers and finished goods warehouses the products sold or committed to the product lines and other manufacturing groups. These responsibilities should be discharged . . . .

> with excellent delivery performance

> with the optimum degree of work load leveling

> at appropriate quality levels

> at lowest possible cost

> with optimum inventory investment

> in minimum delivery times

BASIC ORGANIZATIONAL ELEMENTS

There are three broad elements within Materials. They are:

1. Procurement (includes Sourcing, Buying, Contract Admin., Vendor Perf. Control).
2. Distribution (includes Traffic, Transportation, Warehousing).
3. Materials Operations (includes Production Control, Inventory Control, Materials Systems/Procedures).

Some goals in Human Resources, Information and Indirect Labor productivity, etc. are common across all three organizational elements Under each individual element the major opportunity areas for significant contribution are:

Procurement	Distribution	Materials Operations
Product Availability	Assets	Product Availability
Quality	Information	Assets
Cost		New Products
Assets		

MATERIALS continued

MATERIALS ORGANIZATION COMMON GOALS

HUMAN RESOURCES

Objectives:

> Understand the 5 year plan goals and create an appropriate Materials development program by FY82.
> Create a fully representative multi-cultural organization by FY85.
> Sense base level of employee satisfaction in FY81 and fully identify all major dissatisfiers by year end.
> Assess Materials organization image as an employer in FY81 and identify and prioritize key weaknesses by year end.

Strategies:

> Identify appropriate technical skills personnel by Q3 FY81.
> Develop and implement sensing mechanisms by Q4 FY81.
> Establish joint Materials and Employee Relations functional goals during Q3 FY81.

INFORMATION

Objectives:

> Assess the adequacy by Q3 FY81 of existing systems in meeting the LRP goals and jointly recommend, with Terminals MIS, a system development strategy by Q4 FY81.
> Define base line group information needs in materials during FY81.
> Develop common report format as a norm.

Strategies:

> Create a combined Materials/MIS systems steering group responsible for a strategic development plan.
> Use Westfield I/O Matrix program and remote plant on-line request/commit system as FY81 trials to explore "commonality" issue.
> Develop systems and procedures audits.
> Hire an MIS specialist to support understanding corporate/group information needs by Q3 FY81.
> Focus Group Distribution manager upon driving the development of information needs to meet the increasingly important role of Distribution.

MATERIALS continued

INDIRECT LABOR PRODUCTIVITY

This goal category is a sub-set of cost.

Objective:

> Enhance effectiveness of total Materials function to handle 30% per year additional output at present staffing levels.

Strategies:

> Develop organizational structure and competence.
> Develop organizational tools.

MATERIALS continued

PROCUREMENT GOALS

Since Procurement normally represents Digital to the commercial world that supplies us, it is necessary for the function to maintain a high ethical standard and to depict a competent, professional organization. All actions necessary to preserve and enhance this image must be the responsibility of Procurement although all contacts need not be under their direct control. This puts an extremely high priority upon the ownership of procedures for dealing with suppliers.

PROCUREMENT PRODUCT AVAILABILITY

Objectives:

> Analyze each part class, or sub class if necessary, on a regional and world-wide basis to be able to guarantee capacity to sustain 30 percent growth over the next five years.

> Identify world-wide competitive sources by part class with particular emphasis upon the Far East, for up to 25 percent of purchased dollars.

> Support multiple sourcing efforts in Europe.

> Increase purchases from minority vendors at least at the same growth rate as gross purchasing spending.

> Have multiple sourcing policies available by part class and type to guide new product and growth product situations. These policies should be individually supported by a cost/benefit analysis.

Strategies:

> Implement a commodity management process across the Terminals Group responsible for vendor base capacity planning and development.

> Work with Far East procurement to source high volume components with the most favorable landed cost savings.

> Ensure VT200/LA200 sourcing decisions. Consider European manufacture.

> Proactively plan minority vendor development with those suppliers.

> Charge commodity management with producing multiple sourcing strategies by part type and part class.

MATERIALS continued

PROCUREMENT QUALITY

Objectives:

> Reduce quality costs of raw material by 50 percent over 5 years.

> Eliminate Incoming Inspection on all A class Fabrication parts and 30 class by FY83.

> Have regulation compliance (O.S.H.A., E.P.A., F.C.C., U.L. etc.) evaluations done on suppliers of 90 percent of purchased dollars by FY82.

> Reduce waivered and rejected material to 50 percent of present levels by Q2 FY82.

Strategies:

> Emphasize vendor ship to Distribution (DEC) on buy out options.

> Control both DEC and vendor-owned tooling

> Support all vendor quality problems as needed to minimize schedule impact.

> Buy ship to stock quality where possible.

> Increase emphasis upon buying from vendors on Q.V.L. and actively recognizing high quality suppliers.

> Jointly develop source inspection plans with quality group at the plant level.

> Develop buyer's responsibilities to include knowledge of suppliers conformance to regulatory standards.

PROCUREMENT COST

Objectives:

> Achieve a 90 percent learning curve cost reduction on the purchased parts on all major products, before relevant inflation adjustment. (i.e. part class/type inflation factor)

> Achieve a 95 percent learning curve cost reduction on the purchased parts on all other products - before inflation adjustment.

MATERIALS continued

Strategies:

> Modify the sourcing process to financially assess lowest cost after inclusion of packaging, transportation, distribution and quality costs etc. in addition to piece part cost.

> Identify and buy material from a supply base that provides cost reductions after adjustment for relevant inflation factors.

> Achieve a 90% learning curve cost reduction on the non-inventoriable material costs of products as judged against total inventoriable output growth, before relevant inflation adjustment.

> Hire a Group Purchasing Manager in Q2 FY81 responsible to drive the focus on cost in FY82 standard setting.

PROCUREMENT ASSET

Objectives:

> Increase vendor stocking to reach 20 percent of total material assets by FY85.

> On high volume products rely upon vendors work-in- process so that one week of inventory can be taken out by FY85 by this reliance.

Strategies:

> Focus commodity management on high bulk and then other A class parts onto vendor stocking programs.

> Begin a joint program with MIS to develop the systems needed to support these objectives.

> Hire Group Purchasing Manager in Q2 FY81 to drive the educational process as required to allow the work-in-process concept to be operationalized during FY82.

> Ensure that packaging and lot sizing optimizes DEC's warehousing needs.

MATERIALS continued

DISTRIBUTION GOALS

Since the advent of "unbundled" sales, dock merged products and the high volume terminals market, all aspects of Distribution are rapidly becoming more important to the Terminals Manufacturing Group. In the next five years automatic material handling and warehousing additions are planned for each plant site. Field distribution centers may be placed near to Albuquerque, Phoenix and Westfield and increased volumes of products will be shipping direct from volume manufacturing both into the distribution network and directly to customers. Coupled with these factors is the growth of the Far East as a supplier to all plants and the expected increases in oil-driven transportation costs. It is timely, therefore, for the group to begin to focus on all aspects of distribution.

DISTRIBUTION ASSET

Objectives:

> Ensure capital assets (warehouses, handling systems, vehicles, etc.) are planned for optimum utilization at peak run rates.

> Manage the assets within the material flow to double Manufacturing turns by FY85.

> Reduce net physical inventory adjustment to Ø.5% in April FY81, Ø.4% FY82, Ø.3% FY83, Ø.2% FY84, Ø.1% FY85.

Strategies:

> Hire Group Distribution Manager in Q2 FY81 to drive concepts and understanding of the Distribution process so that operationalizing the objectives can begin in FY82.

> Capitalize upon the Phoenix automated material handling project to benefit all plants.

> Continue emphasis upon cycle counting, stockroom training and system auditing to improve material control and physical inventory adjustments.

MATERIALS continued

DISTRIBUTION INFORMATION

Objectives:

> Analyze distribution systems so that a development plan is availabale by Q2 FY82.

Strategies:

> Enhance, as needed, all control procedures in place governing contact between DEC and non-DEC suppliers, customers, etc.

> Focus Group Distribution Manager during FY81 upon the development with MIS, procurement, materials operations, finance, corporate distribution, other Manufacturing distribution and product line distribution of the systems and procedures necessary to meet all Distribution goals.

MATERIALS continued

MATERIALS OPERATIONS GOALS

The single biggest opportunity for Terminals Manufacturing to visibly affect the company's balance sheet and P and L is in the reduction of the material inventories held to meet schedules. There is broad general acceptance of this concept. Results will be seen in FY81 and FY82. Over the five year horizon, it will be necessary to achieve dramatic improvement in the high volume products with a more modest change on lower volume items. A key signal will be in Q1 FY82 when a goal of maintaining the weeks on hand performance reached in Q4 FY81 will be achieved rather than the 15 - 20 percent deterioration historically experienced.

The sourcing process will be changed so that interdependency with groups other than the Far East and L.S.I. is eliminated as soon as reasonable (by FY83), and that intradependency within the group is optimized within process constraints. The elimination of interdependency will tend to increase Terminals inventory but should be off-set by a larger decrease in the supplier Groups inventory. This has already been seen with the South West Acquisition Center program in FY80.

The expected group outputs and inventory goals, for the next 5 years are:

	FY81	FY82	FY83	FY84	FY85	FY86
Group Output	390	413	583	732	920	1114
Ending Inventory	107	120	123	148	166	193
Weeks	12.42	10.76	10.24	9.88	8.80	8.41
Turns	2.74	3.25	3.36	3.94	4.41	5.03

MATERIALS continued

MATERIALS OPERATIONS PRODUCT AVAILABILITY

Objectives:

> To improve delivery against commitment as:

FY80	FY81	FY82	FY83	FY84	FY85
85%	96%	97%	98%	99%	99.9%

> To deliver 100% weekly against commitment beginning in Q4 FY81 on the LA34, LA120, KD11, KDF11 and VT100.

> To implement stated flexibility positions in Q3 FY81.

Strategies:

> Continue to manage the commit process as developed in the last half of FY80.

> Hire a Group Materials Operations Manager to drive the Master Planning and Scheduling (MAPS) approach to two year product line unit forecasting for Terminals Group.

> Develop on-line Copis data base plant interface capability in FY81. (request/commit)

> Begin reporting weekly vs. commit in Q3 FY81 on the LA34, LA120, KD11, KDF11 and VT100.

MATERIALS OPERATIONS ASSET

Objectives:

> Double turns on high-volume commodity products by FY85.

> Improve turns on other products by 50% by FY85.

> Reduce excess material percent of inventory by 50% in FY81, 60% in FY82, 70% in FY83.

> Reduce obsolete material percent of inventory by 50% in FY82, 60% in FY83, 70% in FY84.

MATERIALS continued

Strategies:

> Eliminate planned overbuilds from production schedules by Q3 FY81.

> Eliminate unnecessary buffering (e.g. excessive minimum stock levels) during FY81.

> Show 100% of excess material on corporate redistribution system by Q2 FY81.

> Raise visibility and analysis of obsolete material and potential products with obsolescence exposure in eight quarter time-frame.

MATERIALS OPERATIONS NEW PRODUCT

Objectives:

> To proactively participate in halving the time-to-market of new products by FY84.

> To develop procedures to assure all new product material is acquired in published lead-times from FY81.

> To reduce new product induced excess material by 50% from present levels by Q1 FY82.

Strategies:

> Begin to investigate CAD/CAM potentials to improve new product start-up process.

> Increase plant materials management focus upon the initial new product material buy decision.

> Begin measuring actual lead-times achieved on new products vs. published lead-times.

PERSONNEL FUNCTIONAL STRATEGIES

CHARTER/MISSION STATEMENT:

To actively contribute to the efficient high growth of terminals manufacturing in meeting our base business strategies by developing the organization while improving employee satisfaction.

In the past Personnel has primarily been a service and support function to the manufacturing organization in the areas of compensation and benefits, employment and employee relations. In the 80's our focus will be towards human resource planning and development, an integrated business strategy of developing the organization towards its goals.

Conditions with which we must deal as a result of our environment:

EXTERNAL

> We will be faced with a less mobile workforce as a result of inflation, dual careers, quality of life considerations, and cost of relocations.

> Issues of our society and workforce are growing much closer together. A company's attitudes and obligations must reflect this.

> Our workforce will be much more aware and sophisticated on issues of computers, pollution, energy, etc.

INTERNAL

> For cost reasons, our acquisition and development strategies will be closely tied into our base business strategies.

> Training and development of our employees will be organizationally focused vs. individually focused.

> Plants will be reaching maturity and employees will be spending more time in their jobs. Growth will come from personal development, increased job competence, and career planning.

> Minorities and women will be a much more important part of our workforce in all levels and types of jobs.

THESE CONDITIONS REQUIRE PERSONNEL TO PLAY A PROACTIVE, INTEGRATED BUSINESS ROLE DURING THE '80'S.

PERSONNEL continued

PERSONNEL GOALS AND STRATEGIES FY81-86:

GOAL 1: HUMAN RESOURCE PLANNING & DEVELOPMENT

Develop a process for translating the Terminals Group business strategies into a set of strategies and programs focused on developing the organization through the acquisition and development of our human resources.

OBJECTIVE:

Put in place a methodology and process for the acquisition and development of our human resources in support of the business strategies. Consult with and educate the line organization in how to implement and operationalize this concept. Our objective is that this linked planning process will be institutionalized similar to budgeting.

GOAL 2: INCREASE THE EFFECTIVENESS AND PRODUCTIVITY OF THE PERSONNEL ORGANIZATION

OBJECTIVE:

Grow Personnel's (headcount and budget) volume sensitive jobs at a rate that is less than the Manufacturing goals.

GOAL 3: AFFIRMATIVE ACTION

To have an organization of different people at all levels who have a mutual awareness and respect of their differences.

OBJECTIVE

We should pass an affirmative action report card from standpoints of availability, utilization and sensing.

QUALITY FUNCTIONAL STRATEGIES

TRADITIONAL - OUTPUT QUALITY FOCUS

The terminals quality organization has acted as the internal advocate of the end customer. The function drove for installation and performance quality to be consistent with an aggressive warranty budget.

The plans were to establish a base level of quality through the adoption and execution of a product certification policy. The policy clearly defined output goals, but more importantly established criteria where positive action would be taken upon detection of process trends--the ultimate action being suspension of shipments. a similar program was also developed and implemented for reliability, including goal and guardbands for performance.

These programs gave the group, for the first time, a quantitative measure of output quality and reliability. It was through these measures, that we could confidently assure our end customers that quality was, in fact, being delivered.

NEW FOCUS FOR QUALITY

The theme of this long range plan is a deliberate shift to an inward focus. Quality must no longer be reviewed as an isolated manufacturing metric independent of cost, inventory, delivery, etc.

Quality will be used as an efficiency tool for manufacturing. Our theme "build it right the first time" will be used to eliminate the need for inspection and rework. This will introduce predictability to manufacturing which will lead to delivery, cost and asset utilization improvements.

QUALITY continued

GOAL: Understand cost of quality model and opportunities it will make available as a management tool.

OBJECTIVE:

Develop the cost of quality model which will allow the utilization of manufacturing cost and production information to detect opportunities for achieving significant productivity gains to effect reductions in product cost.

STRATEGY:

1. Develop model for cost of quality system.
2. Selected plant will use model as test cases. (completed FY81)
3. Bring about efficient utlization of burn-in.
4. Expand model for adoption across all plants. (completed FY81)

GOAL: Material Acquisition Quality Plan.

OBJECTIVE:

Develop material acquisition quality program to assure a continuous flow of quality materials to the manufacturing process.

STRATEGY:

1. Derive plan for materials acquisitions quality. Elements of plan to possibly include:

   a) Vendor base surveys
      Vendor qualifications
      Second sourcing
      Vendor ratings

   b) Efficient measurements strategy. Utilization of incoming inspection, source inspection and ship to stock as economics dictate, including vendor feedback and gauging users.

   c) Purchase specifications quality requirements.

   d) Plans to be completed in FY81.

QUALITY continued

GOAL: Human Resource Planning

OBJECTIVE:

Acquire, train and develop Quality personnel necessary to implement group business strategy.

STRATEGIES:

1. Project Quality staffing requirements thru FY86.
2. Prepare acquisition, development and assimilation programs to complement staffing goals.

PROGRAMS:

1. Develop competency model for Quality engineers (FY81).
2. Streamline systems to upgrade technicians to engineers.
3. Develop with plant functional managers, projections of Quality personnel required thru FY86. This plan to also include strategies for staffing, training and development. A college hire program will be integrated into these plans. (Projections completed by FY81.) (Training and development programs completed FY82.)

GOAL: Make Dock Merge Product Certification Routine

OBJECTIVE:

1. Certify all products which are direct shipped or planned for dock merge within 3 months of first customer shipments.
2. Expand product certification concept to include all inter/intra plant sub-assemblies.

STRATEGY:

1. Develop certification policy for sub-assemblies.
2. Continue to drive product certification with eight quarter forecast of products to be certified.
3. Decentralize product certification process.
4. Evolve certification policy to adapt to terminals group growth.

QUALITY continued

GOAL: Assure New Products Are Designed For High Volume Manufacturing.

OBJECTIVE:

Establish New Products Quality Assurance effort to insure designs readiness for manufacture in volume.

STRATEGY:

1. Identify the role of New Products Quality Assurance. Elements to include:

   > Functional performance to spec

   > Conformance to regulation - UL, CSA, FCC

   > Worse case analysis

   -critical parts
   -critical process

   > DMT and PMT plans

   > Ship to stock programs

   > Clean purchase specs

2. Insure Product Assurance effort in existence in each of engineering groups dealing with Terminals Group plants.

PROGRAMS: (scheduled for FY81)

1. Implement organizations (either plant or group) to execute role of New Products Quality Assurance.

2. Develop guidelines for Product Assurance function.

NEW PRODUCTS FUNCTIONAL STRATEGIES

GOAL: Improve schedule predictability.

OBJECTIVE:

Achieve at least 90% of first six months shipments committed to during new product Phase II (implementation).

STRATEGIES:

1. Enforce the use of the phase review process for all participating new product functions (see phase review planner).
2. Improve project tracking process.
3. Establish readiness reviews for major products.

GOAL: Improve Cost Predictability.

OBJECTIVE:

Achieve product cost goals within 5% of estimate made at completion of phase II review at a given volume level.

STRATEGIES:

1. Enforce phase review process, i.e., "frozen" product specs.
2. Establish computerized cost estimating and tracking for all major programs.

NEW PRODUCTS continued

GOAL: Minimize Manufacturing Cost of New products.

OBJECTIVE:

Provide Terminals with increased functionality at a constant and competitive cost.

STRATEGIES:

1. Use of standardization/modularity of components/ architecture/software.
2. Provide dedicated technical resources to address producibility and automation issues early in the design process.
3. Minimize inter-group flow of components and subassemblies.
4. Maximize plant and intra-group vertical integration.
5. Use of Far East manufacturing for high volume modules, subassemblies and low cost terminals.

GOAL: Improve productivity of the New Product Organization and process.

OBJECTIVE:

Improve the overall effectiveness of the New Product Function while minimizing spending and time to market.

STRATEGIES:

1. Develop metrics for more accurate project planning and measurement of improvements to the New Product process.
2. Manage the selection and development of New Products Human Resources.
3. Fully examine the use of external resources (make vs. buy) in the early design phase.

GOAL: Improve New Product Reliability

See Quality Assurance section of Group Long Range Plan.

MANUFACTURING ENGINEERING FUNCTIONAL STRATEGIES

GOAL: Insure that technical assets and manufacturing processes are such that the Terminals Manufacturing Group remains cost competitive.

OBJECTIVE:

Minimize initial new product cost and achieve cost savings based upon 85% learning curve.

STRATEGIES:

1. Work closely with Design Engineering to optimize new product designs for producibility, testability and maintainability.

2. Expand use of value analysis/cost reduction programs for current products with an increased emphasis on quality costs.

3. Improve manufacturing productivity and quality through mechanization with major emphasis on material handling. Continue to drive group effort out of Phoenix, but establish core groups in each of the plants.

4. Improve understanding of the competition's strengths and weaknesses.

GOAL: Assure the efficient use of capital within the Terminals Manufacturing Group.

OBJECTIVE:

Provide sufficient capacity to meet customer's needs on a timely basis while meeting group R.O.A. goals of 3.42 turns in FY86.

STRATEGIES:

1. Improve the process for budgeting, approving and controlling capital expenditures.

2. Increase utilization of current equipment and floorspace. Develop metrics for FY82.

3. Expand current facilities (as opposed to establishing new facilities).

4. Influence make-vs-buy decisions so as to maximize R.O.A.

MANUFACTURING ENGINEERING continued

GOAL: Insure that new product designs are manufacturable, and that committed cost, quality, and ship goals are met.

OBJECTIVE:

Insure that all new products are manufacturable and that major new commodity products are designed for automation.

STRATEGIES:

1. Work closely with Design Engineering to optimize new product designs for producibility, testability and maintainability.

2. Actively participate in phase review process to insure that manufacturing's needs are being met at each step.

3. Ensure standardization and modularity wherever possible; maintain commonality of parts as far into the manufacturing cycle as possible.

GOAL: Introduce new manufacturing technologies into the Terminals Manufacturing Group to improve quality, productivity, and the ability to manufacture new products.

OBJECTIVE:

Insure that the required technology is developed, installed, and debugged prior to being needed.

STRATEGIES:

1. Continue to expand use of E97 funds for group specific technology development around automation and new operation test equipment. (FY82-83)

2. Build up advanced development capability for group-specific technologies, i.e., keyboards, printheads, etc. (FY84-->FY86)

3. Understand the state-of-the-art relative to processes and drive the development based on need.

MANUFACTURING ENGINEERING continued

4. Insure that all facility expansions take into consideration the state-of-the-art processes. Balance long term objectives against R.O.I.

5. Maintain close liason with the corporate Technology Center and CPU group (their current technology is often our future technology).

6. Develop a hybrid manufacturing facility in Albuquerque and reduce dependence on central functions (FY82).

GOAL: Develop a systematic and cost effective approach for understanding our Human Resource needs and for managing their acquisition, training and development.

OBJECTIVE:

Economically acquire, train, and develop Manufacturing Engineering personnel while developing a multi-cultural environment.

STRATEGIES:

1. Over the next three years, increase the number of exempt hires through a college relations program to 50%.

2. Understand the impact of future technologies on the technical skills required by Manufacturing Engineering and provide means of achieving these skills.

3. Develop a skills inventory and a replacement planning program.

4. Over the next two years, assess the need for functional training within the Manufacturing Engineering organization.

MIS FUNCTIONAL STRATEGIES

Goal: Recognize the function of "information" as a major plant resource.

OBJECTIVE:

1. Help the operating plant functions to own their own data and information systems.
2. Make information collection an integral part of business activity instead of a separate activity.

STRATEGIES:

1. Work with management at all levels to understand capabilities, limitations and role of "information" in the management process. (workshops - (FY81,82))
2. Develop an MIS organization and project process which can accomplish the MIS function. (plant MIS steering committees - FY81)
3. Integrate the MIS planning process with the business planning process. (functional five year plans - FY82)
4. Design systems to support plant functions, not individual managers or organizations. (ongoing in all plants)

MIS continued

GOAL: Use the MIS function to improve asset utilization and reduce product costs

OBJECTIVES:

1. Provide better materials and manufacturing systems.
2. Reduce the effort involved in collection and processing of data.
3. Provide better information analysis tools.

STRATEGIES:

1. Establish an MIS management process which identifies asset and cost opportunities.
   (plant MIS steering committees - FY81)
   (prepare ROI analyses for projects - FY81-82)
2. Concentrate MIS efforts on projects and activities which enable functions to improve asset utilization and reduce product costs.
   (material handling FY81-82)
   (board shop process control, FY81)
   (manufacturing systems FY82,83)

MIS continued

GOAL: Increase the efficiency and effectiveness of MIS solutions to business information requirements.

OBJECTIVES:

1. Determine where shared and common systems are practical and desirable.

2. Accelerate the rate of MIS systems development and installation.

STRATEGIES:

1. Learn to stop reinventing the wheel by sharing across plants and by finding external sources for systems and software.
   (board shop control FY81)
   (materials handling FY81-82)
   (manufacturing systems FY82-83)

2. Develop a common hardware/software/network architecture for the group which will facilitate transporting systems across plants.
   (terminals group architecture committee FY81-82)

3. Work with plant and group management to identify those common business practices which will allow us to adopt multi-plant systems.
   (materials functional I/O FY81)
   (terminals planning model - FY81,82)

MIS continued

GOAL: Use the MIS function to support consistent management systems across the terminals group.

OBJECTIVE:

1. To provide consistent data to measure plant to plant activities, accomplishments and plans.

STRATEGIES:

1. Seek opportunities to develop consistent information needs across the terminals organization.
   (terminals planning model FY81, 82)
   (plant performance statistics FY82)

2. Enable and support multi-plant information projects.
   (materials I/O analysis - FY81)

GOAL: Develop a systematic and cost effective approach to manage the planning and development of our MIS human resources.

OBJECTIVES:

1. Attain the right level, type and quality of MIS human resources to effectively accomplish the function.

2. Develop a reputation for professionalism in a humanistic climate such that MIS professionals from throughout DEC are attracted to and kept by the group.

STRATEGY:

1. Provide a stimulating, satisfying and growth-oriented climate for MIS professionals within the terminals group.
   (implement new D-family job descriptions - FY81)
   (job openings publishing procedure - FY81)

2. Reach an in-depth understanding of the quality, quantity and types of human skills needed to staff the ongoing terminals MIS organization.
   (MIS organizational development plan - FY82)
   (MIS career planning process - FY82)

STEERING GROUP

PLANS IV

STEERING GROUP PLANS - INTRODUCTION

Our Steering Group concept for tactical decision making is a little over a year old. The Steering Groups are working well. They meet at least quarterly on tactical issues and participate twice a year in our group strategic planning meetings. The base build plan was approved in our mid-September group meeting. It now is considerably higher than the latest (mid-November) revision of output targets but has not yet been re-sized. The unit build plans and associated product cost projections represent higher volumes than we now believe will be required by the Corporation in the FY82-84 time frame.

Steering group plans include their charter, membership, goals and strategies, Manufacturing build plans, cost projections, output dollars, and major assumptions.

We are establishing a Keyboard Steering Group which will be chaired by Jim Myers of the Boston Plant.

PRINTER STEERING GROUP - MIKE BARKER, CHAIRMAN

Overall Objectives

To ensure that the Terminals Group has adequate FA&T capacity for projected product group requirements.

To formulate and implement tactical planning based upon Group strategies. Propose strategy changes.

To insure that the represented organizations are working to achieve the same goals. Scope the magnitude of issues that arise and determine how the system should solve these issues. Give direction and focus to Printer Product issues, ensure the system is working, and strive to improve upon the system where required.

Specific/Strategies

1. Develop and maintain five-year product requirements.
2. Improve upon product group forecasting of printer products.
3. Provide focus for product phase-out.
4. Provide focus for the product phase review process
5. Review new product business plans.
6. Focus on capacity requirements.
7. Focus on available and planned capacity.
8. Make split build decisions that fall in line with group manufacturing strategies.
9. Make decisions that will optimize ROA, product cost, and manageability, i.e., communication, plant size, focus, resources, and new product start-up.
10. Develop printhead manufacturing plans.

Steering Group Composition

Membership	Representing
Mike Barker	Terminals Manufacturing
Dave Cotton	Product Management - LA200
Bill Hogan	Product Management - LA12, LA24
Frank Nardo	Product Management - Current Products
Joe Nadler	Corporate Materials
Steve Tocman	Terminals Manufacturing
Art Williams	Terminals Engineering
Lou DiFinizio	Terminals Manufacturing Group
Ted Heywood	Computer Product Group
Don Santora	Technical Product Group
Phil Gillingham	Commercial Product Group

PRINTERS continued

Issues to be Worked During FY81

1. TPG - A five-year planning cycle is in place by product, however, the quality of the projections past the present year has historically been poor. A concerted effort must be placed on raising the quality of these projections.

2. Other Product Groups - A five-year plan at the product level does not currently exist in these groups. A process is currently underway to establish these plans.

3. The Steering Committee has just recently taken on the responsibilities for the Buyout Business. Unit Volume ship numbers are only shown at this time. Future plans will show an integration of the Buyout Business.

Buyout Printer Plan - Unit Volumes

Product	FY81	FY82	FY83	FY84	FY85	FY86
LP05	302	-	-	-	-	-
LP25	1,770	2,900	3,450	4,000	3,700	2,600
LP26	208	1,200	1,400	1,700	1,600	1,100
LP14	375	300	300	300	300	300
LQP01	5,401	4,000	-	-	-	-
LQP02	-	3,020	13,600	17,900	23,700	30,000
Total	8,056	11,420	18,750	23,900	29,300	34,000

PRINTERS continued

Product Group Forecasts and Manufacturing Ship Numbers

The following represents forecasts from the Product Group representatives on the Steering Committee and the Manufacturing build numbers derived from the Product Group forecasts.

PRODUCT LINE SHIP PROJECTIONS
(RELATING TO THE BUILD PLAN)

	FY81	FY82	FY83	FY84	FY85
	TPG/OTHER	TPG/OTHER	TPG/OTHER	TPG/OTHER	TPG/OTHER
LA36	4.0/2.4	-/2.0	-/2.0	-/1.7	-
LA180	.8/2.4	-/1.6	-/2.2	-	-
LA120	52.1/18.7	94.0/26.0	75.0/35.0	45.0/38.0	20.0/10.0
LA34/38	50.0/6.3	52.0/6.2	55.0/10.0	39.0/5.0	13.0/-
LA12	-	-	45.0/10.0	100.0/25.0	139.0/29.0
LA200	-	-	-	-	45.0/50.0
SUB TOTAL	106.8/29.8	146.0/35.8	208.0/66.2	271.0/82.7	348.0/104.0
TOTAL	136.6	181.8	274.2	353.7	452.0
% GROWTH TPG	58%	37%	42.5%	30%	28%
% GROWTH OTHER	19%	20%	85%	25%	26%
% GROWTH TOTAL	47%	33%	57%	29%	28%

PRINTERS continued

PRINTER BUILD PLAN - UNIT VOLUMES

	FY81	FY82	FY83	FY84	FY85	FY86
LA36						
WF	8	-	-	-	-	-
LA180						
PN	3	-	-	-	-	-
LA120						
WF	34	58	50	50	30	5
PN	54	75	60	33	-	-
SUB TOTAL	88	133	110	83	30	5
LA34/38						
PN	61	50	57	44	13	5
LA24/44	-	10	55	125	168	197
LA12						
PN	-	4	25	50	58	60
FE		1	15	50	88	120
SUB TOTAL		5	40	100	146	180
LA200						
PN				15	60	115
FE				5	15	40
WF					20	45
				20	95	200
TOTAL OUTPUT	160	198	262	372	452	587
% GROWTH	31%	24%	32%	42%	22%	30%

PRINTERS continued

PRODUCT COST

Assumptions:

1. The Product costs shown are an average cost of all models of that product.
2. Product Cost is based upon the manufacturing ship numbers and split build assumptions contained in this plan.
3. Product cost is based upon the present plans for utilizing the Far East manufacturing group to manufacture printer sub-assemblies.

Output at Transfer Cost

$/unit	FY81	FY82	FY83	FY84	FY85	FY86
LA36	783	-	-	-	-	-
LA180	1,000	-	-	-	-	-
LA120	802	778	780	820	950	830
LA34	465	557	573	620	720	830
LA24	-	689	669	660	683	675
LA12	-	666	627	624	638	643
LA200	-	-	-	766	745	728

Extended Transfer Cost - Future Standards

($ Mill.)	FY81	FY82	FY83	FY84	FY85	FY86
LA36	6.3	-	-	-	-	-
LA180	3.0	-	-	-	-	-
LA120	70.6	103.5	85.9	68.1	25.5	4.8
LA34	28.4	27.9	32.7	27.3	9.4	4.2
LA24	-	6.9	36.8	82.5	114.7	133.0
LA12	-	3.3	25.1	62.4	93.1	115.7
LA200	-	-	-	15.3	70.9	145.6
Total	108.2	141.6	180.4	255.6	313.6	403.2

	FY81	FY82	FY83	FY84	FY85	FY86
Total Printer Output @ FY81	108.2	140.2	179.2	255.1	315.9	415.1
Standards Total Output To FA&T/TPG/MPG at 95% of Total	102.8	133.2	170.2	242.3	300.1	394.3
% of Total (Printers vs. Corp. TC 81	12.4%	12.7%	12.6%	13.4%	12.3%	12.4%

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PRINTERS continued

PRINTHEADS

1. Westfield will be the source for all printheads for products currently in production.

2. Westfield will start up the LA24 and ramp into volume. The Far East may be a second source if it is cost advantageous to do so.

3. The LA12 will be vertically integrated into the Far East and Phoenix or a variation thereof, depending upon cost.

4. The LA200 could be vertically integrated into the Far East and Phoenix or provide a split that would be the most cost advantageous or, if the LA200 has multiple head designs, a different strategy may be employed.

Bottom Line: Cost will be the most significant factor in determining printhead manufactuirng strategies in the future.

Printhead Requirements

(000 units)	FY81	FY82	FY83	FY84	FY85	FY86
Westfield						
LA30	.7	.7	.7	.7	.7	.7
LA36-180	23.0	13.0	13.0	13.0	13.0	13.0
LA120	103.0	147.0	137.0	118.0	77.0	55.0
LA34-38	67.0	64.0	73.0	65.0	31.0	23.0
LA24-44	-	14.0	68.0	140.0	189.0	223.0
Sub Total	193.7	238.7	291.7	336.7	310.7	214.7
Phoenix						
LA12	-	10.0	44.2	58.2	103.1	168.8
LA200	-	-	-	26.0	110.0	215.0
Sub Total	-	10.0	44.2	84.2	213.1	338.8
Far East						
LA12	-	-	11.8	45.8	87.9	122.2
TOTAL	193.7	248.7	347.7	406.7	611.7	820.7
Note: LA12 Total	-	10.0	56.0	104.0	191.0	291.0

PRINTERS continued

Split Build

1. Pedestal Split Build

   Both Phoenix and Westfield will continue to produce pedestal printers through FY84. In FY85, Westfield will have sole responsibility for pedestal printers, and Phoenix will convert their pedestal capacity to expand the table-top capacity. Westfield will concentrate on the LA12Ø specials with some standard units to maintain economical build volumes and to optimize the pedestal capacity.

2. Tabletop Split Build

   a. The LA34 will continue to be built in Phoenix until the phase-out of that product.

   b. The LA12 will be built in Phoenix and the Far East beginning in FY82. The Far East will concentrate on the basic low-end unit variations, and Phoenix will produce the fully functional variations.

   c. The LA2ØØ is currently planned to be built in Phoenix, Westfield, and the Far East.

   This plan could change, dependent upon design architecture and option level capacity requirements.

PRINTERS continued

CAPACITY PLANNING

Statements and Assumptions

1. Optimum utilization of assets with capacity for upside potential for a given year is targeted at 85%. With the Printer Business growing at 30% per year, the total capacity will only be utilized from 70 - 75% in a given year to ensure adequate capacity exists for the following year.

2. Capacity is not being planned to include a European printer facility at this time.

3. Far East capacity ensures a capacity valve exists, strengthens the vendor base, is a tax advantage, and is cost justified.

4. Phoenix will expand its tabletop line in FY84 and FY85 as the LA120 volumes are picked up by Westfield.

5. Westfield will get into tabletop printer manufacturing in FY85 to maintain a printer volume of 50,000 per year. Exceptions to this plan may be put forth in the future, dependent upon the following:

   a. Printer volumes decline to the extent that the Phoenix and Far East plants are underutilized and jeopardize manpower and costs.

   b. Capacity in Westfield is required for other products, i.e. small systems.

6. Capacity is not planned for production of buyout printers via a licensing agreement.

7. Capacity is not planned at this time for a possible volume impact resulting from the small systems market place.

8. Capacity is planned using an average burn-in time of 12 hours and a utilization of second shift production.

9. Direct Labor Distribution by shift: The following represents a projection of the direct labor distribution for the printer assembly operations.

	FY81	FY82	FY83	FY84	FY85	FY86
% First	80	70	70	70	65	60
% Second	15	25	25	25	30	35
% Third	5	5	5	5	5	5

PRINTERS continued

FA&T CAPACITY (000) Units

	FY81	FY82	FY83	FY84	FY85	FY86
Standups						
WF	45	70	75	75	30	30
PN	80	90	90	45	-	-
Total	125	160	165	120	30	30
Percent Utilization to Projected Volume	79%	83%	67%	69%	100%	17%
Tabletops (Planned)						
WF	-	-	-	-	100	100
PN	100	200	200	300	300	300
FE	-	100	100	100	200	200
Total	100	300	300	400	600	600
Percent Utilization to Projected Volume	61%	22%	51%	72%	70%	97%
Tabletops (Available)						
WF	-	-	-	-	100*	100
PN	100	200	200	400**	525**	525
FE	-	100	100	100	200	200
Total	100	300	300	500	825	825
Percent Utilization to Projected Volume	61%	22%	51%	58%	51%	70%

*space vailable when LA120 phases out
**additional space available on LA120 phase-out

PRINTERS continued

QUALITY

Dock Merge

Printer terminals will be of dock mergeable quality as measured at user audit at first volume commit. The goal is that all units will achieve certification three to six months after first volume commit.

Direct Ship

Terminals will support direct shipping from volume plants when requested by the product groups on any of the dock merge quality printers.

Process Control

We commit that all printers currently certified under the dock merge program will remain certified by maintaining the process control system currently in place.

VIDEO STEERING GROUP-DAVE ELLIS,CHAIRMAN

CHARTER

We are responsible for managing the worldwide manufacturing of all Video Products with direct responsibility for:

Production and Delivery to Product Lines
Capital
Space
People
Capacity in Manufacturing
Transfer Cost
Inventories
Sourcing of Parts
Distribution to Product Lines
New Product Introduction into Manuafacturing
Quality

The following are areas that we must influence:

Product Announcement
FA&T Inventory Levels
Design Engineering
Technology Investment
Build Numbers/Market Forecast

OUTPUT PLAN

Assumptions:

-Boston expansion complete Q_1 FY 83
-Albuquerque expansion complete Q_3 FY 83
-Video growth slows as follows:

81	82	83
87%	54%	30% thereafter

VIDEOS continued

STRATEGY

The FA&T strategy is to utilize the Far East for Cost; Albuquerque for high volume Vanilla; Boston to take products to end of Life; and Westfield to build Special (high mix) and Vanilla Videos to furnish adequate volumes.

In detail, then, the Strategy is:

-Far East build VT101 only
-Far East low end VT200 starting FY85
-Westfield build Vanilla VT100 through FY83
-Albuquerque phase out of VT100 Q1 FY83
-Boston build Vt100 through end of product life
-Albuquerque phase out of VT102/131 in FY86
-Boston start VT102 build in Fy83 and build through end of product life
-Westfield builds VT200's in FY85 to maintain minimum of 40K units per year.

VIDEO BUILD PLAN-BY PLANT

	FY81	FY82	FY83	FY84	FY85	FY86
AB	95	123	145	210	240	270
BO-Vanilla	26	37	60	75	80	95
VK100	-	11	17	20	20	5
TOTAL	26	48	77	95	100	100
WF-Vanilla	15	15	15	-	12	28
Special	12	26	35	45	22	12
VK100	5	3	-	-	-	-
TOTAL	32	44	50	45	34	40
FE	-	40	60	80	143	175
PN	4	-	-	-	-	-
UNRESOLVED	-	-	-	-	-	50
VANILLA TOTAL	140	215	280	365	475	618
VIDEO TOTAL INCLUDING SPECIALS	157	255	332	430	517	635

VIDEOS continued

VIDEO BUILD PLAN

	FY81	FY82	FY83	FY84	FY85	FY86
VT100-AB	90	53	5	-	-	-
BO	26	37	35	25	20	-
PN	4	-	-	-	-	-
WF	15	15	15	-	-	-
TOTAL	134	105	55	25	20	-
VT132 (ALL AB)	6	10	-	-	-	-
VT101 (ALL FE)	-	40	60	80	70	70
VT102-AB	-	20	30	20	25	20
BO	-	-	25	50	60	60
TOTAL	-	20	55	70	85	80
VT131 (ALL AB)	-	40	110	140	150	143
VT200-AB	-	-	-	50	65	107
BO	-	-	-	-	-	35
WF	-	-	-	-	12	28
FE	-	-	-	-	73	106
"X"	-	-	-	-	-	50
TOTAL	-	-	-	50	150	325
VT100 Family Sub Total	140	215	280	365	475	618
VT103	7	8	11	11	5	2
VT125	-	11	15	20	5	-
VT134	-	1	5	10	7	5
VT173	1	3	3	4	5	5
Misc.	4	3	1	-	-	-
Video Specials Sub Total (All WF)	12	26	35	45	22	12
VK100-BO	-	11	17	20	20	5
WF	5	3	-	-	-	-
TOTAL	5	14	17	20	20	5
VIDEO TOTAL	157	255	332	430	517	635

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VIDEOS continued

PRODUCT COST

The Product Cost Strategy is chiefly a Sub-Assembly sourcing strategy as follows:

- > Power Supplies - 100% Far East Build
- > Monitor - 80% Far East
  - 20% Elston through FY83
- > FY80 build in two Far East locations
- > Terminal Controller
  - Far East self sufficient
  - Albuquerque self sufficient
  - Boston to start building in FY82 and will be self sufficient by FY83
- > Keyboard
  - Boston to support Boston/Westfield
  - Far East to support Far East/Albuquerque

COST PROJECTIONS FOR VIDEO MAJOR PRODUCTS

Product Cost for the other Video Products are projected as follows:

'81-'86 Projected Average Cost

	81	82	83	84	85	86
VT100	540	560	555	572	593	-
VT101	-	446	421	442	464	485
VT102	-	531	527	545	`565	595
VT103	823	812	821	867	906	1000
VT125	-	1136	1137	1190	1240	-
VT131	-	535	531	549	569	600
VT134	-	820	775	815	885	975
VT173	-	1585	1665	1700	1700	1785
VT200	-	-	-	650	650	630
VK100	-	625	635	655	680	715

VIDEOS continued

VIDEO PRODUCTS DOLLAR OUTPUT

TO TPG AND FA&T (97% OF TOTAL)

($K)	FY81	FY82	FY83	FY84	FY85	FY86
VT100/132	73332	62468	29609	13871	11504	-
VT101	-	17305	24502	34299	31506	32932
VT102	-	10301	28115	37005	46584	46172
VT103	5761	6496	9031	9537	4530	2000
VT125	-	12496	17055	23800	6200	-
VT131	-	20758	56658	74554	82790	83226
VT134	-	820	3875	8150	61955	4875
VT173	1585	4755	4995	6800	8500	8925
VT200	-	-	-	31525	94575	198608
VK100	-	7880	10470	12710	13190	3470
Misc.	3880	2910	970	-	-	-
TOTAL	84,558	146,189	174,810	252,251	305,574	380,208

VIDEOS continued

QUALITY

Product Performance

> FY81 -Present accumulated (3 plant) MTBF of 3700 hrs.
-Problems identified that when corrected could give 5000 hours MTBF and reduce in-plant burn-in.
-Present index of quality level of 95%

> FY82-83 -Obtain Field Service MTBF data (evaluate true MTBF)
-Reach a 98% Index of Quality Level

> FY84-85 -Achive 5,000 hours MTBF
-Reduce inspection/audit and maintain 98% I.Q.L.

Incoming Inspection

> Not yet addressed as a group issue. Will start in FY 81.

Dock Merge

> All new Video Products are planned to be dock mergeable three months after first volume ship.

> The VT100 has achieved Dock Merge Certification in Boston, Westfield, and Albuquerque.

Direct Ship

> Direct Ship to customers will begin with printers in Phoenix in FY81. When this is running smoothly it will be extended in videos, probably in FY82.

> There are many outstanding issues between Videos and TPG. The Main one being TPG wanting warehouse space to ship to customers and videos would prefer to ship directly from manufacturing.

VIDEOS continued

CUSTOMER SERVICE

> Delivery

- Delivery to customers will be a minimum of 95% measured by mix each month.

> Flexibility

- There will be a six month frozen period where no changes will be considered. The next three months will be negotiated with a possible charge for major changes.

> Repair Strategies

- VT Monitor - Each plant will continue to swap defective sub-assemblies and return them to the Far East.

- Keyboards-Boston will be responsible for keyboard repairs.

- Terminal Controller will be returned to the original point of manufacturing except in the case of Far East products which will be repaired in Albuquerque.

- Power Supplies - Albuquerque will be responsible for power supply repairs.

- Unit Level - complete video returns will be to the plant which FA&T line completed the unit, with the exception of Phoenix and the Far East which will be sent to Albuquerque.

- The issue of cross-charging to support this Repair Strategy has yet to be negotiated.

MICROS STEERING GROUP - BILL WOODARD CHAIRMAN

CHARTER

Insure that the marketing and manufacturing plans for micro products are co-ordinated and that the micro's manufacturing plan supports both marketing goals and group manufacturing goals. Also to provide a forum to work other dependencies such as CPU Group, LSI Group, Central Design Engineering.

PRODUCTS/CUSTOMERS

Primary - MPG's module products

Secondary - Module options for 11/Ø3, 11/23 to FA&T Product Lines
- Volume to volume
- Field service for above

SPECIFIC ACTIVITES

- Communicate and measure MPG forecasts
- Set Manufacturing plans to support market goals
- Manage key vendor manufacturing strategies
- Set new product plans
- Manage capacity/location/process strategies
- Manage assets required
- Developed product cost

MICRO'S STEERING COMMITTEE MEMBERSHIP

Bill Woodard-Chairman
Jack MacKeen
MPG Staff
Chris McGill
Albuquerque Staff
Dick Loveland
Roy Moffa
Mike Titlebaum
Herb Shanzer
John Kuuach
Ed Schmid
Mark Abbett
Gora Dutta

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MICROS continued

KEY ASSUMPTIONS

> MPG will get on track with "CPU dominate" charter with FY81-83 being bridge years

> One year delay on major new products

> Albuquerque will vertically integrate into hybrid process

> KDJ11 (JAWS) is key board level MPG proudct and Albuquerque will build for MPG

> Albuquerque Plant appears level through FY83 so:

1) Willing to give FA&T options to CPU group when Albuquerque growth allows. Options included in CPU group plans after FY83.

2) Options included in this plan through FY83

3) Will solidify transfer plans this year

	FY81	FY82	FY83	FY84	FY85
AB Plant Hours	1025	1073	1189	1503	1732

MICROS continued

TOTAL UNIT BUILD PLAN

	FY81	FY82	FY83	FY84	FY85	FY86
KD11-F	1	0	0	0	0	0
KD11-HA	34	33	33	33	27	18
KDF11-AA	36	40	60	65	44	26
SUB TOTAL	71	73	93	98	71	44
KXT	0	12	25	35	52	46
MSBC	0	0	4	31	52	86
KDJ11	0	0	0	5	26	53
NEBULA JR	0	0	0	3	7	8
CSP11 CHIPS	0	0	1	3	7	20
TOTAL	71	85	122	175	215	257
%GROWTH		21%	44%	43%	23%	19%
MAJOR OPTIONS	184	225	283	343	384	
OPTIONS RATIO	2.01	1.84	1.62	1.31	1.31	

* PlANT X ASSUMED 20% FY85 CPU's & 30% OF FY86 TOTAL UNITS

PRODUCT COST PROJECTIONS KEY PRODUCTS

	FY81	FY82	FY83	FY84	FY85	FY86
KD11-HA	146	141	144	150	156	161
KDF11-AA	225	228	227	236	247	256
MXV11-AA	164	165	165	162	168	174
MXV11-AC	204	187	193	189	198	205
DLV11-F	104	105	105	102	106	110
DLV11-J	114	107	111	114	119	123
DRV11-B	102	103	105	106	106	110

MICROS continued

MICRO'S OUTPUT PROJECTION

($ MILL.)	FY81	FY82	FY83	*FY84	*FY85	FY86*
FA&T	3.94	3.90	3.54	-	-	-
MPG	22.95	26.36	41.42	62.78	82.32	108.00
SUB-TOTAL	26.89	30.26	44.96	62.78	82.32	108.00
VOLUME	4.63	6.19	8.01	4.34	4.41	4.50
OTHER	5.94	6.40	9.05	10.10	13.38	15.00
TOTAL VOS	37.46	42.85	62.02	77.22	100.11	127.50
% GROWTH		14%	45%	25%	30%	27%
% TFR. COST CHANGE	-	-6%	+10%	-3%	+12%	+10%

**FY 84 and FY85 and FY86 do not contian output for Plant X or FA&T

PLANT X BUILD PLAN MPG

	*FY84	FY85	FY86
UNITS	8K	34K	188K
HOURS	10K	50K	225K
PEOPLE	20	40	135
EFFECTIVITY	50%	75%	80%
OUTPUT*	0	6M	28M

*Assumes Start-Up Q3 of FY84

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MICROS continued

OUTPUT HOURS FORECAST (000 HOURS)

	FY81	FY82	FY83	FY84	FY85	FY86
FA&T SALEM	20	20	15	0	0	0
WM	31	31	31	0	0	0
MPG	249	247	347	484	580	696
SUB TOTAL	300	298	393	484	580	696
VOLUME	56	75	87	79	71	71
OTHER	22	15	23	22	27	32
*TOTAL	378	388	503	585	578	799
LABOR	(23%)	(14%)	(8%)	(8%)	(5%)	(5%)
EFFECTIVITY	80%	80%	80%	80%	80%	80%
*DL	225	231	300	363	420	495
%GROWTH	3%	30%	31%	16%	18%	

*MI AND MODULE SERVICES HOURS FOR VIDEO'S AND GENERAL BUSINESS NOT INCLUDED

DEMAND ON CAPACITY (000 HRS)

	FY81	FY82	FY83	FY84	FY85	FY86
AB PLAN	378	388	503	649	747	799
PLANT X PLAN				10	50	225
TOTAL	378	388	503	659	797	1024

Asset Plan

> Through FY85 capacity is primarly limited by the pipeline for custom chips and the impact of high technology P.C. boards on board ship capacity.

> For this plan capacity in AB is not a limiting item based on current projections.

> Custom chip pipeline is being addressed through Hybrid Assembly strategy and the simplication of incoming inspection.

> Board shop capacity is beginning to be addressed with the Terminal P.C. Boards Committee.

MICROS continued

CUSTOMER SERVICE

DELIVERY - Maintain 100% +/- 5% per month

FLEXIBILITY GUIDELINES

0-6 MONTH	6-2 MONTH	12-24 MONTH
0%	15%	See Capacity Plan

REPAIR STRATEGY

> Reponsible for Insuring repair capability for all products we source.

> Currently repair 50% of products in Albuquerque and 50% in Woburn.

> Plan to repair all Albuquerque sourced products in Albuquerque.

PRODUCT PERFORMANCE

> Maintain 98% quality level at Customer Site.

DOCK MERGE

> Certify 3 - 5 options per quarter.

SHIP TO STOCK

> Not yet addressed by group. Should establish goals in FY81.

INCOMING INSPECTION

> Not yet addressed by Group. Should establish goals in FY81.

DROP SHIP

> Micros options are currently drop shipped by MPG. The ability to drop ship options from Albuquerque, based on dock merging 3-5 options per quarter, will come in FY82. The decision to drop will be based on cost, systems manageability to MPG/Albuquerque willingness.

SMALL SYSTEMS STEERING - RON CAJOLET,CHAIRMAN

Committee Objectives

- Identify the small systems which affect Terminals group.
- Resolve the overlap with fixed function terminal and Video.
- Drive resolution of overlap with other group charters.
- Establish working relationships with Central Engineering and Product Lines who will focus on small systems.
- Understand the Corporate Distribution strategy and its affect on Westfield (S/R 328).
- Recommend strategies and supply forecast of all non-terminal or non-Video options and systems which affect the Terminals group.

Committee Membership

- Manufacturing
  - Ron Cajolet, Chairman
  - Susan Holmes, WF Plant Rep.
  - Bill Doolan, AB Plant Rep.
  - John Clark, BO Plant Rep.
  - Les Goldman, PN Plant Rep.
  - Dawn Greeley, Terminals Rep.
- Design Engineering
  - Herb Shanzer
  - Avram Miller
- Field Service
  - Lee Mickle
- Product Managers
  - H. Allard, Minc
  - G. Cole, VT278
  - T. Stambaugh, PDT
  - D. Jenkins
- Other Group Contacts
  - Ed Schmid, CPU Mfg. Group
  - Bill Lowe, Storage Systems Mfg. Group
  - Phil Burns, Systems Mfg. Group

SMALL SYSTEMS continued

STRATEGIES

> Westfield will plan the capacity for bounded Small Systems.

. The tactics are to have a volume Video line which has the capacity for high volume (60K units) and the flexibility to do Video based systems (VT78 and VT278 are planned for this line).

Also, to have a box line which will have this capacity and flexibility (the MINC, PDT, IS11/50 are planned for this line).

. The result will be an efficient use of human resources and capital assets.

> Bounded systems will be planned for direct ship to customer or distribution center.

. The tactics are to focus the new product effort into getting these systems dock merged within 6 months of first volume ship. Test strategies are being put in place to assure option level certification and module level option testing.

. The results will be reduced costs, lower inventories and better quality at the customer site.

> Bounded systems will follow Terminal group strategy for obtaining sub-assemblies.

. The tactics will be to build unique systems sub-assemblies at Westfield, to buy common sub-assemblies from the volume producer (Micro modules for MINC are built in Albuquerque) and to source high volume, high labor content sub-assemblies from the Far East (power supplies, keyboards and monitors are planned for the Far East).

. The result will be to minimize interplant dependencies while minimizing product cost.

SMALL SYSTEMS continued

SMALL SYSTEMS LONG RANGE PLAN

OCTOBER 1980

UNITS	FY'81	FY'82	FY'83	FY'84	FY'85	FY'86
MINC	1,900	2,400	3,000	2,000	500	-
PDT-150	3,000	-	-	-	-	-
VT78	3,300	-	-	-	-	-
VT278	600	8,000	12,000	12,000	6,000	-
IS11/50	-	-	-	10,400	45,300	84,700
D315	1,295	2,800	3,000	1,000	-	-
TOTAL	10,095	13,200	18,000	25,400	51,800	84,700
% GROWTH		30%	+36%	+41%	+103%	+64%

SMALL SYSTEMS LONG RANGE PLAN

PRODUCT COST PROJECTIONS $ @ TRANSFER COST

PRODUCT	FY'81	FY'82	FY'83	FY'84	FY'85	FY'86
MINC	2,105	2,768	3,163	3,697	4,152	-
PDT150	1,752	-	-	-	-	-
VT78	1,732	-	-	-	-	-
VT278	1,095	1,095	1,029	1,030	1,103	-
IS11/50	-	-	-	1,500	1,500	1,500
D315	1,607	1,768	2,022	2,326	-	-

SMALL SYSTEMS continued

$ OUTPUT AT TRANSFER COST

MINC	4.0	6.6	9.5	7.4	2.1	-
PDT-150	5.3	-	-	-	-	-
VT78	5.7	-	-	-	-	-
VT278	.7	8.8	12.3	12.4	6.6	-
IS11/50	-	-	-	15.6	67.9	127.5
D315	-	2.1	4.5	4.8	1.6	-
TOTAL ($M)	17.8	19.9	26.6	37.0	76.6	127.5
% GROWTH	-23%	+11.8%	+33.6%	+39.1%	+107%	+66.4%

SMALL SYSTEMS LONG RANGE PLAN

DIRECT LABOR PEOPLE

PLANT	FY'81	FY'82	FY'83	FY'84	FY'85	FY'86
Westfield						
Modules	4	2	2	62	131	212
Assembly & Test	48	41	54	75	159	265
Sub-Total	52	43	56	137	290	477
Albuquerque						
Modules	39	41	56	12	2	-
Phoenix						
Boards	7	8	10	12	23	37
Boston						
Keyboards	-	4	6	6	3	-
TOTAL	98	96	128	167	318	514

12/1/80

BOARD STEERING COMMITTEE

PREAMBLE

The Terminals Group Board Steering Committee has been in operation for one year and now feels confident that all Printed Circuit Board requirements have been identified, with reasonable accuracy, through 1986 on a square foot basis.

The charter of the Steering Committee continues to be one of recommending strategies and managing the tactics associated with supplying the total Terminals Group with printed circuit boards consistently meeting cost, quality and delivery goals.

The strategies and tactics associated with this charter are outlined below:

STRATEGY - Establish ownership of all Terminal PCBs by Q1 FY82.

TACTIC - Terminal PCBs will be obtained from the Phoenix Board Shop, through the Terminals External Boards Business, or (in the case of the Far East demand) directly from local subcontractors. A subcommittee established within the Steering Committee will develop make/buy strategies and set buy standards.

STRATEGY - Maintain or increase the output capacity of the Phoenix Board Shop regardless of mix changes.

TACTIC - Phoenix Board Shop Engineering will work process and equipment improvements to maintain or increase process quality and capacity.

STRATEGY - Keep abreast of future PCB technology as well as EPA regulations that could have a major impact on both internal and external PCB availability.

TACTIC - Establish and maintain close contact with Process Engineering, Design Engineering and Terminals Group M.E. producibility team.

STRATEGY - Monitor subcontract base to ensure long range availability of externally supplied PCBs.

TACTIC - Use internal and external (Gnostic Resource) resources to investigate long term availability from a cost, quality and quantity standpoint.

BOARDS continued

STRATEGY - In view of the move to vertical integration and the capacity cap on the Phoenix Board Shop, develop a proposal to determine whether to build a Board Shop in the United States, the Far East, or to continue to use the Tempe and Greenville Board Shops as long term suppliers of PCBs to the Terminals Group.

TACTIC - Investigate the availability of both external and internal resources in the USA and Far East for purchased boards. Also investigate the comparative costs of building a Board Shop in either the Far East or USA.

STRATEGY - Develop and implement a plan to acquire self-sufficiency for terminals producibility requirements.

TACTIC - Assign responsibility to implement transfer or acquisition of equipment space, staffing, etc. Ensure consistency and compatibility with decentralization program.

BOARDS STRATEGIES

Present Strategies

> The multilayer and fine line production in Phoenix at 143K ft^2.

> Plan to purchase multilayer and fineline from other sources by FY83.

> All Terminals subcontracting (including Tempe & Greenville) will be managed by TEBB and this will account for 75% of the requirement in FY86. The remaining 25% will be produced in the Phoenix Board Shop.

> Make/buy issues are currently being worked by a subcommittee of the Terminals Boards Steering Committee.

Planned Sq. Ft.

The output of standard density, high density, multilayer and fine line boards planned for Phoenix is:

(K SQ FT)	FY81	FY82	FY83	FY84	FY85	FY86
S.D./H.D.	452	505	505	505	505	505
M.L./F.L.	143	143	143	143	143	143

BOARDS continued

Far East

The issue of the Far East as a supplier of domestic Terminals Group board requirements is currently being worked.

TERMINALS TOTAL BOARD REQUIREMENTS

(K SQ FT)	FY81	FY82	FY83	FY84	FY85	FY86
High Density	411.6	499.0	588.9	634.0	615.7	669.0
Standard Density	406.6	370.8	403.3	519.4	550.1	582.0
Fine Line	20.2	36.5	70.4	107.8	154.9	175.0
Multilayer	42.4	59.6	67.3	85.3	112.3	147.0
Sub Total Domestic	880.8	965.9	1129.9	1346.5	1432.7	1573.0
Management Adjustment	46.4	170.5	282.5	448.8	614.0	847.0
Total Domestic	927.2	1136.4	1412.4	1795.3	2046.7	2420.0
% Growth		22.6	24.3	27.1	14.0	18.2
Far East	200.0	360.0	450.0	600.0	800.0	1000.0
Total World	1127.2	1496.4	1862.4	2395.3	2846.7	3420.0
% Growth		32.8	24.5	28.6	18.8	20.1

BOARDS continued

HIGH DENSITY REQUIREMENTS

	FY81	FY82	FY83	FY84	FY85
PHOENIX	213.Ø	244.Ø	279.2	297.3	279.8
WESTFIELD	3.5	3.5	3.5	3.5	3.5
AB GB	18.5	19.6	22.6.	32.4.	18.3
AB VIDEO	126.8	171.7	137.6	162.9	169.2
AB MICROS	49.8	44.7	56.Ø	63.Ø	67.3
BOSTON	Ø	15.5	9Ø.Ø	74.9	77.6
TOTAL	411.6	499.Ø	588.9	634.Ø	615.7
% GROWTH		21.2	18.Ø	7.7	(2.9)

STANDARD DENSITY REQUIREMENTS

	FY81	FY82	FY83	FY84	FY85
PHOENIX	3Ø7.1	218.7	236.1	242.Ø	2Ø2.7
WESTFIELD	9.2	9.2	9.2	9.2	9.3
AB GB	17.3	8.3	11.Ø	12.3	14.Ø
AB VIDEO	9.8	6.5	4.5	5.2	5.4
AB MICROS	.3	.2	Ø	.1	.1
BOSTON	62.9	127.9	142.5	25Ø.6	318.6
TOTAL	4Ø6.6	37Ø.8	4Ø3.3	519.4	55Ø.1
% GROWTH		(8.8)	8.8	28.8	5.9

BOARDS continued

FINE LINE REQUIREMENTS

	FY81	FY82	FY83	FY84	FY85
PHOENIX	Ø	Ø	Ø	Ø	Ø
WESTFIELD	Ø	Ø	Ø	Ø	Ø
AB GB	.4	.4	1.6	1.3	4.5
AB VIDEO	Ø	Ø	Ø	7.1	23.2
AB MICROS	19.8	36.1	68.8	97.7	126.9
BOSTON	Ø	Ø	Ø	Ø	Ø
TOTAL	20.2	36.5	70.4	107.8	154.6
% GROWTH		80.7	92.9	53.1	43.4

MULTILAYER REQUIREMENTS

	FY81	FY82	FY83	FY84	FY85
PHOENIX	Ø	Ø	Ø	8.Ø	38.Ø
WESTFIELD	4.Ø	4.Ø	4.Ø	4.Ø	4.Ø
AB GB	17.2	24.Ø	27.Ø	29.7	21.Ø
AB VIDEO	Ø	Ø	Ø	Ø	Ø
AB MICROS	21.2	20.1	18.5	22.8	28.5
BOSTON	Ø	11.5	17.8	20.8	20.8
TOTAL	42.4	59.6	67.3	85.3	112.3
% GROWTH		40.6	12.9	26.7	31.7

MODULE STEERING GROUP - LES GOLDMAN, CHAIRMAN

GENERAL

During FY80 a committee was formed (Terminals Group Module Steering Committee) with representatives from each Terminals Group Plant, the Group Staff and Corporate Process Management in an attempt to focus discussions with respect to group module strategies and capacities. The Committee is responsible for creating tactical plans in support of Group strategies. If these strategies are seen as inappropriate, the Committee proposes changes to those strategies. Specific tactical plans are included in the discussion of each plant. However, in general, the Steering Committee is operating with the following goals:

1. Assure that adequate capacity exists or is planned to meet Terminals Group needs.

2. Minimize total module costs for the group by optimizing product and process technology.

3. Minimize interplant module dependencies by more closely aligning Module Business Charters with their respective plant charters.

4. Position the Module Business such that Process Certification becomes a reality.

SPECIFIC

Module Business Charters

WESTFIELD

Currently chartered to produce low volume, high mix video modules for Westfield consumption including MINC Modules. The business has been capacity constrained at 300K hours per year which necessitated receipt of various higher volume non-vanilla video modules from Albuquerque. The business is currently on a path to expand its capacity to 450K hours per year to be fully in place by Q1 FY84. The strategy is to begin to move modules which are currently built in Albuquerque (and new products originally destined for Albuquerque manufacture) strictly for Westfield consumption to Westfield manufacture as their additional capacity comes on line. In addition, MDC modules will be transferred to Augusta by Q1 FY83 end.

MODULES continued

ALBUQUERQUE

Currently chartered to produce high volume vanilla video modules, micro product modules, and Westfield "non-vanilla" volume video modules. This charter will remain unchanged except for their support of Westfield non-vanilla modules which will end by Q1 FY84.

BOSTON

Currently chartered to produce video keyboards only. Beginning in FY82 Boston will assume responsibility for VK100 keyboard and terminal controller. In addition, during FY82 Boston will begin to assume responsibility for VT100 options currently built in Phoenix and total responsibility for VT100 modules as Albuquerque prepares to phase over from VT100 to VT200 manufacture during FY83.

PHOENIX

Currently chartered to supply all modules for Phoenix printer consumption, support Westfield printer module requirements and supply video options to Albuquerque. The phase out of video options will be complete during FY82 and will be transferred directly to Boston.

CAPACITIES

Planned capacities (including commitments in Far East facilities) FY81 through FY83 exceed current perceived demand. FY84 through FY86 appear not to strain capacities but require further refinement to reflect more clarity in build requirements and the impact of productivity increases. We believe that upside flexibility is provided through:

1. Currently no third shift usage in Module Manufacturing in the Terminals Group.

2. Subcontracting is being used minimally in the group today. Downside flexibility is currently provided through limited subcontracting and the use of "temporary" workforces in both Phoenix and Albuquerque.

3. Possible greater use of Far East Manufacturing.

MODULES continued

TOTAL MODULE DEMAND

(X1000 Hrs)

@ Constant FY81 Stds.

PLANT	FY81	FY82	FY83	FY84	FY85	FY86
WF	242.0	175.0	177.0	402.0	477.0	464.0
BO	93.0	226.0	473.0	538.0	550.0	585.0
AB	1078.0	1166.0	1482.0	1746.0	2035.0	2035.0
PN	884.0	900.0	1121.0	1479.0	1676.0	2070.0
TOTAL	2297.0	2467.0	3253.0	4165.0	4738.0	5154.0

MODULE DEMAND ON F.E.

(X1000 Hrs)

@ Constant 81 Domestic Stds.

PLANT	FY81	FY82	FY83	FY84	FY85	FY86
WF	37.0	56.0	92.0	51.0	19.0	19.0
BO	49.0	70.0	148.0	151.0	152.0	180.0
PN	109.0	113.0	158.0	278.0	317.5	468.0
AB	248.0	318.0	442.0	522.0	541.0	541.0
TOTAL	443.0	557.0	840.0	1002.0	1029.5	1208.0

TERMINALS FABRICATION STEERING GROUP - RALPH SEYMOUR, CHAIRMAN

The Terminals Fabrication Steering Group is comprised of representatives of the Terminals Group, Functional Purchasing, New Products Purchasing, and Process Management.

CHAIRPERSON

Ralph Seymour	WF

COMMITTEE MEMBERS

Chuck Blasi	AB
Ron Quiring	AB
Bill Middlebrooks	BO
Fred Forsyth	ML
Bill Luisi	ML
Bob Martin	ML
Fred Oldfield	ML
Steve Qually	ML
George Wood	ML
Stan Znamierowski	ML
Ken Poe	PN
Pete Govoni	WF
Dale Reid	WF
Hank Tucker	WF

The Committee is chartered to:

A. Identify and manage FAB strategic issues in order to prevent such issues from becoming operational problems.

B. Be the forum to surface issues, make and communicate decisions to the Terminals Group and other committees.

C. Own the responsibility for developing a Terminals Group strategy and subsequently relating it to the Corporate Fabrication strategy. Specific areas are internal metals and plastics build.

D. Understand product volume projections and make decisions to allow the Terminals Group to cope. (Accordingly, a means of COMMUNICATION that is EFFECTIVE will be developed.)

FABRICATIONS continued

ASSET UTILIZATION

The estimated Terminals Group demand for the Mechanical FAB Process '80-'86 ($MIL):

	'81	'82	'83	'84	'85	'86
*	41.3	47.4	55.3	71.9	93.0	120.9

*Excludes FA&T cabinet demand, e.g. Corporate cabs.

The FY'81 corporate demand is 60% sheet metal, 25% injected molded plastics, 15% other fab processes.

The Terminals demand is heavier toward plastic and less toward other Fab processes.

Westfield is the only internal Terminals Group supplier of fabricated metal parts.

WF METALS OUTPUT ($MIL) OF CURRENT FACILITY

'81	'82	'83	'84	'85	'86
33.0	36.0	43.0	43.0	43.0	43.0

The output is distributed throughout the corporation as follows (FY'81):

FA&T	73% growing --> '86
Terminals	13% decreasing
CPU	8% constant
Mass Storage	6% decreasing

FABRICATION continued

A decreasing amount of the Terminals fab needs will be made by the internal facility, i.e. Westfield Metals, because an increasing percentage is focused toward supplying enclosures to FA&T. However, much of the Terminals Group Fab demand is not applicable to the current internal capacity, because of the heavy percentage of plastic in Terminals products.

The asset focus of this committee is presently slanted towards evaluating the feasibility of an internal plastic molding capability (complete by end of Q2, FY'81).

The intent of this evaluation is to focus on better utilization of inventory, i.e. reduced inventory levels; and enhance space utilization and capital equipment utilization.

In the future, this committee will also evaluate the need for additional internal metals capability.

FABRICATION continued

CUSTOMER SERVICE

Delivery and flexibility are major considerations of the internal plastics and metals capability.

Considerations are uninterrupted flow of material and improved mix flexibility.

A Tooling Business Plan is under consideration by the committee with the intent of reducing lead time for new tooling. Reduced lead times will enhance deliverability and flexibility around the introduction of new products into manufacturing.

COST

The implicit strategy is to rely on outside vendors for the large majority of our fabrication needs. Therefore, the major cost emphasis is on aggressive purchasing strategies within the group purchasing function. An expanded vendor base is implied. Development of the specific purchasing strategies is left primarily to the appropriate commodity steering groups, e.g. Eastern Metals Committee, Western Metals Committee, etc.

The strategy of this committee is to attack cost through focus on distribution cost via input on: vendor base, possible future internal capacity addition (in-house plastics and metals) and recommendations on new Terminals product build location.

QUALITY

The strategy is to drive towards uniform Incoming Inspection criteria, especially regarding purchasing of fabrication for multi-plant usage, e.g. VT100 Chassis.

FABRICATION continued

CAPACITY

The strategy is to understand the Terminals Group demand by plant location and develop a demand/risk analysis for each plant (complete Q2, FY'81).

The committee has reviewed the corporate demand/risk analysis, which shows that the existing vendor base is sufficient to meet corporate needs through FY'83. Additions to this vendor base are being worked by the various purchasing committees, and capacity is not viewed as a constraint through FY'86.

However, Terminals plant specific analysis and understanding is expected to yield cases of considerably more risk and cases of specific opportunities.

The Westfield Enclosures business will occupy the majority of the Westfield capacity (see above).

MAJOR ASSUMPTIONS

The Terminals Group fabrication demand is forecastable by dollar demand in metals and plastics.

The DEC vendor base, as it exists today, is readily expandable to meet our needs through FY'86.

The importance of vendor base location will grow to be even more critical in supplying the Terminals Group fabrication needs economically.

TEST STEERING GROUP - VAHRAM ERDEKIAN, CHAIRMAN

OBJECTIVES OF THE TEST STEERING GROUP:

- Determine the current test strategy and processes with respect to capital assets, people assets, and technology. Understand (define if need be) the future needs for the Terminals Manufacturing Group processes. Based on the above, make sure that the change needed is identified, directed and managed.

- Provide a forum for Terminals Manufacturing operations to share and communicate testability issues with each other.

- Identify and ensure that resources are assigned and monitored.

- Membership of Steering Group consists of:

Chairman,	Vahram Erdekian
AB	Matt Tynan Dick Shutzberger
PN	Jack Delbrocco Chris Shatara
BO	John Clarke Emmanuel Tucker
WF	Tony Basso Mike Whittlesey
Group	Lou DiFinizio George Wood
Central	Rich Powers Ed Gianetto

TEST continued

GOAL: Maximize test asset utilization in the Terminals Group.

STRATEGY: Assure the existence of a cohesive strategy for the Terminals Manufacturing Group.

PROGRAMS: Establish subcommittee to develop strategy - Q1 FY81.

Review current product test strategies and understand future product test needs. Based on the above, ensure the existence of advanced (E97) development projects where the gaps are covered.

GOAL: Provide dock mergeable, high quality subassemblies.

STRATEGY: Assure the existence of total product test strategies for the next generation new products.

PROGRAMS: Evaluate alternative data utilization and action processes through the quality subcommittee.

Work with plant Quality and ME organizations to put together a group wide (multiplant) closed loop data collection and utilization system.

AFFIRMATIVE ACTION/EEO COMMITTEE-DAVE DEMORANVILLE, CHAIRMAN

ABSTRACT

The committee was formulated as a supplemental alternative to increasing the focus around AA/EEO issues within the Terminals Group. The membership consists of individuals at influential levels of each one of the Terminals Group Plants. The following paragraphs deal with the specific goals the committee has chartered itself with, as well as some of the proposed tactics it plans to implement over time to achieve these goals.

PURPOSE

To better understand our current position relative to Affirmative Action/EEO, and to influence positive changes within the Terminals Group.

STRATEGY STATEMENTS

- Drive towards getting parity at all levels of the organization. This means more than just within the broad ranges of the formal government categories.
- Be focused around the development of tactics that the group staff supports, and to insure that these tactics are driven through the plants.
- We see our efforts as an enhancement to the activities that are currently being planned in each of the plants; i.e. we are an incremental effort and not a replacement for any on-going activity.
- We are directing our efforts both from a long and short term standpoint simultaneously rather than serially. The results of these efforts (positive and negative) will serve to enhance the other.

AFFIRMATIVE ACTION continued

CURRENTLY PLANNED TACTICS

There are two fundamental tactics that we are focusing on. One is to generate a program within the Terminals Group that addresses personal awareness relative to working in managing a multi-cultural work environment. The content of this program will be targeted at all of the exempt work force within the plants/group. In developing this awareness program, outside consultants as well as internal DEC resources (Barbara Walker as an example) are being utilized in the development of the program. The formal design of the program is in its conceptual stages, and issues of presentation format, actual program outline, who will present the program, etc., are being addressed. We, as a committee, see this effort being ready to implement within the next 12 months.

The other major tactic is to identify "fast track" minorities and females in various levels of the organization, and to develop formal plans for development into the next level job. To execute this element of the strategy, emphasis will be given to insuring there is a system in place that will offer the level of support and commitment that is offered to other progressing professionals. Close scrutiny will be given to the overall human resource plan of the plants/group, to make sure these potential promotions will be filling real needs. It is the feeling of the committee that this process will address key issues such as retention, and will begin to establish an informal support system that will be self-strengthening over time.

PLANT PLANS - INTRODUCTION

This section summarizes the Plant Plans within the Terminals Mfg. Group covering Goals, Dependencies, Risks, Opportunities and Major Assumptions for each Resource Plan. Full plant plans are available and will be published internally. In the interest of addressing the most significant issues we have extracted the key parts to each plan as follows:

Although not part of the Terminals Mfg. Group, the Far East is included as a plant plan. It represents a significant piece of our cost strategy. The Far East section is the result of collaborative planning with the Far East Group and, therefore, matches their plan for the Terminals Mfg. Group.

The demand for Terminals boards is such that we are showing a Terminals Board Shop in FY84 in our Resource Plan (location not yet determined). This issue will be worked by the Boards Steering Group. We also are making a statement in support of a probable future European Terminals plant by showing some output ($20M in FY85 and $60M in FY86) from "Plant X". This is an assumption which was necessary in the absence of a decision. The agreement with Systems Mfg. is that they will plan the resources for "Plant X".

CAUTION: The Terminals Group Plan includes a sizeable management adjustment to realign the plan with the latest (mid-November) revision of the output targets for FY82-84. It came much to late in the planning process to ask each plant to rework its entire resource plan. Therefore, we will drive the resizing effort in Q3 FY81.

ALBUQUERQUE PLANT

ALBUQUERQUE PLANT CHARTER

Albuquerque plant uses the following as a context in which to make decisions and influence others:

Business

- Retain dependence on both the Micros and Video terminals market places so as to minimize market exposure.
- Be prime manufacturer for baseline Video terminals and Micros modules.
- Provide other module capacity as the Terminals Group may require, to maximize overhead absorption and minimize the affects of growth or reduction.
- Be vertically integrated sufficient to achieve a balance of a critical mass of expertise (cost) and control of our destiny (for the reduction of inventory throughput and expeditious movement of technology to market).

Human

- Achieve, over time, a profile at all levels of minorities and women which is reflective of the community. Our intent is to achieve the more aggressive interpretation of "community" which may mean city, county, state or region.
- Provide a work environment which is supportive of human growth, recognizes personal worth, promotes excellence and recognizes the totality of our employees' lives.
- Be a responsible corporate citizen in the community.

ALBUQUERQUE continued

RISKS/ISSUES/CONCERNS

The value of this plan is that the process involved all of the functions in the plants and generated substantial cross functional integration. The plan represents our best management judgement in terms of the operating environment and the present output plan. We do, however, expect this plan to change, especially as we implement the lessons we learned during the preparation. Clearly, we must enact change in the areas of resource planning and product cost in order to achieve more acceptable outcomes.

The key facts contained in this plan are as follows:

	81	82	83	84	85	86
VOS Output($)	124	151	175	211	252	285
Load (000's Hours)	996	1038	1184	1398	1583	1758
Build Numbers:						
-Video FA&T	95	123	145	210	240	270
-Micro's CPU's	71	85	122	175	215	257

($ in millions, all others in 000's)

The key long term programs reflected in this plan are:

- Focus on product cost.
- Introduction of Hybrid Chip process.
- Support of self sufficient module strategies for Boston and Westfield.
- Expansion of the facility to improve throughput and increase our ability to handle bulk raw material resulting from the 84% increase in VOS during this period.
- Establishment of management processes to achieve coordination of goals and greater horizontal communication within the organization.

These programs are discussed in greater depth in the full plan.

The planning process has heightened our awareness of two issues which are at the heart of our continued success.

The first is our inadequate overhead absorption during most of the 82-86 period. In FY82 alone, we require 300,000 hours (30%) additional load to sustain our 81 ending run rate, continue our overhead trends and absorb the decreases in labor standards we anticipate.

We need substantially better mix forecasts from Marketing, whether it be Videos vs. Printers as a mix of terminals or CPU's vs. Mass Storage as a mix of Micros sales dollars.

ALBUQUERQUE continued

The second issue involves a series of decisions and trends which come together as we attempt to accomplish long range human resource planning for indirect labor. These decisions involve:

- Balancing functional needs and the demands of product cost.
- The uncalculated effects of decentralization.
- Understanding the career path conflicts set up by our concurrent needs for more functional expertice and broader, cross-disciplined general managers.
- The need for a training and development strategy which is balanced between specific functional skills and the "tone" we need to support within the organization.
- Our increasing desire to reflect the community's multi-cultural makeup at all IL levels.
- Integrating our college hiring desires with what currently looks like a three year "no growth" plan.

There are two key issues embodied in the population portion of this plan. The first is that the direct labor numbers, which could be achieved through attrition, are unacceptable. This area is clearly more objectionable than the under absorption in FY82 to which it is related. Resolution will be pressed with the group and Steering Committees.

The second issue which would result from implementing this plan is that our shifting plan produces several unacceptable profiles. The problems forcing re-examination are:

- Current 1st shift headcount exceeds needs on that shift over time.

- We are not fully absorbed and therefore any third shift is questionable.

- We need to understand the shifting issues in relation to flextime.

A key exposure to the Albuquerque plant is an insufficient understanding and knowledge of the market potential. For the most part, these forecasts are only remotely or verbally supported by market plans. A key area for improvement is the forecast of mix of video and printers within the terminals numbers. Further, new product slips continue to plague our competitive posture. Few groups within the company appear to have aggressive programs to reduce the new products bureaucracy which has been assembled over time.

Our dependency on the Far East and LSI groups is extreme in terms of product cost sensitivity.

ALBUQUERQUE continued

OPPORTUNITIES

The product cost projections in this plan are not acceptable. The planning process, however, has pointed out various avenues to attack these costs. These strategies show up through the entire plan. Those strategies requiring external influencing are summarized in the "Analysis" section.

The sourcing of material is an area that is subject to constant change and is the weakest area of our planning model. The assumptions of P.C. Board and LSI $ content are very gross cuts at this data. It is not clear that any substantial progress will be made in these areas over the next few years in terms of the planning models. Further, we believe that our product cost pressures will force increased self dependence at a time when subassembly suppliers (within Digital) have substantial growth plans. We believe their plans are not tied sufficiently to product cost plans and needs. The reduction in incoming test and increased PPS vendor responsibility are fertile areas for cost and acquisition expense reduction.

Substantial changes in methodology of procurement, transportation and delivery, receipt and inspection of most of the component parts are envisioned in order to be successful. In addition, in the engineering design of products beyond the VT1ØØ, careful attention to testability will be required as well as the ability to rapidly mature the product. Burn-in must not exceed four hours, preferably none.

The decentralization discussions might be most improved if there was more of a balance between cost, control and time to market considerations.

Relatively few changes in process and test technology are anticipated over the next five years in the Micros business. The principle exception being the introduction of the hybrid process into the Albuquerque facility. This chip carrier on a ceramic substrate will continue to grow in significance in the latter part of the 198Ø's.

> The hybrid chip is in the technology of the future. The next five years will see its application embrace products worth billions of dollars.

> Albuquerque is the prime Video source and many Video products are being designed to utilize hybrid chip capabilities. The advantage to the product is processing speed and P.C. real estate. The advantage to the plant is control.

ALBUQUERQUE continued

> This technology, as it exists today, is still in its infancy. Many opportunities exist to build a fully automated manufacturing line for hybrid products built completely through test.

> Potentially high volumes and compact size offer the opportunity for developing innovative material handling techniques that could be applicable to a wider and more diverse range of products.

ASSUMPTIONS

> Build numbers are based on Product Steering Committee plans presented at Dennisport 9/80 as amended. Additional cuts in Westfield support for the General Business are expected. All new products are expected to be one year late.

> Transfer all systems P/L options to the CPU Group FY84.

> Plant X builds micro products starting in FY84.

> Albuquerque vertically integrates to hybrid chips.

> Assume that all Westfield unique modules would be transferred to Westfield in FY84.

> SB11 Phase I will be built in Albuquerque through FY86. SB11 Phase II will be built in CPU group (coordinated with Ed Schmid).

> VK100 CPU board will transfer to Boston in Q1 FY82. We will build some excess inventory of modules in Q1 FY82 to facilitate the transfer.

> Our estimates also assume that several key programs within the Plant and Steering Committees are successful:

. Lower average labor cost per hour through increased use of Assembler I's.

. Indirect labor hiring will be managed to achieve the overhead rates.

. Purchasing is providing goals, assisting in analysis and pressuring other Digital Plant suppliers.

. Support functions have shifted focus from labor standards reduction to material cost reduction.

ALBUQUERQUE continued

- Obtain substantial cost reduction through maximized Far East penetration at both subassembly and raw material procurement levels.
- Vertical integration into hybrid chips to increase control, throughput and reduce cost.
- Aggressive participation in Group process committees to press for aggressive cost strategies.
- Reduction of component test costs by the use of "in Albuquerque testing".
- Frequest analysis and implementation of direct shipment of IC's bypassing incoming test.
- Dock to stock programs.

> Based on current projections of Video product volumes over the five years of concern growing from 95,000 per year to over 240,000 by FY85, with a daily rate of approximately 1100 per production day, the plan assumes additional space will be required in the Albuquerque facility. Despite combining three major high cube components from the Far East (power supply, monitor and chassis) into a simple carton and reducing the inventory levels of six other high cube items to four weeks, it appears, at the time of this report, that this additional space needs to be ready for occupancy in 1984. An addition of approximately 125K square feet of high bay (height as yet undetermined) storage space will be required. It is thought that such an addition will provide for the needs of the Albuquerque Plant thorugh FY87 to perhaps FY90.

> Current thinking anticipates the design of a modular production line capable of producing 1400-1500 Video terminals per production day, accompanied by a highly automated warehouse facility capable of rapidly receiving, storing, dispersing and delivering the lightweight, but bulky major components of a Video terminal.

BOSTON PLANT

BOSTON PLANT CHARTER

Statement of Philosophy

> The Boston Plant recognizes the need to balance the community needs and those of Digital Equipment Corporation.

> The Plant proposes to create a positive impact on the Boston community:

- The Plant commits itself to developing methods for its multi-cultural environment to be enriching to its employees who have a variety of experiences to share.
- It will employ and train people from the Boston community so that its people gain technological experience in a profitable, high growth manufacturing environment, producing cost competitive products.
- The work force will be multi-cultural. A 65%/35% minority/non-minority mix will be maintained.
- There will be proper representation of females and handicapped people.

> Boston is committed to producing low-cost, well manufactured, dock-mergeable products.

> Boston will strive to provide customer satisfaction through responsive, effective customer interfaces and to deliver products on a timely basis.

> It will maximize assets:

- Human resources
- Building
- Equipment
- Inventory

> It will develop its human resources with the skills necessary to produce low-cost, quality products and to earn upward career mobility with DEC and outward mobility into other oganizations.

BOSTON continued

STATEMENT OF PURPOSE

> Trends

- Boston recognizes certain important trends in the terminals products strategy which will influence Boston's own build strategies. In general, Boston recognizes a trend towards parts becoming common within the same product family such as the commonality between VT100/102/131/131/125, and a trend toward commonality across product families as evidenced by the common keyboard which is planned for the VT200 and LA200 families. In fact, keyboards are becoming increasingly important to the Corporation based on the high growth in demand for terminal keyboards between now and 1986.

- A current policy in the Terminals Group is to centralize the strategic management of its major products and processes within steering groups chaired by the prime supplier of each product or process.

- Boston recognizes an emerging need for central focus on the strategic management and control of keyboards which will be a key product in the 1980's.

> Product strategy: Boston will be a low mix, medium volume supplier/manufacturer of Video terminal products, with the major focus on keyboards.

- Keyboards Boston will be the prime supplier of video keyboards and intelligent video keyboards.

  . It will be responsible for managing and controlling the supply of keyboards, for addressing the strategic issues related to keyboards, and for establishing and managing a Keyboard Steering Group in the same manner as those which currently exist for other terminal products and processes.

  . Boston will maintain approximately 40% of its capacity, (250,000 production hours) for keyboard build.

BOSTON continued

- o Option Assembly
  - . Boston will produce basic video end-products and grow into intelligent video end-products.
  - . Production capacity will be about 140,000 hours (100,000 units) and maintain at approximately 25% of total capacity.
- o Components
  - . Boston will produce certain sub-assemblies to satisfy option assembly requirements for the Boston Plant and other terminal plants.

    Cables
    Modules

  - . About 220,000 hours will be available for sub-assembly build, representing about 35% of total capacity.

RELATIONSHIPS OUTSIDE OF DEC

> The members of the Boston Plant will interact with the Boston community by serving on boards, monitoring community expectations, donating individual time and making contributions to needy organizations.

> Several organizations may be sources for future employees:

- o Opportunities Industrialization Center
- o Inner City Corporation
- o Roxbury Community College
- o NAACP
- o Urban League
- o State Unemployment Commission

> The development of surrounding street and plant property must be negotiated with EDIC of the city of Boston.

BOSTON continued

> Other neighboring community groups which have been identified are:

- o Orchard Park
- o Community Development Commission
- o New Market Square Association
- o Boston Indian Council
- o Roxbury Multi-Service Center
- o Solomon Carter Fuller Mental Health Center
- o Boston City Hospital
- o United South End Settlement
- o Roxbury Boys' Club
- o Roxbury YWCA
- o Boston Public Schools

KEY OBJECTIVES: (The details of the many programs supporting these objectives can be found in the complete text of the Boston Plant's Five Year Plan).

FY81

> Achieve Stability And Predictability In Terms Of:

- o Shipping 95% of committed transfer cost and line items.
- o Accomplish an inventory goal of 9 weeks on hand and an ending inventory of $5.6M.
- o Meet Boston standard cost projections:

VT100	$587.56
Keyboards	$ 67.92
Cables	
70-1497801	$ 9.87
70-14652	$ 4.55

- o Attain $2.4M of value added.

> Achieve 95% Index Of Quality Level

> Maintain A Multi-Cultural Environment With A 65%/35% Minority/Non-Minority Mix.

BOSTON continued

FY 82

> Maintain Stability And Predictability In Terms Of:

- o Shipping 95% of committed transfer costs and line items.
- o Inventory of 8 weeks on hand.
- o Variance of ($2.5M)
- o Quality at 95% I.Q.
- o Value added of at least $8.1M.

> Fill 65% Of Direct Labor Requirements With Previously Unemployed People.

> Complete The Building Expansion (to include high bay warehouse and mezzanine) To Minimum of 120,000 sq. ft.

> Add, Train And Manage People In A Way To Achieve Growth From 95,000 To 267,000 Hours.

FY83

> Maintain Stability And Predictability:

- o Delivery of 95% of committed transfer costs and line items.
- o Manufacturing variance of ($0.3M) or less.
- o Quality at 95% I.Q.
- o Inventory at 8 weeks on hand.
- o Capture at least $16.4M of value added.

> Add, train and manage people in order to facilitate timely ramp-up from 267,000 hours to 532,000 hours while maintaining a low attrition rate.

BOSTON continued

RISKS/ISSUES/CONCERNS

FY 81

> The current capacity to produce and store raw materials and finished goods is limited by the size of the plant (60,000 sq. ft.).

> Even though the hiring of indirect labor in start up increased product cost, there is still a need for additional people for adequate functioning of the module and cable businesses and to support additional video option assembly build.

> One of the risks facing the Plant is its current lack of independence which creates an inability to stabilize plant loads.

> Also, additional manpower and equipment needed to begin the cable and module businesses may neither be in place nor functioning in time to sufficiently increase plant load.

> In relating to the community, the Boston plant resources may be over-extended in an effort to respond to community expectations.

> The cost of implementing these strategies may inflate transfer costs.

> DEC's changing product strategy may decrease Boston's ability to maintain adequate and stable production levels.

FY 82

> The ramp from 44,000 hours to 155,000 hours in modules may jeopardize meeting volumes and standards.

> The focus on new products may cause some problems with the old ones, e.g. testing.

> The availability of components for new products and the identification and qualification of new vendors could jeopardize production of new products.

> If the VK100 requests from product lines increase, then Albuquerque will have to make more VK100 Terminal Controller Boards.

BOSTON continued

> The building expansion could cause unexpected interruptions to operations.

> Lack of additional products available to increase load will not allow Boston to capture more value added.

> If an outside warehouse is not procured, then module production capacity will be constrained.

> If raw materials storage and incoming inspection go to an outside warehouse, then an additional 12,000 sq. ft. would be available for production.

FY 83

> All necessary indirect labor may not have been identified. The projected DL:IL ratio of 1.87:1 may indicate that there are not enough people to produce and support the projected output.

> The ramp rate between FY 82 and FY 83 is very high for all products. The ability to attain the higher volumes could be jeopardized by the introduction of new products and the completion of the new building which could interrupt production.

FUNCTIONAL GOALS

Finance:

1. Insure proper financial systems to allow Boston to be predictable and monitor results on a timely basis.
2. Meet product costs and variance goals for the Boston Plant for FY81.
3. Meet corporate ROI criteria for investment: 20% internal rate of return.
4. Meet ROA goals for Terminal Group.

Personnel:

1. Manage the employment process in the Plant.
2. Monitor the E.E.O. mix in the Plant at 65%/35% minority/non-minority.
3. Design and monitor a system for managers and supervisors to review their employees twice a year on objective criteria.
4. Develop subordinates so that 50% of personnel staff should be ready for the next level position in 12 months.

BOSTON continued

Organizational Development

General goals of projects and interventions are characteristically directed toward impacting the interface of productivity and organizational systems throughout the Plant.

Facility Engineering

1. Reduce spending by 6%.
2. Train self and direct reports and develop interpersonal skills so that we are promotable to next level.
3. Provide support necessary for 110K hours of production.

Purchasing:

1. Meet 95% of customer commitment dates.
2. Achieve 9 weeks ending inventory and 98% delivery of PPS of scheduled materials.
3. Meet or exceed PPV goals.
4. Meet or exceed material acquisition goals.
5. Load the floor labor requirements to meet or exceed the required volumes and/or mix.

Planning:

1. To analyze and communicate the volume and value of manufacturing inputs (new and old products) necessary to offset spending projections:
2. To institute a methodology:
   a) To determine goals for a 5-year period.
   b) To manage these goals by managing the present.
   c) To associate and link the present with the 5-year goals.

BOSTON continued

M.I.S.:

1. Establish and chair a Systems Steering Committee and charter it to be the decision making body for all Boston M.I.S. strategies and plans, the selection of the business needs which will be addressed by M.I.S., and the prioritization of those needs.

2. Achieve and maintain a level of at least 90% performance to schedule on all projects approved by the Steering Committee.

3. Achieve and maintain a level of at least 90% performance to schedule on all production reports.

4. Implement the systems which are critical to the success of Boston's functional groups in FY81.

Materials:

1. Return on Assets

   a) 9 weeks ending inventory, Q4FY81.

   b) Defer need for additional storage space by 4 quarters (Q2 FY82).

2. New Products

   a) 95% on time delivery of customer requirements.

3. Cost

   a) Achieve Plant's V.A. goals by loading at least 95% of scheduled labor hours to the floor.

   b) Set standards on Purchased Material consistent with corporate product cost goals.

4. Growth

   Load 95% of the scheduled Line Items and Labor Items consistent with the Plant's Growth Plan.

BOSTON continued

Manufacturing: Video

1. Meet Boston's internal build standard quarterly in FY81 which equals the corporate build standard by Q3 FY81.

2. Achieve 95% schedule delivery. To be measured monthly.

3. Analyze performance status and to develop methods of improvement monthly.

4. Communicate products status to Boston Plant, Terminals Plant and Group Management monthly.

Keyboards, Cables and Modules

1. Meet Boston's internal build standards quarterly in FY81 which equals the corporate build standard for cables by Q2 FY81 and for keyboards by Q4 FY81.

2. Meet the corporate standard cost by Q3 FY81.

3. Achieve 95% of scheduled delivery to finished goods, to be measured monthly.

4. Analyze performance status and develop methods of improvement. To be reviewed monthly.

Manufacturing Engineering:

1. Develop and implement VT100 FA&T Process to bring volume to 150 units per day by Q4 and to meet the FY81 standard.

2. Develop and implement Module process to bring the VT100 Keyboard volume up to 30,000 hours/QTR by Q4,FY81 and to meet FY81 standards.

3. Develop and implement cable process to bring the volume of cables to 10,000 hours/QTR by Q4 FY81.

4. Develop and implement a Quality Control program that assures that products meet applicable product specifications.

5. Set up a process to introduce new products in FY81.

6. Set up an ECO and Documentation Control system.

BOSTON continued

Quality:

1. Customer satisfaction:

   a) VT-100 and Keyboard Module-Maintain Index of Quality at greater than 95% as measured by Boston Quality User Audit, FA&T pretest audit and Boston Video first turn-on station.

   b) VT100-Maintain demonstration of 3000 hour VT100 reliability specification.

2. Productivity optimization through defect prevention:

   a) Improve productivity through reduction and repair. VT100: Defect/repair rate= 31% (June and July) reduce to 20% by Q4 FY81.

   b) Keyboard: Determine defect/repair rate using September/October data, set goal for Q4 FY81 during Q2.

3. VK100 product information:

   a) Assure smooth introduction of VK100 into Boston through up front planning and product qualification. Measurement: Maintain VK100 value added standard at planned efficiency (to be determined).

BOSTON continued

ASSUMPTIONS

1. Rise of Weeks on Hand in Q4 FY81 and Q1 FY82 to accomodate transfer of VK100.

2. FY83-FY86 ending inventory is kept roughly at 8.5 Weeks on Hand using 20% of total output of following year as the Q1 output.

3. Boston will supply all its cable needs and provide Westfield with VT100 cables in FY82 and FY83.

4. Receipts from volume (outside group) only from F.E. and Westboro L.S.I.

5. Rise in spending and salaries was held at 6% rather than 10% to account for the fact that new hires last year got paid at a lower rate than those from the previous years.

6. The 5-year plan is based on the following production hours:

TOTAL BUILD HOURS

(000s)	FY81	FY82	FY83	FY84	FY85	FY86
Option Assembly	41.50	73.17	106.68	127.05	133.80	138.90
Module Build	43.80	150.90	306.55	385.40	393.53	418.70
Cables	20.00	40.00	50.00	50.00	50.00	50.00
TOTAL	105.39	264.07	463.23	562.45	577.33	607.60

PRODUCT UNIT BUILD

Option Assembly Build (000s)

	FY81	FY82	FY83	FY84	FY85	FY86
VT100	26	37	35	25	20	5
VT200	-	-	-	-	-	35
VK100	.3	13	17	20	20	5
VT102/131	-	-	25	50	60	60
TOTAL	26	50	77	95	100	105

Module Load (000s)

VT100 Keyboard	56	144	140	230	235	77.5
VT200 Keyboard	-	-	-	54	155	57.5
VK100 Keyboard	3	15	19	22	22	5.5
VK100 TCB	-	10	19	22	22	5.5
VT100 TCB	-	16	82	66	40	8.5
VT200 TCB	-	-	-	-	-	38.5
VT102/131 TCB	-	-	27.5	55	66	66
VT1XX-AA	-	-	5	3.5	1.5	-
VT1XX-AB	-	-	15	9.6	4.0	-
VT1XX-AC	-	-	2	1.5	.66	-

BOSTON continued

DIRECT LABOR RATES

($/M)	FY82	FY83	FY84	FY85	FY86
VIDEOS	5.50	5.83	6.18	6.55	6.94
MODULES	5.91	6.26	6.64	7.04	7.46
CABLES	5.57	5.90	6.26	6.63	7.03

BUILD TIME ASSUMPTIONS

OPTION ASSEMBLY

(HRS./UNIT)	FY81	FY82	FY83	FY84	FY85	FY86
VT100	1.58	1.4	1.35	1.35	1.35	1.35
VT200	-	-	-	1.5	1.35	1.22
VK100	1.7	1.53	1.29	1.29	1.29	1.29
VT102/131	-	-	-	1.5	1.35	1.22

MODULES

VT100 KEYBOARD	.75	.675	.61	.61	.61	.61
VT200 KEYBOARD	-	-	-	.6	.54	.486
VK100 KEYBOARD	.6	.54	.486	.437	.437	.437
VK100 TCB		2.4	2.6	2.0	2.0	2.0
VT100 TCB	-	1.6	1.44	1.44	1.44	1.44
VT200 TCB	-	-	-	2.4	2.16	2.0
VT102/131 TCB	-	-	1.6	1.44	1.44	1.44
VT1XX-AA	-	-	.5047	.5047	.5047	.5047
VT1XX-AB	-	-	.5146	.5146	.5146	.5146
VT1XX-AC	-	-	.7732	.7732	.7732	.7732

PHOENIX PLANT CHARTER

GENERAL STATEMENT

This charter encompasses manufacturing activities located at the Phoenix Union Hills facility. The focus is on vertically integrated operation of high-volume production lines for dot matrix printer and printed circuit board products. Personnel encompassed by this charter include all persons located in Phoenix reporting to the Union Hills Plant Manager.

CRITICAL DEPENDENCIES

Successful operation at Phoenix is critically dependent on supplies of printheads, modules and integrated circuits from other Digital facilities. New product designs are input from both the Central Terminal and Support Engineering groups. Support Engineering located in Phoenix provides ongoing product support and interface with Design Engineering in Maynard. Product specific manufacturing or process engineering is the responsibility of the Phoenix manufacturing engineering organizations. Phoenix is responsible for the production of high-volume dot matrix printers and high-volume integrated printer options for the product lines. Output for TPG is shipped to the TPG warehouse or to designated locations. Output to other product lines is shipped either to their warehouses or directly to the customer via the distribution center in Boulder, Colorado.

PRIME FUNCTION

The primary function of the Phoenix facility is to manufacture dot matrix printer products on high-volume production lines at a low, predictable cost to supply product line needs through vertically integrated production. The production lines will accommodate a high level of mix variations of the basic products to ensure the volume levels required to achieve cost goals. The plant also produces printed circuit boards for itself and for others in the corporation on a high-volume line.

PHOENIX continued

PLANT GOALS

Goal: Reliable Delivery

Objective: 95% delivery of commitments on a weekly basis.
100% delivery of commitments on a monthly basis.

Strategies: Implement automated scheduling and customer management systems.

Implement shop floor control systems.

Limited flexibility for major build changes.

Selective inventory increases for critical or chronic problem parts.

Goal: High Level of Quality

Objective: Product reliability goals consistent with "drop-ship" standards.

Strategies: Continuing Procurement Quality Engineering programs.

Automated production techniques.

Improved "quality-conscious" attitude throughout the plant.

Goal: Competitive and Predictable Costs.

Objective: Consistently meet aggressive cost goals.

Strategies: Far East sourcing of cost-sensitive subassemblies or products.

Goal: Greater Asset Utilization.

Objective: Attain a 20% improvement in inventory turns within five years (7 weeks by FY86).

Strategies: Construction of an on-site warehouse.

Install automated material handling equipment

Improve planning expertise and teamwork approach within materials disciplines.

Implement computerized material planning, scheduling and control systems.

PHOENIX continued

Goal: Improved Employee Relations.

Objective: Meet the human resource needs of the plant.

Strategies: Maintain an equitable, pleasant and safe place to work consistent with Digital's posture concerning openness and job security.

Foster an environment that makes EEO participation and upward mobility a cultural norm rather than an imposed program.

Continued emphasis on minority and handicapped hiring programs.

Develop training programs to provide needed skills internally.

Actively pursue college recruiting and the assimilation of college hires into the corporation.

RESPONSIBILITIES

The Phoenix Plant Manager will be the Manufacturing Product Manager for dot matrix printer products in the corporation. He will provide a worldwide focus on the status of and plans for those products regardless of where they are built.

Planning: Phoenix will operate under control and define for product line customers the tradeoffs between the above-stated goals and levels of flexibility.

LIMITATIONS

The maintenance of high-volume production and cost reduction programs for specific products while fulfilling Digital's commitments to its employees reduces this facility's ability to react quickly in the event of a significant change in product volume.

Subcontracting capacity to serve as a buffer in the event of a recession is an important part of the Phoenix business strategy. Relatively minor increases in product cost as a result of implementing this strategy are considered acceptable.

PHOENIX continued

RISKS/ISSUES/CONCERNS

Moving the videos to Albuquerque narrowed the plant's product base. Thus, Phoenix is considerably more vulnerable to major build changes in that limited product base.

Reduction of inventory levels and limiting the growth of the materials and distribution functions is dependent on completion of the onsite warehouse and installation of computer controlled material handling systems.

Printer market weakness could seriously erode the volumes on which this plan is based.

Product cost projections are dependent upon cost reduction efforts, better control of overhead expenses and material content reduction. High inflation rates could adversely affect these assumptions.

FY82 is a very heavy new products year. There is some risk that LA24 and LA12 introductions will compete for the same resources in addition to the normal new products difficulties.

The plant is heavily dependent on the introduction of new or improved information systems in achieving its goals.

PHOENIX continued

OPPORTUNITIES

Problem:	Manufacturing Productivity
Strategy/Solution:	The plan does not include benefits from any automation or robotic installations on the manufacturing floor.
Metrics:	This would alter the DL base within the plant by its effect on labor standards.
Problem:	Organizational Efficiency
Strategy/Solution:	The issues of organizational size and structure were discussed in a preliminary fashion. Further development of these topics may lead to major changes.
Metrics:	Functional IL alignment may change. The total IL population may be reduced.
Problem:	Board Shop capacity
Strategy/Solution:	The implementation of process control systems and equipment as well as a stronger focus on quality and productivity may raise the Board Shop output without capital expansion.
Metrics:	Return on Assets would improve. The subcontract base would be reduced. The need for a new Board Shop may be pushed out slightly.
Problem:	IL productivity
Strategy/Solution:	Improved information systems, consolidation of responsibilities and promotion of a teamwork approach to problem solving should improve IL effectiveness.
Metrics:	Fewer IL people to do the same or bigger jobs. Greater satisfaction with the job content of IL positions.

PHOENIX continued

ASSUMPTIONS

- Terminal Build Plans are projected from the September Dennisport meeting.
- VT100 and LA180 are phased out by end of Q1 FY81. Phoenix continues to supply VT100 Terminal Controllers through FY81, and terminates all video option builds by end of FY82. Boston assumes responsibility for those options.
- The LA12, 24, and 200 are introduced in Phoenix. The LA12 and 200 printheads are also introduced in Phoenix.
- The Far East will supply some modules for the LA34, 120, 12, 24, and 200. The Far East will also supply 30K VT100 Keyboards in FY81.
- Phoenix will supply Westfield with certain LA120 and all LA200 modules through FY86.
- Phase III West Wing addition of 180K sq. ft. is completed by the end of FY81. Phoenix plant caps at 520K sq. ft.
- Phoenix Board Shop capacity is 650K sq. ft. per year split 145K for multi-layer and fine line; 505K for standard and high density.
- SWAC and TEBB headcount, budget expenses, space, material flow and capital requirements are not included in this plan.
- An automated material handling system is on line by FY83.
- The 5% increased DL/IDL ratio from the FY81 base does not show effects of increased automation.
- The effects of corporate decentralization are not included in this plan.

WESTFIELD PLANT

WESTFIELD PLANT CHARTER

- To be the primary supplier of small systems (smart and intelligent packaged systems designed for direct shipment to customers).
- To supply metal enclosures for the Corporation through internal manufacturing capacity.
- To supply Buyout printers for the Corporation.
- To be the major supplier of printheads for current printer products and the LA24 and a secondary supplier for LA200 printheads. Westfield will not supply LA12 printheads.
- To supply low and medium volume peripheral products, including disks, printing terminals, Video terminals, line printers, letter quality printers, analog graphic options, to the corporation.
- To supply non-enclosure metals fabrication requirements for DEC (except Western and Far East plants) through internal capacity and through the Westfield Metals Acquisition Group through FY83.

GOALS AND OBJECTIVES

GOAL: To ensure that westfield continues to fill the role as the major manufacturing site for very small systems.

STRATEGY:

Video: Ensure that capacity is in place to produce multi-product build in the range of 70K to 100K units per year.

CPU Box: Ensure that capacity is in place to produce CPU box-based small system in the range of 50K to 60K units per year.

Direct Ship: Ensure the ability to ship small systems to customers or distribution centers for systems built in Westfield. Westfield will participate in setting P/L and Corporate distribution strategies that will determine the level of future involvement.

WESTFIELD continued

STRATEGY: Vertical Integration: Provide in-plant vertical integration of unique sub-assemblies (modules and metals).

PROGRAMS: Expand Westfield module capacity to meet future demand for Westfield unique modules.

New Products/Central Engineering will review products for small systems consistency.

GOAL: Provide Capacity For DEC Enclosure Demand.

STRATEGY: Drive to high volume/low mix processes.

Expand internal capacity as demand dictates.

PROGRAMS: Offload non-enclosure loose piece parts.

Install high volume hard tooling.

Establish finishing capacity at vendors or in-house.

GOAL: Maintain internal build percentage of DEC fabrication demand.

STRATEGY: Site expansion by FY84/FY85.

PROGRAM: Form facilities expansion project team.

GOAL: Reduce the westfield contributed product cost by 2% per year.

STRATEGY: Lower overhead spending.

Increase output $ per sq/ft and output $ per person.

Increase DL:IL ratio to 1.35 by FY84.

WESTFIELD continued

PROGRAMS: Establish centralized functions.

Increase off-shift utilization to 40% direct labor by FY84.

Implement automated storage and retrieval systems.

Site consolidation.

GOAL: Improve plant return on assets.

STRATEGY: Reduce weeks-on-hand inventory from 8.5 weeks to 7.5 weeks by FY84.

Increase inventory turns.

Reduce scrap/obsolescence.

Reduce group interdependence.

PROGRAMS: Work quality of inventory.

Reduce surplus/obsolescence inventory from 8% to 4% by FY83 and to 2% by FY85.

Develop and enhance our vendor storage program, and ship to stock program.

GOAL: Deliver quality products in a predictable manner.

STRATEGY: Continue to focus on weekly line item delivery (95% or better).

Continue product audit programs on options and small systems.

Achieve dock merge certification on all new products within 90 days of first volume ship.

Less flexible, more predictable.

PROGRAMS: Hold weekly production meetings to monitor performance.

Implement a cost of quality program.

Maintain product certification on all Westfield options.

Implementation of a reliability program at the new product stage.

Define and communicate flexibility limits.

WESTFIELD continued

GOAL: Provide a working environment that fosters equal employment opportunity and human resource development consistent with business needs.

STRATEGY: Re-establish a "DEC" culture sensitive to multi-cultural issues.

Implement a human resources planning system.

Continue pay-for-performance policies.

Encourage regular employee/manager interaction and communication.

Stress competency-based training for both individual and organizational training before developmental training.

Maintain an attractive and clean work environment.

PROGRAMS: Develop and present minority awareness program to all WC-4 by FY82, and re-educate all managers and supervisors to EEO/AA for minorities, females, handicapped and veterans.

Continue plant beautification program.

Consolidate WC-4 career planning information by FY83, and merge the total HRP system with the long-range planning process by FY84.

Expand Western Massachusetts pay proposal, FY82, and explore alternative reward systems by FY83.

Implement employee communication program by FY82 and encourage greater direct labor participation in decision-making.

Redefine the training function as an agent for change that is organizationally focused rather than individually focused.

GOAL: Maintain viable printer and video capacity to support group split build strategy at least until plant capacity is absorbed by small systems.

STRATEGY: Maintain video capacity between 200K hours and 275K hours per year.

Maintain printer capacity at 325K hours per year.

Establish table top capacity.

Expand printhead capacity.

WESTFIELD continued

RISKS/ISSUES/CONCERNS

- Failure of the Corporation to compete successfully enough to achieve the scale of volumes of the very small systems products assumed in this plan would render the Westfield Charter insufficient as a basis for a major plant contributing to group and corporate manufacturing performance.

- Without fulfillment of present expansion plans, Westfield's planned outputs are jeopardized and progress toward return on assets and cost goals will be slowed.

- Decentralization of corporate manufacturing level functions crould place an unplanned strain on Westfield's limited human resources.

- Absence or large reduction of "buyout" product activity would drastically affect achievement of output plans, return on asset goals (weeks on hand), total plant cost reduction and productivity parameters.

- Discontinuation of Terminals Group split build strategies for printers and videos would affect the Westfield Charter; therefore, it would affect all areas of aggressive achievement in this plan.

- Product decisions and technology changes may produce less stimulating jobs lacking in technical content and challenges. This may reduce our skilled labor (technicians and craftsmen) resources.

- Growing local industry competition may restrict our labor supply and affect our ability to recruit qualified people.

- Changing character of workforce may enhance Westfield's vulnerability to labor relations activity.

- Site expansion and growth in employment may overly strain local services and/or cause employee communications and coordination problems.

- Failure to achieve Plant Charter may mean critical excess manpower situation.

WESTFIELD continued

OPPORTUNITIES

- To increase output/person and minimize certain repetitive jobs, we will investigate the introduction of automation in the Metals Fabrication area and Printhead Assembly area.

- To increase manpower productivity and reduce inventory while increasing our material thruput, we will study and propose an automatic material stores and handling process to include centralization of material stores and planning.

- To reduce total product cost, we will define a program to address total cost of acquisition which will include vendor storage, Far East procurement, ship to stock, duty, freight consolidation, packaging, and second source strategy.

- Change will encourage re-examination of pay for performance policies to pay for productivity.

- Broader community relations possibilities.

- Expansion will permit opportunities to implement new E.R. programs.

SOUTHWEST ACQUISITION CENTER (SWAC)

SWAC CHARTER

I. STATEMENT OF PURPOSE

SWAC is an integrated Materials Acquisition function servicing the Terminals Manufacturing Group and Terminals Group Products. Terminals Manufacturing facilities being:

Phoenix
Albuquerque
Westfield
Boston

II. ORGANIZATION

1. Internal Organization

> Administration - Acquisition Center and Facility Management.

> Materials - Purchasing, IC, PC, Distribtuion, Long Range Planning.

> Engineering - Test Process, Maintenance, Quality Control, Vendor Engineering.

> Test - Visual, Mechanical and Parametric Testing.

2. Functional Ties

> Westboro LSI/CIT

> Terminals Group Plants

3. Operational/Organization Tie

> Phoenix Plant, Central Materials organization

II. AREAS OF RESPONSIBILITY

1. Initially, charter includes servicing the Terminals Group needs with mature multi-sourced, standard L.S.I. and memory devices thru September 80. (complete)

2. Start-up test operation implemented with Westboro inventory (JAN-JUN, 1980) and continued with vendor-supplied material.

3. Work closely with Westboro purchasing organization in establishing them as a strong vendor base management group, with continuing responsibility for sourcing and qualification activities.

12/1/80

SWAC continued

4. Add procurement and test processes in a controlled manner (including a competent organization). Transfer of product responsibility will occur on a negotiated basis with Westboro LSI/CIT.

5. Act as a resource to Terminals Group Plants in resolving L.S.I. and memory material delivery, quality and engineering problems. For the instances where Westboro is still the source for the problem part, we will help expedite resolution of the problem through Westboro.

6. Act as a focal point in planning for the Terminal Group Plants future needs of L.S.I. and memory devices.

7. Identify SWAC Purchasing and Engineering, as a resource to Terminals Group plants.

8. Maintain a "Long Range Planning" function as a key element of the SWAC organization. Establish strong ties to Corporate, Group and Plant planning functions.

IV. OPERATIONAL TIMETABLE:

- Standard Microprocessors	Q38Ø - Operational 2-15-8Ø (done)
- Masked ROMS - Up to 16K	Q38Ø - Operational 1-14-8Ø (done)
- L.S.I. Peripheral Devices	Q38Ø - Operational 3-15-8Ø (done)
- Static RAMS	Q281 - Planned for 1-1-81
- PROMS and 64K ROMS	Q281 Planned for 1-1-81
- Custom L.S.I.	Only mature, multi-source etc. will be negotiated on part by part basis.
- SSI-MSI Logic	Being negotiated for inclusion in SWAC Charter
- Linear Devices	

SWAC continued

V. GOALS/STRATEGIES/PROGRAMS

GOAL:

To provide an overall long range planning resource for both the Terminals Group and Terminals Group products. Ensure SWAC ability is present to meet anticipated Terminals Group usage, and contribute positively to overall Terminals Group LSI investment.

STRATEGIES:

> Become focal point for Terminals Group LSI usage numbers.
> Facilitate and verify the input of Terminals Group LSI usage to Westboro.
> Become a central resource for plant module and top level option build schedules.
> Help coordinate both ECO and new products phase-in activity.
> Develop strategic sourcing and inventory plans on a part-by-part basis.
> Anticipate technology, capacity, manpower and space requirements.
> Monitor procurement opportunities and impact corporate contracts accordingly.
> Drive development of SWAC business plan.

GOAL:

Develop and implement a fully integrated and interactive test process and information system.

STRATEGIES:

> Develop a functional systems design for SWAC.

> Develop a systems impact statement equating systems modules to direct or indirect SWAC process constraints.

> Obtain necessary terminal equipment and related hardware.

> Identify future hardware requirements including mainframe.

> Prioritize FSD segments and develop total implementaion scheme.

SWAC continued

GOAL:

Ensure consistent delivery of high-quality LSI and memory devices while minimizing costs.

STRATEGIES:

> Accrue a sufficient body of reliable empirical data so as to facilitate Quality decision making.

> Allow for field accountability.

> Develop alternatives to 100% testing.

> Work quality at the vendor's site.

RISKS/ISSUES/CONCERNS

Following are some concerns that have been identified as areas that could have potential operational impact at SWAC. Some of these problems are already being addressed as indicated. Most, however, have yet to be dealt with. It is our intention to develop specific measureable strategies around these areas.

> DEPTH: The general unavailability of Personnel within the marketplace due to the competitive situation and lack of talented "entry age" people is going to force us to look harder at internal development.

> TECHNOLOGY: The exploding LSI technology is going to dictate that we are able to staff with people who recognize and understand the leading edge of technology. We must find out where these people are and how we can attract them.

> PROFESSIONAL EDUCATION: How do we keep abreast of the rapidly changing technology and interpret these changes into meaningful functional/personal terms? How can we best use education to supplement career development and prepare personnel for promotional opportunities?

SWAC continued

ASSUMPTIONS

> Those parts for which SWAC will be responsible at the end of FY81 are the parts upon which the plan is calculated.

> The most recent Video and Printer Steering Groups numbers are the basis for the plan.

> Micro's numbers are a function of the current schedule adjusted by a rate of change as reflected in their most recent schedule.

> VT125, 103, 173, 200, and 278 have the same basic product structure as the VT100.

> I/O assumptions.

- o External material purchases are based upon current Terminals Group outputs and existing product structure.
- o Material acquisition rate reflects anticipated cost reduction over the 5 year planning horizon.
- o Volume spending is factored by increased inflation.
- o Outputs to volume outside group for Terminals Group products i.e. Far East, Field Service are not indicated. Although this sort of output is logical and likely, it is not currently a recognizable portion of the SWAC charter and is in the process of negotiation.
- o Materials transfers to specific Terminals Group plants are not considered for the purposes of this plan.

> All space required thru FY86 will be encompassed within the currently leased facility. The 26.1K sq. ft. facility houses both SWAC and TEBB.

> Capital equipment needs are based upon existing processes. Current test technology will become obsolete and be replaced by more advanced processes.

> Capital equipment needs address those specific testers required to support the Terminals Group requirements agreed upon in the existing SWAC charter.

> Also addressed are auxiliary pieces of supportive equipment (e.g. oscilloscope).

> It is assumed that the basic complexion of the Terminals Group Product structure will not change i.e.

- o Micros: High Custom density
- o Video: High ROM and peripheral density.
- o Printers: High ROM density.

SWAC continued

OPPORTUNITIES:

> S.S.I. Devices (Small Scale Integration)

> M.S.I. Devices (Medium Scale Integration)

> Other Electrical Test Operations

> Complex Modules

> Custom Devices

> Component Engineering

> Product Cost Reduction

> Better Inventory Management Between LSI and Terminals Group

TERMINALS EXTERNAL BOARDS BUSINESS (TEBB)

TEBB CHARTER

An acquisition function to focus on assuring a supply of boards which because of volume or technology cannot be manufactured by Terminals Group internal facilities.

> Chair Terminals Boards Steering Group Subcommittee to perform make/buy amalysis, standard setting and market studies to analyze cost and capacity issues in support of long term supply.

> Acquisition function includes Purchasing, Material Planning and Distribution and Quality.

> Modules/cable subcontracting function for the Phoenix Plant

RISKS/ISSUES/CONCERNS

> Product volume demand drops drastically to a level which doesn't support an external vendor base.

> Sub-contract volume is redirected to fill Digital facilities to the exclusion of an external vendor base.

OPPORTUNITIES

> Market analysis and vendor base development could make boards an economically attractive commodity to buy externally precluding the necessity for further capital investment in board shops.

> External vendor base development to a point of efficiency which precludes high yield loss and associated high dollar scrap loss.

ASSUMPTIONS

> Terminals boards steering committee continues the trend towards group vertical integration and self sufficiency.

> Volume and technology requirement projections remain at current levels (minimum) which supports development of a cost and supply efficient vendor base.

FAR EAST SUMMARY

Strategy: A key component of the overall cost strategy of the Terminals Manufacturing Group is the employment of the Far Eastern facilities located in Taiwan, Hong Kong and Singapore. Initial plans centered around Video product and were drawn up in the latter stages of FY79. During FY80, progressively greater elements of the VT100 product and then some printer subassemblies were obtained from these sources. The continued growth of these sources is contemplated by Terminals Manufacturing Group along the lines indicated in the following discussion.

Management: At the Group level, the broad direction for this relationship is reviewed by both Group staffs, typically at quarterly meetings. These progess reviews normally examine the capacity goals mutually agreed for the current and subsequent fiscal year. The longer term issues are also reviewed at that time.

The primary thrust in this relationship is to achieve maximum cost benefit for the products and subassemblies which have been selected. For simplicity, product management of the particular units remains resident within Terminals Manufacturing Group. As a result, the interface into the product lines or engineering remains as if the units in question were being produced in a domestic plant.

The Far East is extremely important to the Terminals Group. We will be working to develop guideline strategies to manage the business. For instance, at this time, we plan not to exceed having 25% of the Group DL requirements in the Far East. Decisions should be cost driven.

Present Plans: Our present plans call for the supply of material in three (3) major categories:

1. Commodity - Commodity items are those we have historically acquired from U.S. vendors which are now sourced in the Far East to gain cost and quality advantage. In the future, commodity material may or may not include units requiring value added within Digital's Far East plants.

FAR EAST continued

An illustration of this type of item is the VT100 CRT monitor. This item had been supplied exclusively by a U.S. vendor. Currently however, 80% of our usage is furnished by the Taiwan plant with a reduction in cost greater than 30% of the FY79 cost in FY81. The quality of the Taiwan monitors has also exceeded our previous experience. The cost benefit details are:

	FY80	FY81	FY82
Monitor Savings	$1.1M	$1.8M	$3.3M

The monitor, of course, is a rather special illustration, but it does indicate the potential for significant savings represented by the Far East.

2. Subassemblies - Subassemblies are items which have traditionally been assembled and tested in domestic U.S. plants. They generally meet the criteria of either a) high value to weight/bulk ratio or b) high labor content.

Again, as an illustration, 90% of our VT100 video power supplies are furnished by our Hong Kong plant. This started in FY80 with a reduction in standard of 28% with no degradation in quality levels. The cost improvements for this item are:

	FY80	FY81	FY82
VT100 Power Supply	$ .4M	$2.3M	$2.2M

Our subassemblies currently manufactured in the Far East include video keyboards, printer keyboards and printer power supplies. Future subassemblies may include printheads and metal chassis.

FAR EAST continued

3. Products - Complete products (at the option level) are planned to be supplied by the Far East. These will include point products where the marketing requirements for success will be largely achieved by obtaining the lowest possible manufacturing cost and where flexibility of supply or timely new product introduction is not comparatively essential.

   There are no current illustrations of product options being produced for the Terminals Group. The VT101 and the LA12, however, are scheduled for FY82.

FAR EAST RESOURCES AND BUILD SCHEDULES:

	FY81	FY82	FY83	FY84	FY85	FY86
PEOPLE:						
Video People	548	828	976	1175	1698	2025
Printer People	118	223	460	816	1184	1518
TOTAL People	666	1051	1436	1991	2882	3543
SAVINGS: ($ in M)						
Video Savings	5.4	10.5	13.7	17.4	22.1	26.4
Hard Copy Savings	2.7	2.4	4.4	8.9	13.1	18.8
TOTAL Savings	7.1	12.9	18.1	26.3	35.2	45.2
OPTION OUTPUT TO FA&T, TPG, MPG (in support of Terminal Products)						
Printers	-	-	7	17	28	22
Video	-	18	24	30	30	42
TOTAL Output	-	18	31	47	58	64

FAR EAST continued

Open Issues:

At this time, the key areas requiring further clarification are as follows:

- Mutual dependence and capacity shares
- Inventory - the lengthening pipeline
- Cost/benefit analysis
- Support services
  - Cost allocation
  - Management of technical support

Summary:

The tone of this discussion has been historical. In the near future, we need to further develop our strategic posture with respect to replacement products and subassemblies. This will likely be accomplished by establishing selection and implementation guidelines for obtaining future products based upon an analysis of "what we learned" to date.

Furthermore, we will address the direct supply of terminals by the Far East to the GIA market. This will at least an understanding of the cost and market presence implications.

ATTACHMENTS VI

ATTACHMENT #1

SPACE AVAILABLE BY PLANT

		FY80	FY81	FY82	FY83	FY84	FY85	FY86
AB:	Dist	60	86	95	102	115	125	135
	Mfg.	190	164	164	164	260	250	240
	Total	250	250	259	266	375	375	375
	% Util	90%	100%	100%	100%	89%	95%	100%
	% Off shift	25%	27%	33%	34%	37%	42%	44%
BO:	Dist	15	21	45	73	73	73	73
	Mfg.	45	45	45	79	79	79	79
	Total	60	66	90	152	152	152	152
	% Util	91%	100%	99%	96%	100%	100%	100%
	% Off shift	-	-	24%	32%	32%	32%	32%
PN:	Dist	100	114	114	114	114	114	114
	Mfg	319	414	414	414	414	414	414
	Total	419	528	528	528	528	528	528
	% Util	95%	84%	93%	86%	87%	94%	94%
	% Off Shift	32%	32%	30%	30%	30%	30%	31%
WF:	Dist	203	239	265	284	286	326	326
	Mfg	414	446	453	501	519	606	606
	Total	617	685	718	785	805	932	932
	% Util	100%	100%	100%	100%	100%	87%	87%
	% Off Shift	19%	20%	22%	25%	27%	28%	28%
SWAC:	Dist	3	3	4	7	7	7	7
	Mfg	20	20	19	16	16	16	16
	Total	23	23	23	23	23	23	23
	% Util	56%	56%	71%	95%	95%	95%	95%
	% Off Shift	-	14%	18%	20%	20%	26%	30%
TEBB:	Mfg.	3	3	3	3	3	3	3
	% Util	100%	100%	100%	100%	100%	100%	100%
Board Shop:	Dist	-	-	-	-	10	10	10
	Mfg	-	-	-	-	120	120	120
	Total	-	-	-	-	130	130	130
	% Util	-	-	-	-	41%	62%	77%
	% Off Shift	-	-	-	-	30%	36%	36%
G&A:	Mfg.	13	25	25	25	25	25	25
	% Util	103%	59%	64%	76%	78%	82%	84%
GROUP TOTAL:	Dist	381	464	524	581	606	656	666
	Mfg.	1004	1116	1122	1201	1435	1512	1502
	Total	1345	1580	1646	1782	2041	2168	2168
	% Util	96%	93%	97%	95%	91%	90%	91%
	% Off Shift	24%	24%	26%	28%	30%	32%	33%

NOTE: No off shift operations in TEBB and Group G&A.

12/1/80

ATTACHMENT #2

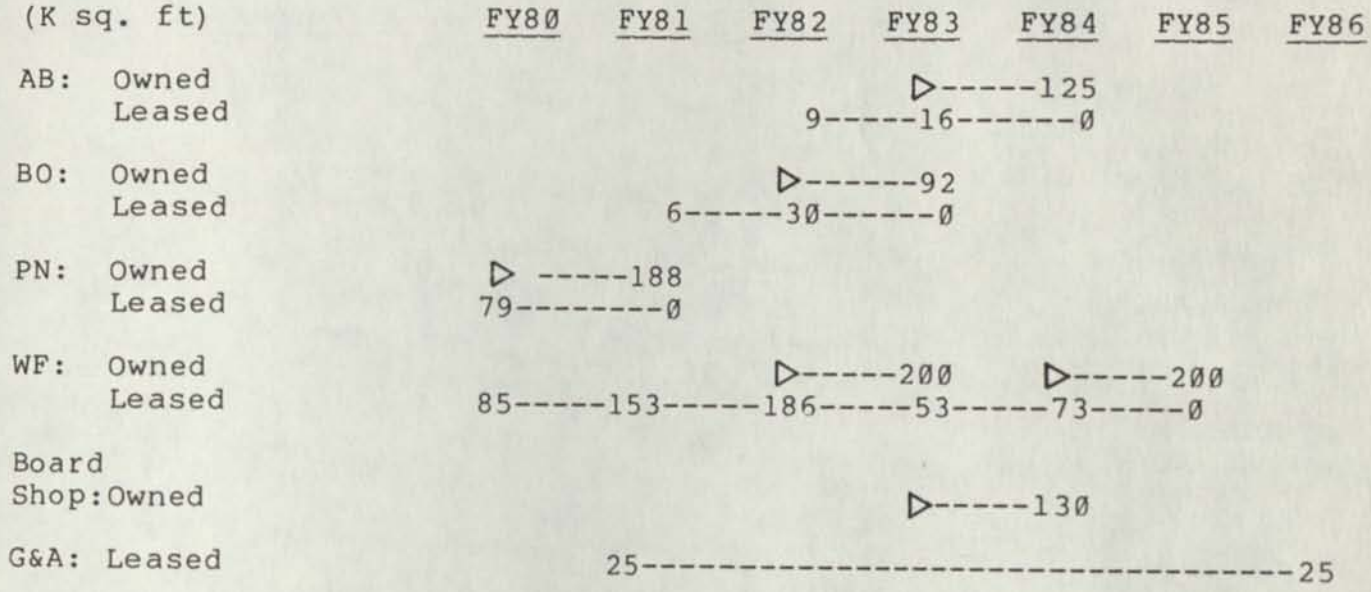
SPACE AVAILABLE BY SITE

		FY80	FY81	FY82	FY83	FY84	FY85	FY86
AB:	Plant (O)	250	250	250	250	375	375	375
	Site 1 (L)	-	-	9	16	-	-	-
	Total	250	250	259	266	375	375	375
% Util		90%	100%	100%	100%	89%	95%	100%
BO:	Plant (O)	60	60	60	152	152	152	152
	Site 1 (L)	-	6	30	-	-	-	-
	Total	60	66	90	152	152	152	152
	% Util	91%	100%	99%	96%	100%	100%	100%
PN:	Plant (O)	340	528	528	528	528	528	528
	Site 1 (L)	79	-	-	-	-	-	-
	Total	414	528	528	528	528	528	528
	% Util	95%	84%	93%	86%	87%	94%	94%
WF:	Plant (O)	532	532	532	732	732	932	932
	Site 1 (L)	45	45	45	-	-	-	-
	Site 2 (L)	-	59	59	53	53	-	-
	Site 3 (L)	40	49	82	-	20	-	-
	Total	617	685	718	785	805	932	932
	% Util	100%	100%	100%	100%	100%	87%	87%
SWAC:	Site* (L)	23	23	23	23	23	23	23
	% Util	56%	56%	71%	95%	95%	95%	95%
TEBB:	Site* (L)	3	3	3	3	3	3	3
	% Util	100%	100%	100%	100%	100%	100%	100%
Board Ship:	Plant (O)	-	-	-	-	130	130	130
	% Util	-	-	-	-	41%	62%	77%
G&A:	Site (O)	13	-	-	-	-	-	-
	Site (L)	-	25	25	25	25	25	25
	% Util	103%	59%	64%	76%	78%	82%	84%
Group Total:	Plants (O)	1195	1370	1370	1662	1917	2117	2117
	Sites (L)	190	210	276	120	124	51	51
	Total	1385	1580	1646	1782	2041	2168	2168
	% Util	96%	93%	97%	95%	91%	90%	91%

*SWAC & TEBB Share a leased facility

ATTACHMENT #3

MAJOR SPACE ADDITIONS FY80-86



Note: Leased space is shown as total leased space available in each year. It is not cumulative.

▷ Denotes beginning of capital spending for new plant.
Ø Denotes year leased space is retired.

ATTACHMENT #4

LANDBANKS

	#Acres	Year Purchased
ALBUQUERQUE		
Plant Site	50	FY76
Adjacent Site	39	FY76
MESA,ARIZONA		
Land	150	FY77
PHOENIX		
Plant Site	96	FY75
WESTFIELD		
Plant Site	225	FY69

ATTACHMENT #5

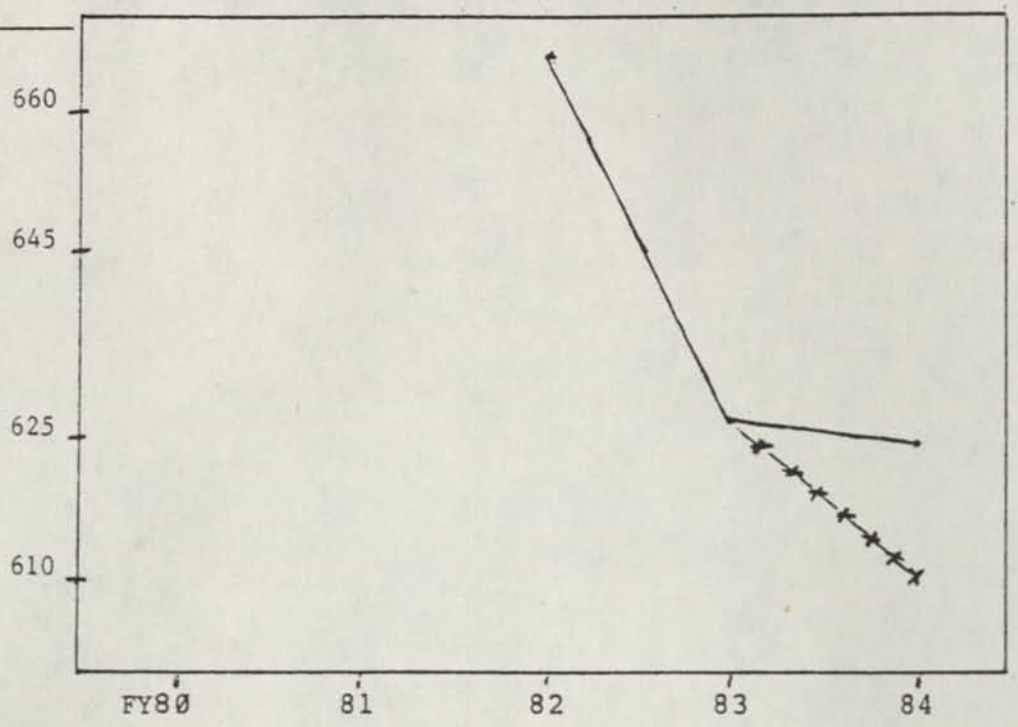
MAJOR PRODUCT BUILD

	FY81	FY82	FY83	FY84	FY85	FY86
LA120	88	133	110	83	30	5
LA34/38	61	50	57	44	13	5
LA24	-	10	55	125	168	197
LA12	-	5	40	100	146	180
LA200	-	-	-	20	95	200
LP25/26	2	4	5	6	5	4
LQP01/02	5	7	14	18	24	30
VT100	134	105	55	25	20	-
VT101	-	40	60	80	70	70
VT102	-	20	55	70	85	80
VT131/132	6	50	110	140	150	143
VT200	-	-	-	50	150	325
VIDEO SPECIALS	12	26	35	45	22	12
KD11	35	33	33	33	27	18
KDF11	36	40	60	65	44	26
KXT	-	12	25	35	52	46
MSBC	-	-	4	31	52	86
MINC	2	2	3	2	.5	-
VT278	.6	8	12	12	6	-
IS11/50	-	-	-	10	45	85
D315	1	3	3	1	-	-

PRODUCT COST CURVES

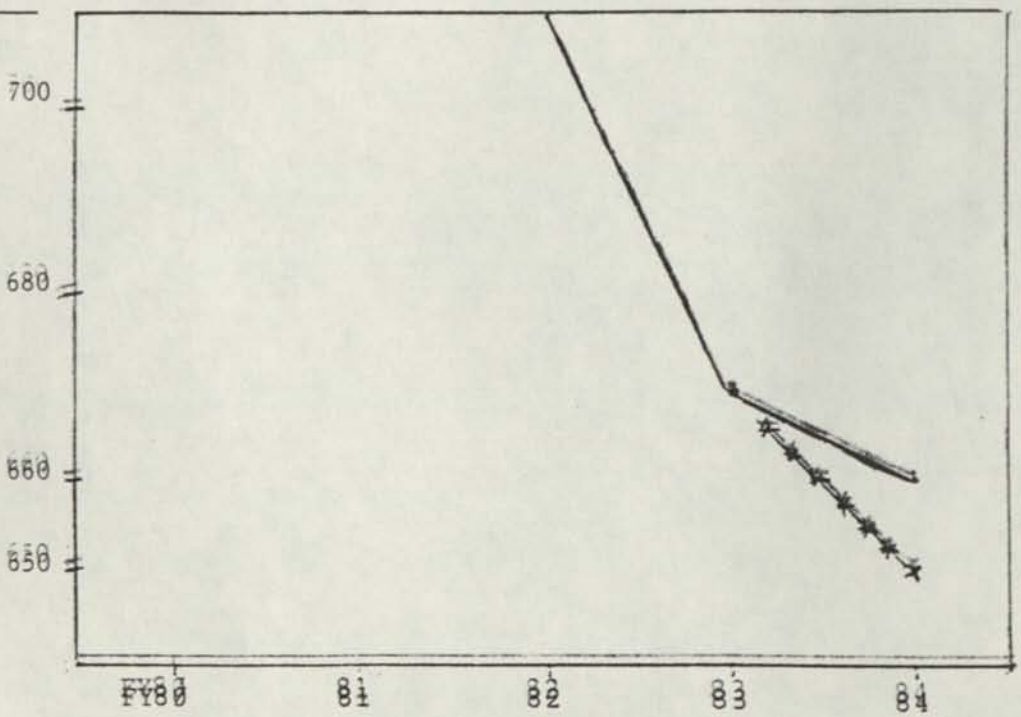
Legend: Solid line = Steering Comm
"x" line = TMG Goal

OPTION LA12



CUMULATIVE VOLUME	-	-	5	45	145

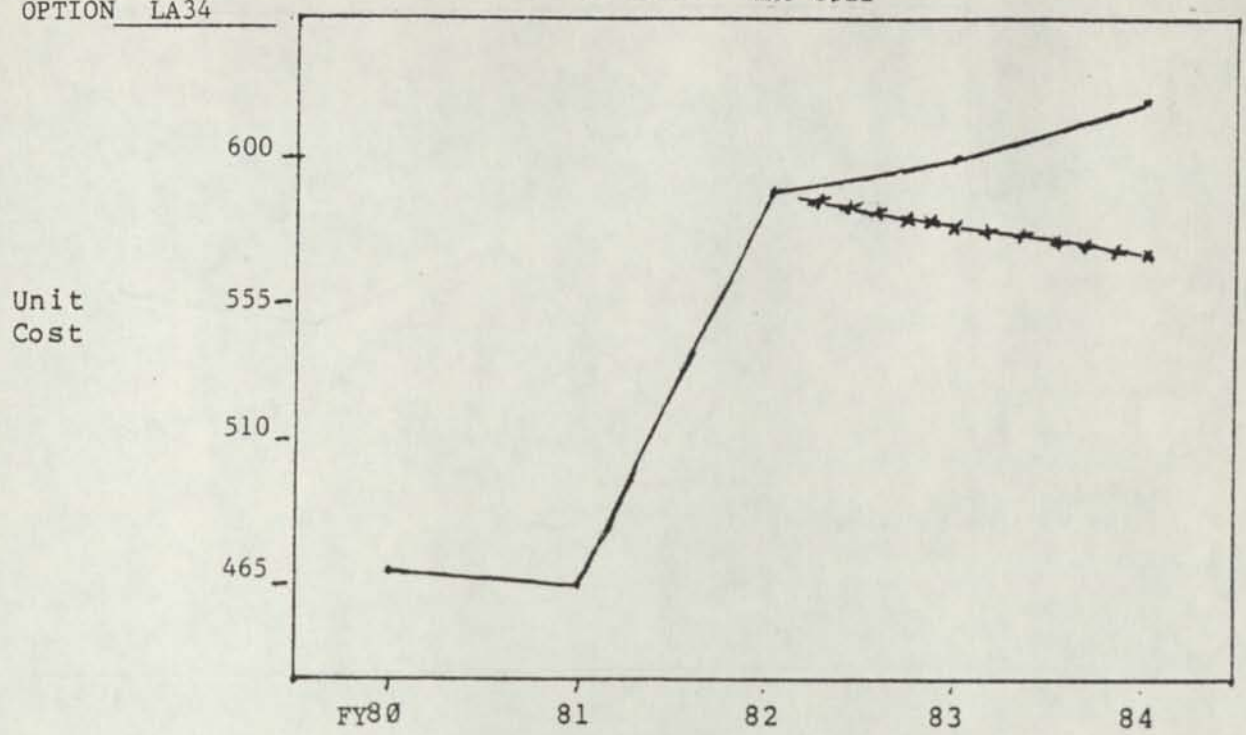
OPTION LA24



CUMULATIVE VOLUME	=	=	10	65	190

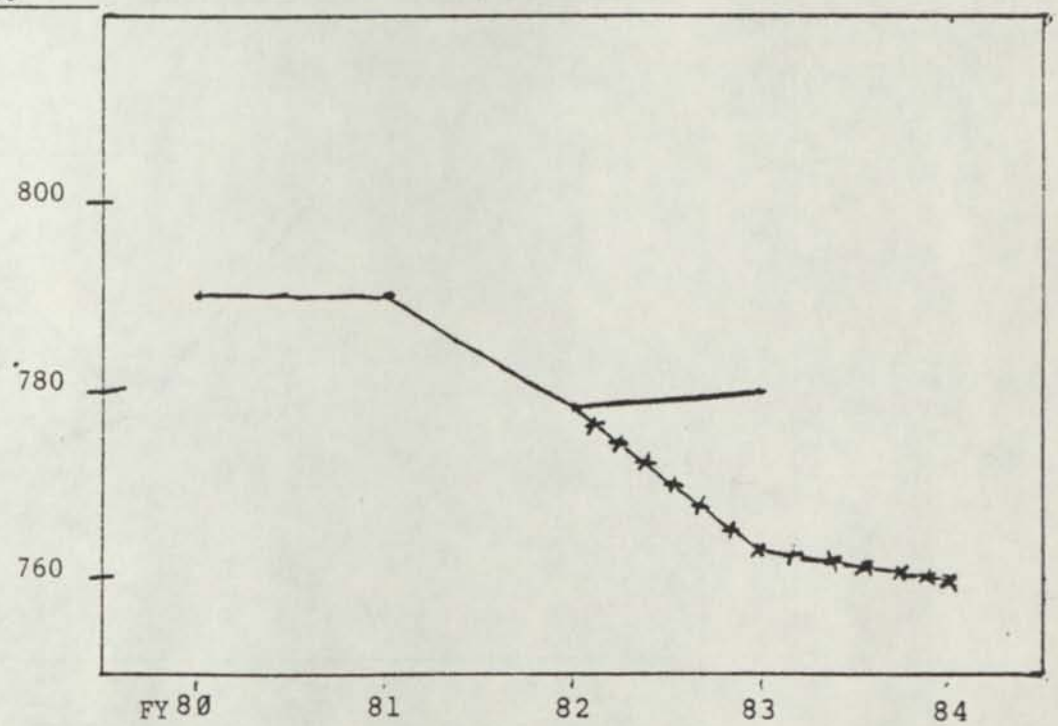
PRODUCT COST CURVES
Legend: Solid line = Steering Comm. Plans
"x" line = TMG Goal

OPTION LA34



CUMULATIVE VOLUME	60	122	162	181	192

OPTION LA120

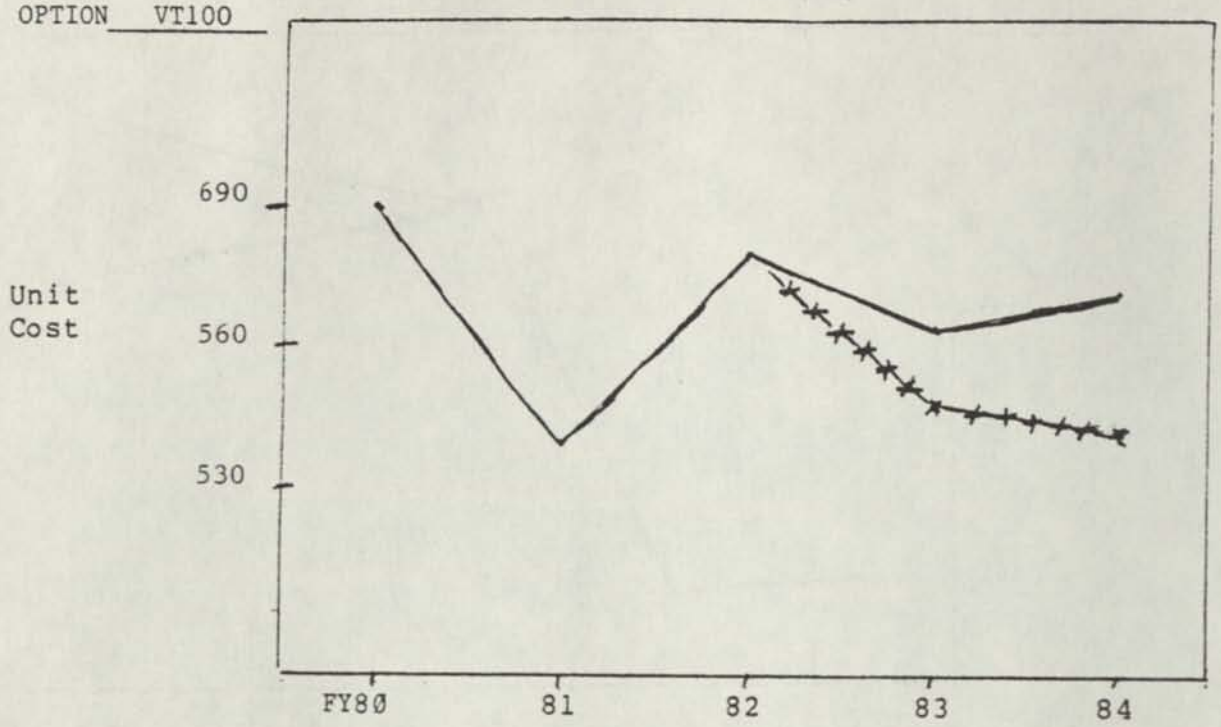


CUMULATIVE VOLUME	46	134	267	377	460

PRODUCT COST CURVES

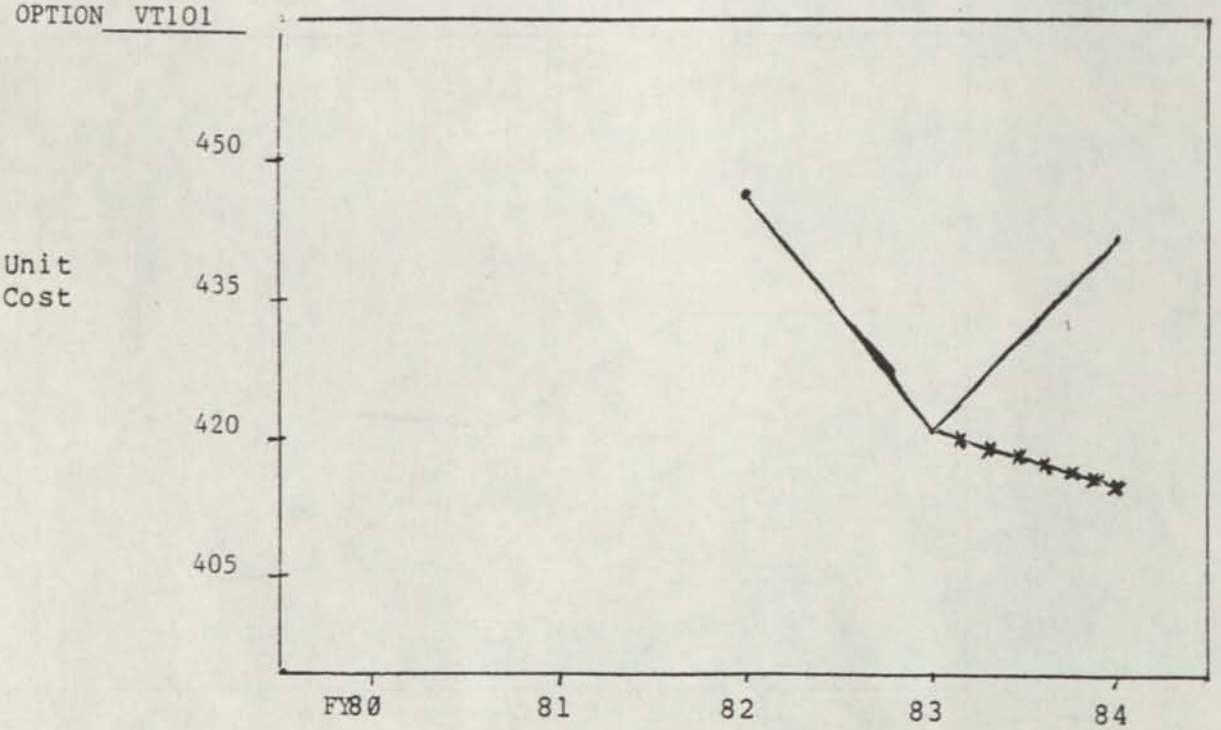
Legend: Solid LIne = Steering Comm. Plans
"x" line = TMG Goal

OPTION VT100



CUMULATIVE VOLUME	103	237	342	397	422

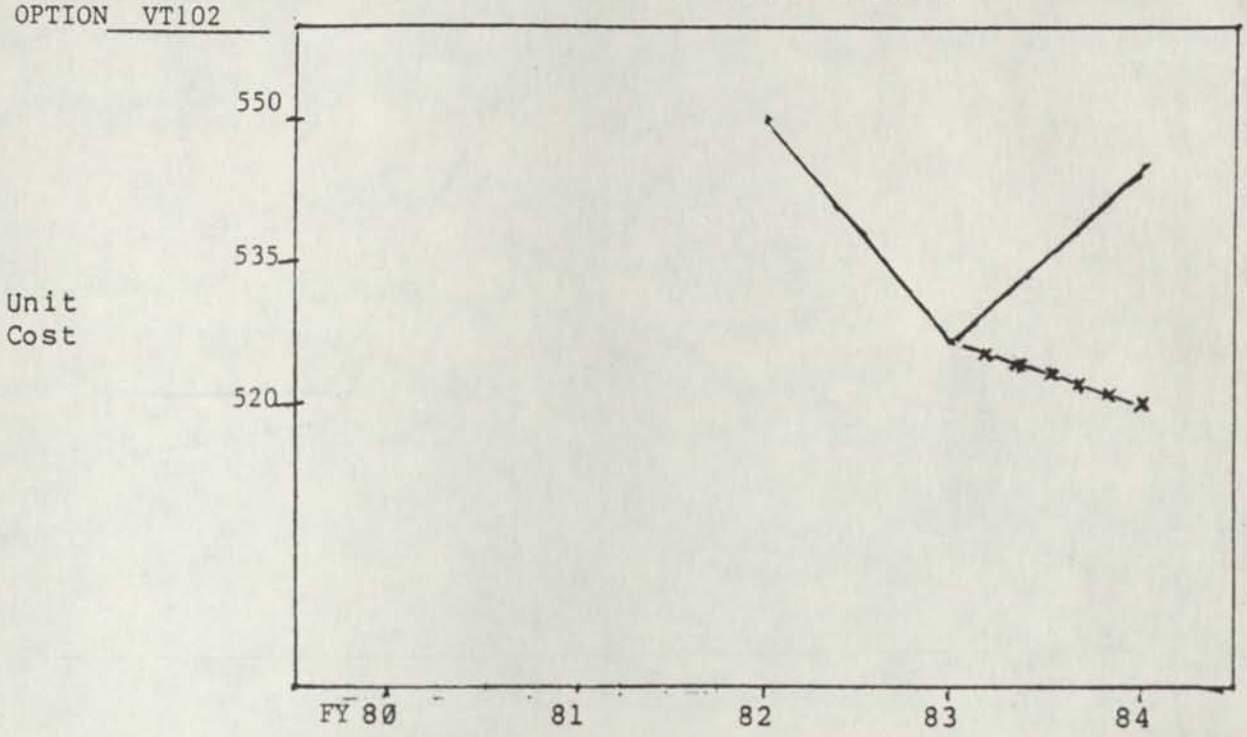
OPTION VT101



CUMULATIVE VOLUME	-	-	40	100	180

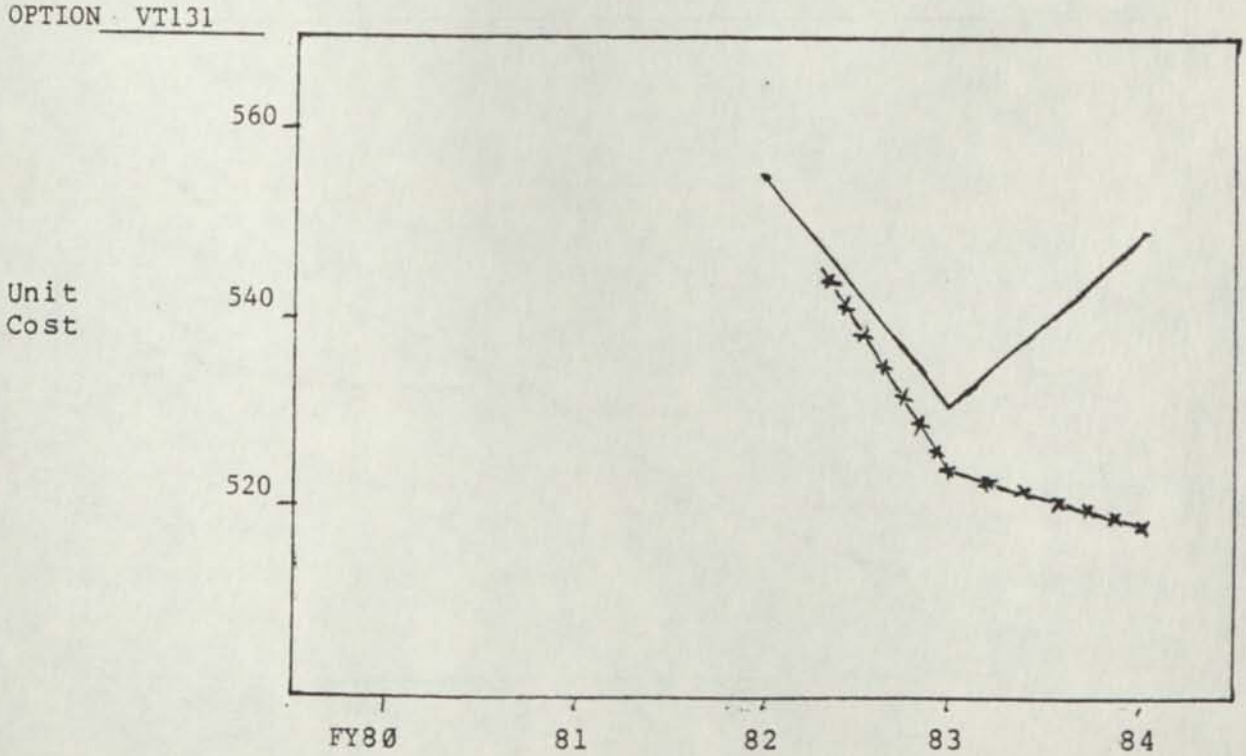
PRODUCT COST CURVES
Legend: Solid line = Steering Comm. Plans
"x" line = TMG Goal

OPTION VT102



CUMULATIVE VOLUME	-	-	20	75	145

OPTION VT131

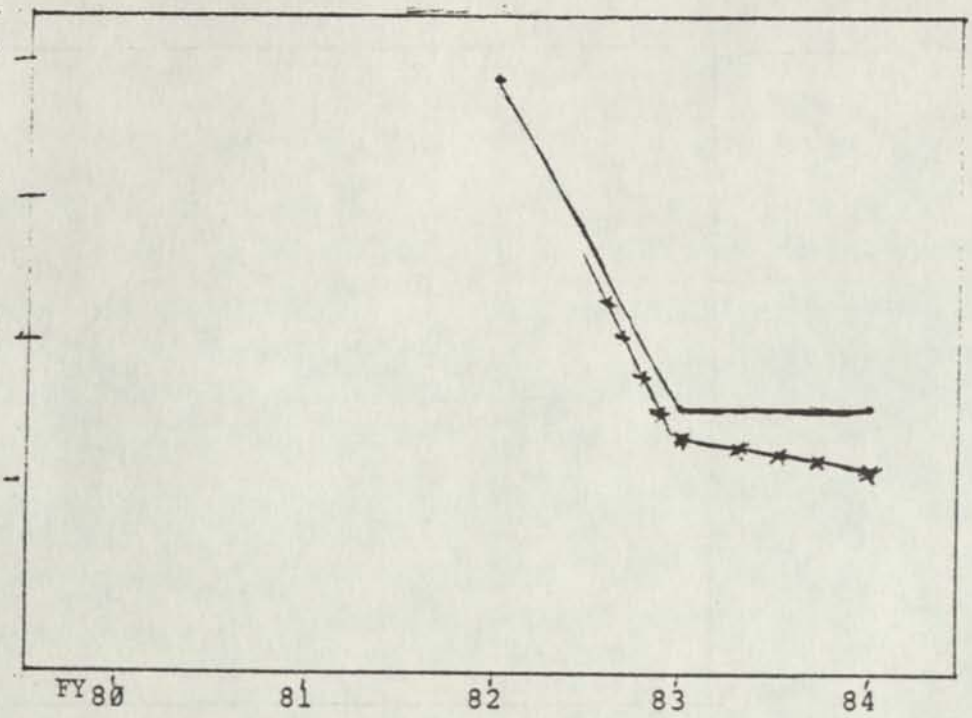


CUMULATIVE VOLUME	-	-	40	150	290

PRODUCT COST CURVES

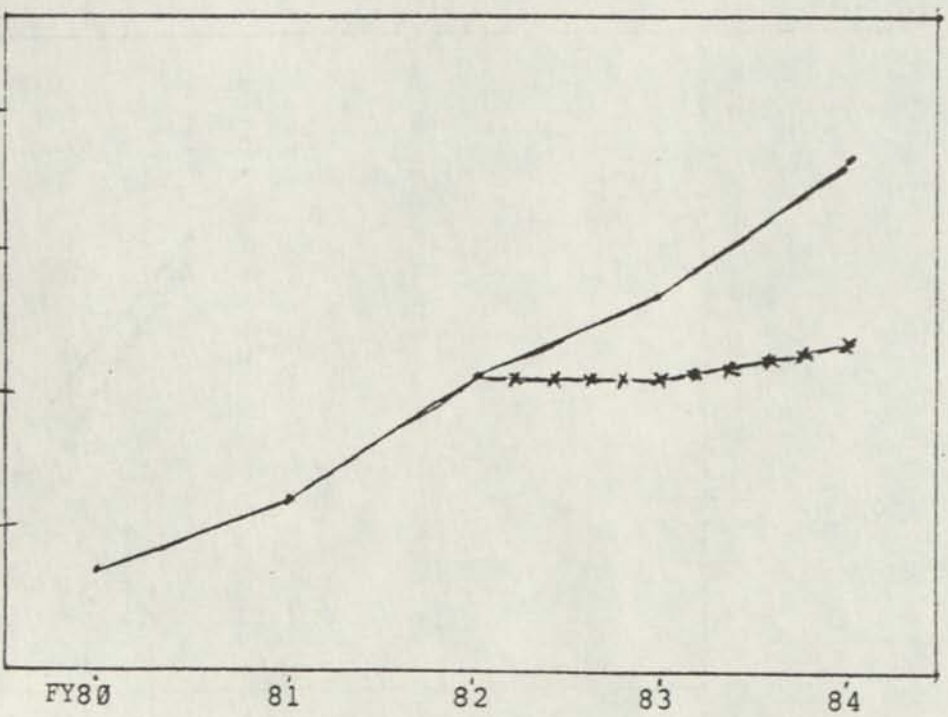
Legend: Solid line = Steering Comm. Plans
"x" line = TMG Goal

OPTION VT278



CUMULATIVE VOLUME	-	-	8.0	20.0	32.0

OPTION RK07

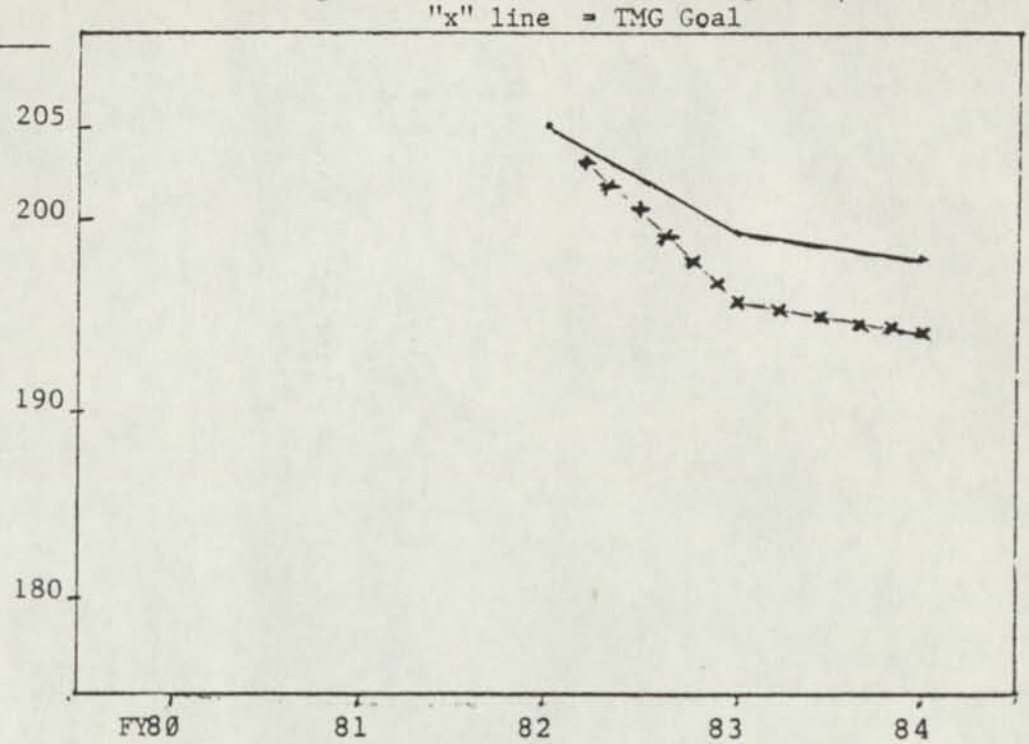


CUMULATIVE VOLUME	15.8	20.1	25.6	29.1	31.1

PRODUCT COST CURVES

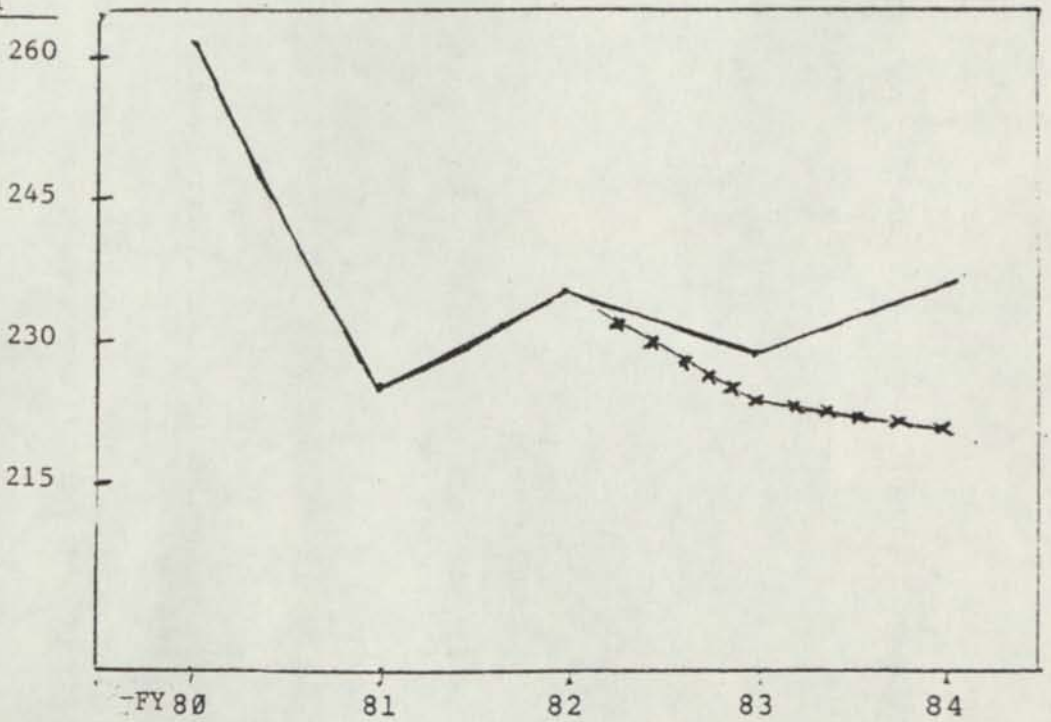
Legend: Solid line = Steering Comm, Plans
"x" line = TMG Goal

OPTION KXT11



CUMULATIVE VOLUME	-	-	12	37	72

OPTION KDF11



CUMULATIVE VOLUME	4	40	80	140	205

MAJOR INVESTMENTS

CAPITAL

Brief description of investment. Quantify cost and benefit by year.

PROJECT	EXPENDITURES ($M)						BENEFITS ($M)					
	81	82	83	84	85	86	81	82	83	84	85	86
BO-92K ft^2 addition		7.6							additional capacity			
AB-125K ft^2 addition		3.0	4.5						additional capacity			
PN-188K ft^2 addition	5.0								additional capacity			
maternal handling sys.	1.5	2.4	0.5				-	0.7	1.7	2.6	3.4	3.8
WF-200K ft^2 whse addit.	0.6	9.4	10.0						1.9	2.6	2.9	3.2
200K ft^2 metals fac.				8.0	12.0	-					2.4	7.2
Board Shop				25.0	3.0	-			internals capacity			

Expense

Major expense program investments. Brief description. Quantify cost and benefit by year.

Expense programs are not currently identified. FY82 Long Rang Plan will identify program-related expenses.

12/1/80

ATTACHMENT #8

TERMINALS MANUFACTURING GROUP RESOURCES

	FY80	FY81	FY82	FY83	FY84	FY85	FY86
GROUP OUTPUT $	293	389	413	583	733	919	1114
OPTION OUTPUT $	224	303	330	476	608	769	934
NON MAT'L SPD $	113	131	140	166	210	293	344
EXT MAT'L PURCH $	138	185	203	302	395	470	559
MAT'L ACQ. %	8.38	8.92	8.35	8.14	8.09	8.07	7.88
RECEIPTS VOLUME $ (OUTSIDE GRP)	67	101	94	123	165	186	224
INVENTORY $	86.1	107.0	120.0	122.8	148.6	166.2	192.6
WEEKS	10.9	12.4	10.8	10.2	9.9	8.8	8.4
CAPITAL SPENDING $	9	18	27	42	48	31	25
CAPITAL APPROP $	8	33	25	26	59	22	22
NET PP&E $	40	50	69	96	134	144	146
DL	2446	2595	2399	3073	3570	4212	4847
IL	2124	2255	2218	2522	2838	3089	3454
% OFF SHIFT	24	24	26	28	30	32	33
% SUB CONTRACT	1.6	1.3	.5	.9	1.6	2.5	2.5
SPACE: (K SQ.FT)							
MFG. AVAIL	1004	1116	1122	1201	1435	1512	1502
% UTIL	94	91	96	94	89	89	91
DIST. AVAIL	381	464	524	581	606	656	666
% UTIL	100	100	99	98	96	92	92
TOTAL AVAIL	1385	1580	1646	1782	2041	2168	2168
% UTIL.	96	93	97	95	91	90	91

ATTACHMENT #9

PERFORMANCE METRICS

	FY80	FY81	FY82	FY83	FY84	FY85	FY86
$VA/PERSON	24.2	24.6	26.8	30.3	31.4	39.9	41.1
△%		+1.4	+9.1	+13.1	+3.8	+27.2	+3.0
$OUTPUT/PERSON	69.1	82.0	86.9	113.8	121.2	132.6	140.7
△%		+18.9	+5.9	+30.9	+6.5	+9.4	+6.2
$OUTPUT/SQ.FT	221	264	259	344	396	474	563
△%		+19.3	-1.7	+32.6	+15.0	+19.8	+18.9
TOTAL SQ.FT/PERS.	290	304	345	303	289	266	238
△%		+4.8	+13.5	-12.2	-4.6	-8.0	-10.5
OUTPUT/AVER.ASSETS	2.52	2.76	2.39	2.86	2.93	3.11	3.44
△%		+9.5	-13.4	+19.7	+2.5	+6.1	+10.6
NON MAT'L SPD/ AVG. ASSETS	.97	.93	.81	.82	.84	.99	1.06
△%		-4.1	-12.9	+1.2	+2.4	+17.9	+7.1
OUTPUT/IL$	9.5	10.1	9.6	11.8	12.1	12.3	12.9
△%		+6.3	-5.0	+22.9	+3.0	+1.5	+4.4
T.C. STD. IMPACT	-	-	+19.4	+17.5	+17.7	+23.3	+34.8
CUM △% FROM FY81			+6.3	+3.8	+3.0	+3.1	+3.9
% INPUTS/OUTPUTS	104.2	102.7	102.2	102.5	100.1	102.1	100.7
DELIVERY GOAL	95%	95%	96%	97%	98%	99%	99.9%
% PROD CERTIF COMMITS MET	50%	100%	100%	100%	100%	100%	100%
% N.P. CERTIFIED	100%	100%	100%	100%	100%	100%	100%
% PROD DECERTIF.	0	0	0	0	0	0	0

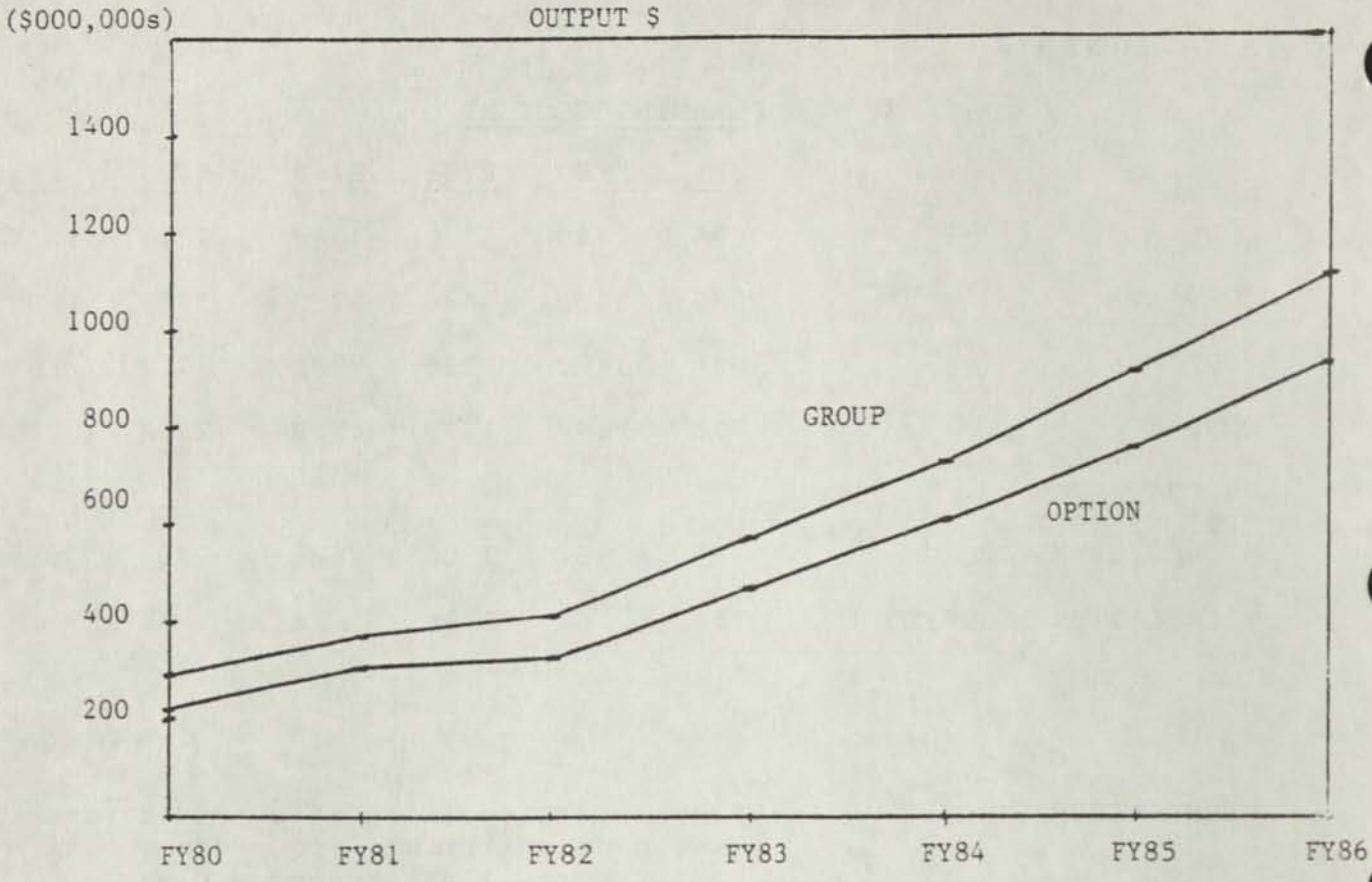
ATTACHMENT #10

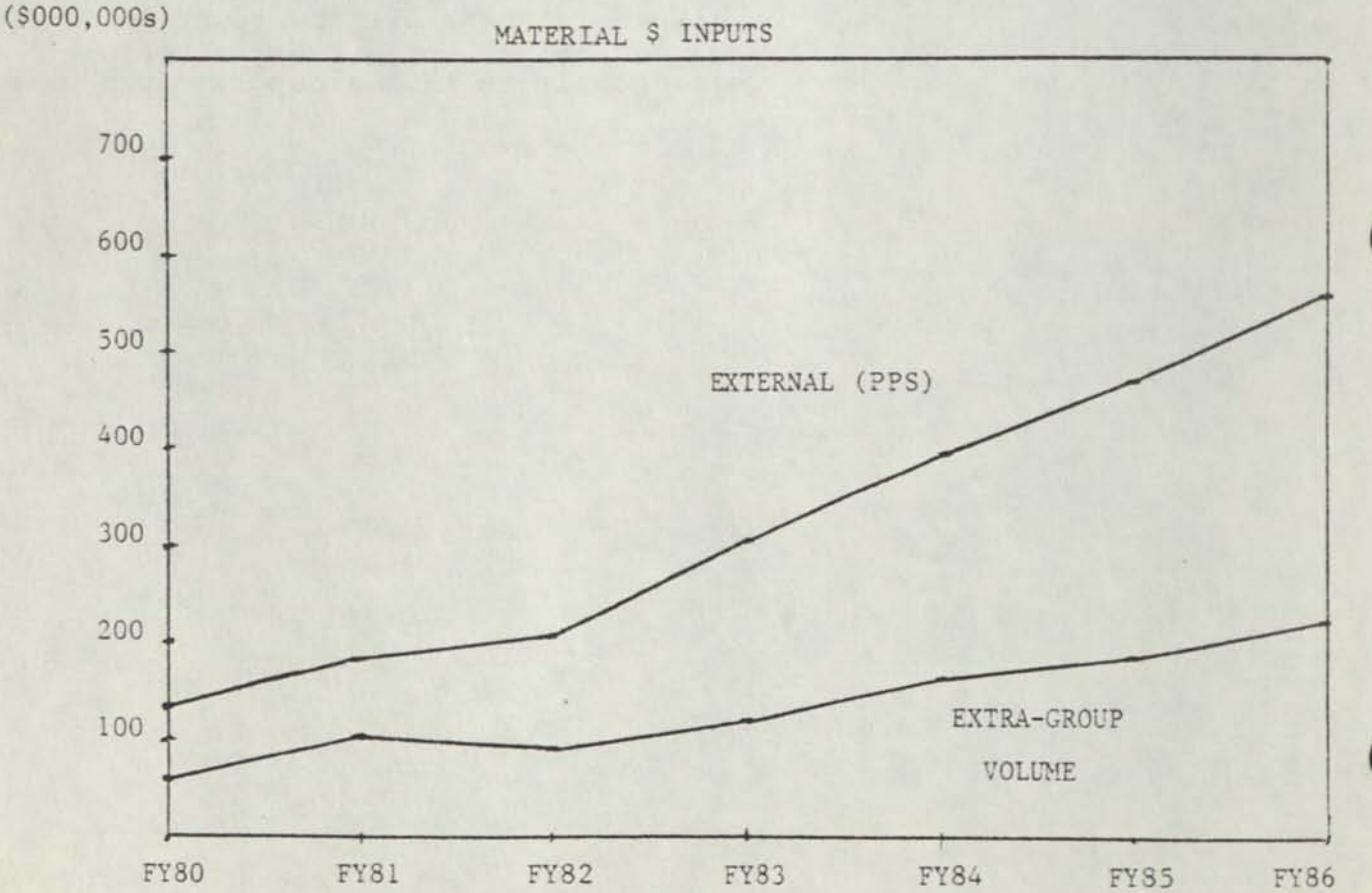
PLANNING CONTEXT

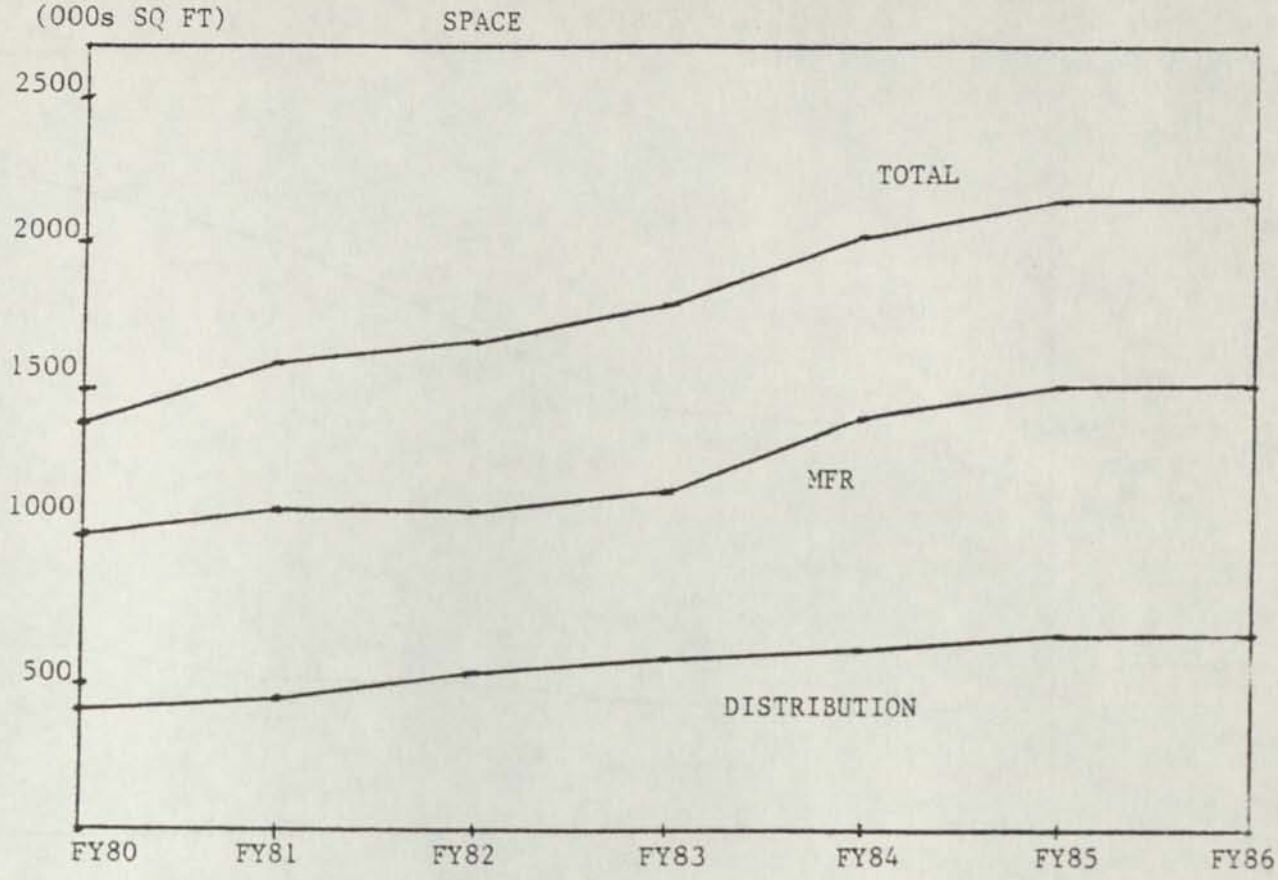
	FY81	FY82	FY83	FY84	FY85	FY86
CORP NOR	3296	4340	5720	7560	9840	12775
CORP NES	2580	3400	4480	5920	7700	10000
CORP MLP	3007	3970	5220	6900	8970	11670
CORP TC	790	1040	1370	1810	2360	3060
PRODUCT MFG* OPTIONS TO FA&T MICROS/TERMS/IEG	845	950	1300	1807	2433	3190
% INFLATION ASSUMED	11%	10%	9%	9%	8%	8%

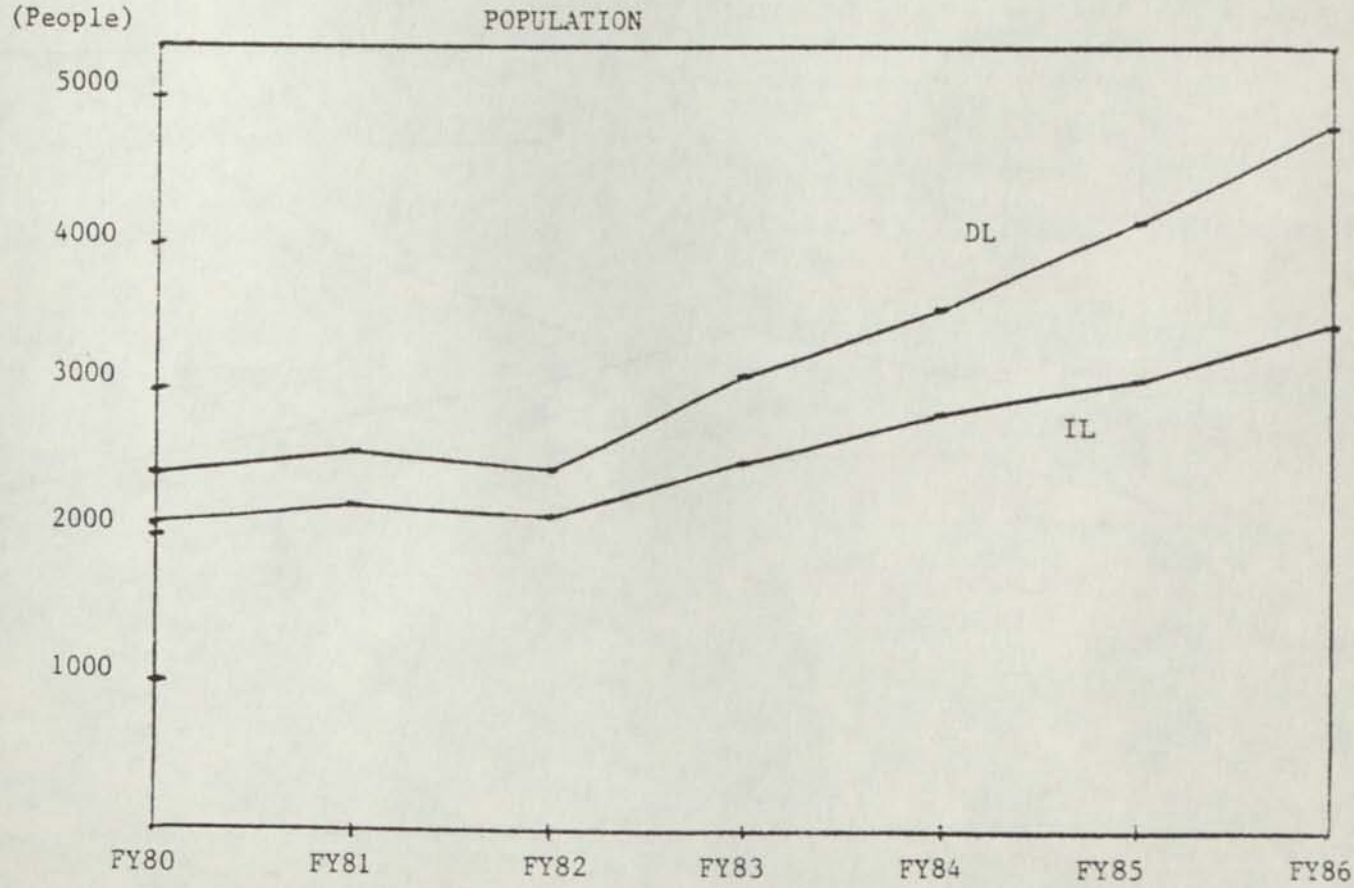
OTHER ASSUMPTIONS:

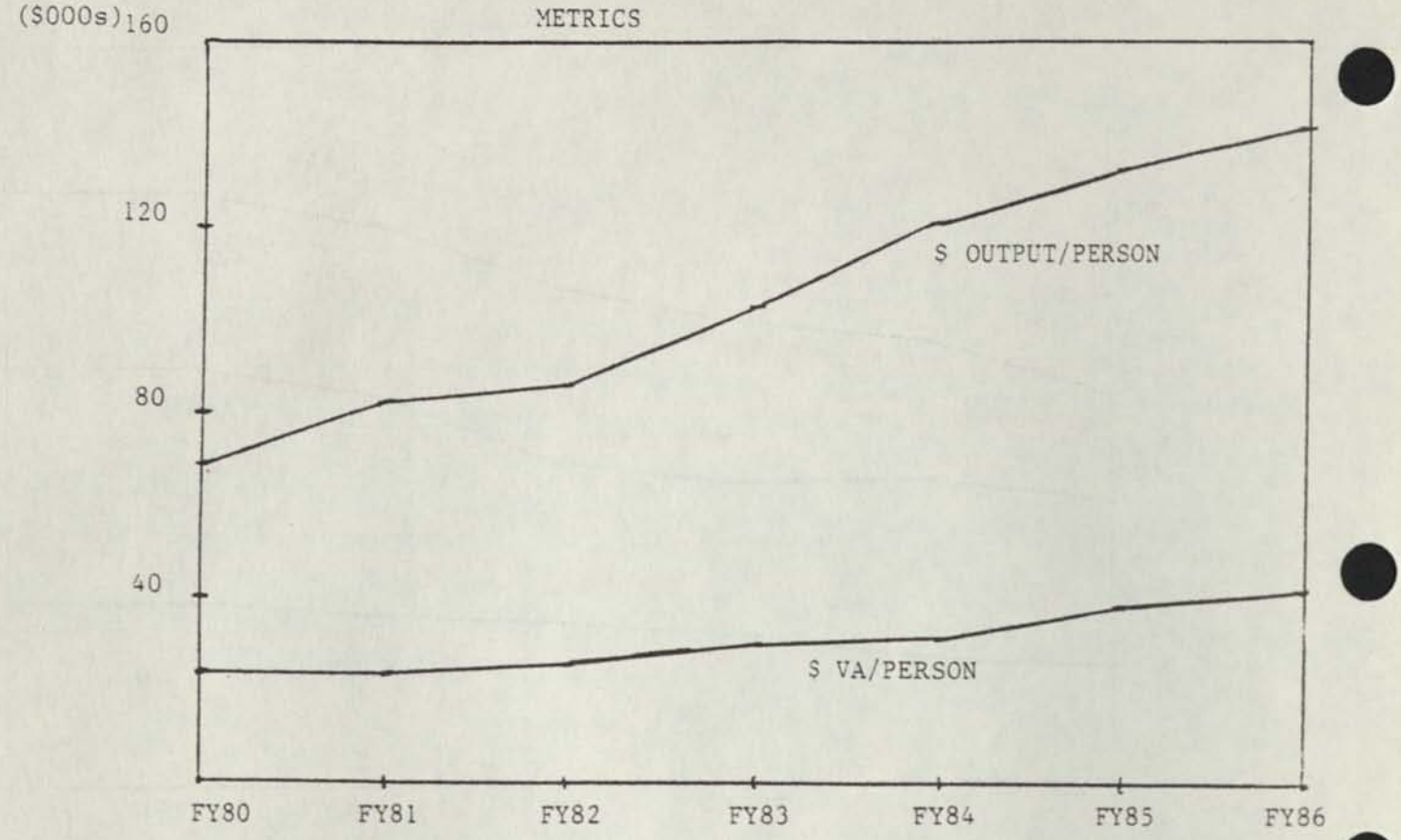
*The latest revision of output targets was handled through group management adjustment. Plant resource plans, steering group build plans and related cost projections are based on higher volumes. These will be reworked during Q3 so that the plants and steering groups tie to this group resource plan.

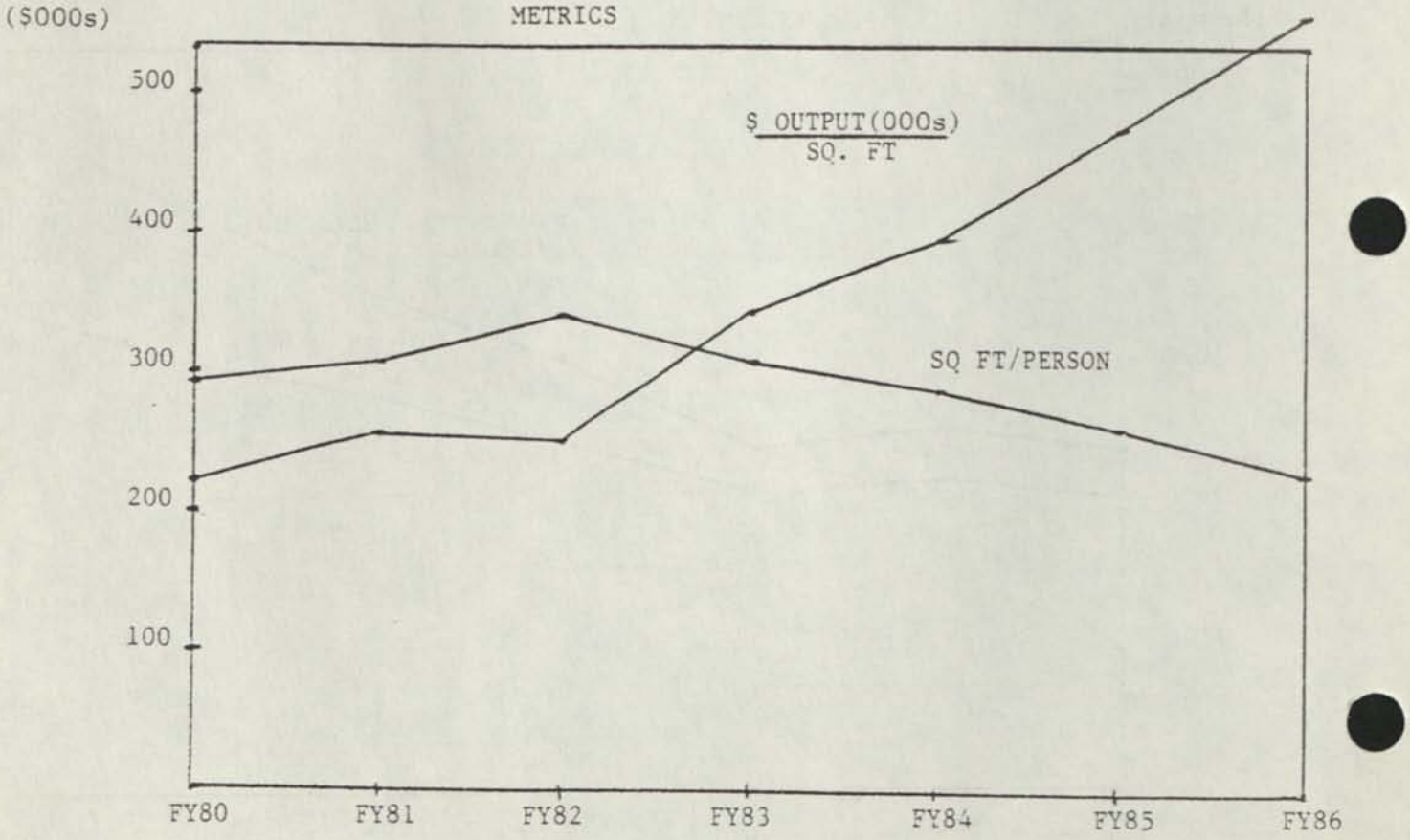

($000,000s)
OUTPUT $
1400
1200
1000
800
600
400
200
GROUP
OPTION
FY80
FY81
FY82
FY83
FY84
FY85
FY86


($000,000s)
MATERIAL $ INPUTS
700
600
500
400
300
200
100
EXTERNAL (PPS)
EXTRA-GROUP
VOLUME
FY80
FY81
FY82
FY83
FY84
FY85
FY86


(000s SQ FT)
SPACE
2500
2000
1500
1000
500
TOTAL
MFR
DISTRIBUTION
FY80
FY81
FY82
FY83
FY84
FY85
FY86


(People)
POPULATION
5000
4000
3000
2000
1000
DL
IL
FY80
FY81
FY82
FY83
FY84
FY85
FY86


($000s)
METRICS
160
120
80
40
$ OUTPUT/PERSON
$ VA/PERSON
FY80
FY81
FY82
FY83
FY84
FY85
FY86


($000s)
METRICS
500
400
300
200
100
$ OUTPUT(000s)
SQ. FT
SQ FT/PERSON
FY80
FY81
FY82
FY83
FY84
FY85
FY86

DATE:21-NOV-80

COMPANY CONFIDENTIAL

LONG RANGE RESOURCE PLAN

REPORT TYPE - FULL RESOURCE PLAN -$MILLIONS- ORGANIZATION : GPTERM - TERMINALS GROUP

LINE NO.	DESCRIPTION	FY80	FY81	FY82	FY83	FY84	FY85	FY86
*****	MANUFACTURING INPUTS *****							
1	EXT MATERIAL PURCHASES	138.02	184.61	202.50	301.78	394.97	469.80	558.53
2	MATERIAL ACQ %	8.38%	8.92%	8.35%	8.14%	8.09%	8.07%	7.88%
3	MATERIAL ACQUISITION $	11.56	16.48	16.90	24.56	31.97	37.90	43.99
4	VOL DL SALARY SPENDING	25.97	30.52	32.95	39.51	52.12	68.45	82.61
5	VOL IL SALARY SPENDING	30.78	38.73	42.87	49.42	60.29	74.53	86.54
6	VOL OTHER PAYROLL	14.75	18.37	19.97	23.39	29.59	37.67	44.41
7	VOL OTHER OH SPENDING	52.07	58.78	60.48	77.67	97.95	146.91	169.84
9	SUBCONTRACT SPENDING	0.58	1.40	0.72	0.89	1.66	3.06	4.17
10	NON-MATERIAL SPENDING	112.59	131.34	140.09	166.32	209.64	292.72	343.58
11	MFG VARIANCE	0.45-	2.69-	2.98-	0.94-	1.11-	1.23-	2.29-
12	NEW PLT START-UP/EXC CAP	1.74-	2.94-	0.00	0.00	5.72-	0.00	0.00
13	NON-INVEN RECOVERIES	7.74	9.14	9.66	10.12	12.81	14.60	15.90
14	VALUE ADDED/FA&T SPENDING	102.66	116.57	127.45	155.26	190.00	276.89	325.39
15	REC FROM VOL - IN GRP	59.31	84.30	95.37	136.92	171.90	218.40	242.58
16	REC FROM VOL-OUTSIDE GRP	68.66	100.58	93.79	122.55	165.41	186.41	223.70
17	REPAIRS & REFURBS (INPUT)	10.10	14.81	19.31	22.87	26.49	29.70	35.95
18	TOTAL INPUTS	388.31	517.33	555.32	763.94	980.74	1,219.10	1,430.14
19	% MTRL SPD/STANDARD SPD	59.30%	63.30%	63.26%	67.76%	69.20%	64.71%	64.93%
*****	MANUFACTURING OUTPUTS *****							
20	TOT VOL OPTION PLAN ($81)	597.00	845.00	950.00	1,300.00	1,807.00	2,433.00	3,148.00
21	OPTIONS TO FA&T	127.98	148.88	159.92	250.84	295.92	375.13	445.06
22	OPTIONS TO MICROS	15.00	31.40	29.63	50.00	71.90	98.83	134.29
23	OPTIONS TO TERMINALS	81.09	122.72	140.38	174.77	240.07	294.90	354.55
24	OPTIONS TO FA&T/M/T	224.07	303.00	329.93	475.61	607.89	768.86	933.90
25	LOOSE PIECE %	4.31%	5.67%	5.83%	4.62%	4.05%	3.72%	3.61%
26	LOOSE PIECE $	9.65	17.19	19.25	21.97	24.61	28.59	33.76
27	OUPUT TO CSS/A&SG/TPL/FS	31.71	37.44	37.21	54.76	69.01	86.12	105.70
28	OUTPUT TO VOL - IN GRP	59.26	84.42	94.95	137.00	172.15	218.99	242.62
29	OUTPUT TO VOL-OUTSIDE GRP	27.40	31.70	27.00	31.00	31.00	35.70	40.40
31	INVENTORIABLE OUTPUT	352.09	473.75	508.34	720.34	904.66	1,138.26	1,356.38
32	REPAIRS & REFURBS(OUTPUT)	8.90	15.72	19.76	23.98	26.20	31.95	39.12
33	SCRAP/MISC %	3.32%	2.98%	3.04%	2.21%	2.27%	2.05%	1.84%
34	SCRAP/MISC $	11.68	14.11	15.44	15.89	20.54	23.30	25.00
35	TOTAL OUTPUT	372.67	503.58	543.54	760.21	951.40	1,193.51	1,420.50
36	GROUP OUTPUT	292.83	389.33	413.39	583.34	732.51	919.27	1,113.76
37	% OPTNS OUTPUT/TOT OUTPUT	78.34%	78.20%	78.26%	80.31%	81.24%	81.90%	82.10%
38	% GRP OPTIONS/TOT VOL OPT	37.53%	35.86%	32.69%	35.24%	32.66%	30.64%	28.58%
39	% V-V OUTSD GRP/TOT OUT	9.58%	8.18%	6.40%	5.23%	4.14%	3.80%	3.55%
40	TRANSFER COST STDS IMPACT	0.00	0.00	19.40	17.50	17.[illegible]	23.30	34.76

LONG RANGE RESOURCE PLAN
REPORT TYPE - FULL RESOURCE PLAN -$MILLIONS- ORGANIZATION : GPTERM - TERMINALS GROUP

LINE NO.	DESCRIPTION	FY80	FY81	FY82	FY83	FY84	FY85	FY86
*****	INVENTORY *****							
44	FY79 EI $	69.20	0.00	0.00	0.00	0.00	0.00	0.00
45	VOL EI $ YRS 80, 81, 82	86.05	107.00	120.00	0.00	0.00	0.00	0.00
46	NXT G1 VOL PLT OUT 80-82	124.50	130.26	170.33	0.00	0.00	0.00	0.00
47	VOL PLT WKS, YRS 80-82	8.99	10.68	9.16				
48	VOL PLT WKS, YRS 83-86	0.00	0.00	0.00	8.70	7.98	7.12	6.83
49	VOL PLT EI $, YRS 83-86	0.00	0.00	0.00	128.70	148.31	166.68	189.99
50	% INPUTS/OUTPUTS	104.20%	102.73%	102.17%	100.49%	103.08%	102.14%	100.68%
51	NXT G1 VOL GRP OUT 80-82	102.47	112.00	145.00	0.00	0.00	0.00	0.00
52	VOL GROUP WKS YRS 80-82	10.92	12.42	10.76				
53	VOL GROUP WKS YRS 83-86	0.00	0.00	0.00	10.24	9.88	8.80	8.41
54	VOL GROUP EI $ YRS 83-86	0.00	0.00	0.00	122.78	148.58	166.20	192.55
55	VOL GROUP EI $ FROM I/O	86.62	106.71	123.13	124.10	152.91	175.16	177.37
61	INVENTORY REVALUATION	1.03	1.08	1.04	1.00	1.01	1.01	1.01
62	COST OF CARRYING INVEN.	19.41	24.15	28.38	30.34	33.92	39.35	44.84

DATE:21-NOV-80 COMPANY CONFIDENTIAL

LONG RANGE RESOURCE PLAN

REPORT TYPE - FULL RESOURCE PLAN -$MILLIONS- ORGANIZATION : GPTERM - TERMINALS GROUP

LINE NO.	DESCRIPTION	FY80	FY81	FY82	FY83	FY84	FY85	FY86
*****	PEOPLE *****							
63	DL REQUIRED	2,486	2,629	2,412	3,102	3,626	4,318	4,967
64	STANDARD HRS/DL	1,565.87	1,566.85	1,569.98	1,570.14	1,570.96	1,572.70	1,574.96
65	% SUBCONTRACTED	1.64%	1.31%	0.54%	0.94%	1.57%	2.52%	2.48%
66	DL IN-HOUSE	2,446	2,595	2,399	3,073	3,570	4,212	4,847
67	SUBCONTRACTING - EQUIV DL	40	34	13	29	56	106	120
68	IL	2,124	2,255	2,218	2,522	2,838	3,089	3,454
69	TOTAL PEOPLE IN-HOUSE	4,570	4,850	4,617	5,595	6,408	7,301	8,301
70	DL:IL	1.15	1.15	1.08	1.22	1.26	1.36	1.40
71	FY79 DL	2,240	0	0	0	0	0	0
72	FY79 IL	1,626	0	0	0	0	0	0
73	FY79 EQUIV-DL SC	0	0	0	0	0	0	0
74	FY78 % IL NON-EXEMPT	53.30%						
75	% IL NON-EXEMPT	51.62%	51.07%	51.26%	50.20%	51.36%	51.30%	51.78%
76	SALARY $K/EXEMPT	22.28	23.57	25.42	27.45	29.53	33.12	35.19
77	% FRINGE/EXEMPT	19.48%	20.88%	20.89%	20.86%	20.90%	20.94%	20.90%
78	SALARY $K/NON-EXEMPT	11.08	12.11	13.20	14.44	15.69	17.59	18.24
79	% FRINGE/NON-EXEMPT	29.53%	29.72%	29.53%	29.44%	29.26%	29.15%	28.91%
80	SUBCONTRACT $K/EQUIV-DL	29.00	37.84	30.64	42.38	39.06	37.78	36.90
81	% OF DL SECOND SHIFT	30.99%	30.40%	32.43%	33.94%	34.90%	35.40%	36.54%
82	% OF DL THIRD SHIFT	4.21%	3.89%	6.34%	6.41%	7.98%	8.33%	8.23%
83	% OF IL SECOND SHIFT	9.98%	10.11%	11.23%	11.50%	12.30%	12.59%	13.32%
84	% OF IL THIRD SHIFT	1.18%	1.42%	1.62%	1.70%	1.97%	2.20%	2.29%
85	PEOPLE FIRST SHIFT	3,472	3,700	3,402	4,022	4,472	5,002	5,592
86	DL FIRST SHIFT	1,585	1,705	1,469	1,833	2,039	2,370	2,677
87	IL FIRST SHIFT	1,887	1,995	1,933	2,189	2,433	2,632	2,915
88	DL:IL FIRST SHIFT	0.84	0.85	0.76	0.84	0.84	0.90	0.92
89	PEOPLE SECOND SHIFT	970	1,017	1,027	1,333	1,595	1,880	2,231
90	DL SECOND SHIFT	758	789	778	1,043	1,246	1,491	1,771
91	IL SECOND SHIFT	212	228	249	290	349	389	460
92	DL:IL SECOND SHIFT	3.58	3.46	3.12	3.60	3.57	3.83	3.85
93	PEOPLE THIRD SHIFT	128	133	188	240	341	419	478
94	DL THIRD SHIFT	103	101	152	197	285	351	399
95	IL THIRD SHIFT	25	32	36	43	56	68	79
96	DL:IL THIRD SHIFT	4.12	3.16	4.22	4.58	5.09	5.16	5.05
97	% OF PEOPLE OFFSHIFT	24.03%	23.71%	26.32%	28.11%	30.21%	31.49%	32.63%
98	GROUP OUTPUT/PERSON $K	69.10	82.02	86.90	113.78	121.20	132.55	140.73
99	PLANT OUTPUT/PERSON $K	83.08	99.80	106.86	140.50	149.68	164.12	171.39
100	VA (FA&T SPD)/PERSON $K	24.22	24.56	26.79	30.28	31.44	39.92	41.12
101	GROUP OUTPUT/DL $K	123.92	152.23	164.01	211.59	217.75	231.44	239.91
102	PLANT OUTPUT/DL $K	149.00	185.24	201.68	261.28	268.92	286.57	292.17
103	GROUP OUTPUT/IL $K	156.18	177.82	184.84	246.14	273.32	310.20	340.44
104	% NON-INV/TOT NON-MAT SPD	8.82%	11.25%	9.02%	6.65%	9.37%	5.41%	5.29%
105	GROUP OUTPUT/DL SPENDING	11.28	12.76	12.55	14.76	14.05	13.43	13.48
106	GROUP OUTPUT/IL SALARY SP	9.51	10.05	9.64	11.80	12.15	12.33	12.87

COMPANY CONFIDENTIAL

REPORT TYPE - FULL RESOURCE PLAN

LONG RANGE RESOURCE PLAN
-$MILLIONS- ORGANIZATION : GPTERM - TERMINALS GROUP

LINE NO.	DESCRIPTION	FY80	FY81	FY82	FY83	FY84	FY85	FY86
*****	SPACE *****							
107	MFG K SQ FT REQUIRED	943.26	1,012.06	1,076.56	1,127.30	1,271.80	1,340.60	1,365.60
108	MFG K SQ FT OWNED	981.16	1,055.56	1,062.56	1,144.40	1,378.40	1,468.40	1,458.40
109	MFG K SQ FT LEASED	23.10	61.10	60.10	57.10	57.10	44.10	44.10
110	MFG K SQ FT AVAILABLE	1,004.26	1,116.66	1,122.66	1,201.50	1,435.50	1,512.50	1,502.50
111	% MFG SPACE UTILIZED	93.93%	90.63%	95.89%	93.82%	88.60%	88.63%	90.89%
112	REQ MFG SQ FT/PERSON	206.40	208.67	233.17	201.48	198.47	183.62	164.51
113	REQ MFG SQ FT/1ST SHIFT	271.68	273.53	316.45	280.28	284.39	268.01	244.21
114	GRP OUTPUT/MFG SQ FT REQ	310.44	384.69	383.99	517.47	575.96	685.72	815.58
115	PLT OUTPUT/MFG SQ FT REQ	373.27	468.10	472.19	639.00	711.32	849.07	993.25
116	DISTRIB K SQ FT REQUIRED	381.34	463.71	517.09	568.41	579.73	599.73	612.23
117	DISTRIB K SQ FT OWNED	214.34	314.72	307.72	517.73	538.73	648.73	658.73
118	DISTRIB K SQ FT LEASED	167.00	148.99	216.00	63.00	87.00	7.00	7.00
119	DISTRIB K SQ FT AVAIL	381.34	463.71	523.72	580.73	605.73	655.73	665.73
120	% DISTRIBUTION SPACE UTIL	100.00%	100.00%	98.73%	97.88%	95.71%	91.46%	91.96%
121	TOTAL K SQ FT REQUIRED	1,324.60	1,475.77	1,593.65	1,695.71	1,851.53	1,940.33	1,977.83
122	TOTAL K SQ FT OWNED	1,195.50	1,370.28	1,370.28	1,682.13	1,917.13	2,117.13	2,117.13
123	TOTAL K SQ FT LEASED	190.10	210.09	276.10	120.10	124.10	51.10	51.10
124	TOTAL K SQ FT AVAIL	1,385.60	1,580.37	1,646.38	1,782.23	2,041.23	2,168.23	2,168.23
125	% TOTAL SPACE UTILIZED	95.60%	93.38%	96.80%	95.15%	90.71%	89.49%	91.22%
126	TOTAL SQ FT REQ/PERSON	289.85	304.28	345.17	303.08	288.94	265.76	238.26
127	GRP OUTPUT/TOT SQ FT REQ	221.07	263.81	259.40	344.01	395.62	473.77	563.12
128	PLT OUTPUT/TOT SQ FT REQ	265.81	321.02	318.98	424.80	488.60	586.63	685.79
*****	CAPITAL *****							
129	CAPITAL-PLANT	0.60	6.00	10.20	15.70	11.05	8.96	1.60
130	CAPITAL-EQUIPMENT	8.45	11.55	17.18	25.98	37.32	21.63	22.93
131	TOTAL CAPITAL SPENDING	9.05	17.55	27.38	41.69	48.37	30.59	24.53
132	GROSS PP&E	62.40	69.72	91.01	125.24	169.31	191.09	205.47
133	NET PP&E	39.79	49.77	68.99	95.63	133.62	143.57	145.85
134	FY79 GROSS PP&E	53.62	0.00	0.00	0.00	0.00	0.00	0.00
135	FY79 NET PP&E	37.25	0.00	0.00	0.00	0.00	0.00	0.00
136	GRP OUT/AVG GROSS ASSETS	2.16	2.39	2.13	2.54	2.59	2.72	2.95
137	PLT OUT/AVG GROSS ASSETS	2.60	2.91	2.62	3.14	3.20	3.37	3.59
138	NON-MAT SPD/AVG GRS ASSET	0.83	0.81	0.72	0.72	0.74	0.87	0.91
139	GRP OUT/AVG ASSETS	2.52	2.76	2.39	2.86	2.93	3.11	3.44
140	PLT-OUT/AVG ASSETS	3.03	3.35	2.94	3.54	3.61	3.85	4.19
141	NON-MAT SPD/AVG ASSETS	0.97	0.93	0.81	0.82	0.84	0.99	1.06
142	CAPITAL APPROP PLANT	0.85	16.02	7.30	6.40	19.00	1.20	1.80
143	CAPITAL APPROP EQUIP	7.48	17.42	17.87	20.03	39.60	20.83	20.53
144	NET PRODUCTIVE REQ	1,059.68	1,180.61	1,274.92	1,356.56	1,481.22	1,552.28	1,582.26
145	NET PRODUCTIVE AVAIL	1,108.48	1,264.29	1,317.10	1,425.78	1,632.98	1,734.58	1,734.58
*****	TAX HAVENS *****							
146	TAX HAVEN RECEIPTS	0.00	0.00	0.00	0.00	0.00	0.00	0.00
147	TAX HAVEN PBT	0.00	0.00	0.00	0.00	1.40	0.21	0.28