Computation Book

NUMBER OF BOOK 1

NAME Gary Morgenthaler

SUBJECT

USED FROM 1977 TO

NO. 09-9890 11¾ IN. x 9⅜ IN. 152 PAGES
A PRODUCT OF THE MEAD CORPORATION, DAYTON, OHIO 45402

Gary J. Morgenthaler

Honeywell - March 8, 1977

Ken Jones -
United Data Centers -
VM/370 - (DOS support in virtual machine)
Paradyne - PIX
multiplexer channel - remote (1000 - 2000 mi)
1403 quality - tax returns
card punch / PIX / card reader / printer
360/30s & 360/40
4 x 370/158 — plus 4 PIX units per 370/158 -
3705 - talks to 2780/3780

Dave - 5 Opportunities:
① Msg. Switch (Walt Ulrich)
② Distributed Processing applications - cross support
③ Data Entry -
④ PPS - page printer system (Boeing & TRW AX in Waltham) -
⑤ ASTA - American Society of Travel Agents - joint proposals -

Data Centers -
- Financial reporting System
- CATV business
- Banking Applications (Birmingham) -

Dynatax - written in FORTRAN
Data Entry -
Entrex, Inforex, 029s -
several hundred people hired during

60 cards - per return
2000 - 4000 chars?

300,000 returns per year

Unitax – Los Angeles –
360/55
simpler, cheaper returns
2 to 3 times the DYNATAX requirements –

48 hour turnaround guarantee – (local processing necessary)
10 form changes per 200 returns !!
a great deal of forms changing –
Print centrally and still maintain 48 turnaround.

Aaron Tymes – 3-8-77

1967 – development
1971 – TYMNET operational

210-215 nodes
growing at one node per week / one & ½ nodes
620i / 620L / V13

TYMNET II – deployment this summer –

32-bit machine –
16 regist
efficient real-time interrupts –
completely operable remotely
partitioned memory for protection
(segmentation – 16 segments) –

128 KByte – to 1 MByte –

Tymnet II –
superimposed over TYMNET I –
"freeway system over general highway system"

TYMNET II:

① Tolerates buggy code - partitioned code
② Operable remotely - unattended operation
③ Temperature sensing
④ Other diagnostic aids - downloaded -
⑤ Configuration is
completely dynamic - real-time reconfiguring
- just plug in a new node
⑥ Error recovery - e.g., line outage, etc.
⑦ Higher bandwidth - 1000 LPM printer
- pro superhigh bandwidth - for Page Printer System
⑧ Ciphering
and Encryption
⑨ Access rights! - monitored by TYMNET II supervisor
very general and as complicated as desired.
⑩ Reliability - highly fault tolerant -
- line outages and node failures are
recovered from transparently
⑪ ASTA -
⑫ Msg switch redundancy geographic dispersion -
⑬ Totally general terminal support!! hosts & terminals
Anadex gas pump, line printer, telephone, etc. [address a group of ports!!]
consumes and emits digital data in real-time
⑭ Touch-tone input with voice answerback - VOTRAX
English / German / French ☺ good fidelity
order entry into retrieval,
212 - not tariffed & does not work yet!
300 → 1800 bps -
⑮ Transaction I & II - transaction telephones -
digital display (LED's) -
special purpose, low cost applications -
special printer)
⑯ Battery backup - critical nodes in the field -
⑰ Dial-out -

John Kallenbach -

Honeywell -

GCOS - MDT 1 - multiprogramming -
release 1 in June -
to test site

multiple on-line tasks (foreground)
one batch stream

long-address format - LAF - 1 megabyte -

File system
- sequential / relative / indexed
- Unified-file-access-system - UFAS -
- file system (directories) -
  - like Multics - hierarchical - up to 69 levels -
  - uses path-names -

EXEC
- execution control language (JCL)
- operator's control language -

Teletype, 2780 non-polled -
- asynchronous
- buffered
- VIP // error control
- addressability -
  - forms
  - polling
  - selective transmission of data

- 1000-2000 chars
- 9600 bps

EDITOR
ASSM
PRE PROC. (MACRO)
COBOL - ISAM (single key) -
FORTRAN
RPG II
SORT
UTILITIES
MLCP LOADER/ASSM.
LINKER

3/8/77

Honeywell –

MDT-1 — limit

MDT-2 (November 1977)
- Advanced Fortran '76
- Enhancements
- COBOL (5 to 13 times / 40 perform) (CIP - commercial instruction proc)
- WCS - 2KW - 64Bit
- HDLC & TOOLS (physical drivers) (X25 derivative) -
- MMU - "simple fence" (no segmentation yet)
- LAP
- Auto Call
- Storage Module 40-80MB
- ISL
-

"6/3"
MDT-3 — 1QT87 } test site
2QT87 } general release
Multi-user transaction-oriented system (à la Varian Vortex)
- Segmentation @ 4 rings
- MMU2 →
- TDS - transaction driven system
- 150-300 MByte Storage Module
- "distributed system environment"

TDS-II – transaction-driven system (about ½ level 66 – GCOS ~~6~~ – TDS)

Reentrant Code
Transaction Processor
IDS-II
EXEC ~~EXEC~~ nucleus

DISTRIBUTED SYSTEM ENVIRONMENT (X25 BASED)
1. prior phase – no general release
2. downline load Q1'78 unattended (level 6)
3. HDLC – SNP-1 – (Honeywell 66)
4. cross support
5. memory mgmt.

TDS level 66 (MME → X25)

Data Entry

SNP – Systems Network Processor –
- individual releases – 3 releases specified between now and 1979
- DSE – "distributed systems environment" – standard protocols – (formerly HDSA) – 4-5→6 years!!
- terminal concentrator w/ standalone
- SNP/1 – more standalone; foreign interconnect
- SNP/3 – communication w/ Q

Action List – Software Distribution –

① Fortran Cross Assembler – Level 6A to Level 6 transferable

② Interface to level 6 from TYMNET mode
- ASync (TTY) ✓
- bSync (2780) | BSC: EBCDIC, ASCII, EBCDIC (non-transparent)

③ Support package for program and data transmission ~~on~~ level 6.

Data Entry:

① we need documentation – slides, manuals, pricing, configurations

② TYMSHARE –
- formalize our requirements –
- send Honeywell a spec

③ VIP synchronous link – replaceable by 2780 link? (Data Entry system does VIP synchronous link).

Action Item:

① General update – trip to Billerica
DST – distributed system terminal
TDS – transaction driven system
DSE – distributed system environment

in 2 to 3 weeks?!

"SNP" – Systems Network Processor –
- 3 releases specified between now and 1979
- now: terminal concentration @ standalone capabilities
- SNP/1: more standalone = foreign interconnect
- SNP/3 – communication @ ...

Clyde Wilder – 3/9/77

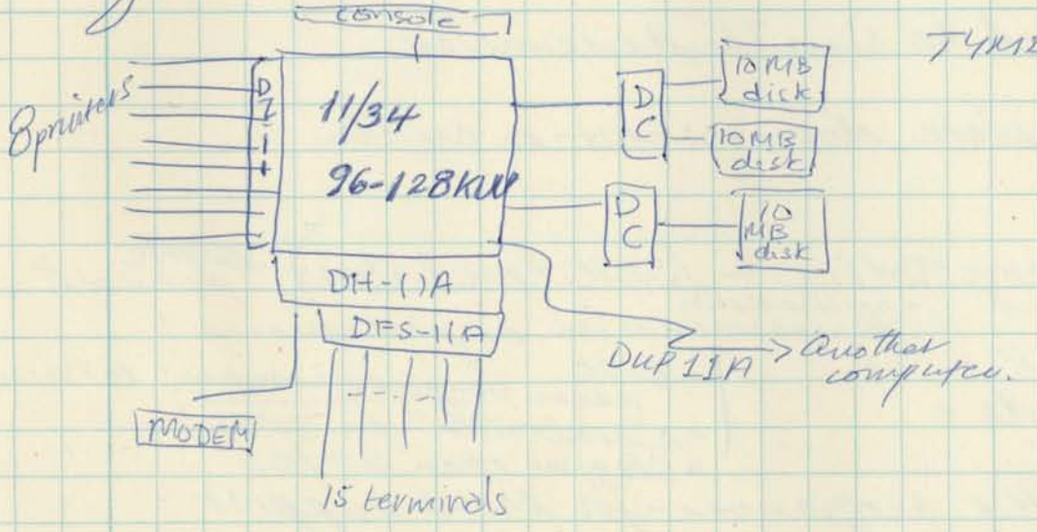
500 μsec –
system overhead to "get you to a driver" –

2 ms. – to do a QIO

DH-11 – to empty a silo – 500 μsec – to handle interrupt

150K transactions / sec across UNIBUS –
1.5 MByte (above and beyond 11/34 CPU requests)

1/4 of disk "rated capacity" – is the average that one can expect w/o degradation at peak requirements.



TIMED.

3/10/77

Bill Weiher -

① Dale would a data entry (off-line system) vehicle for MAGNUM & compatible @ host (Dale would like something up by June - Bill needs spec!)

② Wallace and the ONTYM terminal
@ specification ② time frame ⑥ incentive program
Jim McConnell, also) - Bill needs a spec!)

③ "SPEC" compiler - compiles subroutine calls!!
Bill would write cross compiler

⑨ TITO replacement -
MAGTAPE handling -

8K RAM -
4K disk buffer - one track at a time
4K utilities

16KB - required to run the assembler

④ Bill needs complete documentation on the T.I. 710.

⑤ Polled line controller ? (3270 Emulator) ? - BISYNC protocols
• polled line protocol
• polled line
• application
• Synchronous vs. asynchronous?

⑥ Debugger for ISC -
8080 code -
• 3270 ascii asynchronous! to TYMNET
• a "controller" for 3270's
• cheaper than 3270.

⑦ List of all Bill's programs - for cross support
- documentation
- publication

⑧ CMOS -
RAM - TTY terminal handler dispatch
Comm. files in CMOS

① specifications
② benefits
③ schedules
④ revenue expectation
⑤ incentives program

WFW / 4/4/77 =
$150.00/qtr. (average) -
agreement @ Cindy Anderson
- some "tie-back" into revenue -
- on a decaying curve
-
Save/Restore program -
(pending "?" conversion in spool program)

March 14, 1977

System Industries

① letter
② complete identification against liability of using DEC software — copy of sublicense
③

AMPEX / W. DYNEX:

① controller ↔ disk cable — (Roger Stalman)
a). "S.I." interface — (Ampex: #217 interface & G2 cable)
b). paddleboard
c). needs to be secured (to edge connector)
d). restrainer on both sides

cf. Don Stabler @ W. Dynex Phoenix, Ariz.

Dynex — new drives:
① 10MByte fixed @ $2300.00
5MByte fixed @ $1900.00

Logical address interlock error on bringup (bad card in disk!!)

Digital Equipment Corp 3/15/77

1) Equipment promised:

A) DH-11 (Oakland) by Friday (3/18/77) or before
B). DL11-WB - local machine (by Wednesday 3/16/77)
C). DD11-D - from local supplier (loaner until p.o. clears)
D). KG11-A - can't get one yet.
E). KL11 clock loader (is it necessary?)

Needed:
F). DUP-11-A - end of April - (needed in 2-3 weeks) ASAP!
G). DZ-11A - end of April - (needed ASAP!)

2). We need a signed agreement back from DEC, including OEM agreement number!! (#4933)

3). DEC

④ PL-90 for Clyde Wilder - $45/hr. $360/day $1600/week
- set up a schedule

[redacted] $6000/contiguous month
$4800/mo for 6 contiguous months)

⑤ Wallace needs:
1 × 11/04 - March
2 × 11/04 - April
2 × 11/04 - May
(5 × 11/04 - June?
5 × 11/04 - July?
5 × 11/04 - Aug?)

⑪ 16KW Core
⑫ DZ11A (EIA)
DUP11
DL11-WB

⑥ Change orders -
A). Master agreement - cancel cabinets H960-CA ⑨

⑦ Dave Weber's 10 hrs. consulting - ⑬ 2 weeks.
2780 / DECNET(?) / seminar - PDP-11s

⑧ COBOL - per CPU -
Executable code - license?

⑨ M9301 bootstrap

⑩ PDP 11/34
- User's Guide
- Maintenance Manual & missing schematics (Key sheet)
- Programming manuals

(11) DUP-11 → CRC-16 checksum on entire block, (KG-11A on data portion only?).
~~Bill~~ Spry @ DEC (or Jerry Reffner)

(12) Release schedule — all machines! — end of March — blanket release is needed for price protection
a). release orders, b). modify schedule, c). include new releases

(13) I need the a) current price list!
b). Maintenance manuals (John will give me ① Spares Kits ② Price list for components)
c). Spare Parts Handbook ("spares Reference Handbook")
d). DL-11 asynchronous line manual
e). KG11-A manual (why didn't we get them?)
f). (Microfiche comes quarterly pricing comes on fiche)
call documentation center →

(14) I need Version III - RSX-11M - documentation kit. ("pre-delivery kit")
(Mt. View office on 1900 Garrabella was sold out!) — & Middlefield, Mt. View.

(15) MOS machines vs. CORE machines/differences!
a). voltage regulator not supplied (20 volt regulator @ core)
b). DL11-WB ~~-~~ standard, (not optional) (bundled)
c). battery backup. (Part # for voltage regulator.)

(16) Maintenance info: (617-369-5000 night time) 8:30 5pm
a). "AIR-SPARES" — (phone # 617-897-5111 x2219/x3234/x5142/x5143)
b). DECALOG (ECO) # = 250/yr. — John will get a form for me.
c). ECO's — (via DECALOG service)
d) Depot repairs — #25.00/hr. — (plus parts) — for any DEC product.

(17) Change "ship to" address on Dale's machine to ~~[redacted]~~ Cupertino (from Washington) —

(18) APL available!?
a). RSTS/E — (DMSI) — documentation?
b). RSX-11M — when?

(19) Maintenance Card - EK-11034-MC001 (Charlie Stemp)

3/15/77

Al Fenn's System to Include: (?)

1) 11/34 CPU @ 16KW MOS
2) 64 KW Core
3) CABINET (VDL H960-CA) - 2 short racks? table top?
4) Synchronous Interface - DUP-11 (KG-11A?)
5) Asynchronous Interfaces - DZ-11A, DL11-WB
6) Programmable Real-time clock KW11-P
7) Line Printer - T.I. 810
8) Terminals
9) Software
   A) FORTRAN IV-Plus
   B) COBOL .V3
   C) RMS-11
10) Disk(s) and controller - 3 disks (DM148) and SI 3057 controller

DEC Software Licenses:

Software pricing: DEC quotes (John Marai) @ LIST PRICE

	Supported	Unsupported	(@ 44% disc)
① RMS-11K	$2750.00	$1650.00	$726.00
② COBOL .V3	$7700.00	$4730.00	$2081.20
③ DECNET .V2	$1650.00	$1100.00	$484.00
④ 2780 Emulator	$3030.00	$2750.00	$1210.00
⑤ RSX-11M (V3)	$1750.00	$1980.00	$871.20
⑥ KG-11A - (type 2 disc)	$1150.00		$828.00
⑦ FORTRAN IV-Plus	$3300.00	2750.00	$1210.00

DEC Software Sources - Pricing: (discountable?)

	Sources		Microfiche	
① RMS-11K (?)	(RMS-11 only?)	(not available)		
② DECNET-11M ~~$3500.00~~	QJ681-EE	$2750.00	QJ681-FR	$600.00
③ RSX-11M Utilities	QJ638-EE	$5500.00	QJ638-FR	$990.00
- PIP - FLX				
- VFY - SLP				
- DSC				
Ⓐ FORTRAN IV-Plus (OTS) (compiler source not available)	QP101-EE	$550.00	QP101-FR	$140.00
⑤ COBOL .V3 (product not available)				
⑥ FORTRAN IV (cf. product mgr, if desired)				
⑦ 2780 (11M)	QJD-68-EE	$2750.00	QJD68-FR	$990.00

3/15/77

Announcements and Releases: DEC.

- RMS-11K and COBOL V3 - under RSX 11M - for release in MAY 1977
- PDP-11/60 - for announcement in March 1977 ✓
- BASIC - "Plus II" — "Q1-'77" - i.e. July-August 1977 under RSX-11-M
- BASIC "Plus II" - under RSTS/E — April 15th, 1977 - General release
- DBMS-11 under RSX-11M (?) -
- 32-Bit machine - for pre-release (field-test) to selected customer sites in Dec '77 - Jan. 78 - currently up and running inhouse. (Dave Cutler)

PDP 11/60-CA :

- 2K Byte Cache
- memory mgt.
- Hardware Floating Pt.
- E.I.S.
- DL11-W
- 64K Byte MOS w/ ECC
- Battery Backup
- Programmer's Console
- List = $25,700

- WCS: $5000 (List) — includes software tools & memory
- Extended Control Store (ROM) List = $1200.00
- ~~Kit manual~~
-

ERNIE'S SYSTEM to include:

Bid $110,000.00 to Citibank

1. PDP11/34 CPU @ 16KW MOS
2. 32KW Core (Dataram)
3. 1×DM448 - AMPEX disk drive (DYNEX) (Qty. 1)
4. 1×S.I. 3057 controller
5. DH-11-AD (EIA)
6. Magtape & controller (Kennedy & Plessey)
7. RSTS/E
8. MDB line printer interface
9. RP06 - (Memorex? equivalent @ $10,500.00 200MBytes @ 50 unit qty.) (Datum & Perlec)
   - Telefile
   - DIVA
   - AED
   - XYLOGICS
10. Data Printer - LPT.
11. FP-11AU - floating point
12. KY-11A - programmer's console

3/15/77

Jim Westlake

1. Rotary Switch
   - three position switch ⓓ dual diode monitor select

2). programmable switch - "lookstrap" switch problem

Honeywell Proposal: (for March 23, 1977) 3/16/77

① Objectives & requirements –
② Cost
a). fund development of requirements specification (definition phase) – Precise definition of what 2-3 people we're going to do for them.
– Option at the end of the end of (Creeping commitment)
study to continue
– machine resource & markup
– Mark up manpower by a factor of three –
– tentative schedule
of capabilities and costs associated.

- recruiting cost's, relocation
- travel expenses to Bl/Erica)
- training in Honeywell classes, needed)

Honeywell Level 6 Level 6 decision needed?

b) 2nd phase – Development –
o 5-15 person plan
manager
programmers
document
development
testing & test-plan – (g.o. personnel)

Managerial Problems:

① Revenue Growth plan
- (key to incentives) - Incentive plan
- accounting & accountability -

② Equipment flow problems
a) needs a forecast of equipment, schedule of procurement and associated costs
b) projection of associated revenue
c). Pro-forma revenue/cost forecasts for

+ produce an instrument for approval of mini-based projects.

2) - set of criteria necessary for project approval

3). plan @ milestones - review by vice Presidents in Joint Project
- technical
- equipment scheduling and procurement, & costing
- revenues

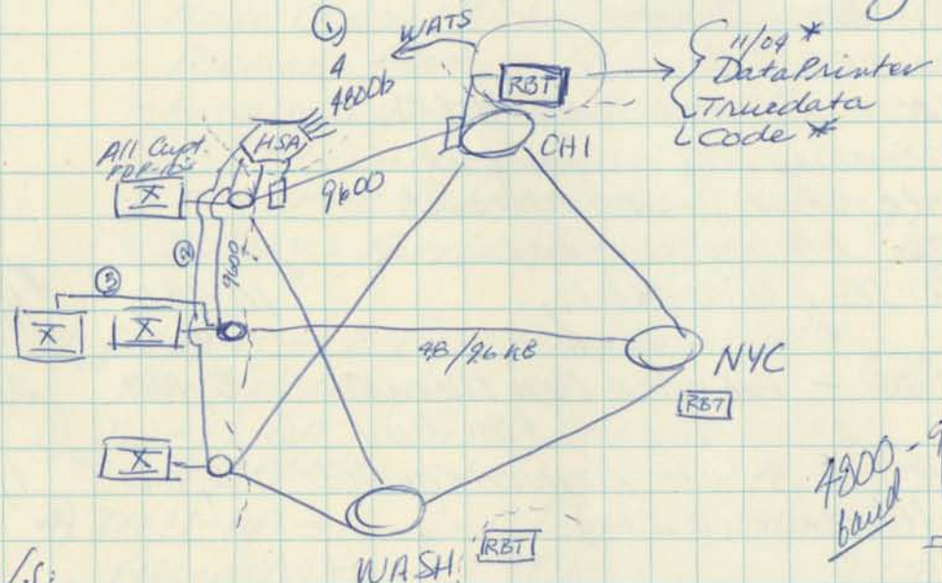
3) Incentives
a). lump sum - on completion of project
b). progress payments - toward completion of project
c). calendar

Bob Wallace, Bill Euske: RJE capability 3/22/77

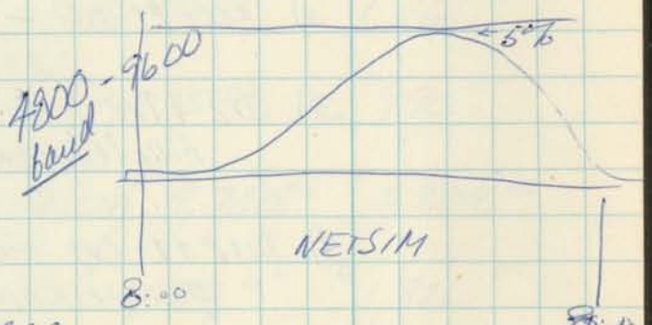
Remicks:

① High speed transmission thru TYMNET will always be compromised.

② TYMNET has never done anything quickly.



HSA - node 11.50 WCOSRS



Protocols:

① 2780/3780

Future?: —— HSA ↔ outside RBT/RCS

② HSA ↔ TYMBASE (TYMNET protocol)

③ TYMBASE ↔ HOST (Block I/O)

Ken Jones 3/23/77

① HSA —

a). needs management commitment!

b). Alternatives

1) additional bandwidth

2) "super-net" - additional HSA nodes

3).

② RJE - Cope replacement -

a). Bill Euske - in charge of HSA-task force -

HSA — 0) No special handling of high speed terminals (at log) Bill Euske 3/25

1). 1000 - 2000 baud (600 LPM) - available typically across 4800 baud network lines

2). 2780 Dispatch Base - recode; consulted 3780 Interdata/Perkin & diagnostics

3). Varian - V4.13 - (2780, no transparency).

March 24, 1977

Mini-Systems: Hardware Procurement Schedule

System #1: MINI-SYSTEMS UNIT

I). MANAGER: Barry Morgenthaler
II). COST: ca. $19,298.00
III). CONFIGURATION:

	COST: (UNIT)	(NET*)
1). PDP 11/34-HH, including: -16kW Core Memory -Operator's Console -ASCII Console Emulator -Memory Management -Extended Instruction Set -10½" Mounting Box -30 Day Warranty	$10,490.00	$6818.00
2). MM11-DP – 16kWord Core Memory (Parity)	3,100.00	2,015.00
3). DZ-11A → 8-LINE ASYNCHRONOUS Multiplexer (E.I.A.)	2,100.00	1,365.00
4). DUP11-DA → SINGLE LINE SYNCHRONOUS INTERFACE	1,375.00	990.00
5) INSTALLATION and 30-DAY ON-SITE WARRANTY	545.00	545.00
6). DM-448 – CARTRIDGE DISK UNIT (10 MegaByte)	$2,800.00	$2800.00
7). S.I. 3057 – CARTRIDGE DISK CONTROLLER	$3,500.00	$2200.00
8). SOFTWARE LICENSES: RSX11-M, 2780 EMULATOR, DECNET – ~~(includes software support fee)~~	$5830.00	$2565.00
	$29,740.00	$19,298.00

IV PLACEMENT → CORPORATE OFFICE, TECH DIV, ROOM "O"
V DATE REQ'D: JAN. 30, 1977 (delivered)
VI PURPOSE: CENTRAL DEVELOPMENT SYSTEM for:
① operating systems support
② assembler/ languages, utilities support
③ network interfaces; software distribution system; cross compilers
④ RJE and DATA ENTRY systems development

SYSTEM #2: COMPUTAFUEL

I) MANAGER: DALE JORDAN / AL FENN

II) COST: #40,160.90

III) CONFIGURATION:

	COST:	(UNIT)	(NET)
1) PDP 11/34-DM - 16kWord MOS Memory - OPERATOR'S CONSOLE (DL11-WB) - ASCII CONSOLE EMULATOR / BOOTSTRAP - MEMORY MGT. - EXTENDED INSTRUCTION SET - 10½" Mounting BOX - OEM BASIC DIAGNOSTIC - 30 DAY - FACTORY WARRANTY	#10,690.00	#6,949.00	
2) DZ11-A → 8 Line Asynchronous Multiplexor (E.I.A.)	#2,100.00	1,365.00	
3) DUP11-DA → Single Line Synchronous Interface	#1,375.00	990.00	
4) DH11-AA → 16 Line Programmable Asynchronous Multiplexer (E.I.A.)	#4,700.00	#3,384.00	
5) SOFTWARE Licenses:			
A) RMS-11K - Multi-Keyed ISAM	#2,750.00	#1,826.00	
B) COBOL-11 - (PDP-11 COBOL; support included)	#7,700.00	#5,051.20	
C) FORTRAN IV "Plus" → PDP-11 FORTRAN	#3,300.00	#1,760.00	
D) RSX-11M License	#1,980.00	#871.20	
6) (2)x DR-11A → 64kWords Core Memory @ parity.	#5,170.00	#5,170.00	
7) S.I. 3057 → cartridge disk controller	#3,500.00	#2,200.00	
8) DM1448 → (3) AMPEX 10 Megabyte Cartridge Disks Units	#8,900.00	#8,900.00	
9) T.I. 810 → 120 cps. Receive Only character printer.	#1,744.50	#1,744.50	
10) Memorex (IBM-Compatible) 5440 Cartridge Disks	#450.00	#450.00	
	#53,859.00	#40,160.90	

IV) PLACEMENT: GERMANTOWN, MARYLAND

V) DATE REQ'D: APRIL 30, 1977

VI) PURPOSE:

- DEVELOPMENT System for Mini-Computer Based "COMPUTAFUEL" system for fuel-oil dealers.

SYSTEM #3: FIELD ENGINEERING

I). MANAGER: ERNIE PORCELLI

II). COST: ca. #25,579.00

III) CONFIGURATION COST: (UNIT) (NET)

1). PDP-11/34-LM, including:
- 16K Word MOS Memory
- Operator's Console
- ASCII CONSOLE EMULATOR
- MEMORY MGT.
- EXTENTED INSTRUCTION SET
- 10½ inch Mounting Box
- DEM Basic Diagnostic
- 30 Day - Factory Warranty #10,490.00 #6818.00

2). DZ11-A → 8 Line Asynchronous Multiplexer (E.I.A.) #2,100.00 #1365.00

3). DUP11-DA → Single Line Synchronous Interface #1,375.00 #990.00

4). DH11-AD → 16 Line Programmable (E.I.A.) Asynchronous Multi-Line Controller #6,600.00 #4,752.00

5). KY11-LB → Programmer's Console Panel 660.00 429.00

6). DD11-D → Backplane 660.00 429.00

7). FP11-AU → Floating Point Processor #4,940.00 #3,211.00

8). DR-114 (Dataram) - 32K Word Core Memory Plane (@ Parity) #2,585.00 #2,585.00

9). SI-3057 - Cartridge Disk Controller #3,500.00 #2200.00

10). DM-448 - Cartridge Disk Unit #2,800.00 #2800.00

#35,700.00 #25,579.00

IV. PLACEMENT: BUILDING "C" - Field Engineering Lab

V). DATE REQUIRED: APRIL 30, 1977

VI). PURPOSE:

① Training of Field Engineering staff for maintenance of TYMSHARE mini-based products in the field.

② Testing and evaluation of peripherals & controllers, & memory to be used in TSHR mini-based products.

③ TURNKEY SYSTEMS → Configuration testing.

SYSTEM #1: RJE - COPE REPLACEMENT

I). MANAGER: BOB WALLACE

II). COST: ca. # 22,471.95

III). CONFIGURATION: COST: (UNIT) (NET)

1). PDP11/04-HC, including: 32KW - 16 KW Core memory (parity) - Operator's Console - ASCII CONSOLE EMULATOR / BOOTSTRAP - ~~MEMORY~~ MAINDEM DIAGNOSTICS - 30 DAY FACTORY WARRANTY - 5¼" Mounting Chassis	#2325.00 #5495.00	3571.75
2). DZ11-A → 8 LINE ASYNCHRONOUS MULTIPLEXER (E.I.A.)	#2,100.00	1365.00
3). DUP11-DA → SINGLE LINE SYNCHRONOUS INTERFACE (DL11-WB)	#1,375.00	990.00
4). LINE PRINTER INTERFACE (MDB Systems)	#1,250	1,250.00
5). SOFTWARE (RSX-11M)	#1,980	871.20
subtotal	#12,200.00	#8047.95
6). DATA PRINTER (LINE PRINTER) 1000 Lines-per-Minute (600 LPM - #8678.00?)	#12,213.00	12,213.00
7). TRUE-DATA (CARD READER) 1000 CARDS-per-Minute	#2211.00	#2211.00
	#26,624.00	#22,471.95

IV). PLACEMENT: SAN FRANCISCO DISTRICT OFFICE (TEST SITE)

V). DATA REQ'D: MAY 1, 1977

VI). PURPOSE:

① Demonstrate feasibility of replacing Harris/Cope RJE terminals at considerable savings (and with increased performance).

② Begin deployment of PDP11/04-based RJE stations to all TYMSHARE district offices.

③ Ancillary benefits:

a). Provides Field Engineering staff with Maintenance experience in the field in advance of any customer sales.

b). PDP11-System is upgradeable for use as a district "showcase" for TSHR mini-based applications.

SYSTEM #5: RJE - "Cope" Replacement.

I). MANAGER: LASZLO KAKOCZI / GARY MORGENTHALER

II). COST: ca. $25,574.95

III). CONFIGURATION:

	COST: (UNIT)	(NET)
1). PDP11/04-FC, including: (8KW Core Memory (Parity) - Operator's Console - ASCII Console Emulator Boot Strap - OEM Diagnostics - 30 Day Factory Warranty - 10½" Mounting Chassis)	$4,695	$3051.75
2). DZ11A → 8 Line Asynchronous Multiplexer (C.E.I.A.)	$2,100	$1,365.00
3). DUP11-DA → Single Line Synchronous Interface	$1,375.00	$990.00
4). Line Printer Interface (MDB Systems)	$1250.00	$1250.00
5). Software (RSX-11M & DECNET license)	$1980.00 / 1100.00	$871.20 / 484.00
6). DMC-11 → High Speed Network Interface	$2,991.00	$1,619.00
7) DATA PRINTER (LINE PRINTER) (1000 Lines Per Minute)	$12,213.00	12,213.00
8). TRUE-DATA (Card Reader) (1000 Cards per Minute)	$2,211.00	$2,211.00
9). DATARAM - 16K Hybrid Core Memory (DR-114)	$1,520.00	$1,520.00
	$30,835.00	$25,574.95

IV). PLACEMENT: CORPORATE - "PRINTER ROOM"

V). DATE REQUIRED: MAY 30, 1977

VI). PURPOSE:

(1) REPLACE EXISTING HARRIS/COPE RJE terminal at significant cost savings and performance increase for inhouse volume printing requirements.

(2) Support machine for the development of bisynchronous terminal drivers on both hosts and minis. Debugging machine for customer/network problems in RJE/RBT support programs.

(3). Test and evaluation machine for inhouse DECNET deployment.

SYSTEM #6: TYMED DEVELOPMENT MACHINE

I). MANAGER: BILL BECHTOLD / FAITH BUGELY

II). COST: Ca. #40,370.20

III). CONFIGURATION (proposed): COST (UNIT) (NET)

1). PDP11/34-DH System to include: – 16KW MOS Memory – Operator's Console & Bootstrap – ASCII CONSOLE EMULATOR – Memory Management – Extended Instruction Set – 10½ inch Mounting Box – OEM Basic Diagnostics – 30 Day Return-to-Factory Warranty	#10,690.00	#6,949.00
2). DZ11-A → 8 Line Asynchronous Multiplexer (C.E.I.A.)	#2,100.00	#1,365.00
3). DH11-AA → Programmable 16-line Multiplexer	#5,170.00	#3,722.00
4). KW11-P → Programmable Real-time Clock	#770.00	#554.00
5). KY11-LB → Programmer's Console		
6). (4)× DFS11-A → 8 Line Conditioners	#1,200.00	#1200.00
7). DR411-P → Memory Chassis Power Control	#1,990.00	#1,940.00
8). DR1103 *(3) → 32K × 18 Bit Memory Modules (96K Words Core)	#6,930.00	#6930.00
9). DM1448 *(3) → Cartridge Disk Units	#8,400.00	#8,400.00
10). SI.3057 *(2) → Cartridge Disk Controllers	#7,000.00	#4,400.00
11). DMC-11 – Network Link	#2,491.00	#1,619.00
12). SOFTWARE: RSX-11M, RMS-11K, FORTRAN IV-PLUS, DECNET	#1,980.00	#871.20
	1,650.00	726.00
	2,750.00	1,210.00
	1,100.00	484.00
	#54,171.00	#40,370.20

IV). PLACEMENT: TYMSHARE CORPORATE (C2)

V). DATE REQ'D: JUNE 30, 1977

VI). PURPOSE:

(1) DEVELOPMENT MACHINE for "TYMED" Medical Information Application on PDP-11 series minicomputers.

Bill Eustice - HSA: 3/25/77 -

- V73 @ semiconductor has 5* the Interdata 7/32 power
- 2780 service on the Interdata 7 (CHAK SANCHEZ)
- 3780 service " " " " "
  released today
- 3780 still does not support transparency
  i.e., we cannot send binary records
- "Glass mode" - network transparency (8 level) - end-to-end

- Short records - 20%-30% thruput loss (on last record)
- Acknowledgment protocol - ½

Interdata code does not this ½ sec acknowledgment bug,
∴ ca. 900 LPM can be attained on release of Interdata mode code -
600 LPM - 3780 - typical

Interdata { 380 cps - 2780 } optimum figures, thru the network -
420 cps - 3780 }

120 ms. modem turnaround & acknowledgment.

Varian { - 256 cps 2780/3780
- or 10% faster

Prime time - concepts -
High Speed Access Circuit Switcher.
① no passthroughs
② high speed modems
③ legally, it doesn't go thru TYMNET.
(i.e., mode and bases are owned by TYMSHARE)
④ record acknowledgment problem -
still exists in the base
- single direction transmission
- ½ sec acknowledgment.
- reception of zero-length record.

memory shuffler -
- direct DMA - interface - 250K Baud -
multiplexed on to the memory bus - (cycle steals)

(memory shuffler -
- transmits a block at a time (256 bits long, max)
- mini
- Varian equivalent could be designed

V72 - 10	load units (?)	(900 cycle-memory)
Int. 1/32 - 20	"	(1 ~~usec~~ usec)
620i - 12	"	
1100 - 20	"	

Varian machines could also support 1200 baud i/o.
(No reason, other than political, why not.).

Interdatas also have ½ sec acknowledgment timeout problem for single direction transmission.
This will not be resolved before TYMNET II.

BORT problem.

Les Baker (415)-487-0455
Helfrich Co. - Infotronix - DHII

300 - 9600 baud

6745
@ logic, power supply
sixteen line drivers. (40 cards)
- one line per card - (central logic).
19" wide
8 3/4" high
15" deep

Dr. Gary Marguardt ([redacted], Marguadt)
(301) 821-5980

Development Prototype Systems:

Master
RJ504 -
100 Million Bytes Storage

	Old Price	Disc	New Price	Disc
11/04-HC 16kW core	$5495.00	$3,571.75	6045.00	$3929.25
11/04-FC (8K Core)			4695.00	$3051.75
16kW Core Dataram-				$1520.00

Bill Euske - 4/6/77

1). double buffering - req'd to determine whether ETR or ETD

W29- 4/6/77

8 hrs/day - 20 days/month -
4 CRTs, modem & micro & printer
lease price of $700.00 /mo.

CRTs	$100	= 400
printer	$125	125
micro & modem	$150	150
		$675.00

40 x $700. = $28,000.00 (his purchase price)

4000	CRTs
1750	printer
2000	micro
600	modem(s)
$10,350.00	

Vadic modem - $750.00
(Rental from Lease) $60.00/mo

Bell 212 modem $30 - 40

Cost of the line

$100/mo leased line.

$3 - $4/mile for a leased line.

$4320.00 = cost of controller/modem/line for $150/mo.

$1500.00 controller modems line

Bell
202 modem $15/mo.
"100 bit characters" -
reduces overhead of start and stop bits.

- Request to Send
- Clear to Send

Controller functions - TYMNET protocol?
- set terminal characteristics.
- backpressure on terminal by terminal basis
- get in and out of deferred echo mode
- requires disregarding certain TYMNET signals
- green balls (deferred echo mode).

ICP - full duplex asynchronous -

4 plugs -
CPU < $1000.00
memory
2 channel
i/o ports

3790 - IBM SDLC - multi-keyboards.

202 MODEM
ICP - @ 4 ports
protocol -

128 terminals - LaRoy's protocol

ICP - a viable vendor?
How many units a month?
Production capabilities:
- 100 microprocessors/month - (6 mos. from now)
- Jim McC needs 25 units/month. (50/mo. in 90 days)

$2550.00
16
uproc. 64KB RAM 2 EIA 2 boards.
floppy and controller

4/7/77

Neil Sullivan - ONTYM -

login procedure?
key and lock?
identification?

- command to enter msg, editor, message buffer,
- re-edit stored messages
- check status of msg. in and out
- TWX and DDD -
- multiple terminals per controller
- auto answer @ msgs in
- printer (R.O.)
- how much storage - 4K chars is enough

⇒ put Bill in touch @ Dennis Shadrick -

2000 - 2500 price to the customer
controller, CRT, 300 baud modem, no hard copy.

Walt Ulrich -

- auto power up and power down - "off" command
- dual purpose machine - ONTYM / TWX -
- WRU - "who are you?" TE - trips answerback of other machine
- audible indicator for busy signal.
- ring / no answer - power / no power
- busy signal - constant power.

ICP - (250 qty) ⇒ μPROC, 4K Rom BOARD, 4K RAM, 2 EIA ports
#955.00 (for PROM ROMS - $140.00 (1K Bytes)
1K CMOS - ~~$550~~ $125.00 + (Board Cost)
controller board =
→ breakeven at 250 qty
DICOM / MICOM / Anderson-Jacobsen (Los Angeles) disk drive ⇒ $750/drive.

ICP - 4K ROM - no PROMS - 8K RAM

PROCESSOR
4KB ROM BOARD
8KB RAM - (Static CMOS)
2 ports

$995.00

Processor
4KB ROM
16KB ROM
1KB CMOS
3 ports
DSK CONTROLLER
1 DSK

$590.00

(Development System includes DeBug option and external disk; needs additional port plus 1K CMOS for PROM debug)

4K/8K BOARD

4KB = $125.00
8KB = $250.00

$67 ⇒ $192.00 (4K @ $125.00)
$67 ⇒ 317 (8K @ $250.00)

(upgrade 1K to 8K = $125.00)

1 disk drive — $750.00
single port — $198.00
dual port — $256.00

1KB CMOS ≅ $125. + 67.00 = — $192.00
4KB CMOS ≅ 500. + 67 — 567.00

1KB PROM — $40.00
disk controller card (up to 4 disk drives controlled) — ca. $210.00

ICP estimates $50 for manufacture of MARK IV modem

Jim Harrison / N.W. Area Mgrs Mtg. 4/8/77

DATA ENTRY / ORDER ENTRY Software

Seattle $200K
San Diego $100-200K
Boston $100-200K

fisheries
crabs...

Bill Combs —

High Speed Access — a problem

1200 baud - contract @ Supreme Court —
Nadie
202 - lousy service

1200 baud - requires an Interdata 7/32 -
or a V72 by the end of the year

32,552 logins - April 1, 1977
in one day

Magnum - 24 hrs
SAIL 30 mins. !!!

Network accounting
Verne Van Vleet —

Computer Usage — about to go out of business.
(What about their Amdahl?).

Level 6 - ONTYM - $200,000

MJK Associates

V77 $1000/mo.
8 ~~consultas~~ asynchronous lines!!

WFIN - 5/2/77

ICP - functional
1). 2 async board complete failures - 1 failure on one interface
2). 8th bit problems - prior to 3 cards on 5 interfaces
3). "random" unknown anomalies -
memory/cpu/or prom failure

"com tym"
load

4). considerable number of unrecoverable disk errors.
5). "end error" - ~~[illegible]~~ in assembly - can be corrected be copying file & reassembling.
6). lost disk directories and files -
power line problems possibly -
(Bill has lost an entire directory).
(Jim has been losing files lately, regularly).
7). no diagnostics available to test what is causing problems
8). Ben Russell's unit - problems such that it had to be returned to Dallas.

Bob Miller hand carried the failing async card back to Dallas - Friday three weeks ago.
(Bob Wallace was on the road down @ the time).

{Async card failed completely
{prom card failed completely

Miller called Dallas and had Fed. Exp. and had two new cards
This was on Saturday

Bill doesn't see commitment on the part of ICP to get the unit

9). Disk problems - GSI.
   a). disk error (mentioned previously)
   b). mechanical problem w/ door latching
   c). insertion of diskette unseats the drive belt.
10). Mechanical problems -
   of reseating cards in card cage.
11). CMOS ram problems - (terminal configuration gets lost).
   ICS is planning test switch to ~~load cmos~~
   force terminal into standard configuration.

Return from breakpoint problem in debugger

NFW- 5/10/77

① Incentives explained.
② ICS
   a). "random anomalous" unit exchange
   b). Disk errors -
      1. caused by a test card delivered to field. (test card cancelled "error indication".)
      2). Media problems - Jim McConnell had bad WABASH -
      3). door latching still a problem - GSI should fix this.
      4). Unseating of drive belt - fixed! and fixed on all new units.
③ Mechanical stop and new front panel - due this week & will be retrofitted.
④ CMOS RAM configuration was getting 100 ohms + (got changed to 100K resistor in manufacture.
⑤ Memory test diagnostics - we now have a copy.
⑥ ASYNC card - the single remaining unresolved problem.

→ SPEC compiler -
   2 new versions of runtimes; compiler is not yet compatible

Laszlo Rakoczi 5/3/77

1). Prepare Data Entry proposal
- reference task force CP/CMS manpower schedule
- prepare manpower proposal
- survey market (George Grodahl)
- talk to Joe Crawford, Ross Ramsey
  (Data Printer not acceptable print quality!)
- Jasz would like to replace the Par/dyne (PIX) / 1403 printer on PDP11 & printer
- Jasz is bidding a CORE / Data Entry machine for SOLTEX (Houston)
- Spanish network (TYMNET) = PDP11 accounting machine (Contract would pay for programming manpower)
- check ENTREX INFOREX job product specifications
- Jasz envisions very complex data entry / reporting / supervisory system required for DYNATAX // DATA CENTER) / FRS / Cable TV

2). Intelligent Terminals
- Not simply a marketing function —
  ∴ should not simply be left to Terminal Equipment Marketing
- Need analysis of the terminal requirements for the following projects should be undertaken:
  a). Western 29 (cluster controller)
  b). TYMED
  c). Data Entry (MAGNUM/FOCUS, etc.)
  d). On TYM

- 3790 terminal!! Check it out! Expensive, but has data collection / multi-terminal support and batch entry capabilities

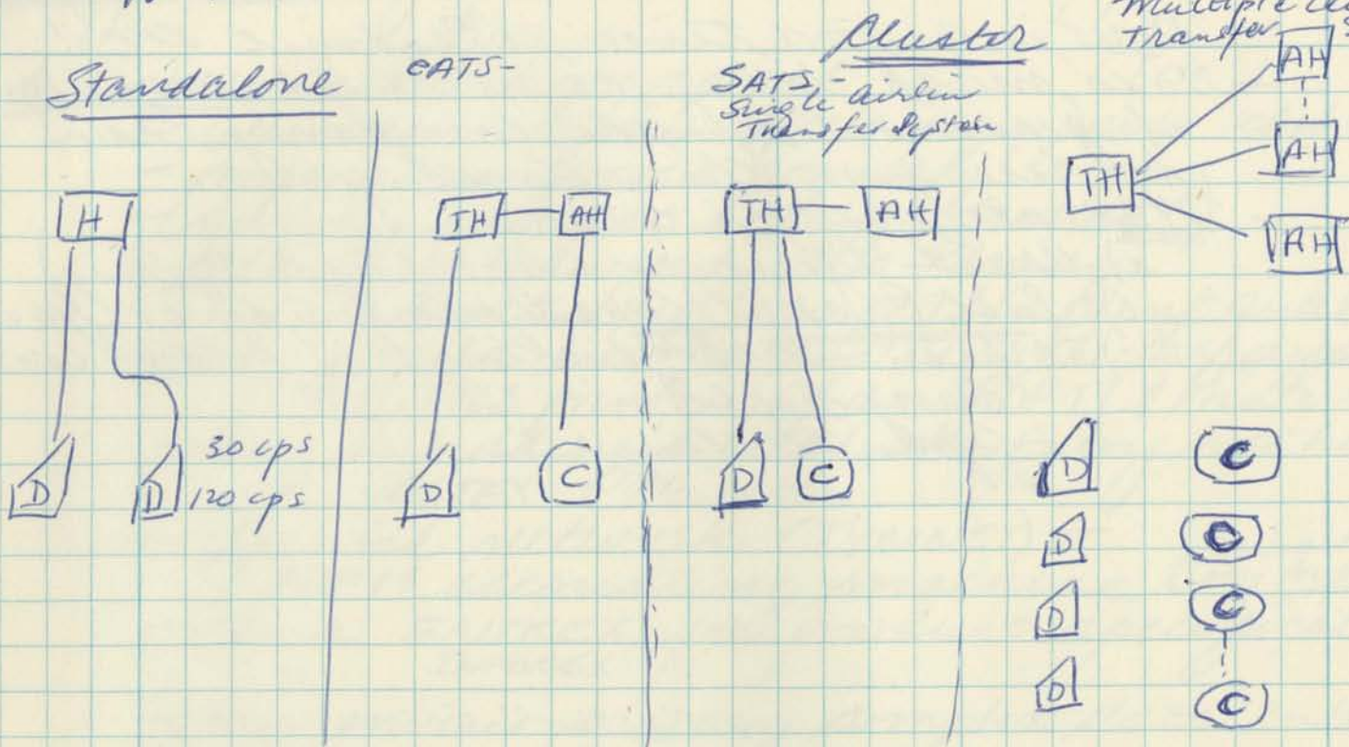
3) Manpower:

- Now is a good time to resubmit RIF's! (resurrect 2 RIF's from President's Staffing)
- It is much better to attempt transfer of personnel w/i the company than to hire from the outside.
- Who are my candidates?
  a). Chuck Spunger (agreed upon by Jass)
  b). Bill Elyske (had him in; don't want to lose Ernie)
  c). others? Start looking! (but don't lose Bill)
  - Gary Gere?
  - John Stallings?

5/5/77

W29 –

MATS – (ASTA)
Multiple Airline Transfer System



T^2 ⇒ 8 terminal system
{6 CRTs
{2 ticket printers
(2 part paper!!)
average of 4 CRTs, 2 ticket printers.

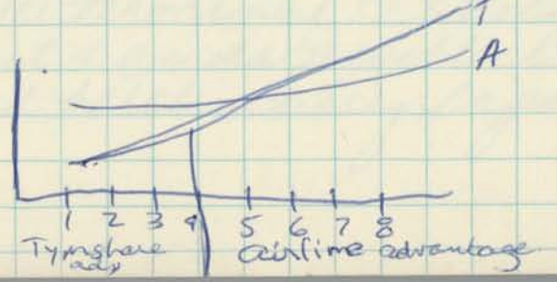
70%+ of total market (?)

40 baud of traffic per CRT/printer –

Nick Shaw Each CRT generates $55/ worth of xChars –

1.5 million characters/month

- industry standard function keys per CRT
- error detection and retransmission
- fast CRT fill is necessary
- reduced line cost less necessary
-



TyMED – Terminal Requirements (5/5/77)

1). March 1978 –
prototype delivered to customer –
(means we need to go @ existing terminal designers)
2). 10-40 CRTs
3). 5-20 printers (LA-180) – standard features
4). 1/2 pic. for display of screen max
250-500 chars (non-blank) per screen –
5). 4 second data base retrieval
6). input edits.
7). 1 megabyte screen file –
8). 2 megabyte data base
9). <#2000 per terminal cost (CRT cost only).
10). 2000 ft. – remote terminals –

Low transaction rates – (per station)
Get figures from Bill Bechtold –
9600 bps – 2000' – differential drivers –

ADM-2 – (#1500) –

Maintenance from vendors – is at retail!

CRTs – #20-25/mo. | maintenance.
LA180 – #40-50/mo.

minimum
#200 – CRTs
#200 – printers
350 – PDP11
#700/month

maximum
#200 – CRT
300 – printer
#350 – PDP11
#1950/mo.

Ernie needs #5000/mo. in an area to justify a maintenance person in an area.

Maintenance in Hawaii & Alaska?

T.I. 5/6/77

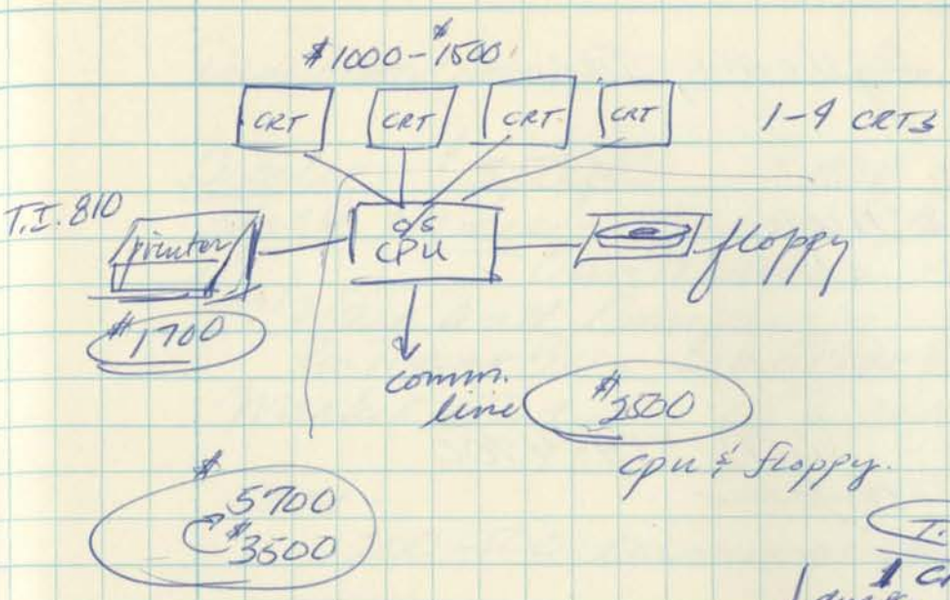
Texas Instruments – T.I. 770

- initial program load – complex (OCP)
- unforgiving error diagnostics
- file manager –
  sequential & slow (vs) fast & random

1). User psychology
  A) tape noises
  B) tape delay
TAPE LOSES!
2). Flexibility of Utility Routines
  A). No overlays in Data Entry
  B). No files in data entry language routines
    (precludes large tables)
  C) Fixed file structure
    no individual file protection
  D). Menu mode operator channel only
  E). limited editor command –

3). No R.S.I.A. port expansion
  Synchronous interface (BSC – 2780/3780)

Positive:
- Multi-tasking
- Media copy capability –
- Menu – command select.
- Powerful cursor positioning commands (functions)
- Maintenance support from T.I.
- CRT scrolling (editor)
- logical zone capability –
-



I.I
1 CRT
dual floppy
printer
cpu
$9000

TSYS

ICP
ADM 1
T.I. 810
$5700
(Tymshare leases at $400.00/mo.

Maintenance contract:
< $150.00 maintenance.

990/9

990/2
CRT - 911
CPU 990/9 4K words
printer - 810

downloadable ROM pharmacy application (H.A.S.) !!!! Burlingame.

T.I. offers:
- flexibility
- maintenance organization (worldwide).

Dataprinter / MDB Systems, Inc.

MDB Amos Deacon – Pres.
Don Perkins – Sales Mgr.

DataPrinter

Joe Morales –
Charlie Flynn – (617)-354-4700
manager, Interfaces
Dave Smith / Bill Euske

V132 C –
physical changes: ① swap cables
② change one jumper
③ remove one board from DataPrinter (CDC interface) and it works.

---

⑧ Specific

Jim Winkel – OEM contract
System Industries:

① Bill back problem – even if we take 100% if we don't meet their schedule, we don't get full discounts. (manufacturing error)
② Act-of-God limitation in delivery
③ Warranty – they should pay transportation back and forth – if something
④ Spare parts – availability – for a guaranteed period of time
⑤ Inspection or acceptance – we have right to conduct incoming contract – for some period of time
⑥ Patent indemnity – mandatory
⑦ Termination – right of assignment to acquiring company

Dave Goodman 5/9/77

Digilog - $3,500,000 - $75K pre-tax earnings
John Hance - Inverness Capital, Alexandria - Olin Mathison
O'Hare and Company - Horsham, Pa. - North of Philadelphia
Ron Moyer Pres., Bob O'Hare - Mktg Co
Market study - 65% return on ques

OEM -
200-500 terminals/year.

3/4 - OEM terminals -
W.N. Stored Mailgram
1500 terminals
- return to Digilog -
maintenance 6 to 7

Four Configurations (End User List Prices) - C.L. Systems - LIBS 100 - several hundred - custom terminals
Action
Lexis - Mead Datacentral
600 installed
RCA - military dual users LSI-11 - screen

TPL I - 8080A
2K ROM
16 RAM
1 - Comm. I/O - (8250 - Programmable I/O e.g. Centronics 701) $3850.00 2760.00
1 - parallel printer i/o

TPL II → same +
1 - diskette
1 mini-floppy (89KB) - $6170.00 $4320.00
→ dual diskettes $6950.00 $4865.00
→ dual diskette plus SCI printer $8560 $5990.00

(Includes dev't software package
Basic, Assembler, OS, File mgt.)

30% discount

Tom Emory
V.P. Engineering

Competes against:
- WANG PC II
- TI 770
- SYCOR/DATAPOINT

5/9/77

Digital Equipment – Issues

① Master Purchase Orders – what is the status?

② Machine shipments – scheduled 4/30/77
a). Release #2 – (Computofuel/FTMED)
b). Release #1 – (Engineering system) –

Equipment Schedule

c). DZ11-A
DUP11-DA
MM11-DP – 16KW Core plane
(cancel if possible)
} O.S. Machine – January delivery!

d). Partial shipment has been okay'ed by purchasing – What will be shipped with each of the above orders? When will the other components be shipped?

③ Engineering drawings – not delivered on initial system. (missing schematics).
– MM11-DP

④ Documentation – denied to Warren Falls!
– preventive maintenance manuals

⑤ Equipment Schedule: (schedule given to Faith B. – 5/3/77)

KY11-LB	June 1977
KW11-P	Feb. 1978
DH11-AA	Jan 1978
DFS11-A	Jan. 1978

⑥ DMC-11 – high speed network link –
Room "0" to printer room!! ASAP!!

⑦ Clyde Wilder & PL-90
a). change in COMPUTAFUEL development plan
b).

---

⑧ RMS 11-K (under COBOL – release in MAY 1977)
FORTRAN-IV "Plus"
COBOL-V3
RSX-11M (manuals for TyMED)

We still need to pick up this software

5/20/77 ⑨ ~~MAY 1978~~ DBMS 11; DECNET (V2-V3); (SEPT '77) ~~[illegible]~~ (unscheduled) BASIC-Plus II; APL
(schedule under RSX11M)

⑩ 32-bit machine – We'd like a presentation.

⑪ Dave Weber's – 10 hrs of consulting

⑫ Written notification that executable code (e.g. COBOL) is NOT licensed on a per cpu basis!

⑬ ~~[illegible]~~ PDP-11 based "word processing" system due "by the end of the month" – ENQ – 5/16/77
(to Compdc @ Navy Labs & IBM

⑭

DEC – fails to meet PDP 11/34 commitment ~~5/10/77~~
for 2 machines @ interfaces; (and one additional set of interfaces for C.S. machine)

Order Processing – "Slot #793 reserved for end-of-May" –
– issued to the floor

DEC's offer: "early June"

① • PDP 11/34-HM (16KW Core)
• DL11-WA (WB?) / 10½" Box
• DUP11-DA
• DZ-11A

② • PDP 11/04-DM-(16KW MOS)
• 10½" Box
• DUP11-DA
• DZ11-A
• DL11-WA (WB?)

③ DH-11AA (OCT, 1977)

④ ~~[illegible]~~ E –
PDP11/T34 time available at DEC's site.

DATA ENTRY:

Ken Jones 5/9/77

- Data Entry proposal - (Friday) - manpower & schedules.
- Milestones - Bill - (budgeted-estimated vs. actual.)
  significant response to important opportunities -
- Support personnel - PDP 11
- Intelligent terminals
- Revised schedule
  for the year -
  - broken out by person!
  - show Bill and Chuck (including consultants to DNTY and Wizard in Residence)

KDSS - (under RSTS/E, soon under RSX-11M) (Key-to-Disk Subsystem) - written in assembler and very competitive @ 4-Phase, etc.

TAM - 64K runtimes 1500 words/terminal terminal time based model

1K common per job

Several definitions, validations, model -

72K KDSS

ca. 20 terminals under RSTS/E on 11/34

Get a KDS manual!

EG&H → Evans, Griffith & Hart, Inc.
1844 Massachusetts Avenue
Lexington, Mass.

Judy Darley

(617)-861-0670

(Royal Bank of Canada - RSX-11M implementation?)

DEC's DIBOL is terrible, non-re-entrant.

early fall - September, October, November

license per CPU:
TAM - $5000
KDSS - $4500
Combined $9500

Multiple licenses & OEM license

ADMINS, INC.
P.O. Box #254
Weatherford, Conn. 06019
(203)-563-4218

City of Sunnyvale uses ADMINS-11 DBMS @ query language.

Talk @ Roes Ramsey and Joe Crawford about Data Centers requirements.

- Market
- Competitors
- Strategies
- TymShare's position and proposed strategy
- Development plan - general
- Specific proposal and milestones.

DL11-WB
KG11A
DD11D - 9 slots

(Rene's fictitious P.O.# 72444)

5/9/77

Plessey Microsystems -
Dick Cavanaugh - 965-1400 (Donna - sec'y)

No charge evaluation P.O. -
* - 16KW (32KB) Core Plane - PM-1116E-AP
- 32KW (64KB) Core plane - PM-1132 P/102 - due May 12-15, 1977
- 32KW (64KB) Core plane - PM-1132P/102 | 101 - parity/standard Unibus
("By the end of the month".!!!) | 100 - non parity

June 9th

• July 1	PM-D11/SPC-1 (DD11-D equivalent)		(30 days)	#350.00
• July 1	DL11-WB - (PM-DL11-WB)		(30 days)	(for delivery June 6th)
60 days	KG11-A	(PM-KG11-A) #845.00	(30 days)	
• July 1	MT850			

- Accessories and Interfaces @ 2-4 pricing level.
- Memory @ #50.00/board less than Dataram!
- Disk subsystem - @ #5500.00
  - Tested
  - compatible @ DEC

KW11-P (Monday - May 15th, 1977)

PDP 11/34 - Plessey unit - (pulled from shipments to Europe)
to
#8740 (list price)
• enhanced @ Plessey Ulsystems, Inc. memory
• preferably 10MB disk subsystem

PDP11/34-DH 10½" chassis #11,000.00
- DJ-11 3366.00
#14,366.00

in stock from:
DATA LEASE - (L.A. - Computer Broker)
(914)-533-3920 - Bill Norkunas

I still need:
DUP11-DA; DZ11-A; DMC11-AL (?)

AMPEX: price quotations (Will Sprowl)

DM 448	#2800 ←
DM 940	#5140
DM 980	# ~~10,090~~ 5465
DM 9100	# 10,090
DM 9200	# 10,590
DM 9300	# 11,563

5/11/77

MDB / DATA PRINTER -

Don Tuhl x31

MDB Systems, Inc. 714-998-6900
Arnold Deacon, President - Don Perkins - Sales Rep.
30' cable - maximum w/o differential line drivers/receivers
3000' cable - " with " " " "

- CDC interface @ ~~standard~~ modified Data Printer connector
(Warren Falls has pin configuration)

Data Printer - Charlie Flynn, Mgr. Interfaces (617) - 354-4700

Joe Morales - Data Printer, Costa Mesa (714-557-6582

I). Procedure: ① remove ~~Data~~ CONTROL DATA interface ② exchange cables ③ change 1 jumper
II). Std. Data Printer ~~##~~ format control protocol
- paper feed character → "paper feed command" line on ~~#~~ control bus.
- format char follows ~~#~~ 0-63 (commit for line skipping - binary number)
- binary configuration (0-255
- buffer (132 characters) - turning ptr. "off" causes printing of buffer -

PDP-11 jumper change (Print before feed) LP11

5/11/77

System Industries -

1). Cable @ edge connector for W. Dynex drive

2). S.I. has 5 sets of PROM's - #19301 - one set aside for TSHR. - cf. Gus Sutera - product specialist

3). Version III - June 1st final release

4). Attempted charge of $400.00 for papertape of modified bootstrap - This sort of bullshit is embarrassing!

5). OEM contract - Warren gave it to Rick Snow.

(W. Dynex drives - Al Conrad - Mgr. Tech. Support)

SR. SYSTEMS PROGRAMMER / ANALYST.
extensive experience @ Compiler design, maintenance, & internals; multiple asynchronous software interrupt-driven processes. Experience @ SAIL highly desirable.

- network protocols
- software library design & maintenance
- documentation
- operating systems (see below)

Job candidates / Applicants:

Holmdel

1). John Reiser - (201)-949-2521-LAB -2944 -3942 2945 Sec'y
Home: (201) 741-3128
c/o C.S. Roberts, Bell Telephone Labs, 4F617, Holmdel, N.J. 07733
53 South St., Red Bank N.J. 07701

2). Mike Miller
c/o Tektronix - Wilsonville, Ore., (503) - 638-3411 (ext. 2539)

3). Murray Bowles
503-658-5324
11744 S.E. 222nd St BORING, OREGON

4). Richard Nielson - Applied Technology (?)

5). Bob Smith - (201). 932-3546 (C.S. Dept); 201-932-3626 (direct)
c/o Comp Sci Dept, Rutgers Univ., New Brunswick, New Jersey 08903 (201) - 238-1650 (home)

6). David Levine - (609)-921-1690 (home); (201).932-2657 (BELL)

7). Pentti Kanerva -

8). Steve Weyer

9). Tovar Mock

10). Avron Barr -

11). CMU staff (call @ Bill Wulf, @ Lee Erman; @ Raj Reddi; Algol 60 / PASCAL ?.); @ Jim Low; @ Tom Larkin. (412) - 621-2600 x164

12). @ Ralph Gorin & @ Clark Wilcox for leads...

13). Seth Steinberg & M.I.T. (Nick Negroponte). (617) 253-7920

14). Larry Everett - Great Western Steel

15). @ Charlie Landau; @ Joe Ride; Jed Donnelly (UL #447-1100 x3406)

16). Brian Harvey - Martin Frost

Qualifications (cont):

- Distributed software systems design & implementation
- Familiarity w/ different software environments at all levels, including:
  ① operating systems (incl. device drivers); ② loaders; ③ utilities; ④ debuggers; ⑤ network interfaces.

Non DEC Software:

1). ELF (public sector) & support packages, including cross compilers, debuggers & simulators

2). PASCAL and ALGOL-68

- RUN (DALE)PASREL$_2$
*<sourcefn>[,pos]$_2$
⋮
- LOAD <source>, (DALE)PASLIB.REL/LIB$_2$

3). MICOR - COBOL Cross Compiler to PDP 11 (from 370?)
Jim Castlebury in Phoenix (Lazy knows him)

4). Stanford "E" editor (for PDP-10's) - call Marty Frost (Bob Wallace)
& Stanford's LSI-11 graphics system

5). DIAL-NET (DIALNE.PRO [W77, JMC]) Ethernet (CACM)
(NSF)

6). MACY11; LNKX11 -

7). UNIX -

8). SAIL optimizing compiler - Steve Hobbs - CMU (Hobbs@CMUAI)
Jim Low - University of Rochester (POSNER?)

⑨ MAINSAIL - "modules" - segmentation scheme - "RIM10" switch - image code - "base-displacement" (i.e., constant displacement off an index register). Interpreter/debugger possible.... but not underway.

MAINSAIL status: (end-of-January 1977)
a). TENEX (now running)
b). TOPS-10 - (FEB 30, 1977 - EST.)
c). PDP-11 (MARCH 30, 1977 - ~~EST~~) - April 30, 1977) EST.
Files-11 -> RSX/RSTS/IAS -> ? when?
Runtime system - no garbage collection yet.

6/6/77
- RUTGERS
- SUAI
- SUMEX
- Tape to N.I.H.

(includes conditional compilations)

- all procedures permanently recursive.
- (recursive qualifier goes away).

Magic Den - XEBEC

$1600 - pen & analog - XEBEC - 200 units (10% of total in advance)
$1200 - in qty. 1000

Terms: no staircasing
10% - up front
90% - on delivery

3x10 bit value

PEN & MICRO:
3500.00 (200 units)
2100.00 (1000 units)

line speed "etrappable"

DEC - RSX11M - ① Bring up nodes, ② QIO - full duplex problems. | TRNAUX.

DEC - John Marai 5/10/77
announces failure to deliver
2 11/34's and 2 interfaces & memory.

Alternatives:
① Cancel OEM contract -
hurts us more than it does them.
② Protest to various levels w/i their organization - : TELEX to VP Marketing; or perhaps PRESIDENT.
a). Ban the salesman now! (This causes a problem w/i the district)
b). Have Warren call the Regional VP or manager.
- Region - focus for PDP10 / PDP11 / terminal business.
③ Invoice them (our costs 20) for the delay.
④ Suit - general damages; breach of contract.

Gale Morgan
Regional Mgr.
Tony Walton | DECSYSTEM 10's/20's
Murray Cook
John Marai
TERMINALS.
Dick Loveland - Sr. Prod. Mgr. DEC's Network Communications DECNET

John Soden - McKinsey & Co. in NYC - Data Proc Practice.
212-692-6068

- Negligence? I strongly suspect we were skipped in favor of another order!!
- Threaten suit over lost profits! (lost revenues!)
- DEC may see us as a potential competitor.
- Their offer in response: arrogant & thoroughly unacceptable; unordered configuration.
- Unresponsive local organization. Unconcerned by problem they caused.

DATA ENTRY: 5/11/77

- Sources: Datapro, IV-Phase, Entrex, Inforex
  George Grodahl's database.
- GE — Service offering —
  Timeshared Data Entry System (minicomputer)
  Access in major Metropolitan Areas
- Proposal —
  Manpower by project; time line.

Z80-8080 —

- CPU
- Disk — (floppy or diskette)
- Index Registers — (are they necessary?)
- Multiple serial i/o ports —
- In-circuit emulation — (best way to develop these products)

2 approaches: assembled vs. multi-vendor —
(TSHR assembled)

Index Registers

- 9900 — T.I. (lacking full set of cards & integration)
- 6800 SWTC —
- Z80 — Zilog (2 MHz
  Crobhemco (4 MHz)
- 6500 — MOS Technology —

WFN — 5/16/77

Z80 — leading uproc candidate

1). index registers (only 6800, 6500, 9900, & Z80)
2). I.C.E. (only Zilog & Intel)
3). 4 MHz & peripherals P dev't software (a year from full definition and support ∴ wait for next generation)

I.C.P — planning 3 products:

1). 16K memory chips on mem. board (16KB-32KB card) — (cost crossover Jan '78)
2). quad density floppy disk (Shugart 801) (controller) — 1.2 MByte
3). Z80 CPU card ** 1 to 2 mos. (w/o software) if we push!
pending bus structure clarification.

Strategy:

- acquire dev't system (A10K) — (usable for all Z80's via I.C.E.)
- develop basic Z80 programs, utilities, cross-support knowledge for any Z80 (CIC, RASTER, TDL, Zilog, Cromemco) debugging
- This strategy gives us software compatibility
- (@ obvious limitations re: I/O & mem bus), programability, performance, and alternatives among hardware vendors.
- Removes dependence of software support on target system.

5/11/77

Major Opportunities:

- Linde Division - Union Carbide - (Acetylene tanks)
  Automate their distribution system

  → 17 distributors
  → 20+ by the end of the year
  → 30+ by the end of 1978

  [Currently 78 customers → 100×120 cps terminals
  (Simplified Data systems "TELEFUEL" 170 Uniscope terminals (leased)]

  Q3/'78 – 15 systems (estimate)
  Q3/'79 – 40 systems (")

  $250,000 software development funds.

- MAGNUM Cross Compiler –
  -Best case - Nine mos. (9) × 3 people
  Mini Ten (PDP-10/KI) - 6 Mos. – 1 person.

- General Business Systems, Washington, D.C.
  single largest tax preparer
  → added 20,000 returns this year!

  PDP-8/ DEC Datasystem 310

  Jim Anderson, consultant – (202)-296-0303
  Management Response.
  Tom Surwenski

WFW - project milestones - 2077 – (potentially):

1. Consulting & demo programs - ONTYME (Walt Ulrich)
2. Host software: a) MICRO assembler (PDP extensions); download, etc.
3. Sal Spinale - support programs
4. Review Dale Jordan's data entry document
5. Technical Analysis of Data Entry marketplace
6. Analysis of µcomputers in multi-terminal environments
7. PDP-11 related projects.

From Me: ① actual time vs estimated for milestones
② documentation person assigned: SPEC; MICRO; MICHE
③ PDP-11 related projects.

O.S. Machine needs:

✓(1) additional memory (on loan from Plessey Msys)
✓(2) Line Frequency clock - DL 11-WB: (DEC or Plessey)
✓(3) MDB - line printer controller
(4) KG-11A - Arithmetic CRC Unit
✓(5) DD-11D - Backplane extension
✓(6) DZ-11A - } DEC owes me these
✓(7) DUP-11DA }
~~(8) MM11-DP - cancel this!!!~~ buy Plessey!!
(9) DMC-11 AL(?) - 6 of these for CORPORATE!!
(Nov. 1977 delivery, if ordered now! 5/19/77)
✓(10) S.I. PROM conversion - Paper tape → ELMAR
✓(11) W. Dynex - CABLE
(12) DH-11 ?? (AA)
(13) S.I. - O.S. Changes (by June 1st)
(14) RMS-11K
(15) FORTRAN IV - "Plus"
~~(16) COBOL-43~~
(17) BM873 Bootstrap - for DECNET download!!
(18) TYMNET hookup - 1200 baud!! / (19) CRT console terminal from Terminal Equipment Mktg. 5/17/77

John Marai

Release #2

① June delivery - commitment
PDP 11/34-HH / 16KW Core (MM11-DP)
DZ-11A
DL-11WB
DUP 11-DA
DH 11-AA (Slotted for October, 1977)

Scheduled for April

② Release #1 - June commitment
PDP 11/34 HH
DL11-WB
DUP11-DA
KY 11-LB
DD11-D
FP 11-AU
DH 11-AA (Committed for October 1977)

③ No commitment for #6 (end of June)
DMC-11 - no commitment yet

④ Mailed René & me - Explanation of MPO/CO .. rec'd 5/10/77

⑤ Release #1 - being shipped this week

⑥ no status on the 11/04 '6

Telephone
Conversation @ Murray Cooke 5/13/77

Murray agreed to provide the following items to TYMSHARE in writing:

① Written explanation of the proposed amendments to the Master Purchase Order / Change Order — specifically, regarding price protection on PDP-11/34 units. due 5/17/77 Rec'd 5/18/77

② Delivery commitments (in writing) for the quantity of machines ordered for May/June/July and beyond.

③ Delivery dates on the 2 interfaces & memory board ordered @ the initial (O.S.) machine purchase. Rec'd 5/10/77

④ Written Delivery dates on all interfaces and components not deliverable with initial machine (CPU) deliveries.

⑤ Written confirmation by Digital that all Tymshare-written ~~code~~ applications and programs which use DEC compilers for the generation of object code (executable code) do not require licensing on a per cpu basis or otherwise. due 5/24/77

⑥ Written confirmation of Digital's offer of two machines in June 5/18/77
⑦ Schedule Quarterly Meetings - New Product Reviews
⑧ DN-11AA & DAC-11A Recommitments - in writing !!!
⑨ Donald Hunt 5/19/77

Art Sarch - compensation
Dick Canning - (719) - 739-5900
"Canning Hands Letter"

Telephone conversation @ John Soden McKinsey & Co. 5/13/77
Data Processing Practice mgr.

1). Don't go through the field. — you won't get any response.
2). Send a TELEX to the President of DEC and copy the regional, district, and local managers. (Word it carefully and sincerely, and have legal counsel examine it first.)
3). Immediately renegotiate the Master Contract to include a clause saying that if DEC fails to deliver any component or system for any reason, it will be incumbent upon them to arrange for the acquisition of such hardware on the open market and payment of the cost difference to TYMSHARE for such equipment.

Mini Systems: Unit notes 5/19/77

1). Warren Falls' schedule: May 23-27 → MACRO programming course
Operating Systems ← June 6th-June 10th
to Give (wk(?) course of DIM in mid-June (July?)
2). Honeywell Proposal - ?...?
3). P.O.'s for:
- MDB line printer interface
- Plessey paper tape reader
- Plessey memory; DL11-WB; KW11-P; KG11-A; DD11-D;
-

4). S.I. OEM contract
5). Clyde Wildes' (PL-90) consulting.
6). Memorex disk packs for my system!
7). Memory interleaving on D.S. (and all) machine(s)
8). Power consumption - esp. per backplane
9). Heat dissipation and ducts.
10). DEC's software sources pricing
11). • Magtape for CORPORATE CORE replacement
- Disk " " " "
- DMC-11 " " " "
- OS/HASP RTE " " " "

✓12). MM 11-DP schematics still needed.
13). SYSGEN.
14). Write-up MDB interface specs
15). AUXSLV / TRNAUX for PDP 11's!! (command files?)
16). Piths Jarvis (SUAI → Xerox PARC) - Video Synthesis
"Inexpensive High Quality Graphics" - LSI-11
→ Hal Eden (Bell Laboratories).
17). Call Bill Wulf!!
18). Check out David Gardiner's network (supervisor/node) debugger! (remote from PDP-10 host!!)
19).

Data Entry: 5/22/77

Intelligent terminal can be used for:
- remote data entry
- remote job entry
- inquiry / response
- teletype communications
- IBM BSC compatible communications
- (Other synchronous protocols)
- local editing
- local file manipulations
- report formatting & batch printing (local).
- utilities do move, copy, merge, sort, & delete files
- self diagnostics.
- bootstrap

Data Entry functions:
1 ° Format description (compilation) for data entry
1 ° manipulation of fields / justification
1 ° computation of extensions to inputted data
2 ° range checks
2 ° table look-ups
3 ° reformatting of output data
4 ° linking between display formats
° Functions:
- tab to next field (skip)
- back field (skip)
- Back page
- next page
- status line (displaying forms no.; field; type(s))
- dup (duplicate field from previous page)
- skip field (enter blanks or nulls)

1 ° Protected fields.
3 ° Each record flagged as °verified / °balanced / °valid.
2 ° data validation (verification) under format control
° field highlighting (underline, blink, ½ intensity, reverse video)
° arithmetic instructions
(field accumulation, batch balancing, inter-field & inter-record calculations, handling constants, & reformatting.
4 ° chaining together of multiple formats.
2 ° Field auto validation
- alpha; numeric; alpha/numeric; must enter; must fill; auto dup; constant; right justify; mod 10 check; mod 11 check; zero fill; blank fill; verify (must); highlighting (alpha → left justified; numeric → right justified)

5/22/77

Data Entry:

Supervisor Functions — (Entred)

1). Batch operations
- display status
- display batch log
- edit
- delete/rename/sort
- value tables
- batch protection

2). Batch i/o operations —
- standard job output
- write batch
- write batch status
- write batch log
- read std job
- read batch / append to batch
- read w/ std job header

3). Utility operations
- magtape operations (authority)
- communications utilities

4). Libraries
- std job
- input format
- record/batch end edit
- output/sort program
- command sequence.
- Operator statistics, etc

5). Perform command sequence (command file).

6). Privileged terminal

Data Entry Structure:

1). Bit & Micro + passed a data structure; interpreted by micro
2). Runtimes on mini - interpret data structure, files.

5/25/77

Digital Equipment –
Software Licensing policy:

1) FORTRAN IV+ } [Runtime System is licensable Product]
BASIC PLUS 2 }

2) COBOL V3 – John Marai is checking on status
3) "Less than 20% of 'non-significant' portion of DEC supplied software product" makes inclusion of routines, etc., non-licensable.
4) Scheduled for the end of June 1977 –
– Third category of software licensing –
• The "Right to Reproduce" – does not include documentation or media.
(Does DEC then owe us media on RSX 11M distribution kits ?!? Yes!! p. 33 of OEM Hardware & Software Product Summary.)

• Category 3 Prices: Base
– COBOL V3 $1360
– FORTRAN IV+ $580
– BASIC PLUS II – $775
– RSX-11M (V2) $968 ← price is going up on July 1st
– DECNET 11M $~~484~~ 484 (68s)
– RMS 11K
– FORTRAN

(5) Word Processing System. (Mike Hastings 397-0670)
Series 102 – similar – (PDP-8) – 2 terminals.
turnkey system
send & receive – formats.
VT78 → WS78/WT78 – OCR reader – @ paper tape reader.
programming & storage downloaded from !!.
LOOP – Diablo + Qyptype
PDP-8 – LS
(6) Quarterly meeting
(7) DMC-11
(8) DUP-11-DA – to be ~~shipped~~ by June 10th (p.m.) #ISP-54
(9)

Zilog - Pricing 6/2/77

MCB:

$495	4K + 600	
375		
495		
750	− 750	(no floppy)
$2115	$1965	

Backplane	$255.00	
Cage & Wiring	$200.	
Cabling	$200.	
TV Monitor & Keyboard	$350.	
3K Monitor (?)	$360.	(1K monitor for $60)
	$350	(cheaper box available)
Box		
Power Supply	$350	
	$4030	
	+ 200	testing
	$4230	
	− 300	1K monitor
	$3930	Qty. 1 pricing

Zilog "Target" system price

$3200 - Qty. 1

MICOM: $1070 @ qty 250, $975 @ qty 500

1). 5 x 8251 USART
2). 2 controls (?)
3). 16KB RAM
4). interrupt driven I/O
5). watchdog timer
6). 8 prograph displays; power supplies
7). 5 x RS-232C
8). extra parts < $100 each.

60 days to production prototype

11/04 Pricing:-

11/04 CPU 8KW (16bit) − (Box & power supply) (16KB Memory)	$2500.00	(fully discounted from $3495.00)
	1365.00	(DZ-11A - 8 serial EIA ports)
	3865.00	
	+X000	per terminal
	2X000	per printer

e.g. 3865 + 6000 + 4000 = $14000.00

ABLE Computer Technology

Quadrasync:
1 − $1600.00
2-9 − $1140.00
10 − ?

Cache + 34
1 − $4450
29 $4005

Bob Wallach - RSX 11M
20-25% runtime improvement
25-33% thruput increase

WFW - 6/30/77

Data Entry

~~range checking?~~
~~error handling?~~
① what validation checks will be performed on fields?
② What to do under all error conditions?
③ Cursor moveability -
- move to any field after validation
- move to particular field after validation
- chain forms on ~~data~~ data (conditionally)

④ "Loading" of fields -
- partial screen fills
- in advance of entering data (preload)
after entering ~~data~~ no data (auto-dup)
after entering data - (validation
." Bill to: → Ship to: (duplicate)"
- standard entry, duplicate previous -

⑤ Describe form - (how everything looks) -
- generalize to include foreground, background color, etc.

7/8/77 - WFW -

	280:	Current: (F8)
ICP-	CPU - 280 (new) + mapping - 2K Prom - but no CMOS	4 cards - disk
	ASYNC card (new)	X * asynch
	Mods. to Memory cards (decoders to look at high order 2 bits for	Y* memory
	+ 4 disk controller (same)	1 - CPU + 1K CMOS mem.
	1-2K CMOS card	1 - PROM
	→ no PROM card.	1 - front panel controller
	- Front panel interface card. (more flexible, but protection through mapping	

Wirewrap version ~~done~~ in progress.
for CPU & asynch -
Starting PC card layout - 2 day turnaround.
- different bus & additional map from cards the designers have done before)

Haven't started testing yet -
1 week to wirewrap

System Industries - problems - 7/12/77

1). RSX-11M. V3 - Barry Maze & Ed ~~Hidden~~ Mueller now working on the problems.)
a). Booting of PRESRV (fixed 7/12/77)
b). Loadable drivers
c). Error logging (9500 okay; 4500 started)
d). User mode diagnostics
e). DSC - Bad Block Routine (manual fix)

This week - Neither Jerry Robertson, nor Murray Cook returned my calls !!

7/12/77 – Project Notes:

1) Minimum delay of 2 mos. from shipment from DEC to completed customer installation, including:
   – 2 weeks shipping delay from DEC
   – 1 month integration, burn in, & test
   – 1 week to ship to new site
   – 1 week to install & train customer
2). (11/34 @ disk site. = 10 days install & train)

DEC – 7/12/77 – John Marai – telephone conversation:

a). ✓ 1SW64 ✓ 1SP55 (11/34-DM1) will be shipped 7/12 or 7/13 shipped 7/[illegible]/77 – No. Am. # NP0313
John will call on 7/13 with bay pill # Flying Tiger #43910145
It will go by air at DEC's expense. ✓

b). 1SX81 – "Still in build cycle" – placed on ETA 7/15/77
✓ "priority A" – it "will be Out no later than July 30. (13 working days!)

c). DMC-11AL, DMC-11MA, KG-11A – Six (6) are available at the end of August. John will pick up a P.O. for 2 on 7/13/77. Purchase orders for the remaining four should follow ASAP.
List Net
DMC11AL = #1500 → 850
DMC-11MA = 850 → 850
KG-11A = #1150 → 870

d). John Marai claims that 3 * 11/04 HC (16KW Core) are deliverable at the end of July (7/30/77). He will call on 7/13/77 @ DEC internal machine numbers on these units.
machines
2 * 1SY02 ✓
1SY03
– DZ-11A @ PO
– DRP-11BA
– DL11-WB

e). COBOL Version 3 rebate – Have we paid the #505[illegible].00 indicated on P.O. 70301 Release #2?

f). Quarterly meeting – John will confirm a meeting time at DEC Corporate HQ @ top technical & marketing people. We have supplied an oral agenda but should follow up with a written one.

g). Installation guides & Distribution media – 1). Fortran IV-Plus, 2). RMS-11K, 3). DECNET.

h).

Second Source Vendors:

Disks (& Controllers):

- Ampex (W Dynex)
- Diablo
- Pertec
- EM&M (ex-Cachus)
- Wangco

Controllers:

- Diva
- AED
- Telefile (Trident)
- Plessey MicroSystems
- Minicomputer Systems
- System Industries
- Datum

Storage Module Drives

- CDC
- AMPEX
- Memorex (?)
- Calcomp (Trident) - ~~Zeltner~~ Giles (mnt'c service) - 599 N. Mathilda Ave. Sunnyvale, CA. 94086 735-9920
- ISS
- Ball

Memorex

memories - Add-in, Add-on

- Dataram
- Ampex
- Plessey
- Intel
- National
- EM&M
-

Floppies -

- DIGICOM
- Data Systems Design
- Charles River Data System
- Xylogics

Communications:

- Plessey Microsystems
- Xylogics
- MDB

Printers:

- Data Products
- Data Printer
- Centronics
- MDB Systems (controllers)

Magtape & Controllers:

- ~~SUBANGCO~~
- PERTEC
- Kennedy
- Plessey (Kennedy)
- Ampex
- Storage Technology
- Datum
- ~~Kennedy~~

SEVCO, Inc. (Used Computers) c/o Jerry Severence
22 Karal Drive (617) 879-8187
Framingham, Mass. 01701

Zilog - Doug Broyles, Mel Snyder, Jeff Ward, WFW — 7/20/77

9 port version - 2x SIB + MCB -
13 port version - 3 x SIB + MCB -

RS-232 -
Secondary receive - (reverse channel)
" transmit -

clear to send
carrier detect
rqs - request to send
dsr - data set ready
dtr - data terminal ready -

- 8251 support not sufficient because of secondary r/t requirement of T.I. 810 and other

PIO chip - 16 bits - bit set & reset - control lines -

required signals:

modem out	modem in
1) car (carrier)	1) dtr (data terminal rdy).
2) dsr (data set rdy)	2) rqs (request to send
3) cts (clear to send)	3) sect (secondary xmit).
4) sect - (sec. xmit)	

Requirements -
1) Key locked power switch
2) 4-position key switch (2 bits) -
3) Sense-switches (4) micro-switch toggles okay)
4) One or two momentary push-buttons - non-maskable interrupts -
5) Output display - led/seven segment/alphanumeric display - ca. six characters

LED displays

6) a) carrier detect (necessary) } ICP -
   b) clear-to-send ("ready") }
c) power indications LED

- DMA chip
- one sector buffer
- SIO and DMA

Disk controller holds "wait line" for 4 ms. - okay @ 1200 baud but no higher!

ICP does it w/ FIFO ~~—~~ (40 chars) - and polls FIFO.

ISC - (Bill reburned PROMs to buffer @ interrupt level and process @ non-interrupt level)

Prototype board in a couple of months

Sector read - 350 msec - "wait line" pulled waiting for "start bit"

32 msec

LDIR
OTIR

Sector transfer ≅ 4 ms.
Char time @ 1200 baud ≅ 8 ms.

8 msec - char from usart (read)
32 msec - char-to-char disk read time -
~10 msec - interrupt processing time.

1). second MCB on a disk controller - (undesirable) - needed for AIR FORCE?
2). comm. char between disk bytes (no) X
3). DMA board - special design? (no!!) X
4). SIO/DMA board - in January (optimal)
5) run @ 1200 baud on comm. line until January) -

IBM-Series 1 7/20/77

STM - store multiple - stack

Supervisor { 28KB bare minimum supervisor -
30-32KB with diskette support

Supervisor and 2 partitions - realistic at present. (14 "theoretical")

Online program preparation - 16KB min.

{ #4360 - model 3 @ 16KB
5100 - Model 5 16KB

48KB -

1130 Floating Pt. add/subtract mult/div/comp.

Task Mgt.

RTPS - real time programming system.

Byte-addressing
209 instructions - bytes/words/double-words
370-like

Two-address instruction words -
one-level of indirection -
MVW AD1, AD2
R1, R2
R1, (R2)
(R1), R1
(R1), (R1)
AD1, R2
AD1, (R2, D_1)*
, D_2(R1, D)*

auto-inc?
auto-dec?

No translate and test
as on 370.

simultaneous
access and update in

8/1/77

Zilog - HFW/RTW/Marty Cohen/Jeff Ward/David Wise/Mel Snyder

- Disassembly & ZDDS bugs -
- RIO conventions
- I/O driver interface conventions
  interrupt mode #2 - normal execution -
  - programming the interrupt vector.
  - ibit bit

Zilog working on debug package - "ready w/i a couple of months."

- New "User Interface Board" - September
- Disk loadable software @ full memory mapping -

8/4/77

Jim Westlake:

Mtg. @ Dick Cavanaugh's Monday August 8th PM

① Lash-up – Plessey-to-Dynex —
② Inventory control system
– parts list to F.Eng. on each system ‖ 1SP55
③ Memory evaluation
H775-A #550 (Type 1) / H775-CA #1000 (Type 1)
5¼" Box #400-650 / 10½" Box CB #650-750
④ Tie-Down Party

⑤ Download of Diagnostics (Diagnostic verify capability)
⑥ Extender brackets
⑦ Dial-up connection
⑧ 2* RK05's for reading

8/8/77

Ken Jones:

1. extra 1200 baud line - extra terminal
2. TYMNET - ECC protocol - commitment from TYMNET group
3. W29 - definition of requirements; full-duplex? local editing? etc.
4. When is user-interface specification to be done?
5. MICRO-SAT
6. - power-fail handling
   - how many can be replaced
   - tertiary cities entry cost - $12,000.00 ; 4800-6000
   - (leased) line cost? vs. message unit rates?
   - maintainability problems
   - MICRO-TYCOM-II talking to 3705 -
   - Relation to remote dial-up data entry and key-to-disk?
7. 123 mandays ≅ 2 quarters !!
8. MICRO-TYMSATS - 2
   W29 - } lower priority than URGENT data entry !!!!

8/10/77

Dale, Dick Ouellette, Ken Jones -

1) logical screen larger than physical screen - backup 1 logical screen
2) Picture formats - floating asterisks floating dollar-sign subset them out
3) "Go ahead with protocol design" - (Dick & Dale cover with functional specification).
4) local print capability

W29 - (Mike Rude, T², Jim Nappa, Karen Sachs) 8/29/77

needed: -PROM - (fill characters on CR, LF, TAB)
- all delay times for all character sequences

1. LOGIN: Terminal
   Printer
2. INPUT: Char or Msg
   Full or ½ duplex
   a) editing
3. Output:
   a) end of screen
   b) Printer -
4. DISCONNECT
   b) end of Msg. <CR>

8/2/77

Laszlo (Mtg. over Lunch) —

1) 21.8
2) review in six months
   a). adjust base to section mgr. base (currently 25)
   b). include "up-tick" incremental increase for all section mgrs. — in my new base
3) Retroactive "incentive as section mgr." to April 1977
   a). retroactive to 2Q77 — @ higher base & leverage
   b). computed incentive on the basis of 3 people assigned to the tasks accomplished for 2Q77
4) Section Mgr. assignment — effective immediately
5) Section Mgr. base — $400 + ~~Factor~~ 4 leverage
   Dept Gen Mgr base $800 + factor 6 leverage
6) Stock options — as section mgr.
7) Div. VPs as in Marketing — (e.g., WSBA, etc.)

Laszlo — Transfer of M/M Sys. Section to W.U. — "communications aspects" — 10/3/77

John Reiser -

9/19/72

8/24/77-

John Marai-

WTC - #5900 / 10/13/77 Est. A.

1. DMC-11AL, DMC11-MA – September delivery (early)
2. DL11-WB – 5 to be sent the week of Sept. 15th
3. Reschedule 11/04's – 2 mos – done – John will pick up order
4. Reinstate COBOL purchase – done. clean
5. DTS-11A – John will call back today commit 9/16/77 maybe sooner
6. TyMED – DMC11's – John will call back today
7. RSX 11M T. V3 –
   - change order to Master P.O.
   - John will pick up change order today
8. Serial # differences – John will follow up.
9. New price list (delivered)
10. Status of Version 3 COBOL –
    John will call. – ~~we need "RA" number~~
11. October 14th mtg.!!! Schedule

Most can Sept. 12th

November

QIO problems:

1) 1.6 ms. per QIO
2) speed up necessary and possible
3) Only 1 ILPT at a time
4)

Linda Sarles
Ted Zeydel - 11/34, 11/04, 11/03
Reports to Joe Meany — 9/1/77

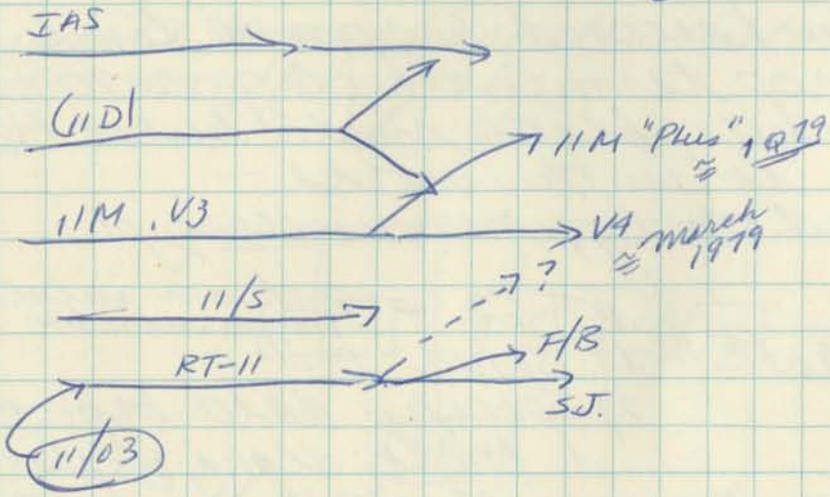
- TPS-11
- DBMS-11 — not targeted as product under 11M; already in test site.
- RSX-11M
- 32 bit machine native mode / RSX-11M emulator in kernel —
- LSI-11
- Intelligent terminals
- DECNET.
- Graphics terminals & products; disks; tapes; Memories interfaces

---

QIO - half duplex →

RSX-11M V3. → RSX-11M V4
RSX-11M "A" or RSX-11M "Plus"
— with BATCH
— with "C.C.L."

V4 - a minimum of one-year — perhaps 18 mos. from 9/77



RKV11

RLØ1 — long term replacement for RKØ5

RSX11M —

support of interrupt levels
~~switch Register~~ status word smaller -
p

T.P.S. - transaction processing system -
"externally a new operating system —
internally based on RSX-11M -

- current hardware project to develop terminals
- time frame - January to December 1978 -
- 3 mos. decision time frame -
- language support issues * (COBOL & BASIC Plus II)
- unbundled as an operating system -
- bundled with application programs
- bundled with hardware

issues

program development } lose in performance to transaction
batch processing } processing -

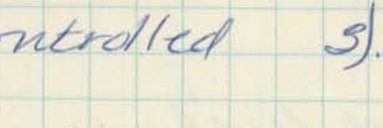
TPS will support large numbers of terminals -
from 50 to 100 up to 500 - 1000

Data Entry and Retrieval product -

Goal: - less than 1 second response time
- multi-drop terminals (e.g. 3270-type)
slave units block mode burst transfer
VT-62 is in the works -
- polled only, non-interrupt

VT-61
1). Interrupt host
2). Host controlled
3). Host controlled
4). Not multi-dropped.
5). 75 - 9600 baud Asynchronous -

VT-62 - note an intelligent programmable terminal
1). Slave
2). Specify data type checking blank, alpha, alpha-numeric checking
3). 3 partitions 24 lines
error message -
4). Multi-dropped -
5) Synchronous or asynchronous (DUP - a string of terminals hanging from synchronous line) 1200 - 2400 only (DU11, DH11) DL11-WE
DV11 - synchronous line (1)
6). Uses DDCMP as protocol only



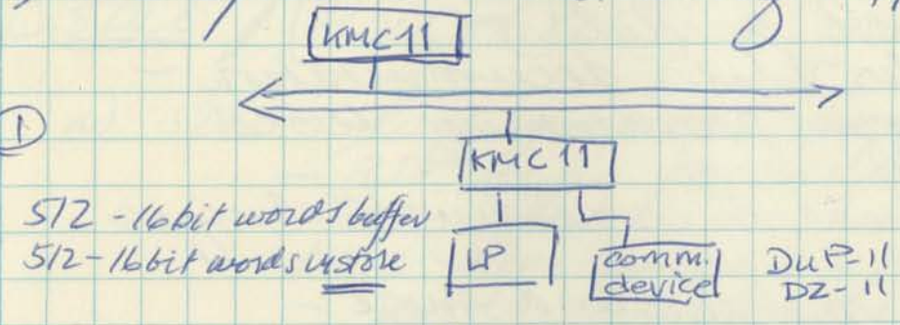
auxiliary printer port.

TPS- oriented to support VT-62 (but will support VT-52)
Automated regeneration of terminal configuration
on-line - addition and subtraction of terminals On-line.

SDLC, HDLC - two most important other protocols -

announcement w/i one to five months

- KMC-11 - (DUP-11, DZ-11) - announcement w/i one month
fast microprocessor that hangs off the Unibus!!

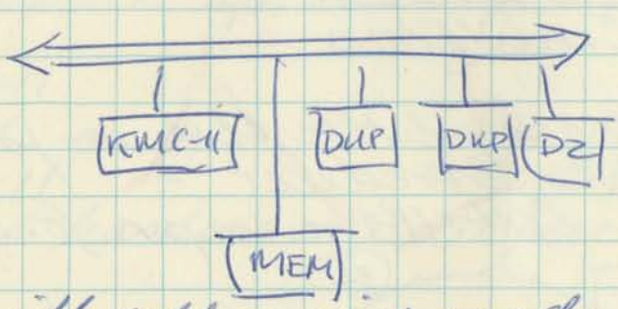


① multiple KMC-11's
- backup (redundancy)
- thruput increase
-
KMC-cycle steals -

512 - 16bit words buffer
512 - 16bit words instore

KMC-11 - microcoded -
writeable control version of the DMC-11!!!

converts ~~data~~ character-interrupt hardware
into non-proc reg -



② disable direct interrupts to the processor

DEC will sell microcode package(s) to support -

multiplexed - character interrupt devices -

- KMC does not magically reduce bus load -
but it does reduce processor interrupt load.

- DEC will sell user programming tools
for coding the KMC -

9/1/77 –

Ted Zaydel – (Performance enhancements for existing comm. equipment !!)

③ KMC-11 can be used as a parallel processor –

Great for ① communications, ② converting char interrupt to n.p.r. devices, ③ SDLC – HDLC – support in ucode –

Ucode modules – announcement scheduled for this month
① multiple DUP 11
② " DZ 11
③ LP support module –
④ assembler, editor, documentation –
debugger programming tools
very linear microcoding techniques

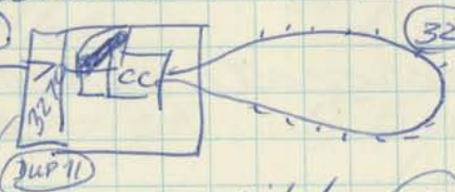
Futures: six months and more –
① HDLC –
② SDLC –

Performance increase for existing systems – (Performance "band-aids") – esp. NPR –

Comm. Device Emulators

⓪ – 2780 – patches, little use in prospect –
– 3270 – DSS has a product –

① DSS product – DV11 – under RSX-11M – n.p.r. for both input & output.



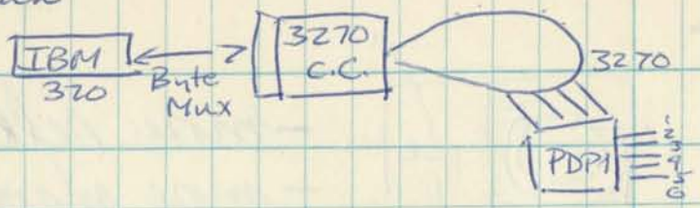
3270 terminals – several strings per DV11.

available (used by Microfocus Data Systems)

MDS – compatible ⓦ IBM 3270's not with IBM

② DICAM-11 (3270 package – follow on DICAM-8)
RSX-11M – (March 1978 – upline to the ~~3270~~ 370 via 3270 protocol
April May
RSX-11D/IAS – in field test now.

Chuck



5MByte - RL01

③ [3790] - within one year -
3/e/11 product to development test site w/i 6 mos!

④ 3780 - might happen -
CSS has done it once -
so have software support in the field.
groups

⑤ SDLC / [HDLC ↔ X25] / [DDCMP ↔ DECNET]

a). SDLC - line protocol support -
- RJE-type packages based on SDLC - terminal
- KMC ROM package speaking SDLC - within one year -

b). X25 ↔ HDLC - European Standard -
standardized last October -
PTT's in Europe & Canada -

- hardware w/i one year
- software w/i two years

- Jack Zimm -
- Ohio Edge Planning
- Nick Johnson
- Ralph Dement

- DUP-11
- DU11-
- KMC-11
- other hardware interfaces

Ask Caisse: Level 2 / Level 3 | corporate network standards - implementations desirable

---

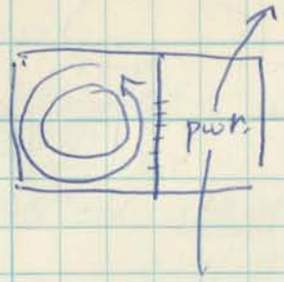
Disk Product - Available early 1978 - (in volume) -
(20%) (2 times)

RL01 → minor perf/capacity improvement
major/price improvement
Major/Reliab

available by August 1978

removable media
- Coming: fixed disk, double density

single hex module -
will run on the PDP-8/LSI-11 (11/03) - 2 quad modules



- more reliable
- more maintainable
-

August/Sept. 1978

floppy → competitive —
— six months — double density; 2 density — 2-sided.
write specific questions to Ted.

Terminals — new generation — one year —
— power supply conversion (voltage & frequency) —
+ universal character set — subtitlable
— LATIN alphabet
— Cyrillics — "—
— standard ROMs
Hebrew, Greek, Cyrillic, Farsi —

Video graphics — raster scan
625 line —
VS30 525 line —
color

Sweden
Election System — CSS in Reading —
— precincts —
— tapped off video signal and broadcast it on television

Long-term — ongoing effort — video &
One year for

Integrated modems @ DAA's —
information in DECEMBER —

DECNET —
V2 in February March, April 1978 RT RSX IAS RSTS RTS-8 TOPS-20 (TOPS-10?)

V1 → V1.2 ——→ V2

— eliminate bugs —
— improve performance
— solidify and stabilize
— not a major functionality increase

NSP - major changes
DAP - " "
DDCMP - 2%-3% change. (stable already) -

V2:
- point-to-point -
- not multi-drop and with no route-through
- dynamically alterable topology -
" " routed -

Few nodes on the system
≤ 5 anywhere in the world.
≤ 8 local nodes

Max 2 types on a given node (comm. device types)
5 lines per node.

DMC 11 -

1 MHz — with your own handlers -
56 KBaud ← voice grade line (DECNET)
20.4 KBaud - DECNET

data processes thru DMC buffer to RSX to user buffer.
0-100% performance improvement -

BASIC Plus II - November 1977 (roughly) -
Fortran IV+ -
Fortran 1977 - ANSI standard -
zero trip "do" loop -
- (problems for backward compatibility!) -

Gateways -

1. hardware - framing chars as well as bit-stuffing
2. packet level - originate and terminate connections
3. closed user groups, etc.
4.

Intelligent Terminals:

Potential projects:

1). Local loop error detection & retransmission (multi-line protocol)
2). Local loop data compression [data formatting & compression]
3). Data Entry functions
4). Display editor
5). Display-oriented debugger
6). Graphics (limited) RT library routines
7). Scrolling of output
- "Controlled scrolling" - or paging -
automated ctrl-s & ctrl-q @ differing
8). Code conversion/handshaking/protocol matching

Chuck Spurgeon - Design Review 5/16/77

- 3777 - ("plagiarized") -

- Option switch "/delete" -
- to delete spool file after printing -
- DK0: vs. DK1:
[128 Words -
[9600 Blocks -

1200 blocks - RSX-11M -
∴ 80% or 8400 blocks -

- Systems w/o a disk - requires modification of specification -

- AutoDial -
- RJE can connect w/ the TELECOPY slave.

security problem

- Julian Brooks's feature of printing overlapped with spooling to disk/

- Billing information to Tymshare offices -

Configuration issues:
- Disk vs. non-disk
- Console/CRT vs Console & CRT
- Magtape vs. (none)
-

- Circular buffer - @ last "n" top-of-forms for backup and reprint after paper-jam.
- Forms alignment - print "n" lines and return to RTE. - "autostop" command @ record-count

3600 × 8 × 500 = 12.5 Megabytes max (?) per night.

2.5×10^6
5×10^6
12.5×10^6 =

- Commands in any specified order -
yes! executed in the order in which they appear -

problem: <<wait for host response>>

```
LOGIN
        NL: = R1                    ; null device should be defined
        DK1: ~~~~ = RZ:
        DIAL   996-5261
        X1: = DK1: [1,50] LOGIN

PRINT
```

Indirect command processing -
string substitution for filename, etc. (device name)
via MCR

86 Chuck Younger
-9/16/77-

Issues for follow

① Configurations range & impl
② when do force, c/s transmission of job definition
③ user interface
④ 3780 (real 3780) vs. limited 3780
full
⑤ Circular buffer for restarting file (modify auto stop command)
⑥ Over-side host setting of left
⑦ accounting of # of pages & # of characters
⑧ Automatic selection of output files.
⑨ Status information on file management -
- spool files
-
⑩ "QUE" facility — (cf. Dave Weber) —
⑪ sample job definitions
& user decision

⑫ restart procedures
file allocation procedures
⑬ Training of users
⑭ Purging of spool files
⑮

9/21/77

RSCS - sometime will support (via TYMNET) - HASP -

- can currently support HASP via 3705

Tymnet - Interdata implementation of HASP 1078 -
- includes multiple printer/punch stream (input/output) but not concurrently. (Because of backpressure problems etc.)
- no host software for support as yet.

Guy Blood – (Julian Brooke) 9/19/77

USBA – ("ESBA")
Eastern States Bankcard Assn
using TANDEM.

3 possibilities

① ② – communications front-end
② – communications concentrator
(if we split sales authorization between SF and Los Angeles
③ – data entry

– Currently looking into TANDEM – for communications front-end –
– non-fallibility required! –
– should drive 100 tubes
– should handle comm. protocol and switching for 4-5 "nets" – (different lines)
INET
(i.e., switch either to USBA or ICA – (all other nets) –

– should do "negative card file" – known bad cards

TP module – called CONVERSE (converse1 & converse2
25% CPU – 840% of CPU

dual processor 158 –

150-200 keystations – downstairs –

User Functions –
SAS – sales authorization System –
120 tubes
Data Entry –
125 tubes –
TSO – 15 tubes

All IBM 3270 – ~~50~~ tubes into 3705 into dual 370/158

Trace equipment (2) 100,000 documents/hour per machine – (OCR)
reads microfilms, places control nos. on sales slips, etc.

- cardholder number
- name
- date-of-sale -

- places info on tapes - load info into 370 - by "tray"

- once loaded into 370, then D.E. operator fills in missing (or wrong) info on cards -

ACT- ("Advanced Computer Techniques, Corp. (NYC))
recommended -
① splitting sales authorization centers -
② not splitting off data entry function
③ cross-train operators for DE and SAS -
④

ACD- Auto Call Director - Collins - 3* PDP-11/35 CPU's -
calls - 40% to SF date-base; 60% to other cities in U.S.A.
data access -

- taped message
- statistics, logging of calls, duration, etc.
- routing
-

B.O.S- Bank Online System -

9/19/77

Jay Wurts - Express on a PRIME is ready!!

Linda Davidson -
Terry Collijan
Carl Young - VM1/IBM
AED debugger
- Express II - major enhancements in the spring -
- data
- display command → "between TABLE & QUERY"

1.25 MB @ ECC ($17K/256KBytes for ECC memory) -
300 MB CDC
2 x 12 MB Pertec
800/1600 BPI
floppy
2 u/c
COR
16 x phone lines
RTC
power, cables, etc.

Jay would like to sell EXPRESS in-house (on a PRIME) to his present customers & prospects -

- dedicated application system

PRIME 400L - in 2-3 months
PRIME 600 - next year - (front-end & backend processors)

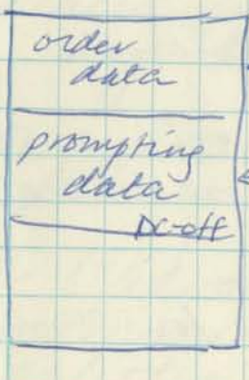
Issues:
① network interface - (file xmission; host interface)
② Tymshare marketing - of Express machines!
③ O.S. support / utilities
④ maintenance
⑤
⑥

9/27/77

Texas Instruments –

Dennis Shadrick
Steve Flanagan
John –

"Record" and "Playback" files –



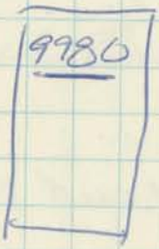
1.) setup
a). speed
b). parity & parity check
c). full duplex / half
d). interface / EIA.

2). create file
a). order
b). prompting
c). record prompting into prompting file
d). configure for operation
– set order to record
– set prompting to playback

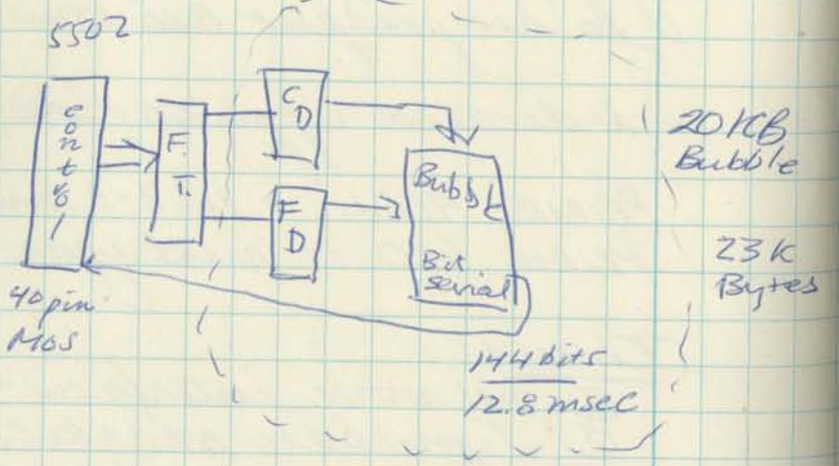
3). cmd. "offline"
– collect data

4). cmd "online" – transmit data

763 architecture –



① 20k Bytes ROM (28 KB ROM capability)



① 1½K R.S. buffers, – editor buffers – communication buffers

② 3 KB RAM (4 KB RAM capability)

③ 1 KB PROM

④ 2 UART's – 9902 interrupt driven

⑤ TMS-8080 – [redacted] keyboard printer interface through one of the 2 UART's

⑥ Acoustic coupler – current loop internal bi-quinate modem.

4 Plug-in boards of 2 bubble modules each
80-90 KBytes total.

Bubble –
select module, select page w/i bubble module,
20 Byte FIFO

O.S.: ① multi-tasking EX-990 –
② device service routines
③

32 K bits = $20 for ROM
4 K bits = $15 for RAM

RAM to ROM – a factor of 6! in cost!

9980 can only address 16K Bytes of memory!!
Memory bank switch –

Can we define an intermediate language?
qty 1 – qty 100
$2995 $1800

Candidates for ROM –

1) print
2) input from keyboard
3)
4)

① Bootstrap
② bubble memory
③ keyboard/printer
④ comm. primitives
⑤ overlay (bootstrap)
⑥ self verification
⑦ power up

16 KB RAM

$360 cost
$720
$500 @ discount ×10,000 terminals
$5,000,000

9/27/77

[redacted]

Doug Fonner -

Johnson Associates
IBIS - International Banking Information System

Interface Requirements -

BASIC-Plus on PDP-11 (RST-S/E) 11/34 to 11/70

Pres - (ex Peat-Marwick) - Bill Johnson; Eddie Alasad - (Lebanese) - Republic Bank in N.Y.

need Network, Balance Sheet & credibility

ARBAT - England

- General Ledger
- Foreign Exchange
- Operations for International Bank -

- Is the system complete? Functional...

~~$250K~~ per installation

- Talking @ ADP & BOEING

15-30 min recovery

(2) 11/34 256KB

(2x) RP06
1 - DZ11A
1 x 300 LPM printer
1 x 800/1600 BPI

RSTS/E - Version 5, 6A, 6B
- application modules
- Foreign Exchange module
  - assets: ① loans & placement
  - liability: ③ demand & time deposits

20-50 foreign exchange contracts per day

③ General Ledger + 4 modules (above) -

input in batch mode or in

- every activity has customer #, the same
- activity

"memorandum files"
"official files"
"contract files" - 6000 contracts

Customer -
- activity code specifies
- "Bank-Code" number - to consolidate

Their own access method - "both good & bad"

Trans. Data Set - Multi-Terminal 2-Terminals Response time?

40 sec - data enter data update & price

Eddie Alassad -
(212)-680-1110 - daytimes

pointer-table → converts into physical sector #
table must be maintained continuously
in high volume application, ptr. table

only time deposit activity may be

"GISAM" - a workable ISAM access method -
used to develop Euromarket module
Background send/receive supervisor - to
Update time deposit - / in detach mode.

= time deposit

Foreign exchange - 200 programs - 4KW to 16KW programs.
- overlays were used for >16KW
- 80 debugging programs
-
151 - application program
49 - utility "

Editing and validation is on-line -
Everything but time deposits is real-time -
send/receive in background -
Report generators in all applications - spool files -

Virtual array i/o @ ptr. tables -

760 4K 1.4 - 6MW program

tables updated in real-time -

May 1975 -
massive changes -
pilot test not smooth
met all target date
running parallel @ mutual system +
- Service Bureau
#5K/mt.

"GISAM" written in BASIC -
- in-line -
inquiry programs tie into
customer # & fields ptr. into table
file sizes are small -
200 - records
fixed size records -
32,678 blocks - RSTS/E -
2 notes per block -

mag tape 800/1600

DH11's - 300 LPM
1 RP04
128 KW memory
11/34 - Computer Horizon
data center -
Englewood Cliffs

10 programmers + 3 Project

Foreign Exchange, Loan, Time Deposits

32K per program.
1

11/70 - Long Island - demonstration

5 customers - per 11/34
2 terminals per customers

American
"Nordic Bank -
field test.

2 - RK06 - 14 MB ea.
300 LPM printers -
GE terminet
mag tape - 800/1600
1

DEC

9/30/77

- Apache #11/34 - Nov/Dec 1977 - field upgradeable - price avail
- Low-cost 11/70 - repricing 11/74 (commercial instruction set)
- VAX - for announcement in October 1977 - [virtual addressing extension]
-
- Half-size LSI - November - announcement
  - half size memory - 32KB / 32KW ½ quad board
  - 4-channel async mux
  - availability - January 1, 1978 (VT-78-)

FONZ-11

- End of this week - DMC 11's [redacted] - Air Freight @ DEC's
-
- Manuals DL11-WB's RSX 11M packs - to upgrade all ordered packs -

Ben Russell - Bell System intelligent terminal application:
- 2500 orders/month, 90-100 Bytes/per order
- DEC 1st - for first prototype shipment
- Datapoint #. LSI-11 under consideration.

Loc: _____ Acct. _____

Order #: _____ Acct: _____

Col:	Amt	Col.	Amt

LSI-11 Board Sets - for announcement by Nov. 1st, 1977:
- dual high CPU and MOS memory cards

- CPU w/ 8KW MOS	$1290	- 35%
" " 16KW MOS	$1690	- 35%
" " 32KW MOS	$2490	- 35%

- PDP 11/03 @ $10,000. uses old board sets.
- Memory refresh is now on memory board
- Coming: Writeable control store option
- 4 Port Mux: $600.00 - 700.00 @ list - 35%
- Dual density floppies in the works -
- 11/34 cache - $3800 Qty 1, delivery March - announce @ end of calendar
- Low cost PDP 11/70's.

10/11/77

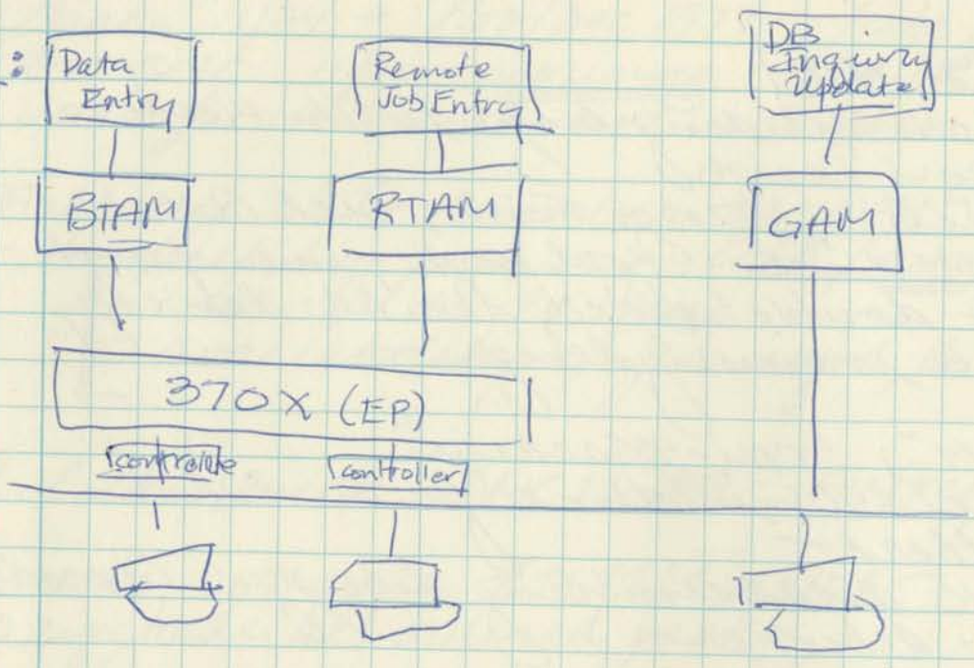
Random Notes:

① Dial-Net [*, TMC]
② DMC-11 - 3 outstanding bugs in the ucode
③ Data Systems Design
- Rich Preston; George Fink; Dick Acres
- good products; good mgt.; mini-periph - DEC add-on
- floppy - double-sided, double density
- bubble memory design -
④ BLISS-11
⑤ "Night-TYM"; "TYM-Machine"
⑥ 2 Radio VS405 modems for the PDP-11
⑦ Elik Gilbert -
a). PDP-10 disassembling debugger (decoder)
b). PDP-11 debugger
- no breakpoints
- (no) labels
- symbol file capability
- PDP-11 front end (DT spooler)
⑧

10/13/77

IBM - SNA

pre-SNA:



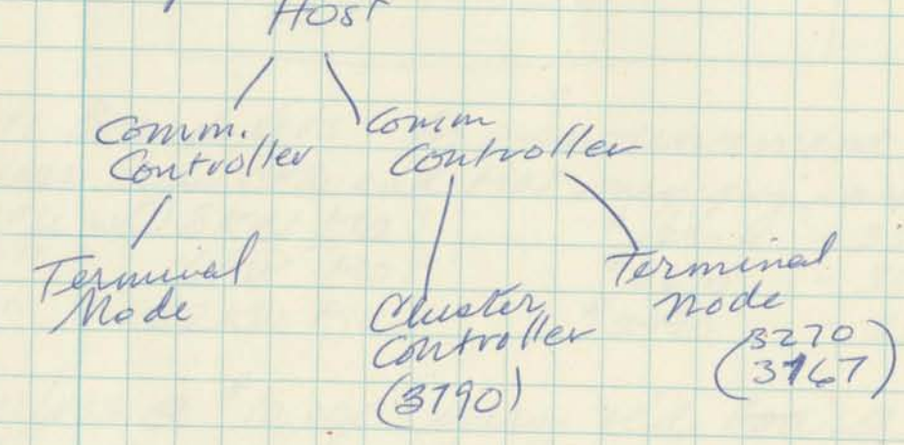
dedicated
- terminals
- lines

- standard interface
- shared network
- shared devices (terminals) & destinations (applications)

SNA:
- VTAM
- NCP
- SDLC

Logically Separated:
- data link management
- path management
- device mgt.
- network mgt.
- end user functions

Nodes types:



Each node has logical separation of functions:

Application layer
Function Mgt. layer
Transmission mgt. layer

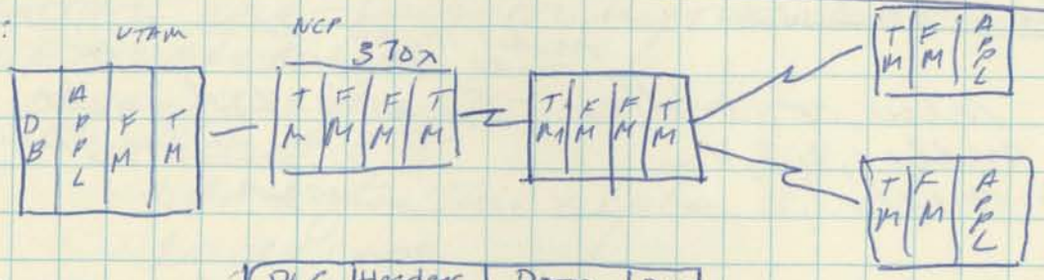
{Transmission Mgt layer
Function Mgt. layer
Application layer}

Device

"Equivalent layer communication"

"Adjacent layer communication"

SNA:



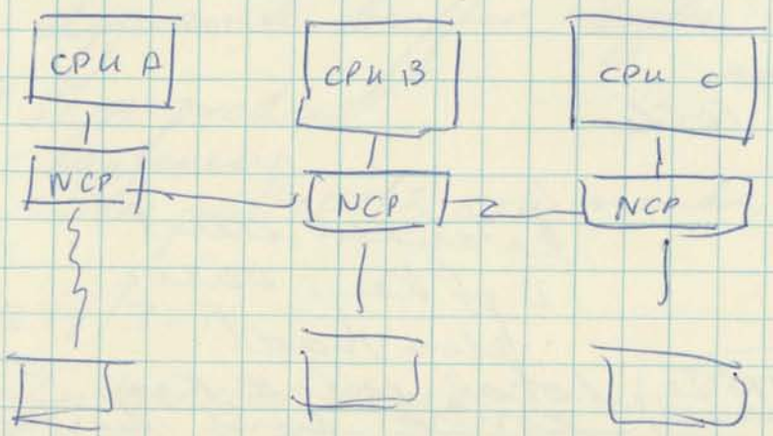
Msg. Format

Data Link Control:
- e.g.; SDLC framing characters.

→ Transmission Header (what level of error control)
= {originate address, destination address} 13 bytes
{sequence number for message}
→ Requestor Header –

- Addresses established when NCP is generated.
- Each NCP knows all devices in the network

Function Mgt –
Today is VTAM or TCAM –



NOSP = {network operator's support program}

IBM - 3270
Information Display System
- configurability
- ease of migration
- BSS to SNA/SDLC
3270

added performance
Screen capacity
Ease of operator use

3270 Enhancements:

3274 - new controller - 32 attached "ports"
model 1A, 1B - local channel
mdl 1C - TP-SDLC/BSC -
- IPL on either SDLC or Bisync.
- load dis/ette
- error log

new { 3278 mdls 1, 2, 3, 4 -
3284 Mdls 1, 2

old 3277 Models 1, 2
3284/86/88

3276 - display & internal control unit -
mdls 1, 2, 3, 4 - BSC
SDLC
DEC 1977 mdls - 11
smaller
April 1978

3278 mdls - 1-4 display
3287 - mdls. 1, 2 printer

3278 - New display station -

All old 3270 features
typewriter & data entry
mag slot reader
selector pen
audible alarm
security key lock

3270 plus -

12x80
32x80
43x80

Extended select
12 pf keys basic
plus 12 add
local print key
control unit switch

94 char set - u/l + ASCII chars.
cursor home
operator selected alternate cursor
cursor select - (same as light pen)

Keyboard:

① palm rest
② typamatic data key ~10 cps.
③ shuttle finish
④ destructive keys protected
⑤ grouped cursor move keys.

Display =
- low glare
- bottom row – Operator information row
- alternate cursor
- character format –
  Numerics:
  - 1 dot higher than alpha
  - lower case
  960/1920/2560 chars =
  9 × 16 matrix
  7 × 14 chars. dots
  3440 screen
  9 × 12 matrix
  7 × 12 chars.

"no blink" – screen is "painted" –
"no scrolling" –

Why? –

Intelligent controller –
Engine (≈3790) for 3274
(≈3770) for 3276
Memory (≈3777) in 3274
(≈3774) in 3276
Transfer speed (coax) – 2 to 4 times 3271
dynamic buffer mgt.

Full SNA product
- layering
- SNA protocols, commands, data streams –

3274/3276
- Interrupt driven
- FIFO

10/17/77

Doug Danforth -

Single Software Supervisor -
"Content-oriented" distribution of material.

COS -

GCOS - Level 6 - 6/43, soon 6/20
4-25 CRTs -
1 in August 1977 - Caternickel Hospital, Bluffton, Ind.
3 mos 1977 -
Dubuque
Chicago (Aurora) -
~~Boston~~

Assembler -
Data Entry package
CRT controller & Hazeltine Mod 1 - XY -
4-6 programs in core
Other program -

3270 compatibility -
written and functional -

Plessey Systems - 10/18/77

11 disk systems * by DEC 30 - P.O. 74965 (DS-11C)
20 " " * by March 30 - P.O. ____ | confirm by Nov. 30th 1977.
5-8 magtape systems - by March 30 - P.O. ____

* includes ① expansion box, ② memory (PN 1132/02-STC1) ③ controller & 10 MByte drive.
*

Deployment schedule
- RFE
- Configuration

Al Fenn - Application Requirements:
- interface any asynchronous EIA terminals (want to)
- up to 1200 baud
- printer
- X,Y coordinate - cursor positioning
- Blinking features - would be desirable
- IMS50 - $1400/ea

- Hants able to interface a T.I.
- Escape problems
- Scrolling
- [redacted] cursor movements
- # installation

[redacted]

45	1 CRT	1 printer
33	2 CRTs	1 printer
20	3 "	"
5	4 "	"
2	5 "	"

Julian Brook - 3780 is available.

180 Entrex (includes mag tape & controller) - $1080.00/mo
maint. 165.00/mo
33 Mega Byte Disk (includes controller) 425.00/mo
maintenance 80.00/mo.

2.5MB disk = 260.00/mo
maintenance = 50.00/mo

{up to 32 screens} 10* screens @ 80.00/mo
maintenance 14.40/mo

- 20% discount for 5-year lease

Short-term - screens $95.00/mo.
lease - maintenance 20.00/mo

$2690 list
$2152 discount

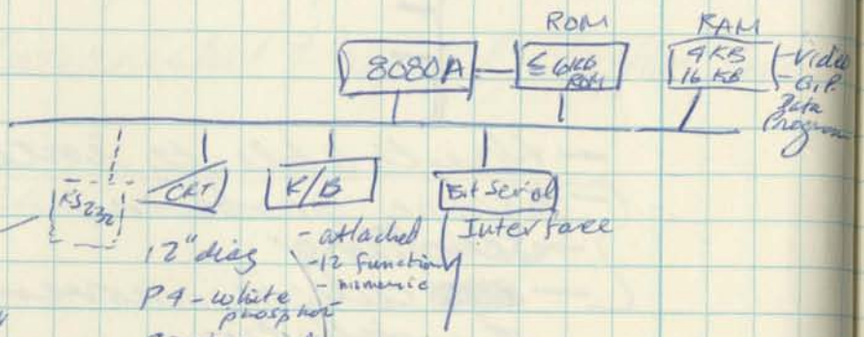
Inforex - limit of 16 screens per system
$10k for second system - Wichita
(one system for 3½ months)

10/24/77

Zentec - TYMED
Grant Morgan - VP Engineering
Barry Loverbeck - Chief Designer
Lionel Martin - Director of
Jay Gorzinski (?) - Salesman (?).

Objectives 2000' drivers
- minimize cost.

Zentec - ZMS-50



Video:
① 2 page methods
X '1000'
X '1030' - 25th line
X '1080' - 1-24
25-48

② List driven -

address	Byte Count	Control
16-bit		

- Advantages:
- non-contiguous in core
- effective compressor of data in sparsely

	List	Fully Discounted (@Qty 100-250)
ZMS 50 - mid 1Q78	$	$800?
ZMS 90 - early 1Q78	$	$1500?
ZMS 70 - ~~late~~ 1Q78	$	$3500+?

GTE Sylvania - IAS - Rises Zentec
LA County Sheriff's office

RS-232C | 50' @19.2KB
500' @9600 baud -

E.I.A. - "RS-XYZ" - Emerging Standard
compatible w/ RS-232C

Will implement -
- send data
- receive data
- terminal
- dataset ready
- incoming call ("ring")
- terminal timing (receive clock)
- reverse channel interrupt
- No secondary request to send
" " receive
" loopback

37 pin connector (all defined) including differential drive Trans/Receive

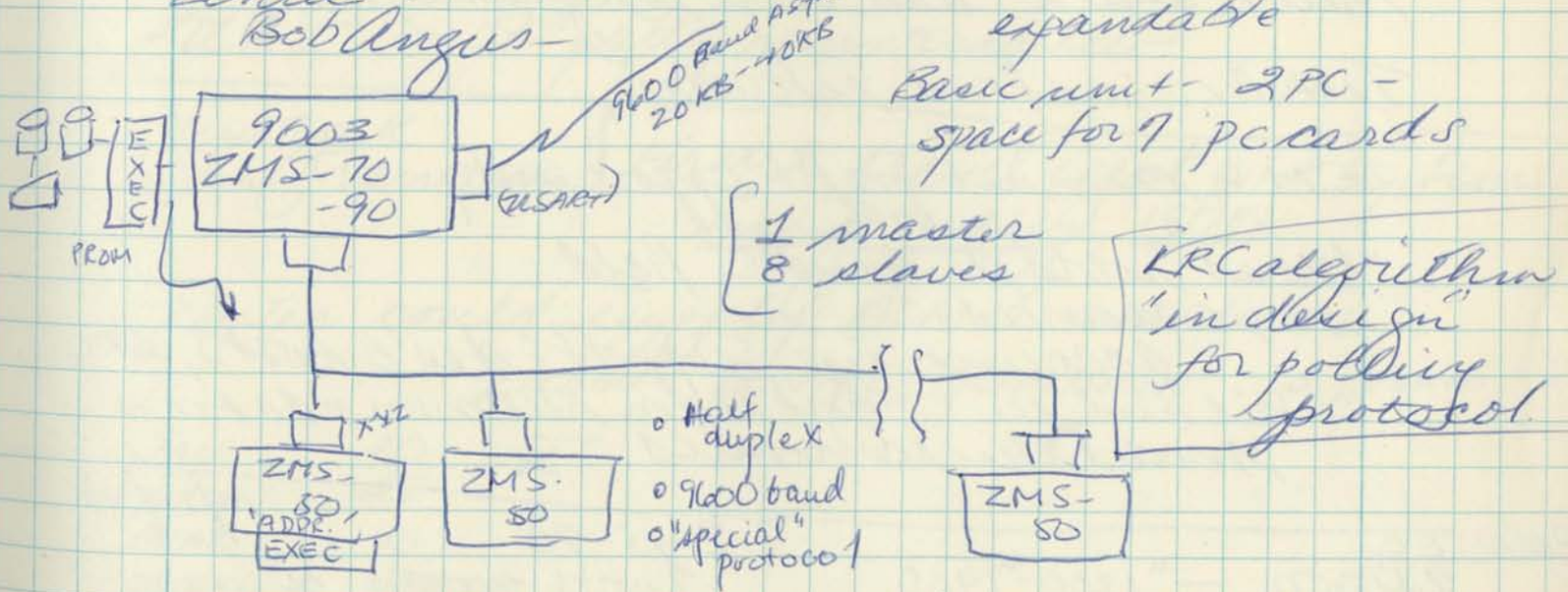
- Adapter available

EIA RS423 - 200' (@ 9600 bps.) -
RS422 - (long line driving) -
1000 meters - @ < 100,000 baud
twisted pair #24 AWG min. wire size; no shielding

IC's:-
(Fairchild) 9637 9636
(AMD Motorola) MC-3487

① Change driver
② Install connector pin adapter

Zentec -
Bob Angus -



"Executive":
~~9003~~
editor
forms generation
telecomm
test routine
Download -
PROGRAM -

FIFO buffers for RS232's -
25 - printer
64 char. capability
" (block & send)

"Homegrown" polling protocol:

Cupid Boldon -

Consumer Finance and Small Business Mgt.

Used M.I.S.

Intelligent Terminal

Short run

Recommend - Mktg. Staff, Ed Field, Tech. Div.

Private Label: Schwartz -

Ed - Low Risk ② Profitable ③ (Price Competition)

Ed Field won't allow a straight pass-through

"Value-added" has been unquantified.

Tech Div: uniform software,

T.E.M. - current profit opportunity

"Grass roots demand" - field.

- economics

account size, support & dev't costs, etc.

"Wait and see" - short term recommendation

model the economics

ZENTEC

ZMS-50 — $1300 - $1400

ZMS-70 — $2000 ± 700

TYMED - 44 terminals

Travel - 250 terminals -

≈ 300 terminals

1978

10/25/77

ZMS-70

2 ports ~~No disk~~ ≅ $2000

no disk

no printer

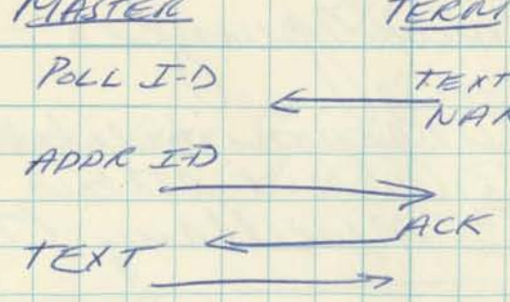
ZMS-90 $4500

52KB

dual

mini diskettes

ZMS-50 : 1 port
1 optional port
(fixed keyboard-



1978 - ZMS-70 (uses 9003 case) ≅ Jan 1978
" -50 ≅ Feb 1978
90 ≅ March 1978

12 weeks lead-time on tooling for the case-

Medical — pilot system in California —
Zentec has a maintenance capability in Calif.

MATS-Service —
1200 baud - 15 cities —

3rd party maintenance - requires 90 days to "get up to speed"

-U.P.I. — 3rd party maintenance-

New York
San Francisco } First 2 travel agent pilot systems in January, 1978

Zentec could supply ADM-2 emulator

		ZILOG	ZENTEC	RAYTHEON	LS./Vadic
JAN	20	X			
FEB	25			X	
MAR	40				
APRIL	40				
MAY					
JUNE					

Half of ZMS-50 - 1978 (40 units) have been booked

W29 Business plan -
4 CRTS - 1 ticket printer installation —

10/25/77

Chuck Younger:

Topics:
① Responsibilities as Unit Manager
② Current status of RTE project
③ Miscellany (TYMED / TYMCARE) -

---

① Mtg 1:30 p.m. -
— Chuck - every Wednesday - or every other -

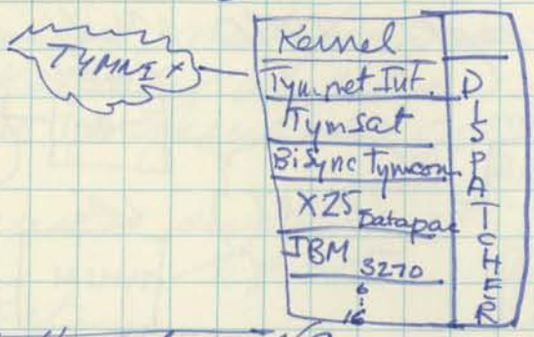
② Status report - once per month -
Chuck needs to know the date!

③ Design
Chuck & Dave — TYMCARE -
— analyze system requirements — hardware & operating system

④ Reschedule - RTE completion
Chuck will produce schedule -

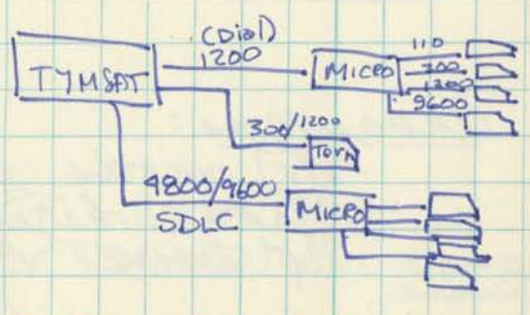
Tymnet Planning Meeting - 10/27/77

ISIS - "Internally Switched Interface System"



JCH - Bob Harchanko

3270's & Varian Question" -
Varian 32KW limitation



mode takeover
supervisor traffic -

~~$~~200-$1000/mo. for cluster terminal connection
(Boston-"Fargo")

New tariff required

Can this be done

1). ASTA - how priced?
2). Remote Tymsat (from Interdata) - how priced -
3). Varian ~~interface~~
implementation?
4). Tymcom III - not valuable @ present.

Error checking asynchronous protocol. -
(except for Kay's protocol, forget this
for the next 6 months).

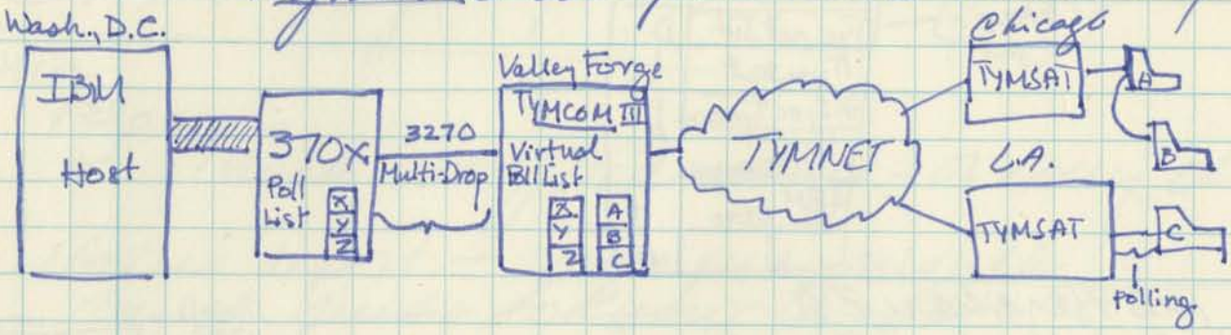
HASP is the only marketable product to the
IBM world. (via Tymnet) -

10/27/77

Tymnet - Annual Product Planning Mtg.

-3270's: H1:

Tymcom accepts 3270 Multi-Drop Protocol



Advantages:
- No mods to host environment
- Works wherever 3270 is supported
- No TYMNET Equipment required on site. (can share TYMCOM)

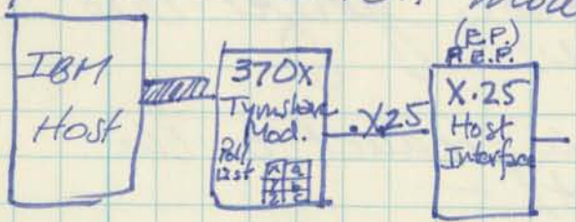
Disadvantages:
- Host must provide more hardware
- Host must give more 370x CPU for polling
- Less efficient use of bandwidth between Host & Net. (Logic question).

Development:
- TYMCOM Software -
- TYMSAT " -

| Interdatas and Varians ??

W.S.B.A.
- 1000 (3270) terminals!!!!
  - 500 - ~~big cities~~ in house
  - 500 - Everywhere else - Example: 1 term. in each town on Hwy 5 - from S.F. to Portland
- 7 western states - Calif, Utah, Oregon, Idaho, Wash, Wyom, Nev.

TYMSHARE 370x (H2:) module answers Polls to Channel:



(same) - . . . . . .

Advantages:
1) Uses Std. X.25/Host interface
2) Very Quick Response to Channel Poll
3) Efficient Use of Real Bandwidth between Host & Net.
4) Generally uses less CPU

(Telenet has this (?)
CPX has it !!)

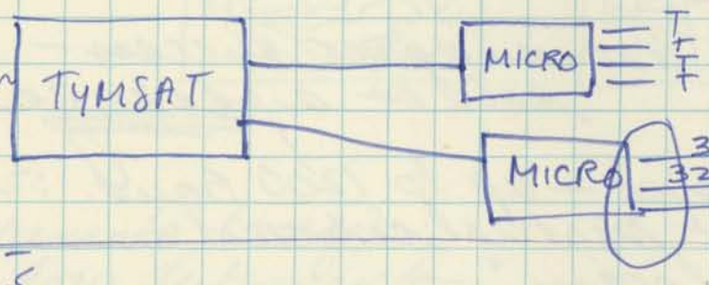
5). No TYMNET hardware on site (shares TYMCOMs)

Disadvantages:
1). Requires modification of host environment
2). Works only at sites with 370x and who give consent to go non-standard (leaves out 1270, CONTEL, CCI, etc.)
3). Requires support of two pieces of code.

Development:
1). TYMCOM Software
2). 370x "
3) TYMSAT "

Partitioned Emulator Program – P.E.P. (old)
Network Control Program – N.C.P. (new) | 370x driver module.

Micro 3270 implementation



3270's
1. numerous – second only to teletypes
2) - numerous random inquiries
3). - existing customers @ parallel 3270 nets.
4). We can't handle the larger user's legs' – its volume justifies circuit switching
5). Info – difficult to get.
6). We must do polling locally.

3270 Unknowns:
1). Impact of higher char. rates on Tymnet is unknown
→ 20K to 250 KChar/hour range.
→ educated guess is 130KChar/hour.
2). Can we compete viably and economically – (price competitive) Unlimited service for $175 to $300/month/terminal location
3). Host interface to host software – how should it look??
4). – Can't force an access method change
– Should be as transparent to existing polled environment as possible.

4). Is the big city-first approach viable? Our market may not be in big cities.
5). Impact of SDLC? What happens to existing bisync 3270's over the next three years.

3270 Prospects:
1). Continental Can - some locations - $5000/mo.
2). New England Life - $10,000/mo
3). Insco $2000/mo.
4). Std. Oil of Calif. - $5,000./mo. etc.

Burroughs support: . . . . . (8)

6	$ 20k/mo
12	50k/mo
24	150k/mo.

Based on $200-$300/terminal/mo. price

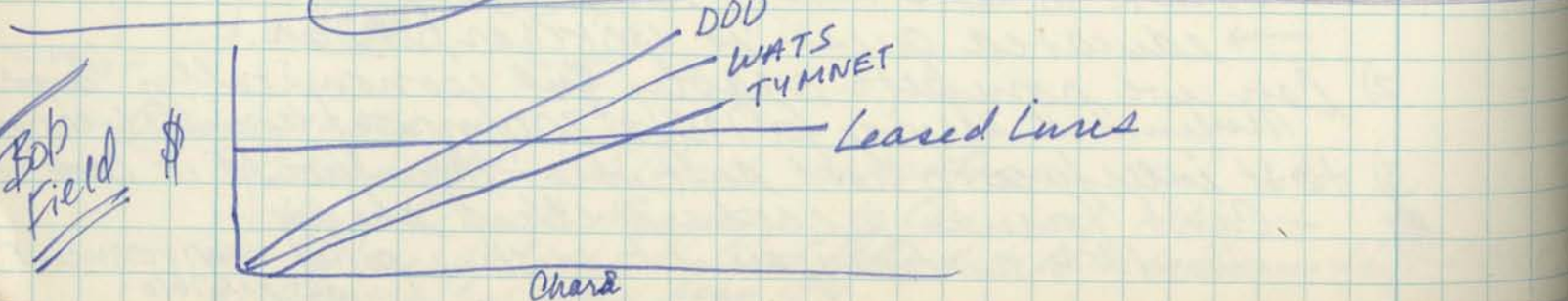
[3270↔3705↔370↔CICS] (tremendous success - sold as a package.)

TELENET - "Hotline" service - up to 1200 baud.
- point-to-point virtual circuit
- "automatic login" -
$75/mo. - all you can eat!!

Tymnet Rates (Present):

Tymsat port $175.00
Characters 624.00
130K Chars/Hr.
× 160 Hours/mo.
20.8 Million
× $ .03/K Char
$ 799.00 plus local loop

Bob Field



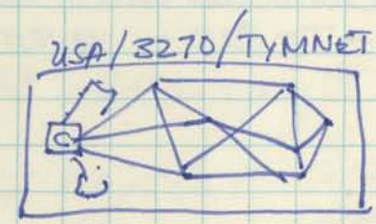
Switched DDS @ 2.4, 4.8, 9.6 KBaud —
— very cheap end-to-end
— increased local loop charges

S.P. has raised DATRAN prices to where they are realistic, & now they can't sell it!!!

3270's are somewhere between interactive terminals & RJE relative to cps req'd vs. connect-time.

LaRoy: 2400 Bps line — 45 users
4800 " " — 92 "
② What are the fundamental economics of connecting 3270's to TYMNET?

Warren Prince:



3270's:
: remote (very)
: low duty-cycle
:

Warren: 50¢ per watts callin for credit card for validation

350,000 logins/day (must be avoided if possible) —
Rotary #407 Dataset (Touchtone telephone or Transaction Telephone)
Touchtone phone — authorization code.
Votrax (or MICRO-VOX, etc.) (Warren does not want to use ATT transaction telephones!)
25¢ validation via Tymnet

$20 million w/i 2 years — it would wipe out TSHR (us) competition

Rotary of #407 datasets — permanent circuits —

November 1, 1977

Doug Danforth - Software Distribution System -

Ben Russell - $500/mo - DATAPOINT - 4 diskettes -

{RSX-11M
{Basic Plus II -

(1978) JAN FEB MAR APR JUNE JULY AUG SEP OCT NOV.
' ' ' '

11/4/77

WFW -

{① Need delay parameters for Tymnet supported terminals.
{② Need 1200 terminal delay params - GSA - needs further breakdown.
③ Proper delay characteristics which Tymshare wants to support.
④ Special req't - TI-810 - reverse channel - (ff/tab/vtab/256 char buffer)
⑤

Bob Wallace — Network Spooling

1) Bandwidth utilization ✓

4800 baud modem
operating at 4000 baud effectiv

2) Duty cycle - (available from Colin)
assume 6 hrs/day.

3) Average distance to host ✓
establishes the cost of the link
- $/mile per month
- modems
- Tymsat (ports)

Establish potential savings:

utilization × duty cycle × cost of avg. line link

Savings could be realized:
1) Release of certain network lines
2) Growth potential at no cost
- printing at local office
- network traffic in the day

Al Fenn - Cluster Concentrator Requirements 11/2/77
① will not support TI-810 or Centronics
② local editing
③ printer output (slave device) needs to be expanded
④ more generalized function key capabilities -

Grant Morgan (ZENTEC) Harry Summa) - 11/3/77

12"
P4 - phosphor (Ball Bros. / "S.C" - Minneapolis) -
Truncated 9003 Keyboard (no numeric pad) -
Cannot generate 8-bit chars for display editor -
10 bits - repeat & control

Bit 9 - all caps
10 = repeat - ½ sec. hardware/~~implemented~~ pimplemented
30 to 60 repeats per second.

Keyboard -

Board sets differences -

50 - option connector
options - printer interface -
- 37 pin connector
"same as bus interface on 9003 -
Keyb. Interface - interrupt driven
- no printer interface available -

→ 8080A-1

{9900Z-} ("Bounded system") - architectural differences -
{ZMS-50} - run @ rated speed of processor -
- fixed configuration
RAM, ROM, PROM - (EPROM TV-2116-2KB)
- up to 8KB of EPROM (equivalent fuse link PROMs available)

Memory - 2116 - 16KB chip -
2117

- switch selectable up to 19.2KB - {async / synch. / isochronous}

Same character
Interrupts through std. R.S.T. vectors

Linear power supply -

~~Two~~ Two "pages" of memory -
Extended text
word wrap & reverse word wrap -
TCOM4
Self-test -
basic subroutines (incl forms generation) -

Display list structure

Interrupts vectored through RAM(?)
- must if user program is to grab interrupts.

RS-422 option
current loop

RS-232 / RS-X42
(not fully implemented in the terminal)

12 function keys on the keyboard.

Programming differences between
ZMS-50 & (ZMS-70 & ZMS-90) -
& embedded control codes
(include floppy disk -
- Speed restriction < 12 attribute changes per line.

service priority:
- CPU highest
- memory refresh next highest
- video board - last

ZMS-70 - 6 card slots
ZMS-90 7 " "

? "strap it back to 9003 compatibility" -
can't mix them

Video timing board 8KB (4K chips) - 32KB (@ 16K chips)
- six chip locations for character generator
(2K x 8 either PROM or RAM)

ZM570/90 - common video timing board -
- 10×10 dot field for character generation -
"ascender / descender" bit(s) - half dot shift.
- If you use ram you can download -
character generation -

ZM550 - straight 9003 - character generation
- 20×20

All boards are into "PC layout"
with the exception of the ZM5-50 board.

ZM550 case - longest leadtime - due in in Feb.
ZM570 - modified
horizontal
- click/keep in motherboard @ IDC circuit

2 sided boards - except
- Video timing board - multi-layer

Bill Morton -
Printer terminals - (hardcopy 30cps?) 11/4/77
Bank - one building - several floors -
querying a single data base -
Memorex - 12 CRT's (?) - 500 queries/day @ simple update.

Bob Wallace 11/8/77
① 2-3Q78 - $500-2600 in qty.
- card cage
- LSI-11
- Mem
- 4 port mux
- f/d controller
(4 Floppy dual-sided single density ("Model 1600 equivalent"))

② - CRT - $1100 in qty.
- LSI @ mem/P.S./bootstrap.
CRT controller board -
keyboard in on parallel interface

ZM570/90 - common video timing board -
- 10×10 dot field for character generation -
"ascender / descender" bit @ - half dot shift.
- If you use ram you can download -
character generation -

ZM550 - straight 9003 - character generation
- 20×20

All boards are into "PC layout"
with the exception of the ZM5-50 board.

ZM550 case - longest leadtime - due in in Feb.
ZM570 - modified
horizontal
- click/keep in motherboard @ IDC circuit

2 sided boards - except
- Video timing board - multi-layer

Bill Morton -
Remote terminals - (hardcopy 30cps?) 11/4/77
Bank one building - several floors -
querying a single data base -
Memorex - 12 CRT's (?) - 50 queries/day @ simple update.

Bob Wallace
① 2-3Q78 - $500-2600 in qty. 11/8/77
- card cage
- LSI-11
- Mem
- 4 port mux
- f/d controller
(4 Floppy dual-sided single density ("Model 1600 equivalent"))

② - CRT - $1100 in qty.
- LSI @ mem/P.S./bootstrap.
CRT controller board -
keyboard in on parallel interface

11/8/77

SYCOR controller:

$356/mo
60/mo
110/mo.
$526/mo.

4 CRT & SYCOR controller
Vadic modem (GE maint) ($90/mo @ Bell 212) !!
TI-810 printer

$765/mo. T²
$526/mo
$139 = 31% G.P.M. !!
@ 0% RISK

DEC/TI. line

11/8/77

PDP11 - RJE Advantages:

<NP> = network printer/reader
<C> = COPE

Relative to Cope & Network Printer & Reader:

<NP> ① ~~[redacted]~~ have magtape, high speed card reader <C>
<C> ② PDP11 is cheaper, < 50% of amortized cost of COPE { ~~[redacted]~~ }
<C> ③ CRT console - ease of operator interface
<NP> <C> ④ ~~[redacted]~~ network spooling - operator unattended (unattended) - uses nighttime Tymnet bandwidth (NYC - 10% of bandwidth used for COPE and high speed printing) -
⑤

⑥ Daytime thruput { 125 cps - 300 cps } • daytime •
~~vs~~ night-time thruput { 200 cps - 400 cps } • night-time •
⑦ customization of batch jobs.
- job definition language - "BATCH" facilities for use on the 990's & 10's.

<NP> <C> ⑧ multiple copies of the same file(s) need be sent only once (header page printed twice by Spool trailer page " " " ")

<NP> <C> ⑨ Batch ~~printing~~ of the same form (print job) collected from multiple hosts (fewer form changes by the operator)

<NP> <C> ⑩ Possible replacement of second shift operators.

<NP> <C> ⑪ Possible elimination of additional printers (or reduction in current # of printers).

<NP> <C> ⑫ Can make use of faster (e.g. 1000 LPM & 1200 LPM) printers

<NP> <C> ⑬ Job Definition Files -

<NP> <C> ⑭ Run periodic requests -
Run timed requests.

<NP> <C> ⑮ Run applications & key-to-disk at night

<NP> <C> ⑯ Data Compression - possible use of character pairing algorithms, Huffman codes, etc. (can't do ⑪ dumb printer).

⑰ Read cards & magtape during the daytime & transmit
<NP> <C> - customers can enter media w/o waiting for Tymnet @ night.

(18) Read cards & magtape while transmitting or receiving across Tymnet.

(19) Potential for Better operator interface and error diagnostics

[C] (20) Solve recurrent protocol problems w/ COPE by having control of the software (End-of-media @ magtape)

✓ [NP] [C] (21) Multiple printers per cpu — using only one Tymnet port!

[NP] [C] ✓ (22) Shift host load required generating and listing spool files from daytime to night time — effectively offloading other host cpus as well. (Equivalent of night time BATCH REQUEST capability)

✓ (23) Will support media conversion from customer systems to Tymshare centers prior to transmission to task hosts (e.g. floppies, cassette, paper tape, magtape,

✓ (24) Eliminate or drastically reduce use of WATS service during daytime.

[C] (25) Eliminate modems or hardwiring into the Tymsat — this cannot be done with the COPE. (208B = #125/mo. × #2 + Data access Arrangement & Business Telephone)

[C] (26) Operator guidance menus — saves operator training
Edit - validation
complex printing - (?)

(27) PDP11 provider standard means of interface to future peripherals — e.g. high performance magtape, diskettes, printers (e.g. ink-jet, electrostatic, multiple print train etc.), card readers, bubble storage devices, word processing quality printers, special printers FAHRT, KATAKANA

✓ (28) "Electronic forms control" — forms control by the processor not by the printer operator need never change the carriage control tape

✓ (29) Automatic retry (possible) to upload & download files to or from hosts.

(30) Possibility of automatic accounting/tracking by center: e.g. # of pages, chars transmitted, # of spool req'ests

(31) Processor/memory portion of system cost will decrease rapidly — so that additional system cost of cpf will be negligible -

(32) Saleable product to customers —

(33)

WFW — Intelligent Terminal 11/14
Debugger — Characteristics Requirements —

(1) 3KB ≅ Z80 debugger. 8080 debugger ≅ 2KB
16KB = I.S.C. — A lot of memory

(2) Directly addressable screen - "core refreshed" - almost necessary.

(3) 48 lines or 2 pages (or video board) —

(4) Function keys - desirable (8 bits)

(5) Has to be interrupt-driven !!
(i.e., from the keyboard and line !)

(6) 8080/8085/Z80 — easier to write debugger !!

(7)

Chuck - Project Status - 11/14

① RJE -
a). Julian could be assigned:
- protocol manager (½ man-month) (TASK) (CY's - JAN)
- DUP driver (TASK) (DW's - DEC)
- Control module (TASK) - (CY's MARCH)
-

b). ~~[redacted]~~ Bill Eureka - could be assigned to debugging

c). ~~Schedule~~ "SPOOL" modifications on host systems.

11/14

Nate Kalowski - Intelligence & Storage Products
Product Line Mgr.
comm. products@DEC for Terminal

[redacted]
- LA-36 buffer board
- uproc

(617)-481-7400
x5052

RXT 11 - intelligent peripheral product - "box"
- single/dual (single density) - 1/2 MegaByte (First release)
- 8 KW / 32 KW
- cluster controller option - up to 4 terminals total (4 printer + comm port)
- std. — "Bounded system" - "Terminal Intelligence Module"
  - comm line (synch (Byte); 2 asynch.) (USART (8251?))
  - printer port
  - terminal (1 to 4) CRT, hardcopy; — auto baud rate settings; full EIA interface for
- (double density in future) head and drive compatible/upgradeable read/write electronics
- 11 I.S.P. - fully compatible -
- purpose to sell runtime machines - not development machines.
- "software licensing becomes virtually free" - RT-11 - $97
- $2500 - single floppy 100-200 per year
  $3500 - dual floppy " "
- units change read/write controller board - pluggable - field upgradeable -
- large breadbox 12" wide x 17" deep x 7" high (1 diskette)
- Dev't System - RT11 - PDP11.V03
- Downline loadable -
- By summer, ~~June~~ or so. (July/August)
- Pilot production in May
- announcement in the beginning of ~~February~~ March
- Double density - [redacted] in first half of 1978.

I/O port emulation done with 8085

add terminal ports to 4 ports - or to 2 floppies [redacted]

① RXT-11 - [production schedule]
5-MAY
25-JUNE
50-JULY
production - August.

Q-Bus RX02 - July/August 1978
Double density.
(not available on this product!!)
i.e., non-RXT-11 compatible

② 3+ Cartridge
Feb 1979 - Like HP "DC-100A"

③ Downline loadable CRT: October

④ VT-100 September/October (preproduction)

RX02 - DMA controller.

11/14/77

Laszlo Rakoczi –

re: Msg. Switch position –

– Honeywell orientation vs. PDP10 & DEC 2020
– Shell contract – (Floifax? & overseas contract)
problems @ overcommitment
– my own misgivings about staff position
(not a line position) – (analogous to Walt Eismann or his people)
– Jay says "he would take it" –
to round out my background
– Jay worries I might have been brought in to "bail out" the Honeywell system.
– Jay feels I should buy some time –
– "don't burn any bridges"
– "buy a couple of weeks to research it"
– "talk to Bob Archarik re: msg switch"
– Three month test-and-checkout phase on PDP10 message switch
– Possible reorganizations of Tymnet – (incl. Ernie? vs Tiburon Princeton)
– Look at the Shell contract – (default on customization?)
– Find out what problems exist with the software vendor
–

Dick Scott, Nate Kowalski –

VT-100 1/11/78

– cures screen limitations of VT-52
4 function keys + 9 additional; "smart" terminal
– decision point in January 1978 –
– low cost, many ~~features~~ featured terminal –
– introduction as buffered terminal –

Texas Instruments - 11/16

"Bubble Disk"

- 3 to 8M Bytes -
Reliability / non-volatile
fast access
transfer
low power

Reliable (head/track) access - (moving head - 10,000 HR. MTBF (conservative 24,000-25,000)

continual = 1/year
10hr week = 1 call per 5 years.

"cost of ownership" -
→ equal to floppies ←
purchase + repair + scheduled pm + lost opportunity cost.

25 ms. avg. access -
150KB transfer rate.

14" x 17" x 5"; 25 lbs.

By January 1978:
Faith

Dennis Kratz -
Microdata 1600 - 1621 control memory PROM
1630
16KW
8KW
8KW
1/11/56
5 Megabyte - Dynex
Wango tape drive - 800BPI / 9track / 12½ ips.
Centronics 1015
QSI-7700A -
Display processing unit - DMA - Info. Display, Inc.
Cross assembler - 360/50 -
re-written at ROLLA -

Experience
- IBM 360 - Fortran & assembly language routine interface
- Microdata 1600, 4 - magtape handler; diskutil (by Diskedit) TOS; COSMAC emulator 1600 mode.
- Honeywell 516
- Intel 8080 - (CP/M)
- DG NOVA - interrupt driven msg printing
- comp Auto LSI-200

MPL / PL/I / FORTRAN / ALGOL / BASIC / APL? COBOL

12/9/77

Doug Danforth - Software Distribution System -

Helper -

Source/Destination - host or terminal w.r.t. network

TTY - terminal of commands file

Guardian
- restricted command mode - runs nothing but the guardian
access to guardian's user

Attributes
- time stamps
- list of sites
- archived?
- who's responsible -

W29 -

Application req'ts:

① protected fields → a) variable screen size
- to simulate airline screen format.

[64 chars × 13 lines] ⇒ airline system screen size

② data compression

③ visual characteristic
- blink ✓
- half-intensity ✓
- reverse video (they could use it)
- underline (no need) -

④ "save"
- data compression
- partial send
- protected mode -

⑤ function keys - 8 functions -
- "partial" send
- "send"
- (same as any airline.)
- special escape
  compressed data messages -

12/13/77

Gary Myers - Jacksonville / Miami
- Tony Ficcara, Jance Jay
- Bill Parris, John Swarbrick -
- Gary Myers.
- GTM

Printer(s)
Tape Drive -
Card Reader -
11/34 -

DD11-SPC-1
Memory
Expansion box.

Miami: 75,000 print lines night

Printer upgrade in the field. ? - 12-14 hrs.
$1500 [redacted]. field upgrade

CDs:
Miami - intermittent character errors
Jacksonville - seems to be working

Card reader in Jax - out of service for weeks.

MIAMI: null characters or arbitrary chars generated. 75K print lines/night - 9 to 10 hours
- Sporadically dropping column(s) on a single card

mid month / month-end.
2500 cards/box
10-20K cards/night
5-10 boxes/night
(3 to 4 times/month)

JAX: 8-10K cards/night -
40-50K print lines/night

ANSI - standard tape labels -
1. backup of disk files
2. overflow
3. customer tapes.

---

end-of-paper sensor - payroll checks
paper slewing - carriage control tape -
power supply - powering down - (JAX)
reported 12/6/77

Swarbrick:
1. power supply - in the air (for the line printer)
2. hardware guy - from Cupertino to Miami
3. if failure, then send Julian
4. mag tapes - on their way - today or tomorrow!
- Includes 11/34, memory, backplane (DD-11-SPC)

1/2/78

Miami and Jacksonville Problems:

1/2/78 – Bud says JAX is running

1/2/78 – Miami –
- touchy ROM M9301 – seating
- parity controller problems?
- 11/34
- 64k memory } installed –
- magtape

CT 4964 ~~6600~~ LPM printer coming here – Jan. 27th –

Corp RJE need
- power supply
- memory –
- short cabinets –

SMB disk to Miami –

VT-100

→ Should be able to do a login

→ problem on disconnect –

1/3/78

Global DANA Strategy

Questions:
- CBC ?
- ADCP ?
- Series 1
- Action plan schedules -

Distributed applications:
- On Time
- Pharmacy
- W29
- TymCARE
- Mable - Data Entry - 370 Burroughs or 360
- Telefuel -

- Lunch @ ten -
- Call Art Caisse
- TBM Series 1

1/3/78

Jack Liart -

- COM & source

- ultra strip -
whole gamut

- formatted tapes format -
or generate print tapes
COM units can convert print-tapes -

unique indexing -

IBM 3071
370/158
370/155-165's 168's
Burroughs 7700's

Some
NCSS
Remote Computing
In-House -

100 different applications -

- invent
- business reports
- COM for business office
monthly billing for 7.5 million
- service
- share
- A/R
- trunk report
- credit card lists

Format-on-the-fly - (on the host machine) -
Format - second pass
Print tape conversion

System 9 1/4/78

Ken Jones -

Triumph Adler - person to Access method

Technical liaison
Ralph Rotter (conservative technical honcho)
Dr. Wendt -
Dr. Ketzlaff - Taylorix - marketing head

Itinerary -
Stuttgart - Taylorix / Nixdorf - Zibelesafe - corporate head.
Paris - ~~Olivetti~~ SEGOS -
Darmstadt - Bundespost,
London - BPO, USL

System 9 - small business acct's - general ledger, payroll, (microprogrammed, including cassettes, med-speed printer, ~~cassettes~~ ? 60 to 80 lines.
System 6 - new, smaller, cheaper -> handshake ACK NAK.
literally 100's installed
- some customers run applications in

Dial-out from the central 370 (2×370/158)
batch processing on central 370 -

Single price for all of Germany at night

Bundespost has night-time rates - tariff independent of where you're calling from in Germany.

Bundespost - ⊗ processing in the network - encourages shared-use network - partial to RCA, because of post-war treatment

use 1200 Bi-Sync now -

Can this system (6) communicate asynchronously ??

Jean wants to hook their

Taylorix wants ① Bi-Sync - circuit support
② Dial-out

SEGOS
- Packard - Technical Director -
SEXTANT designer
APL - Jean Pierre Barozy - (in BLISS) (I.P. Sharp's APL - large-business credit card processing. Carte Bleu, Carte Blanche

370/155
Burroughs 6700

Many bisync RJE's - primary business
370's in 2-3 cities

SIGDS's motivation
- network maintenance and reliability problems
- limited in ability to expand their network. they would like to piggyback on Tymnet.
- flexibility in network reconfiguration
- Bisync through the network supported by TYMCOM II's
- Interested in intelligent terminal plans and products

Be prepared! They will want specifications

1/4/78

- ~~Call Cathy Rakoczi~~
- ~~Flip Charts for Friday~~
- ~~Manager for Mini Systems~~
- ~~Call Gary Myers~~
- ~~Call Jo Boyt~~
- Milestones
- Stock options
- Incentives - Thursday night -
- ~~Vacation plans for Chuck~~
- Chuck's memo re RJE - to Wallace - this week!!
- RSX-20F 2 wk. delay -
- ~~Follow-up with a memo to Faith~~
  - ~~interest on a low priority basis~~
- Send Walt a copy of overall RJE document
- Chuck's documentation -
  - record blocker/deblocker
  - file system -
- ~~Get paycheck this Friday!!~~, before leaving -
- ~~call Faith about~~ ✓
  ~~Pilot system~~
- ~~European trip~~
  ~~day by day basis - daily notes~~ -
- Rex Heller

Commitments from Walt

① Follow through with Gary Myers
② " " " " Jo Roby
③ If not, then I will submit a revised schedule for WFW.
④ Bill's milestones
⑤ Meeting Thurs. night - incentives
⑥ Review during Agenda.

Tom Miller 1/10/78
Jerry ——— ?
Ruben Hoppe

Sycor

3270 – message oriented – enter key
field orientation —

T.I. printer –

printer support is funny! —
block oriented — 256 char blocks –
variant of BiSync — Acknowledge
Enquire —
DLE (space available?)

Digital Equipment 1/11/78

Bifurcation of LSI-11 product line in 15 mos. —

① 11/24 performance @ current LSI price
LSI-11 bus

② LSI-11 performance @ reduced price —
— bounded product —
— test marketing vehicle for single chip design —

RL01 — interfaced to LSI-11 —

— Bob McFadden, Jim Kelley, Rich Billig —

RSX-11M
(includes DCL) — base system for ~~DBMS~~ TPS

~~Dan~~ Hubbert
Jerry Braun 1/11/78

Support

11M+ — multi-volume disk
— overlapped seeks
— DEC command language —
Wish lists: — fast backup utility
— system generation

— cleaned up in version 3.1 — announced for release in February
— "save" feature
— add new drivers:
— RM03
— RX02 — new floppy —

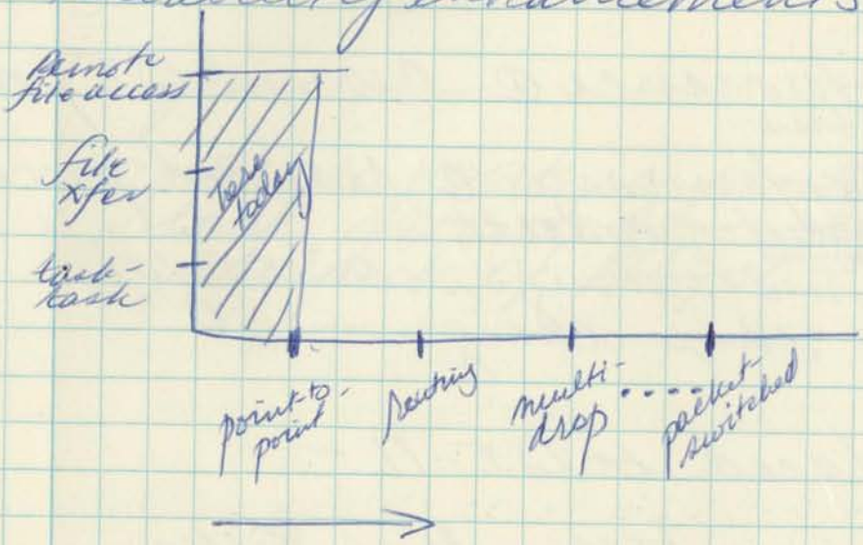
DECNET —

11/70 to 11/34 —
50—75 KBaud — data throughput —

next release in ½-2 mos. ~~V1.3~~ V.2.0
— 1024 words of ucode in DMC-11

Stage 2 - DECNET -
performance improvements & testing
performance measurement tools
reliability enhancements

RSTS/E & RT-11 will have DECNET support -



Current activ

TPS-11 -
announcement in April-May
Basic Plus II & COBOL

Classical
order entry
e.g. - separate finance application
cluster of users -

- large number of users -
= small number of files -
=

full-blown system

terminal communication -
- block mode
- oriented around VT-62 -
microcode for checking data fields -

- 3790 -
6 mos. to a year off

Action Items:

① TPS-11 presentation - inform Ann Hardy.
in early February !!!
② a). 3270 - CSS product - presentation
b). DICAM-11
c). RSX-11M - 3270 line protocol presentations
③ Request BETA-test site - for TPS-11
④ Follow up on X25 / (Swift ~~RSX-11M~~ interconnection.
⑤ DECNET V.2.0 release in March - Beta-test site?
⑥ VT.62 - presentation to Bob Wallace -
for 3270 emulation
⑦ OEM Referral program - APE - Applications Program Exchange
- DECUS
⑧ TPS-11 functional spec and
user programming manual.

Dick Scott

January 13, 1978

Advanced video functions - last 2 KW scrolling page

VT105 -
VT162 -

Composite video
EIA - ~~[redacted]~~ interface -

⟹ Extremely important that contingent order contain specification for EIA connector expansion - comward

- integral modem - DAA -

- cross license Bell design - Bell 212 -

⟹ ROM loader problem -
- no provision for down-line loading -
Disk mid (1012) is more important to Dick Scott the

Announcement of RXT-11 in March -
- VT-100 at same time
-

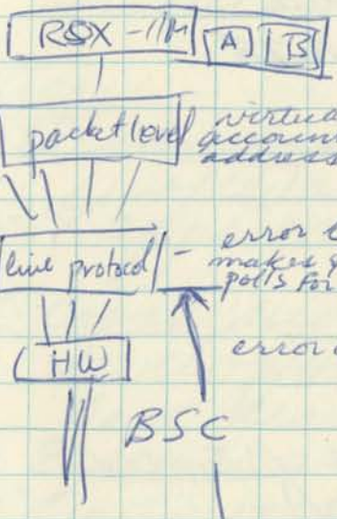
"Not-to-exceed" pricing - (NTE)
@ quantity

CCA

David Dowe (CCA) Computer Corporation of America
KOU-MEI CHUANG

incorporated as a driver —
Could have done it as an ACP — DECNET implemented as an ACP.
anticipated that driver will support
DQ-11 module is operating
DU-

Virtual terminal oriented driver —
treated as though a local terminal
(not as though a _____ _____)



IO, RLB - read logical block
IO, WLB - write logical block
not all terminal features implemented
ATTACH, read-no-echo, write-break-through
Accounting information - request connection
IO INF accounting
Editing functions
- local echoing
- local editing
read w/ prompt not supported

- One-to-one mapping between terminal & virtual terminal number
- DYNAMIC assignment of virtual terminal addresses
- DIAL-Out origination - a local task
- Can applications manipulate terminal characteristics via X.29 or Telenet I, II, III

Telenet:
- 12 parameters predefined now (X.29)
- Telenet has 58 parameters specified
- Terminal parameter io calls (status)

DU-driver not ready
DQ-11 ready
(CDMA device) lots of problems)

Yet to be done:
① accounting package (task)
② documentation

April 15th delivery to customers —

- still working on TELENET interface 3/6/78
- DU-11 module being developed — for TELENET customers
- As few changes as possible on RSX-11M; designed as device driver
- 4KW driver (a) several assembly options; loadable driver
- DUP-11 next driver
- subset of TDRV facilities -
- UNSOLICITED input - discarded
- no discernable
- can't run on an unmapped facility?
- multiple line handling
- only one device type

I.B.I.S. 1/25/78

Configuration:

1. 11/34 @ 128 KW memory
2. RP04 * 2 – for backup
3. magtape – 9 track – 800/1600 BPI
4. line printer ≤ 300 LPM
5. async mux → DZ-11 E 16 lines @ modem support
6. console interface/clock
7. console terminal & user terminals & char printer

Plan: → DECnet (under RSTS/E)
connected to RSX-11M switcher –
connected to TYMNET via X.25

→ "Swift" network interconnection –

[SYN-SYN-SYN-(SYN) DLE-STX : DLE-ETX] BiSync frame

X.25 1/26/78

– "window" = no. of outstanding frames.

– Enters deferred echo; leave deferred echo
logical data types yellow ball green ball –

– Multiple X.25 links supported?
– not at present

Interdatas:
12 sites @ NO MAC

– echo on/off
– terminal delay parameters
–

Bldg B
Burroughs – DKI – Boston
ITT – DPO NYC (belongs to ITT)

Speech - ~~12~~/3/78

Problem:
① cost of communications
② Response time requirements (interactivity)
③ Guaranteed resource availability
④ Fixed price for budgeting purposes
⑤ Global data storage requirements
- demountable volumes
- physical security of data
⑥ High reliability / high machine availability
⑦ Diverse economies of scale for production-oriented systems

Strategy:
① family of processors, ∴ preserve software investment and allow application migration
② Cross support software — leverage software development from familiar and flexible host development environment
③ Execution-oriented systems
④ "Optimized-OEM" equipment — target yields of $6/1 (~~revenue~~/hardware cost)
⑤ Orient applications and developments around existing Tymshare strengths (Tymnet - cost drivers financial and industry oriented)
⑥ Growth by acquisition
- software house market (2000)
- 70,000 PDP11's running applications

Tactical problems:
① Gain adequate software experience
- build tools
- gain familiarity @ hardware & environment
- build first systems; develop support group.
② Gain maintenance experience in the field
- same as above
- critical to success of OEM program. (not end-user)

(Speech - cont'd)

III). Current Mini Projects

① "Night-Tym" RJE
- Deferred spooling across Tymnet
- Chuck Younger ("COACH")

② Systems support for applications
- TymCARE
- MAGNUM - cross-compile & execute
- I.B.I.S.
- other

③ Hardware evaluation and selection
- full system configuration, including cartridge & storage module disk, diskette, tape, LPS, CDR, memories, interfaces

④ Acoustics - Terry Schwab - ("Terrible")

⑤ Internal support -
- RSX-11M (Dave Weber - "Ace")
- RMS-11K
- Fortran COBOL, BASIC, ...
- DECNET

IV. Current Micro Projects: Bill Weiher ("Wiz")

① Terminal communications concentrator
- W29
- micro-node (w/Tymsat)
- micro-Tymcom III - (?)

② Intelligent terminal projects -
- cross support
- simple data entry
- Other...

③ Synergy from sophisticated development tools
- display oriented debugger
- display oriented editor
- graphics..... (?)

VI. Cross Support Software

① Software distribution system -
- finished preliminary design ("Dashing Dog")

VII Strategy for 1978 - ("run like hell")

2/2/78 —

CORE Replacement - RJE

— Phil Petri — N. York — Ops. analyst —
1½ yrs. experience
110 million chars/month —

— Computer maintenance - staffing, spares, maintenance in the field —

— April 1st - Field test @ CORPORATE

— Documentation —

— 600 LPM Data Printer

— Schedule equipment with Ron Richter

— Customer site installations -
deferred until 3Q78
— Review again in June/July —

— Mike Colon, Jack Melnick, Bill Euske —

— CORE vs. MOS -
power-fail recovery & battery backup —

— add backplace (w/i)

— RSX-11M — ($826.00)
hold harmless letter from Dave Weber

— 15% discount on MDB gear.

— footnoted @ quantity levels assumed —
by vendor —

— Bob Wallace to do pricing and costing study —

2/4/78 -

Product Marketing -

Done - Banking -

A). ① Network interconnection -
② Swift "
③ → RSX-IBM conversion
④ Communication ⓒ
PDP-10 or 370 — for central data

IBS: enter:
- foreign exchange info -
- debits & credits info -
-
trader
back office - can be deferred -
front " cannot " "

B). Citizens Savings -
Loan tracking system Datapoint 5500 / Databus
- needs verification on input -
(logical verification, not
verification against data base)
Computer Automation Style - form printing -
everything associated ⓦ home loan

C). Rainier Bank (Seattle) -
- customized software development in MAGNUM
$15-20K/mo.
2020 - TASC (CAPS) looked develop some front end
software -
- interface ⓦ MAGNUM

Larry Kowitt - Utilities - Telephone industry

① Chesapeake & Potomac - Telephone -
1 system - prototype -
5 pre-production "
→ 80 potential systems
[RCR Plant Cost Results]

Bell Russell

Datapoint 1845 -

Classic opportunity -

② Packaged applications –
– Bell System – UNIX –

– 50 simultaneous users – (250 overall)
personnel data terminals –
Pacific Tel & Tel –

Ed Walsh:
KOMARC
EFRAPS – $150/mo. to NCSS – for
strictly data collection & checking –

Ken Churilla –
– Model 1600 – capabilities – very desirable
2.5–5 MB – high speed

Bill Mulert – needs a micro concentrator!!
20 in 1978
additional 50-60/yr. thereafter –

Jim Armstrong – FRS
3000 card images – 200 card images/ledger –
Model 1600 configuration is fine –

2/3/78 –

Magnum – Data Entry – Ben Russell, Ken Holcomb,
Dave Wyper, Julian Brook,
Carl Van Zoeren –

ISAM lookup
from disk to
upload and download from host –

Cross-compilation of data entry procedure –

3/6/78 -

KDS57 Problems:

① will only run on a mapped system - KDSS uses features available only under a mapped system

② - NO ISAM capability
- linkage capability available (for ISAM host table lookups, customization, etc) allows host table capacity

③ - They don't do sorts! (SORT-11 is available) sorts are necessary -

④ - per copy license fee.

⑤ Written for RSTS/E - "altered" to run under RSX-11M.

Licensed (KDSS)		TAM	KDSS-TAM combined
1-3 - $9000 ea	= $27,000	@6000 =	$11,400
4-8 $5400	= 27,000	@3600	$6890
Total	$54,000	$36,000	$68,400

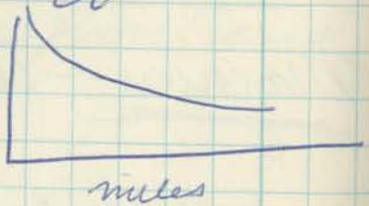
Multi-drop:

- $25/drop (1) a given "exchange" - (voice grade 300 circuit

"Exchange" - doesn't relate to geography, demography Central Office, prefix.

2001 - private line voice grade circuit
2006 - private line voice - foreign exchange

$1/mo/per mile — up to 25-28 drops



1) Modems & cost
2) Multi-drop
3) Leased line
4) DDS
5) Wideband communications

3/16/78

Bill Zadel - Plessey

1. Micro-I (LSI-11) (includes backplane) qty 50 - $365 / qty 100 - $315.00 - ASAP
2. New RP04-6 controller - generate no charge P.O.
3. Mos memory - 32KW 18 - 64KW (18) Mos - #400 @ parity (4 KW) #2480 Mos @ parity
4. new small disk - 2.5MB
5. LSI-11 controller for hard disk - avail late Sept. eng. prototype - $1500 Q-Bus compatible
6. alpha/graphic terminals
7. CDC 32/64/96 MB drives ? - Plessey
8. Calus 3/2
9. LSI - deliveries

includes Chassis p/s backplane slide-rails - $870 standalone
cabel connectors - (maintenance panel & cable $150)

Diagnostic maintenance panel

10. Single card disk controller -
    - LSI - QB
    - RK11 - Unibus

Jean Gentile PT&T - 291-3830

			Installation
103J Dataset	- <300 bps	$33/mo	$130 - full duplex
201C -	- 2400 bps	$65/mo	$100 DDD - half duplex $125 - private line
202 "	1200/1000 bps	$45/mo	$75 half or full.
		$19.25/mo.	$65 - 4 wire circuit
208 "	- 4800 bps	$100	$150 -
209 "	- 9600 bps.	$220	$410 -

also multiplexer

Leased line
- w/i same exchange (same C.O) $3.50 half duplex $7.00 full duplex for local loop (one message unit per transmission after 5pm. locally)
- different exchange
  - local loop $7.00/mo.
  - channel termination $41.00/installation
  - mileage
  - Channel termination - measured usage 8 to 5 pm.
  - local loop

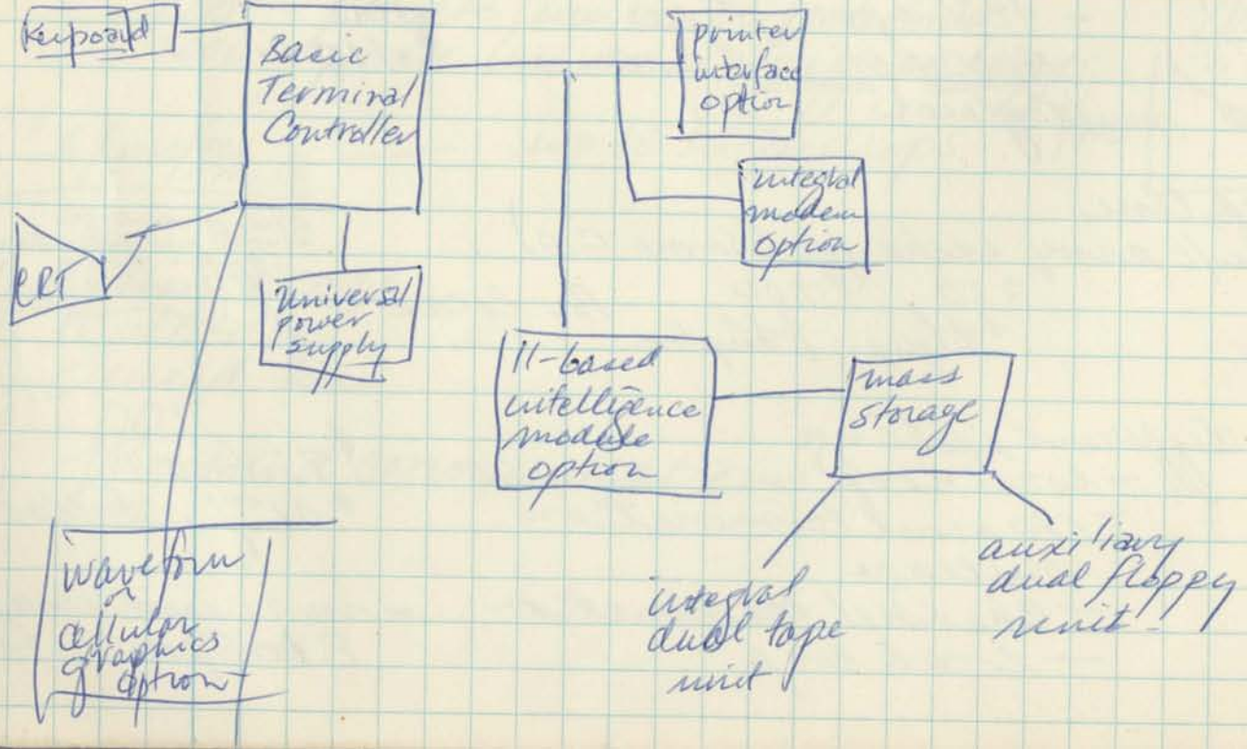
May 1, 1978

DIGITAL –

Don Beauvais
Neil Hackler – Ted Zeydel –

VAX –

	IT100/IT120 Memory Only	IT100 – Cartridge Tape Based	IT100/IT-120 Floppy-Based
Proc.	TIM-11 (Downline or ROM loaded)	TIM-11	TIM-11
Mem.	Up to 64KB	≤ 64KB	≤ 64KB
Console	VT100/LA120	VT100	Any TTY compatible terminal
Comm.	Synch/Asynch	Synch/Asynch or Both	Synch/Asynch or Both
Mass Storage	NA	TU58 (256KB) avg. 10-11 sec access worst = 20 sec	RX01
Options	LA120 printer VT100 Additional (3) VT100 CRT's or LA-120's	LA120 printer up to 5 addt'l VT-100's	LA120 printer VT-100 up to three additional VT-100's or ~~LA-120~~



5/1/78

Ron Olsen:

TRAX-11 to be announced tomorrow (May 2nd)

ATL - Applications Terminal Language -

- Pre-release in May/June (to Tymshare) a possibility -
- Availability in June/July/August @ documentation & training

- Datatrieve -

- Comm: Trax Task-to-task (DECNET subset)

Hardware: 11/34 - 192-256 KB - up to 16 terminals
11/60 - 192-256 KB - up to 16 terminals
11/70 - 256-4096 KB - up to 64 terminals

Disk drives RK07 28 MB
RK03, 3 67 MB
RP06 176 MB

DZ, DUA, - through KMC-11's -
DMC-11 for task to task inte

DZ-11's - up to 48 terminal line
DUP-11 - / 8 lines

Dan Hubbell

RSX-11M:

① Terminal handling?

RSX-11M developing in 2 directions
- Enhancements of 32 KB version (3.1) [real-time enhancements]
- TRAX-11 system basis @ full duplex

(RSX-11(M+) "Base Level 2" for TRAX - full duplex
multi-batch streams -

Formal letter - requesting

Ted Zaygel:

RL01 -

fixed media - 1* capacity
fixed/removable - 2* capability

LSI-11

{ DHeight CPU
{ Quad - CPU + Mem (128KW) + 1 sync/asynch)

Chip's (4+1) → 2 (FIS incl FIS) + (5-7) → (1) FPP CIS FIS

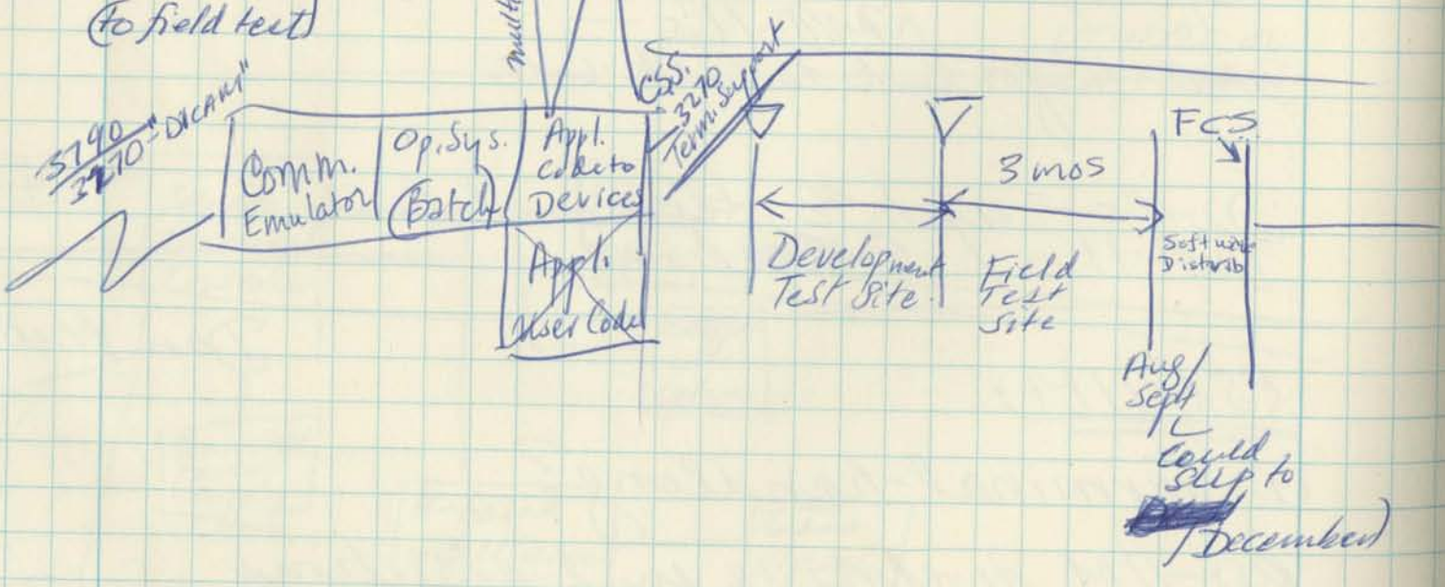
(18 months)

Integral modem - 1200 baud - 212 compatible - on VT-100

Motivating factors.

IBM + Multidrop → 3270 - (contact CSS)
SNA → 3790 - (6/1 - 3 mos.)
Eur/Can. → X25 (HDLC)
(to field test)

3780 may be released as a general product.



IBM 3790 (Slides are forthcoming) —

3790 in development test

3790 Memory Reqts (words)

DUP-11	.7K
KMC+DUP	1.5
SDLC	1.2
SNA	3.0
Interface Driver	
ACP ~~Mgmt~~	
Total @ DUP	7.5K
" KMC/DUP	8.3K

interface macros look like DECNET macros

50% @ DECNET
25% @ IBM SDLC/SNA
25% X25

X.25

→ going into field test site immediately
available as a full product in December 1978

1). X.21 electrical
2) Frame level
3). Packet level (DECNET)