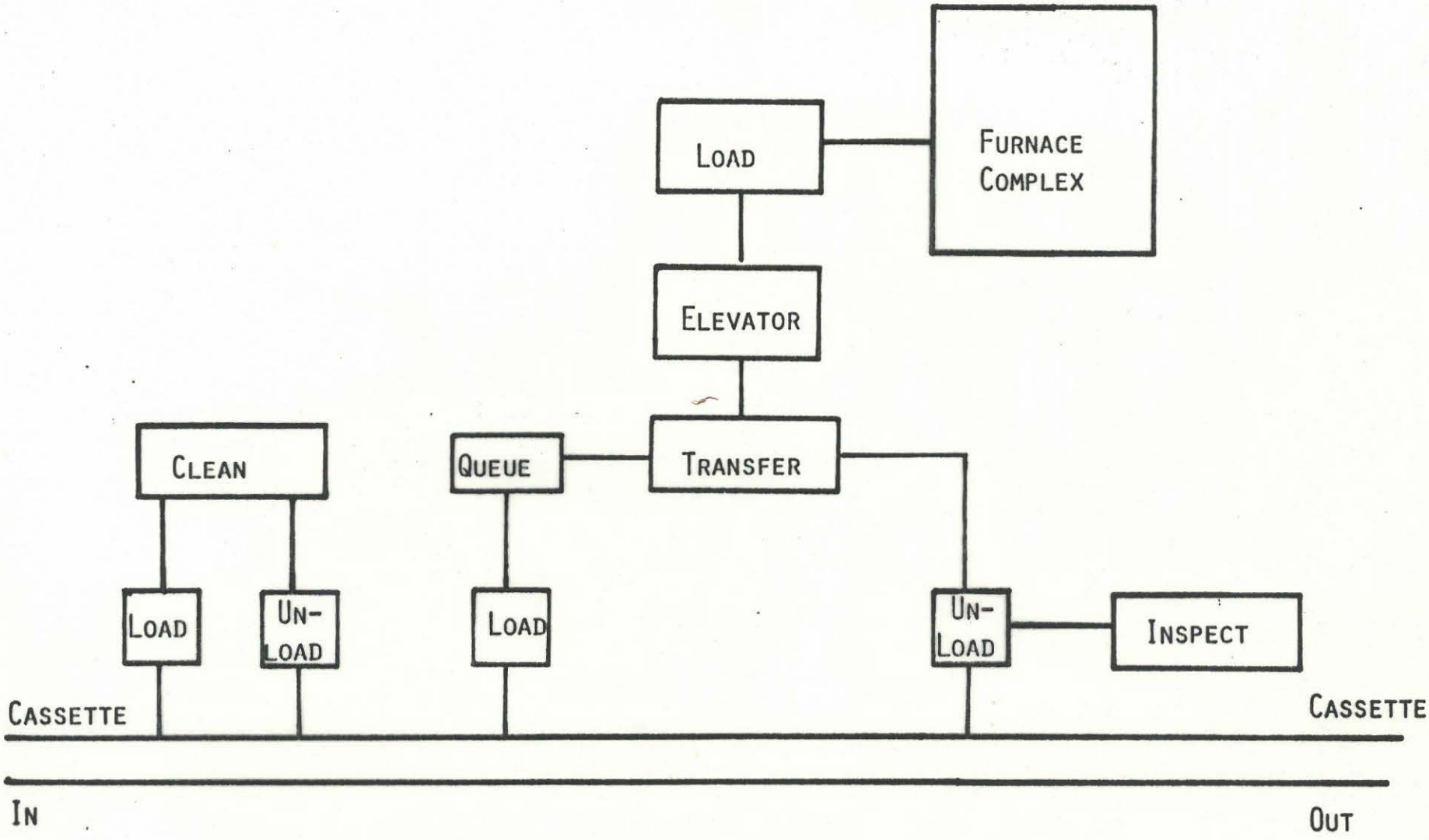


COMPLEXITY REQUIRES WORK STATION TO CONTROL

BRUCE SYSTEMS

AUTOMATION TARGETS

SALES DRIVEN	TECHNOLOGY DRIVEN
SALES ORDER	DESIGN
COSTING	PROCESS
INVENTORY CONTROL	MATERIAL HANDLING
BILLING	TEST
PLANNING	QUALITY
	FACILITY

Bruce Systems

FASTTRACK

REAL TIME FRONT-END COMPUTER

RELATIONAL DATA BASE

ENGINEERING ANALYSIS

COLOR GRAPHICS

PROCESS/INVENTORY REPORTS

Bruce Systems 

FASTTRACK AUTOMATION HOST

REAL TIME EQUIPMENT INTERFACE

WORK STATION INTERFACE

INVENTORY CONTROL

COMMON DATA BASE

ENGINEERING ANALYSIS

REDUNDANCY

Bruce Systems

FASTTRACK

- Machine Definition
- Process Definition
- Lot Start
- Lot Movement
- Data Collection
- Information Reports
- Inventory Control
- Line Balancing

Bruce Systems

FASTTRACK - FRONT END

PDP-11/44

PROCESSOR RUNNING MULTI-TASKING, MULTI-USER, REAL-TIME OPERATING SYSTEM PERMITTING REAL-TIME AND NEAR REAL-TIME CONTROL OF AND COMMUNICATION TO FAB AREA PROCESSING EQUIPMENT.

Bruce Systems

FASTTRACK - BACK END

RELATIONAL DATA BASE

DEDICATED DATA BASE MACHINE SPECIFICALLY DESIGNED AROUND THE RELATIONAL DATA BASE MODEL. PROVIDES POWERFUL DATA MANAGEMENT TOOLS WITHOUT LOADING THE MINI-COMPUTER CPU AND WITHOUT SACRIFICING REAL TIME FEATURES. SPECIFICALLY:-

Bruce Systems 

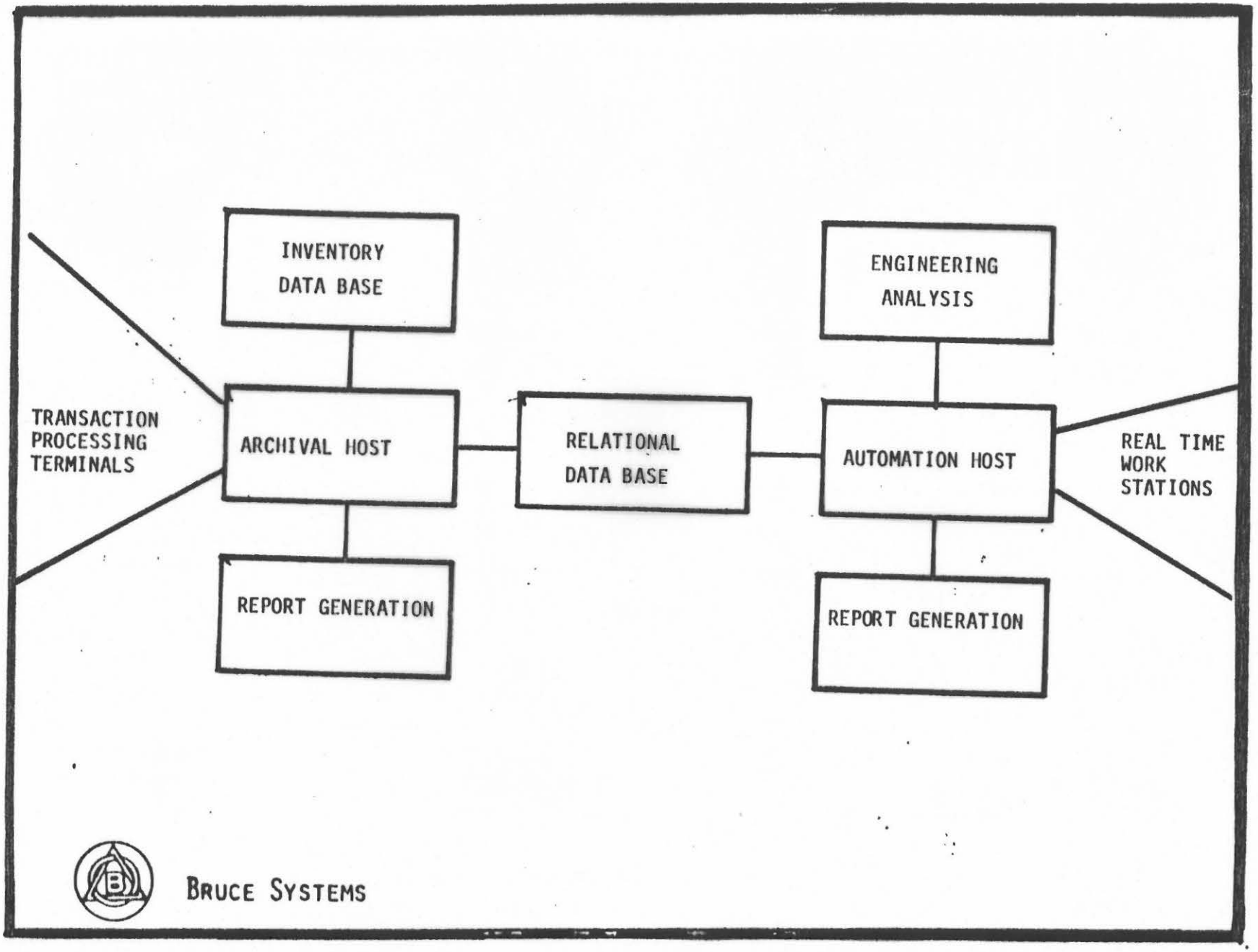
INVENTORY (MIS)

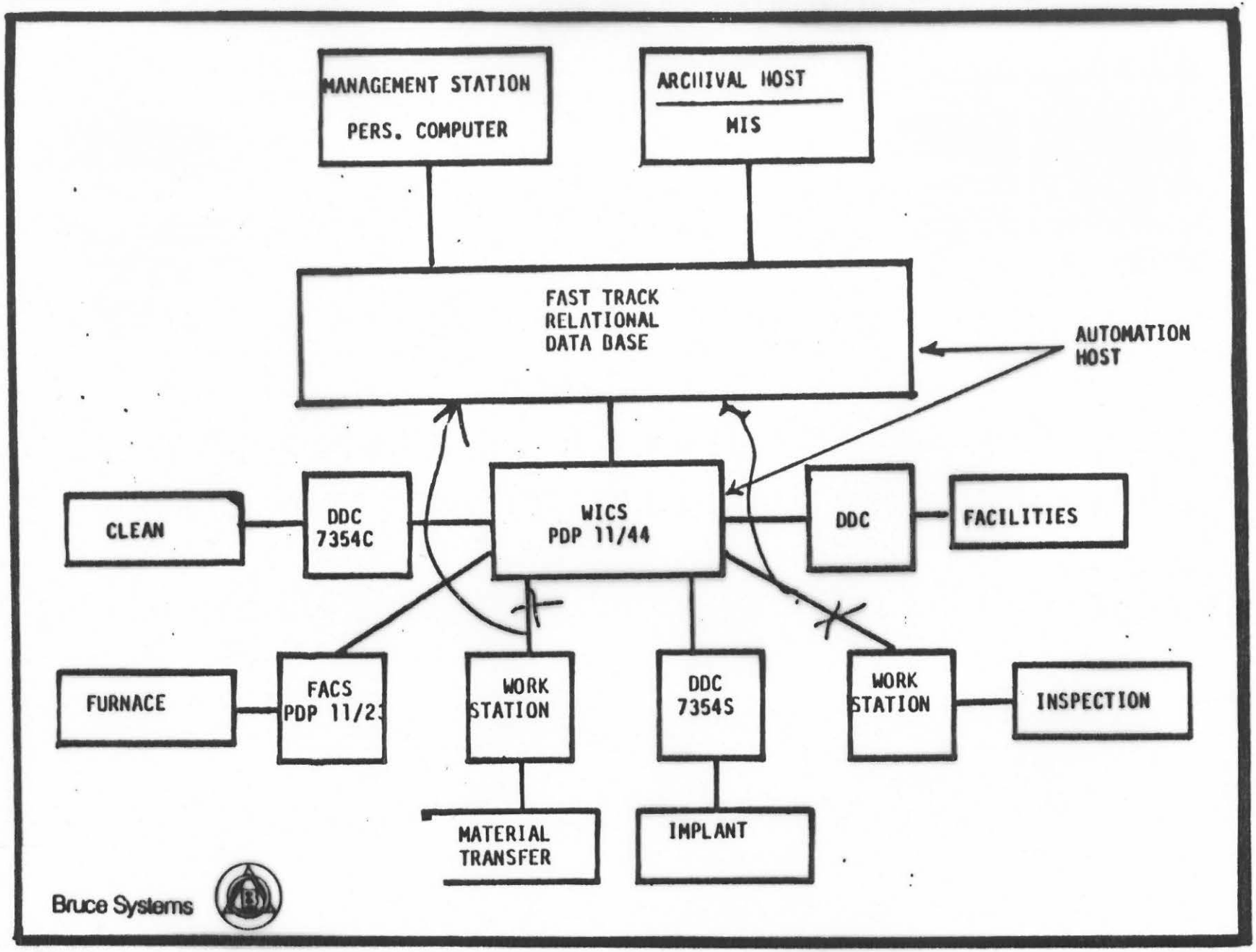
AND

PROCESS (CAM)

BRUCE RELATES !!

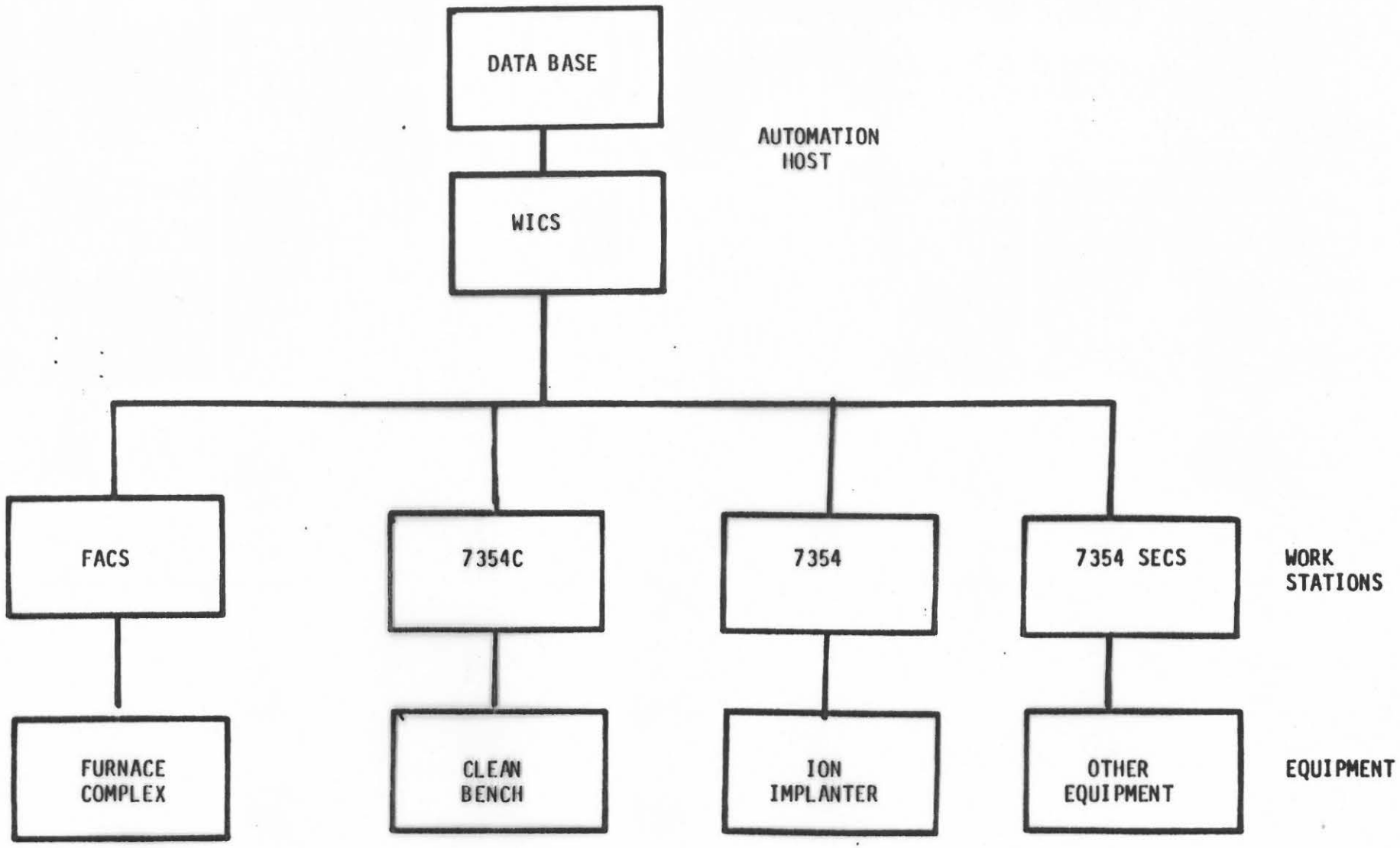
Bruce Systems


INVENTORY
DATA BASE
ENGINEERING
ANALYSIS
TRANSACTION
PROCESSING
TERMINALS
ARCHIVAL HOST
RELATIONAL
DATA BASE
AUTOMATION HOST
REAL TIME
WORK
STATIONS
REPORT GENERATION
REPORT GENERATION
BRUCE SYSTEMS


MANAGEMENT STATION
PERS. COMPUTER
ARCHIVAL HOST
MIS
FAST TRACK
RELATIONAL
DATA BASE
AUTOMATION
HOST
CLEAN
DDC
7354C
WICS
PDP 11/44
DDC
FACILITIES
FURNACE
FACS
PDP 11/2
WORK
STATION
DDC
7354S
WORK
STATION
INSPECTION
MATERIAL
TRANSFER
IMPLANT
Bruce Systems

BTU'S MODULAR APPROACH TO FAB AUTOMATION PERMITS A PHASED IMPLEMENTATION. THIS PUTS LESS OF A FINANCIAL BURDEN ON THE FAB MANAGER AND OFFERS LESS RISK.

Bruce Systems



BRUCE SYSTEMS

TYPICAL AUTOMATION COMPLEX

7354 DDC FAMILY

I/O

ANALOG I/O

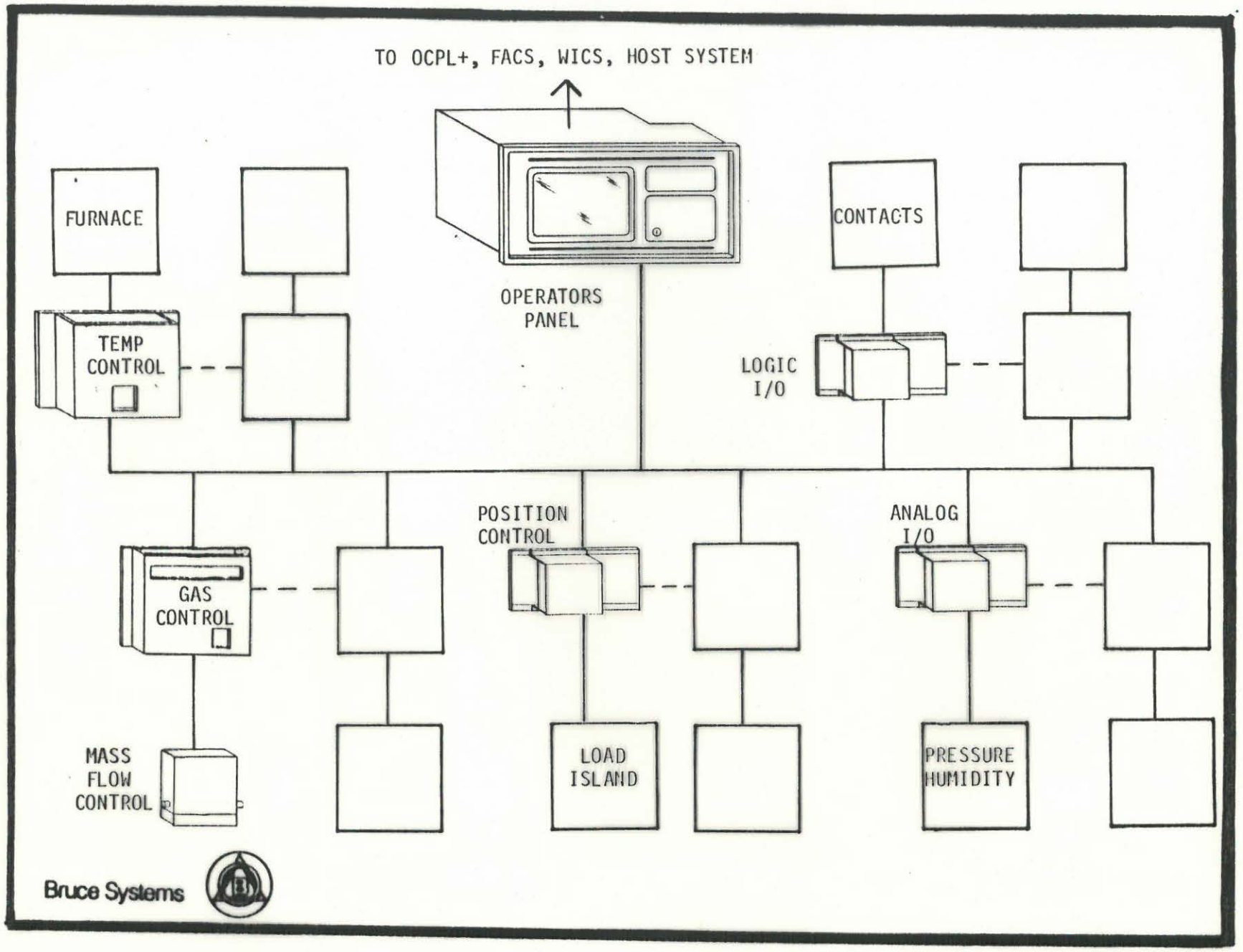
TEMPERATURE

GAS

POSITION

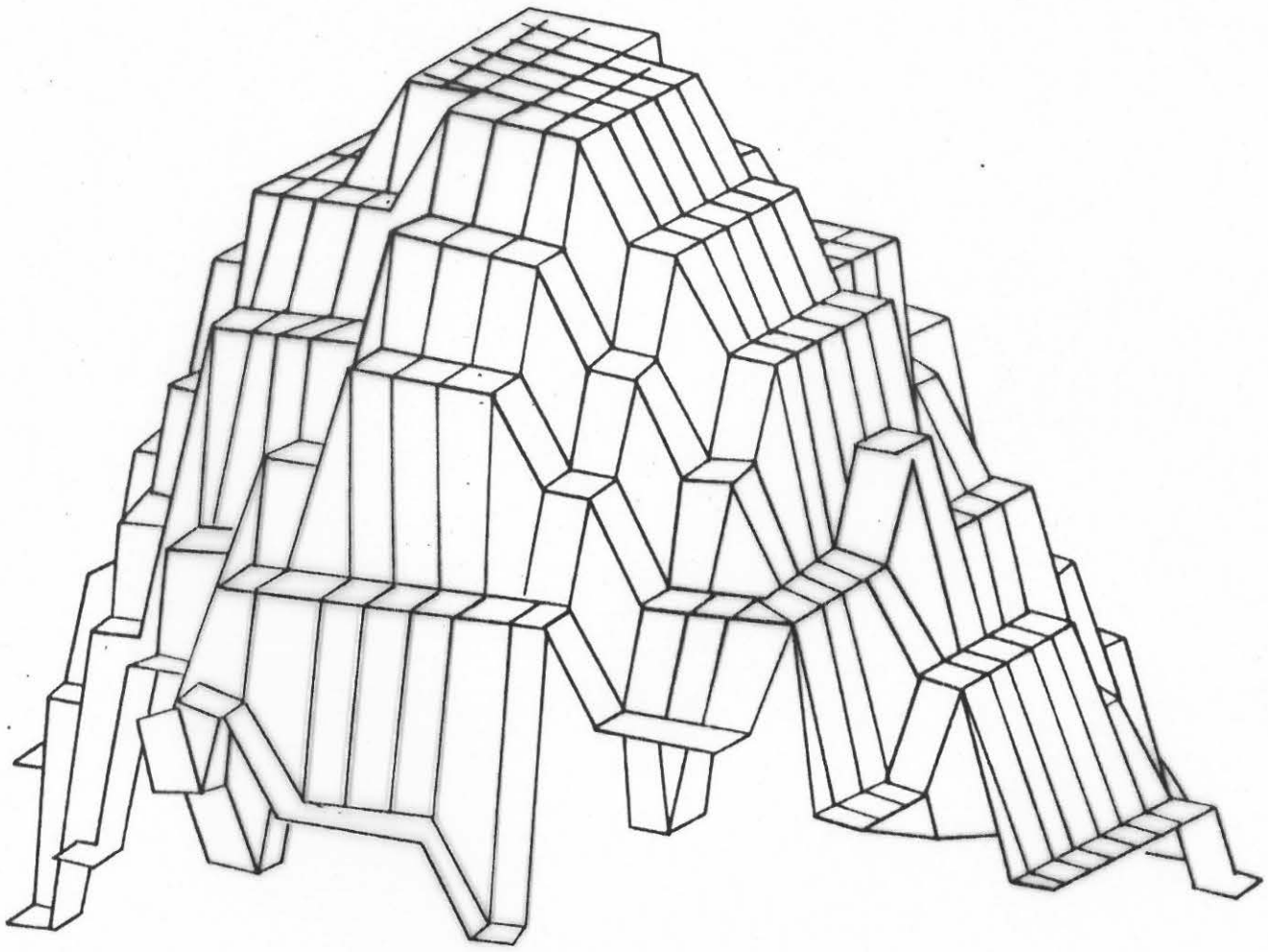
OPERATOR INTERFACE

Bruce Systems


TO OCPL+, FACS, WICS, HOST SYSTEM
FURNACE
TEMP CONTROL
OPERATORS PANEL
CONTACTS
LOGIC I/O
POSITION CONTROL
ANALOG I/O
GAS CONTROL
MASS FLOW CONTROL
LOAD ISLAND
PRESSURE HUMIDITY
Bruce Systems

FILE STRUCTURE

	ATTRIBUTE (1) ---	ATTRIBUTE (2) ---	ATTRIBUTE (N)
TUPLE (1)	AAA	LLL	JJJ
TUPLE (2)	BBB	KKK	TTT
TUPLE (3)	ZZZ	000	YYY



WAFER PLOT CONTACT RESISTANCE

Bruce Systems

DATA BASE SYSTEMS

OCPL+

FACS

WICS

Bruce Systems

RELATION - MASKING

Attribute		Description
MASK	Tuple	Mask id
MSET	Tuple	Mask set id
DEV		Device
PROC		Process
LEVL		Mask level
DESC		Description
CHNG		Last change time and date
MACH		Machine
FLG		Delete flag
CYCL		Number cycle between changes
IHB		Inhibit flag
ECYC		Elapsed cycles
TIME		Maintenance cycle - time based

RELATION - LOTMOVE

Attribute		Description
DEV		Device name
OWN		Departmental "owner" of this ICP
SNUM		Sequential IC number
ICNM		User defined IC number
DESC		User defined IC name
FLG		Delete flag
DBOH	To the moment since midnight	Counts today beginning on hand
DINS		" " wafers entering
DOUT		" " wafers exiting
DEOH		" " wafers present
DREJ		" " wafers rejected (total breakage)
DRWK		" " wafers reworked
DCRP		" " wafers scrapped
DBON		" " wafers bonused in
WBOH	Since beginning of week	Counts week to date
WINS		" " wafers entering
WOUT		" " wafers exiting
WEOA		" " wafers present
WREJ		" " wafers rejected (total breakage)
WRWK		" " wafers reworked
WCRP		" " wafers scrapped
WBON		" " wafers bonused in
MBOH	Since beginning of month	Counts month to date
MINS		" " wafers entering
MOUT		" " wafers exiting
MEOA		" " wafers present
MREJ		" " wafers rejected (total breakage)
MRWK		" " wafers reworked
MCRP		" " wafers scrapped
MBON		" " wafers bonused in

Bruce Systems

RELATION - MACHINE

Attribute	Description
MACH	Machine designater
RUNC	An operation designater
PER	Temporal period covered by this triple. May be today, any of last six days, previous week, or current month.
WAIT	Quantity of wafers waiting in the queue for this machine (MACH) with this operation (RUNC).
ENT	Quantity of wafers that have entered the MACH for operation RUNC.
EXT	Quantity of wafers that have exited this MACH for operation RUNC.
SCRP	Quantity of wafers scrapped from this MACH for operation RUNC.
BON	Quantity of wafers bunused into MACH for operation RUNC.
RWK	Quantity of wafers reworked
LENT	Number of lots entered MACH for op. RUNC
LEXT	Number of lots exited MACH for op. RUNC
REJØ-9	Used to be breakage quantitites - now call reject (codes/quantities)
IHB	Inhibit flag
FLG	Delete flag

RELATION - ENGDATA

Attribute	Description
NAME	Lot name data came from
WFID	Wafer data came from
DIID	Die id from wafer
QNUM	Question # that generated data
SEQ	Step # in lot question came from
DATA	The real thing!
FLG	Delete flag
MACH	Machine code
RUNC	Operation code
ARCD	Archival date - if lot is archived may keep data - this flags for cross-correlation stuff that other info was archived.

RELATION - DEVICES

Attribute	Description
DEV	Device name
FAM	Device family
DESC	Description
PROC	Process used
MIX	% of total product on line
MODE	Data collection mode for this device
PRI	Numberic priority for this device
FLG	Delete flag
IHB	Inhibit flag

RELATION - LOTSTAT

Attribute	Description
NAME	Lot name
DEV	Device code
OPT	Options
TARG	Work week out (goal)
STDT	Start time and date
PTYP	Priority type L, H, N etc.
TATS	I/W state
SEQ	Lot sequence # (step #)
MACH	Current machine
RUNC	Current operation
STYP	Step Type
EDIT	Edit flags
LUPD	Last date and time of update
PROC	Process number/name
SNUM	IC seq. number
ICWF	IC wafer count
ICPQ	Previous IC wafer count
PRI	Numberic priority
STPS	Number of steps in lot
MASK	Current mask id
MTRL	Material used
ENG	Engineer responsible
INWF	Initial wafer count
MODE	Data collection mode for this lot
DISP	Lot disposition (offsite, etc.)
AUTO	Auto or manual line balance flag
WCNT	Current wafer count
FLG	Delete flag
IHB	Inhibit flag
ICPN	Previous IC number (used def.)

RELATION - LOTHIST

Attribute	Description
NAME	Lot name
STYP	Step type
RUNC	Run code for this step, this lot
ICNM	IC number (user defined)
SEQ	Lot sequence # (step #)
DESC	Step description
CTIM	Conditional time
MACH	Machine
PROC	Process
PNUM - STEP	Process step number - this step informs
EDIT	Edit flags
ETIM	Time and date step entered
EOPT	Operator who entered
XTIM	Time and date step exited
XOPT	Operator who exited
WCNT	Good wafer count at exit
AMCA	Actual machine used (if different than planned)
RRNC	Replacement run code (initially same as RUNC unless TIP action)
REJØ → 9	Reject wafer quantities
MODE	Data collection mode for this step this lot
FLG	Delete flag
MASK	Mask id this step
SNUM	IC Sequential number this step
ENEX	Enter/exit flag (@,*)
IHB	Inhibit flag

RELATION - SCREENS

Attribute	Description
MACH	Machine
RUNC	Operation
QNUM	Question number
-QUES- should be C80	Question or prompt
UNIT	Units
MODE	Data collection mode
COMM	Comments (entered by operator)
FLG	Delete flag
IHB	Inhibit flag

RELATION - TINPUTS

Attribute	Description
MACH	Machine
RUNC	Run code
QNUM	Question number
LIMS	Limit value array
RMCH	Replacement machine to use
RRNC	Replacement run code array
RELS	Relation array (position correlated to LIMS)
FLG	Delete flag
IHB	Inhibit flag

RELATION - PROCESS

Attribute	Description
PROC	Process number/name
STEP	Step number/name
STYP	Step type
MACH	Machine
RUNC	Runcode
DESC	Description
CTIM	Conditional time
MODE	Data collection
SNUM	IC sequence number
ICNM	IC number (used defined)

RELATION - REMARKS

Attribute		Description	
NAME		Lot name	Source or reference of comment
SEQ		Lot "step"	
MACH	Tuple	Machine	
RUNC		Run code	
MASK		Mask number	
COMM		Comments	
LINE		Comment number	

Bruce Systems

RELATION - PROCDIR

Attribute	Description
PROC —— Tuple	Process
SIZE	Number steps
DESC	Description
PRI	Priority numeric
OWN	Owner
IHB	Inhibit
FLG	Delete
EDDT	Last edit time and date
EDTR	Last person who edited

RELATION - REPAIRS

Attribute		Description
MACH -	Tuple	Machine
LAST	|	Last repaired/maintained
CYCLE	Non-Unique	Maintenance cycle - cycle based
TIME		Maintenance cycle - time based
ECYC		Cycles executed since last
FLG		Delete flag
IHB		Inhibit flag
COMM		Comments re repair

RELATION - OPERATE

Attribute		Description
OPID	Tuple	Operator id
OPNM		Operator name
OPSS		Operator social security number
VALID		Authorized/certified
MACH		Machine
RUNC		Operation
FLG		Delete
IHB		Inhibit

RELATION - MACHDES

Attribute		Description
MACH	┐ Tuple	Machine
RUNC	┘	Run code
STYP		Step type
DESC		Description
MCAP		Maximum capacity
MCYC		Minimum possible cycle time
BACH		Batch size
CCAP		Current capacity
CCYC		Current cycle time
OWN		Owner
IHB		Inhibit
FLG		Delete flag
REJØ → 9		Reject descriptions

RELATION - CROSREF

Attribute	Description
NAME	Lot name
WFID	Wafer id
DIID	Die id
PKG	Package (assembled die)
DLOT	Destination lot
DATE	Time date of change
ENG	Engineer responsible
IHB	Inhibit flag
FLG	Delete flag

RELATION - BACHLOT

Attribute	Description
NAME	Key lot name
ASOC	Associated lot
FLG	Delete
IHB	Inhibit

FACS

FURNACE CONTROL

MACHINE SPECIFICATION

OPERATION MANAGEMENT

OPERATOR INTERFACE

LOCAL LOT HISTORY

Bruce Systems

WICS

LOT MOVEMENT

PROCESS CONTROL

INVENTORY CONTROL

COMMUNICATIONS

Bruce Systems

FEATURE	OCPL+	FACS	WICS
FURNACES	X	X	X
MACHINES		X	X
LOTS		X	X
PROCESS			X
INVENTORY			X
MISCELLANEOUS	X	X	X

BRUCE SYSTEMS

THE IDM COMMAND SET

THE IDM SUPPORTS A FULL SET OF DBMS COMMANDS:

- CREATE/DESTROY DATABASES
- CREATE/DESTROY RELATIONS
- LOAD DATA INTO RELATIONS
- PERMIT/DENY READ/WRITE TO DATA
- PERMIT/DENY USE OF STORED COMMANDS
- CREATE/DESTROY INDICES ON DATA
- APPEND NEW DATA
- MODIFY/DELETE DATA
- RETRIEVE DATA
- CREATE/DESTROY VIEWS
- BEGIN/END TRANSACTION
- DEFINE/EXECUTE STORED COMMANDS
- AUDIT CHANGES
- CREATE/USE RANDOM ACCESS FILE

Bruce Systems

FASTTRACK - QUERY

RETRIEVE (ATTRIBUTE LIST)

ORDERED BY (ATTRIBUTE ORDER)

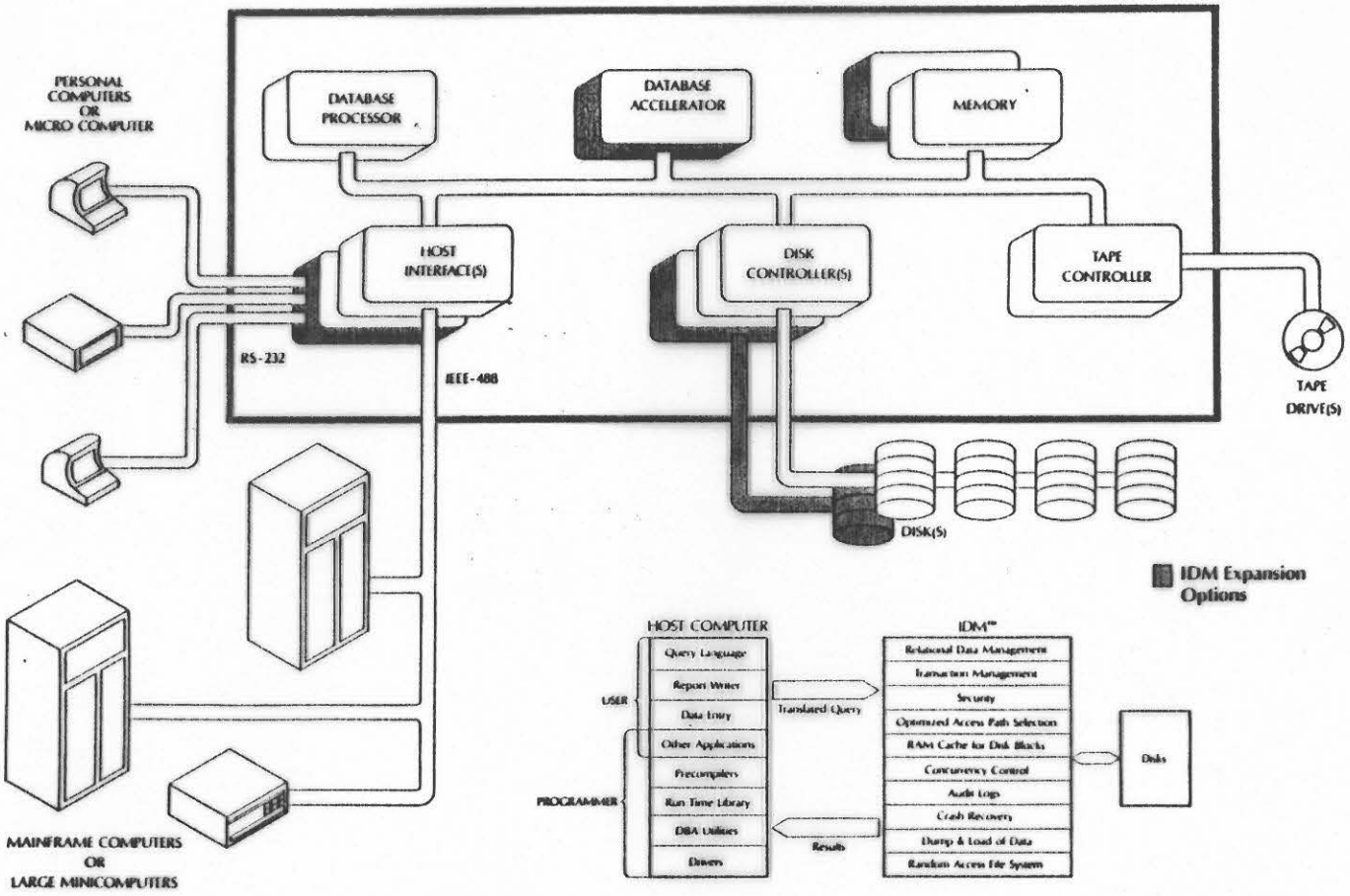
WHERE (TUPLES) = (RECORD)

EXPRESSION (TUPLES) = (RECORD)

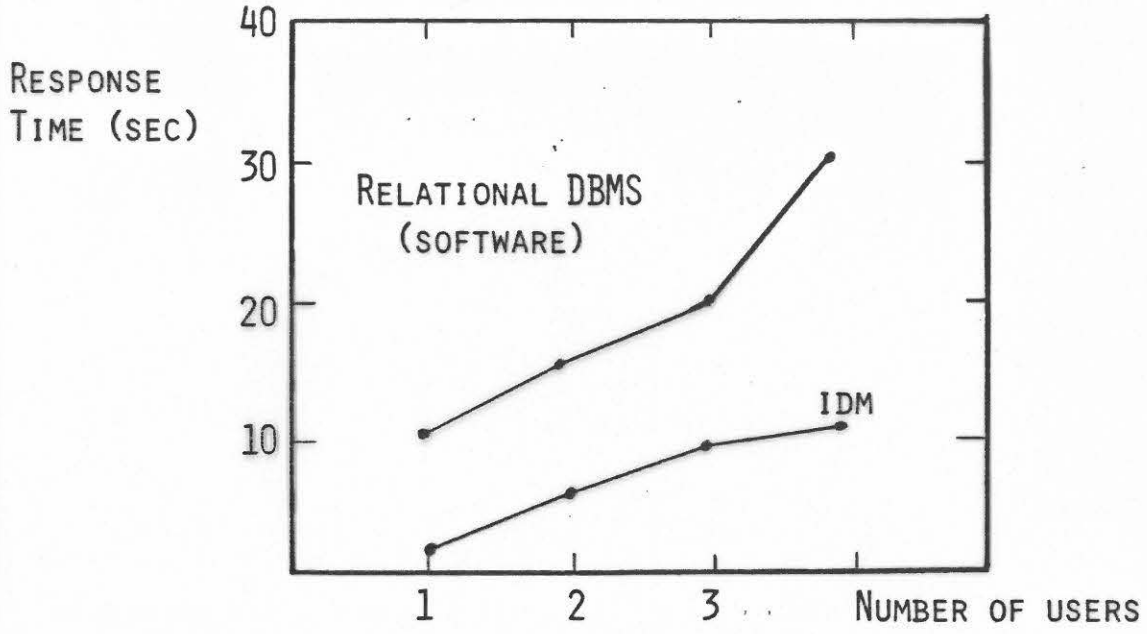
EXPRESSION AND, OR, =, >, <, (RECORD (+, -, X, ÷) RECORD)

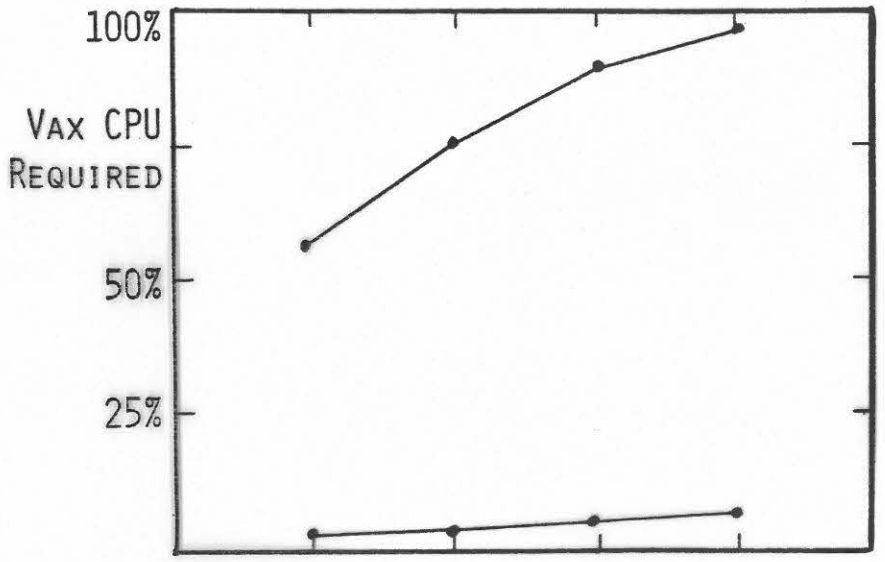
Bruce Systems

Intelligent Database Machine



Bruce Systems





A COMPARISON BETWEEN THE IDM
AND AN ALL-SOFTWARE RELATIONAL
DBMS ON THE VAX

Bruce Systems

INTELLIGENT DATABASE MACHINE SPECIFICATIONS

SPECIFICATION	IDM 200	IDM 500
Base Configuration	5 board set in 7 slot chassis	5 board set in 16 slot chassis
Expandable to:		
IDM Memory	1 Mbyte	5.5 Mbytes
Disk Storage	4 SMD disks	16 SMD disks
Tape Controller	8 transports	8 transports
I/O Controller RS-232 serial and/ or IEEE-488 parallel	24 devices	64 devices
Database Accelerator	No	Yes - Optional*
Relational DBMS Capacity		
Number of databases	50	50
Relations per database	32,000	32,000
Attributes per relation	250	250
Tuples per relation	2 billion	2 billion
Tuple Wide	2,000 bytes	2,000 bytes
Indices per relation	255	255
Attributes per index	15	15
Index type	B*tree	B*tree
Performance (transactions/sec)	6-8	10-30*
Number of Users	126	4,094

*The Database Accelerator can improve performance by a factor of 2 to 10 times (IDM 500/2)

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RELATIONAL DATA BASE

50	Data Bases
32,000	Relations/Data Base
250	Attributes/Relation
2×10^9	Tuples/Relation
2000	Byte Tuples
255	Indices/Relation
15	Attributes/Index

Bruce Systems

RELATIONAL DATA BASE

DATA STORAGE

DATA RETRIEVAL

MULTIPLE HOST TRANSACTION MANAGEMENT

FILE SECURITY

CONCURRENCY CONTROL

MULTIPLE USER

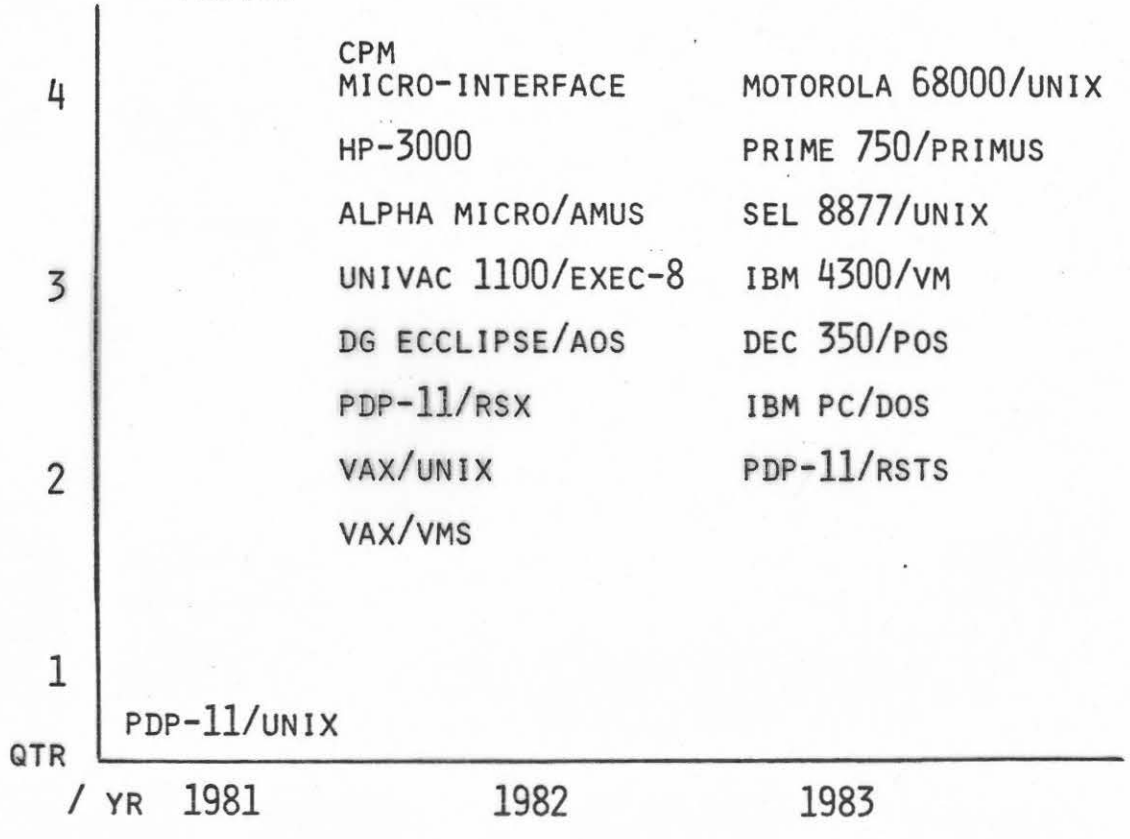
Bruce Systems

THE HOST ENVIRONMENT AFFECTS PERFORMANCE

THE IDM IS AFFECTED BY ITS ENVIRONMENT:

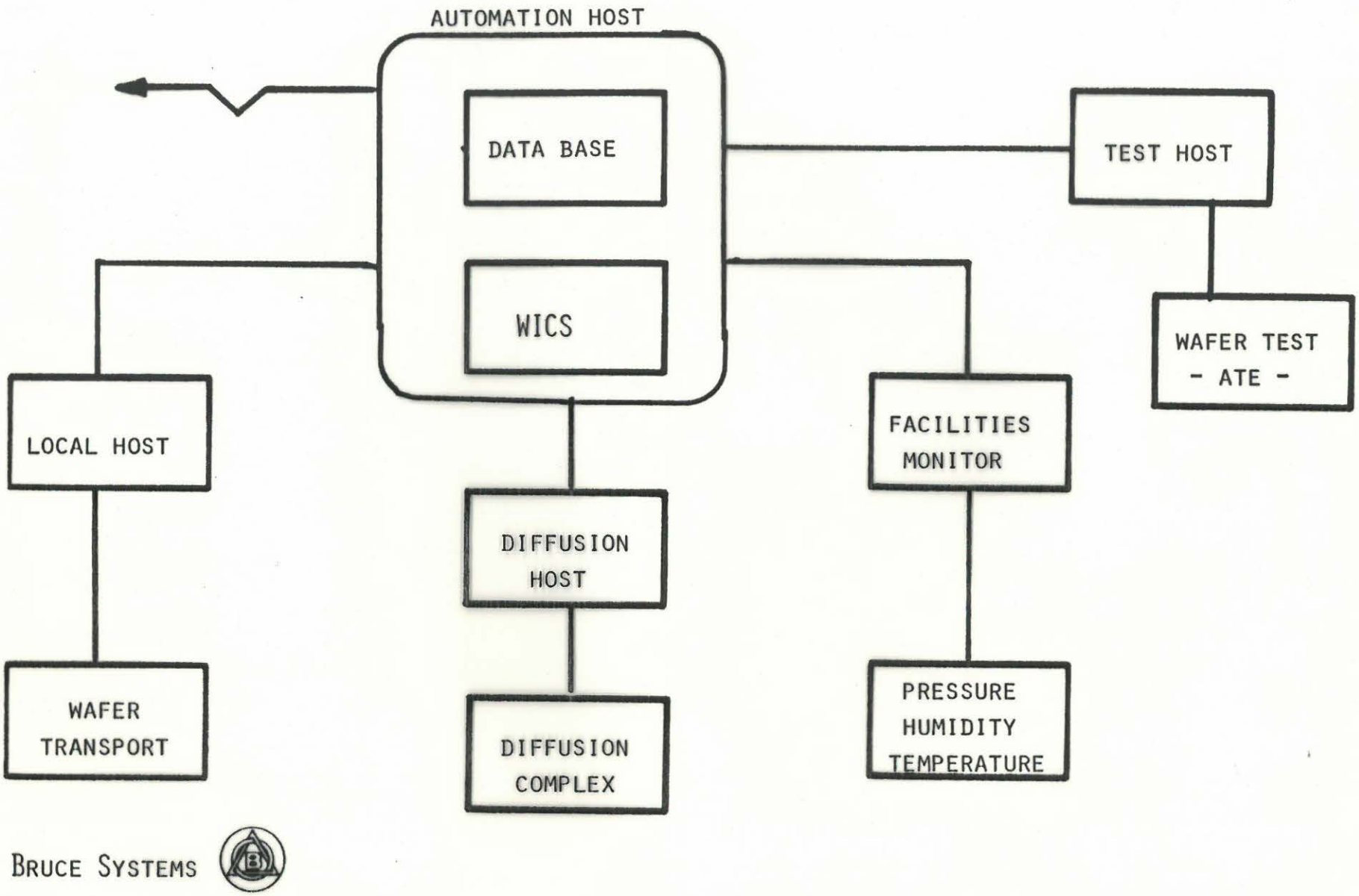
- NUMBER OF ACTIVE USERS
- TYPE OF DISKS ATTACHED
- NUMBER OF HOSTS
- TYPE OF HOST(S)

THE IDM CAN BE INTERFACED TO THE FOLLOWING HOSTS:

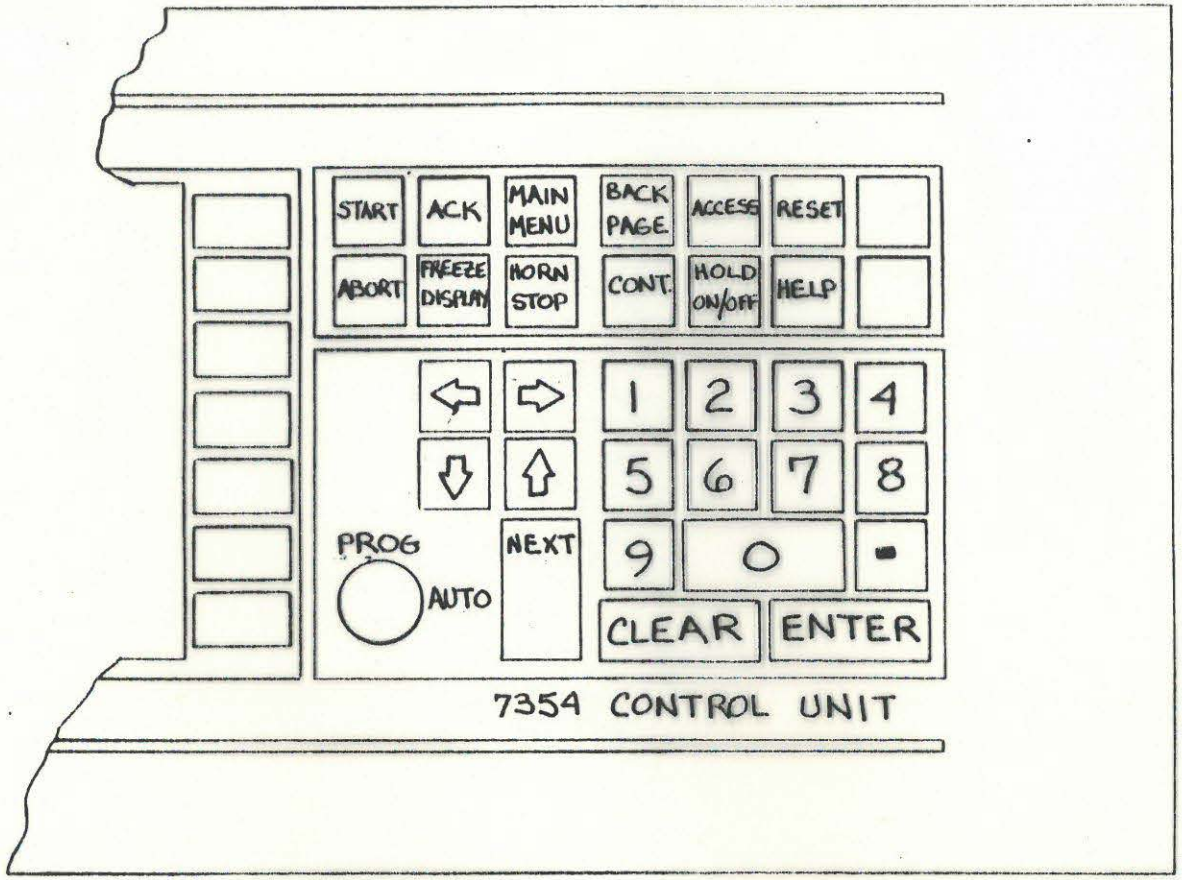


Bruce Systems

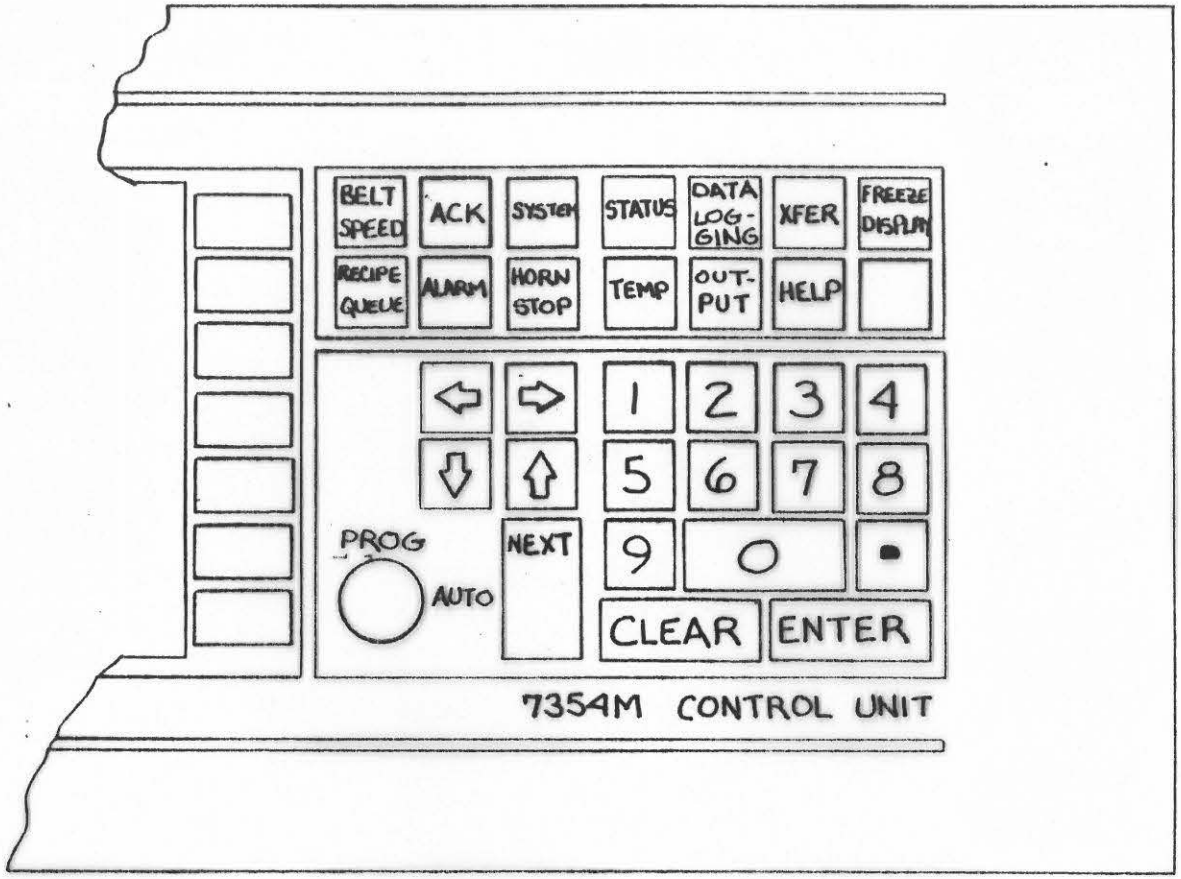
FASTTRACK



BRUCE SYSTEMS

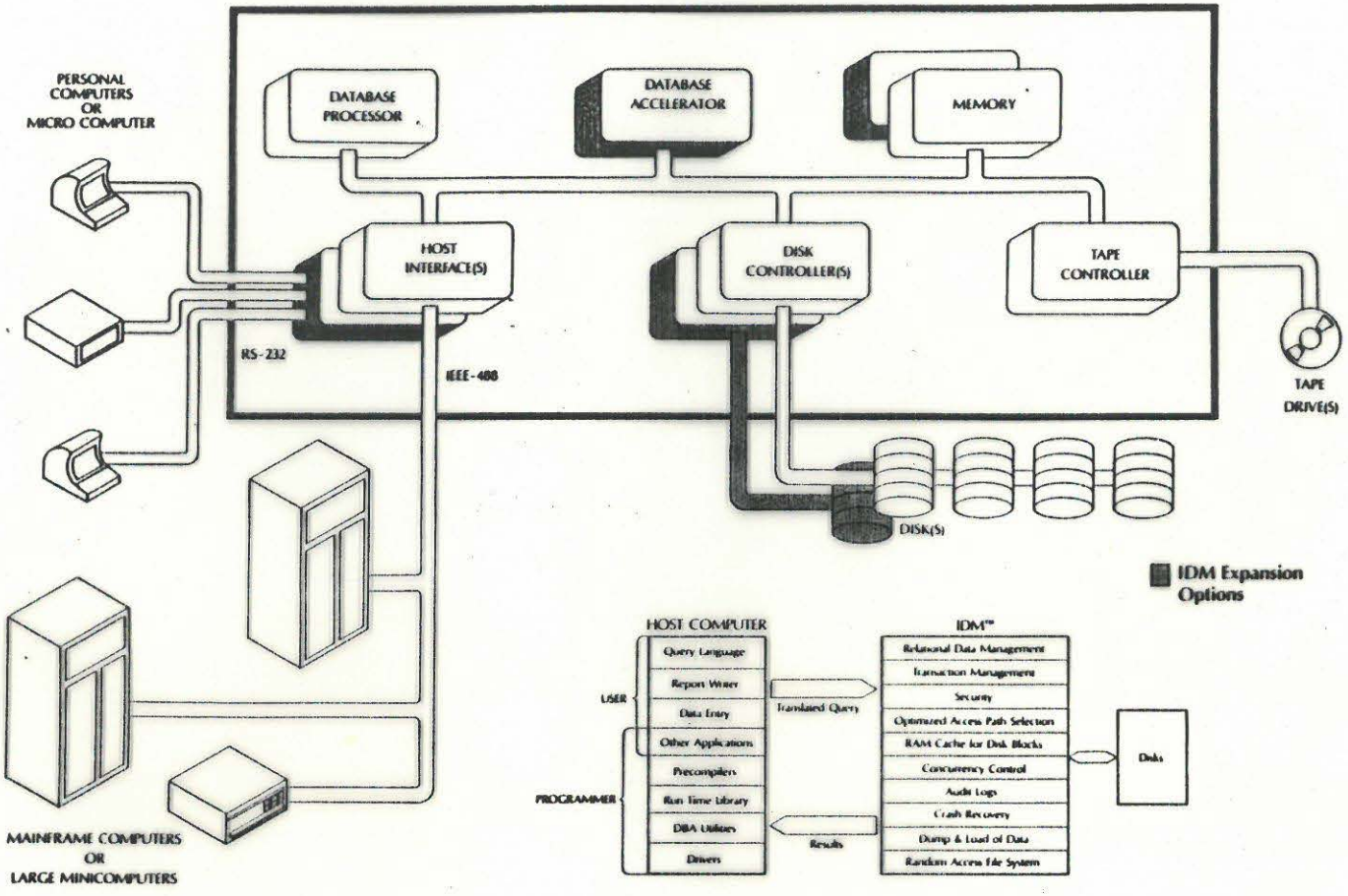


Bruce Systems

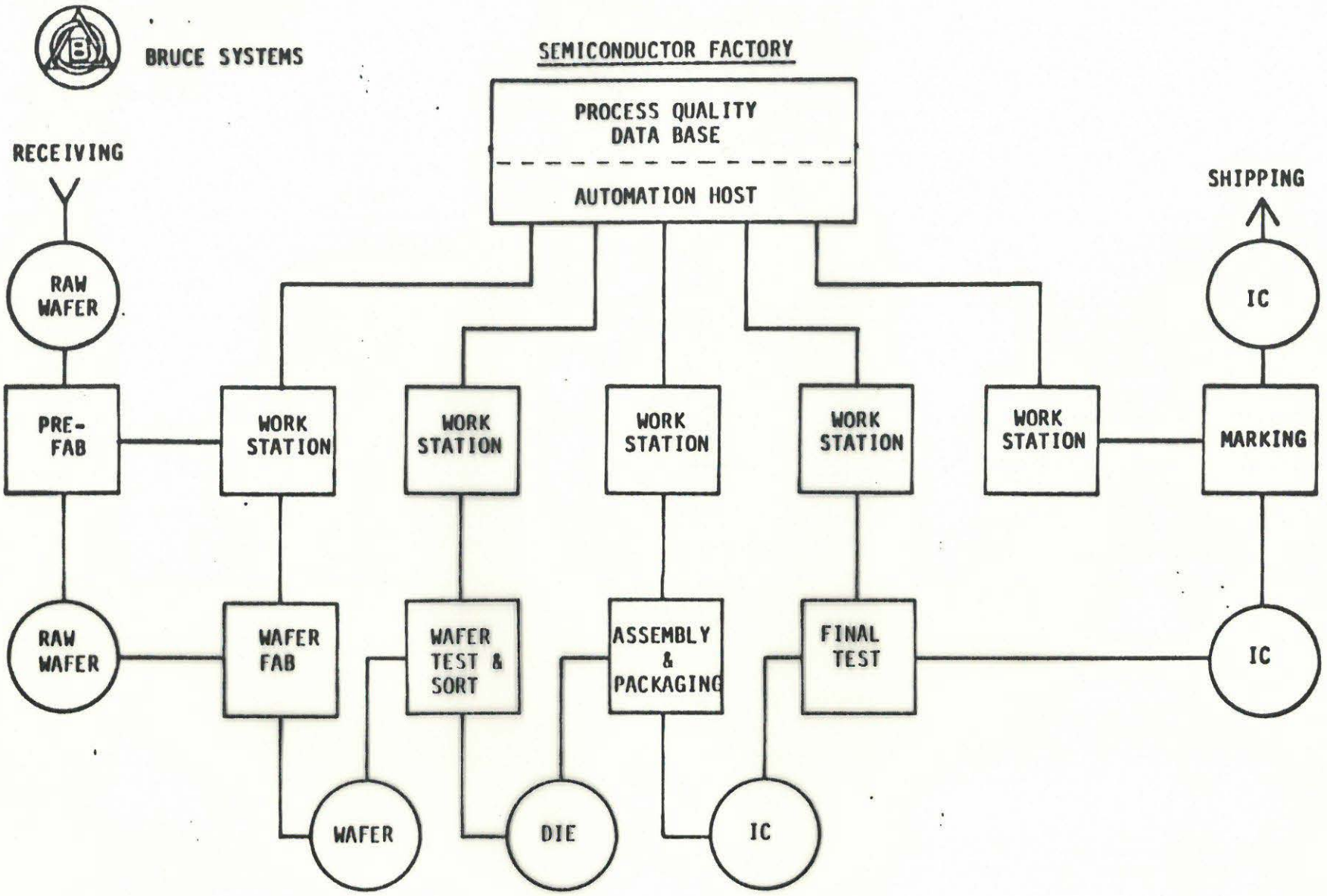


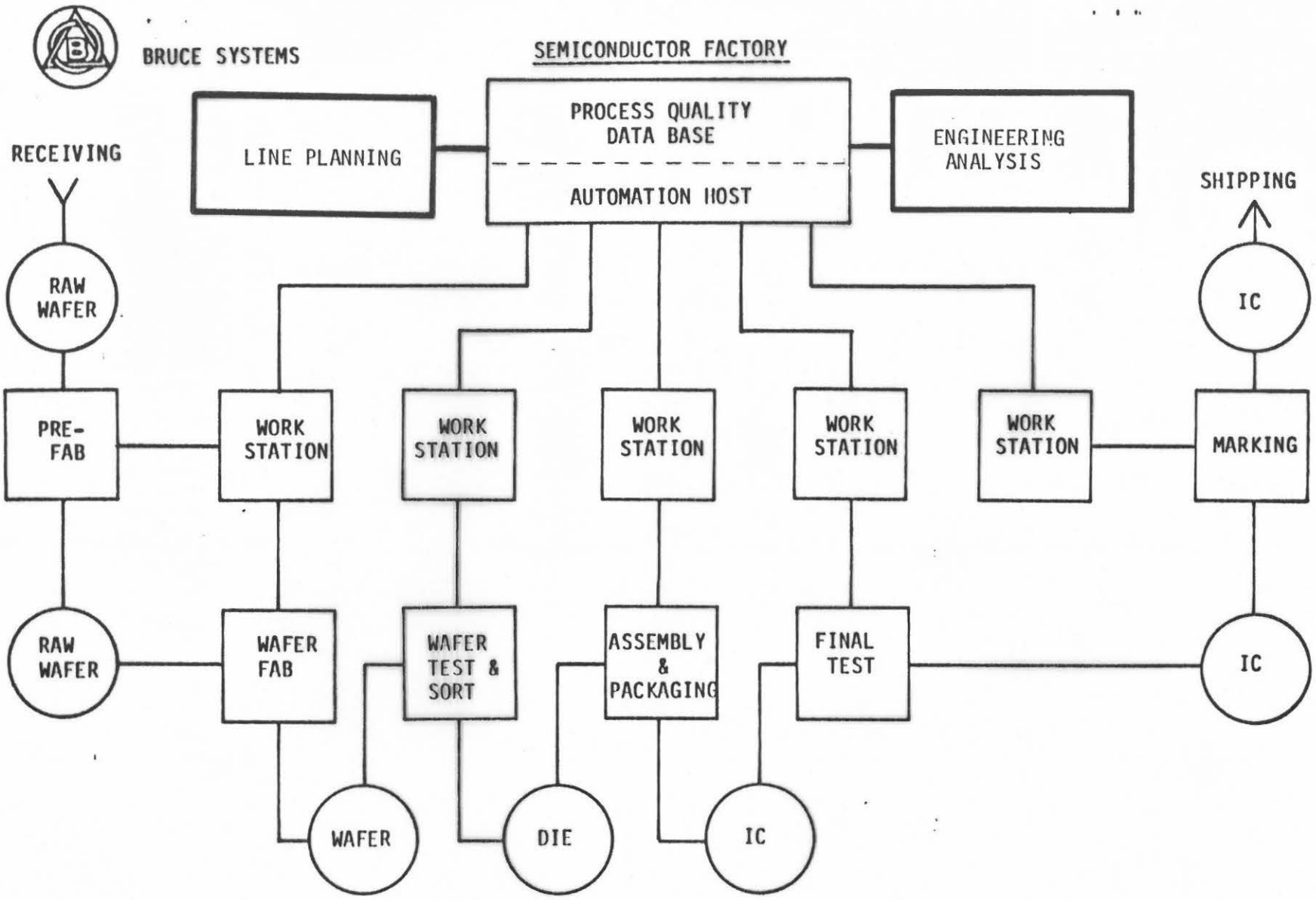
Bruce Systems

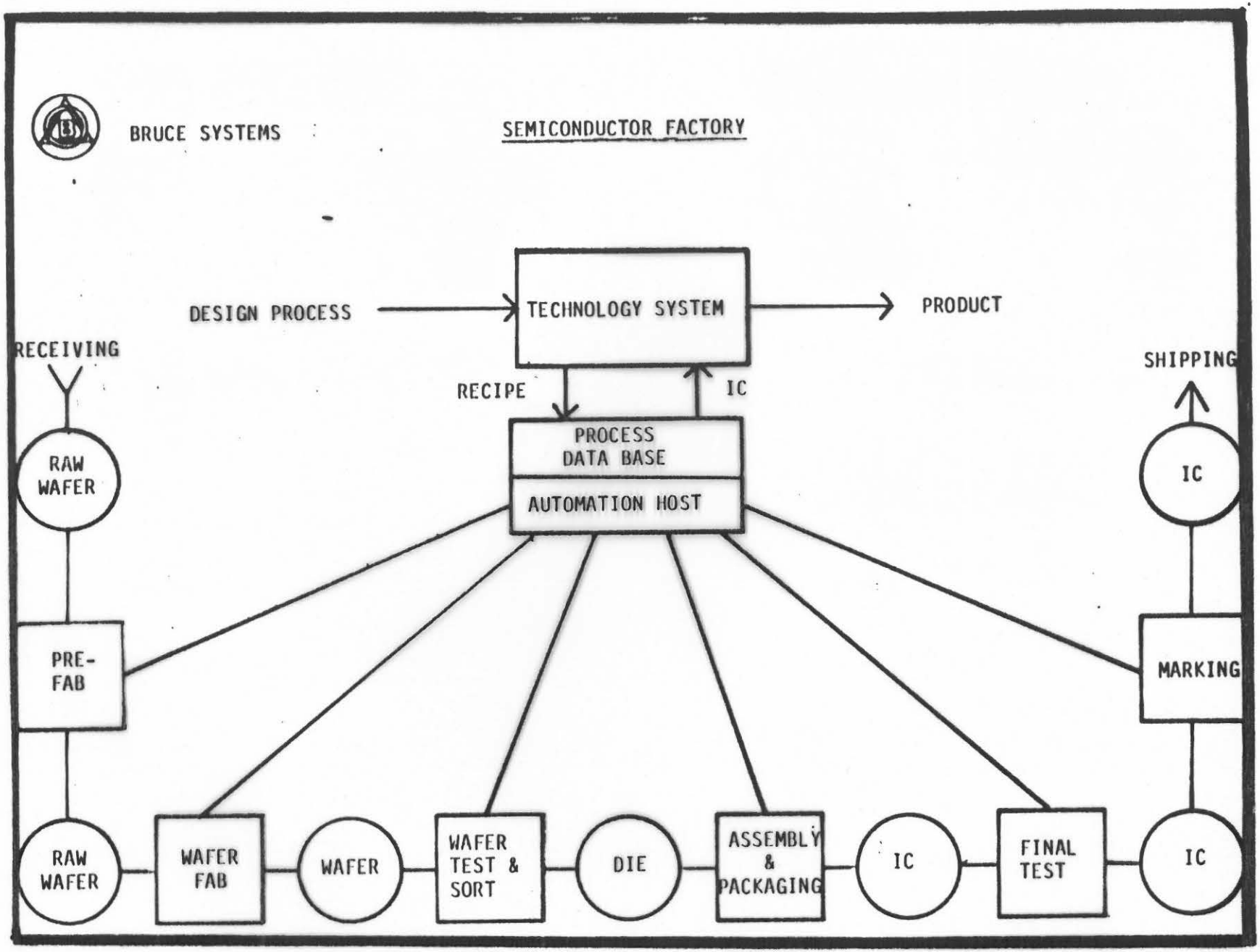
Intelligent Database Machine

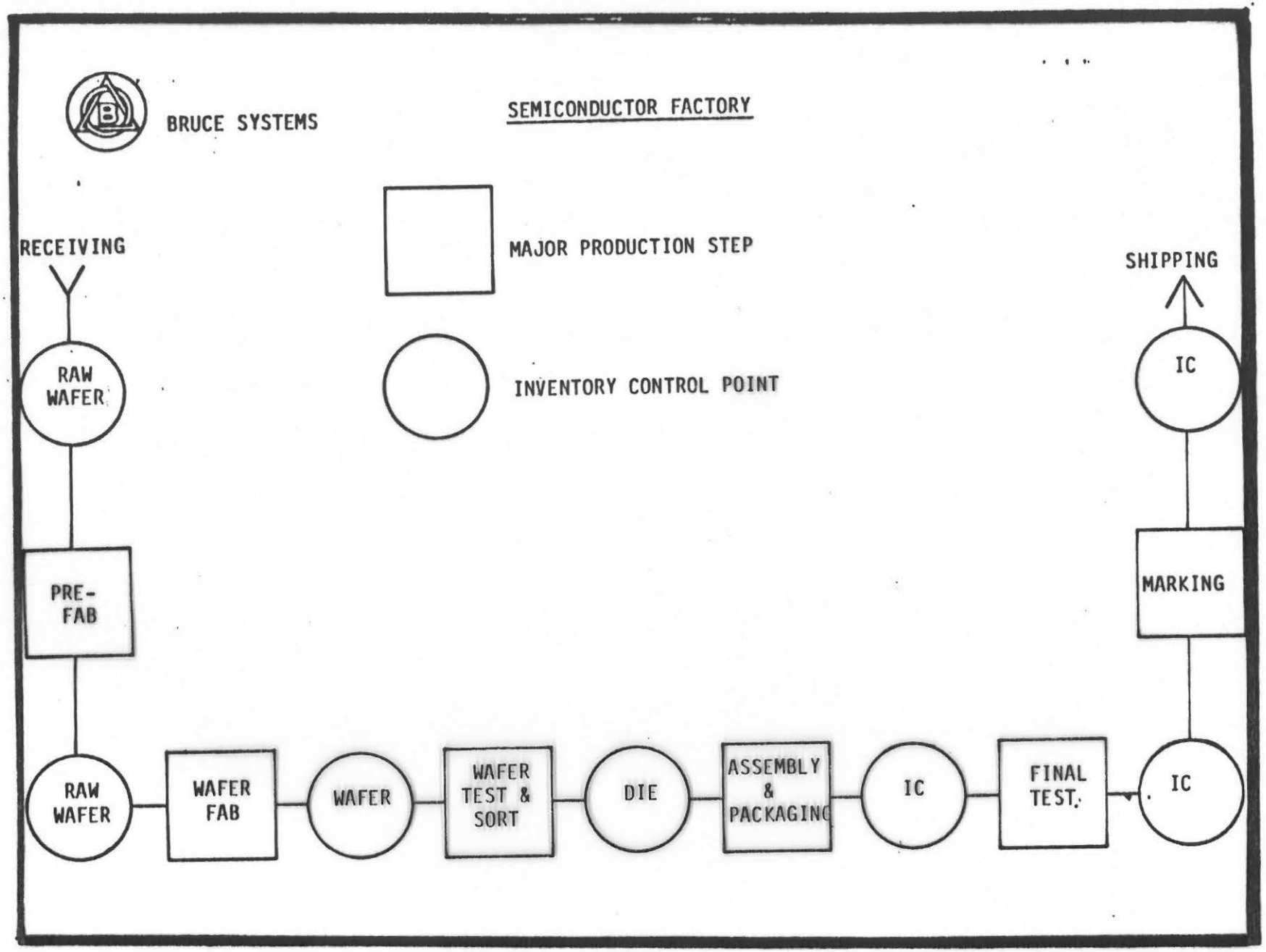


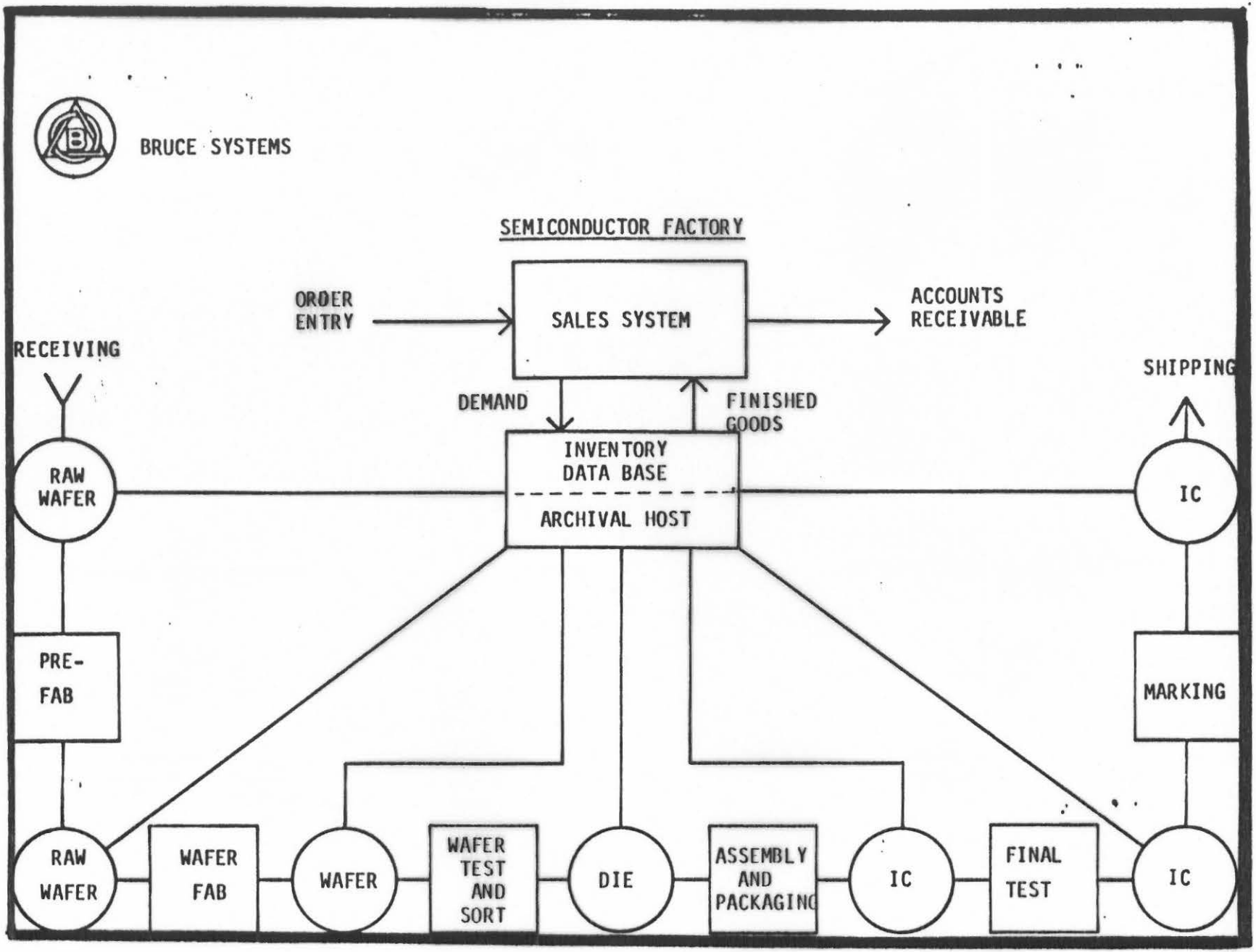
Bruce Systems


BRUCE SYSTEMS
SEMICONDUCTOR FACTORY
PROCESS QUALITY DATA BASE
AUTOMATION HOST
RECEIVING
SHIPPING
RAW WAFER
IC
PRE-FAB
WORK STATION
WORK STATION
WORK STATION
WORK STATION
WORK STATION
MARKING
RAW WAFER
WAFER FAB
WAFER TEST & SORT
ASSEMBLY & PACKAGING
FINAL TEST
IC
WAFER
DIE
IC


BRUCE SYSTEMS
SEMICONDUCTOR FACTORY
LINE PLANNING
PROCESS QUALITY DATA BASE
AUTOMATION HOST
ENGINEERING ANALYSIS
RECEIVING
SHIPPING
RAW WAFER
IC
PRE-FAB
WORK STATION
WORK STATION
WORK STATION
WORK STATION
WORK STATION
MARKING
RAW WAFER
WAFER FAB
WAFER TEST & SORT
ASSEMBLY & PACKAGING
FINAL TEST
IC
WAFER
DIE
IC

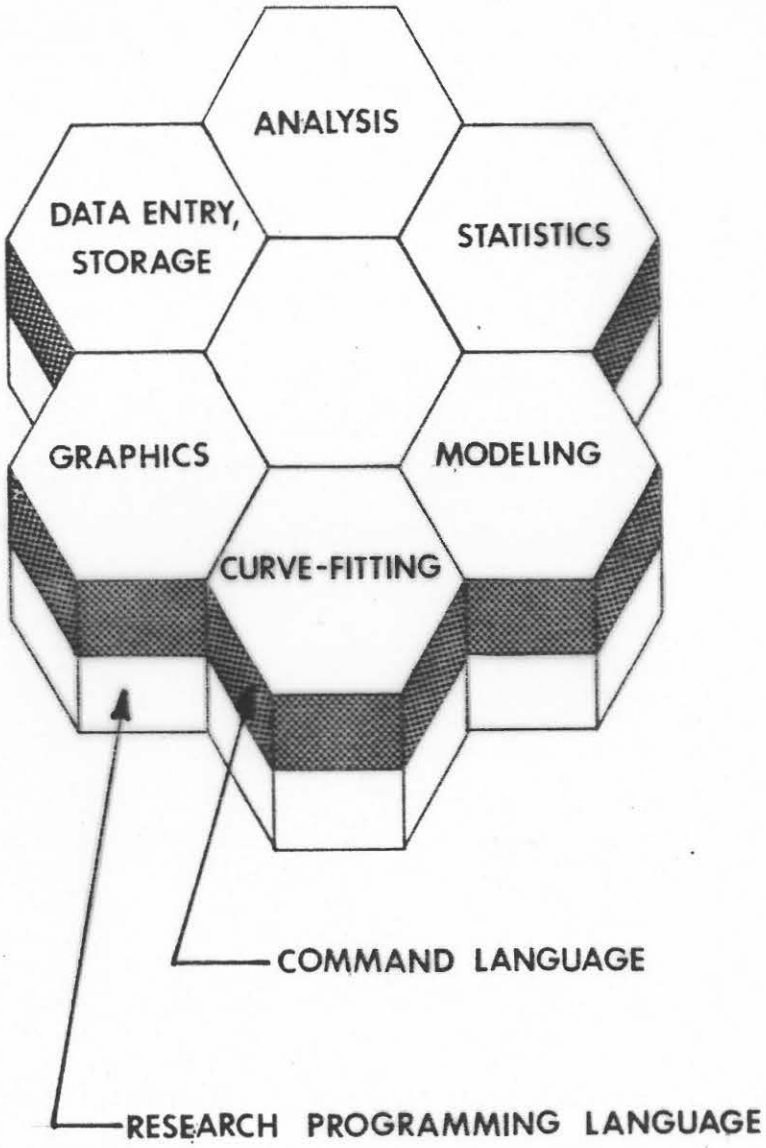

BRUCE SYSTEMS
SEMICONDUCTOR FACTORY
DESIGN PROCESS
TECHNOLOGY SYSTEM
PRODUCT
RECEIVING
SHIPPING
RECIPE
IC
PROCESS
DATA BASE
AUTOMATION HOST
RAW
WAFER
IC
PRE-
FAB
MARKING
RAW
WAFER
WAFER
FAB
WAFER
WAFER
TEST &
SORT
DIE
ASSEMBLY
&
PACKAGING
IC
FINAL
TEST
IC


BRUCE SYSTEMS
SEMICONDUCTOR FACTORY
MAJOR PRODUCTION STEP
INVENTORY CONTROL POINT
RECEIVING
SHIPPING
RAW WAFER
PRE-FAB
MARKING
IC
RAW WAFER
WAFER FAB
WAFER
WAFER TEST & SORT
DIE
ASSEMBLY & PACKAGING
IC
FINAL TEST
IC


BRUCE SYSTEMS
SEMICONDUCTOR FACTORY
ORDER ENTRY
SALES SYSTEM
ACCOUNTS RECEIVABLE
RECEIVING
SHIPPING
DEMAND
FINISHED GOODS
INVENTORY DATA BASE
ARCHIVAL HOST
RAW WAFER
IC
PRE-FAB
MARKING
RAW WAFER
WAFER FAB
WAFER
WAFER TEST AND SORT
DIE
ASSEMBLY AND PACKAGING
IC
FINAL TEST
IC

ENGINEERING
ANALYSIS

SYSTEM OVERVIEW



Bruce Systems

DATA ENTRY

- FORMS ORIENTED
- MAKE TABLES
- ADD/INSERT/DELETE ROWS AND COLUMNS
- SORT/MERGE/COMPARE/TRANSPOSE
- PRINTOUT
- READ/WRITE FILE TO TABLE

- Data Entry and Retrieval
- Data Transformation and Analysis
- Full Color Graphics
- Statistical Analysis
- Curve Fitting
- Analytical Models
- Three Dimensional Graphics
- Quality Control Analysis

Bruce Systems

DATA TRANSFORMATION

ARITHMETIC +, -, X, ÷, EXP, UNARY

LOGICAL AND, OR, NOT

RELATIONAL =, >, <,

TEXT CONCATENATE

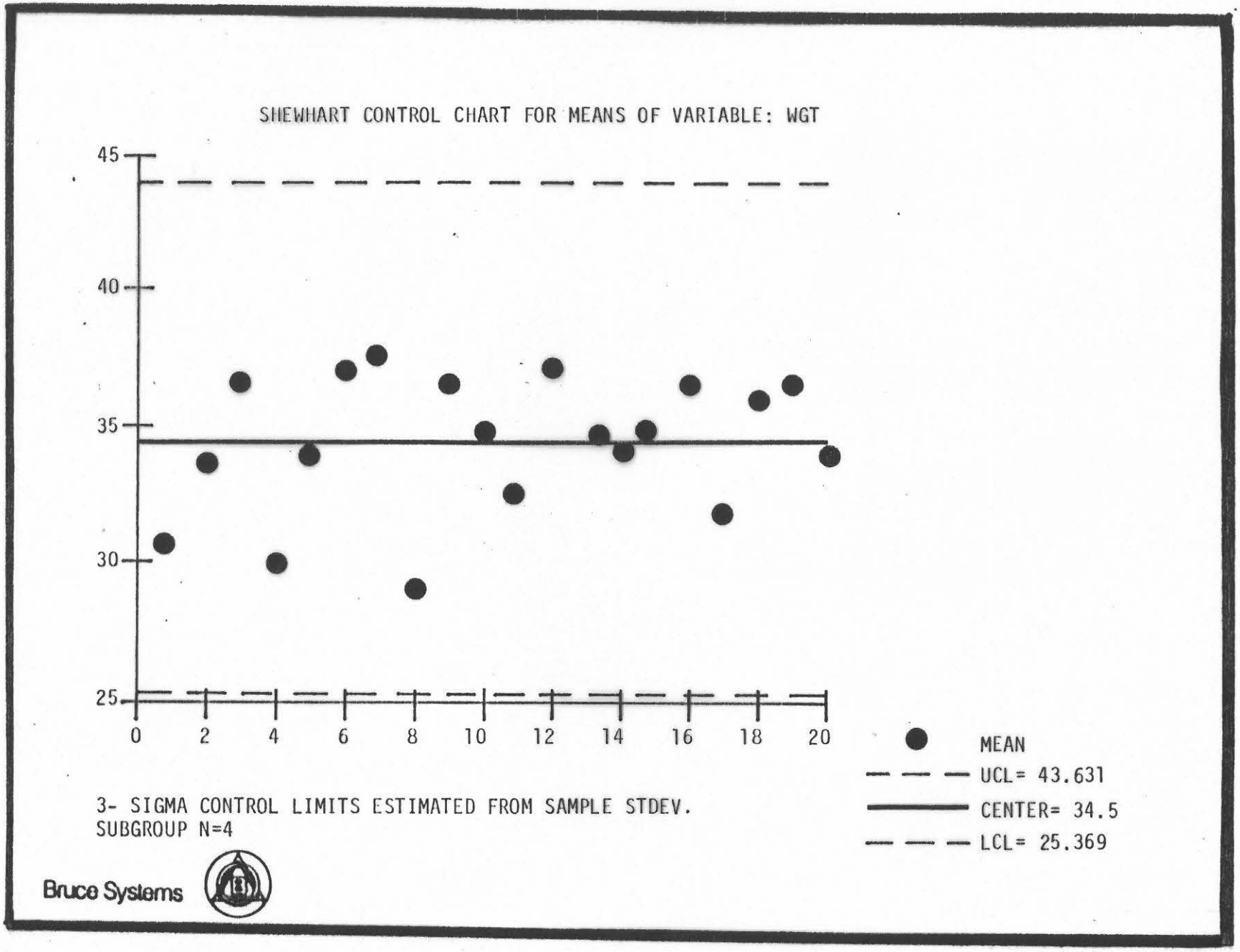
DATE ARITHMETIC

Bruce Systems 

GRAPHICS

- Scatter Plots
- Line Graphs
- Histograms
- Bar Graphs
- Pie Charts
- Color Graphics
- Complete Format Control

Bruce Systems


SHEWHART CONTROL CHART FOR MEANS OF VARIABLE: WGT
45
40
35
30
25
0
2
4
6
8
10
12
14
16
18
20
MEAN
UCL= 43.631
CENTER= 34.5
LCL= 25.369
3- SIGMA CONTROL LIMITS ESTIMATED FROM SAMPLE STDEV.
SUBGROUP N=4
Bruce Systems

CUSTOMER BASE

NOSC

ANALOG DEVICES

AMI

INTERMETALL

UNITRODE

CUSTOMER BASE

SYNERTEK

IBM

DELCO

NATIONAL SEMICONDUCTOR

TEXAS INSTRUMENTS

CUSTOMER BASE

BURR BROWN

PLESSEY SEMICONDUCTOR

NORTHERN TELECOM

RCA

BELL LABORATORIES

CUSTOMER BASE

ITT

INMOS

LINEAR TECHNOLOGY

TRILOGY

XICOR

SIGNETICS

CUSTOMER BASE

WESTERN ELECTRIC

DIGITAL EQUIPMENT COMPANY

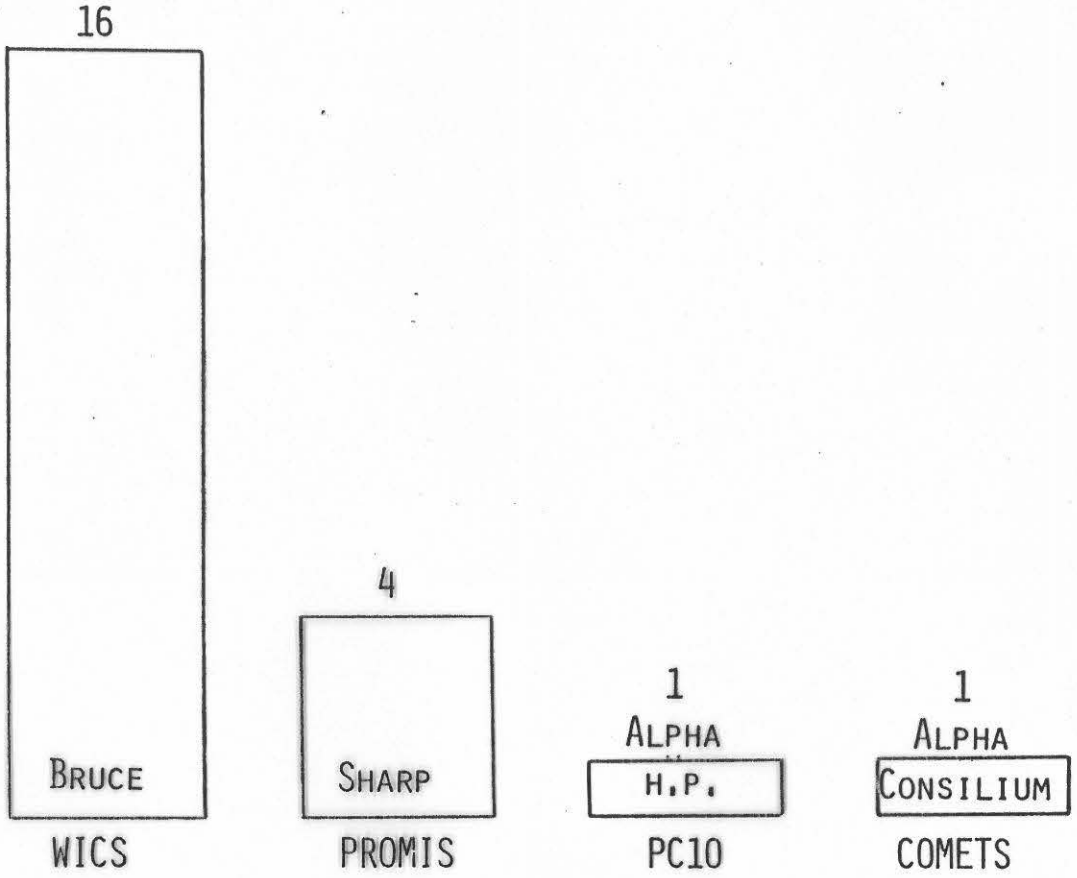
MOTOROLA

FAIRCHILD

HONEYWELL

SEMICONDUCTOR FABRICATION

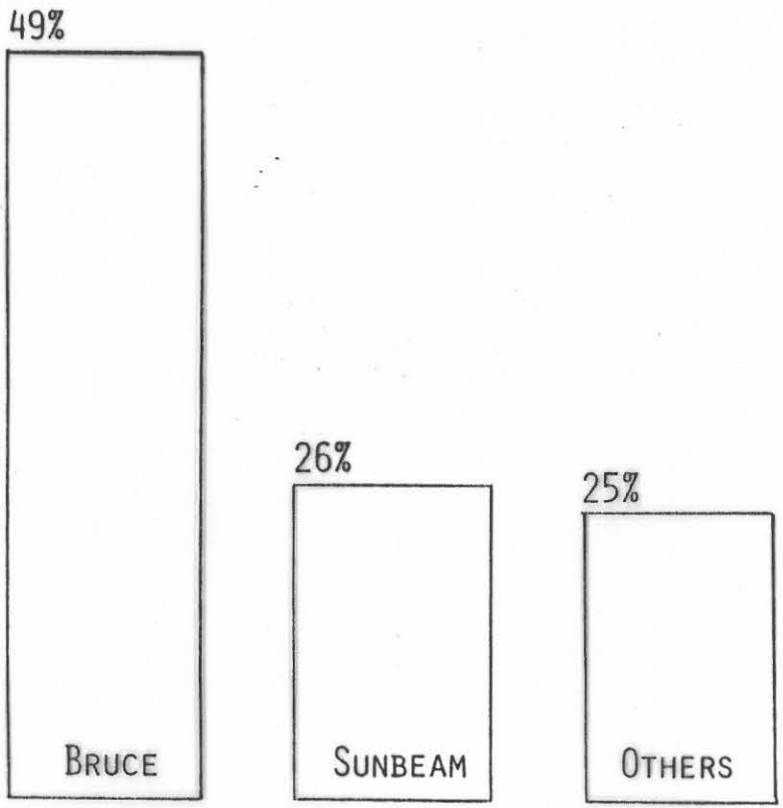
WAFER FAB INFORMATION SYSTEMS



Bruce Systems

SEMICONDUCTOR FABRICATION

DIFFUSION OXIDATION SEGMENT



1982 MARKET SHARE

Bruce Systems

BRUCE SYSTEMS

PRODUCTS AND SERVICES

FOR

SEMICONDUCTOR FACTORY AUTOMATION

Bruce Systems

BRUCE
SEMICONDUCTOR FABRICATION
AUTOMATION HOST
WORK STATION
CONCEPT

Bruce Systems

B R U C E S Y S T E M S

COMMAND	DESCRIPTION	OCPL+	SYSTEM FACS	WICS
	Machines			
MCH	Machine Specification		X	X
MDR	Machine Directory		X	X
WAF	Wafer Throughput.		X	X
PMM	Preventive Maintenance		X	X

COMMAND	DESCRIPTION	SYSTEM OCPL+	FACS	WICS
	ENGINEERING ANALYSIS			
	Lots			
CPP	Change Priority		X	X
DEL	Delete Lot		X	X
ELT	Edit Active Lot			X
HDR	Edit Lot Header		X	X
HLT	Edit Lot History		X	X
LOT	List Active Lot		X	X
STR	Lot Start		X	X
SUM	Lot Summary		X	X
UPD	Lot Update		X	X
SOR	General Reporting		X	X
SPL	Lot Split		X	X
MRG	Lot Merge		X	X
BON	Lot Bonus		X	X
SCP	Lot Scrap		X	X

COMMAND	DESCRIPTION	OCPL+	SYSTEM FACS	WICS
	Inventory			
ICD	Modify ICP Description			X
ICP	ICP Report			X

Bruce Systems

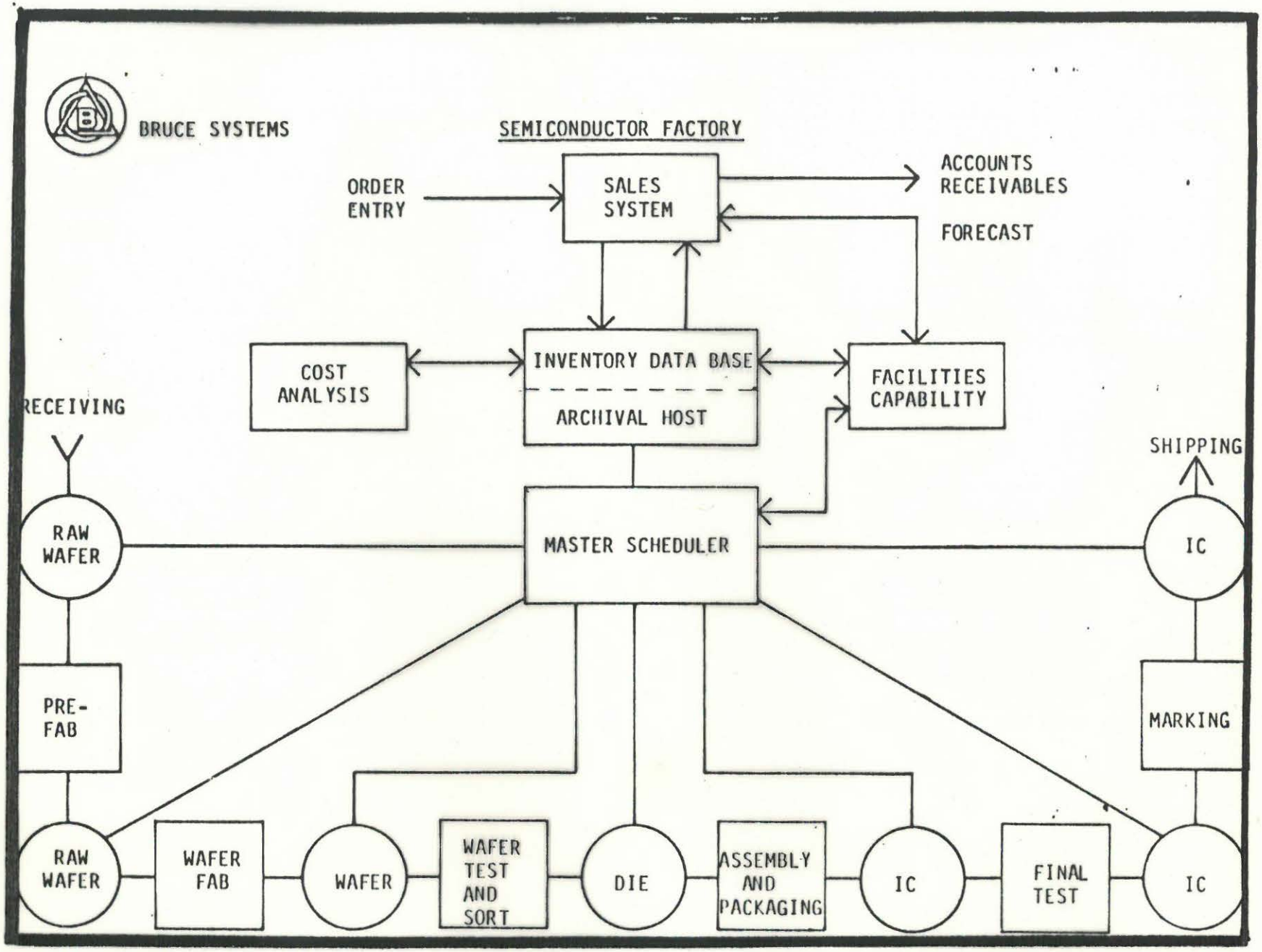
COMMAND	DESCRIPTION	OCPL+	SYSTEM FACS	WICS
	Furnaces			
ADJ	Adjust Tube ID's	X	X	X
DCD	Data Capture Report.	X	X	X
DCS	Data Capture Start	X	X	X
ELE (2)	Eng. Lang. Op. Editor.	X	X	X
EOP	Edit Operation (Recipe).	X	X	X
FLS	Alter Tube Files	X	X	X
LOG	Show Event Log	X	X	X
OPR	Operation Directory.	X	X	X
OWN	Set Tube Ownership	X	X	X
PDR	Maintenance Directory.	X	X	X
PMM	Furnace Maintenance.	X	X	X
PMR	Maintenance Report	X	X	X
POP	Print Operation.	X	X	X
SPG	System Page	X	X	X
TPG	Tube Page.	X	X	X
UPL	Operation Transfer	X	X	X
XFR	Operation Download	X	X	X

COMMAND	DESCRIPTION	OCPL+	SYSTEM FACS	WICS
	Miscellaneous			
DECNET	DECNET Support	X	X	X
ERRLOG	DEC Error Logging.	X	X	X
HELP	On-Line Help	X	X	X
PRV.	Privelege Adjust	X	X	X
SCH.	Scheduler.	X	X	X
SECS	SEMI SECS Protocol	X	X	X
TUBES.	Control 128 Tubes.	X	X	X

Bruce Systems

COMMAND	DESCRIPTION	OCPL+	SYSTEM FACS	WICS
	Process			
BCH	Batch Lot Modification			X
COP	Copy Process			X
DIR	Process Directory			X
DPR	Delete Process			X
EXQ	Examine Queue			X
PED	Process Editor			X
PPR	Print Process			X
PSR	Process Status Report			X
CTR	Cycle Time Report			X
RWK	Rework Loops			X
LIN	Line Balancing			X

Bruce Systems


BRUCE SYSTEMS
SEMICONDUCTOR FACTORY
ORDER ENTRY
SALES SYSTEM
ACCOUNTS RECEIVABLES
FORECAST
COST ANALYSIS
INVENTORY DATA BASE
ARCHIVAL HOST
FACILITIES CAPABILITY
RECEIVING
SHIPPING
RAW WAFER
MASTER SCHEDULER
IC
PRE-FAB
MARKING
RAW WAFER
WAFER FAB
WAFER
WAFER TEST AND SORT
DIE
ASSEMBLY AND PACKAGING
IC
FINAL TEST
IC

INVENTORY DATA BASE

ORDER ENTRY

ACCOUNTS RECEIVABLE

COST ANALYSIS

FACILITIES CAPABILITY

INVENTORY STATUS

Bruce Systems

SALES DRIVEN

ARCHIVAL HOST

TRANSACTION ORIENTED

MANUAL DATA ENTRY

MAINFRAME COMPUTER

WORK STATION

LOCAL CONTROL

DATA COLLECTION

OPERATOR INTERFACE

REAL TIME ACTIVITY

VIRTUAL TERMINAL

ACTUAL VALUES

BRUCE SYSTEMS

PROCESS QUALITY DATA BASE

- SCHEDULE
- ENGINEERING ANALYSIS
- PROCESS OPTIMIZATION
- TREND ANALYSIS
- SPECIFICATIONS
- RECIPES
- LIBRARY

BRUCE SYSTEMS