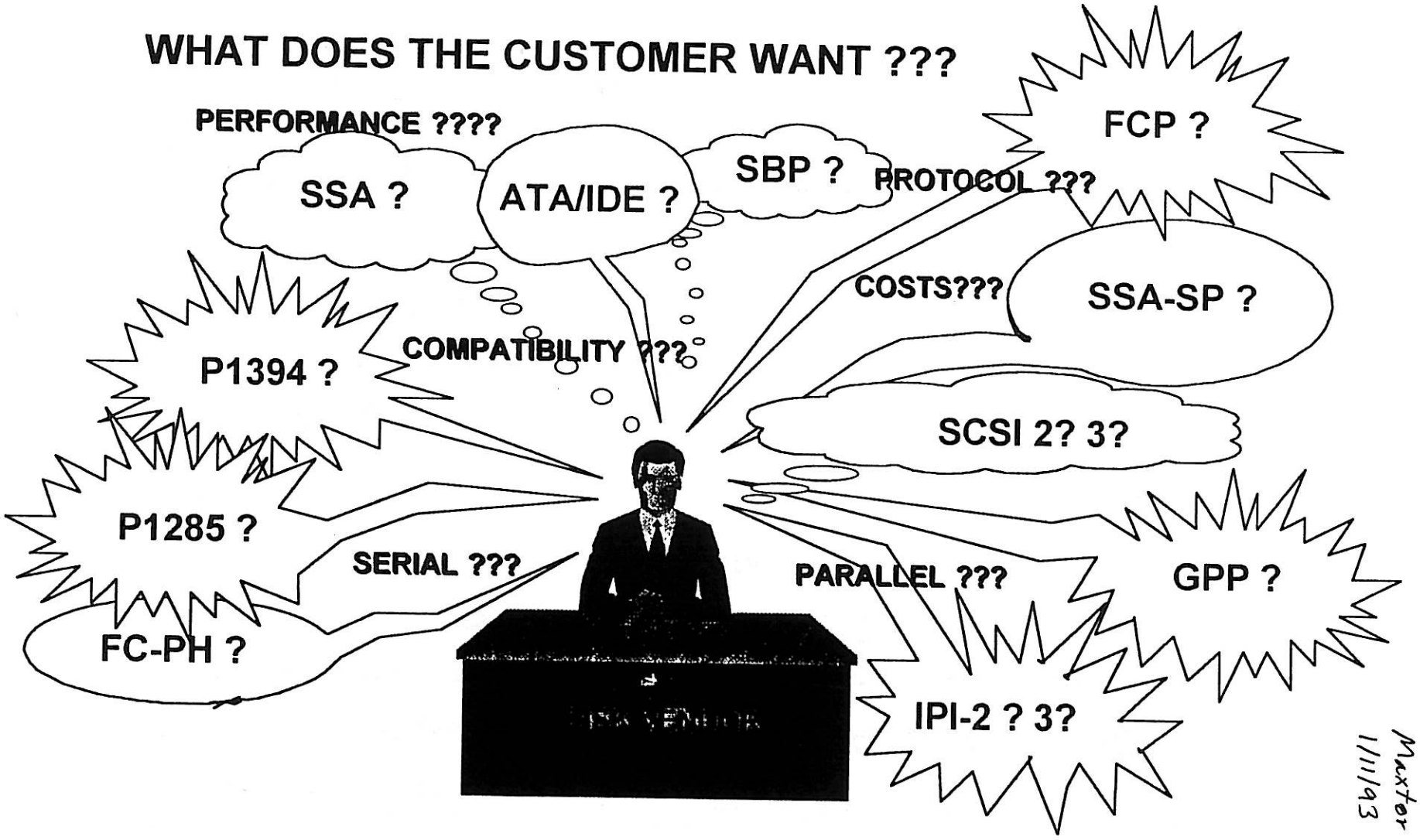

X3T9.2/93-10
Ron Roberts
Maxtor Corp.
1/11/93

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APPLICATION DEVELOPMENT

PERIPHERAL DEVICE INTERFACE

DISK LEVEL INTERFACES ?

HISTORY LESSON No 100001

IN THE BEGINNING

- ONE CONTROLLER THAT HANDLED MANY DISK'S OR SPINDLES PER SYSTEM
- COSTS OF ECC CIRCUITS, BUFFERS, ENDEC'S, WERE AMORTIZED OVER MANY SPINDLES.
- ARRAYS OF DISKS WERE COMMON (FARMS)
- DISKS HAD VERY LITTLE MICROCODE

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PERIPHERAL DEVICE INTERFACE

DISK LEVEL INTERFACES ?

HISTORY LESSON No 100001-2

WHEN WE INHERITED INTELLIGENCE

- SYSTEMS BECAME SMALLER AND ONLY NEEDED ONE OR TWO DISKS
- INTEGRATION TECHNIQUES BECAME VERY COST EFFECTIVE
- IF ONLY ONE DRIVE .... PUT EVERYTHING IN IT... TAKES COST FROM SYSTEM
- PERFORMANCE WAS QUESTIONABLE .... BUT OVER-RIDDEN BY COST ADVANTAGES
- THE NEED FOR BETTER COMMUNICATIONS BETWEEN SYSTEM AND PERIPHERAL BROUGHT US INTELLIGENT INTERFACES
- DISKS HAVE LARGE MICROCODE PROGRAMS... DEVELOPMENT COSTS ARE HIGH

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APPLICATION DEVELOPMENT

PERIPHERAL DEVICE INTERFACE

DISK LEVEL INTERFACES ?

HISTORY LESSON No 100001-3

NOW WHERE ARE WE

- LARGE CAPACITY SPINDLES.... MANY GBYTES UNDER ONE ARM... MANY SPINDLES TO OBTAIN AVAILABILITY, THROUGH-PUT
- AVAILABILITY OF DATA MORE CRITICAL THAN EVER
- COST IS STILL CRITICAL BUT PERFORMANCE IS REQUIRED
- ACCESSIBILITY TO DATA FOR INCREASED SYSTEM PERFORMANCE
- FAST - WIDE - SINGLE - OPTICAL - SYSTEM INTERFACES TO ACCESS PERIPHERALS
- MORE FUNCTIONS.. MORE MICROCODE.. MORE **MORE**

MORE

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PERIPHERAL DEVICE INTERFACE

ANOTHER INTERFACE !!!

DESIGN GOALS

- LOW LEVEL ACCESS TO THE MEDIA... IF REQUIRED
- VARIABLE DATA TRANSFER RATES FOR PERFORMANCE VS COST TRADE-OFFS
- ALLOW VENDORS TO TAKE ADVANTAGE OF VOLUME PRODUCTION
- PROVIDE EASY IMPLEMENTATION OF ARRAYS OF DISKS
- PROVIDE SIMPLIFIED COMMAND STRUCTURES AND FLOW
- PROVIDE FOR MAXIMUM THROUGH-PUT
- PROVIDE FOR ERROR FREE TRANSFERS

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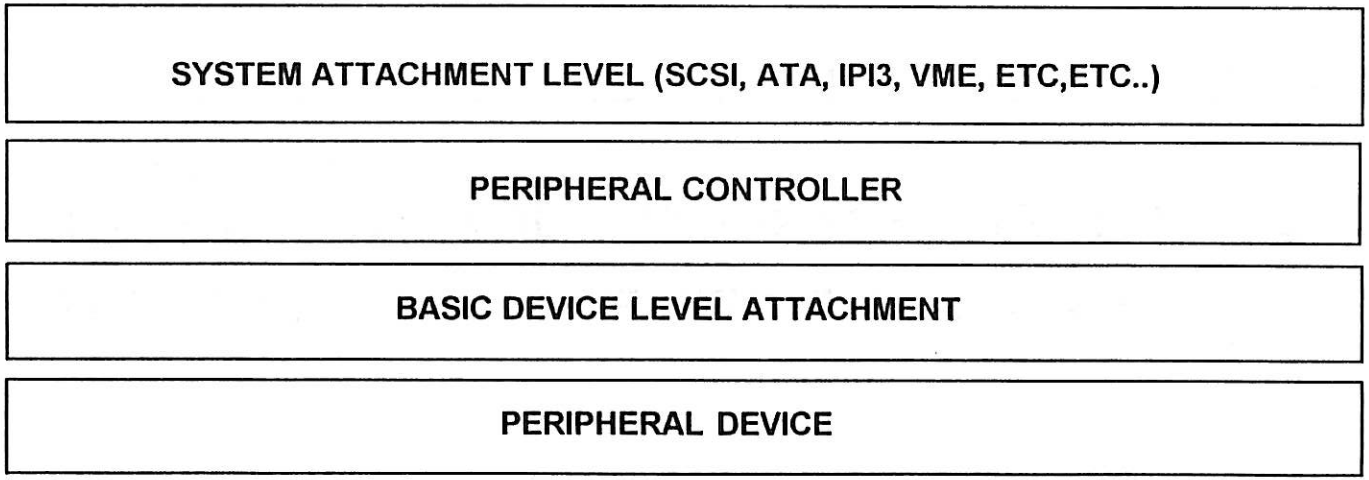
PERIPHERAL DEVICE INTERFACE

ARCHITECTURAL MODEL



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APPLICATION DEVELOPMENT

PERIPHERAL DEVICE INTERFACE

ARCHITECTURAL MODEL

ATTRIBUTES OF LEVELS

PERIPHERAL CONTROLLER	PERIPHERAL DEVICE
SYSTEM INTERFACE CONTROLS	ALL SERVO CONTROLS
CACHE MEMORIES(IF REQUIRED)	ENCODER DECODER
CONTROLS MULTIPLE DEVICES(NO LIMITS)	READ/WRITE CIRCUITS
BUFFER AREAS	ECC OF THE FLY
SYSTEM SPECIFIC KNOWLEDGE	STORAGE MEDIA
	SPINDLE SYNC CKTS
	ALL POWER CONTROLS

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PERIPHERAL DEVICE INTERFACE

ADVANTAGES OF INTERCONNECTION SCHEME

- PROVIDES LOW LEVEL ACCESS TO MEDIA (if required)
- SIMPLIFIES PERIPHERAL DEVICE FIRMWARE
- LESS COSTLY PERIPHERAL DEVICES
- EASE OF IMPLEMENTATION FOR ARRAYS OF DISKS (RAID's ??)
- PERIPHERAL GUIDED VS SYSTEM AFTER THOUGHT
- PERFORMANCE ORIENTED WITH LESS $ THAN SCSI (PER SYSTEM)

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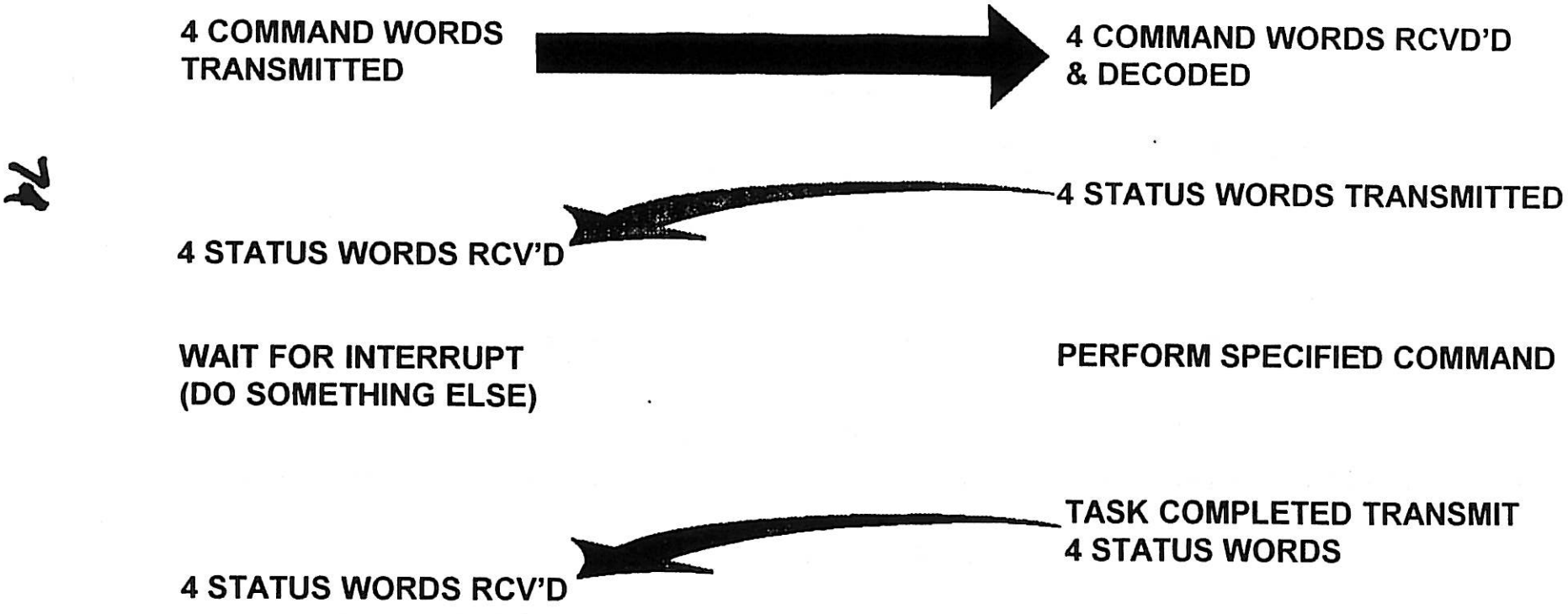
PERIPHERAL DEVICE INTERFACE

INFORMATION MOVEMENT PROTOCOL



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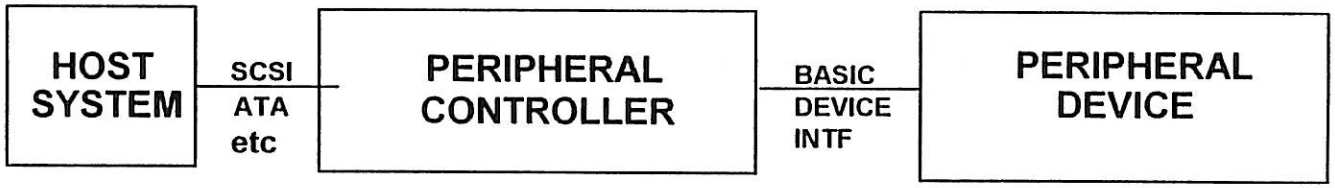
PERIPHERAL DEVICE INTERFACE

WHERE DOES IT FIT ?

IN THE HIERARCHY OF THE SUBSYSTEM



TYPICAL PERIPHERAL SUB-SYSTEM

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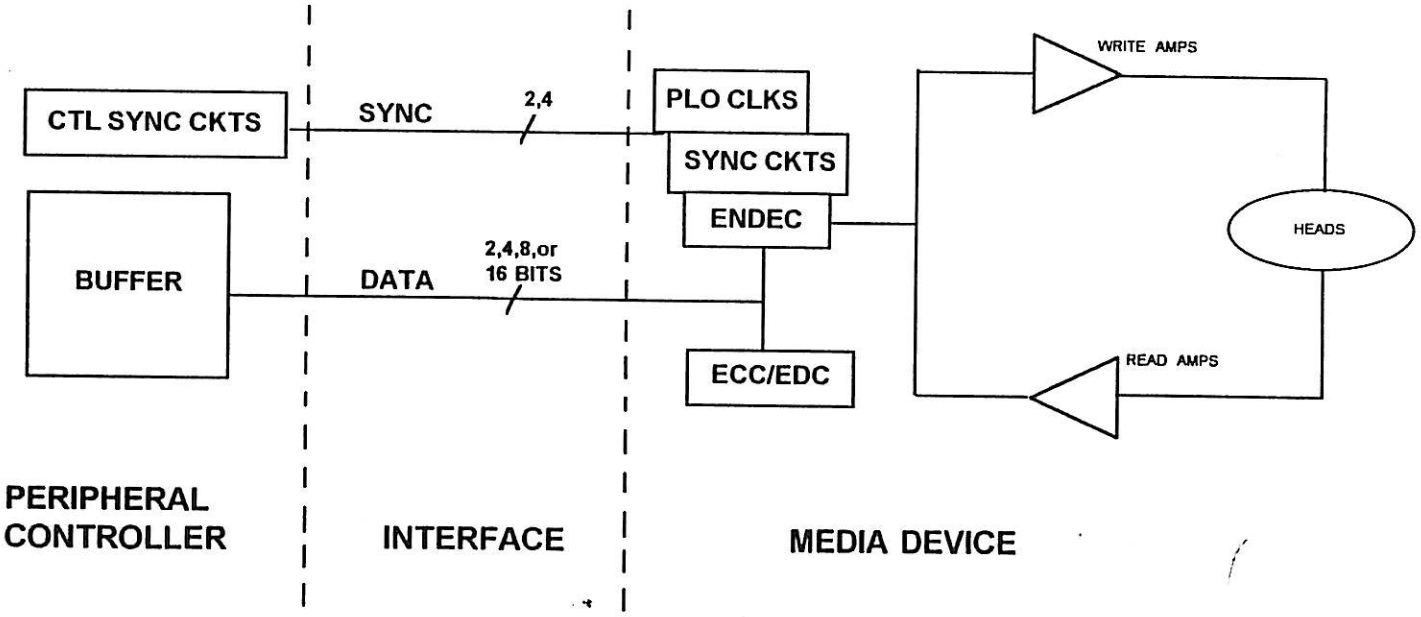
PERIPHERAL DEVICE INTERFACE

DATA PATH LAYOUT



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