

EASTMAN KODAK COMPANY

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GENERATION 2 PRODUCT PROPOSAL

(COMMON CARD CAGE/CHASSIS DESIGN)

WORKING DRAFT

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INTRODUCTION

As the development cycle begins on the next generation of EPD Still Video Products there are several issues which need to be addressed, as they have a direct bearing on how the design of the next generation of products will be approached.

The first major issue is manpower, or the lack of it. The need to effectively utilize our limited resources should be obvious. Any approach we can take that reduces the redundancy of our efforts in any area, be it design, manufacture or software should be carefully considered.

Another issue of equal concern is that of designing the right product for the intended market. This is a harder issue to tackle due to our lack of knowledge of our customers specific needs and also our inability to predict the future in regards to advances in technology, and new markets just over the horizon.

Lastly, an important concern is being able to bring several new products to market in as timely manner as possible.

This proposal addresses these issues and offers a new approach to the design of our next generation of products.

In a nutshell, the concept is one common box or chassis with an expandable bus architecture for all our products. Using this standard EPD chassis the individual product designers would customize it by adding unique front panels and filling the card slots of the bus with the special purpose boards necessary for that product. All the products would have at least three common boards in the first three of a suggested seven slots, the processor card, framestore card and the analog card. (See figure 2)

This concept effectively addresses the manpower issue since only one design is necessary for the chassis, framestore and analog card. Manufacture and testing is common for these components also. Software routines for the framestore only have to be developed once and can be shared from a common library. And if the concept was also carried over to the microprocessor and compiler/programming language used in all products the same savings would apply.

An additional bonus of this concept is a common footprint and "look" to our product line. The units could be stacked and since the rear panel layouts would be nearly the same, cabling is much cleaner.

The card cage design also effectively addresses the right product for the customer's needs issue, in that a card cage design is inherently extremely flexible. If we adopt a standard bus design such as the NuBUS that is currently used by the new Mac II, special purpose boards developed for the Mac II such as modems, special signal processing boards, audio cards, RAM cards, and high resolution displays could be plugged into the additional slots in our products enhancing their capabilities and making the products extremely attractive to system integrators and value added resellers. And as new technologies become available new versions of our products can be brought to market by simply installing new boards into the existing chassis.

The time required to bring new products to market should be significantly reduced and our ability to adapt to an everchanging marketplace will be enhanced due to the flexibility of this design concept.

PROS:

ONE SINGLE HIGH PERFORMANCE FRAMESTORE DESIGNED TO BE USED BY ALL PRODUCT GROUPS.

- ONE DESIGN FOR NTSC AND PAL MARKETS
- STANDARD EPD ANALOG/DIGITAL INTERFACE

COMMON DESIGN OF FRAMESTORE, ANALOG CARD, CARD CAGE/CHASSIS AND MICROPROCESSOR BOARD ALLOWS:

- COMMON FABRICATION
- COMMON DOCUMENTATION
- COMMON TEST PROCEDURES
- LOWER EWO COSTS

COMMON SOFTWARE/OPERATING SYSTEM

- UNIVERSAL LIBRARY FUNCTIONS FOR IMAGE MANIPULATION AND FRAMESTORE OPERATION1
- COMMON LOOK FOR ON SCREEN GRAPHICS
- COMMON DOCUMENTATION
- COMMON TEST PROCEDURES
- LOWER SOFTWARE DEVELOPMENT COSTS

COMMON FOOTPRINT AND REAR PANEL LAYOUT

- WHOLE PRODUCT LINE HAS SIMILAR LOOK
- SEVERAL PRODUCTS CAN EASILY BE STACKED
- CABLE CONNECTORS LINE UP WHEN STACKED MAKING CABLING NEAT

CAN BRING SEVERAL SIMILAR PRODUCTS TO MARKET FASTER AND WITH LESS MANPOWER WITH A COMMON CHASSIS DESIGN.

UTILIZING EXISTING BUS STANDARD SUCH AS NuBUS, MEANS THAT THIRD PARTY SPECIAL FUNCTION BOARDS DESIGNED FOR THE MAC II, SUCH AS MODEMS, AUDIO CARDS, RAM, HIGH RESOLUTION DISPLAY CARDS, ETC., CAN BE PLUGGED INTO UNUSED SLOTS IN KODAK STILL VIDEO PRODUCTS MAKING OUR PRODUCTS MORE ATTRACTIVE TO SYSTEM INTEGRATORS AND THOSE WITH SPECIAL NEEDS.

CARD CAGE DESIGN MEANS THAT NEW TECHNOLOGIES CAN BE ADDED TO EXISTING PRODUCTS AND NEW GENERATIONS OF PRODUCTS CAN BE BROUGHT TO MARKET WITHOUT MAJOR RETOOLING EXPENSE.

CONS:

HIGHER UNIT MANUFACTURING COSTS. TOTAL EPD COSTS ARE A COMBINATION OF EWO, WHICH WOULD BE LOWER, TOOLING EXPENSES, WHICH WOULD BE LOWER AND UNIT MANUFACTURING COSTS, WHICH WOULD PROBABLY BE HIGHER, DIVIDED BY THE TOTAL QUANTITY BEING MANUFACTURED.

COMMON CHASSIS SIZE FORCES ALL PRODUCTS TO HAVE SAME FOOTPRINT. A DISADVANTAGE WHEN SIZE (PORTABILITY) OR FORM FACTOR IS IMPORTANT.

REQUIRES A GREAT DEAL OF CAREFUL COORDINATION BETWEEN ALL PRODUCT GROUPS TO PULL IT OFF.

STANDARD EPD IMAGE CAPTURE / IMAGE DISPLAY SIZES

THE EPD FRAMESTORE WILL BE CAPABLE OF CAPTURING AND DISPLAYING IMAGES IN THE NTSC (RS 170) FORMAT OR THE PAL (625 LINE) FORMAT.

THE NUMBER OF SAMPLES PER LINE PROVIDED FOR IS SHOWN:

NTSC FORMAT:	COMPUTER COMPATIBLE	640 X 480 (SQ PIXELS)
	HIGH RESOLUTION NTSC OPTION	768 X 484

PAL FORMAT:	HIGH RESOLUTION PAL	768 X 576 (SQ PIXELS)
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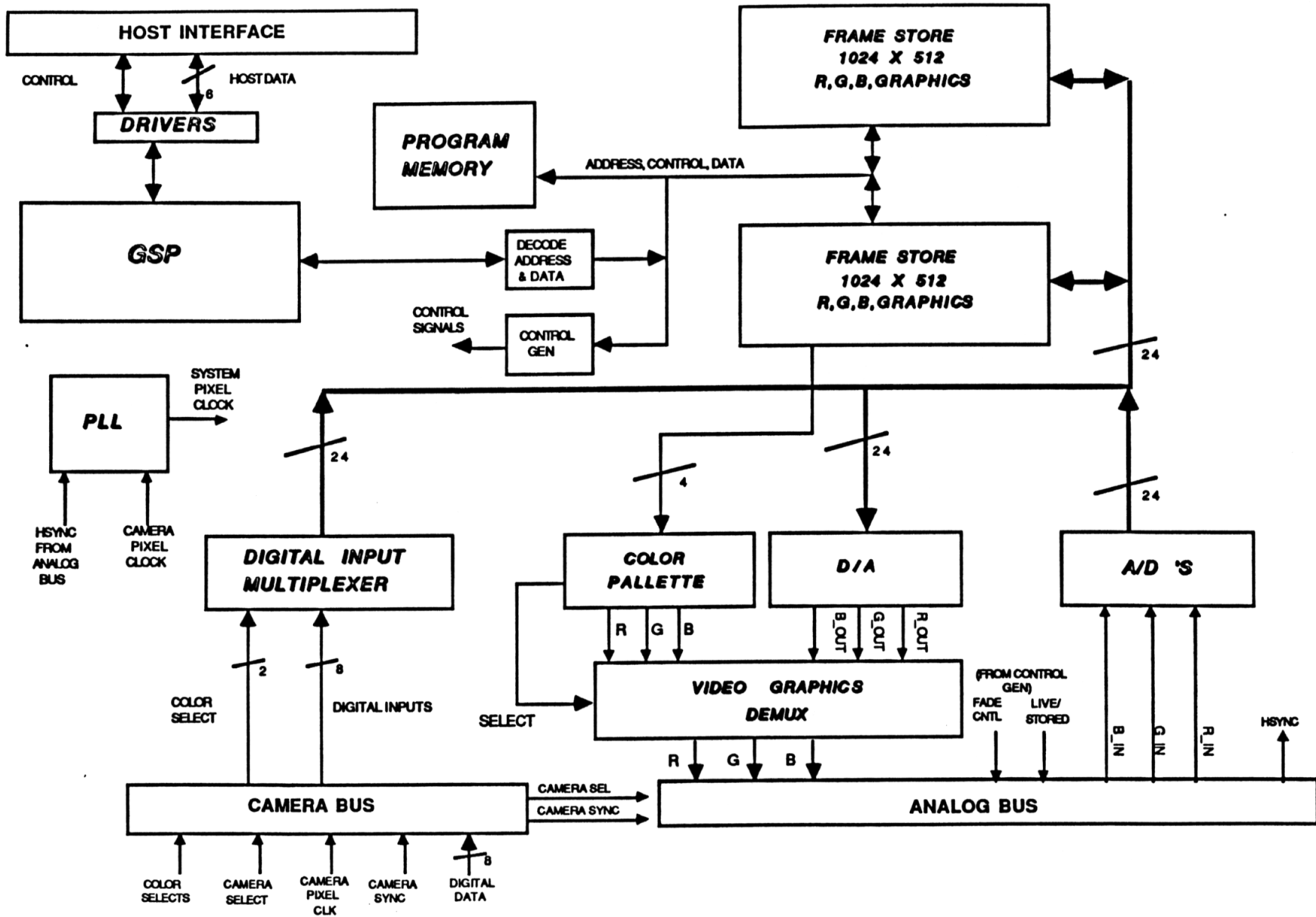
WITH THE FRAMESTORE POPULATED WITH THE FULL 1024 X 1024 MEMORY IT WILL BE ABLE TO STORE A 1024 X 768 HIGH RESOLUTION IMAGE. FOR DISPLAY PURPOSES EVERY OTHER PIXEL IN THE HOZONTAL AND VERTICAL DIRECTION WILL APPEAR ON THE OUTPUT TO THE MONITOR. THEREFORE A 1024 X 768 IMAGE WILL BE DISPLAYED IN EITHER THE NTSC OR PAL FORMAT AS A 512 X 386 IMAGE LOCATED IN THE CENTER OF THE SCREEN. FOR BOTH OUTPUT FORMATS (NTSC OR PAL) THE SUBSAMPLED IMAGE WILL BE DISPLAYED IN A SQUARE PIXEL FORMAT, IE. NTSC AT 640 SPL RATE AND PAL AT 768 SPL RATE.

FOR IMAGES THAT EXCEED PIXEL DIMENSIONS OF 1024 IN EITHER DIMENSION AN ADDITIONAL DRAM BOARD WILL BE REQUIRED TO STORE THE IMAGE. A SUBSAMPLED VERSION OF THESE LARGE IMAGES WILL BE MADE VIEWABLE IN THE NTSC OR PAL FORMATS VIA THIS FRAMESTORE BY TRANSFERRING EVERY OTHER PIXEL OF THE IMAGE DATA FROM THE DRAM BOARD TO THE FRAMESTORE. A MORE EXACT SIZING OF THE STORED IMAGE TO THE DISPLAY FORMAT IS POSSIBLE BY DOING A SAMPLE RATE CONVERSION BUT THIS WILL MOST PROBABLY REQUIRE THE USE OF THE DSP BOARD IN ORDER TO ACCOMPLISH THIS IN A REASONABLE TIME (ONE SECOND)

FEATURE SUMMARY

- ONE OR TWO NTSC/RGB FS (1024 X 512)
ONE OR TWO PAL/RGB FS (1024 X 1024)
- MULTISTANDARD INTERFACE PAL/NTSC
- RGB I/O
- Y/C BUS
- 6MHz ANALOG PERFORMANCE [SPL = 720]
- VIDEO SPECIAL EFFECTS (AFA SPEC.)
- DIGITAL VIDEO INPUT (TRANSFER STAND)
- UNIVERSAL FRAMESTORE - HOST COMPUTER INTERFACE

DIGITAL BOARD



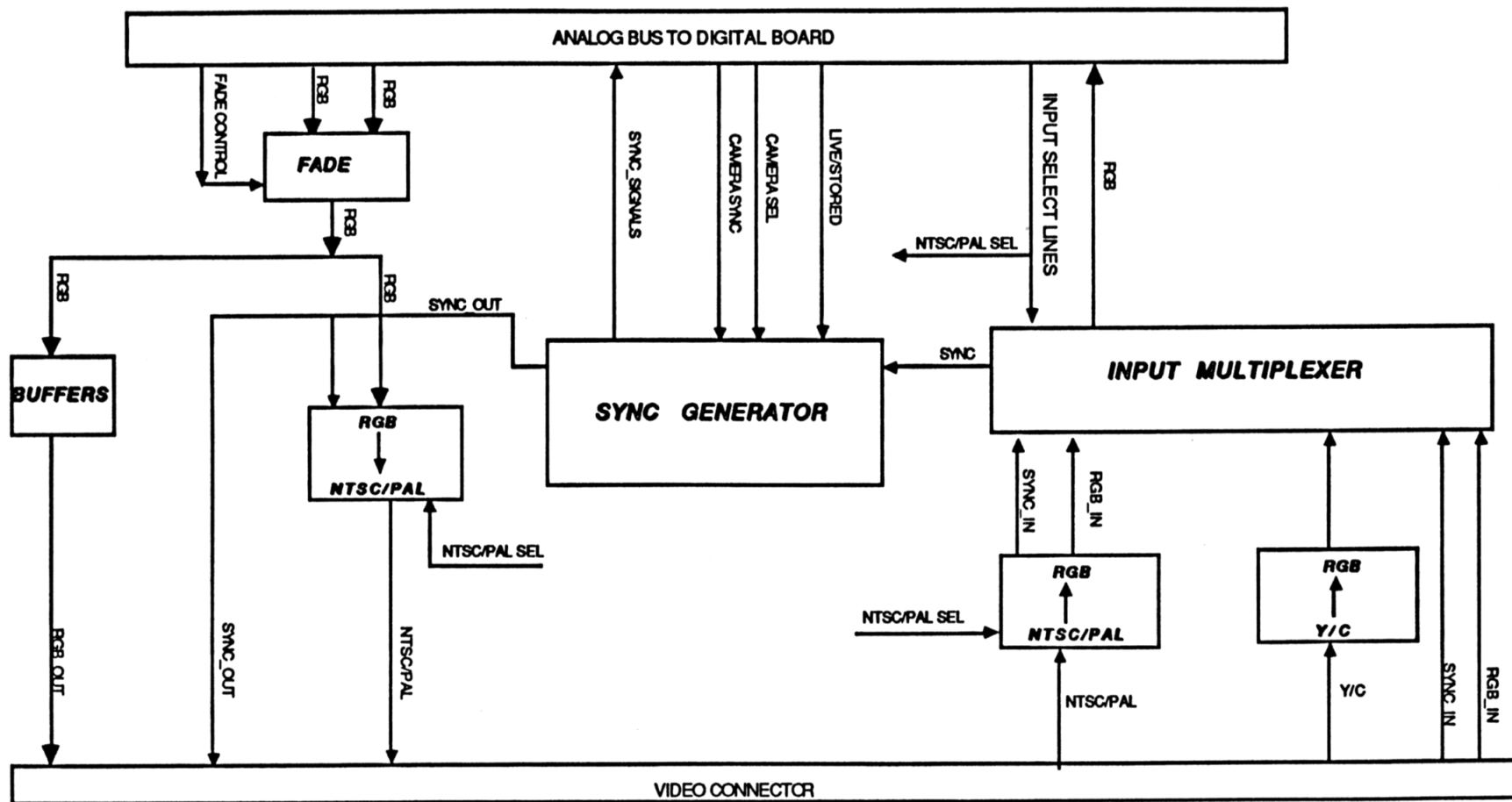
October 29, 1987

ANALOG BOARD

EPD FRAMESTORE

10

October 29, 1987



EPD GEN. 2 PRODUCT LINE

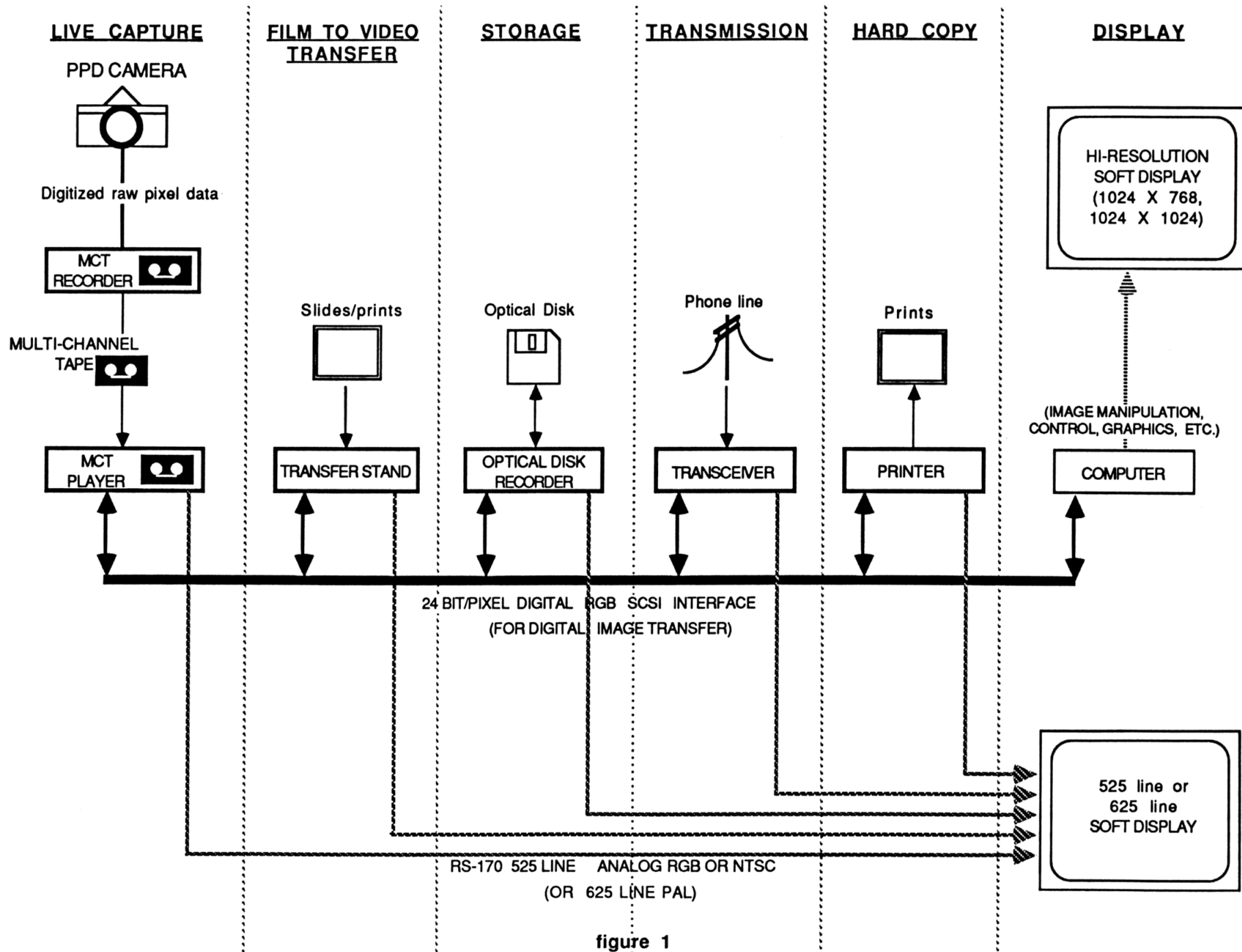


figure 1

EPD GEN. 2 PRODUCT BOARD REQUIREMENTS

	MULTI-CHANNEL TAPE PLAYER	TRANSFER STAND	OPTICAL DISK RECORDER	TRANSCIVER	PRINTER
PROCESSOR BOARD (PRODUCT CONTROL) AND DIGITAL INTERFACE (SCSI)	×	×	×	×	×
ANALOG (RGB AND NTSC)	×	×	×	×	○
FRAMESTORE (CAPTURE/DISPLAY)	×	×	×	×	○
HI-SPEED DSP (SRC, COMPRESSION, CFA DECODING, ED&C)	×	○	×	×	○
MODEM (TRANSMISSION)	○	○	○	×	○
AUDIO BOARD (STEREO A TO D AND D TO A W/ AMP)	N.A.	N.A.	○	N.A.	N.A.
RS-232 (CONTROL)	○	○	○	○	○
OPTIONAL DIGITAL INTERFACE (IEEE-488, ETHERNET)	○	○	○	○	○
RAM (IMAGE BUFFER)	○	○	○	○	×
HIGH RESOLUTION DISPLAY BUFFER (MAC II BOARD)	○	○	○	○	○

×

= REQUIRED



= OPTIONAL

figure 2

NuBUS Description

- 10 Mhz SYNCHRONOUS OPERATION
- MULTIPLEXED BUS (ADDRESS AND DATA)
- 32 BIT ADDRESS SPACE (4 GIGABYTES)
- 16 MBYTE ADDRESS SPACE PER CARD LOCATED IN GLOBAL MAP BY ID NUMBER OF SLOT
- UP TO 16 CARD SLOTS
- VARIABLE DATA WIDTH - 8,16 OR 32 BITS
- EACH CARD CAN BE A MASTER OR SLAVE
- "STRICTLY FAIR" ARBITRATION FOR BUS OWNERSHIP
(ALLOWS EVERY CARD AN EQUAL CHANCE TO CONTROL THE BUS)
- BUS LOCKING AVAILABLE (TO ENSURE UNBROKEN BUS ACCESS)
- CARDS ARE SELF CONFIGURING (NO JUMPERS NEEDED)
- EUROCARD TYPE C CONNECTOR (96 PIN)
51 SIGNAL LINES, 45 POWER AND GROUND LINES
- VOLTAGES AVAILABLE + 5, -5.2, +12, -12

COMMON CARD CAGE DESIGN UTILIZING NUBUS ARCHITECTURE

(COMMON CHASSIS WHERE POSSIBLE)

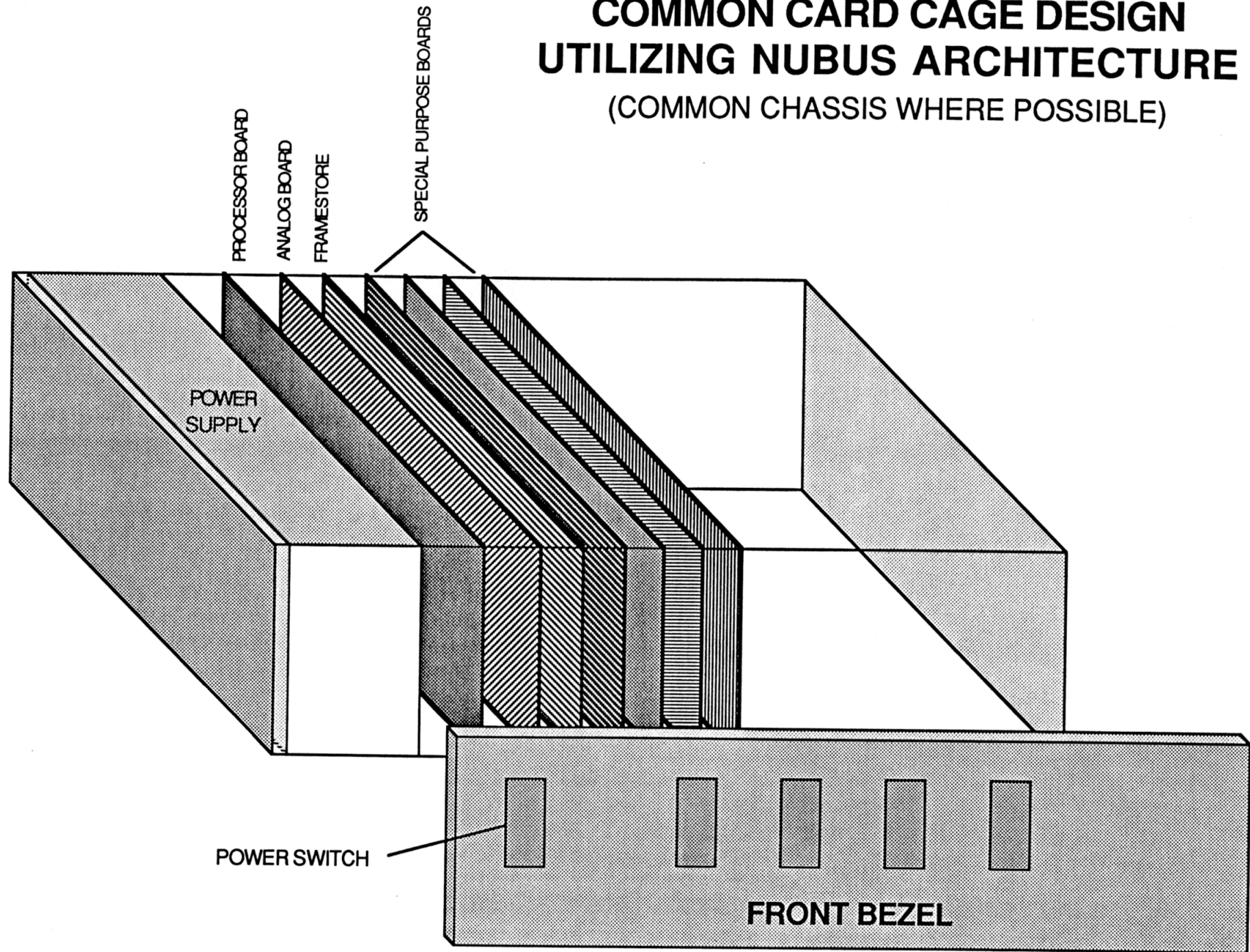


figure 3

Typical Rear Panel Layout

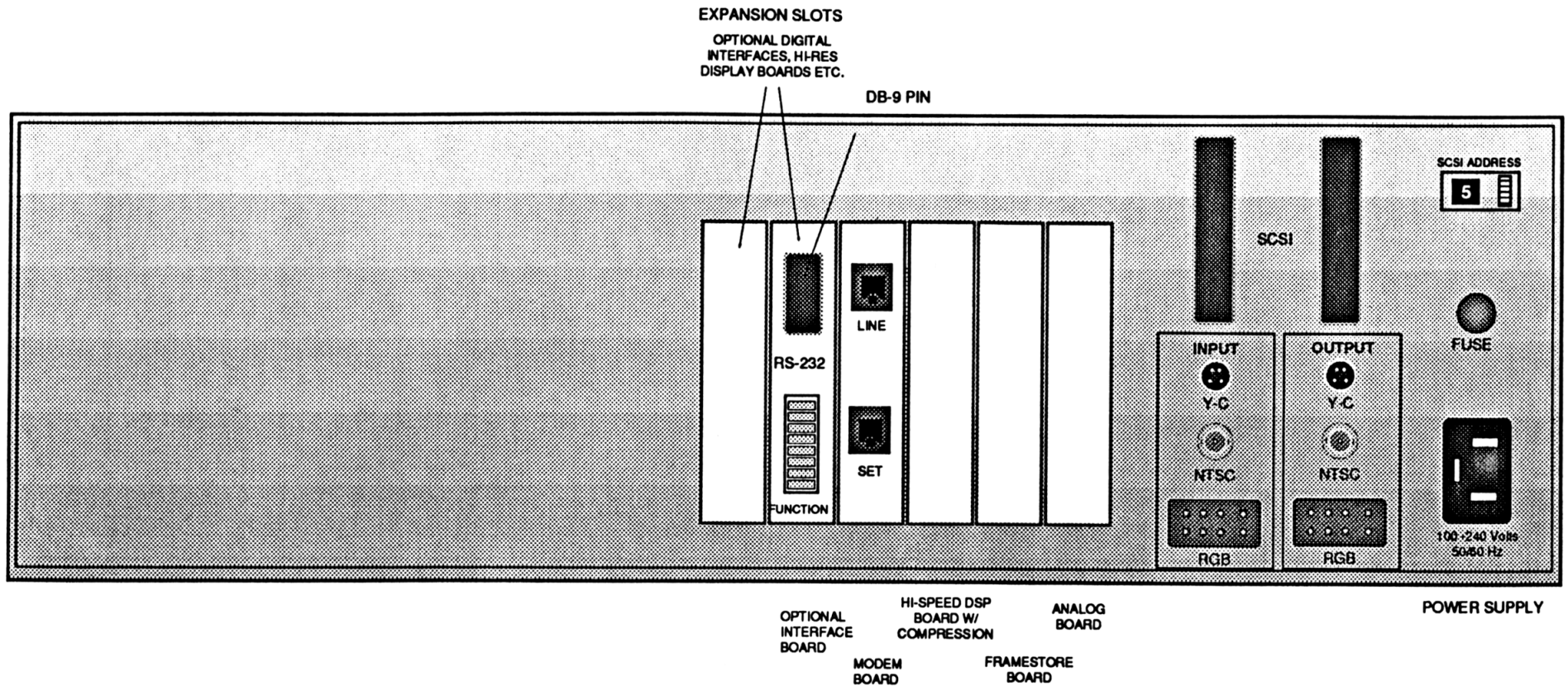


figure 4