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"WORKING PAPERS"

PDE
FUNCTIONAL
REVIEW

5 April 1971

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CONTROL SYSTEM ~~ONLY~~ *gently*

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NAVAL RESEARCH LABORATORY
WASHINGTON, D. C. 20390

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AGENDA

- I. INTRODUCTION
 - A. PDE Concept
 - B. System Interface
- II. FUNCTIONAL BREAKDOWN
 - A. SICU (System Interface and Control Unit)
 - B. REFOR (Reformatter)
 - C. PTF (Pulse Train Filter)
 - D. On-Line Computer
 - 1. SEL Model 810A
 - 2. SEL Model 86
- III. PHYSICAL CONFIGURATION
- IV. PROTOTYPE AND INITIAL DEPLOYMENT
 - A. Schedule
 - B. Deployment Impact
- V. FUTURE DEVELOPMENT
 - A. PTF (Pulse Train Filter)
 - B. Delta Time Filter
 - C. Other Parametric Filters

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(PDE)

PRIORITY DATA EXTRACTOR

START/STOP TIME SELECTION

LOGICAL CHANNEL (RF BAND) SORT

LOGICAL CHANNEL BLANKING ON NORMAL RECORDING

*PRI AND PULSE TRAIN FILTERING

ON-LINE DATA REFORMATTING

*NOT IN FIRST DEPLOYMENT

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PDE, GENERAL DESCRIPTION OF

The PDE (Priority Data Extractor) selects and passes to an on-line signal processing computer special interest data that has met predetermined criteria. Data selection criteria may be* (1) start/stop times, (2) RF band, (3) PRI, (4) pulse train consistency, (5) delta time, or (6) other parametric recognition. PDE output data is optimally formatted to enhance the most efficient time utilization of the on-line computer.

The PDE has two interfaces with the on-line computer. The first of these is through a standard input/output peripheral terminal and serves the purpose of enabling setup parameters and controls to be entered via the computer console. The second interface is the high-speed data input terminal through which all PDE output data will pass. Thus the PDE is an integral component of the on-line signal processing computer.

Data input to the PDE is digital pulses from the Analog-to-Digital Data subsystem (A/DDS). These pulses have already been quantized to the station clock and carry with them pulse width information (RF band identification). A channel blanking feature is designed into the PDE so that unwanted RF bands may be inhibited from the normal digital data collection tape. Aside from this option, the PDE has no effect on the digital data recorded via the Buffered Tape System (BTS).

Components of the PDE are (1) SICU (System Interface and Control Unit), (2) REFOR (Reformatter), and (3) parameter filters.* SICU provides for the man/machine interface via either the local controls or the on-line computer. REFOR gates the selected pulses, assigns the time of arrivals, and formats the digital output characters. Parameter filters will enable data selection on the basis of known signal characteristics.

*Items 1 and 2 are scheduled for the first deployment.

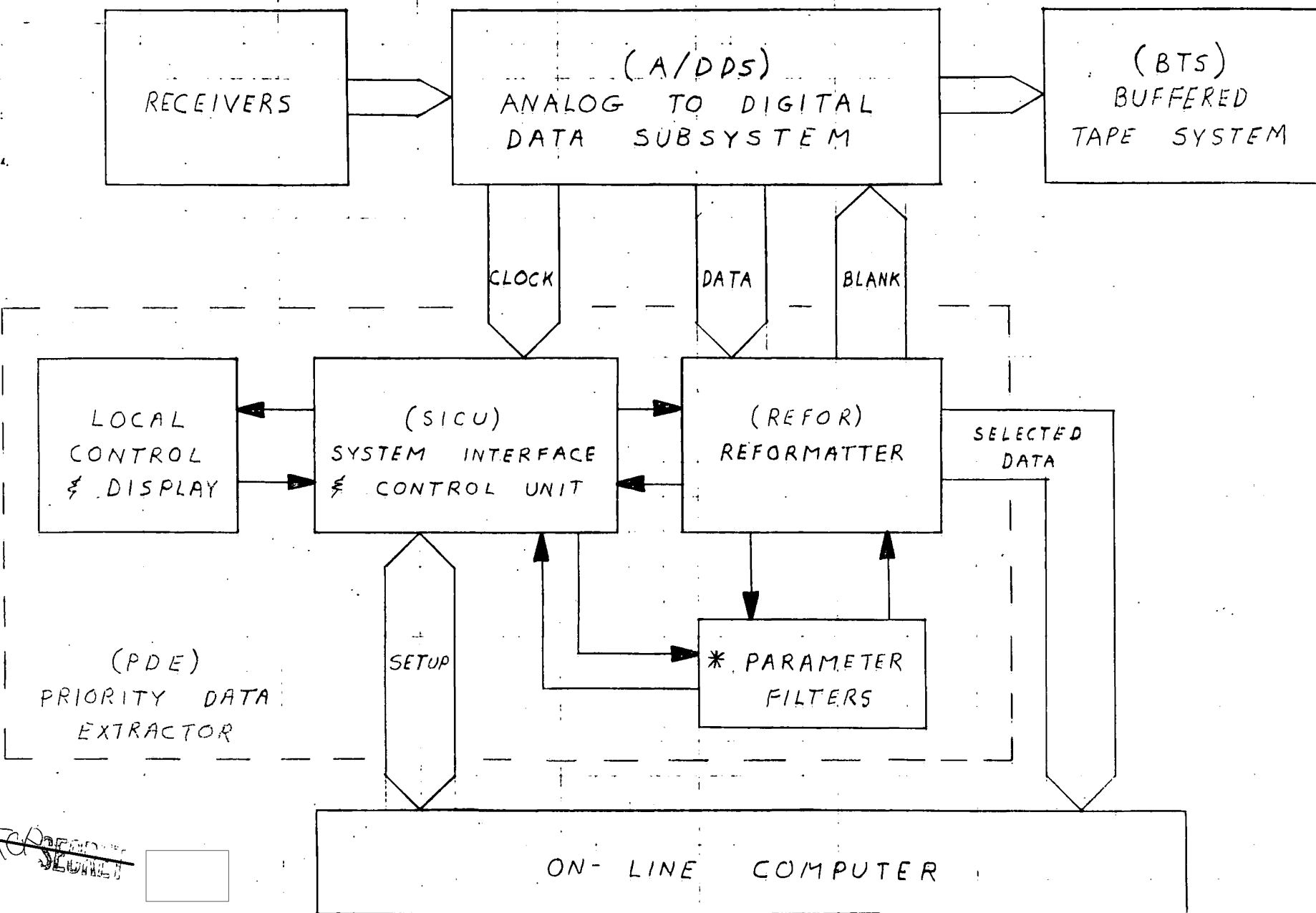
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* NOT IN FIRST DEPLOYMENT

PDE , BLOCK DIAGRAM

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(SICU)

SYSTEM INTERFACE AND CONTROL UNIT

ACCEPT COMMAND AND CONTROL INPUTS FROM:

1. ON-LINE COMPUTER
2. MANUAL ENTRY

DISTRIBUTE SETUP PARAMETERS THROUGHOUT PDE

DISPLAY PDE SETUP CONDITIONS

DISTRIBUTE TIMING SIGNALS RECEIVED FROM A/DDS

DISPLAY PDE STATUS AND DATA FLOW INDICATIONS

INITIATE START AND STOP ACTIVITIES

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SICU, GENERAL DESCRIPTION OF

The function of the System Interface and Control Unit (SICU) is to provide the man/machine interface capability between an operator and the PDE system. The operator requires control of the PDE in order to select a "Start" and "Stop" time, the filter parameters, the desired data flow paths through the PDE, and the blanking of those logical channel outputs which are undesirable to record via the A/DDS-BTS path.

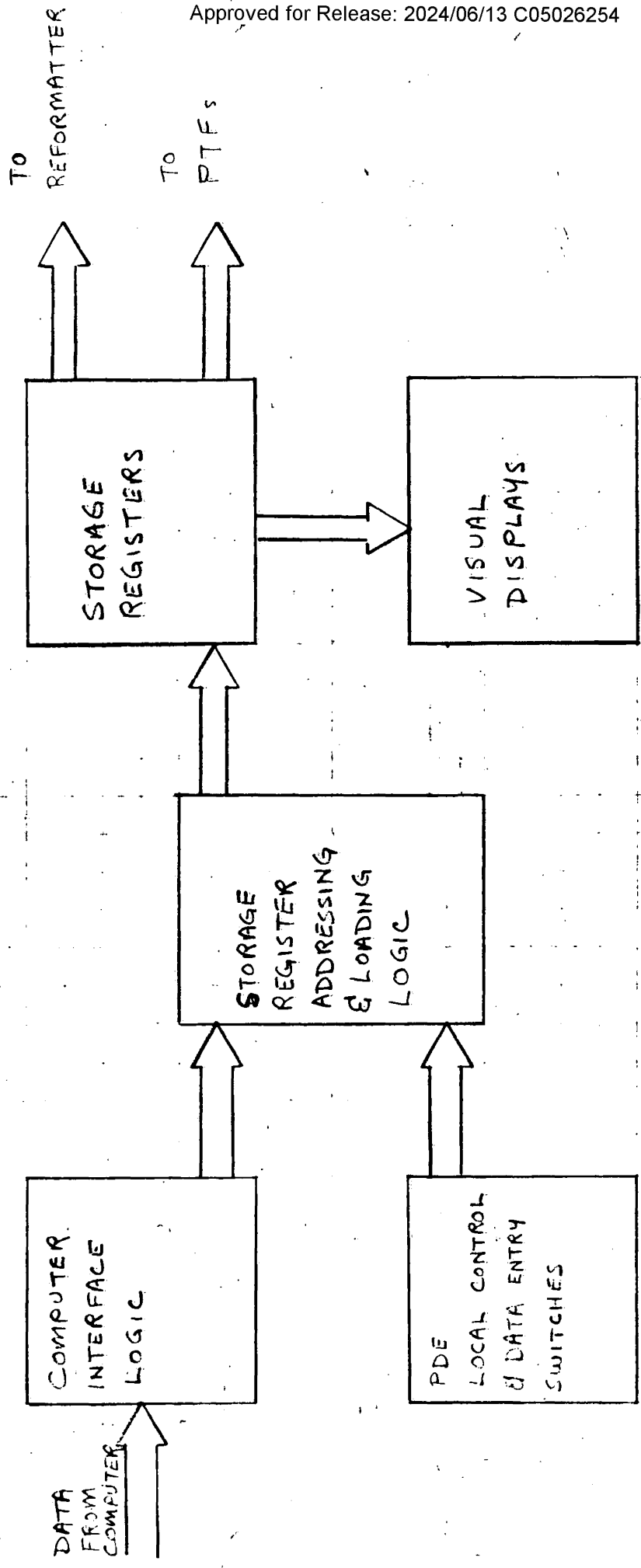
As each selection is made by the operator, it is stored in the SICU and made available to the appropriate units of the PDE. Front-panel indicators and displays monitor the stored information and provide visual feedback to the operator.

Operator control of the PDE is achieved via either of two paths--computer or local control and data entry switches mounted on the SICU front panels.

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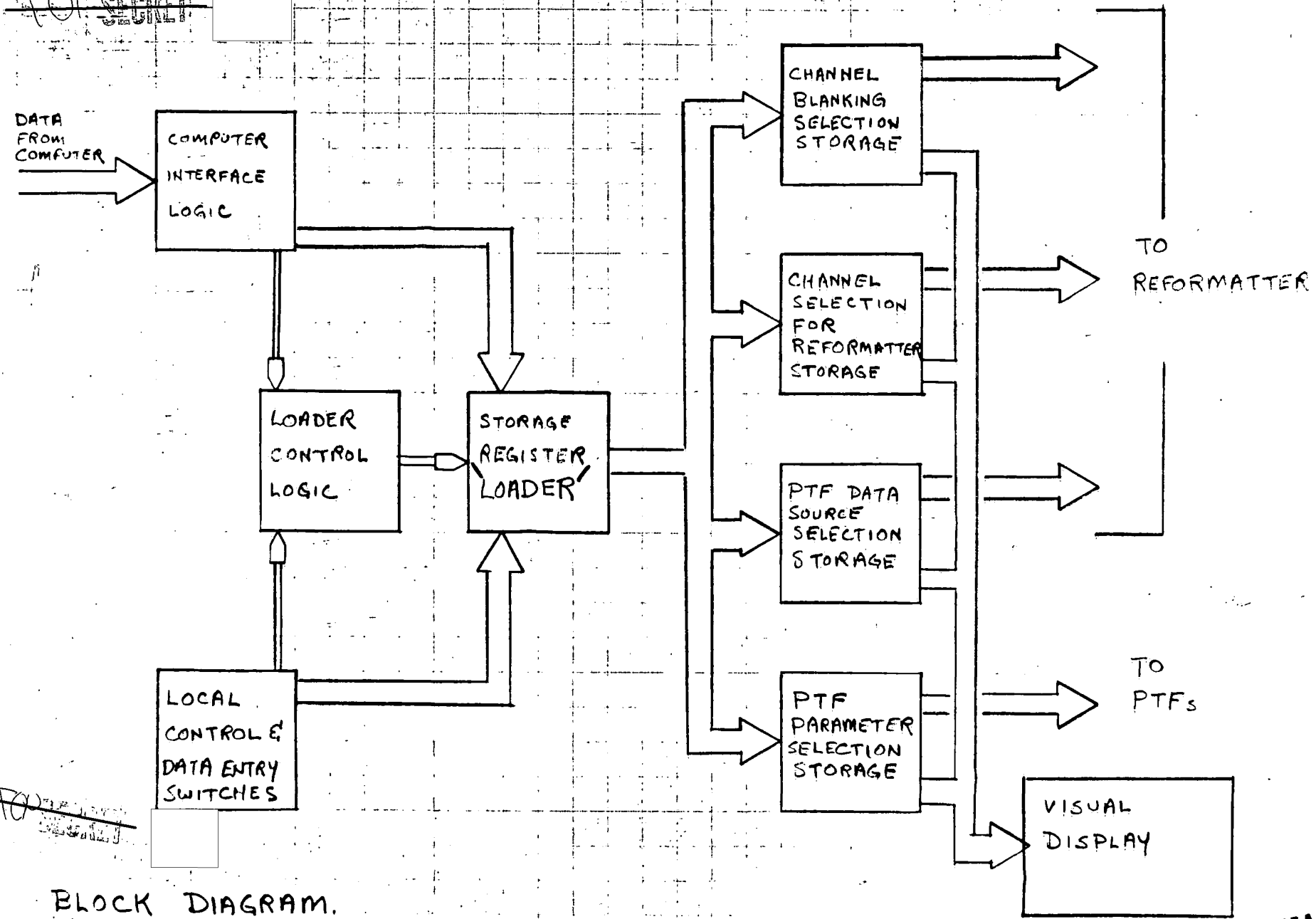


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CONTROL SYSTEM UNIT. (SICU)

4/2/71 DK

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SYSTEM INTERFACE & CONTROL UNIT (SICU)
4/2/71

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Joanthy

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SYNCHRONIZE TIME-FROM-REFERENCE COUNTER

PASS SELECTED DATA

INHIBIT BLANKED DATA FROM NORMAL RECORDING

DIRECT SELECTED DATA TO PTF

RECOMBINE PTF SELECTED DATA

ASSIGN TIME-FROM-REFERENCE TO SELECTED PULSES

OUTPUT "ATCON" FORMATTED DATA TO:

1. 32 BIT/WORD COMPUTER
2. 16 BIT/WORD COMPUTER (SEL-810A)

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REFOR, GENERAL DESCRIPTION OF

The REFOR receives digital data from the channel unit of the A/DDS. This data consists of 32 separate logical channels, each corresponding to an RF band of interest. The 32 channels are broken up into eight receiver channels with four logical channels within each receiver channel. The REFOR performs four primary functions to this data. These functions are (1) Logical Channel Selection, (2) Matrix Data Selection and Blanking, (3) form the selected data into the ATCON format, and (4) multiplex the formatted data and output it. To do this successfully, the REFOR must contain a Timing and Sequence Generator. All controls and selection information must be input to the REFOR by the SIC. This allows the control function and data handling function to be kept separate. This modularity by function insures future flexibility.

The REFOR is organized into four PORTS. Each port can monitor one receiver channel and any or all of the four logical channels within the receiver channel. The REFOR is capable then of processing data from 16 of the 32 logical channels available to it.

Each port, controlled by the SIC, selects the one to four logical channels that the port will process. It is also possible to blank in the A/DDS the logical channels being monitored by the PDE. One logical channel of data per port may be output to the external devices. This data is blanked from the normal stream of data unless an (ALLOW) signal is received from the external device within a specified period of time. If the ALLOW signal is received, this selected data is recombined into the main data stream.

Each time a valid signal is received in the MUX and OUTPUT portion of the REFOR, an output word is formed. The output word contains (1) the time the data was received in .5 usec increments from the start of the operation, (2) ID characters

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REFOR, GENERAL DESCRIPTION OF cont'd.

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identifying what logical channel (RF Band) it originated in, and (3) ID information describing the status of the external devices. This word is stored in a buffer area and an output priority is assigned. At the appropriate time and in the appropriate sequence, the word is transmitted from the REFOR to the computer.

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(PTF)

*PULSE TRAIN FILTER

DATA SORT OPTIONS:

1. PRI SORT (2 PRI RANGES)
2. PRI REJECT (2 PRI RANGES)
3. STAGGER SORT
4. PULSE TRAIN SORT (2 PRI RANGES)

PULSE DEINTERLEAVING

DATA MAY BE FILTERED OR TAGGED

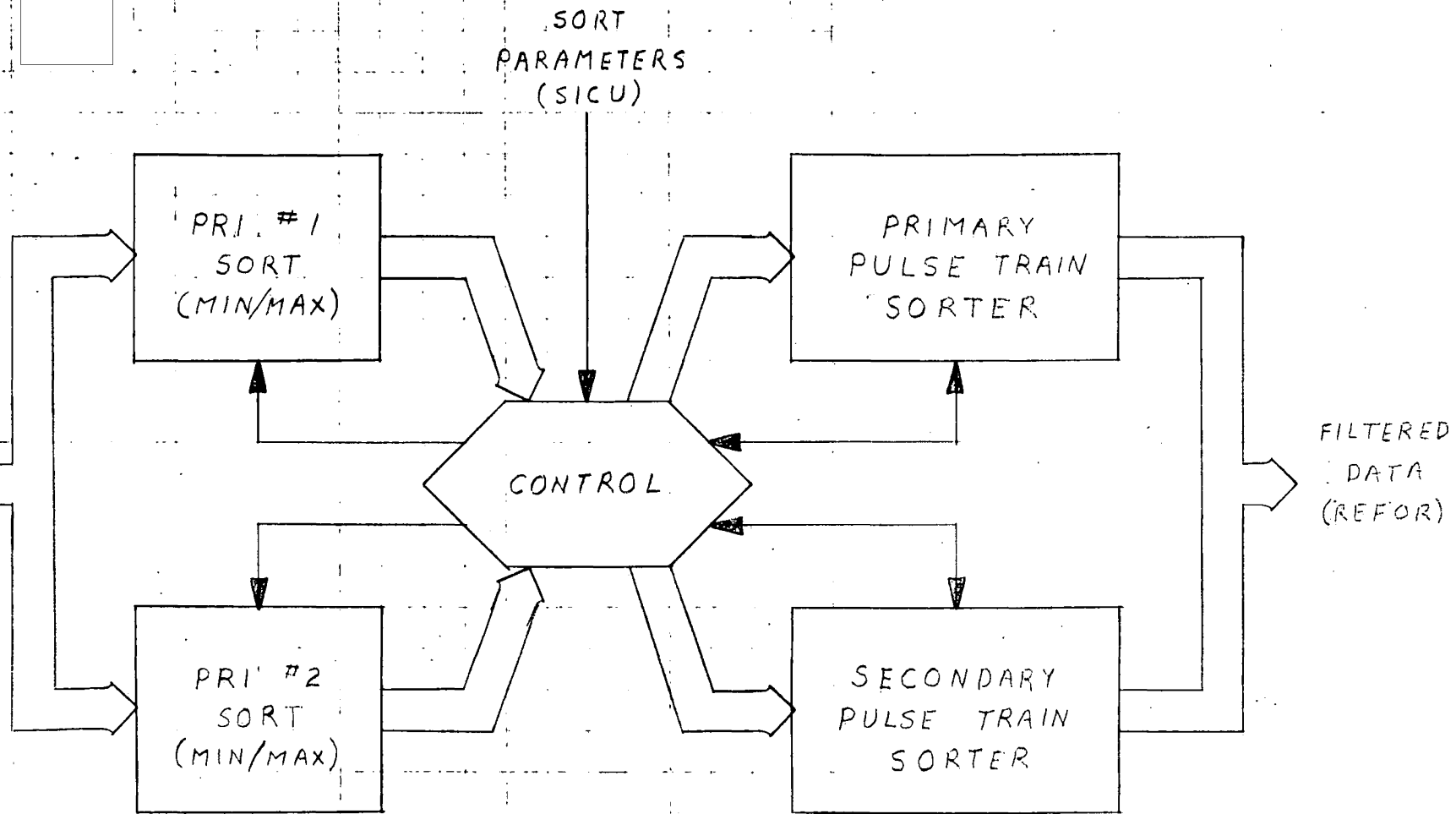
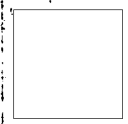
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PULSE TRAIN FILTER (PTF), BLOCK DIAGRAM

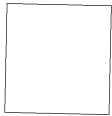
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ON-LINE COMPUTER

PROVIDE OPERATOR INTERFACE

PASS SETUP PARAMETERS TO PDE

STORE SETUP AND TASKING CONDITIONS

RECEIVE "ATCON" FORMATTED DATA

PERFORM ON-LINE DATA REDUCTION

COMPLETE PROCESSING IN OFF-LINE CONFIGURATION

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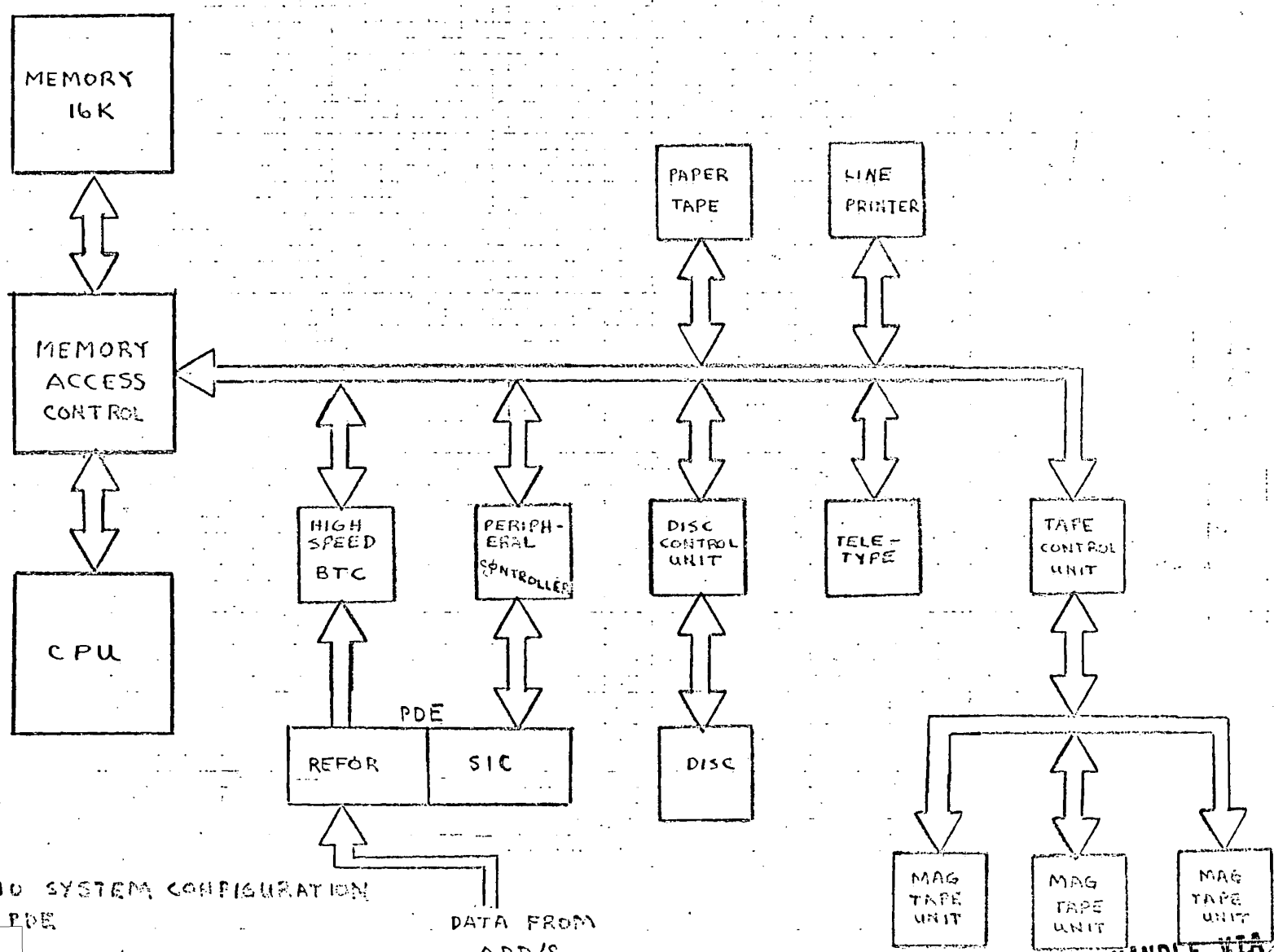
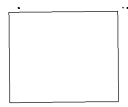


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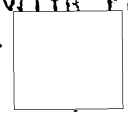
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SEL 810 SYSTEM CONFIGURATION
WITH PDE



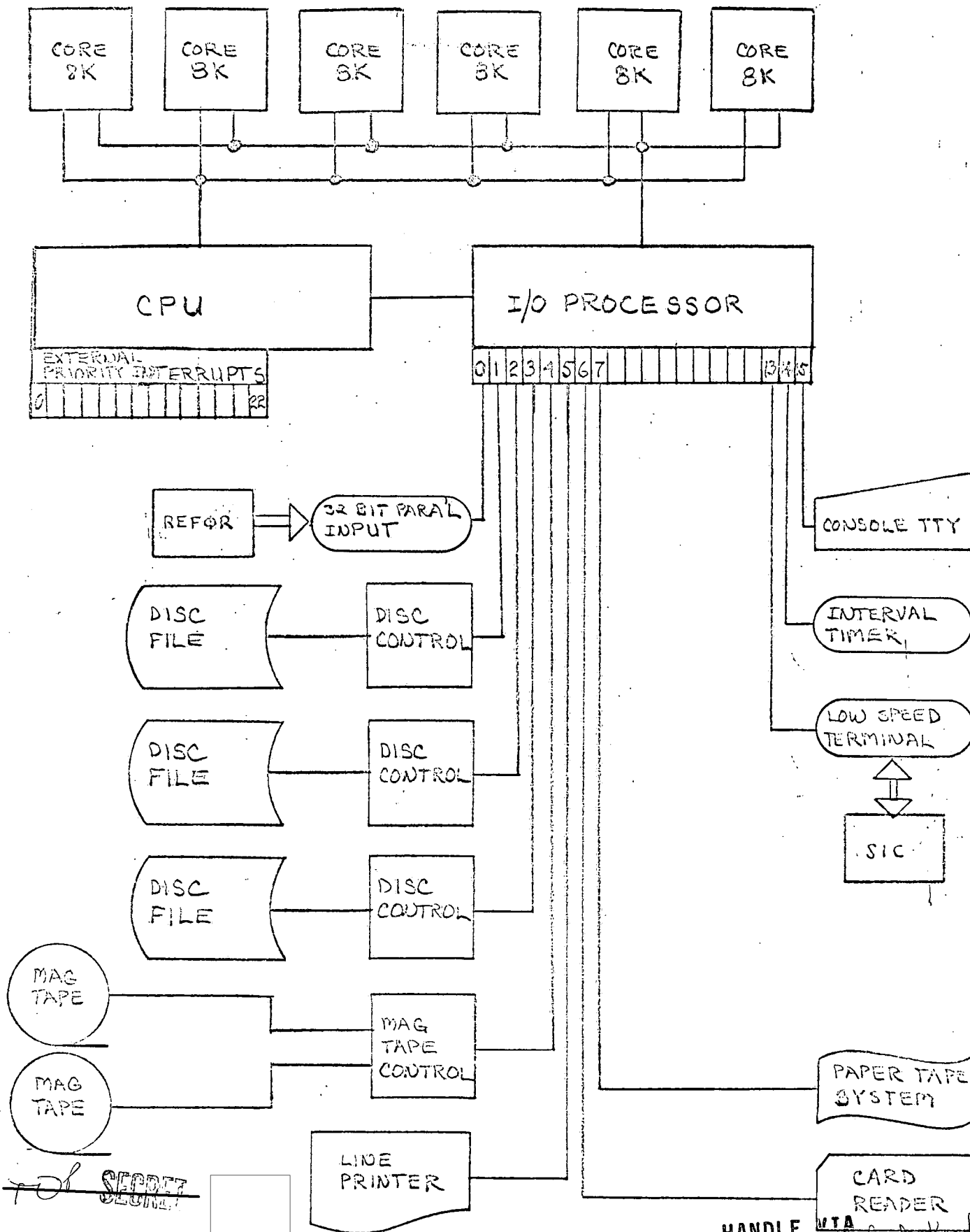
PDE/810

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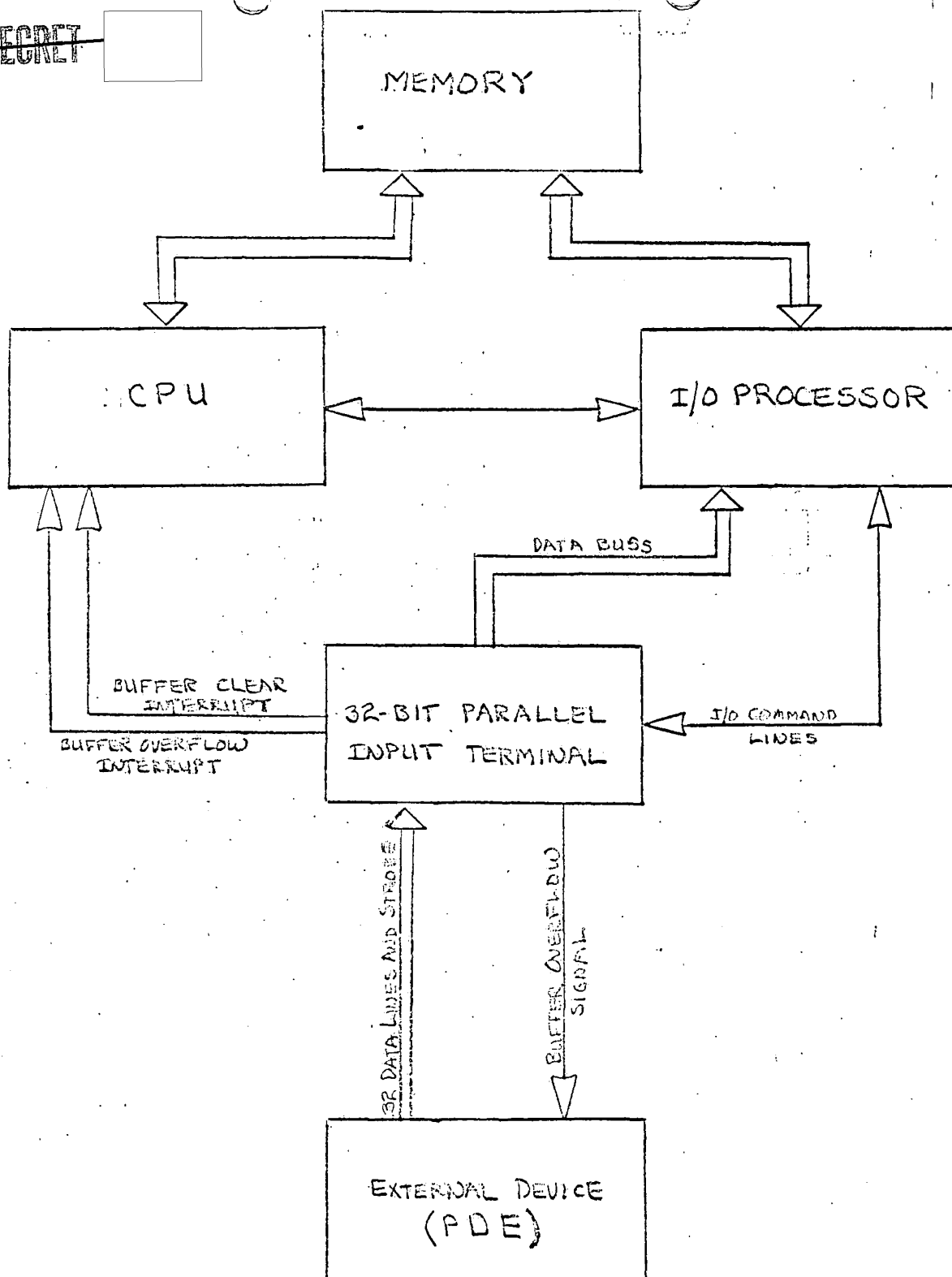
DESIRED FUNCTIONAL CONFIGURATION



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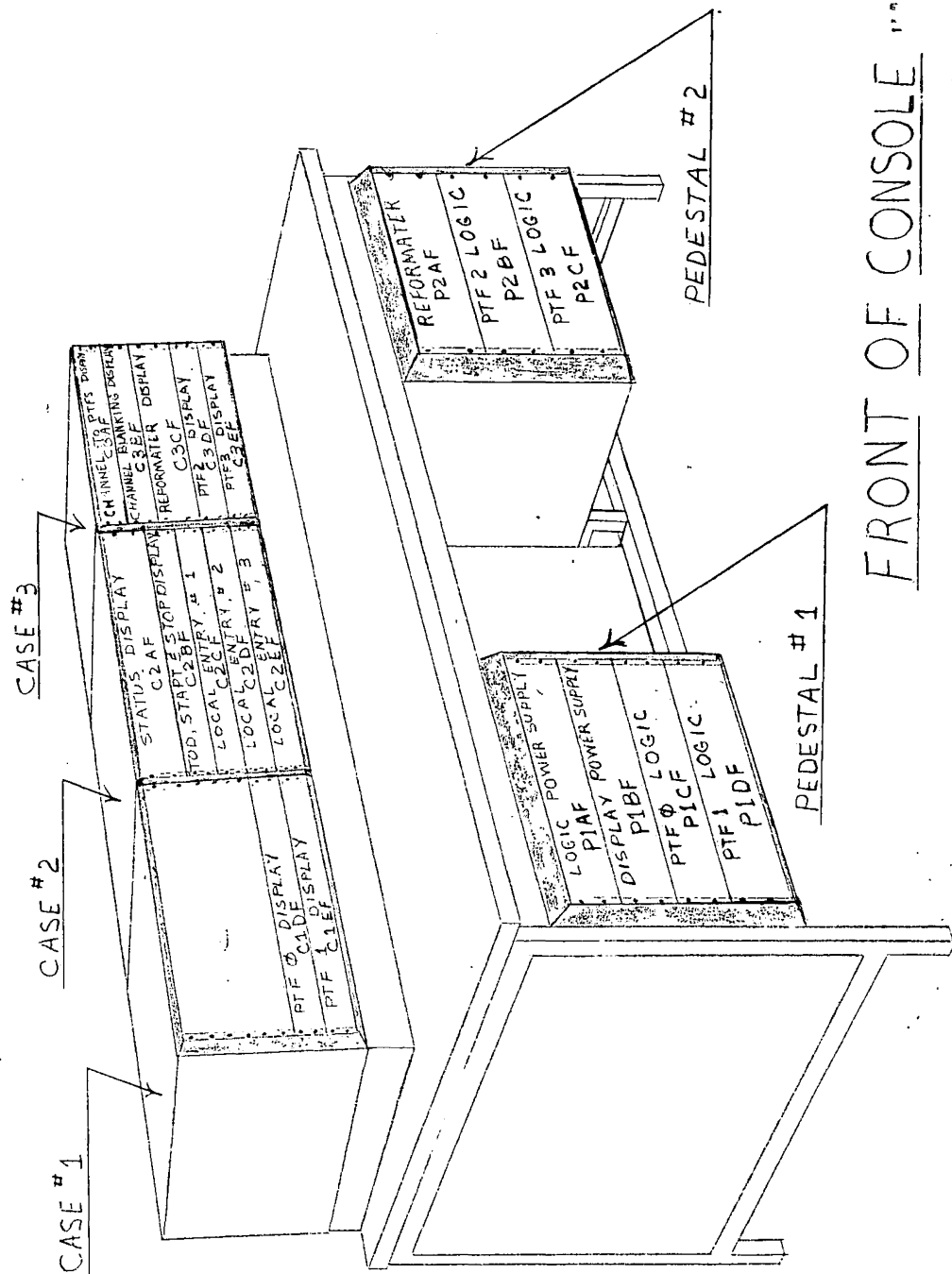
32-BIT PARALLEL INPUT TERMINAL

PDE / 86 CONFIGURATION

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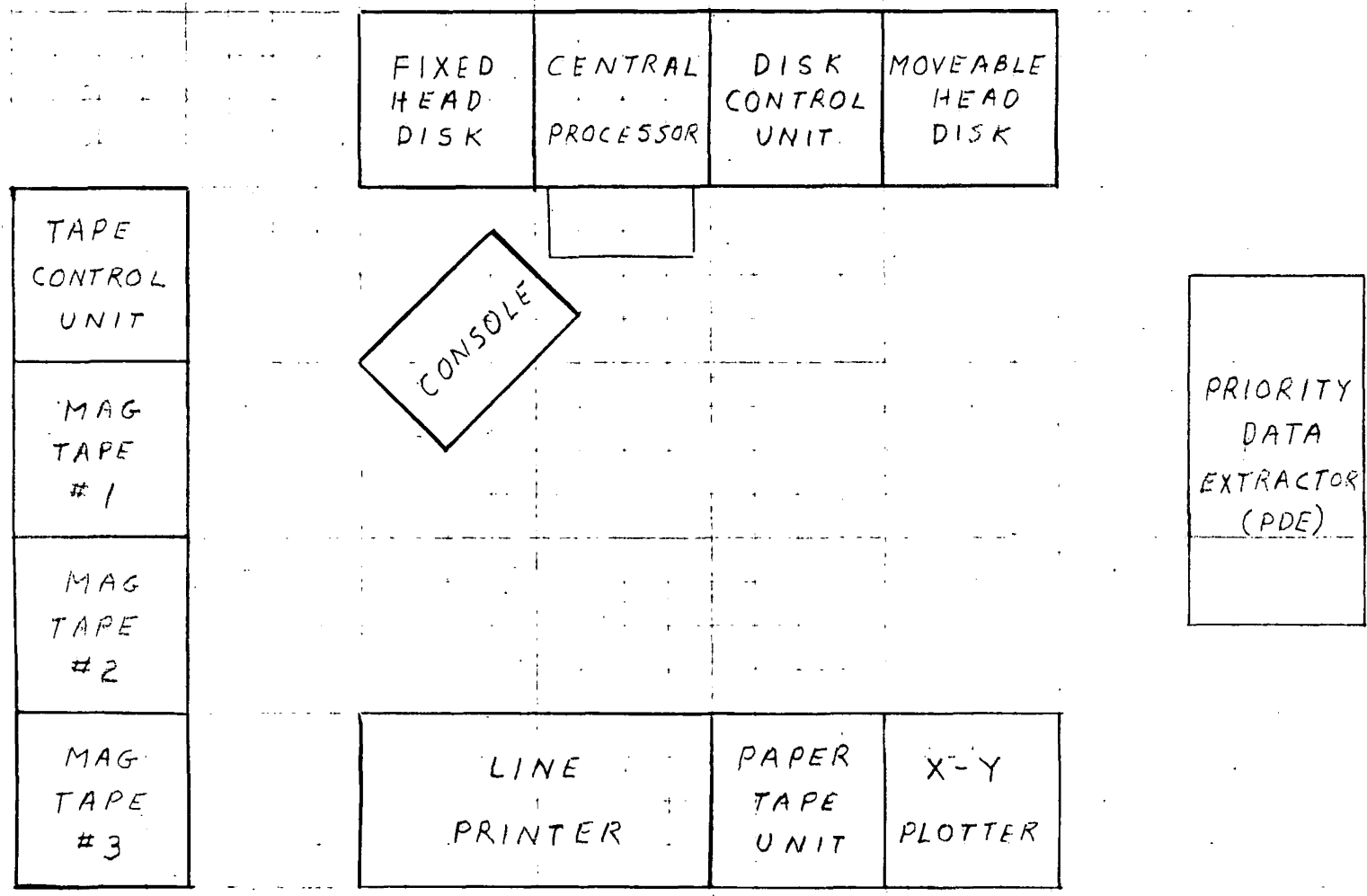


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PDE/810 CONFIGURATION

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A

CONSOLE

CONTROL PANELS

SIC 1 ELECTRONICS

PDE CONTROL SOFTWARE

REFORMATTER

1ST STEP DATA SOFTWARE

TEST GENERATOR

BIO A BUFFER MOD

A/DDS MOD (SN-1) [COMPLETE - []

A/DDS MOD (SN-2) [COMPLETE - []

A/DDS MOD (SN-3) ——— ○ ADAP DEPLOYMENT

A/DDS MOD (SN-4) [MOD KIT COMPLETE]

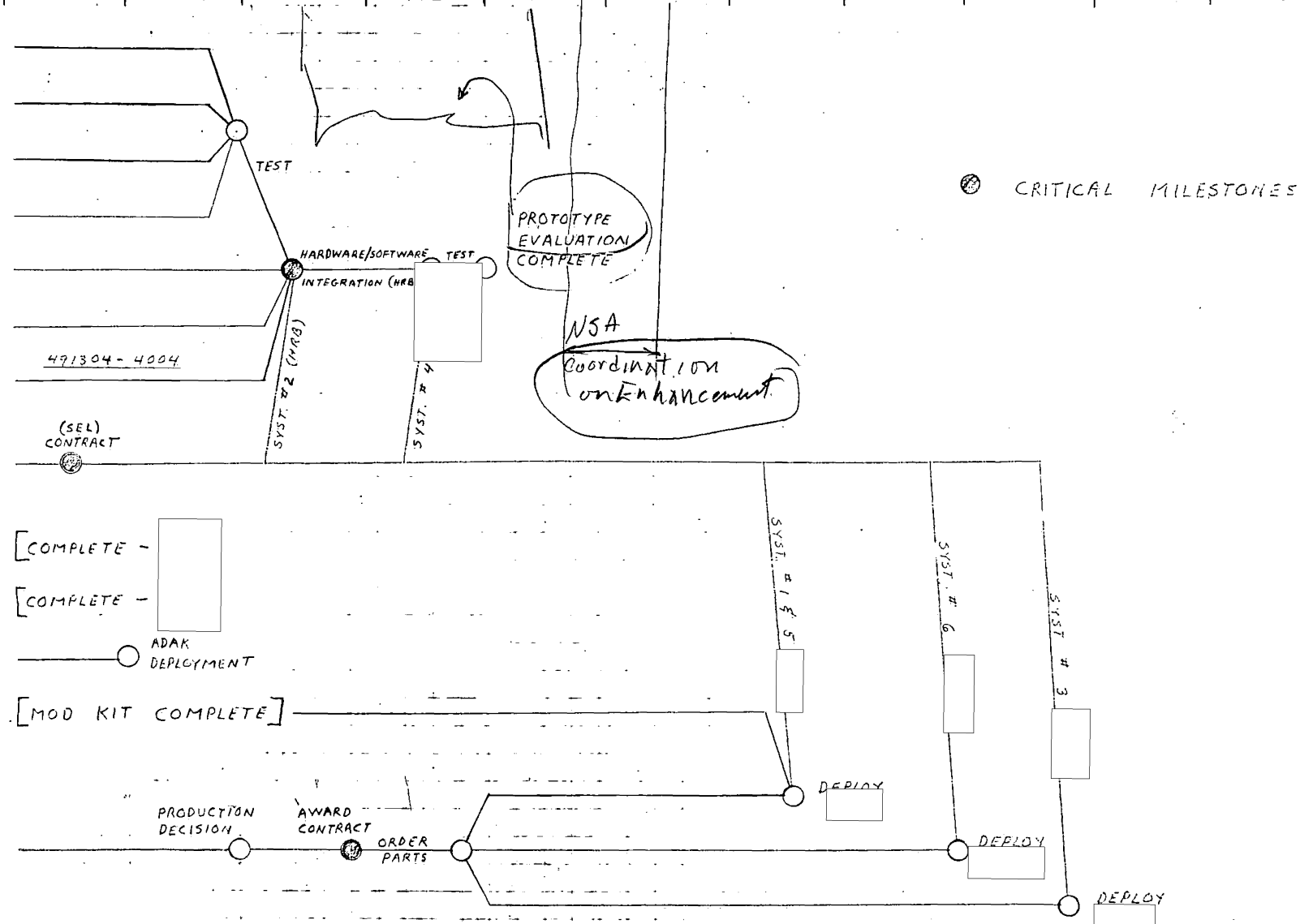
D

DEPLOYABLE PDE

E

PTF BREADBOARD

1971
 2 9 16 23 30 7 14 21 28 4 11 18 25 2 9 16 23 30 6 13 20 27 3 10 17 24 1 8 15 22 29 5 12 19 26 3 10 17 24 31 7 14 21 28 4 11 18 25 3
 APR MAY JUN JUL AUG SEP OCT NOV DEC JAN FEB

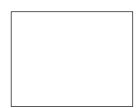


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PDE/810 SCHEDULE

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PDE IMPACT

PDE/810 (EXISTING COMPUTER)		PDE/86 (MUCH MORE POWER & SPEED)	
WITHOUT PTF	WITH PTF	WITHOUT PTF	WITH PTF
* DATA REFORMATTING	* DATA REFORMATTING	* DATA REFORMATTING	* DATA REFORMATTING
* RF BAND SORT	* RF BAND SORT	* RF BAND SORT	* RF BAND SORT
(Disc) PULSE STORAGE	* PRI SORT	PULSE REDUCTION	* PRI SORT
	PULSE REDUCTION	BURST MAKING	PULSE REDUCTION
			BURST MAKING
			BURST REDUCTION
			maybe DT calc.

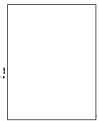
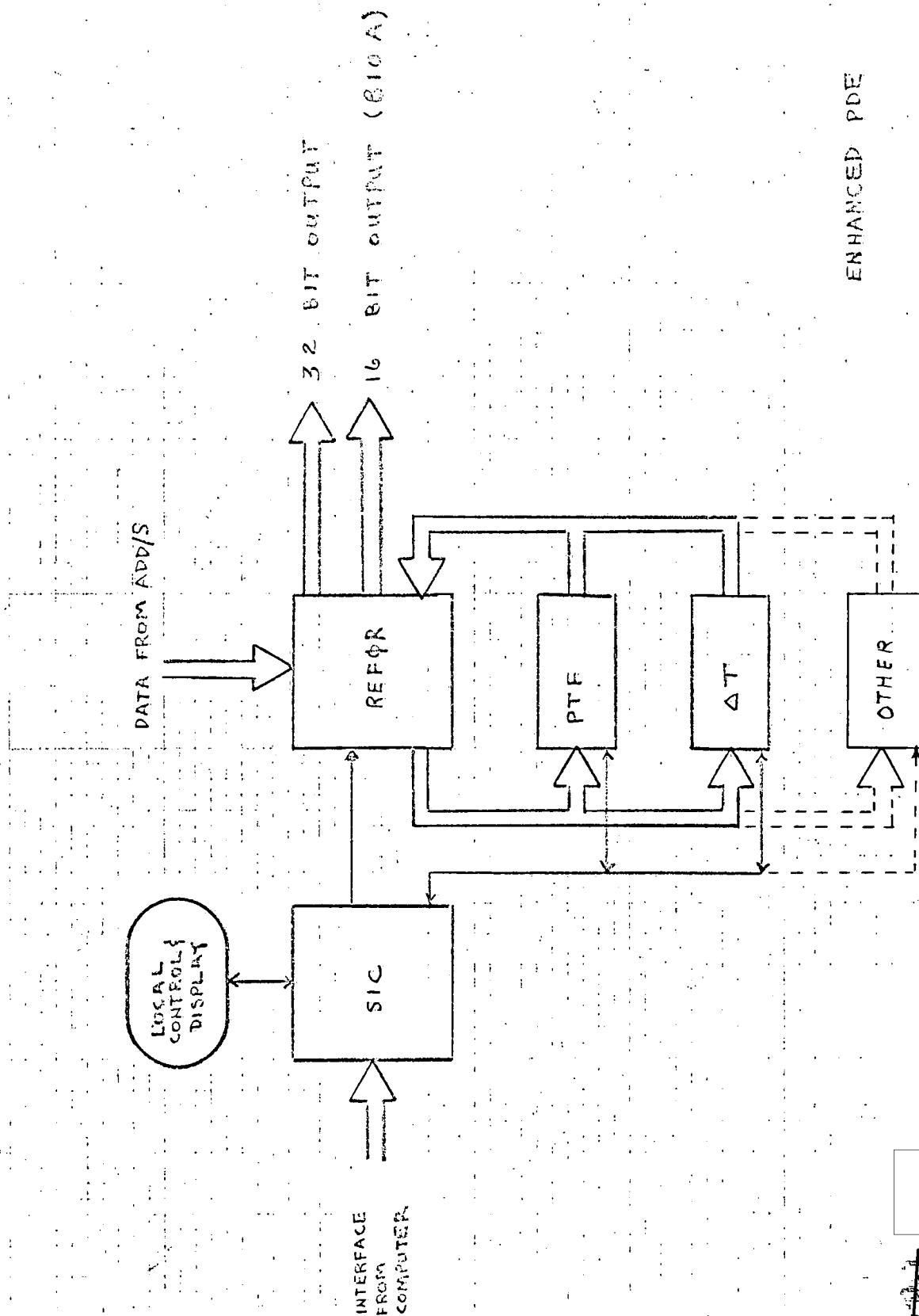
* DONE WITHIN PDE
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ENHANCED PDE



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