Westinghouse Electric Company LLC

Box 355
Pittsburgh Pennsylvania 15230-0355

CAW-99-1373

December 10, 1999

Document Control Desk
U.S. Nuclear Regulatory Commission
Washington, DC 20555

Attention: Mr. Samuel J. Collins

APPLICATION FOR WITHHOLDING PROPRIETARY INFORMATION FROM PUBLIC DISCLOSURE

Subject: E3 System Presentation [Proprietary Class 2C]
E3 System Presentation [Non-Proprietary Class 3]

Dear Mr. Collins:

The proprietary information for which withholding is being requested in the above-referenced report is further identified in Affidavit CAW-99-1373 signed by the owner of the proprietary information, Westinghouse Electric Company LLC. The affidavit which accompanies this letter, sets forth the basis on which the information may be withheld from public disclosure by the Commission and addresses with specificity the considerations listed in paragraph (b) (4) of 10 CFR Section 2.790 of the Commission's regulations.

Accordingly, this letter authorizes the utilization of the accompanying Affidavit by Wisconsin Public Service Corporation.

Correspondence with respect to the proprietary aspects of the application for withholding or the Westinghouse affidavit should reference this letter, CAW-99-1373 and should be addressed to the undersigned.

Very truly yours,

H. A. Sepp, Manager
Regulatory and Licensing Engineering

Enclosures
cc: T. Carter/NRC (5E7)

0367s.doc

CAW-99-1373

AFFIDAVIT

COMMONWEALTH OF PENNSYLVANIA:

ss

COUNTY OF ALLEGHENY:

Before me, the undersigned authority, personally appeared H. A. Sepp, who, being by me duly sworn according to law, deposes and says that he is authorized to execute this Affidavit on behalf of Westinghouse Electric Company LLC ("Westinghouse"), and that the averments of fact set forth in this Affidavit are true and correct to the best of his knowledge, information, and belief:

H. A. Sepp, Manager
Regulatory and Licensing Engineering

Sworn to and subscribed
before me this 8th day
of December, 1999

Notary Public

Notarial Seal
Janet A. Schwab, Notary Public
Monroeville Boro, Allegheny County
My Commission Expires May 22, 2000
Member, Pennsylvania Association of Notaries

0367s.doc

(1) I am Manager, Regulatory and Licensing Engineering, in the Nuclear Services Division, of the Westinghouse Electric Company LLC ("Westinghouse"), and as such, I have been specifically delegated the function of reviewing the proprietary information sought to be withheld from public disclosure in connection with nuclear power plant licensing and rulemaking proceedings, and am authorized to apply for its withholding on behalf of the Westinghouse Electric Company LLC.

(2) I am making this Affidavit in conformance with the provisions of 10CFR Section 2.790 of the Commission's regulations and in conjunction with the Westinghouse application for withholding accompanying this Affidavit.

(3) I have personal knowledge of the criteria and procedures utilized by the Westinghouse Electric Company LLC in designating information as a trade secret, privileged or as confidential commercial or financial information.

(4) Pursuant to the provisions of paragraph (b)(4) of Section 2.790 of the Commission's regulations, the following is furnished for consideration by the Commission in determining whether the information sought to be withheld from public disclosure should be withheld.

(i) The information sought to be withheld from public disclosure is owned and has been held in confidence by Westinghouse.

(ii) The information is of a type customarily held in confidence by Westinghouse and not customarily disclosed to the public. Westinghouse has a rational basis for determining the types of information customarily held in confidence by it and, in that connection, utilizes a system to determine when and whether to hold certain types of information in confidence. The application of that system and the substance of that system constitutes Westinghouse policy and provides the rational basis required.

Under that system, information is held in confidence if it falls in one or more of several types, the release of which might result in the loss of an existing or potential competitive advantage, as follows:

(a) The information reveals the distinguishing aspects of a process (or component, structure, tool, method, etc.) where prevention of its use by any of Westinghouse's competitors without license from Westinghouse constitutes a competitive economic advantage over other companies.

(b) It consists of supporting data, including test data, relative to a process (or component, structure, tool, method, etc.), the application of which data secures a competitive economic advantage, e.g., by optimization or improved marketability.

(c) Its use by a competitor would reduce his expenditure of resources or improve his competitive position in the design, manufacture, shipment, installation, assurance of quality, or licensing a similar product.

(d) It reveals cost or price information, production capacities, budget levels, or commercial strategies of Westinghouse, its customers or suppliers.

(e) It reveals aspects of past, present, or future Westinghouse or customer funded development plans and programs of potential commercial value to Westinghouse.

(f) It contains patentable ideas, for which patent protection may be desirable.

There are sound policy reasons behind the Westinghouse system which include the following:

(a) The use of such information by Westinghouse gives Westinghouse a competitive advantage over its competitors. It is, therefore, withheld from disclosure to protect the Westinghouse competitive position.

(b) It is information which is marketable in many ways. The extent to which such information is available to competitors diminishes the Westinghouse ability to sell products and services involving the use of the information.

(c) Use by our competitor would put Westinghouse at a competitive disadvantage by reducing his expenditure of resources at our expense.

(d) Each component of proprietary information pertinent to a particular competitive advantage is potentially as valuable as the total competitive advantage. If competitors acquire components of proprietary information, any one component may be the key to the entire puzzle, thereby depriving Westinghouse of a competitive advantage.

(e) Unrestricted disclosure would jeopardize the position of prominence of Westinghouse in the world market, and thereby give a market advantage to the competition of those countries.

(f) The Westinghouse capacity to invest corporate assets in research and development depends upon the success in obtaining and maintaining a competitive advantage.

(iii) The information is being transmitted to the Commission in confidence and, under the provisions of 10CFR Section 2.790, it is to be received in confidence by the Commission.

(iv) The information sought to be protected is not available in public sources or available information has not been previously employed in the same original manner or method to the best of our knowledge and belief.

(v) The proprietary information sought to be withheld in this submittal is that which is appropropriately marked in the E3 System Presentation [Proprietary Class 2C] being transmitted by Wisconsin Public Service Corporation letter and Application for Withholding Proprietary Information from Public Disclosure, to the Document Control Desk, Attention Mr. S. J. Collins. The proprietary information as submitted for use by Wisconsin Public Service Corporation for the Kewaunee Nuclear Power Plant is expected to be applicable in other licensee submittals for upgrading plant protection systems.

This information is part of that which will enable Westinghouse to:

(a) Provide the architecture for protection system upgrades..

(b) Establish the basis for the design of the protection system upgrade architecture.

(c) Assist the customer in licensing of the upgrade architecture.

Further this information has substantial commercial value as follows:

(a) Westinghouse plans to sell the use of similar information to its customers for purposes of upgrading plant protection systems.

(b) Westinghouse can sell licensing support and defense of similar proposed protection system upgrade projects.

Public disclosure of this proprietary information is likely to cause substantial harm to the competitive position of Westinghouse because it would enhance the ability of competitors to provide similar protection system upgrade architectures and licensing defense services for commercial power reactors without commensurate expenses. Also, public disclosure of the information would enable others to use the information to meet NRC requirements for licensing documentation without purchasing the right to use the information.

The development of the technology described in part by the information is the result of applying the results of many years of experience in an intensive Westinghouse effort and the expenditure of a considerable sum of money.

In order for competitors of Westinghouse to duplicate this information, similar technical programs would have to be performed and a significant manpower effort, having the requisite talent and experience, would have to be expended for the design of the proposed protection system upgrade.

Further the deponent sayeth not.

PROPRIETARY INFORMATION NOTICE

Transmitted herewith are proprietary and/or non-proprietary versions of documents furnished to the NRC in connection with requests for generic and/or plant-specific review and approval.

In order to conform to the requirements of 10 CFR 2.790 of the Commission's regulations concerning the protection of proprietary information so submitted to the NRC, the information which is proprietary in the proprietary versions is contained within brackets, and where the proprietary information has been deleted in the non-proprietary versions, only the brackets remain (the information that was contained within the brackets in the proprietary versions having been deleted). The justification for claiming the information so designated as proprietary is indicated in both versions by means of lower case letters (a) through (f) contained within parentheses located as a superscript immediately following the brackets enclosing each item of information being identified as proprietary or in the margin opposite such information. These lower case letters refer to the types of information Westinghouse customarily holds in confidence identified in Sections (4)(ii)(a) through (4)(ii)(f) of the affidavit accompanying this transmittal pursuant to 10 CFR 2.790(b)(1).

COPYRIGHT NOTICE

The reports transmitted herewith each bear a Westinghouse copyright notice. The NRC is permitted to make the number of copies of the information contained in these reports which are necessary for its internal use in connection with generic and plant-specific reviews and approvals as well as the issuance, denial, amendment, transfer, renewal, modification, suspension, revocation, or violation of a license, permit, order, or regulation subject to the requirements of 10 CFR 2.790 regarding restrictions on public disclosure to the extent such information has been identified as proprietary by Westinghouse, copyright protection notwithstanding. With respect to the non-proprietary versions of these reports, the NRC is permitted to make the number of copies beyond those necessary for its internal use which are necessary in order to have one copy available for public viewing in the appropriate docket files in the public document room in Washington, DC and in local public document rooms as may be required by NRC regulations if the number of copies submitted is insufficient for this purpose. Copies made by the NRC must include the copyright notice in all instances and the proprietary notice if the original was identified as proprietary.

ATTACHMENT 2

Letter from Mark L. Marchi (WPSC)

To

Document Control Desk (NRC)

Dated

December 20, 1999

Reactor Protection and Engineered Safety Features Upgrade

"E3 System Presentation."

– Non-Proprietary Class 3

E3 System Presentation

US Nuclear Regulatory Commission
Kewaunee I&C Upgrade Meeting
November 29, 1999 - December 1, 1999

Westinghouse NPBU Headquarters
Pittsburgh, PA

Topics of Discussion

(1) I&C Upgrade System Architecture
(2) I&C Upgrade System Test Philosophy
(3) Key System Elements
(4) E3 Hardware Overview
(5) E3 Software Overview
(6) I&C Upgrade System - Thread Path from AI to RT
(7) I&C Upgrade System - Response Time
(8) Design Constraints Concerning Hardware Interrupts
(Appendix A) Answers to NRC Questions Received Prior to the Meeting
(Appendix B) Answers to NRC Questions Raised during the Meeting

(1) I&C Upgrade System Architecture

Retrofit Protection System Architecture Simplified Block Diagram

a,c,f

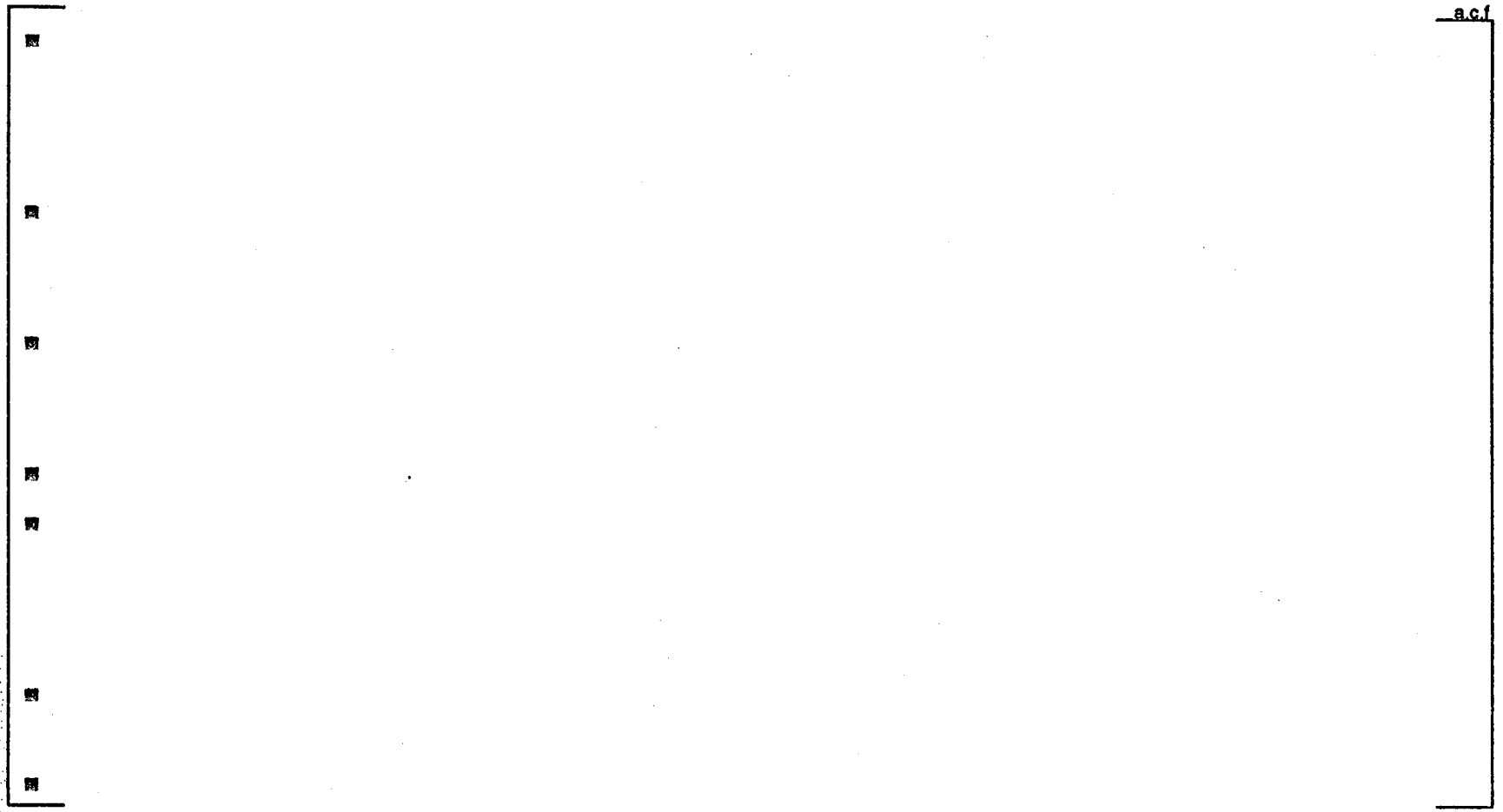
I&C Upgrade System Detailed Architecture

a,c,f

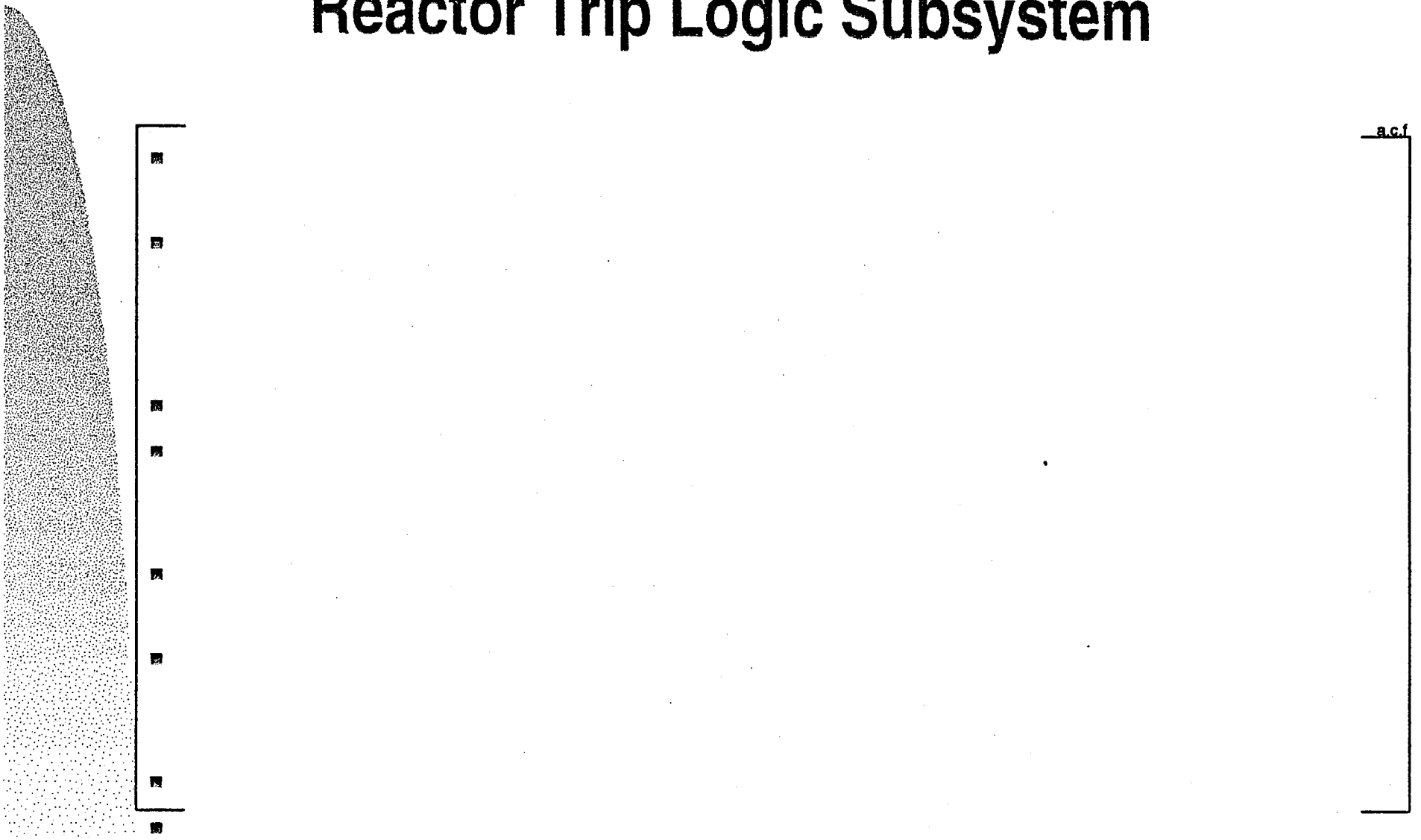
"E3" Controller Internal Architecture

a.c.f

Process Protection Typical Channel Set

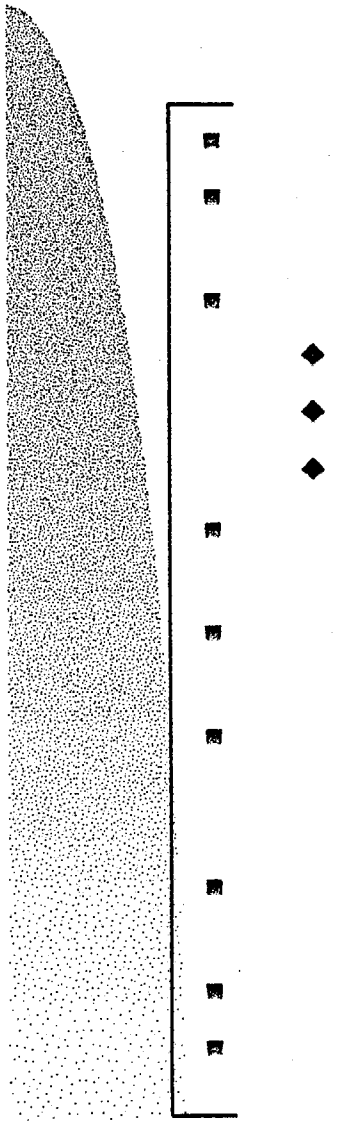


Reactor Trip Logic Subsystem



Dynamic Trip Bus

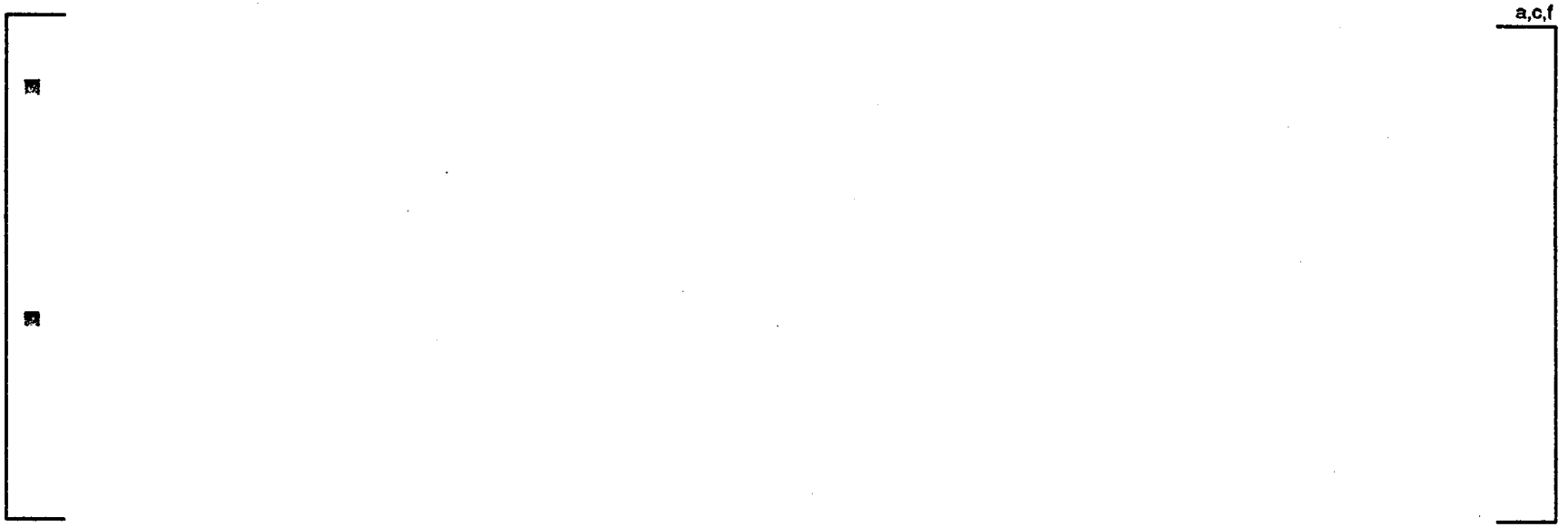
a,c,f



Reactor Trip Circuits

Reactor Trip Logic Subsystem Control Room Status Lights, Etc.

a,c,f



ESF Actuation Logic Subsystem

a,c,f

ESF Actuation Logic Subsystem Control Room Status Lights, Etc.

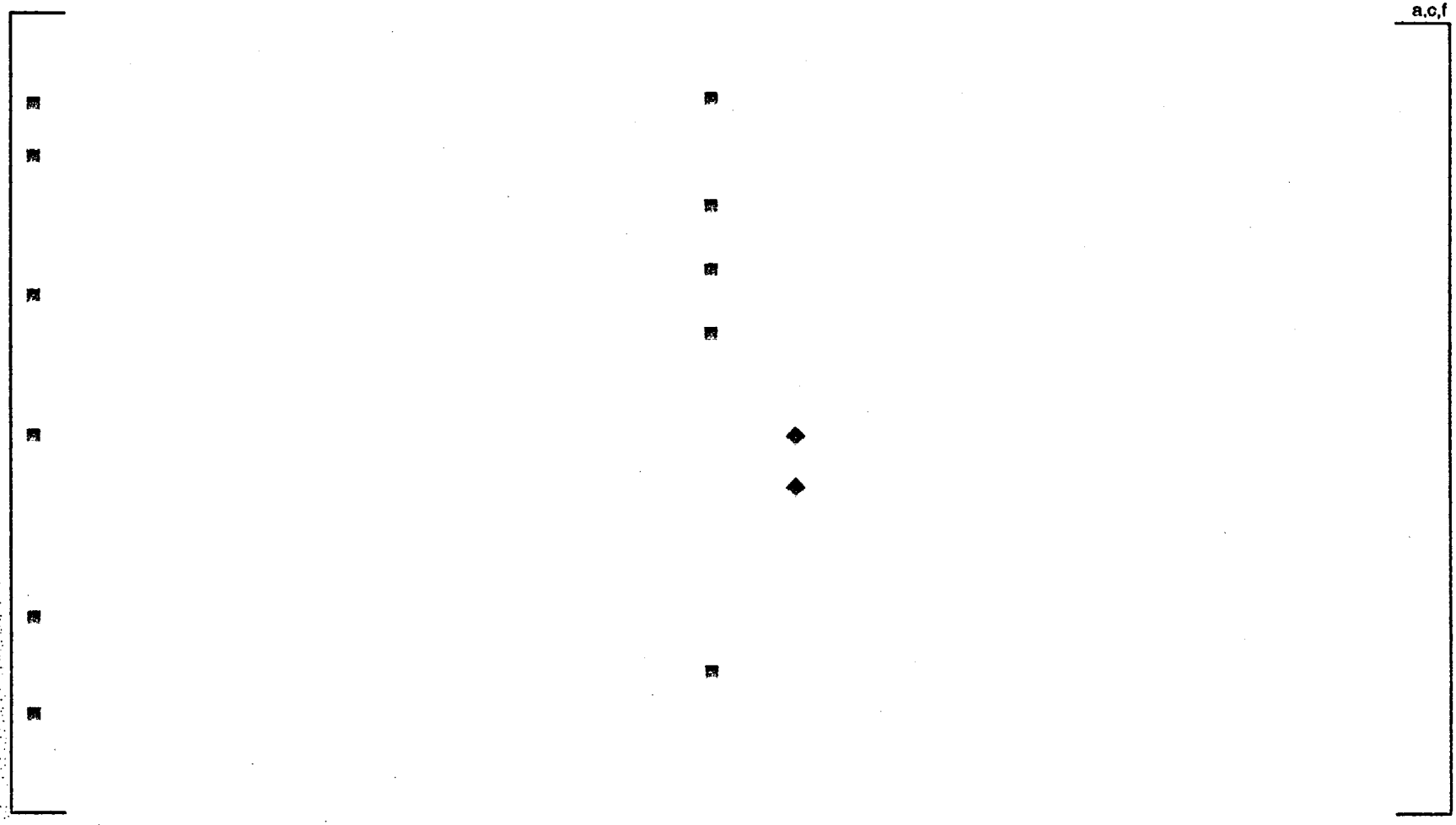
a,c,f

SafetyNet Information Buses

a,c,f

SafetyNet Information Buses Characteristics

a,c,f



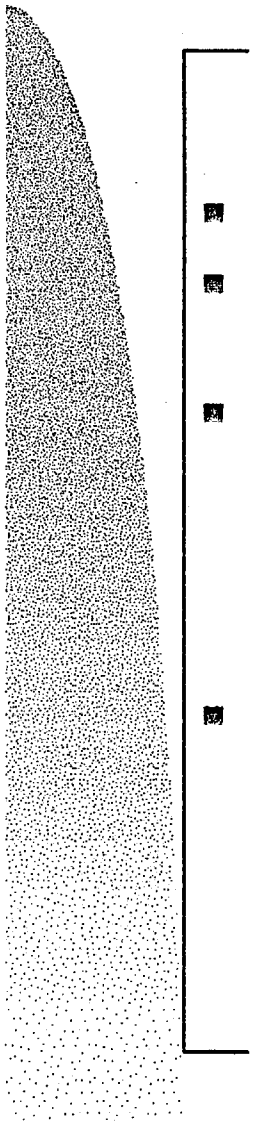
(2) I&C Upgrade System Test Philosphy

Periodic Semi-Automatic Test Features

a,c,f

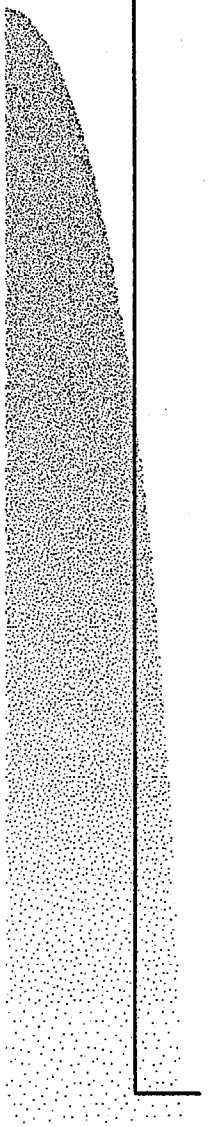
Test Interface

a,c,f



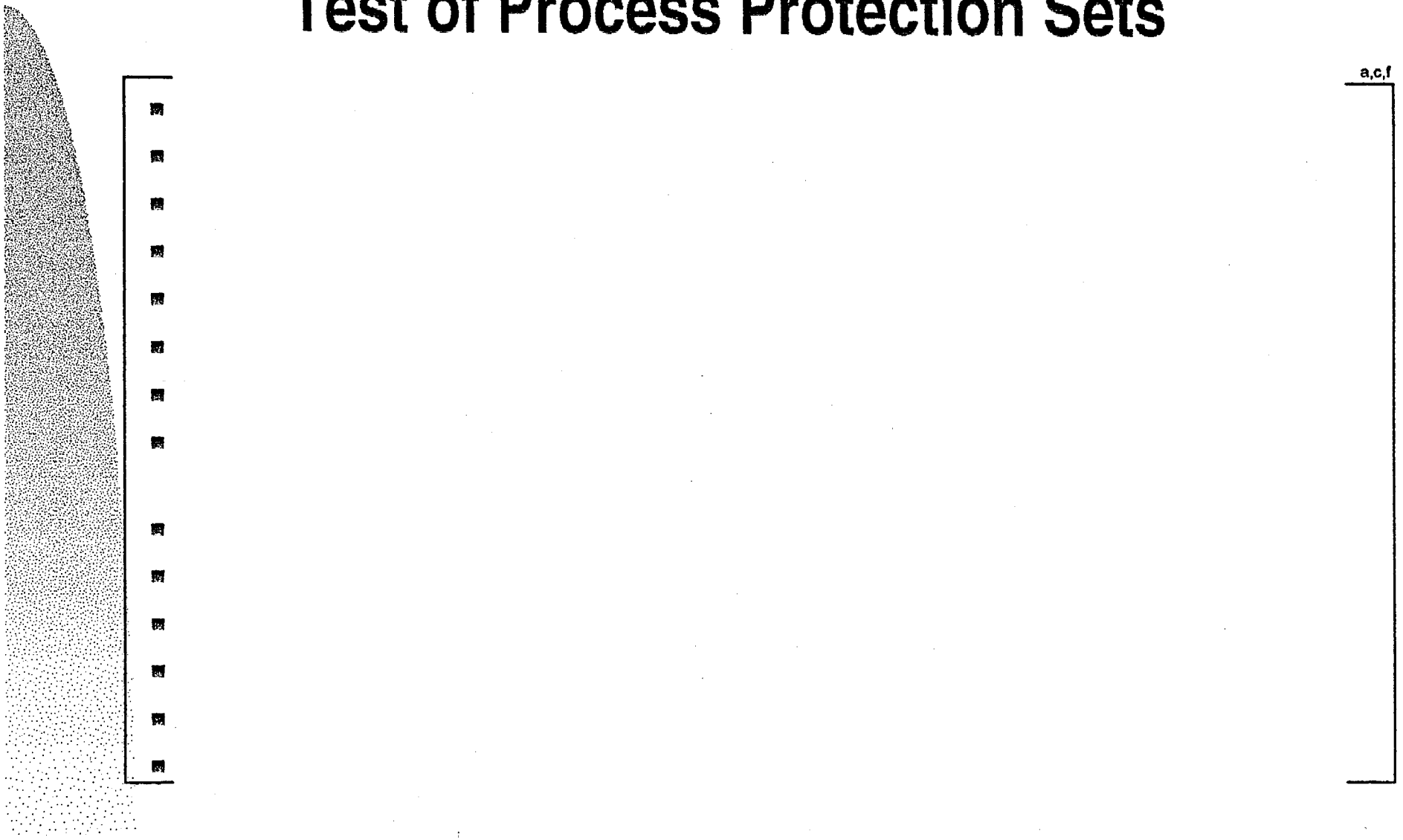
Test Cart

a,c,f



Test of Process Protection Sets

a,c,f



Test of Reactor Trip Logic Subsystem

a,c,f

Test of ESF Actuation Logic Subsystem

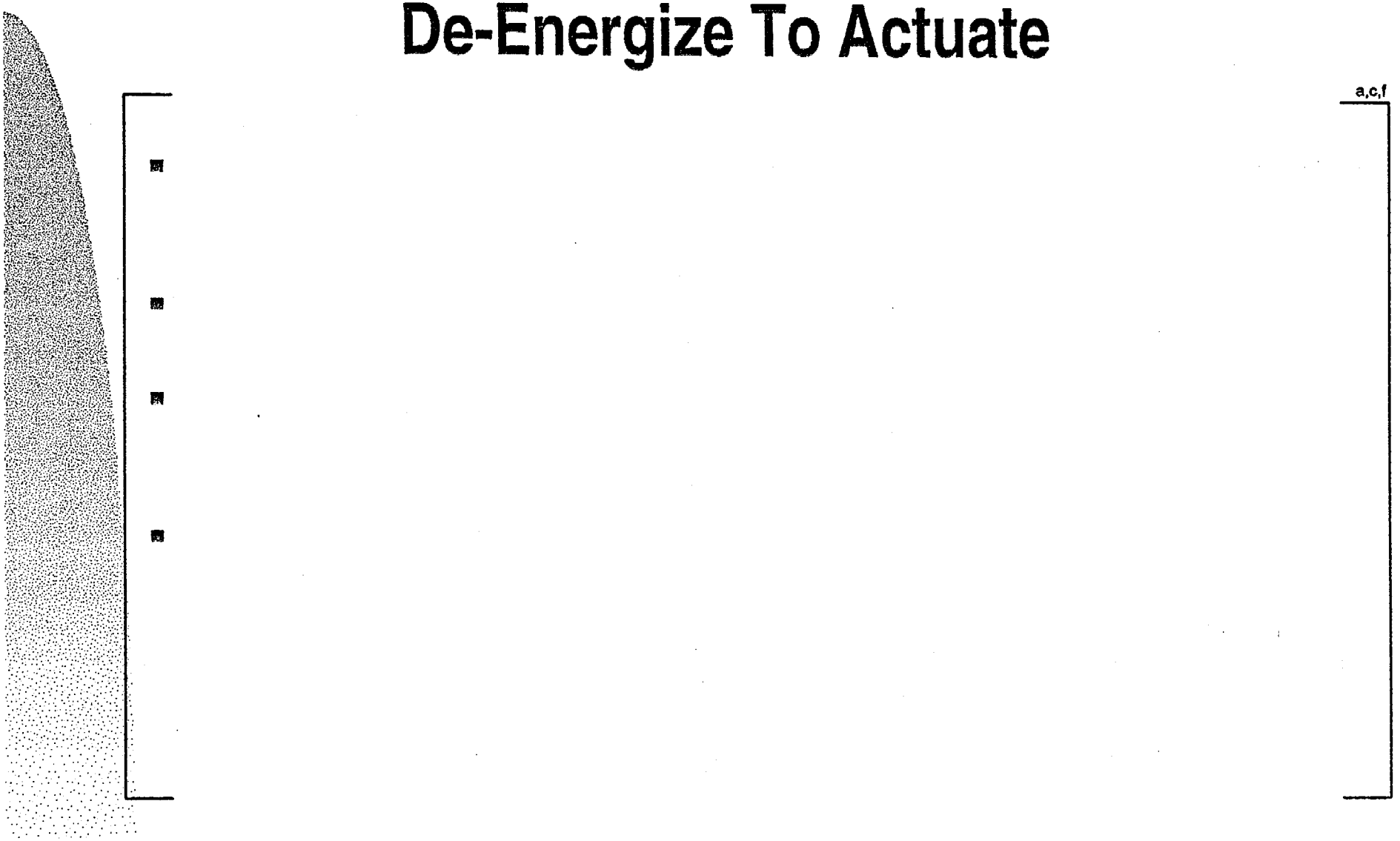
a,c,f

Energize To Actuate

a,c,f

De-Energize To Actuate

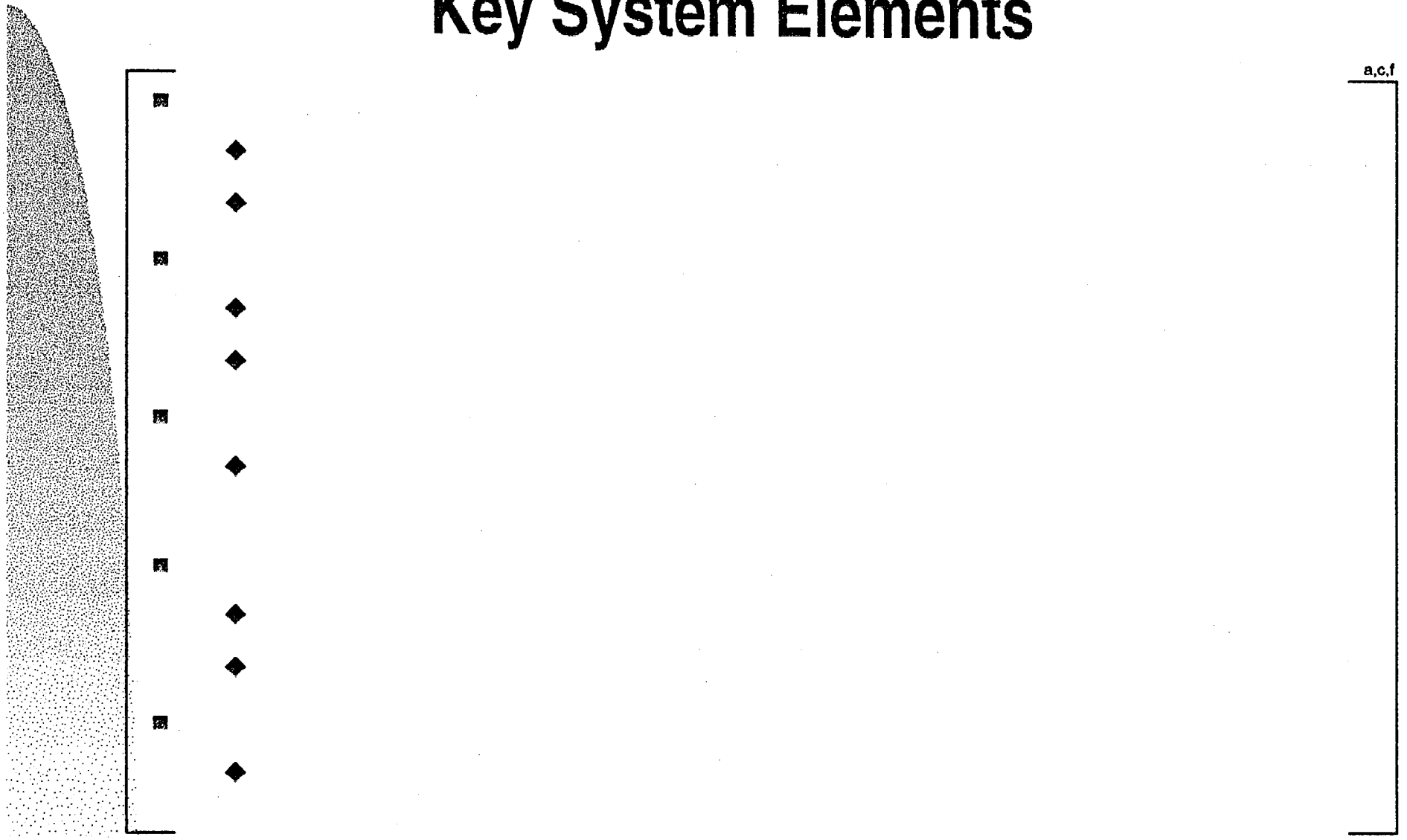
a,c,f



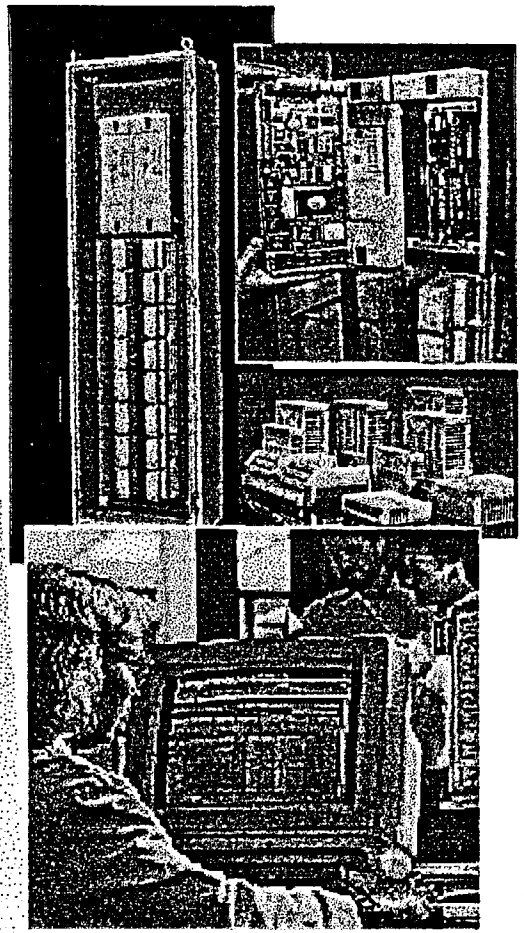
(3) Key System Elements

Key System Elements

a,c,f



System Elements Implemented in E3



- Ovation™ hardware platform
- Additional "*nuclear*" features
  - Seismic Cabinet
  - CompactPCI Form Factor
  - Intelligent Communication Processors
  - Test Interface
- Qualify to Class 1E requirements

→ ***"E3"***

- Eagle series multiprocessor controller architecture
- Eagle series licensed (NII) safety software
- Upgraded for new hardware

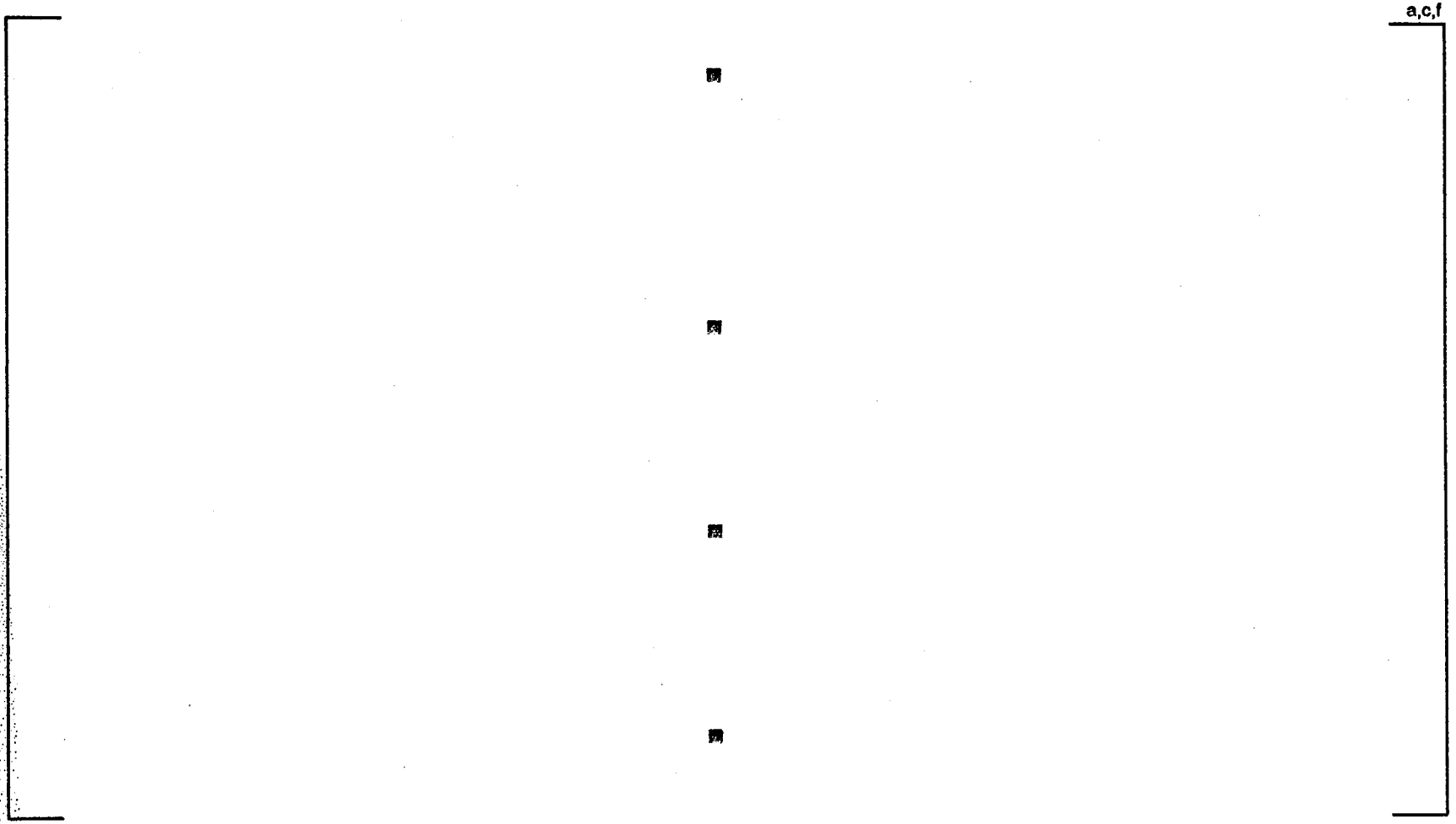
(4) E3 Hardware Overview

E3 Controller Chassis

a,c,f

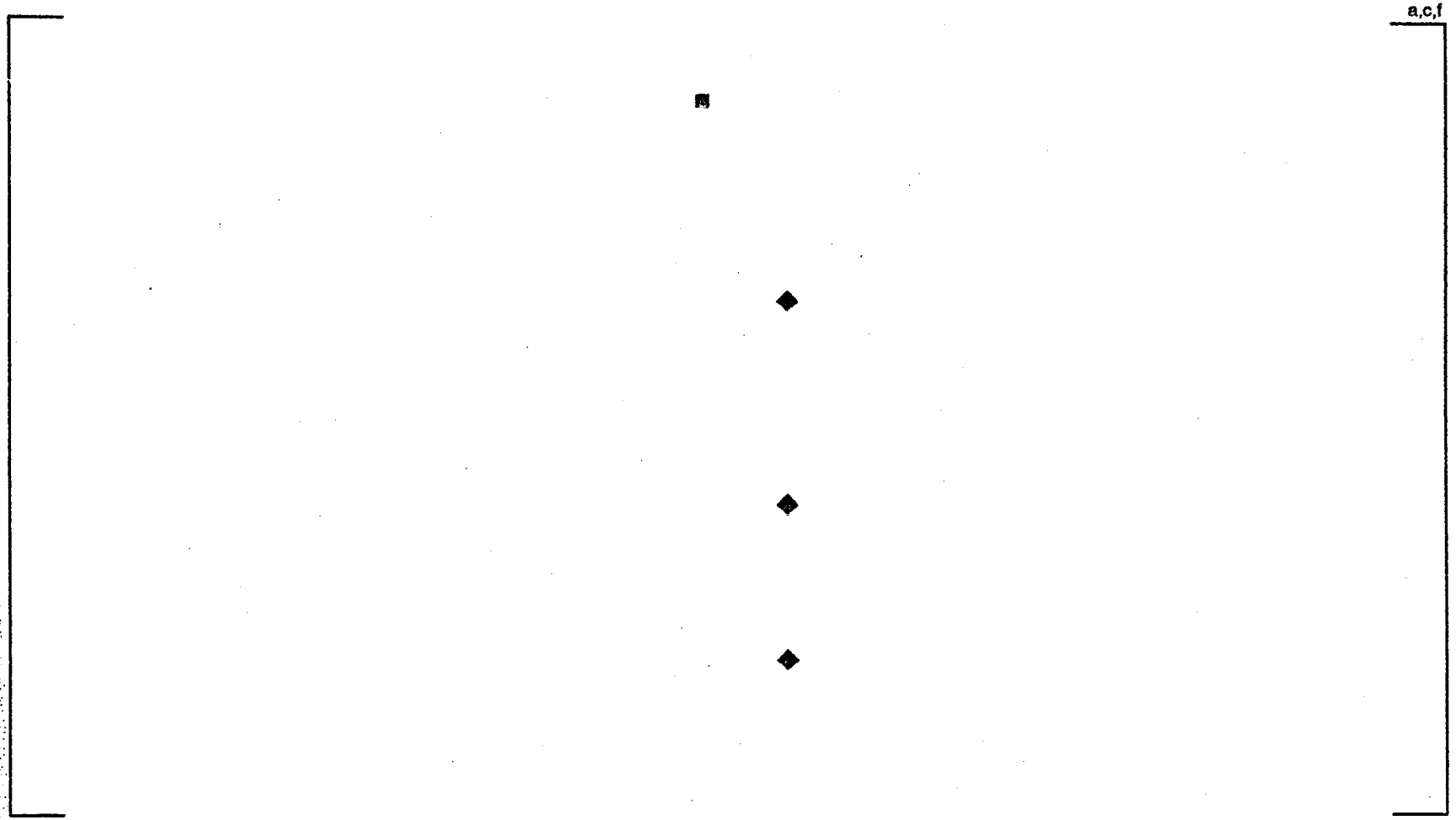
Reasons for Selecting Compact PCI

a,c,f



Reasons for Selecting Compact PCI

a,c,f



Reasons for Selecting Compact PCI

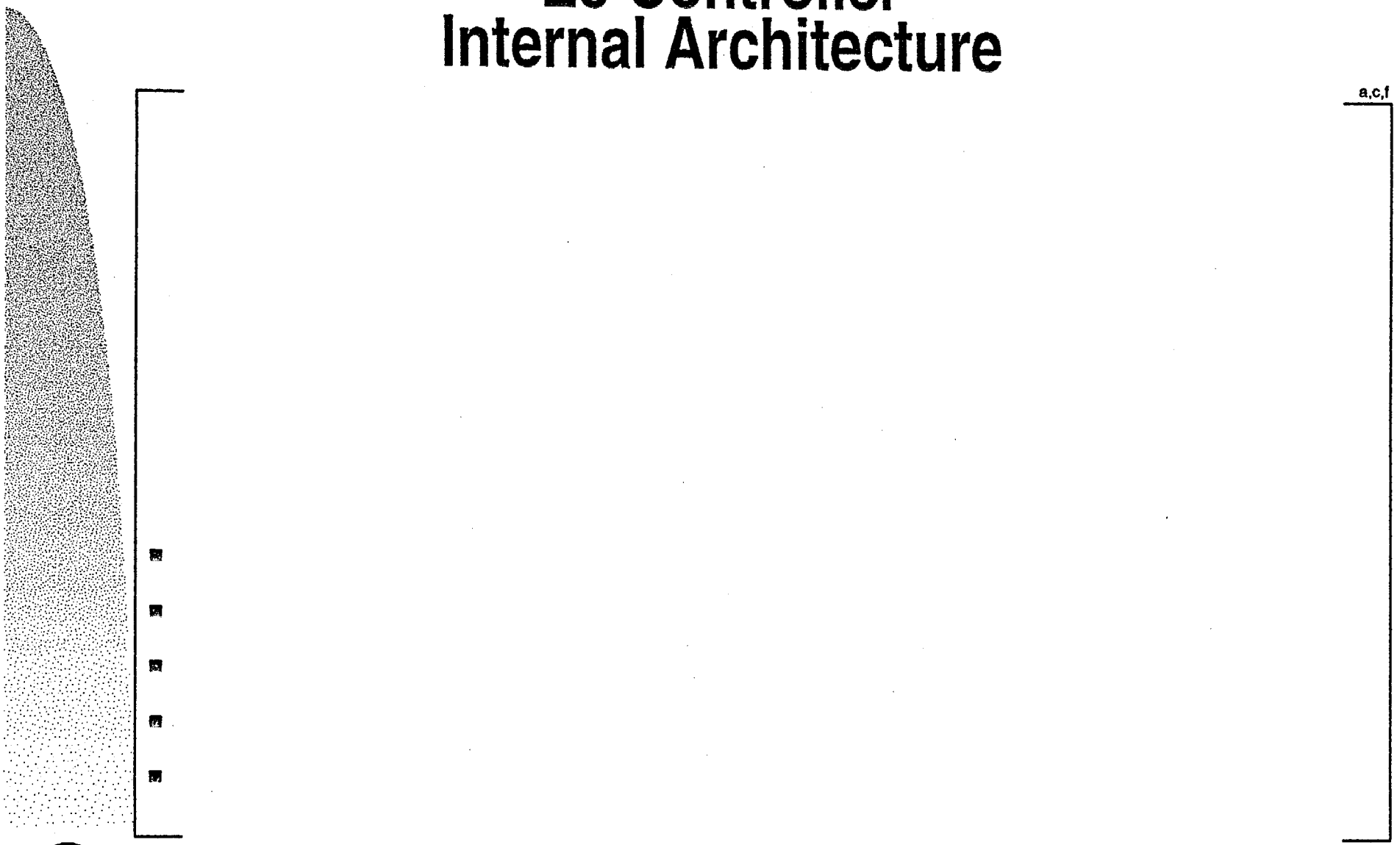
a,c,f

Reasons for Selecting Compact PCI

a,c,f

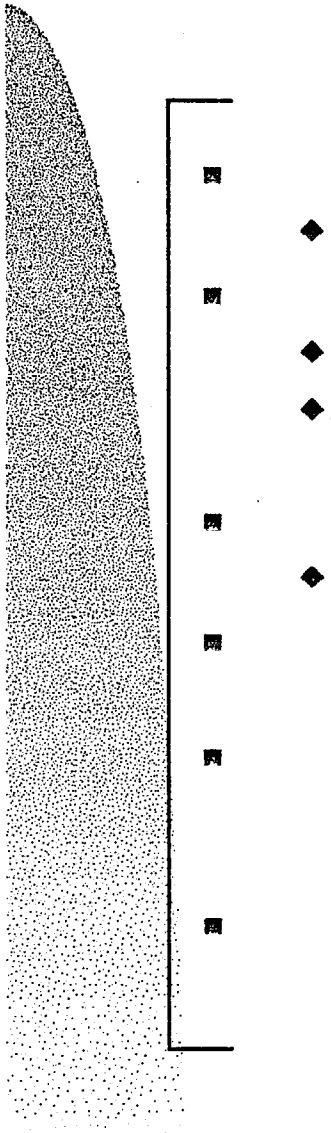
E3 Controller Internal Architecture

a,c,f



E3 Host Computer Board

a,c,f

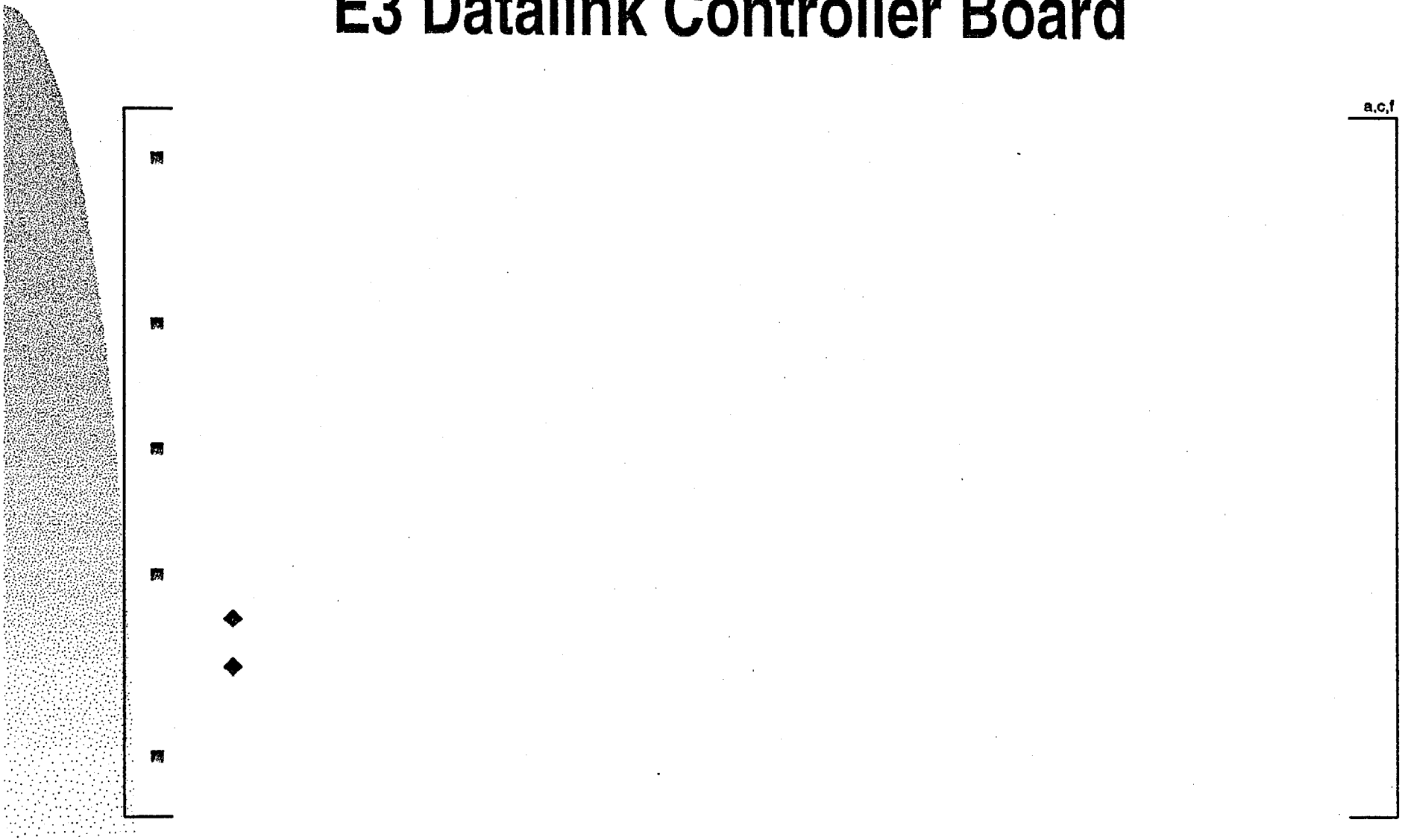


E3 Data Highway Controller Board

a,c,f

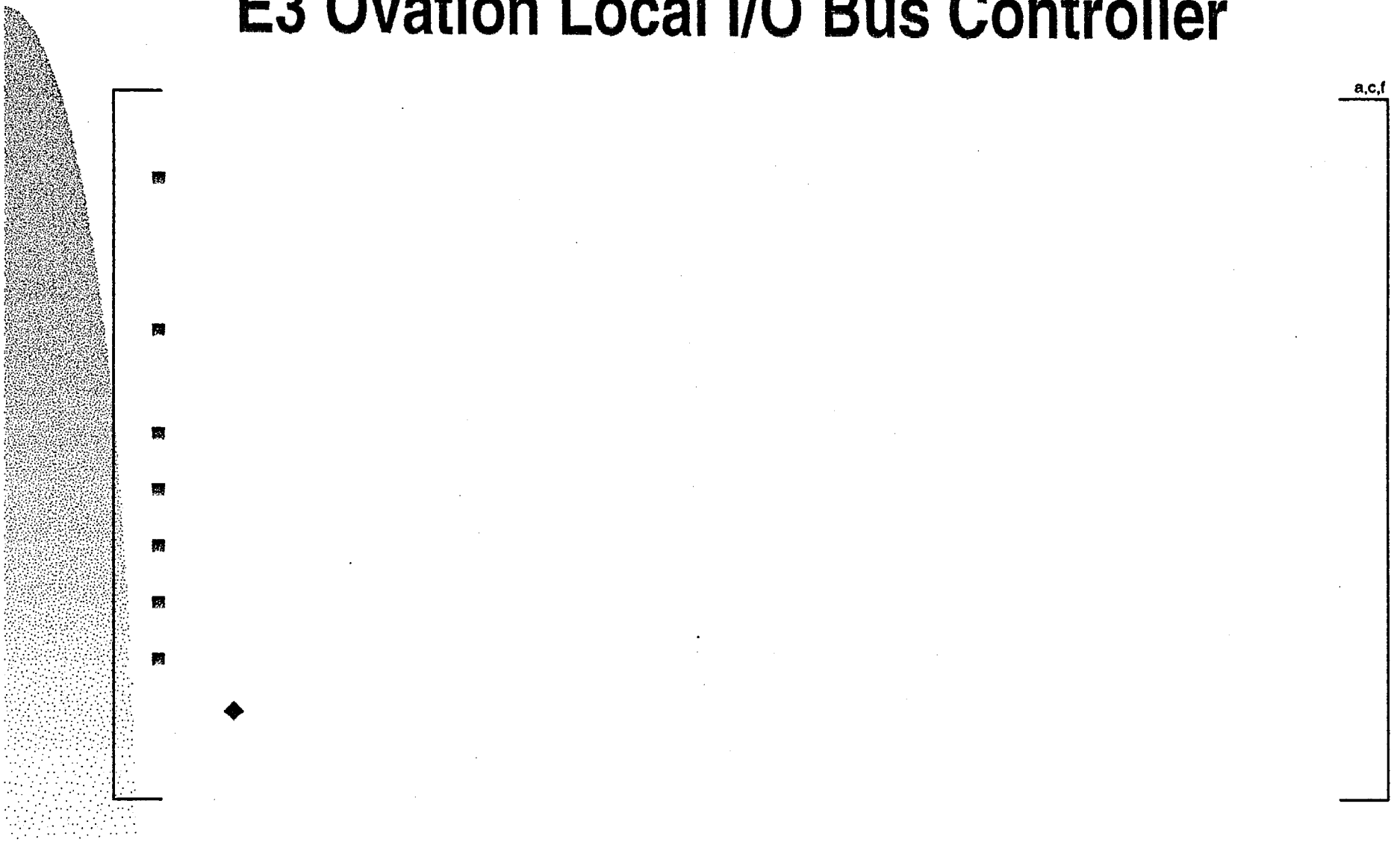
E3 Datalink Controller Board

a,c,f



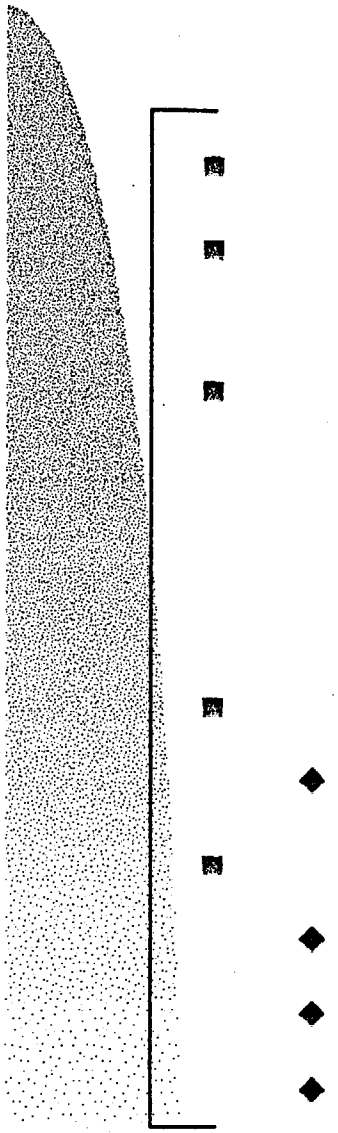
E3 Ovation Local I/O Bus Controller

a,c,f



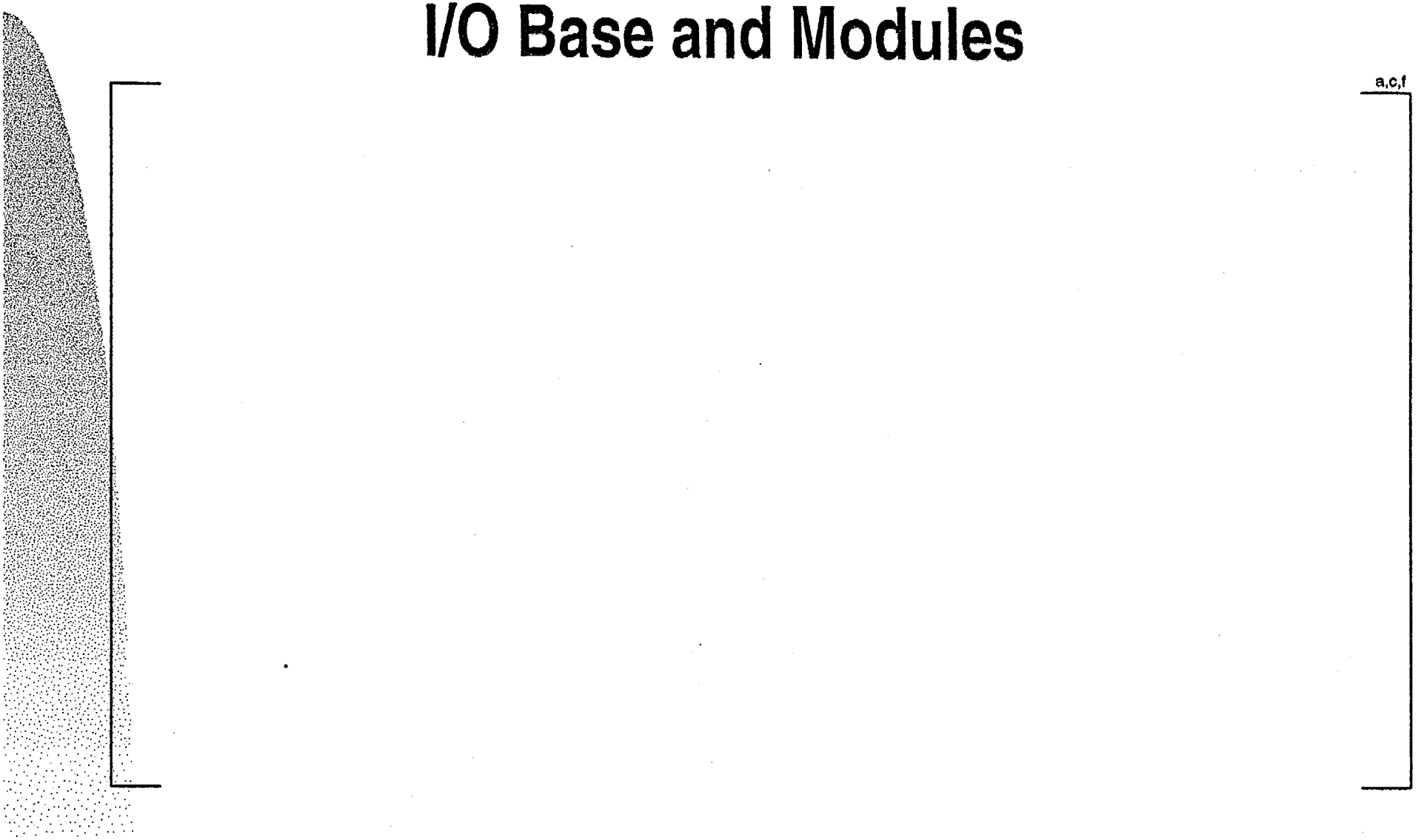
I/O Subsystem

a,c,f



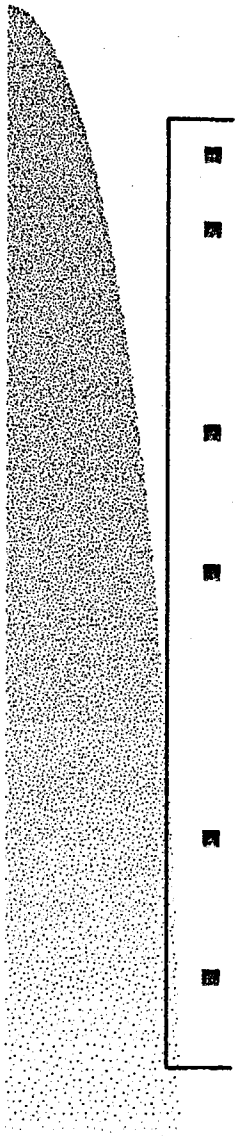
I/O Base and Modules

a,c,f



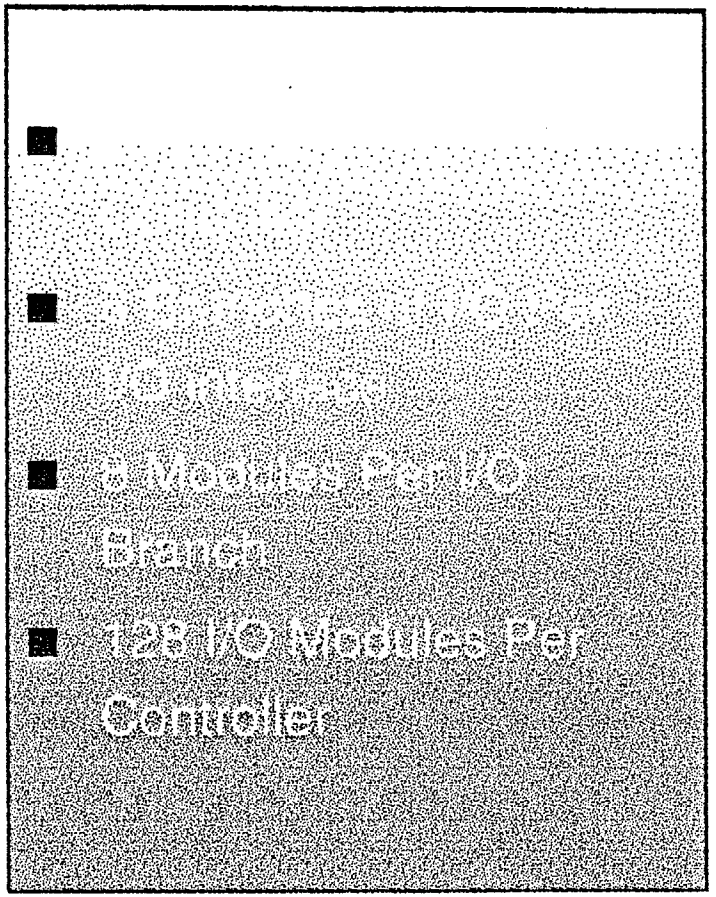
I/O Modules

a,c,f



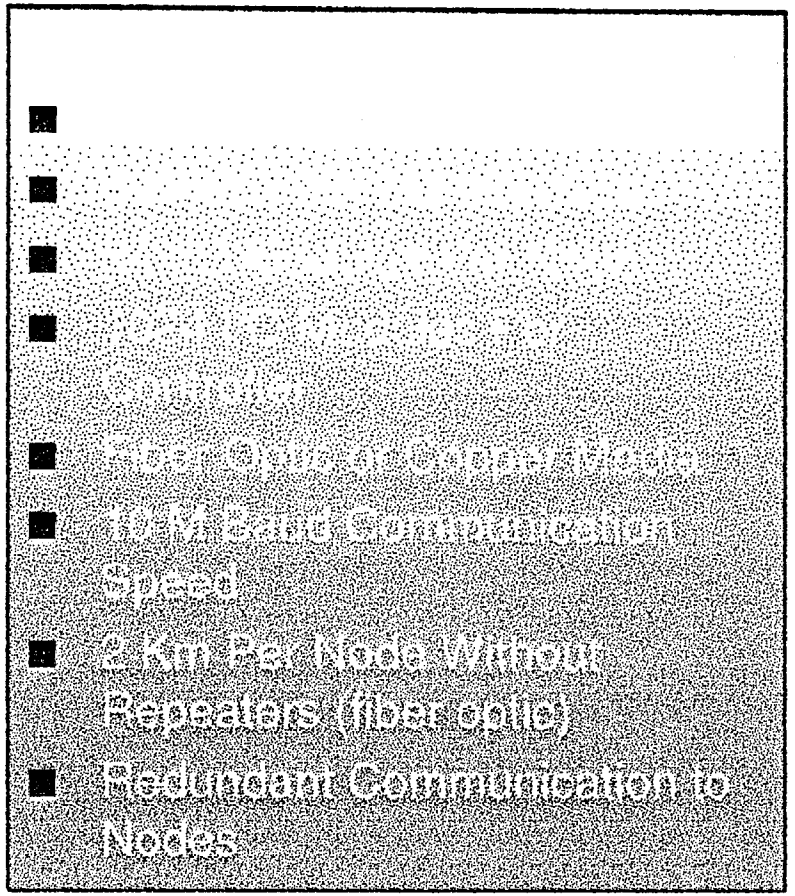
Maximum Local I/O Capacity

a,c,f



Maximum Remote I/O Capacity

a,c,f



Datalinks

a.c.f

- Fiber Optic Media for Isolation and EMC
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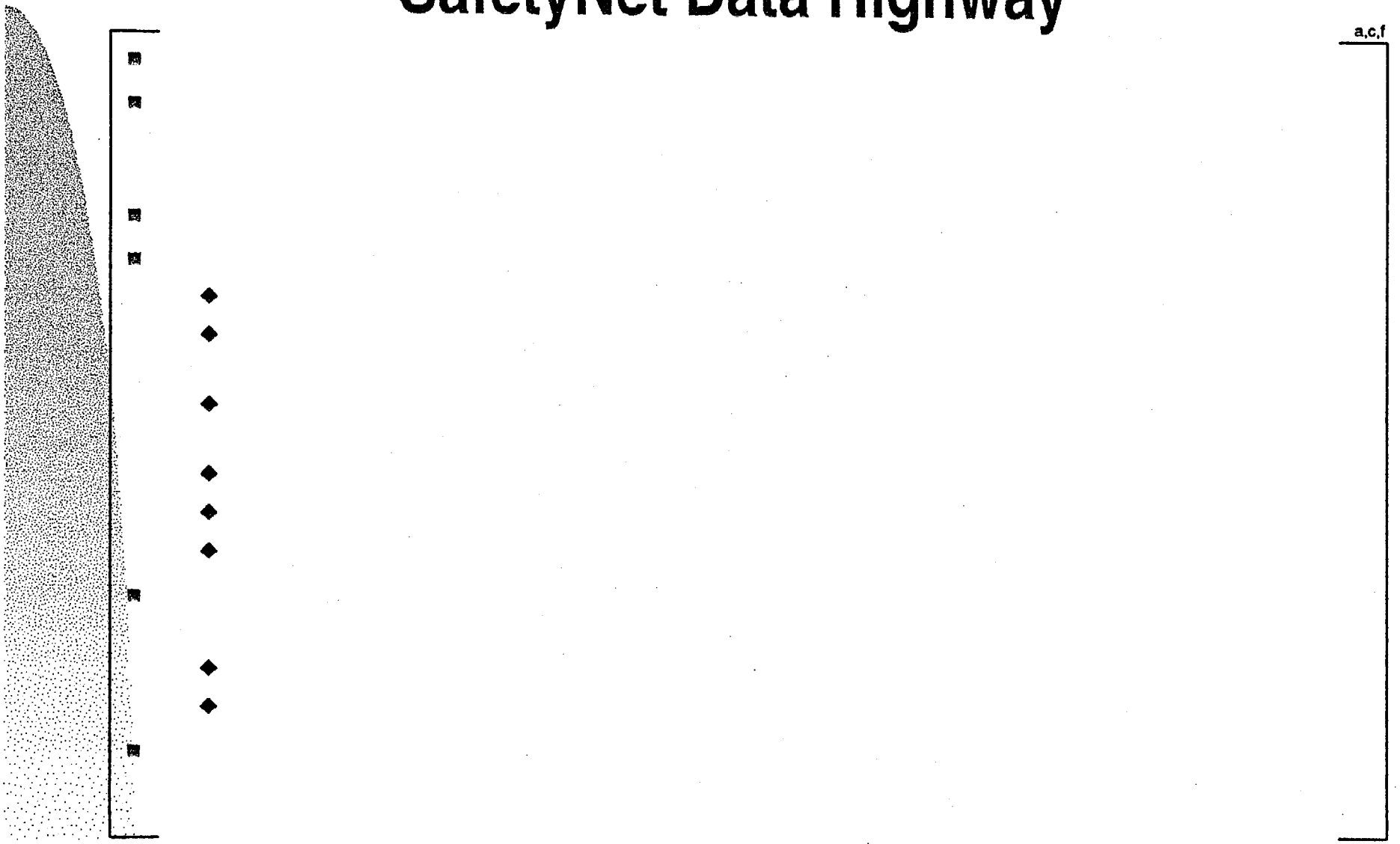
SafetyNet Data Highway



SafetyNet Data Highway
Generic I&C Upgrade System

a,c,f

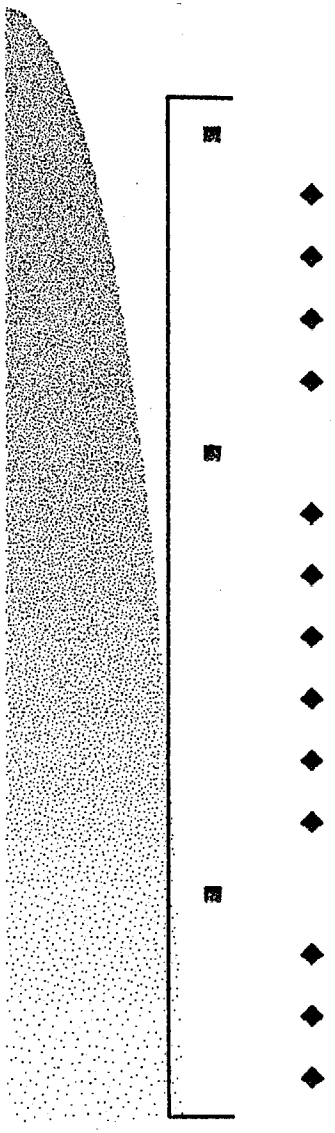
Gateway

a,c,f

(5) E3 Software Overview

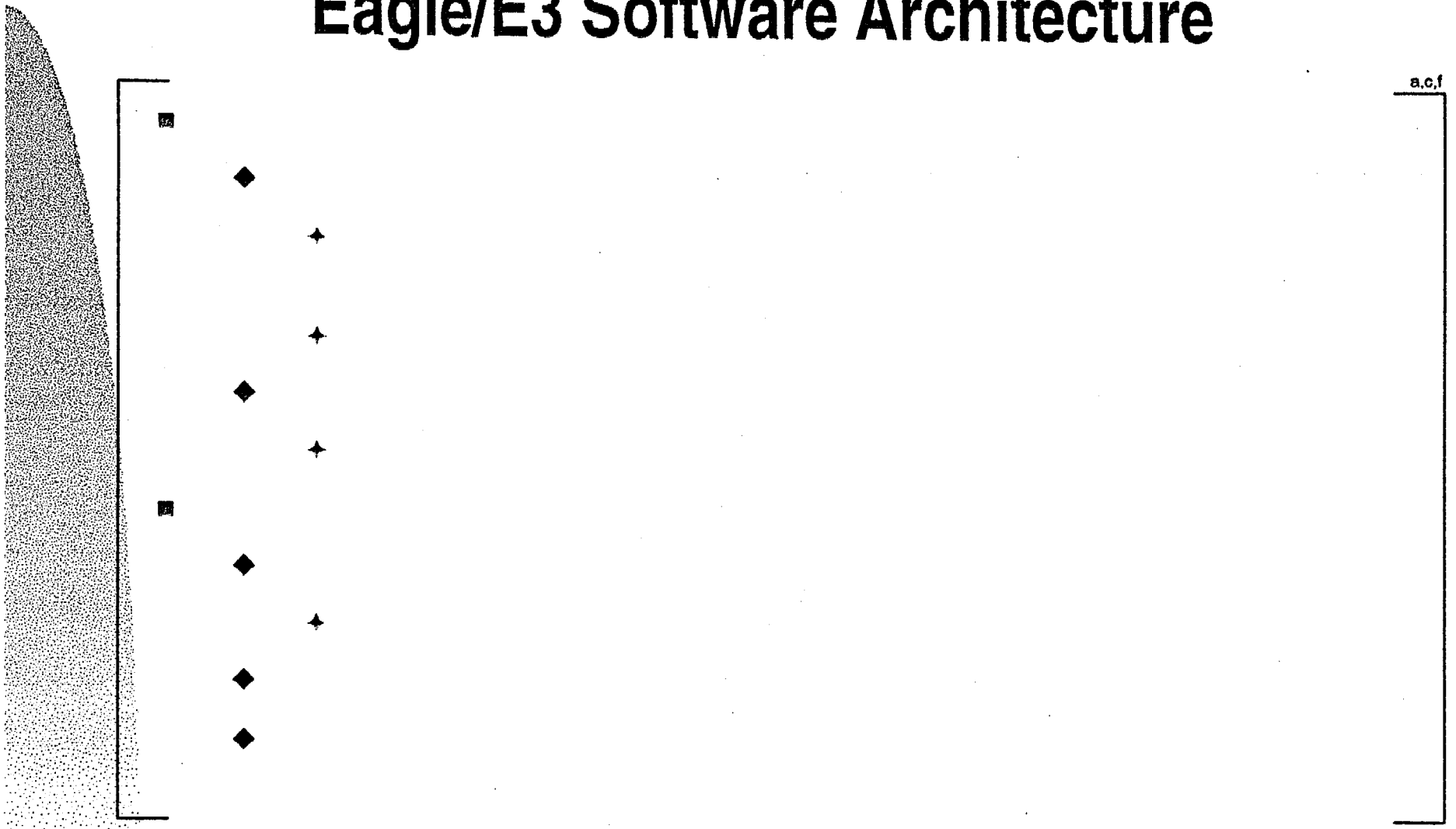
Primary Goals

a,c,f



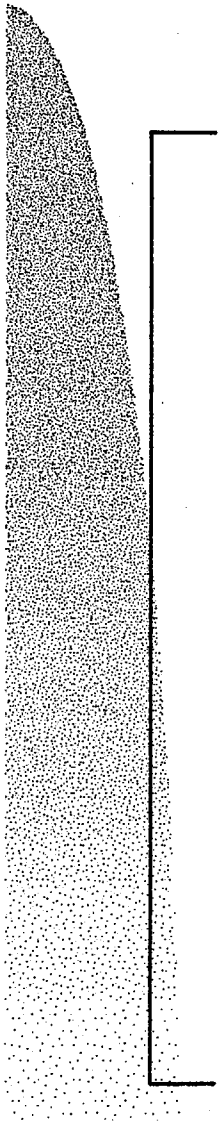
Eagle/E3 Software Architecture

a,c,f



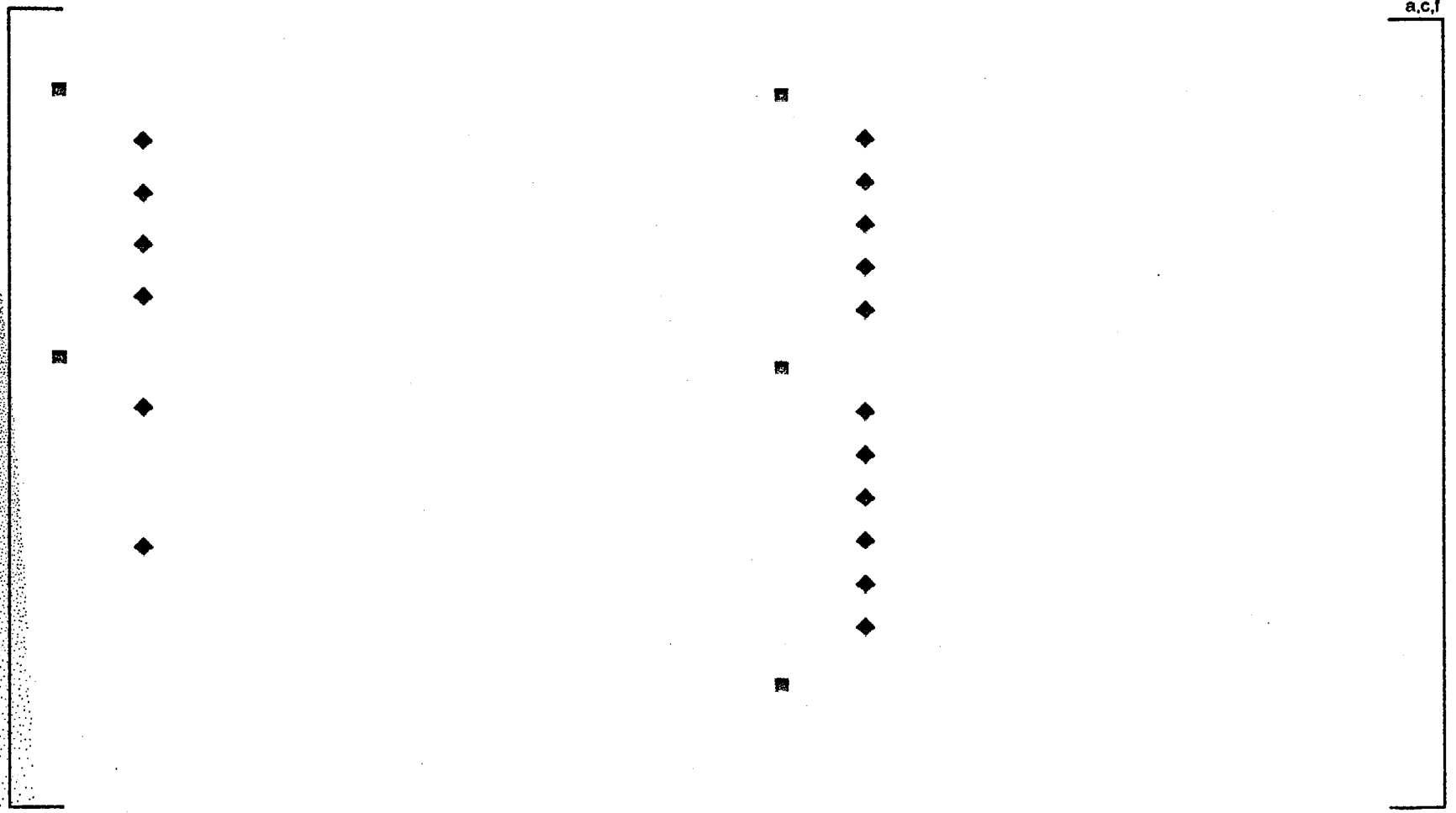
Platform Software Composition

a,c,f



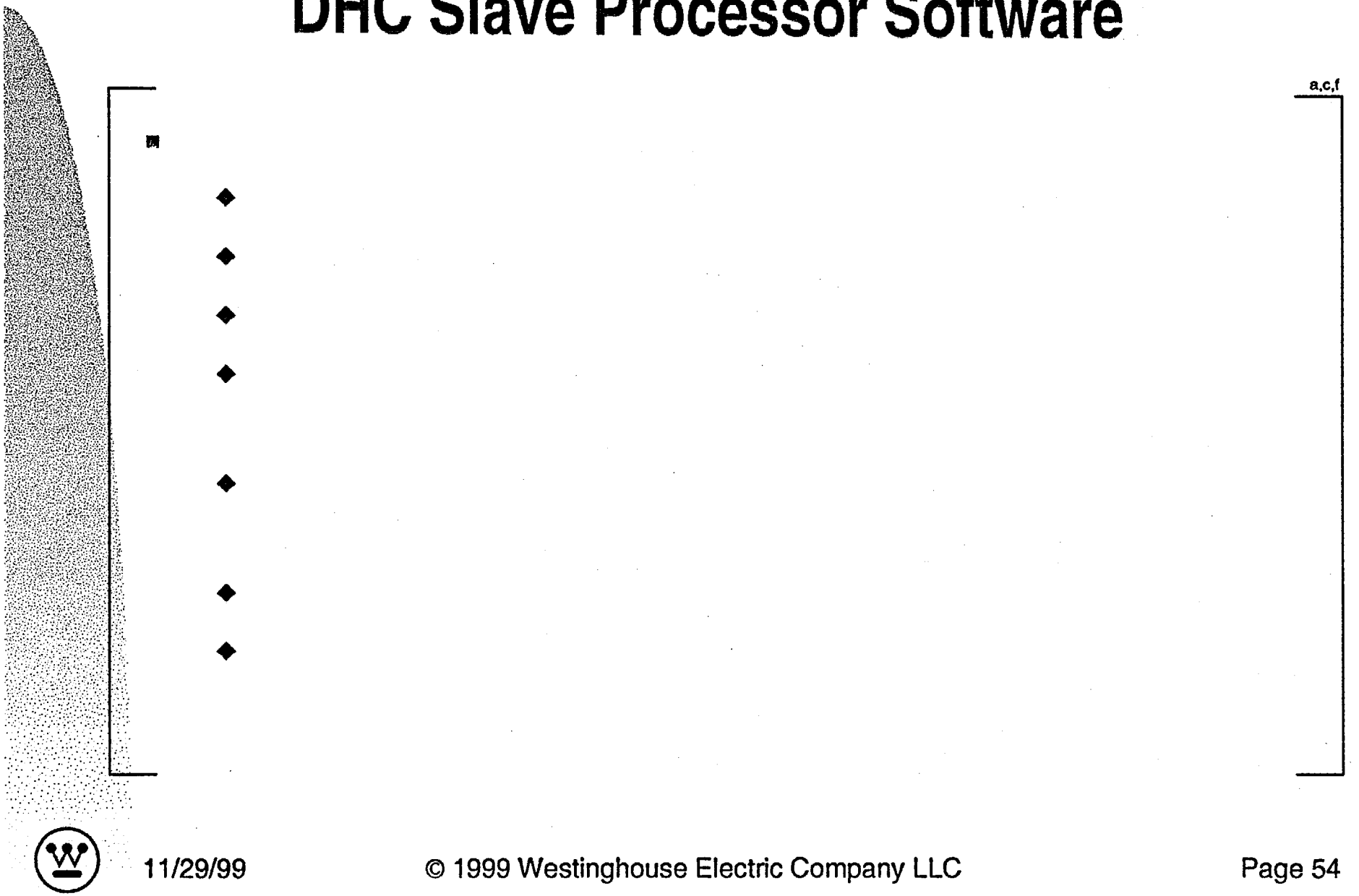
Platform Software
Major System Support Functions

a,c,f



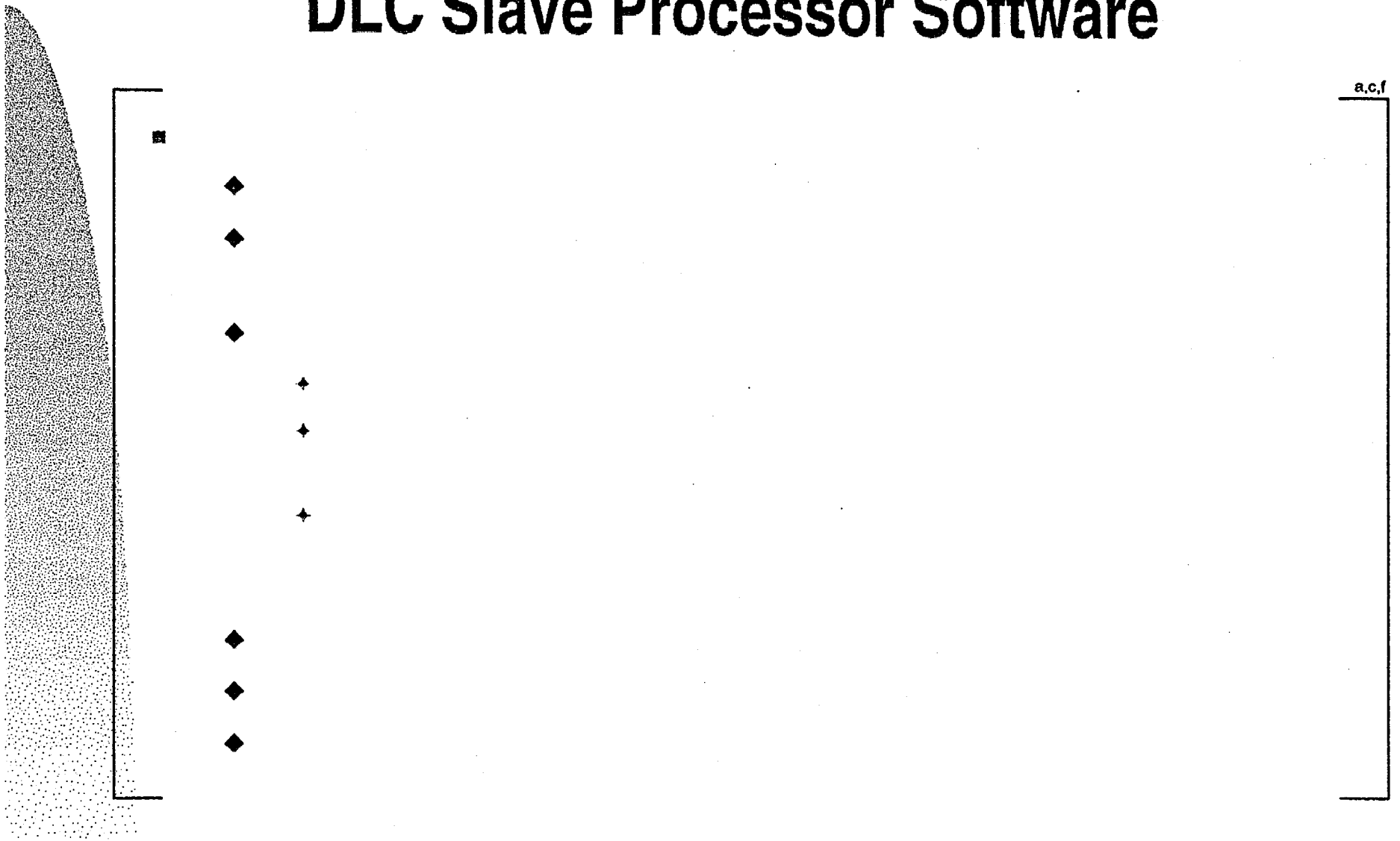
DHC Slave Processor Software

a,c,f



DLC Slave Processor Software

a,c,f

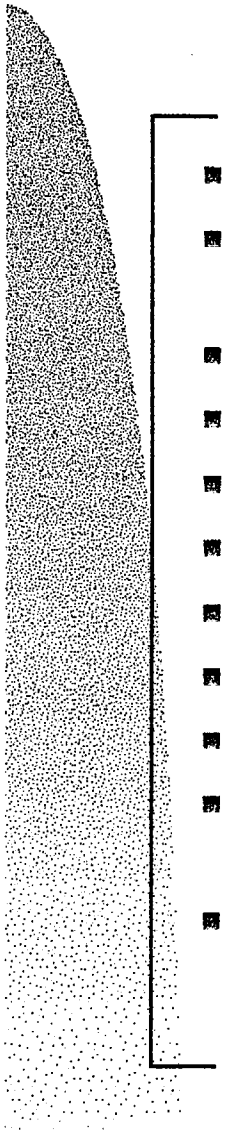


Local I/O Controller Slave Processor Software

a,c,f

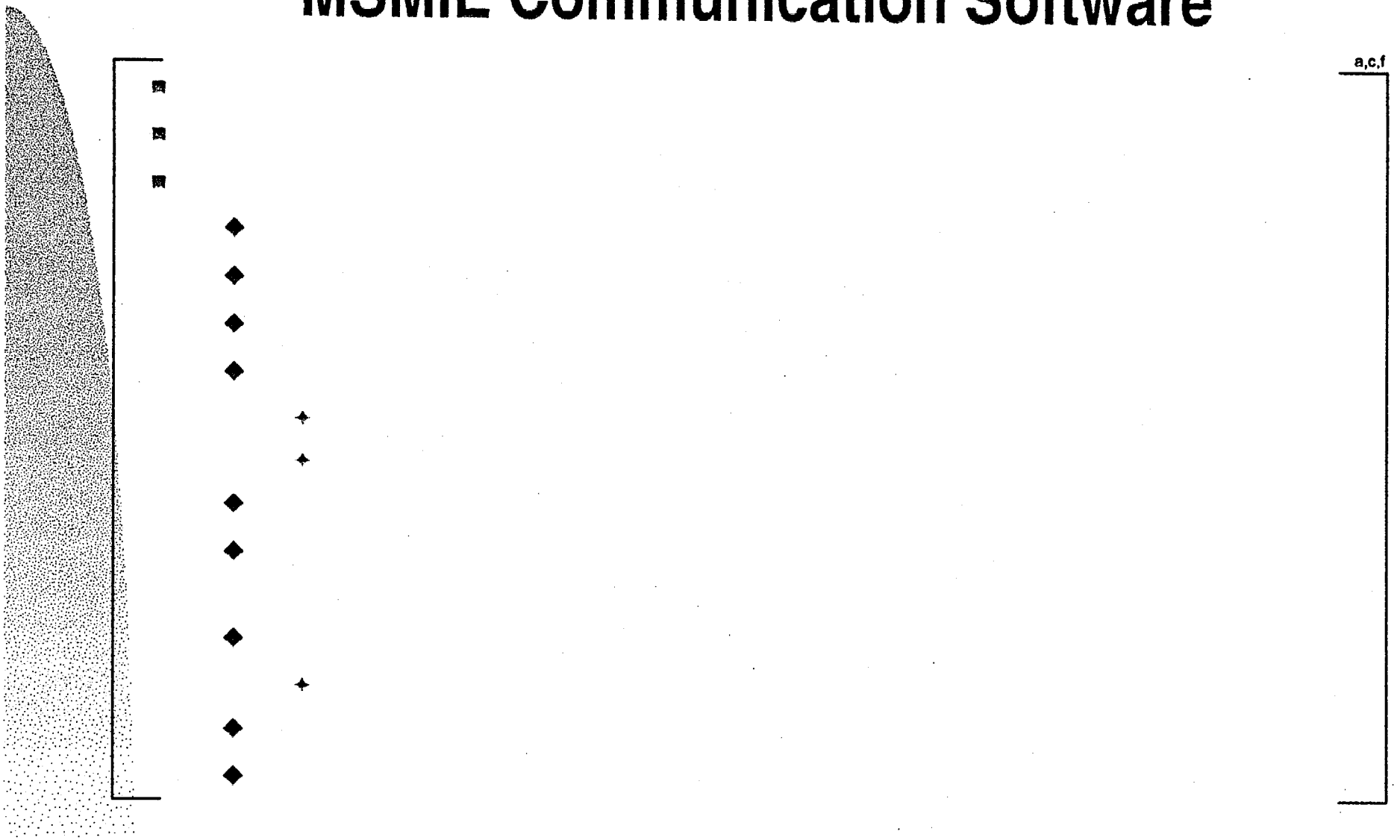
Remote I/O Controller Slave Processor Software

a,c,f



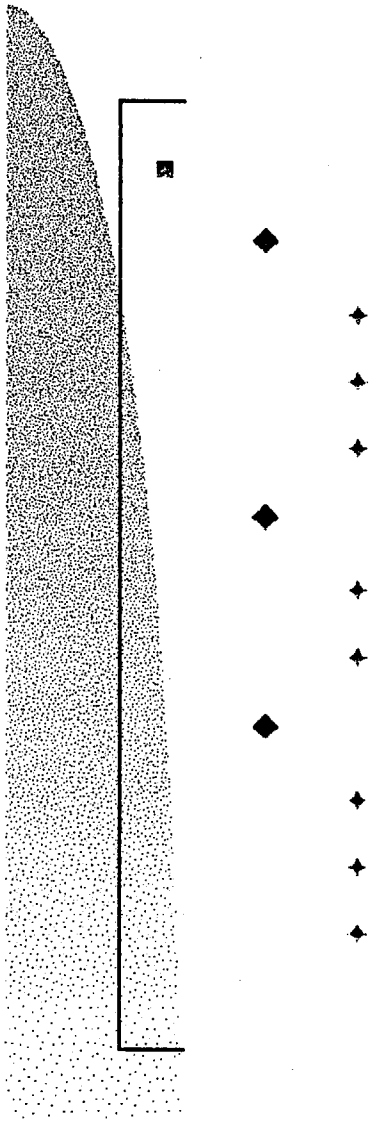
MSMIE Communication Software

a,c,f



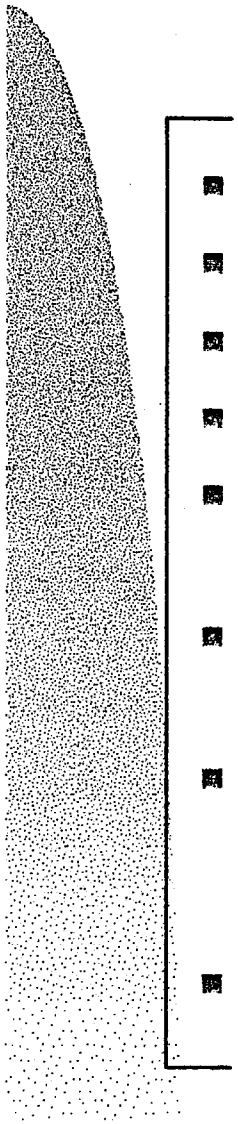
MSMIE Communication Software

a,c,f



DBI Communication Software

a,c,f

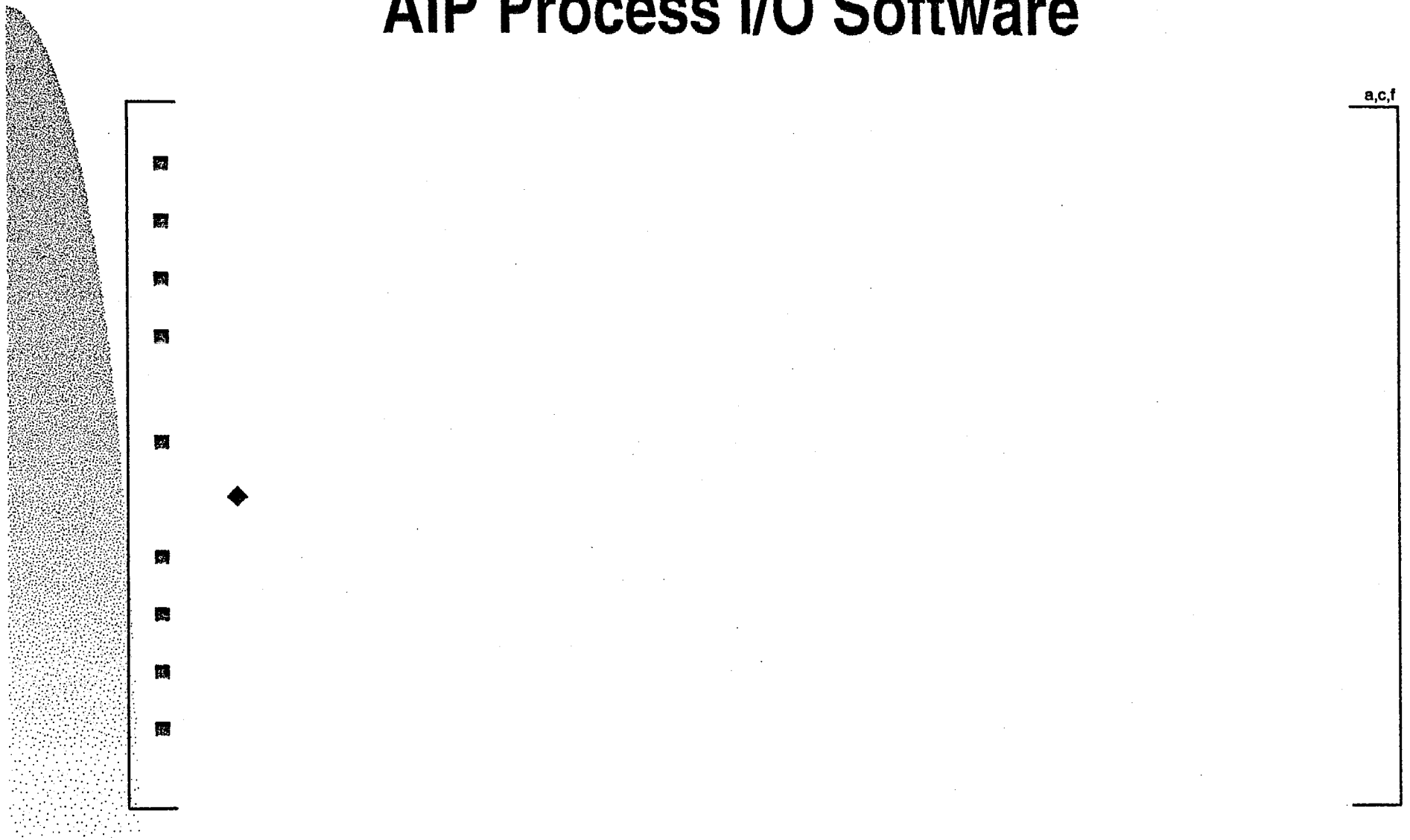


ISP Process I/O Software

a,c,f

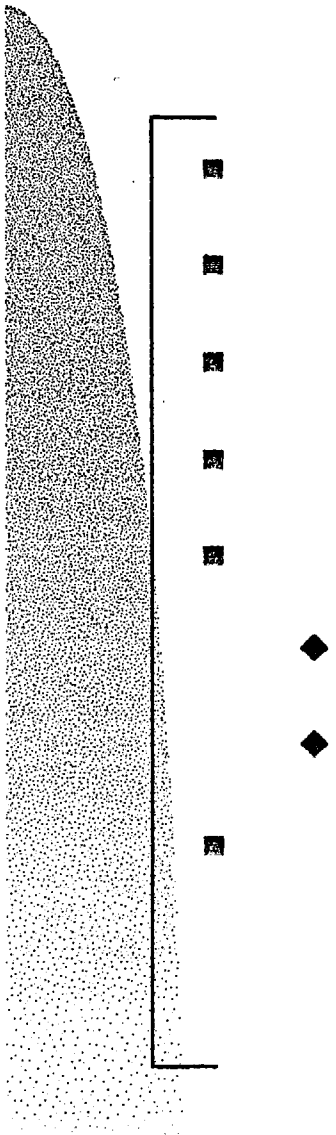
AIP Process I/O Software

a,c,f



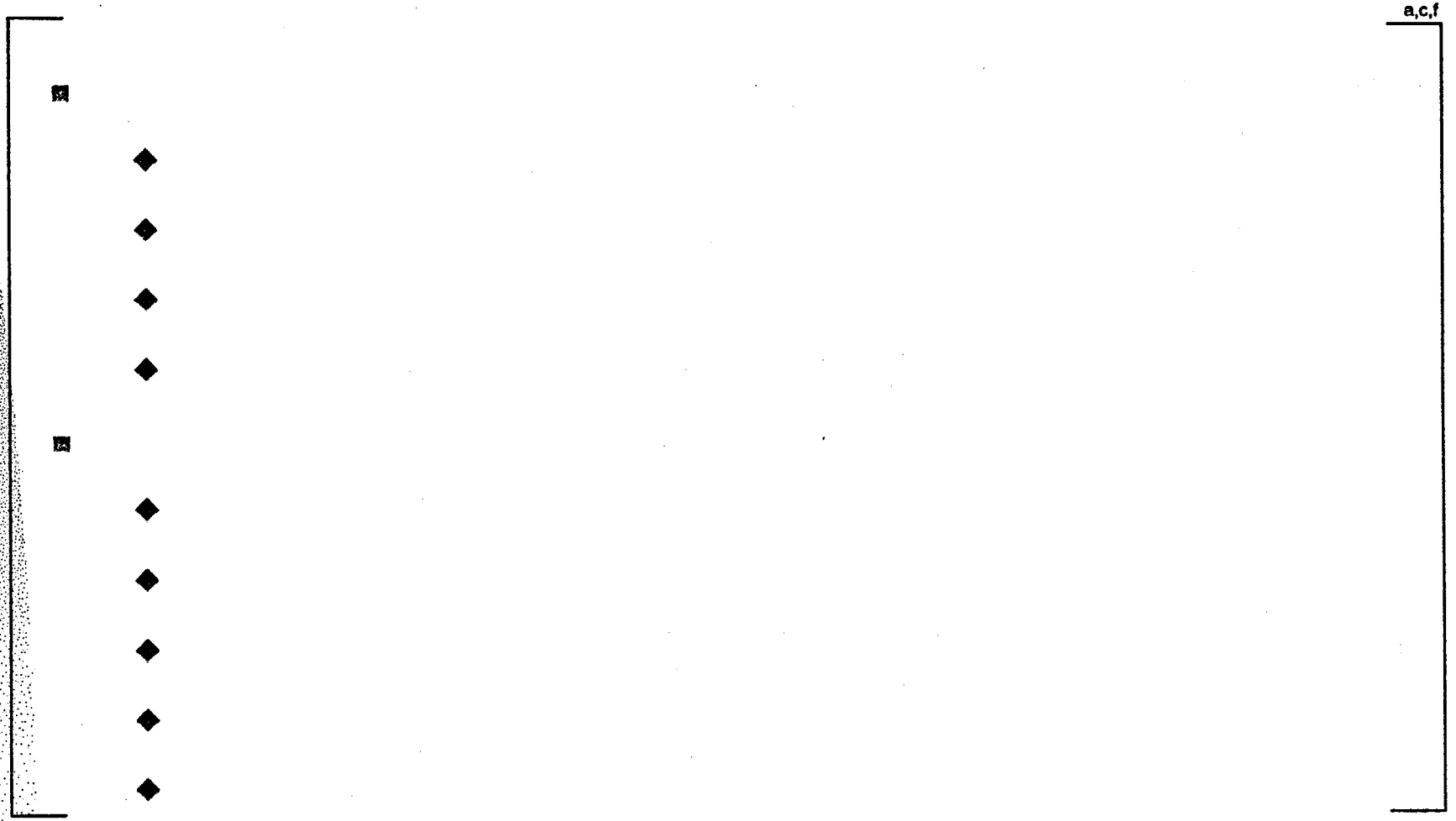
DIP Process I/O Software

a,c,f



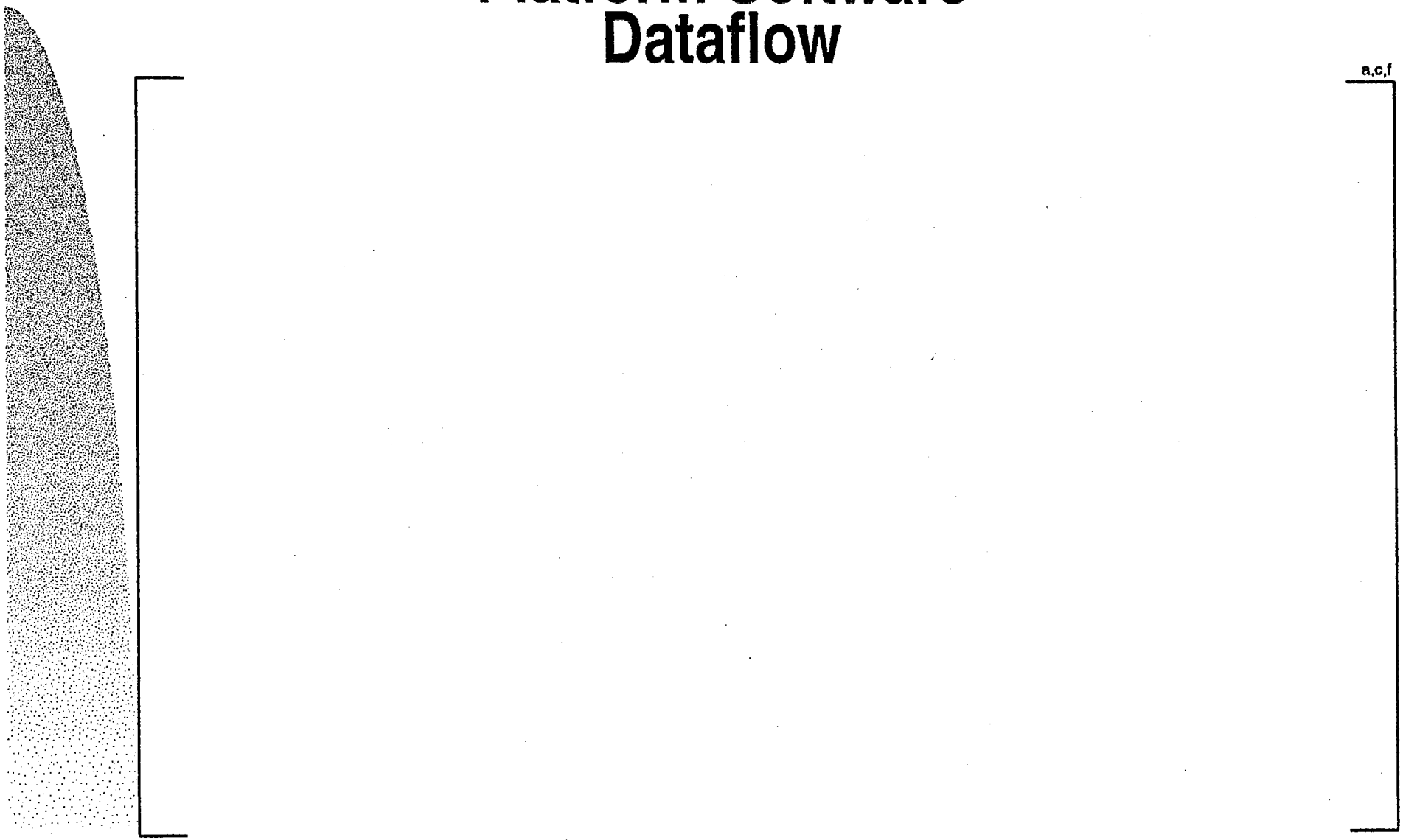
AOH and DIOH Process I/O Software

a,c,f



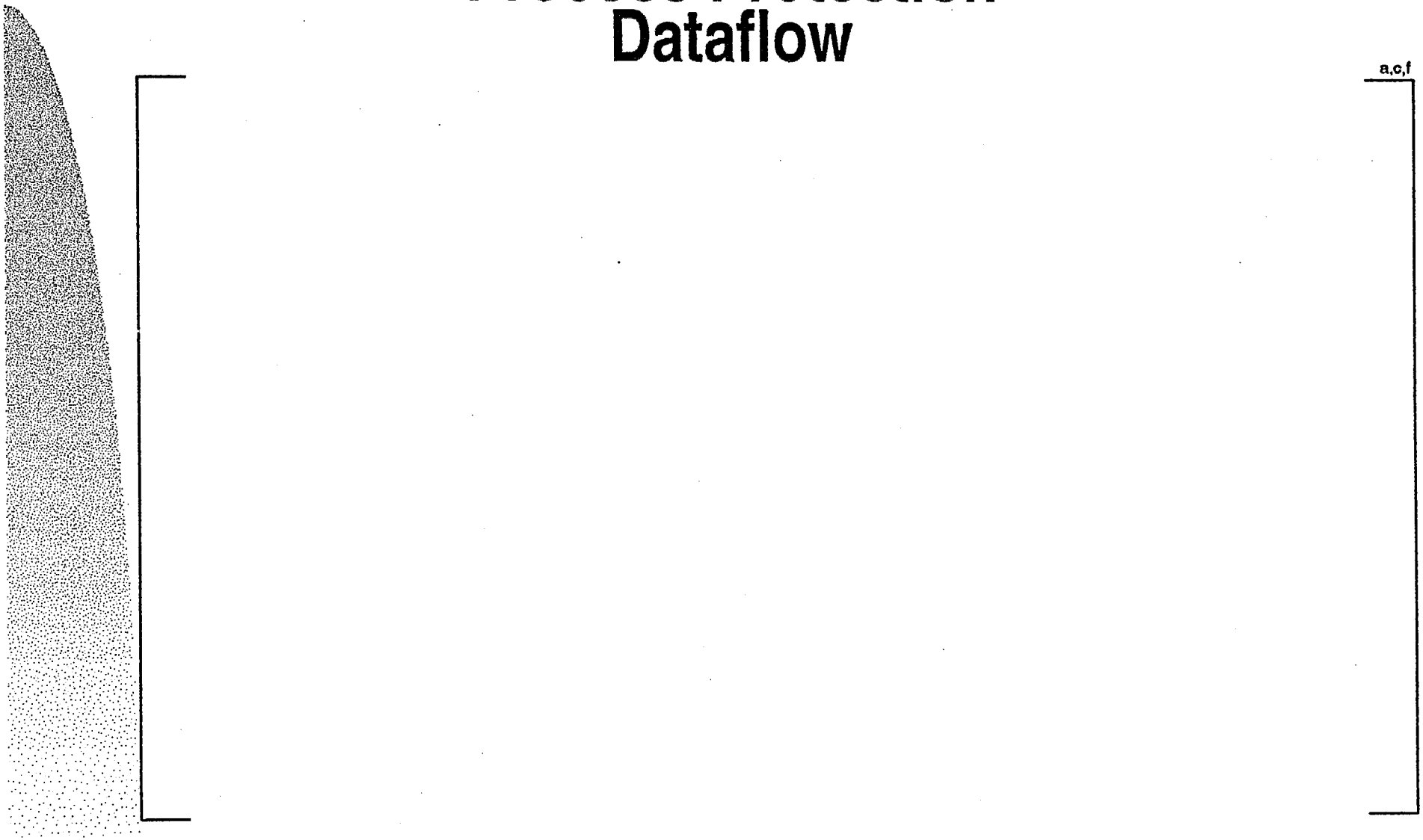
Platform Software Dataflow

a,c,f



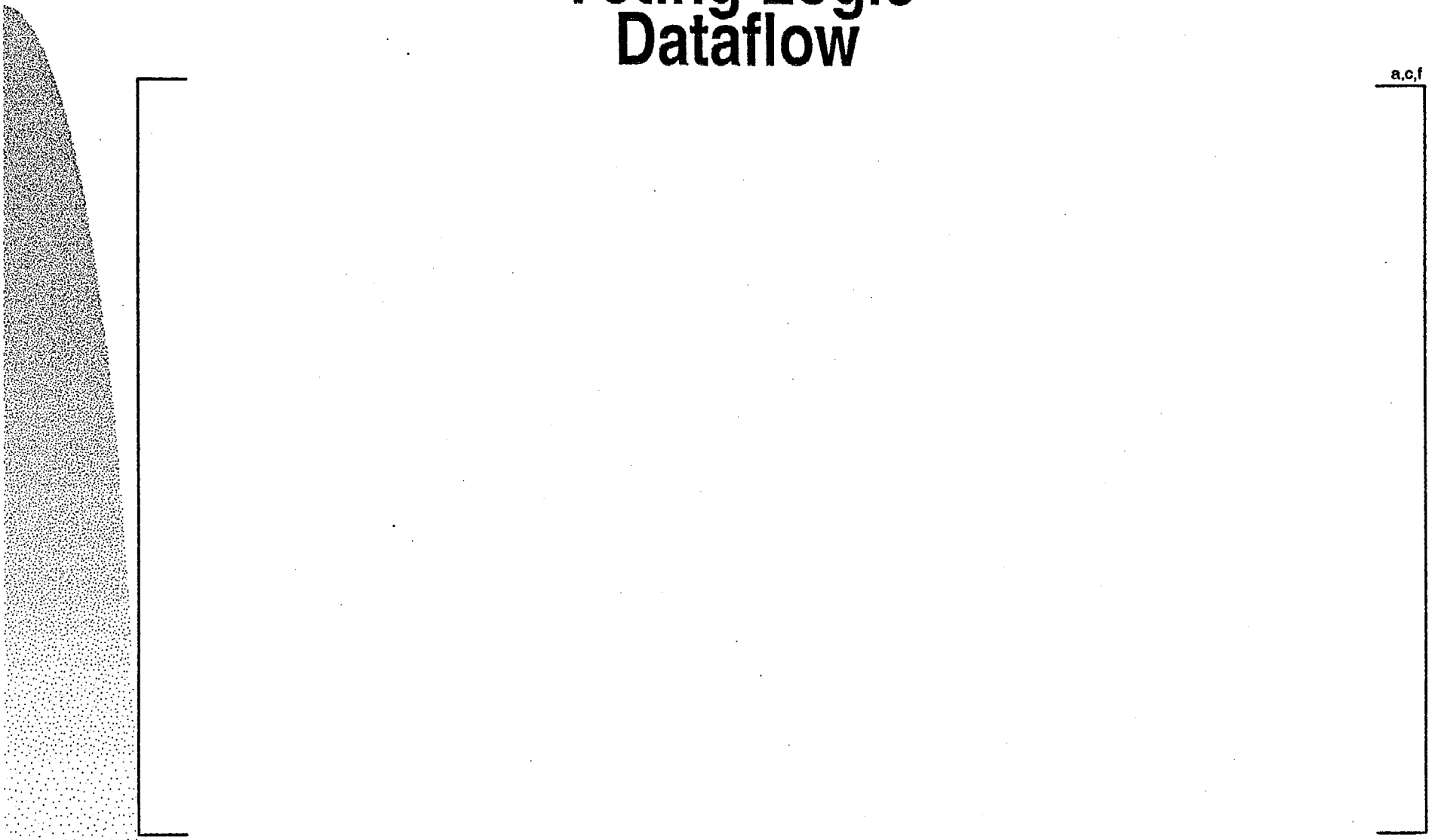
Process Protection Dataflow

a,c,f



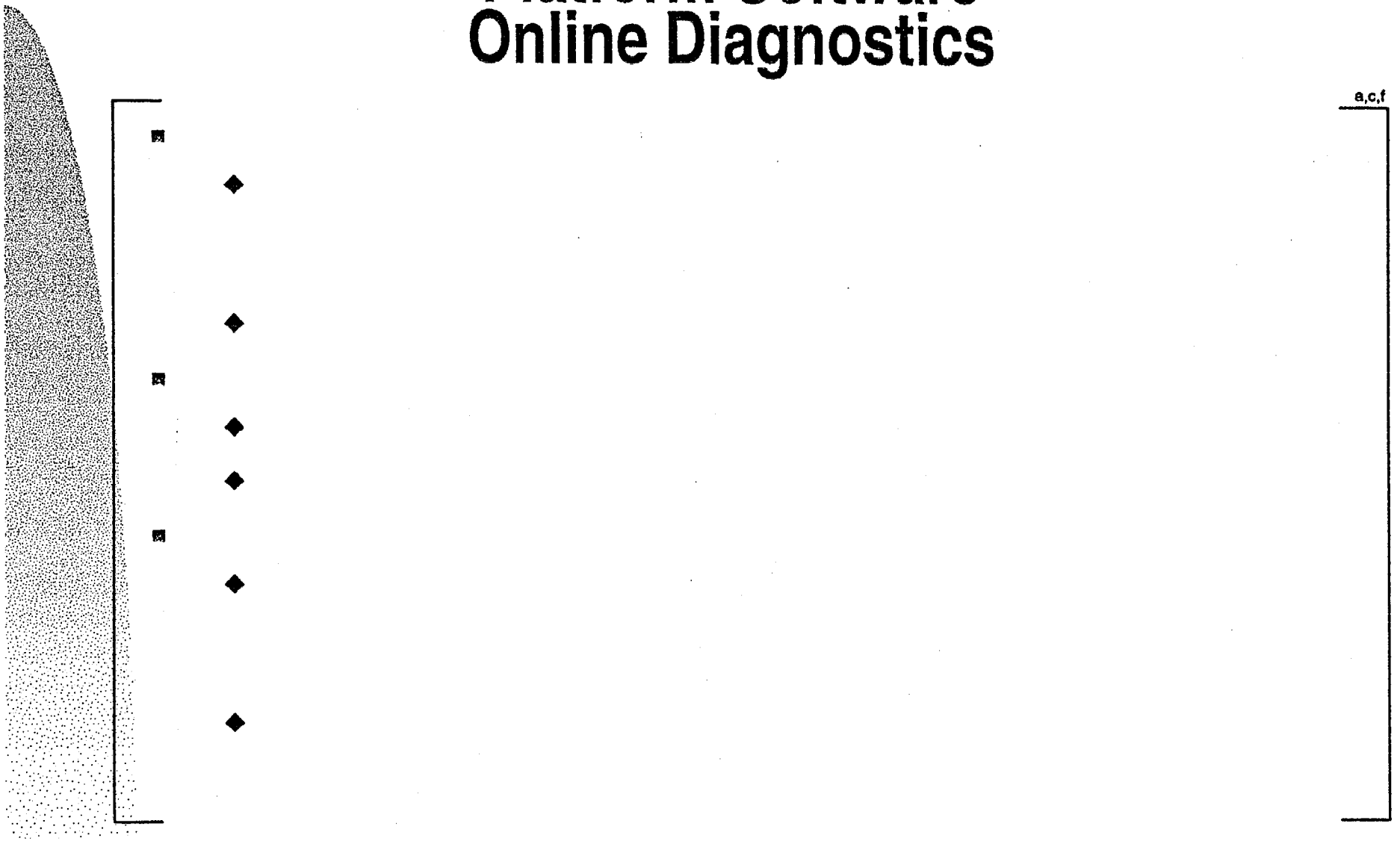
Voting Logic Dataflow

a,c,f



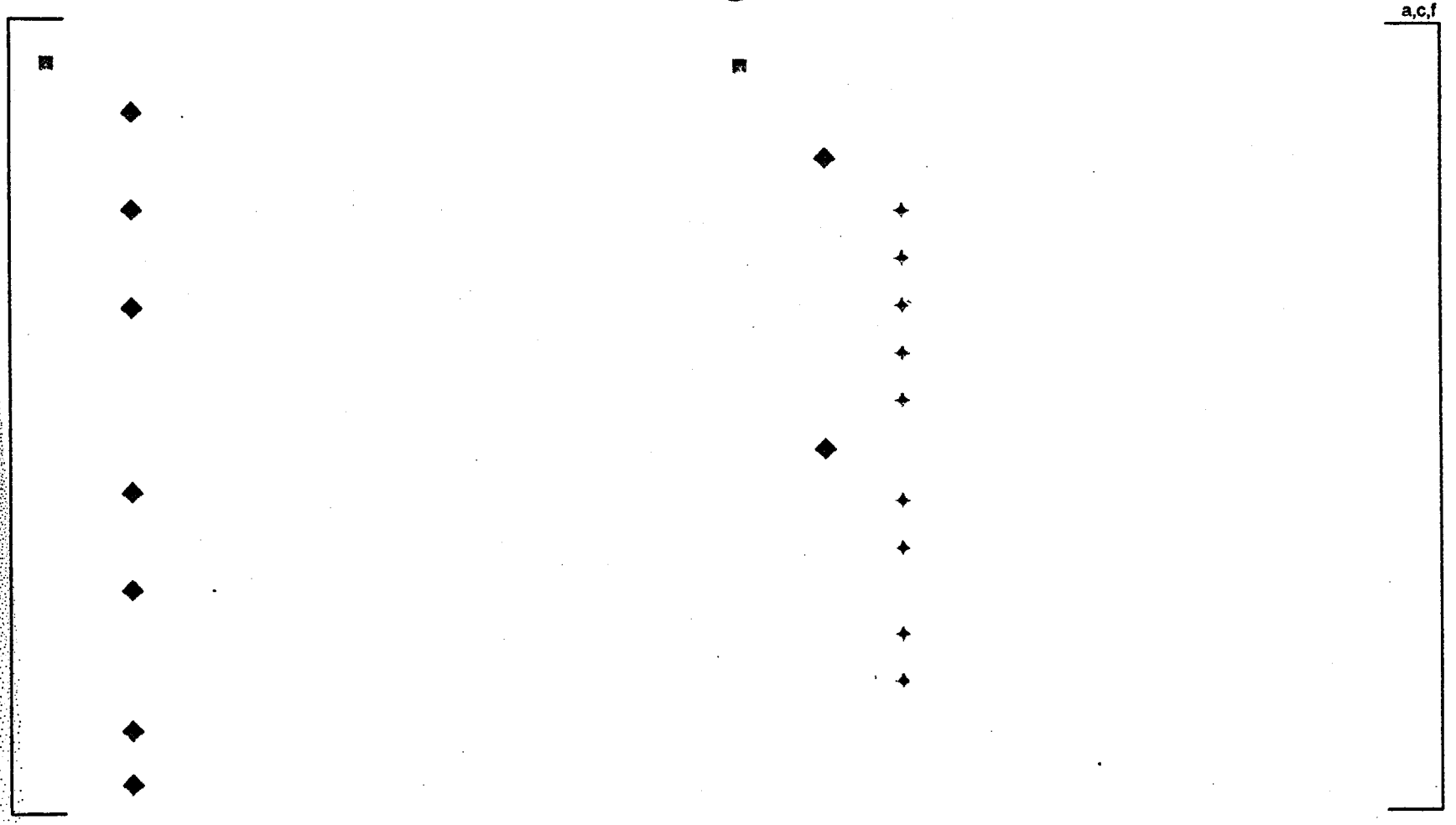
Platform Software
Online Diagnostics

a,c,f



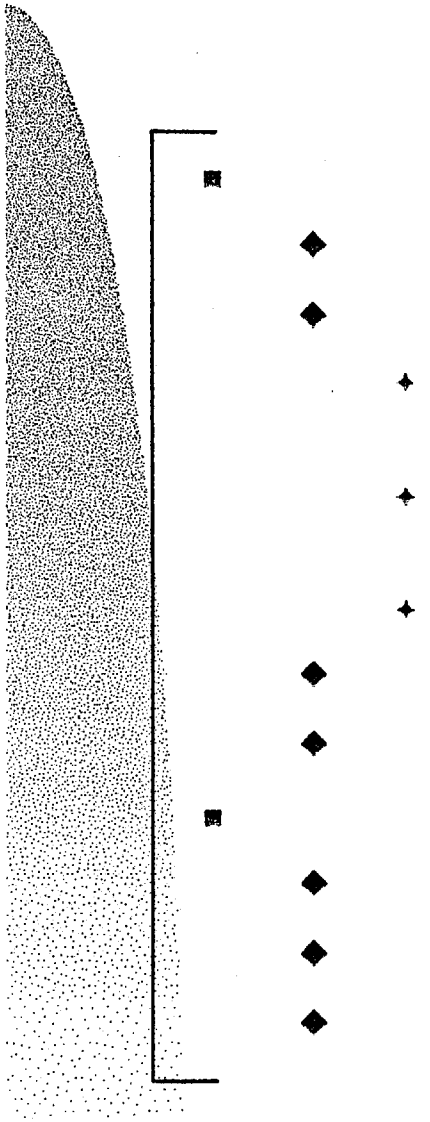
Platform Software
Online Diagnostics

a,c,f



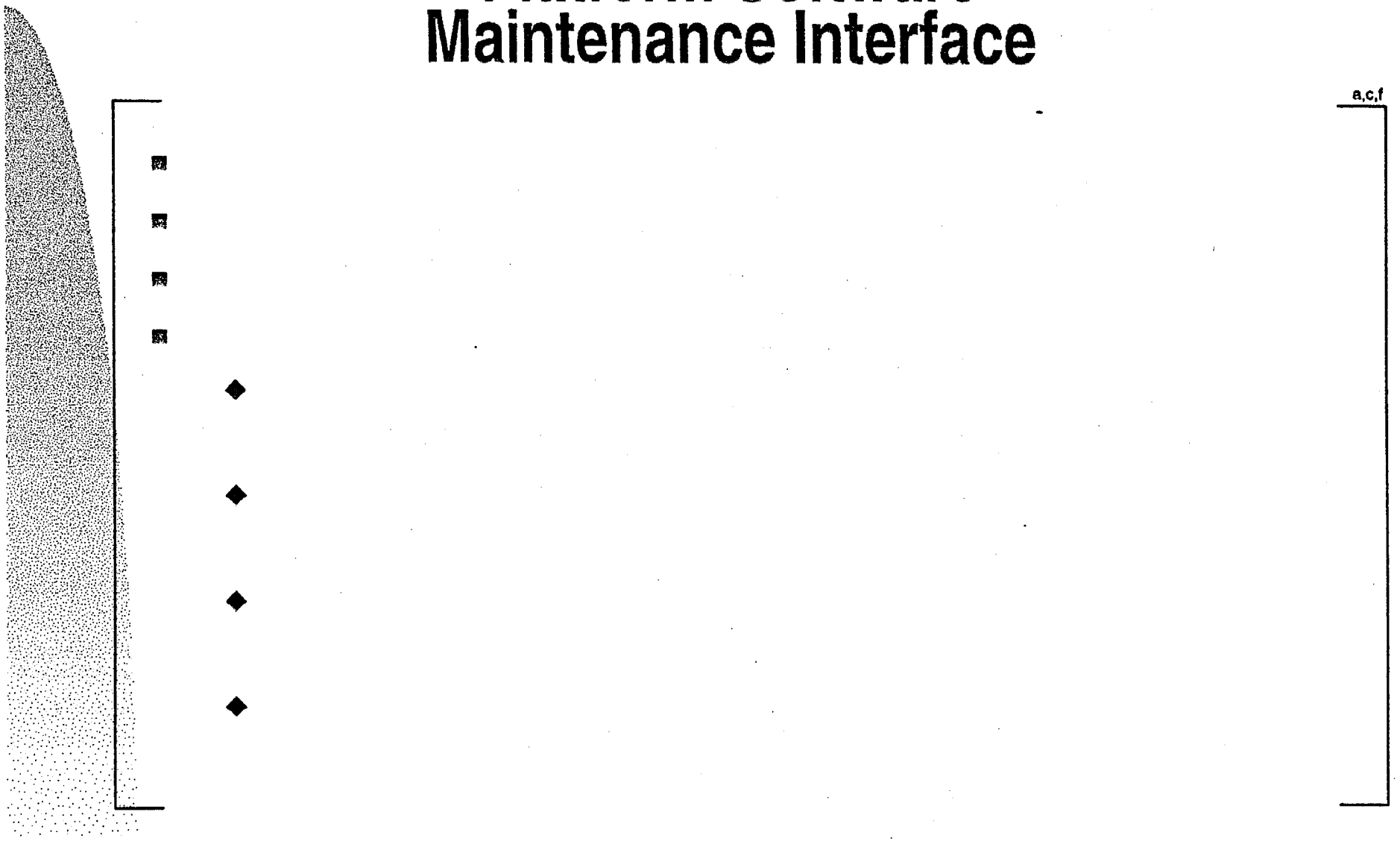
Platform Software Online Diagnostics

a,c,f



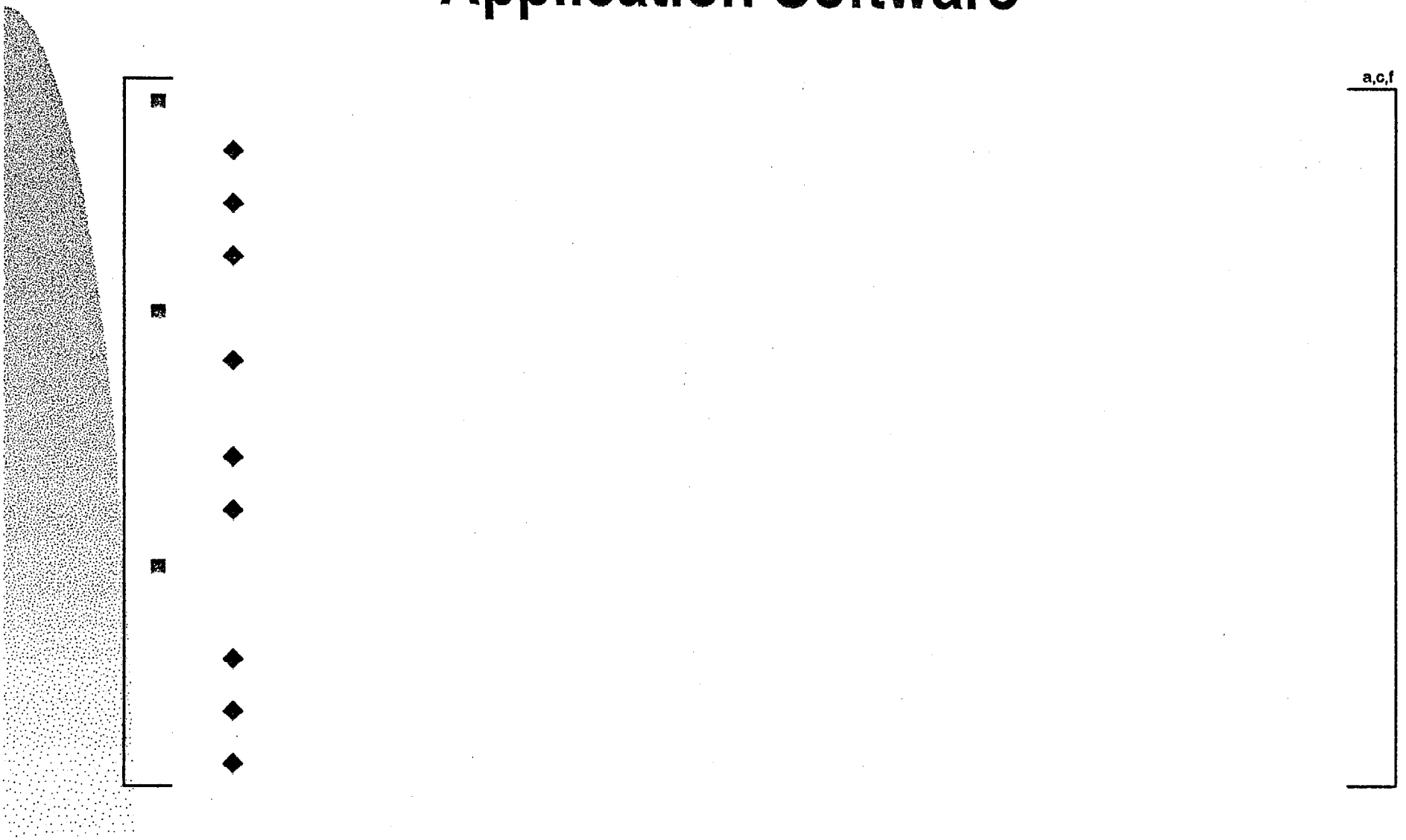
Platform Software Maintenance Interface

a,c,f



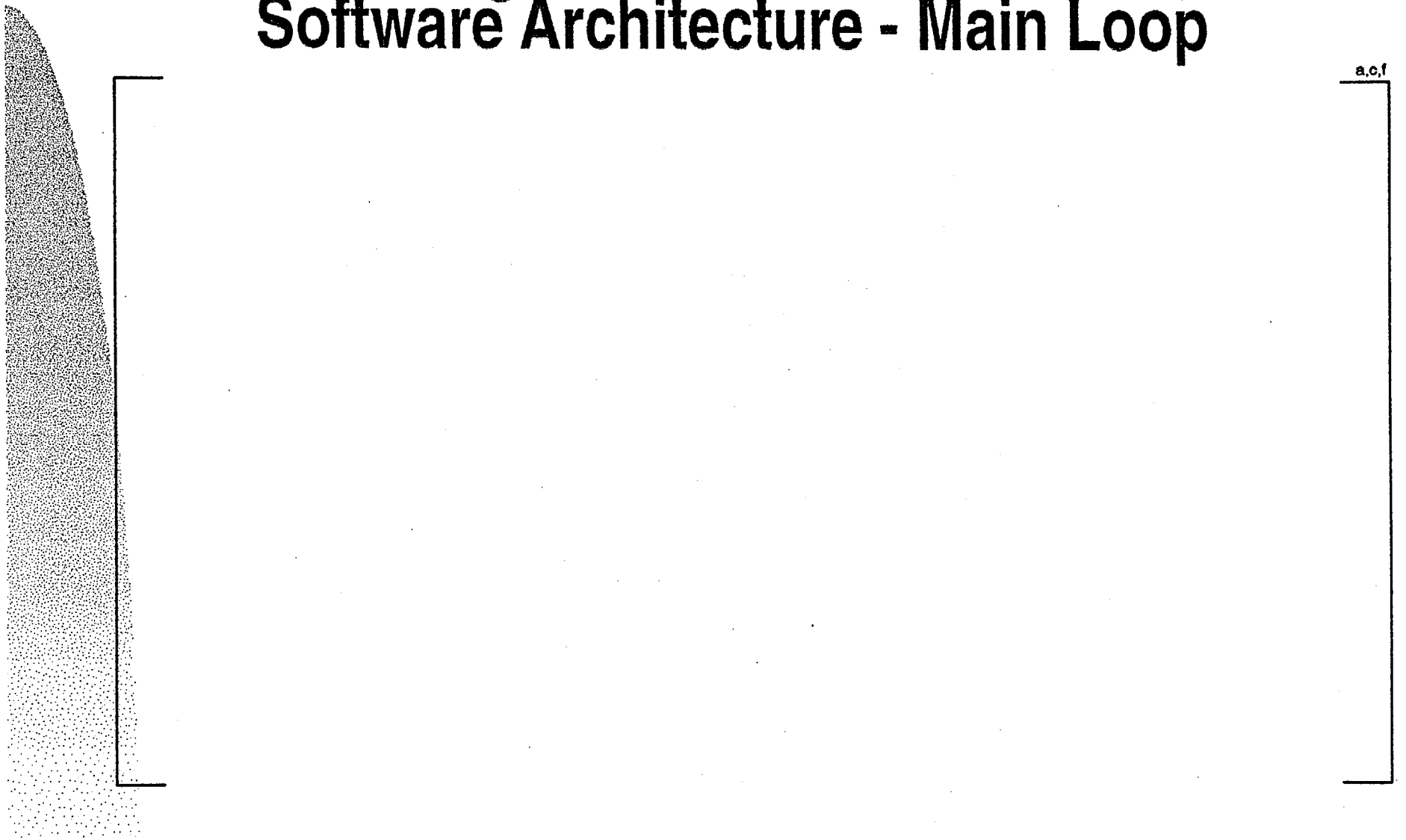
Application Software

a,c,f



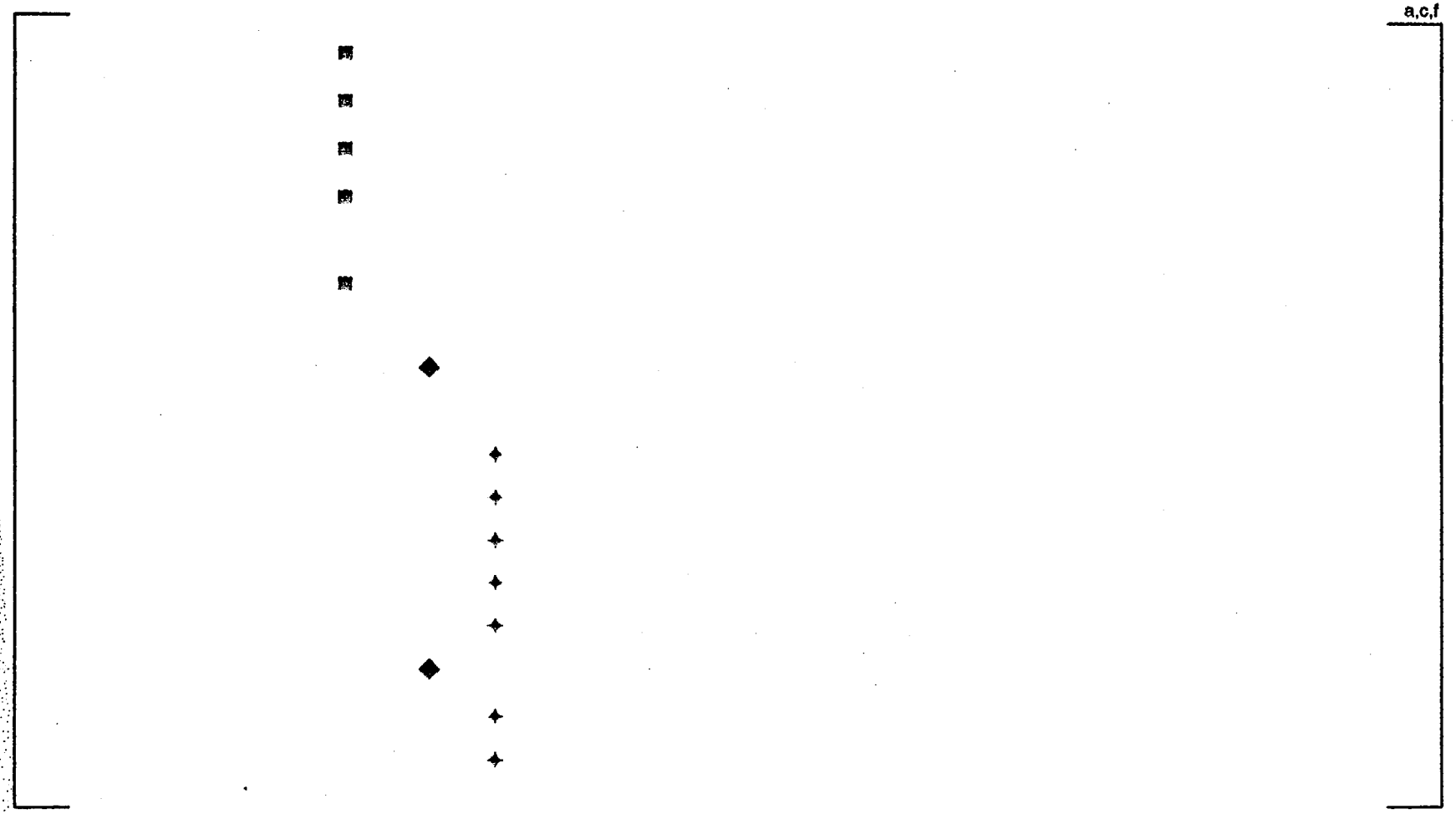
Eagle/Ovation E-Series Software Architecture - Main Loop

a,c,f



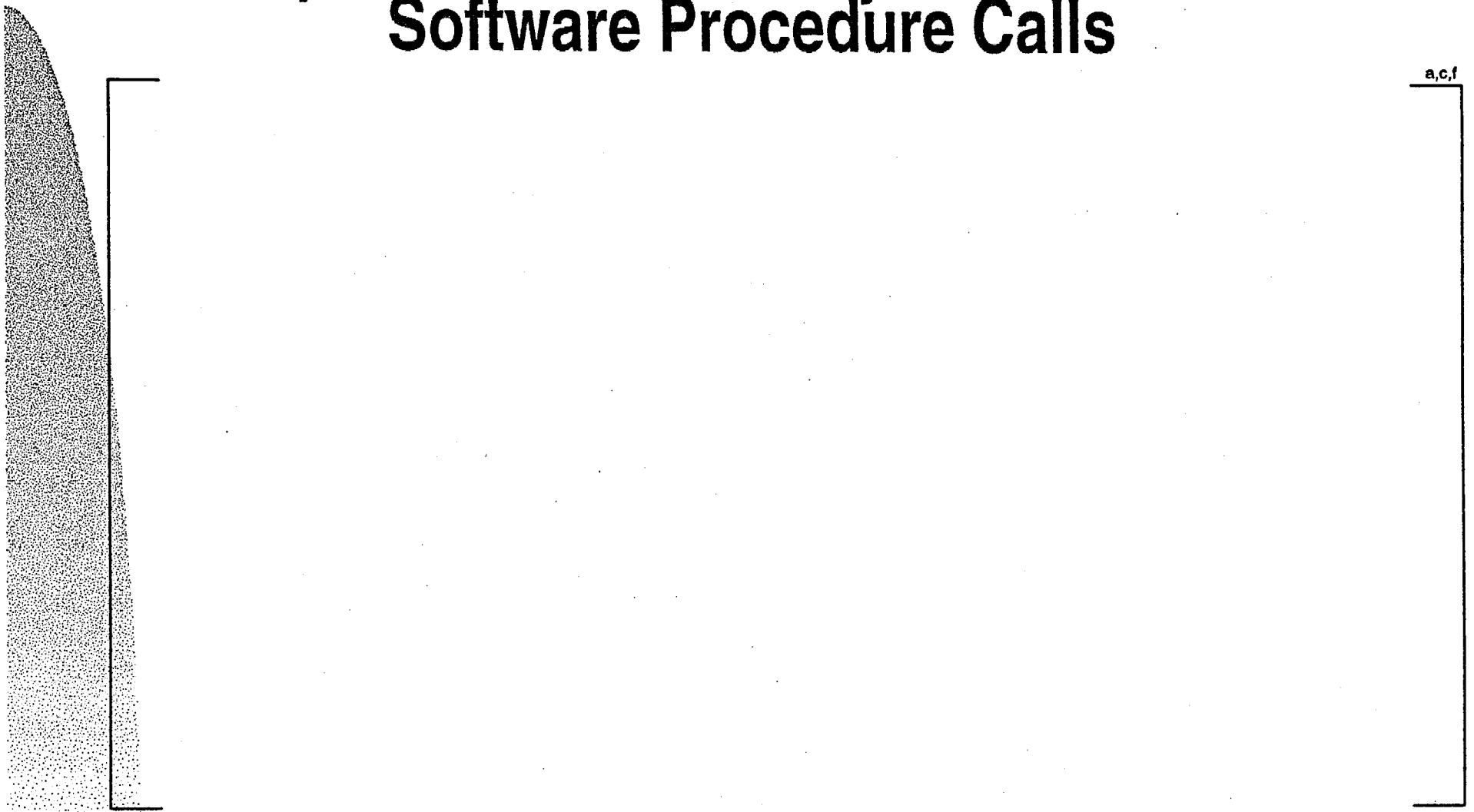
Correspondence of CBD Symbols to Application Software

a,c,f



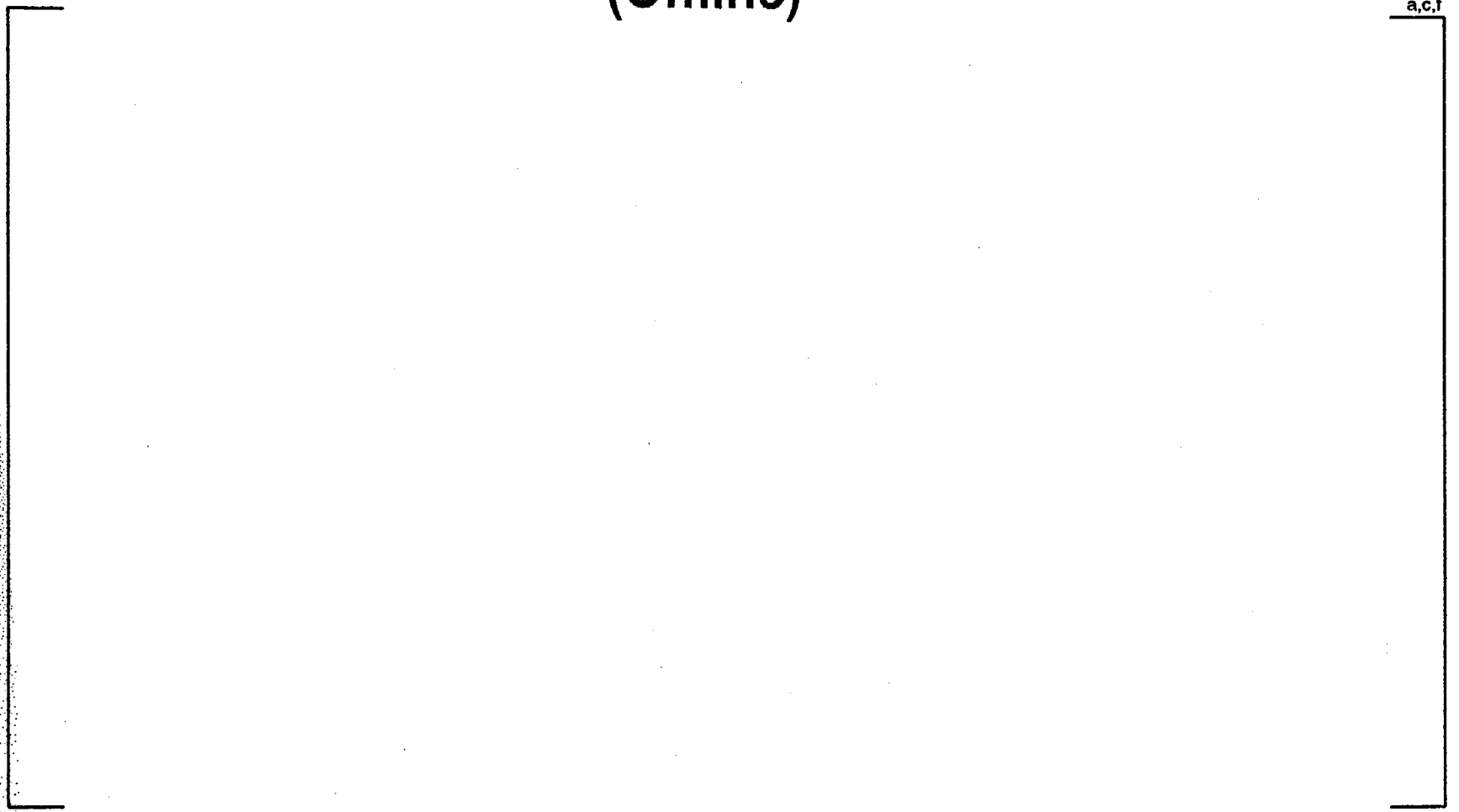
Correspondence of CBD Symbols to Platform Software Procedure Calls

a,c,f



E3 Application Software Generation and Configuration Process (Offline)

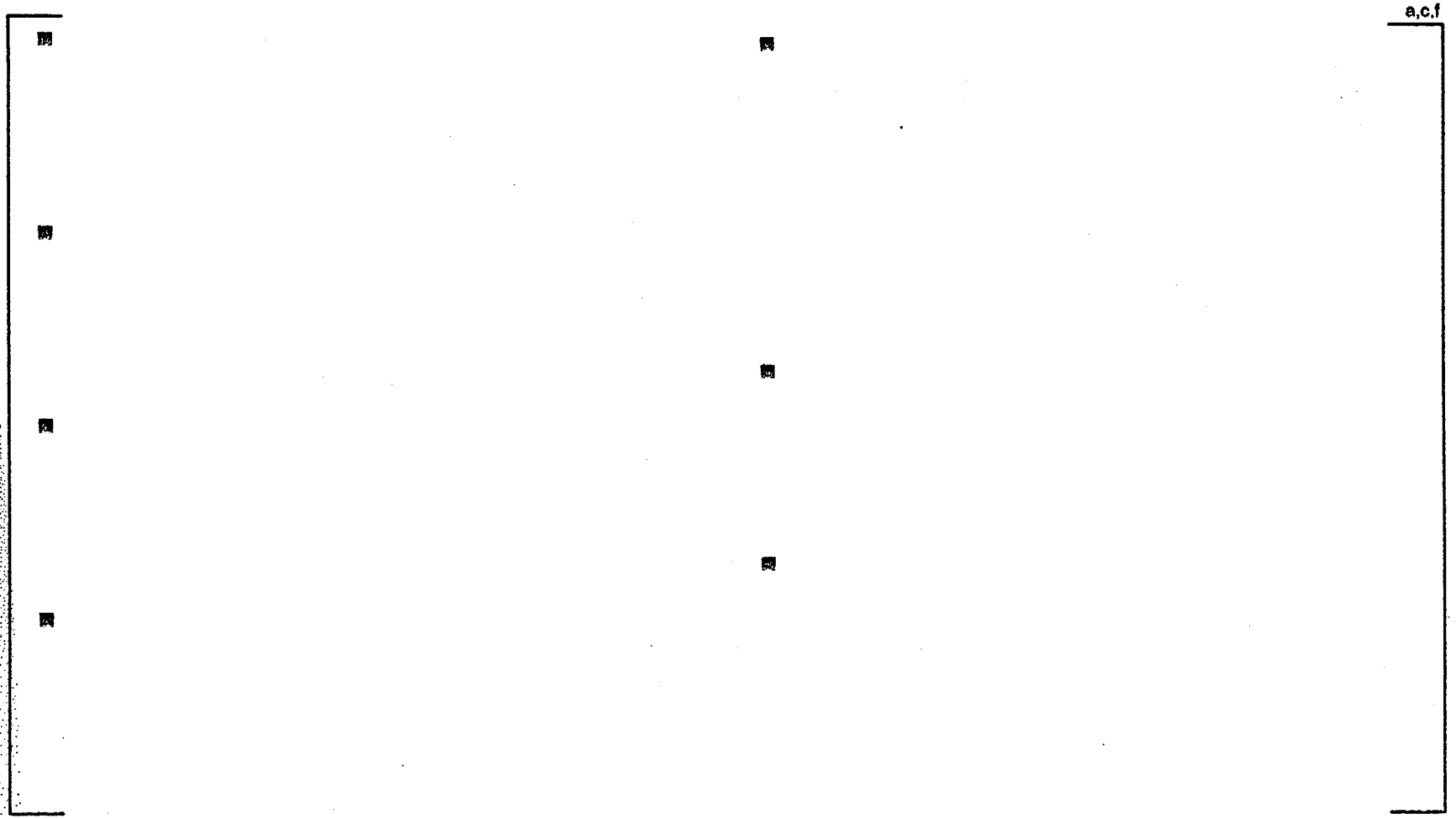
a,c,f



(6) I&C Upgrade System Thread Path from AI to RT

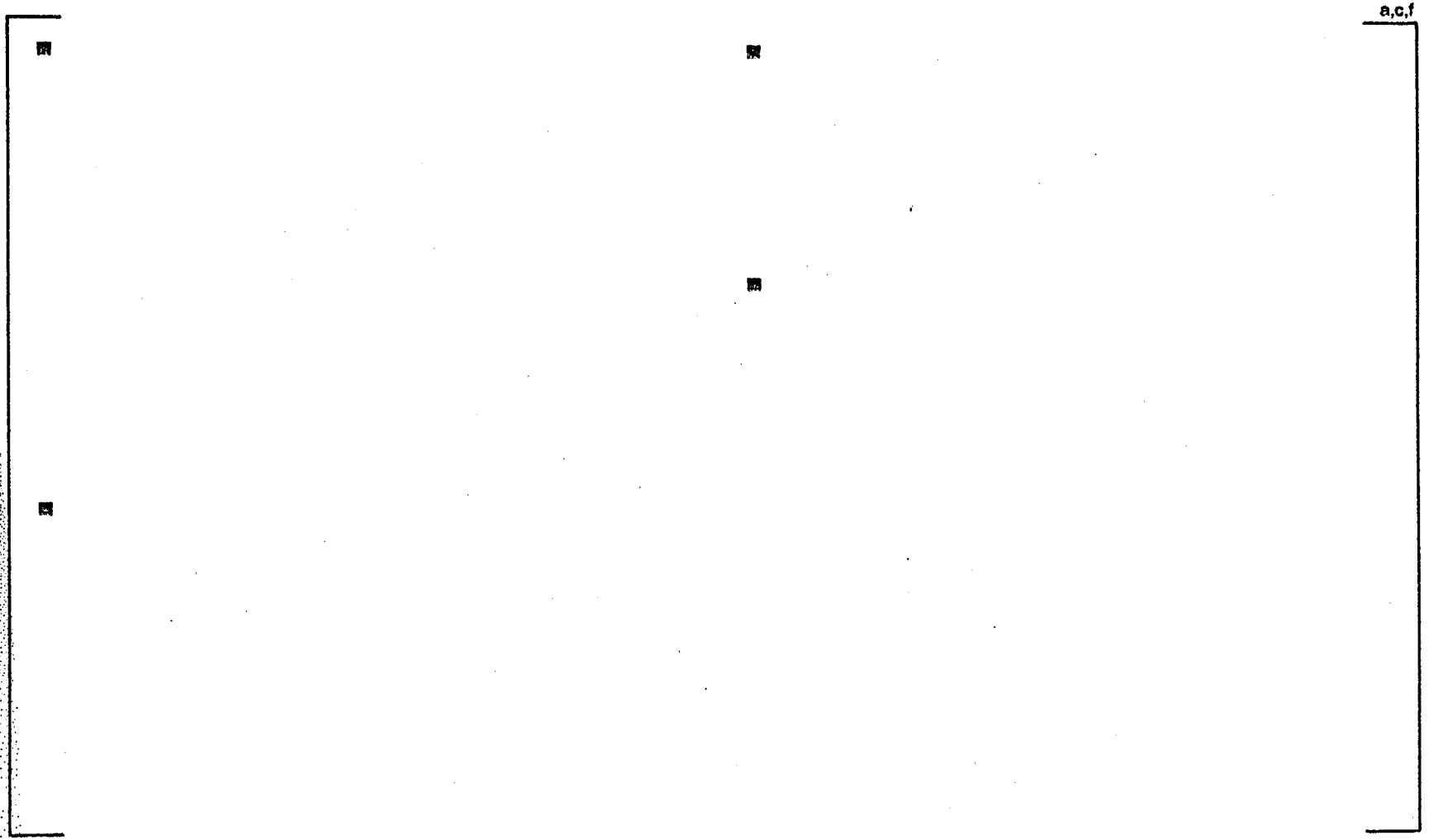
Thread Path AI to AIP Dynamic Data Table (Process Protection Set)

a,c,f



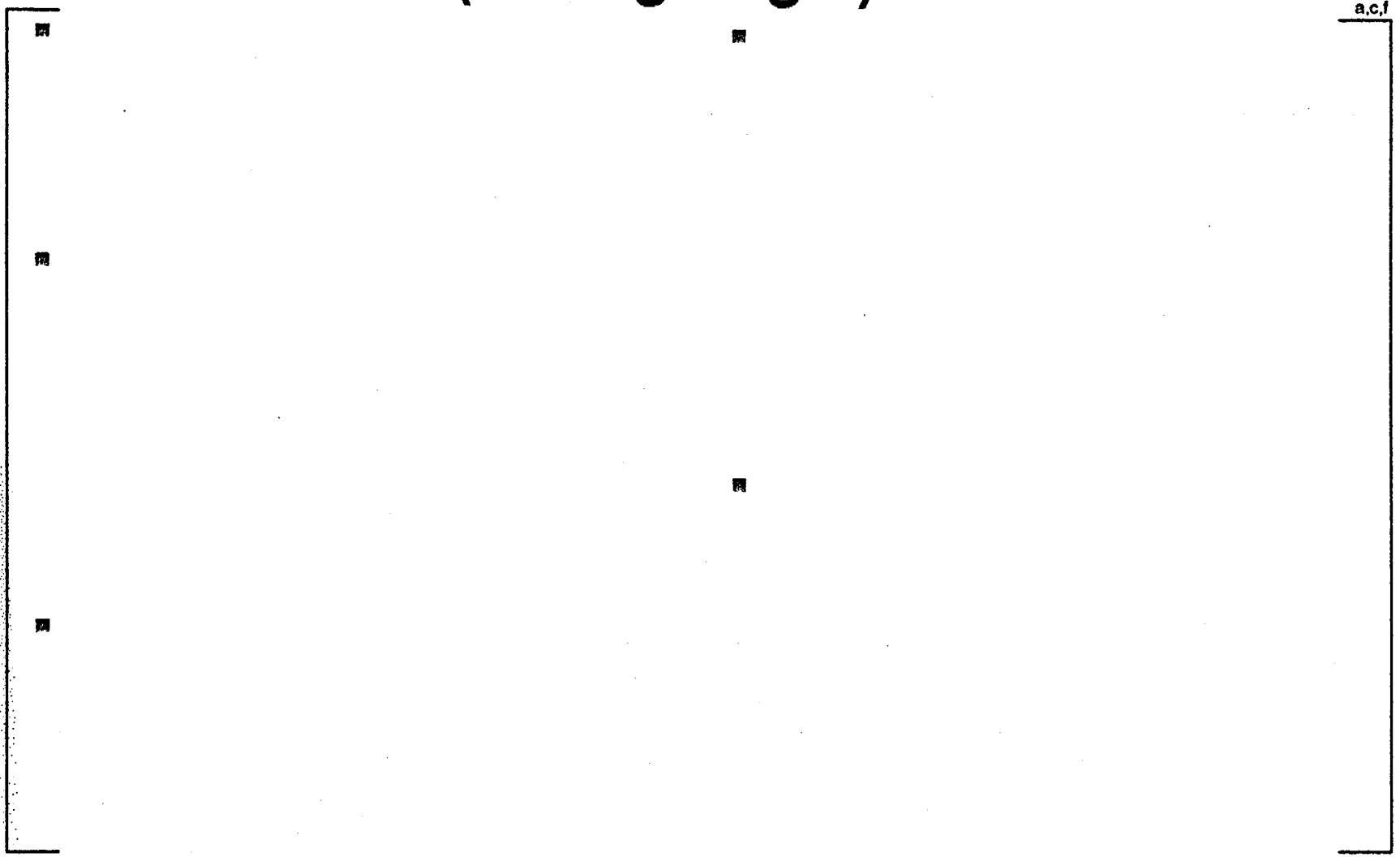
Thread Path AIP Dynamic Data Table to Data Link (Process Protection Set)

a,c,f



Thread Path Data Link to I/O Controller (Voting Logic)

a,c,f



Thread Path I/O Controller to Trip Breaker (Voting Logic, Dynamic Trip Bus and RT Breaker)

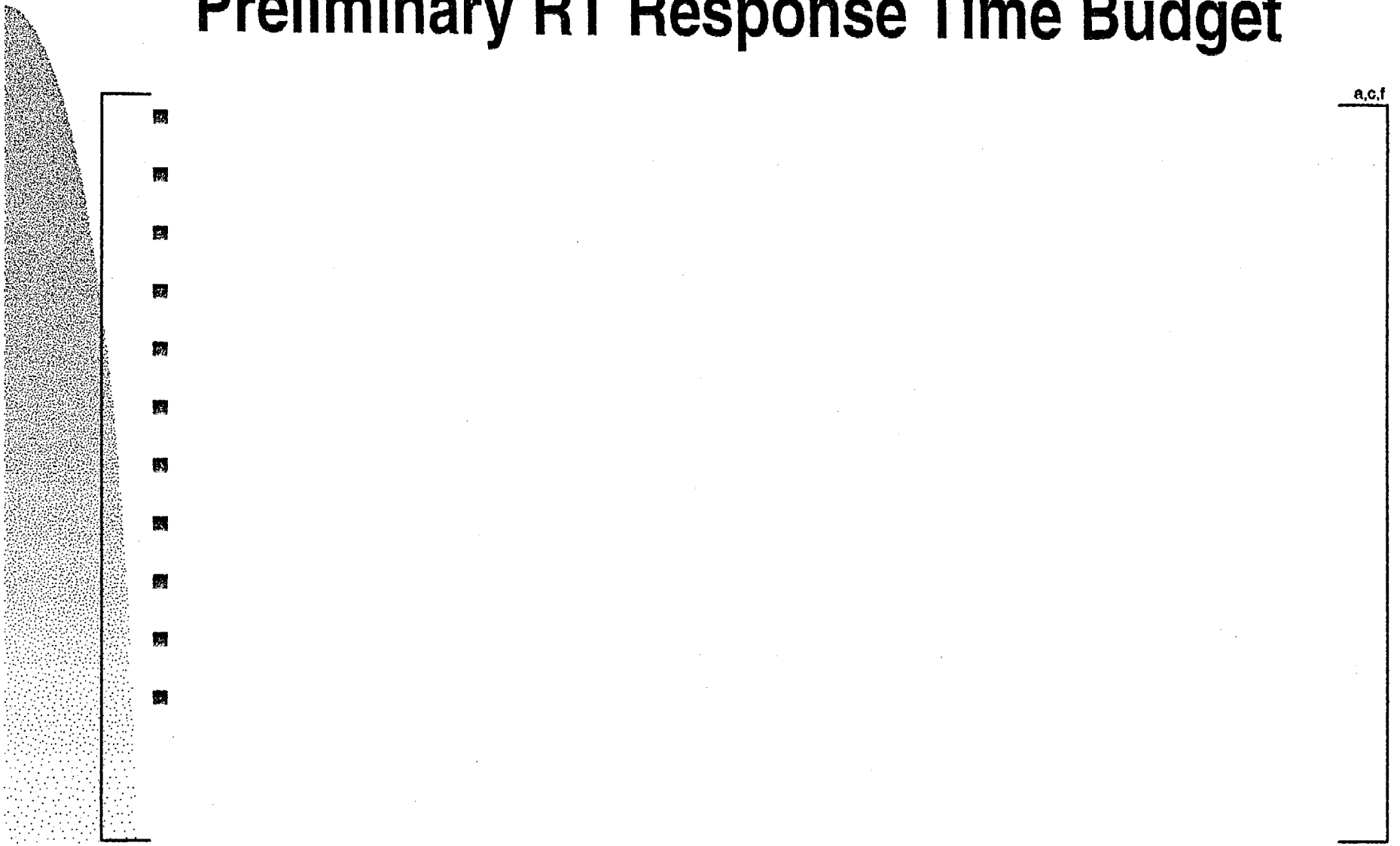
a,c,f

(7) I&C Upgrade System Response Time

Response Time Budget

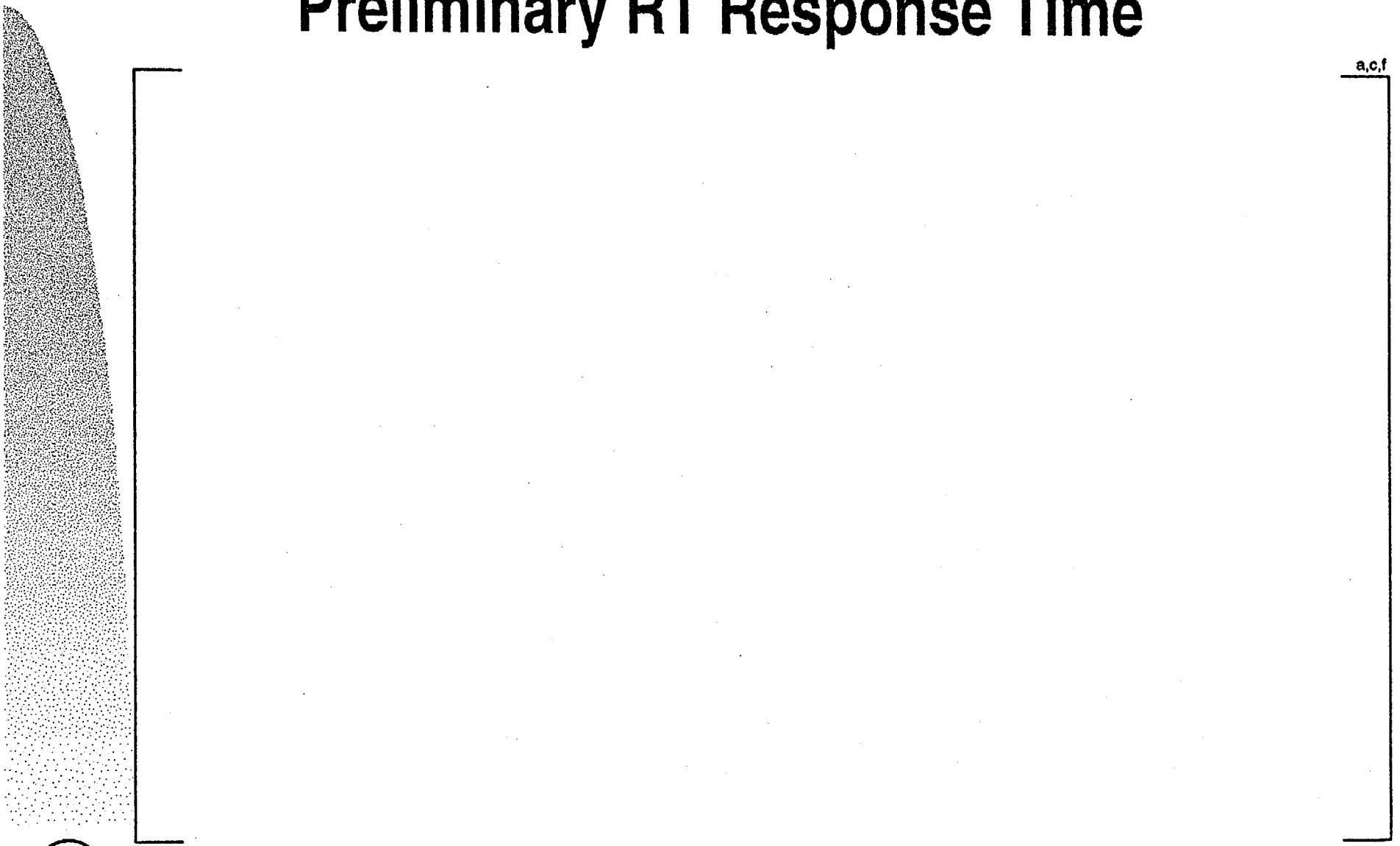
- Three Cases Based on Physical Topology
  - RT - Reactor Trip With Inputs Through Process Protection
  - ESF - ESF Actuation With Inputs Through Process Protection
  - NI - Reactor Trip With Inputs Directly to RT Voter

Preliminary RT Response Time Budget



Preliminary RT Response Time

a,c,f

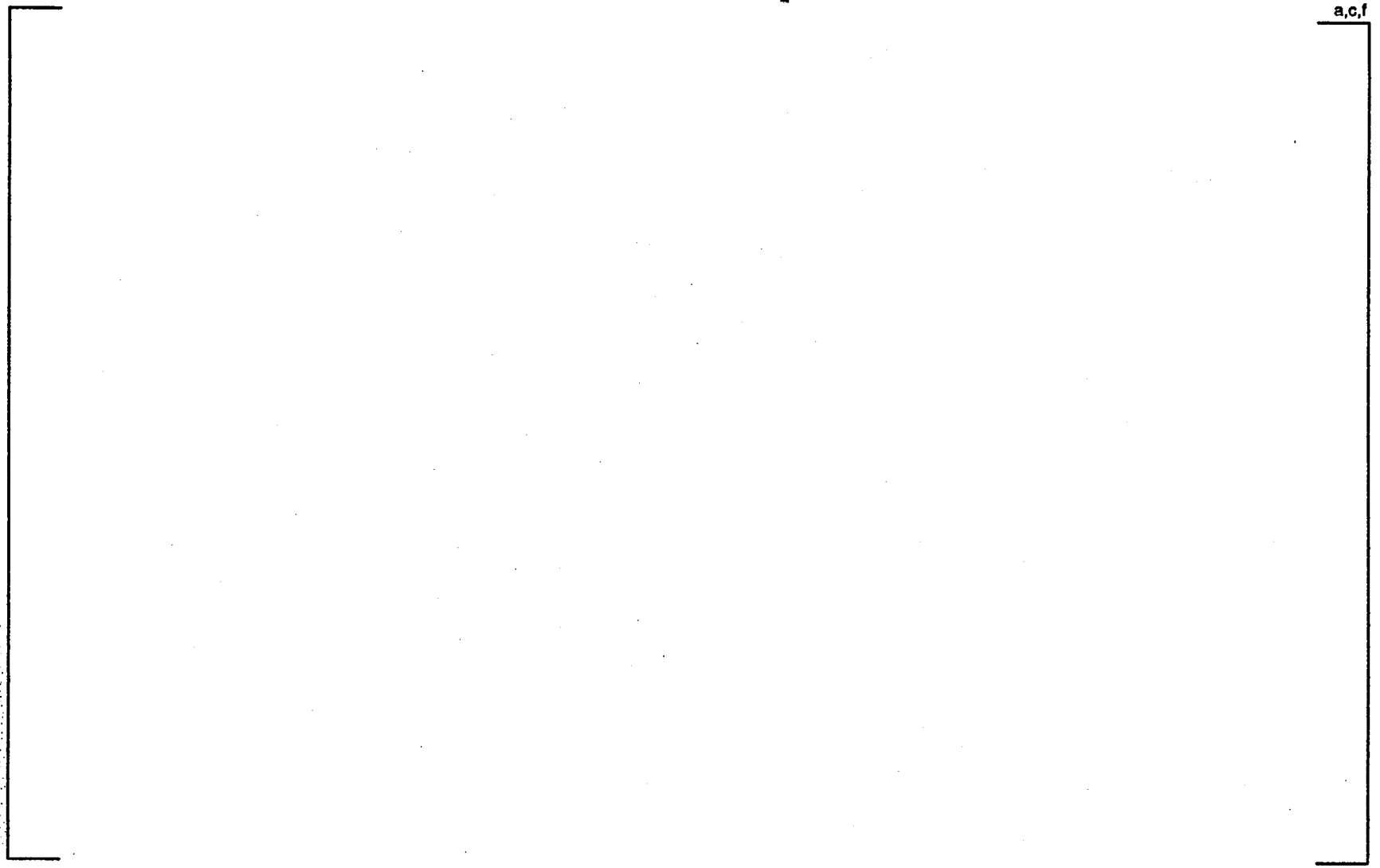


Preliminary ESF Response Time Budget

a,c,f

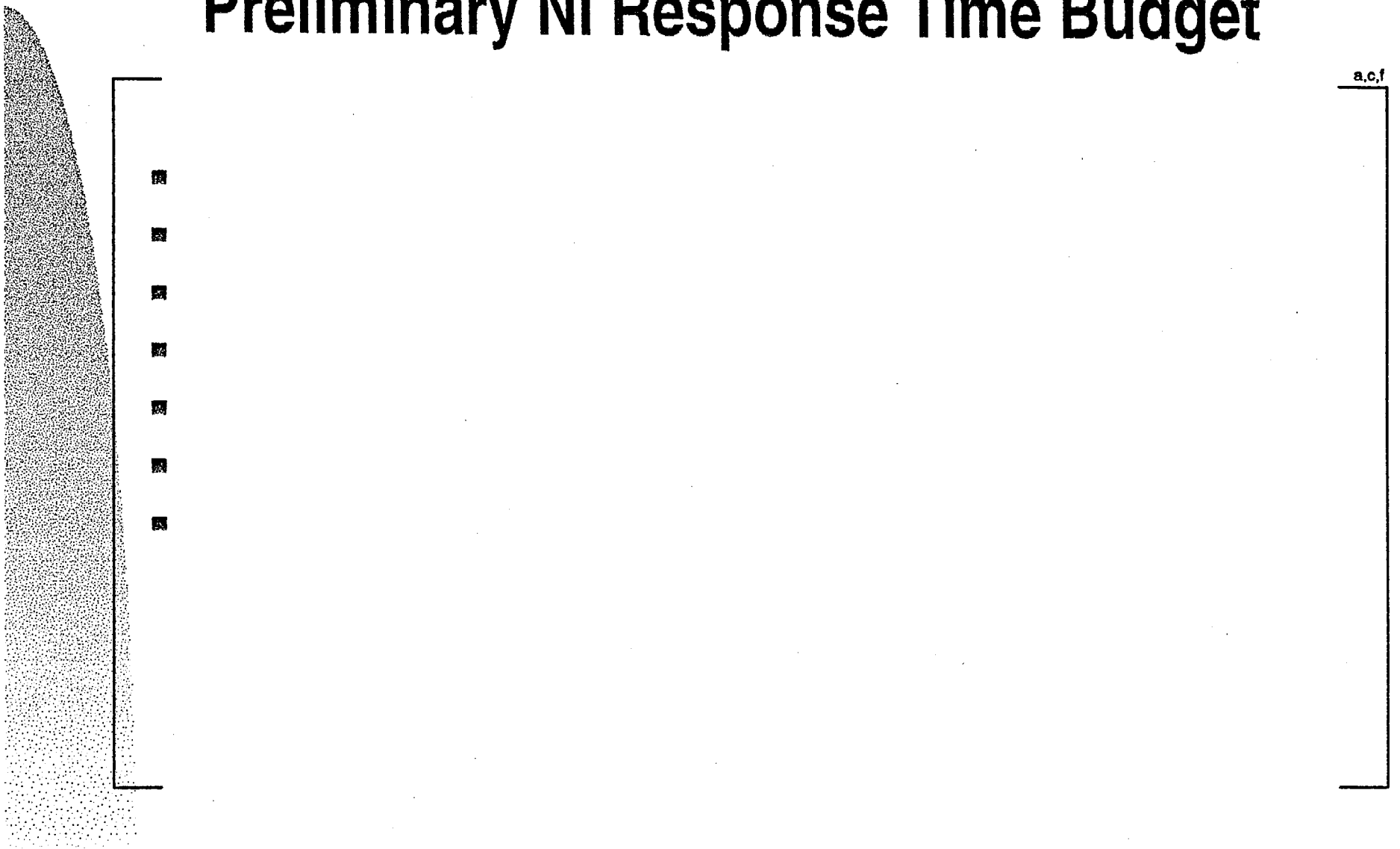
Preliminary ESF Response Time

a,c,f



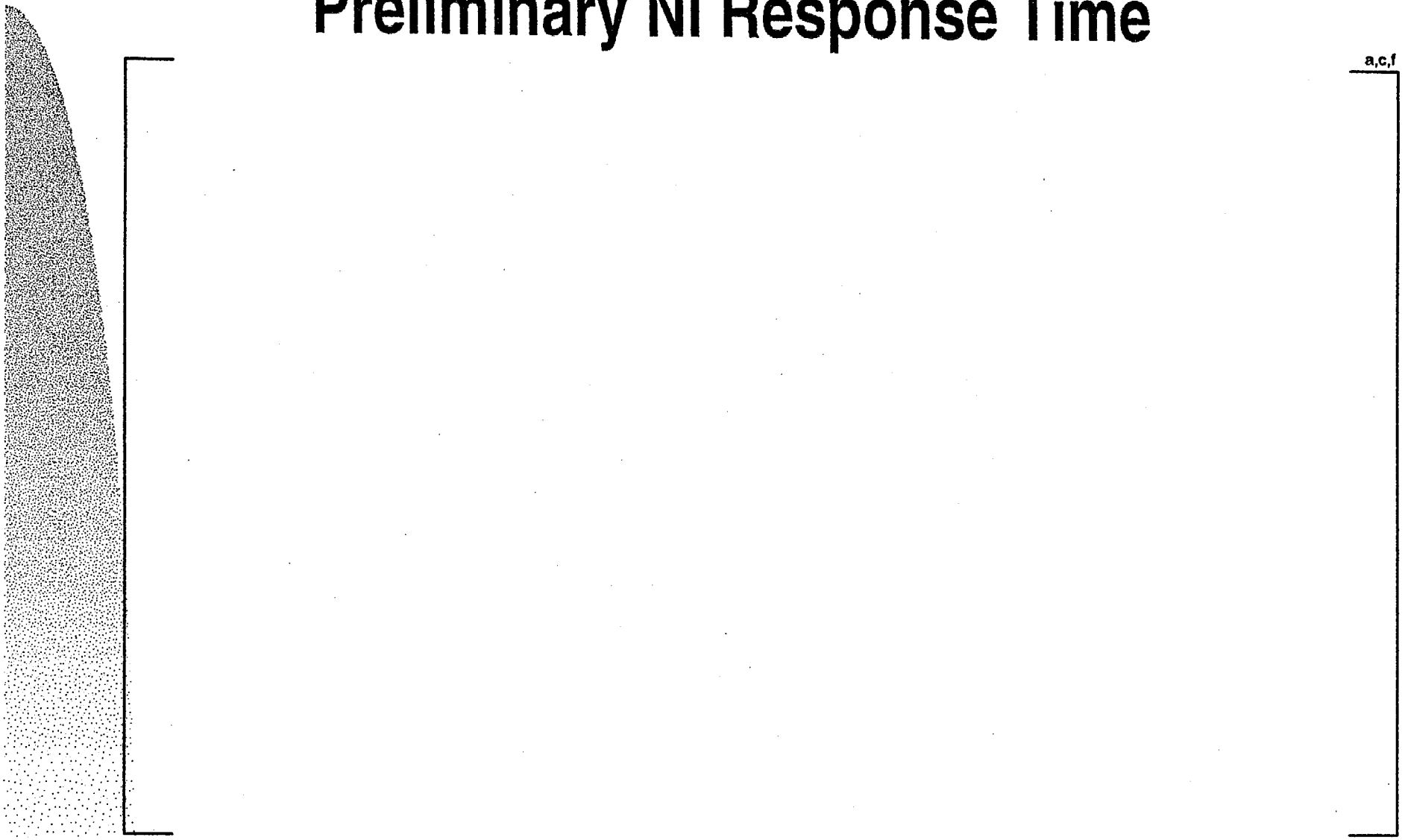
Preliminary NI Response Time Budget

a,c,f

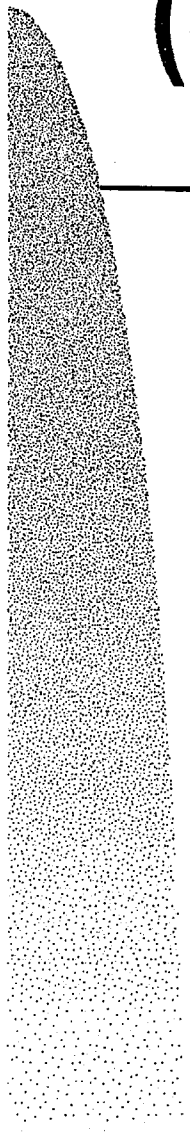


Preliminary NI Response Time

a,c,f



(8) Design Constraints Concerning Hardware Interrupts



Definition of Hardware Interrupts

Interrupt (IEEE 610.12): "The suspension of a process, such as the execution of a computer program, to handle an event external to the process, performed in such a way that the process can be resumed."

a,c,f

Use of Hardware Interrupts

- The Basis of (W) Design Constraints is IEC 880-1986
- IEC 880-1986 B2.*e:*
  - "The use of Interrupts shall be restricted".
- IEC 880-1986 B2.*ea:*
  - "Interrupts may be used if they simplify the system."

Use of Hardware Interrupts E3 Design Constraints

a,c,f

Use of Hardware Interrupts

a,c,f

(Appendix A) Answers to NRC Questions Received Prior to the Meeting

Questions 1-2

- (1) What hardware interrupts does the processor use?

a,c,f

  - See Section 8.
- (2) Describe the process by which analog data is acquired and how it gets into memory?
  - See Section 6.

Question 3

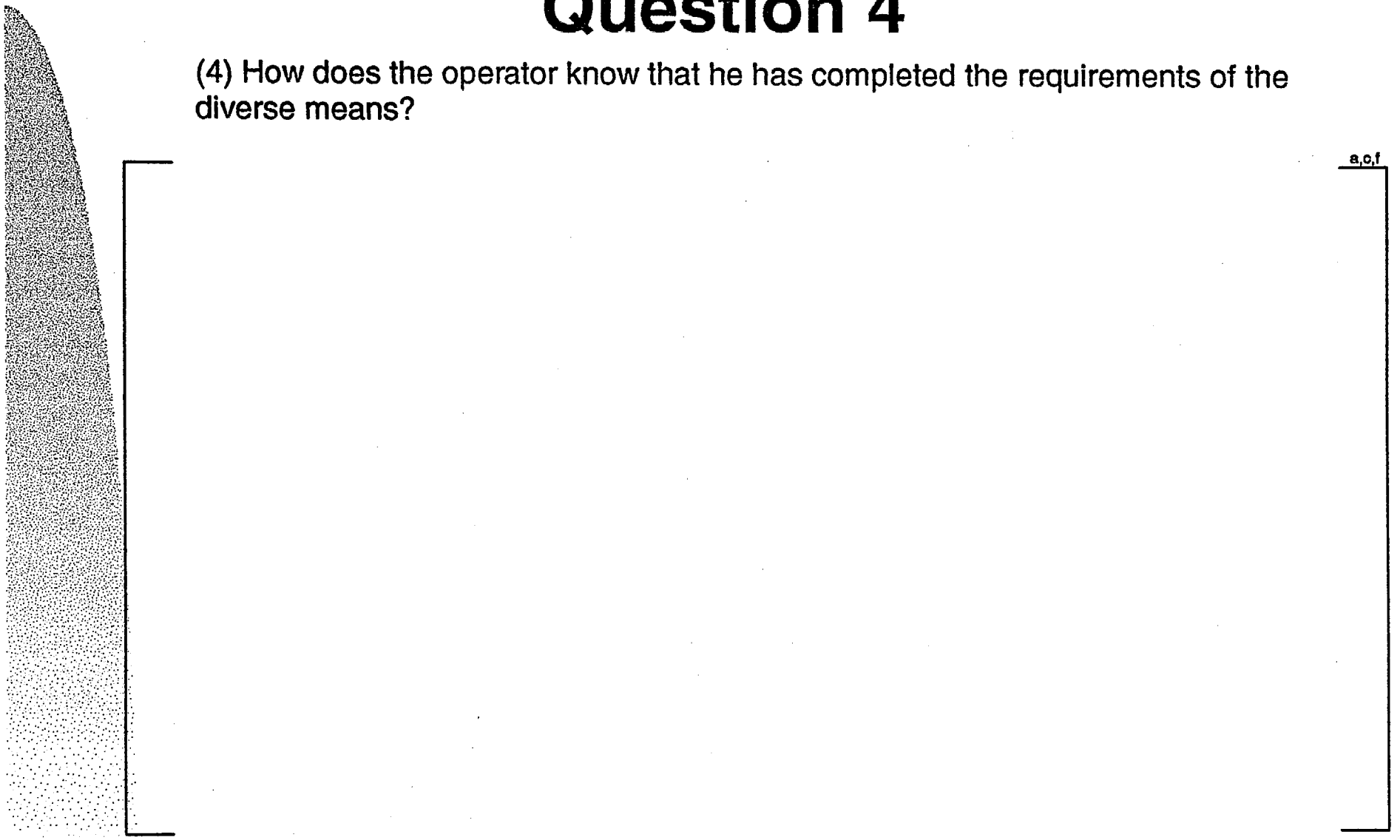
(3) How does the operator know that it is necessary to go to diverse means?

a,c,f

Question 4

(4) How does the operator know that he has completed the requirements of the diverse means?

a,c,f



Questions 5-8

- (5) What on-line diagnostics will be running?
  - [ ] a,c,f
  - See Section 5, Page 69.
- (6) What is the purpose of the online diagnostics?
  - Increased Availability
  - See Section 5, Page 68.
- (7) How do they work?
  - See Section 5, Page 70.
- (8) How often do they run?
  - [ ] a,c,f
  - See Section 5, Page 70.

Questions 9-12

- (9) How do you know they are executing?

a,c,f

- (10) Can the on-line diagnostics become corrupted?

a,c,f

- (11) Is there any indication if they fail to run?

a,c,f

- (12) Can an on-line diagnostic corrupt an application program?

a,c,f

Questions 13-16

- (13) If it does, how do you know it?

a,c,f

- (14) How much processor time is used to execute the diagnostics?

a,c,f

  - See Section 5, Page 70.

- (15) How much processor time can be used for application software?

a,c,f

- (16) How much memory is required for the diagnostics?

a,c,f

Questions 17-20

- (17) How much memory can be allocated to application software?
  - [ ] a,c,f
- (18) What is the interrupt structure for scheduling diagnostics?
  - [ ] a,c,f
  - See Section 5, Page 70.
- (19) Can a diagnostic be interrupted before it completes?
  - [ ] a,c,f
  - See Section 5, Page 70.
- (20) If it does, how can you be sure that it restarts in the correct location?
  - [ ] a,c,f
  - See Section 5, Page 70.

Questions 21-24

- (21) How many processors are there and where are they located?

a,c,f

- (22) What are the different types of memory and where is it located?

a,c,f

- (23) How is memory used?
  - See Question 22
- (24) Where do application programs reside?

a,c,f

Questions 25 -27

- (25) Where do program constants reside?

a,c,f

- (26) Where do diagnostics reside?

a,c,f

- (27) What is the protocol for scheduling tasks?

a,c,f

- See Section 5, Page 73.

(Appendix B) Answers to NRC Questions Raised During the Meeting

Questions 1 -2

1. Do we access calibration constants (setpoints and tuning constants) from FLASH memory each cycle or do we get them from RAM that is copied from FLASH memory during initialization?

a,c,f

2. Floating point numbers - How many bits?

a,c,f

Questions 3-4

3. Which counter is used for determining cycle time?

a,c,f

4. Does CPCI have a CRC or other error detection mechanisms?

a,c,f

Question 5

5. Is autocalibration unique for every input channel?

[a,c,f]

Question 6

6. What type of failure detection is present on analog input modules?

a,c,f

Question 7

7. What is the clock rate of each processor in the system?

[a,c,f]

Questions 8-9

8. Is there a limit on the number of restarts (resets) of a processor? How is this limited?

a,c,f

9. Where is information (number of resets) being stored when a restart occurs?

a,c,f

Questions 10-11

10. Is there a task scheduler (hardware) used on the processor?

a,c,f

[redacted]

11. Are we using single-shot or continuous transmission of data?

a,c,f

[redacted]

Questions 12-13

12. How long is the time-out on loss of datalink communications?

a,c,f

13. Can the host processor on CPCI reset the slaves so that they reload their program?

a,c,f

Questions 14-15

14. Suggested change: Send Datalink error counter (CRC, etc) information for display and alarm.

a,c,f

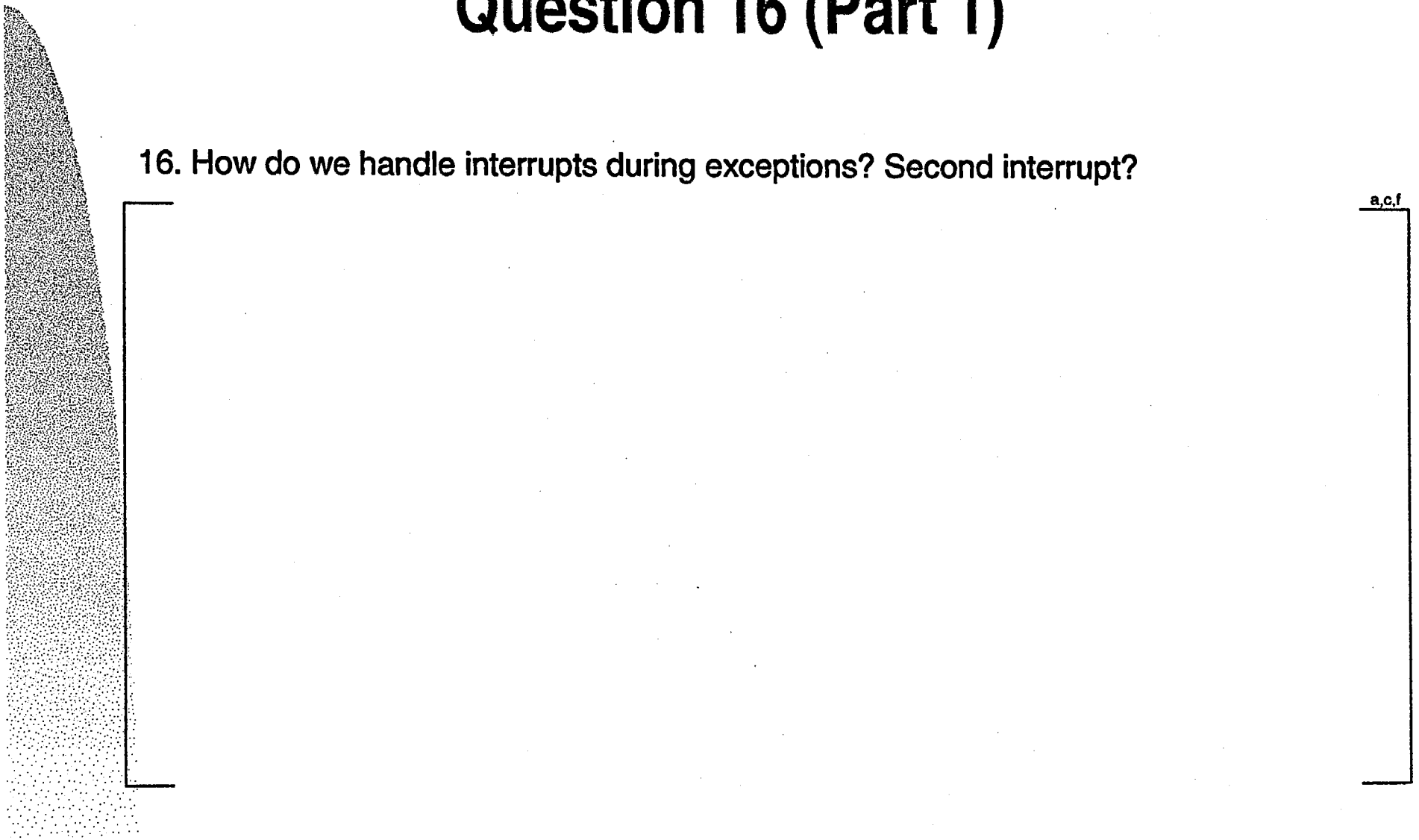
15. How do we verify that the diagnostics have completed their cycle?

a,c,f

Question 16 (Part 1)

16. How do we handle interrupts during exceptions? Second interrupt?

a,c,f



Question 16 (Part 2)

a,c,f

Questions 17-18

17. Provide the interrupt vector table and a schematic for the host processor.

a,c,f

18. Consider changing the "PROM" checksum routines to use CRCs.

a,c,f