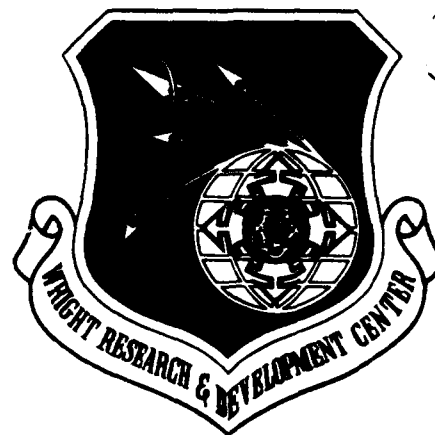


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Volume VIII
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INTEGRATED INFORMATION SUPPORT SYSTEM (IISS)
Volume VIII - User Interface Subsystem
Part 18 - Forms Language Compiler Unit Test Plan

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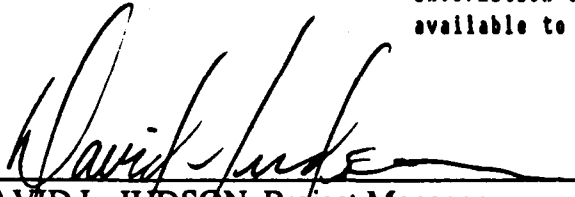
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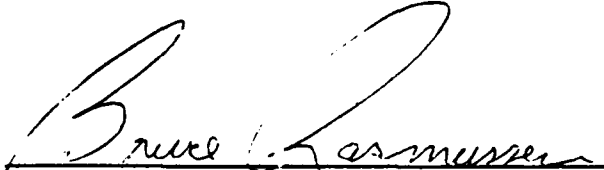
This technical report has been reviewed and is approved for publication.

This report is releasable to the National Technical Information Service (NTIS). At NTIS, it will be available to the general public, including foreign nations


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FOREWORD

This technical report covers work performed under Air Force Contract F33600-87-C-0464, DAPro Project. This contract is sponsored by the Manufacturing Technology Directorate, Air Force Systems Command, Wright-Patterson Air Force Base, Ohio. It was administered under the technical direction of Mr. Bruce A. Rasmussen, Branch Chief, Integration Technology Division, Manufacturing Technology Directorate, through Mr. David L. Judson, Project Manager. The Prime Contractor was Integration Technology Services, Software Programs Division, of the Control Data Corporation, Dayton, Ohio, under the direction of Mr. W. A. Osborne. The DAPro Project Manager for Control Data Corporation was Mr. Jimmy P. Maxwell.

The DAPro project was created to continue the development, test, and demonstration of the Integrated Information Support System (IISS). The IISS technology work comprises enhancements to IISS software and the establishment and operation of IISS test bed hardware and communications for developers and users.

The following list names the Control Data Corporation subcontractors and their contributing activities:

<u>SUBCONTRACTOR</u>	<u>ROLE</u>
Control Data Corporation	Responsible for the overall Common Data Model design development and implementation, IISS integration and test, and technology transfer of IISS.
D. Appleton Company	Responsible for providing software information services for the Common Data Model and IDEF1X integration methodology.
ONTEK	Responsible for defining and testing a representative integrated system base in Artificial Intelligence techniques to establish fitness for use.
Simpact Corporation	Responsible for Communication development.
Structural Dynamics Research Corporation	Responsible for User Interfaces, Virtual Terminal Interface, and Network Transaction Manager design, development, implementation, and support.
Arizona State University	Responsible for test bed operations and support.

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SECTION 1

GENERAL

1.1 Purpose

This unit test plan establishes the methodology and procedures used to adequately test the capabilities of the computer programs identified as the Forms Definition Language Compiler known in this document as FLAN and MAKE Includes known as MAKINC. FLAN and MAKINC are configuration items of the Integrated Information Support System (IISS) User Interface (UI).

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- [8] Structural Dynamics Research Corporation, Text Editor Development Specification, DS 620244600A, 16 February 1987.
- [9] Structural Dynamics Research Corporation, Form Processor Development Specification, DS 620244200A, 16 February 1987.
- [10] Structural Dynamics Research Corporation, Application Interface Development Specification, DS 620244700A, 16 February 1987.
- [11] Structural Dynamics Research Corporation, Forms Driven Form Editor Development Specification, DS 620244402A, 16 February 1987.

- [12] Structural Dynamics Research Corporation, User Interface Services Development Specification, DS 620244100A, 16 February 1987.
- [13] Structural Dynamics Research Corporation, Virtual Terminal Development Specification, DS 620244300A, 16 February 1987.

1.3 Terms and Abbreviations

Application Generator (AG): A subset of the IISS User Interface that consists of software modules that generate IISS application code and associated form definitions based on a language input. The part of the AG that generates report programs is called the Report Writer. The part of the AG that generates interactive applications is called the Rapid Application Generator.

Application Interface (AI): A subset of the IISS User Interface that consists of the callable routines that are linked with applications that use the Form Processor or Virtual Terminal. The AI enables applications to be hosted on computers other than the host of the User Interface.

Application Process (AP): A cohesive unit of software that can be initiated as a unit to perform some function or functions.

Attribute: A field characteristic such as blinking, highlighted, black, etc., and various other combinations. Background attributes are defined for some forms or windows only. Foreground attributes are defined for items. Attributes may be permanent, i.e., they remain the same unless changed by the application program, or they may be temporary, i.e., they remain in effect until the window is redisplayed.

Closed Figure: A figure is closed if the path traced by a moving point returns to its starting position. The starting position may be arbitrarily assigned. "Fillarea" is synonymous with "closed figure".

Complex Figure: A figure is complex if the path traced by a moving point crosses itself. An arbitrary point may be determined to be contained within the traced boundary if a line drawn to infinity crosses the boundary an odd number of times. If the number of crossings is zero or even, the point is outside the traced boundary.

Dependent Data: Data correlated to a dependent variable.

Dependent Variable: A mathematical variable whose value is determined by that of one or more other variables in a function.

Device Drivers (DD): Software modules written to handle I/O for a specific kind of terminal. The modules map terminal-specific commands and data to a neutral format. Device Drivers are part of the UI Virtual Terminal.

Display List: An internal Form Processor list that contains only those forms that have been added to the screen and are currently displayed on the screen, along with information on where those forms are used.

Element: A graphics line or other primitive composed of graphics lines, such as an arc.

Field: In reference to the Forms Processor, "field" refers to any object on the open or display list. These objects can be forms, items, windows, etc.

In reference to graphs, "field" refers to a collection of one or more graph figures. A graph field can be an axis, curve, pie chart, grid, etc.

Figure: A collection of elements. A figure may be closed or open.

Fillarea: A collection of elements. A fillarea must be closed. "Closed figure" is synonymous with "fillarea".

Form: A structured view which may be imposed on windows or other forms. A form is composed of fields. These fields may be defined as forms, items, windows, prompts, non-graphics lines, and graphics.

Forms Definition Language (FDL): The language in which electronic forms are defined.

Forms Driven Form Editor (FD FE): A subset of the Form Editor which consists of a forms-driven application used to create and/or modify Form Definition files interactively.

Form Editor (FE): A subset of the IISS User Interface that is used to create definitions of forms. The FE consists of the Forms Driven Form Editor (FD FE) and the Forms Language Compiler (FLAN).

Form Hierarchy: A graphic representation of the way in which fields are related to their parent form.

Forms Language Compiler (FLAN): A subset of the Form Editor that consists of a batch process that accepts a series of Forms Definition Language (FDL) statements and produces form definition files as output.

Form Processor (FP): A subset of the IISS User Interface that consists of a set of callable execution-time routines available to an application program for form processing.

Graph: A picture correlated with data that alters as the data changes; by necessity, this is a dynamic (not pre-defined) picture. A graph may be imposed on windows or forms.

Graph Definition Language (GDL): An extension of the Forms Definition Language (FDL) which is used to define business graphs such as pie charts, X-Y plots, and bar charts.

Graph Figure: A collection of graphics primitives. The primitives can be circles, lines, arcs, etc.

Graphics Kernal System (GKS): A 2-dimensional graphics standard which is defined independently of any programming language.

Icon: A collection of figures and points that is pre-defined. An icon may be imposed on windows or forms. "Icon" is synonymous with "picture".

Independent Data: Data that is correlated to an independent variable.

Independent Variable: A mathematical variable whose value is specified first and determines the value of one or more other values in an expression or function. For example, in a business graph of sales versus month, month is the independent variable and sales is the dependent variable, because sales varies by month.

Integrated Information Support System (IISS): A test computing environment used to investigate, demonstrate, and test the concepts of information management and information integration in the context of Aerospace Manufacturing. The IISS addresses the problems of integration of data resident on heterogeneous data bases supported by heterogeneous computers interconnected via a Local Area Network (LAN).

Item: A non-decomposable area of a form in which hard-coded descriptive text may be placed and the only defined area where user data may be input/output.

Local Area Network (LAN): A privately owned network that offers reliable, high-speed communications channels optimized for connecting information processing equipment in a limited geographic area.

Message: Descriptive text which may be returned in the standard message line on the terminal screen. They are used to warn of errors or to provide other user information.

Message Line: A line on the terminal screen that is used to display messages.

Open Figure: A figure is open if the path traced by a moving point does not return to its starting position. The starting position may be arbitrarily assigned. "Polyline" is synonymous with "open figure".

Open List: An internal Form Processor list that contains all forms that the application has opened for use along with information on where the form is used.

Operating System (OS): Software supplied with a computer which allows it to supervise its own operations and manage access to hardware facilities such as memory and peripherals.

Page: An instance of a form in a window that is created whenever a form is added to a window.

Physical Device: A hardware terminal.

Picture: A collection of figures and points that is pre-defined. A picture may be imposed on a window or a form. "Picture" is synonymous with "icon".

Picture Definition Language (PDL): An extension of the Forms Definition Language (FDL) which allows the definition of any graphics picture.

Point: A marker or a symbol.

Polyline: A collection of elements. A polyline must be an open figure. "Open figure" is synonymous with "polyline".

Primitive: The smallest unit of graphic detail. A graphic primitive can be a line, point, arc, etc.

Qualified Name: The name of a field preceded by the hierarchy path so that it is uniquely identified.

Report Writer (RW): Part of the Application Generator (AG) that generates source code for report programs based on a language input.

Subform: A form that is used within another form.

Text Editor (TE): A subset of the IISS User Interface that consists of a file editor that is based on the text editing functions built into the Form Processor (FP).

User Data: Data which is either input by the user or output by the application programs to items.

User Interface (UI): A subsystem of IISS that controls the user's terminal and interfaces with the rest of the subsystem. The UI consists of two major subsystems: the User Interface Development System (UIDS) and the User Interface Management System (UIMS).

User Interface Development System (UIDS): A collection of IISS User Interface subsystems that is used by application programmers as they develop IISS applications. The UIDS includes the Form Editor (FE) and the Application Generator (AG).

User Interface Management System (UIMS): The run-time UI. It consists of the Form Processor (FP), Virtual Terminal (VT), Application Interface (AI), the User Interface Services (UIS), and the Text Editor (TE).

User Interface Services (UIS): A subset of the IISS User Interface that consists of a package of routines that aid users in controlling their environment. It includes message management, change password, and application definition services.

User Interface/Virtual Terminal Interface (UI/VTI):
Another name for the User Interface.

Window: A dynamic area of a terminal screen on which pre-defined forms may be placed at run-time.

Window Manager: A facility which allows the following to be manipulated: size and location of windows, the device on which an application is running, the position of a form within a window. It is part of the Form Processor (FP).

SECTION 2

DEVELOPMENT ACTIVITY

2.1 Statement of Pretest Activity

During system development, the computer programs will be tested progressively. Functionality will be incrementally tested and as bugs are discovered, the software will be corrected.

2.2 Pretest Activity Results

This activity is not applicable until development begins.

SECTION 3

SYSTEM DESCRIPTION

3.1 System Description

FLAN is a compiler which translates Form Definition Language source files into binary Form Definition File format. The binary Form Definition Files are then used as input by the Form Processor (another configuration item of the IISS UI) for display and entry of data under the control of other application programs.

The format of the binary Form Definition Files produced by FLAN is constrained to agree with the format expected by the Form Processor configuration item.

The syntax of the Form Definition Language accepted as input is described in the Forms Language Compiler Development Specification.

The interface block diagram for FLAN is shown in Figure 3-1. The top box represents the file MYFORMS which is input to the FLAN compiler (second box). FLAN produces a Form Definition object file (FD) for each CREATE FORM statement in the source file. Each FD file is input for the Form Processor which is part of the User Interface system. The compilation of an FDL file which results in an FD file is the same as program language compilation. The FDL file is the source; the FD file is the object.

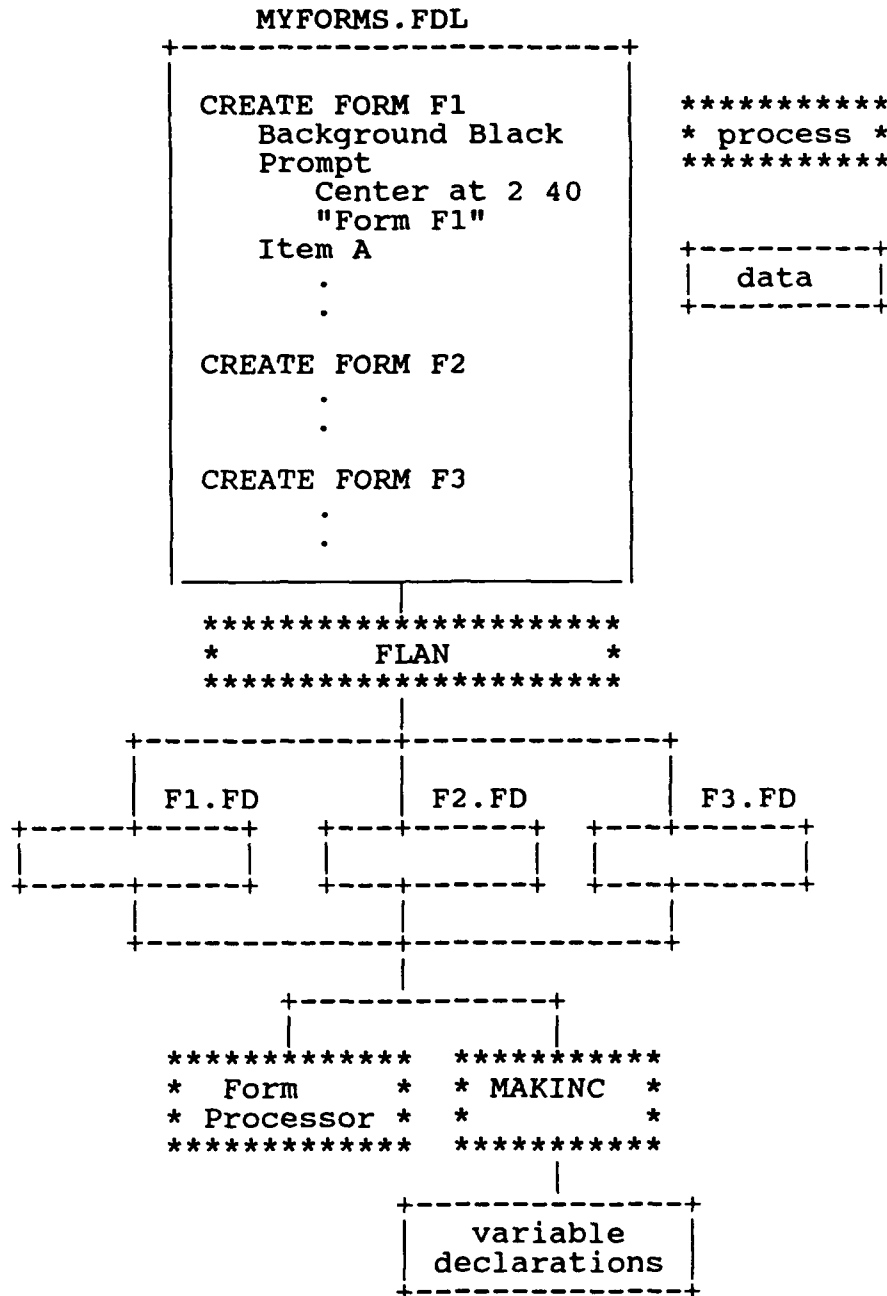


Figure 3-1 FLAN Interfaces

While FLAN is normally invoked from the IISS Function Screen another version is available which can be invoked from the host system. This second version is required so current configuration management software can be used in managing FDL files in a manner similar to other source files.

MAKINC is a program that creates program variable declarations which correspond to the structure of a form and may be used in application programs which make use of the Form Processor calls PDATA and GDATA. The following programming languages are supported: PL/I, COBOL, and C. MAKINC is invoked from the host system.

3.2 Testing Schedule

The execution of FLAN is dependent upon the NTM subsystem of IISS and testing of FLAN must be done only after the NTM has been successfully tested. Within the UI subsystem, FLAN uses the Forms Processor and must be tested only after its successful test.

3.3 First Location Testing

These tests of FLAN require the following:

Equipment: IISS Air Force Testbed VAX or IBM, terminals supported by the Virtual Terminal as listed in the IISS Terminal Operator Guide.

Support Software: The Integrated Information Support System, a C compiler and the UI/VTI subsystem.

Personnel: One integrator familiar with the IISS FLAN.

Training: FLAN training and manuals have been previously provided with all past releases.

Deliverables: The Forms Language Compiler subsystem of the IISS UI/VTI.

Security considerations: None.

Test Materials: This test is interactive and can be manually performed as outlined in this test plan.

3.3.1 VAX Environment Test Materials

This test also could be run as a script file if so desired. No script file has been provided because it is believed that on first testing it should be observed and then may be run again to create a script file for later testing reruns.

3.4 Subsequent Location Testing

The requirements as listed above need to be met. The script file, FLANUTP.SCP and the saved output to be used for comparison, FLANUTP.SAV are under IISS Configuration Management.

SECTION 4

SPECIFICATIONS AND EVALUATIONS

4.1 Test Specification

The following requirements are demonstrated by the outlined tests:

4.1.1 Test Forms

Functional Requirements	Test Activity												
	A	B	C	D	E	F	G	H	I	J	K	L	M
Specification of forms:													
background attributes	*												
form prompts	*												
size	*												
fields		*											
Specification of fields:													
type of field			*										
arrays				*									
location					*								
size					*								
display attributes						*							
field prompts							*						
domain (item only)								*					
help(message and form)									*				
value (item only)										*			
appears if											*		
generate form definitions												*	
semantic error messages													*

- A - input of forms fat1 and fat2.
- B - input of form testform.
- C - input of field types: items, windows and forms.
- D - input of item field i4.
- E - input of all fields.
- F - input of all items and windows.
- G - input of items i1, i5, i6, i7, i8, i9, i10, i0, window w1, form fat1.
- H - input of items i5, i6, i7, i8.
- I - input of items i9, i10.
- J - input of items i1, i2, i3.
- K - form definitions used by Form Processor.
- L - input of file FLAN2.FDL.
- M - Figures 5-9a through 5-32d

4.1.2 Test Graphs

The following functionality of the GDL is demonstrated by the test outlined in section 5:

List of Functions

GRAPH DEFINITION

1. bar
2. pie
3. line
4. independent axis
5. independent data

ATTRIBUTE DEFINITION

6. color
7. font
8. size
9. upvector
10. line width
11. line type
12. symbol
13. symbol frequency

DATA LOCATION

14. constant list
15. path list

CURVE DEFINITION

16. absolute display
17. additive display
18. dependent axis
19. independent data
20. shading
21. monochromatic shading
22. display
23. monochromatic display
24. legend label

LEGEND

- 25. enclosed
- 26. not enclosed
- 27. horizontal
- 28. vertical

PIE SEGMENT

- 29. explosion
- 30. shading
- 31. monochromatic shading
- 32. legend label
- 33. label
- 34. inside percent label
- 35. outside percent label
- 36. inside quantity label
- 37. outside quantity label

AXIS DEFINITION

- 38. length
- 39. log scale
- 40. linear scale
- 41. grid lines
- 42. fine grid lines
- 43. horizontal
- 44. vertical
- 45. location
- 46. label
- 47. maximum limit
- 48. minimum limit
- 49. minor tick marks
- 50. major tick marks by step
- 51. major tick marks by number
- 52. major tick mark labels

AUTOMATIC GENERATION

- 53. independent axis
- 54. dependent axis
- 55. tick marks
- 56. axis length
- 57. minimum axis value
- 58. maximum axis value
- 59. tick mark labels
- 60. legend labels
- 61. pie segments
- 62. pie segment percent label
- 63. automatic layout

CLIPPING

- 64. polyline clipping
- 65. fillarea clipping
- 66. text clipping

Tables 4-1 and 4-2 show the direct correspondence between the test graphs and the functional requirements as listed in this section. These functions directly correspond to the detailed functional requirements of the Graph Definition Language Development Specification. The 'x' indicates the tests for the functionality implemented in the current release. The '*' indicates functionality not yet implemented.

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z
1	x									x				x	x			x	x	x						x
2			x	x			x	x	x												x	x	x	x	x	
3		x			x	x					x	x	x			x	x									
4	x	x			x	x				x	x	x	x	x	x	x	x	x	x	x						x
5	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
6	x	x			x	x				x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
7																										
8																										
9																										
10																										
11																										
12																										
13																										
14		x			x	x				x	x	x	x	x	x	x	x	x	x	x						x
15	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
16	x	x			x	x				x	x	x	x	x	x	x	x	x	x	x						x
17	x	x			x	x				x	x	x	x	x	x	x	x	x	x	x						x
18	x	x			x	x				x	x	x	x	x	x	x	x	x	x	x						x
19																										
20																										
21																										
22																										

Continued on next page

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z
23																										
24	x										x	x	x	x	x	x	x	x	x	x						
25																	x	x	x	x	x	x	x			
26	x										x	x	x	x	x											
27												x	x				x		x	x						
28	x										x	x				x	x		x					x	x	x
29			x			x	x	x															x	x	x	x
30		x	x			x	x	x															x	x	x	x
31																										
32																								x	x	x
33																								x		x
34																								x		x
35																								x	x	x
36																								x		
37																								x	x	x
38	x	x			x	x				x	x	x	x	x	x	x	x	x	x	x						x
39																										
40	x	x			x	x				x	x	x	x	x	x	x	x	x	x	x						x
41																										
42																										
43	x	x			x	x				x	x	x	x	x	x	x	x	x	x	x						x
44	x	x			x	x				x	x	x	x	x	x	x	x	x	x	x						x

Continued on next page

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z
45	x	x			x	x				x	x	x	x	x	x	x	x	x	x	x						x
46	x	x			x	x					x	x	x	x	x	x	x	x	x	x						x
47																										
48	x																									
49										x																
50	x																									
51										x																
52	x									x																
53																										
54																										
55	x	x			x	x				x	x	x	x	x	x	x	x	x	x	x						x
56																										
57	x	x			x	x				x	x	x	x	x	x	x	x	x	x	x						x
58	x	x			x	x				x	x	x	x	x	x	x	x	x	x	x						x
59	x	x			x	x				x	x	x	x	x	x	x	x	x	x	x						x
60																										
61																										
62			x	x			x	x	x													x	x	x	x	

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z
63																										
64		x				x				x	x	x	x	x	x	x	x	x	x	x			x			x
65							x			x				x	x			x	x	x						
66		x			x	x	x	x	x		x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x

Table 4-1 Matrix Mapping GDL Functions to Test Graphs

	AA	BB	CC	DD	EE	FF	GG	
1	x		x			x		
2		x			x			
3				x			x	
4	x		x	x		x	x	
5	x		x	x		x	x	
6	x	x	x	x	x	x	x	
7								*
8								*
9								*
10								*
11								*
12								*
13								*
14	x		x	x		x	x	
15	x	x	x	x	x	x	x	
16	x		x	x		x	x	
17	x		x				x	
18	x		x	x		x	x	
19								*
20	x		x			x	x	
21								*
22	x			x			x	

Continued on next page

	AA	BB	CC	DD	EE	FF	GG	
23								*
24			x	x		x	x	
25								
26			x	x		x	x	
27								
28			x	x		x	x	
29		x			x			
30		x			x			
31								
32								
33					x			
34					x			
35								
36								
37								
38	x		x	x		x	x	
39								*
40	x		x	x		x	x	
41	x		x	x		x	x	
42	x							
43	x		x	x		x	x	
44	x		x	x		x	x	

Continued on next page

	AA	BB	CC	DD	EE	FF	GG	
45	x		x	x		x	x	
46			x	x		x	x	
47	x							
48			x	x		x	x	
49	x							
50								
51	x		x	x		x	x	
52	x		x	x		x	x	
53								*
54								*
55	x		x	x		x	x	
56								*
57	x		x	x		x	x	
58	x		x	x		x	x	
59	x		x	x		x	x	
60	x							
61								*
62								
63								*
64	x							
65	x							
66								

Table 4-2 Matrix Mapping GDL Functions to Test Graphs

The test activities labeled A through GG map to the figures in Appendices C and D as follows:

A - Figure C-1
B - Figure C-2
C - Figure C-3
D - Figure C-4
E - Figure C-5
F - Figure C-6
G - Figure C-7
H - Figure C-8
I - Figure C-9
J - Figure C-10
K - Figure C-11
L - Figure C-12
M - Figure C-13
N - Figure C-14
O - Figure C-15
P - Figure C-16
Q - Figure C-17
R - Figure C-18
S - Figure C-19
T - Figure C-20
U - Figure C-21
V - Figure C-22
W - Figure C-23
X - Figure C-24
Y - Figure C-25
Z - Figure C-26
AA - Figure C-27
BB - Figure D-1
CC - Figure D-2
DD - Figure D-3
EE - Figure D-4
FF - Figure D-5
GG - Figure D-6

4.1.3 Test 2-D Graphics

This section describes the functionality of the Graphics Definition Language (GDL) test outlined in Section 5:

Functional Requirements	Test Activity			
	A	B	C	D
Specification of Graphic Primitives:				
Polyline	*		*	
Polymarker	*		*	
Fill Area	*			
Text	*		*	
Display Attributes:				
Size	*		*	
Location	*		*	
Style	*		*	
Scroll Large 2-D Graphics region			*	*
Pick ICON			*	*
Combine Business graphics with 2-D graphics:				*
Subform with array of Items		*		

The test activities labeled A through D map to the figures as follows:

- A - Figure 5-39
- B - Figure 5-40
- C - Figure 5-41, 5-42
- D - Figure 5-43, 5-44

The steps outlined in Section 5 and the files in the appendices show the direct correspondence between the test and the functional requirements as listed in this section.

4.2 Testing Methods and Constraints

The tests as outlined in Section 5 must be followed. The required input is stated for each test. This testing tests the normal mode of operation of these functions and does not completely exercise all the error combinations that a user of the FLAN might create by faulty entry of field information. These tests have been done, however, through the normal testing done by the developer of these functions. No data recording is required. No additional constraints are placed on this unit test besides those listed in Section 5 of this unit test plan.

4.3 Test Progression

The progression of testing of the FLAN is fully outlined in Section 5 of this unit test plan. This progression should be followed exactly to insure the successful testing of this IISS configuration item.

4.4 Test Evaluation

If scripting is used on a VAX host, the test results are evaluated by using the command file DIFFILE.COM to compare the generated file, FLANTST.SAV with the file, FLANUTP.SAV in IISS Configuration Management. The only differences should be the time and date stamps on the IISS Function Screen.

No scripting ability is available for the IBM host.

4.4.1 Test Evaluation Stages

There are several stages in the testing of FLAN.

Forms Test:

Stage 1: Input the file FLAN1.FDL to FLAN. This will produce the FD files TESTFORM, I10HELP, FAT1 and FAT2 in the NTM directory.

Stage 2: Run ARTEST from the IISS Function Screen and add the form TESTFORM to screen. This will produce a screen like the one in Figure 5-7. Then terminate ARTEST and restart it. Follow the scenario shown in Figures 5-9a through 5-32d.

Stage 3: Input the file FLAN2.FDL to FLAN. This will produce the error messages listed in Section 5.1.2.3.

Graph Test:

Stage 1: Input the file GRAFTEST.FDL to FLAN. This will produce the necessary FD files in the tester's directory.

Stage 2: Input the file GRAFDE.FDL to RAP. This will produce the necessary FD files in the tester's directory.

Stage 3: Compile, link and sysgen the applications GRAFDE., and GRAFTST.

Stage 4: The test results are evaluated by comparing the information returned on the various output screens with that specified as successful for the given test. As outlined in section 5, each test of GDL functionality provides a screen with the output for a successful test. The data necessary for input is done automatically before the output screen. The only differences found should be the date and time stamps on the IISS Function Screen (Figure 5-3) and the first test output screen (Figure C-1).

2-D Graphics Test

Stage 1: Input the file ICONTST.FDL to RAP. This will produce the necessary FD file in the tester's directroy.

Stage 2: Compile, link, and sysgen the application ICONTST.

Stage 3: The test results are evaluated by executing the application ICONTST and comparing the information returned on the various ouput screens with the appropriate ouput as specified in Section 5.

SECTION 5

TEST PROCEDURES

5.0 Test Procedures

The Form Processor Unit Test Plan consist of the following three test cases:

- o Forms (with APPEARS IF)
Section 5.1 on page 5-1
- o Business Graphics (Pie, Bar, Line charts)
Section 5.2 on page 5-125
- o Graphics on Forms (Icons, 2-D graphics)
Section 5.3 on page 5-131

5.1 Forms Test Description

This test uses the test program ARTEST and two FDL source files. FLAN1.FDL defines a form with correct syntax and semantics to test all FLAN features and FLAN2.FDL defines a form that tests all semantic errors. ARTEST is used to test the APPEARS IF syntax of the language.

5.1.1 Forms Test Control

As outlined, this unit test is a manual test which may be done by anyone. The required input data are documented for each function being tested and the resulting successful output is also documented. The order of the testing is also completely documented. The test control information is completely described in Section 5.1.2. Verification of the test is by a manual comparison of the test output with the expected results as they are documented here.

5.1.2 Forms Test Procedures

To run the unit test, you must be logged on to an IISS account. The NTM must be up and running and the UI symbolic names IISSFLIB, IISSULIB and IISSMLIB must be defined as described in the host specific sections.

5.1.2.1 VAX Test Procedures

The IISSFLIB, IISSULIB and IISSMLIB symbolic names must be defined as logicals at the group level. IISSFLIB and IISSULIB should point to the directory containing the production form definitions (FD files). IISSMLIB should point to the directory containing the error messages (MSG files).

Assuming the NTM is up and running, an IISS user may start the test by accessing the IISS environment with scripting as follows:

```
$ SET DEF <to directory containing NTM environment>  
$ VT100 -RFLANUTP.SCP -SFLANTST.SAV
```

These commands start up the VT100 device driver with a source script as input and specify a save file for the results of the test. If the User Interface system has been installed at your site with a different device driver, then this step is amended as appropriate. The test begins executing on the terminal. The results of this test are saved in the current directory in the file FLANTST.SAV. To execute the test manually, enter only VT100 at the second '\$' and enter the data as shown in the following sections.

This brings up the IISS Logon Screen which must be filled in:

The diagram shows a rectangular box representing the IISS Logon Screen. Inside the box, there are three input fields stacked vertically, each preceded by a label: "User ID:", "Passvord:", and "Role:". Each label and its corresponding input field are centered horizontally. At the bottom left of the box, there is a label "MSG:" followed by a small square containing the number "0". At the bottom right of the box, there is a label "application".

Figure 5-1 IISS Logon Screen

- (1) USER ID is the identification name of the user, and is 1 to 10 alpha-numeric characters. USER ID is input as "MORENC".
- (2) PASSWORD must be the password associated with the USER ID, and is 1 to 10 alpha-numeric characters. PASSWORD is input as "STANLEY".
- (3) ROLE is any of the identifiers which are associated

with the USER ID, and is 1 to 10 alpha-numeric characters. It will be checked against functions and applications which are selected by the user. ROLE is input as "MANAGER".

When this form is correctly completed and the <ENTER> key is pressed, the form in Figure 5-2 is displayed.

5.1.2.2 Choosing the FLAN Function

Specific IISS functions are accessed through the form displayed in Figure 5-2.

IISS TEST BED VERSION 2.3			
Date: 12/ 4/87	Time: 8:30:46	User ID: MORENC	Role: MANAGER
Function:	Device Type:	Device Name:	
MSG: 0		application	

Figure 5-2 IISS Function Screen

When the form appears, the cursor is located in the Function field. The items in the form are summarized below:

- (1) DATE contains the current date. This may not be changed by the user.
- (2) TIME contains the current time. This may not be changed by the user.
- (3) USER ID is the user's identification that was entered in the previous form. This may not be changed by the user.
- (4) ROLE is the currently active role and was entered in the previous form. This may be changed at any time.
- (5) FUNCTION is the function the user desires to activate.

In the Function field enter FLAN. The screen in Figure 5-3 is displayed.

IISS Forms Definition Language Compiler Release 3.0

Forms Definition Language File Name:

MSG: 0 application

Figure 5-3 FLAN screen

In the input field type "FLAN1.FDL" (a copy of FLAN1.FDL must be in the NTM directory) and press the <ENTER> key. Wait for the IISS Function Screen to return. Next type in ARTEST in the Function field as shown in Figure 5-4.

IISS TEST BED VERSION 2.3

Date: 12/ 4/87 Time: 8:30:48 User ID: MORENC Role: MANAGER

Function: Device Type: Device Name:

MSG: 1 Application SDPLANZZZZ has terminated application

Figure 5-4 Starting ARTEST Application

Figure 5-5 shows the initial ARTEST screen.

The diagram illustrates the initial ARTEST screen layout. It features a 'Command Line' at the top left. Below it are two large rectangular boxes. To the right of the Command Line is a large box labeled 'form ff1'. Below the Command Line and the two large boxes are several smaller forms: 'form ff2' (two instances), 'form ff3' (two instances), 'form ff5' (one instance), 'form ff6' (one instance), and 'form ff7' (one instance). Below these are 'form ff4' (two instances) and 'form ff8' (one instance). At the bottom left, there is a section labeled 'Line 21 Display:' followed by 'Line 22' and 'Line 23'. Below this is a 'MSG:' field with the value '0'. At the bottom right, the word 'application' is displayed.

Figure 5-5 ARTEST Screen

In the command line type "ADDFRM SCREEN TESTFORM" as shown in Figure 5-6 and press the <ENTER> key.

Command Line	addfrm screen testform		form ff1
form ff2	form ff2	form ff3	form ff5
form ff4	form ff8		form ff6
form ff4			form ff7
Line 21 Display:			
Line 22			
Line 23			
MSG:	0	application	

Figure 5-6 Add Testform to Screen

Compare the appearance of the screen with Figure 5-7.

size/display domains		help	
1	☐ (must enter must fill numeric)	☐ message	
22	☐ (left lower)	☐ for	
22	☐ (right upper)		
333	☐ (max 10 min 0)		
333	☐ windows		
array		location	
☐ ☐ ☐	fat1 ☐	11 12 13 14	
☐ ☐ ☐	fat2 ☐	11 12 13 14	
☐ ☐ ☐		15 16 17 18	1b 1b
☐ ☐ ☐		16 16 17 18	1c 1c
☐ ☐ ☐		17 18 19 19	1a 1a
☐ ☐ ☐		18 19	
MSG: ☐ 0		application	

Figure 5-7 FLAN1.FDL/TESTFORM Screen

When finished viewing, press the <QUIT> key to terminate ARTEST. When the IISS Function Screen is displayed, enter ARTEST in the Function field to redisplay the initial ARTEST screen shown in Figure 5-5. The screens shown in section 5.1.4 describe the remainder of this unit test.

5.1.2.3 Standalone Version of FLAN on VAX

The standalone version of FLAN is invoked by typing "run [flandir]flansa.exe" where [flandir] is the IISS production directory containing the FLAN executable. When the "args:" prompt appears type "[formdir]flan2.fdl" where [formdir] is the directory containing the FLAN2.FDL file. The messages printed should be identical to the following list.

- 6: ERROR - must specify relative field name
- 13: ERROR - size not specified or invalid
- 18: ERROR - value too big for field
- 22: ERROR - no display attribute specified
- 64: ERROR - unterminated string
- 66: ERROR - value too big for field
- 70: WARNING - string too long
- 72: ERROR - duplicate field name: J
- 81: ERROR - duplicate display attribute specified
- 86: ERROR - unknown display attribute: UGLY
- 88: ERROR - no display attribute specified
- 92: ERROR - domain only legal for items
- 98: ERROR - duplicate justification specified
- 104: ERROR - duplicate case specified
- 110: ERROR - duplicate minimum specified
- 116: ERROR - duplicate maximum specified
- 122: ERROR - help only legal for items

122: ERROR - field NOTHING referenced in item BB not defined
122: ERROR - item HH off left of screen
122: ERROR - item G off top of screen
122: ERROR - form TESTERR prompt off top of screen
122: ERROR - form TESTERR prompt off left of screen
122: ERROR - circular reference in location of item DC
122: ERROR - circular reference in location of item CD
122: ERROR - overlap between item A and item CC
122: ERROR - overlap between item A and item E
122: ERROR - overlap between item A and item F
122: ERROR - overlap between item E and item F
122: WARNING - form TESTERR too wide for standard screen
122: WARNING - form TESTERR too long for standard screen
122: ERROR - form TESTERR too narrow: fields extend to
column 157
122: ERROR - form TESTERR too short: fields extend to row 25
130: ERROR - duplicate help specified
136: WARNING - help message too long, truncated
142: ERROR - value only legal for items
156: ERROR - unknown function FUNC
162: ERROR - invalid argument for INDEX
168: ERROR - duplicate size specified
173: ERROR - unterminated comment Unable to continue...

5.1.3 IBM Test Procedures

Partitioned datasets must be allocated for each of the following symbolic names: iissslib, iissflib, iissmlib and iissulib. Each of the datasets should be compressed before testing. Additionally, it is recommended that the following dataset characteristics and minimum space allocations be used:

iissslib	Variable blocked with LRCL 80, BLKSIZE 3120, and 10 tracks with 5 directory blocks.
iissflib, iissulib	Variable blocked with LRCL 80, BLKSIZE 3120, and 15 tracks with 15 directory blocks.
iissmlib	Fixed block with LRECL 73, BLKSIZE 730, and 3 TRACKS with 2 directory blocks.

Assuming the NTM is up and running, an IISS user may start this test by accessing the IISS environment. To do this, enter "IISSi" at the ENTER APPLICATION: prompt. The "i" following IISS must be your IISS instance id as entered in the NTM SYSGEN file. This starts up the IBM3270 device driver and brings up the IISS Logon Screen as described in section 5.1.2.1.

When this screen is filled in correctly and the <RETURN> key is pressed, the screen in Figure 5-2 is displayed.

5.1.3.1 Choosing the FLAN Function

In the Function field type FLAN. The screen shown in Figure 5-3 is displayed. In the input field type "flan1" (flan1 must be a member of the partitioned dataset referenced by the ddname IISSSLIB) and press the <RETURN> key. Wait for the IISS Function Screen to return. Next type "ARTEST" in the Function field as shown in Figure 5-4.

The initial ARTEST screen is shown in Figure 5-5. In the command line, type "ADDFRM SCREEN TESTFORM" as shown in Figure 5-6 and press the <RETURN> key. Compare the appearance of the resulting screen with Figure 5-7.

5.1.3.2 Standalone Version of Flan on IBM

The dataset associated with the ddnames iissulib, iissslib, iissmlib, iissflib must be allocated previous to the call to FLANSA. The following clist describes how to invoke the standalone version of FLAN. The name of the file that is to be flanned should be passed in the clist.

```
PROC 0 FILE(.) LOAD(TIISS.R22.LODLIB)
/*
/* This clist opens the required datasets for standalone FLAN.
/* The variable LOAD references the partitioned dataset /*
containing the executable member FLAN. The variable file /*
references the file to be flanned. It should be noted that /*
even though FLAN will open the dataset as either a ddname or /*
a member of a ddname, the latter method is not reached since /*
we allocate the file member as a ddname.
/*
IF .&FILE EQ . THEN EXIT
CONTROL NOFLACH NOMSG
ALLOCATE DDN(SYSPRINT) DSN(*) SHR
ALLOCATE DDN(SYSTEM) DSN(*) SHR
ALLOCATE DDN(IISSSLIB) DSN('TISS.R22.MSG') SHR REUSE
ALLOCATE DDN(IISSMLIB) DSN('TISS.R22.FORMS.FD') SHR REUSE
ALLOCATE DDN(IISSFLIB) DSN('SDREJ.FORMS.FD') SHR REUSE
ALLOCATE DDN(IISSULIB) DSN('SDREJ.FDRMS.FDL(&FILE)') SHR REUSE
CALL '&LOAD(FLANSA)' '&FILE'
```

5.1.3.1 Choosing the FLAN Function

In the Function field type FLAN. The screen shown in Figure 5-3 is displayed. In the input field type "flan1" (flan1 must be a member of the partitioned dataset referenced by the ddname IISSSLIB) and press the <RETURN> key. Wait for the IISS Function Screen to return. Next type "ARTEST" in the Function field as shown in Figure 5-4.

The initial ARTEST screen is shown in Figure 5-5. In the command line, type "ADDFRM SCREEN TESTFORM" as shown in Figure 5-6 and press the <RETURN> key. Compare the appearance of the resulting screen with Figure 5-7.

5.1.3.2 Standalone Version of Flan on IBM

The dataset associated with the ddnames iissulib, iissplib, iissmlib, iissflib must be allocated previous to the call to FLANSA. The following clist describes how to invoke the standalone version of FLAN. The name of the file that is to be flanned should be passed in the clist.

```
PROC 0 FILE(.) LOAD(TIISS.R22.LOADLIB)
/*
/* This clist opens the required datasets for standalone FLAN.
/* The variable LOAD references the partitioned dataset /*
containing the executable member FLAN. The variable file /*
references the file to be flanned. It should be noted that /*
even though FLAN will open the dataset as either a ddname or /*
a member of a ddname, the latter method is not reached since /*
we allocate the file member as a ddname.
/*
IF .&FILE EQ . THEN EXIT
CONTROL NOFLACH NOMSG
ALLOCATE DDN(SYSPRINT) DSN(*) SHR
ALLOCATE DDN(SYSTEM) DSN(*) SHR
ALLOCATE DDN(IISSMLIB) DSN('TIISS.R22.MSG') SHR REUSE
ALLOCATE DDN(IISSFLIB) DSN('TIISS.R22.FORMS.FD') SHR REUSE
ALLOCATE DDN(IISSULIB) DSN('SDREJ.FORMS.FD') SHR REUSE
ALLOCATE DDN(&FILE) DSN('SDREJ.FDRMS.FDL(&FILE)') SHR REUSE
CALL '&LOAD(FLANSA)' '&FILE'
```

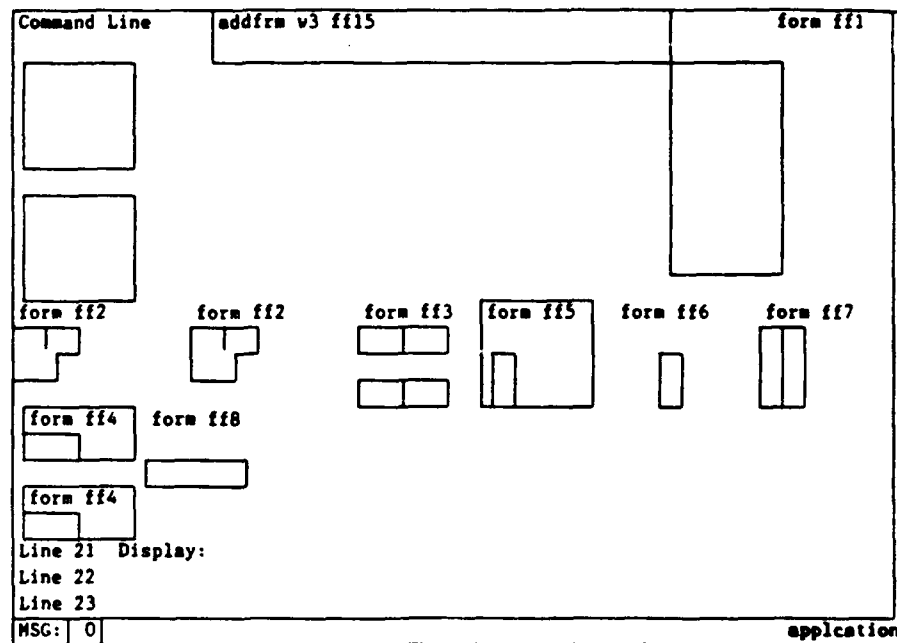


Figure 5-9a Test Case 1

CRITERION: Item I3 APPEARS IF $2 > 1$

Command Line		addfrm v3 ff15		form ff1	
				xxx	
form ff2		form ff2		form ff3	
form ff4		form ff8		form ff5	
form ff4				form ff6	
Line 21 Display:		Line 21 Display:		form ff7	
Line 22		Line 22			
Line 23		Line 23			
MSG: 0				application	

Figure 5-9b I3 Appears

Item I3 appears because the criterion evaluates to true.

Command Line		rplfrm v3 1 ff16		form ff1	
				XXXX	
form ff2		form ff2		form ff3	
form ff4		form ff8		form ff5	
form ff4				form ff6	
Line 21 Display:		Line 22		Line 23	
MSG: 0				application	

Figure 5-10a Test Case 2

CRITERION: Item I3 APPEARS IF $2 < 1$

Command Line		rplfrm v3 1 ff16		form ff1		
form ff2		form ff2	form ff3	form ff5	form ff6	form ff7
form ff4		form ff8				
form ff4						
Line 21 Display:						
Line 22						
Line 23						
MSG: 0		application				

Figure 5-10b I3 Does Not Appear

Item I3 does not appear because the criterion evaluates to false.

Command Line		rplfrm v3 1 ff17		form ff1	
form ff2	form ff2	form ff3	form ff5	form ff6	form ff7
form ff4	form ff8				
form ff4					
Line 21 Display:					
Line 22					
Line 23					
MSG:	0	application			

Figure 5-11a Test Case 3

CRITERION: Item I3 APPEARS IF I1 != 1

Command Line		rplfrm v3 1 ff17		form ff1	
form ff2		form ff2	form ff3	form ff5	form ff6
form ff4		form ff8			
form ff4					
Line 21 Display:					
Line 22					
Line 23					
MSG: 0		application			

Figure 5-11b I3 Appears

Item I3 appears because the criterion evaluates to true.

Command Line		pdata v3.ff17.i1 " 1"		form ff1	
				xxx	
form ff2		form ff2		form ff3	
form ff4		form ff8		form ff5	
form ff4				form ff6	
Line 21 Display:		Line 22		Line 23	
MSG: 0				application	

Figure 5-11c Change I1 Value

Set the value of I1 to "1".

Command Line		pdata w3.ff17.11 " 1"		form ff1		
				1 1		
form ff2		form ff2	form ff3	form ff5	form ff6	form ff7
form ff4		form ff8				
form ff4						
Line 21 Display:						
Line 22						
Line 23						
MSG: 0		application				

Figure 5-11d I3 Does Not Appear

Item I3 does not appear because the criterion evaluates to false.

Command Line		pdata w3.ff17.i1 " 3"		form ff1	
				1 1	
form ff2		form ff2		form ff3	
form ff4		form ff8		form ff5	
form ff4				form ff6	
Line 21 Display:		Line 22		Line 23	
MSG: 0				application	

Figure 5-11e Change I1 Value

Set the value of I1 to " 3".

Command Line		pdata v3.ff17.i1 = 3"		form ff1	
				3 3	
form ff2		form ff2		form ff3	
form ff4		form ff8		form ff5	
form ff4				form ff6	
Line 21 Display:		Line 22		form ff7	
Line 23					
MSG: 0				application	

Figure 5-11f I3 Appears

Item I3 appears because the criterion evaluates to true.

Command Line		rplfrm v3 1 ff18		form ff1	
				3 XXX 3	
form ff2		form ff2		form ff3	
form ff4		form ff8		form ff5	
form ff4				form ff6	
Line 21 Display:		Line 22		Line 23	
MSG: 0				application	

Figure 5-12a Test Case 4

CRITERION: Item I3 APPEARS IF BETWEEN('i1', 1, 10)
I1 is defined to be numeric for this test.

Command Line		rplfrm v3 1 ff18		form ff1	
form ff2		form ff2	form ff3	form ff5	form ff6
form ff4		form ff8			form ff7
form ff4					
Line 21 Display:					
Line 22					
Line 23					
MSG: 0		application			

Figure 5-12b I3 Does Not Appear

Item I3 does not appear because the criterion evaluates to false.

Command Line		pdata v3.ff18.i1 = 5"		form ff1	
form ff2		form ff2		form ff3	
form ff4		form ff8		form ff5	
form ff4				form ff6	
Line 21 Display:		Line 22		Line 23	
MSG: 0				application	

Figure 5-12c Change I1 Value

Set the value of I1 to " 5".

Command Line		pdata w3.ff18.i1 " 5"		form ff1	
				5 5	
form ff2		form ff2	form ff3	form ff5	form ff6
1		1			
form ff4		form ff8			
form ff4					
Line 21 Display:					
Line 22					
Line 23					
MSG: 0		application			

Figure 5-12d I3 Appears

Item I3 appears because the criterion evaluates to true.

Command Line		pdata v3.ff18.i1 " a"		form ff1	
				5 5 5	
form ff2		form ff2		form ff3	
form ff2		form ff2		form ff3	
form ff4		form ff8		form ff5	
form ff4		form ff8		form ff5	
form ff4				form ff6	
form ff4				form ff6	
				form ff7	
				form ff7	
Line 21 Display:					
Line 22					
Line 23					
MSG: 0		application			

Figure 5-12e Change I1 Value

Set the value of I1 to " a".

Command Line		pdata v3.ff18.11 " a"		form ff1	
form ff2	form ff2	form ff3	form ff5	form ff6	form ff7
form ff4	form ff8				
form ff4					
Line 21 Display:					
Line 22					
Line 23					
MSG:	0	application			

Figure 5-12f I3 Does Not Appear

Item I3 does not appear because the criterion evaluates to false.

Command Line		rplfrm v3 1 ff19		form ff1	
form ff2	form ff2	form ff3	form ff5	form ff6	form ff7
form ff4	form ff8				
form ff4					
Line 21 Display:					
Line 22					
Line 23					
MSG:	0	application			

Figure 5-13a Test Case 5

CRITERION: Item I3 APPEARS IF IN('i1',0,1,2,3,4,5,6,7,8,9,10)
I3 is defined as numeric for this test.

Command Line		rplfrm w3 1 ff19		form ff1	
				xxx	
form ff2		form ff2		form ff3	
form ff4		form ff8		form ff5	
form ff4				form ff6	
Line 21 Display:		Line 22		Line 23	
MSG: 0				application	

Figure 5-13b I3 Appears

Item I3 appears because the criterion evaluates to true.

Command Line		pdata w3.ff19.i1 " a"		form ff1	
form ff2	form ff2	form ff3	form ff5	form ff6	form ff7
form ff4	form ff8				
form ff4					
Line 21 Display:					
Line 22					
Line 23					
MSG: 0		application			

Figure 5-13c Change I1 Value

Set the value of I1 to "a".

Command Line		pdata v3.ff19.11 " a"		form ff1	
				a a	
form ff2		form ff2		form ff3	
form ff4		form ff8		form ff5	
form ff4				form ff6	
Line 21 Display:		Line 22		Line 23	
MSG: 0				application	

Figure 5-13d I3 Does Not Appear

Item I3 does not appear because the criterion evaluates to false.

Command Line		pdata w3.ff19.i1 " 5"		form ff1	
form ff2		form ff2		form ff3	
form ff4		form ff8		form ff5	
form ff4				form ff6	
Line 21 Display:		Line 21 Display:		Line 21 Display:	
Line 22		Line 22		Line 22	
Line 23		Line 23		Line 23	
MSG: 0				application	

Figure 5-13e Change I1 Value

Set the value of I1 to "5".

Command Line		pdata v3.ff19.i1 " 5"		form ff1	
				5 5	
form ff2		form ff2		form ff3	
1		1		1 1	
form ff4		form ff8		form ff5	
1		1		1 1	
form ff4				form ff6	
1				1	
				form ff7	
				1 1	
Line 21 Display:					
Line 22					
Line 23					
MSG: 0		application			

Figure 5-13f I3 Appears

Item I3 appears because the criterion evaluates to true.

Command Line		rplfrm v3 1 ff20		form ff1	
				5 xxx 5	
form ff2		form ff2		form ff3	
form ff4		form ff8		form ff5	
form ff4				form ff6	
				form ff7	
Line 21 Display:					
Line 22					
Line 23					
MSG:	0	application			

Figure 5-14a Test Case 6

CRITERION: Item I3 APPEARS IF 'I1' > 10 ? 1 : 0

Command Line		rplfrm w3 1 ff20		form ff1		
form ff2		form ff2	form ff3	form ff5	form ff6	form ff7
form ff4		form ff8				
form ff4						
Line 21 Display:						
Line 22						
Line 23						
MSG: 0		application				

Figure 5-14b I3 Does Not Appear

Item I3 does not appear because the criterion evaluates to false.

Command Line		pdata v3.ff20.i1 = 15"		form ff1	
form ff2		form ff2		form ff3	
form ff4		form ff8		form ff5	
form ff4				form ff6	
form ff7					
Line 21 Display:					
Line 22					
Line 23					
MSG: 0		application			

Figure 5-14c Change I1 Value

Set the value of I1 to "15".

Command Line		pdata w3.ff20.i1 " 15"		form ff1							
				<table border="1"><tr><td>15</td><td>xxx</td></tr><tr><td>15</td><td></td></tr></table>		15	xxx	15			
15	xxx										
15											
form ff2		form ff2		form ff3							
<table border="1"><tr><td></td></tr></table>			<table border="1"><tr><td></td></tr></table>			<table border="1"><tr><td></td><td></td></tr><tr><td></td><td></td></tr></table>					
form ff4		form ff5		form ff6							
<table border="1"><tr><td></td></tr></table>			<table border="1"><tr><td></td></tr></table>			<table border="1"><tr><td></td></tr></table>					
form ff4		form ff8		form ff7							
<table border="1"><tr><td></td></tr></table>			<table border="1"><tr><td></td></tr></table>			<table border="1"><tr><td></td><td></td></tr></table>					
Line 21 Display:		Line 22		Line 23							
MSG: 0				application							

Figure 5-14d I3 Appears

Item I3 appears because the criterion evaluates to true.

Command Line		pdata v3.ff20.i1 "-1"		form ff1	
				15 15	
form ff2		form ff2		form ff3	
form ff4		form ff8		form ff5	
form ff4				form ff6	
form ff4				form ff7	
Line 21 Display:					
Line 22					
Line 23					
MSG: 0		application			

Figure 5-14e Change I1 Value

Set the value of I1 to "-1".

Command Line		pdata w3.ff20.i1 " -1"		form ff1	
				-1 -1	
form ff2		form ff2		form ff3	
form ff4		form ff8		form ff5	
form ff4				form ff6	
Line 21 Display:		Line 22		form ff7	
Line 23		MSG: 0		application	

Figure 5-14f I3 Does Not Appear

Item I3 does not appear because the criterion evaluates to false.

Command Line		rplfrm v3 1 ff21		form ff1	
				-1 -1	
form ff2		form ff2		form ff3	
form ff4		form ff8		form ff5	
form ff4				form ff6	
				form ff7	
Line 21 Display:					
Line 22					
Line 23					
MSG: 0		application			

Figure 5-15a Test Case 7

CRITERION: Item I3 APPEARS IF 'I1' > "CCC" ? 1 : 0

Command Line		rplfrm v3 1 ff21		form ff1	
form ff2		form ff2		form ff3	
form ff4		form ff8		form ff5	
form ff4				form ff6	
Line 21 Display:		Line 22		Line 23	
MSG: 0				application	

Figure 5-15b I3 Does Not Appear

Item I3 does not appear because the criterion evaluates to false.

Command Line		pdata v3.ff21.i1 "CCD"		form ff1	
form ff2		form ff2		form ff3	
form ff4		form ff8		form ff5	
form ff4				form ff6	
Line 21 Display:		Line 22		Line 23	
MSG: 0				application	

Figure 5-15c Change I1 Value

Set the value of i1 to "CCD".

Command Line		pdata v3.ff21.i1 "CCD"		form ff1	
				CCD XXX CCD	
form ff2		form ff2		form ff3	
form ff4		form ff8		form ff5	
form ff4				form ff6	
Line 21 Display:		Line 22		form ff7	
Line 23		MSG: 0		application	

Figure 5-15d I3 Appears

Item I3 appears because the criterion evaluates to true.

Command Line		pdata v3.ff21.i1 "CCB"		form ff1		
				CCD xxx CCD		
form ff2		form ff2	form ff3	form ff5	form ff6	form ff7
form ff4		form ff8				
form ff4						
Line 21 Display:						
Line 22						
Line 23						
MSG: 0		application				

Figure 5-15e Change I1 Value

Set the value of I1 to "CCB".

Command Line		pdata v3.ff21.11 "CCB"		form ff1	
				CCB CCB	
form ff2		form ff2	form ff3	form ff5	form ff6
form ff4		form ff8			form ff7
form ff4					
Line 21 Display:					
Line 22					
Line 23					
MSG: 0		application			

Figure 5-15f I3 Does Not Appear

Item I3 does not appear because the criterion evaluates to false.

Command Line		rplfrm v3 1 ff22		form ff1	
				CCB CCB	
form ff2		form ff2		form ff3	
form ff4		form ff8		form ff5	
form ff4				form ff6	
Line 21 Display:		Line 22		Line 23	
MSG: 0				application	

Figure 5-16a Test Case 8

CRITERION: Item I3 APPEARS IF NOT 'I1'

Command Line		rplfrm v3 1 ff22		form ff1	
				XXX	
form ff2		form ff2		form ff3	
form ff4		form ff8		form ff5	
form ff4				form ff6	
Line 21 Display:		Line 22		Line 23	
MSG: 0				application	

Figure 5-16b I3 Appears

Item I3 appears because the criterion evaluates to true.

Command Line		pdata v3.ff22.i1 "yes"		form ff1	
				xxx	
form ff2		form ff2	form ff3	form ff5	form ff6
form ff4		form ff8			
form ff4					
Line 21 Display:					
Line 22					
Line 23					
MSG: 0		application			

Figure 5-16c Change I1 Value

Set the value of I1 to "yes".

Command Line		pdata v3.ff22.i1 "yes"		form ff1	
				yes yes	
form ff2		form ff2	form ff3	form ff5	form ff6
form ff4		form ff8			form ff7
form ff4					
Line 21 Display:					
Line 22					
Line 23					
MSG: 0		application			

Figure 5-16d I3 Does Not Appear

Item I3 does not appear because the criterion evaluates to false.

Command Line		pdata w3.ff22.i1 " 0"		form ff1	
				yes yes	
form ff2	form ff2	form ff3	form ff5	form ff6	form ff7
form ff4	form ff8				
form ff4					
Line 21 Display:					
Line 22					
Line 23					
MSG: 0		application			

Figure 5-16e Change I1 Value

Set the value of I1 to "0".

Command Line		pdata w3.ff22.i1 " 0"		form ff1											
				<table border="1"><tr><td>0</td><td>xxx</td></tr><tr><td>0</td><td></td></tr></table>		0	xxx	0							
0	xxx														
0															
form ff2		form ff2	form ff3	form ff5	form ff6										
<table border="1"><tr><td></td><td></td></tr></table>				<table border="1"><tr><td></td><td></td></tr></table>			<table border="1"><tr><td></td><td></td></tr></table>			<table border="1"><tr><td></td><td></td></tr></table>			<table border="1"><tr><td></td><td></td></tr></table>		
form ff4		form ff8			form ff7										
<table border="1"><tr><td></td><td></td></tr></table>				<table border="1"><tr><td></td><td></td></tr></table>					<table border="1"><tr><td></td><td></td></tr></table>						
form ff4															
<table border="1"><tr><td></td><td></td></tr></table>															
Line 21 Display:															
Line 22															
Line 23															
MSG: 0		application													

Figure 5-16f I3 Appears

Item I3 appears because the criterion evaluates to true.

Command Line		rplfrm v3 1 ff26		form ff1	
				0 xxx 0	
form ff2		form ff2	form ff3	form ff5	form ff6
form ff4		form ff8			form ff7
form ff4					
Line 21 Display:					
Line 22					
Line 23					
MSG: 0		application			

Figure 5-17a Test Case 9

CRITERION: Item I3 APPEARS IF NOT APPEARS('I1')

Command Line		rplfrm w3 1 ff26		form ff1	
form ff2		form ff2		form ff3	
form ff4		form ff8		form ff5	
form ff4				form ff6	
form ff7					
Line 21 Display:					
Line 22					
Line 23					
MSG: 0				application	

Figure 5-17b I3 Does Not Appear

Item I3 does not appear because the criterion evaluates to false.

Command Line		rplfrm v3 1 ff28		form ff1	
form ff2		form ff2		form ff3	
form ff4		form ff8		form ff5	
form ff4				form ff6	
Line 21 Display:		Line 22		Line 23	
MSG: 0				application	

Figure 5-18a Test Case 10

CRITERION: Item I3 APPEARS IF APPEARS('ff28.i1')

Command Line		rplfrm v3 1 ff28		form ff1	
				XXXX	
form ff2		form ff2		form ff3	
form ff4		form ff8		form ff5	
form ff4				form ff6	
Line 21 Display:		Line 22		Line 23	
MSG: 0				application	

Figure 5-18b I3 Appears

Item I3 appears because the criterion evaluates to true.

Command Line		rplfrm v3 1 ff31		form ff1	
form ff2		form ff2		form ff3	
form ff4		form ff8		form ff5	
form ff4				form ff6	
Line 21 Display:		Line 22		Line 23	
MSG: 0				application	

Figure 5-19a Test Case 11

CRITERION: Item I3 APPEARS IF 'I1' <= 0 OR 'I1' >= 10

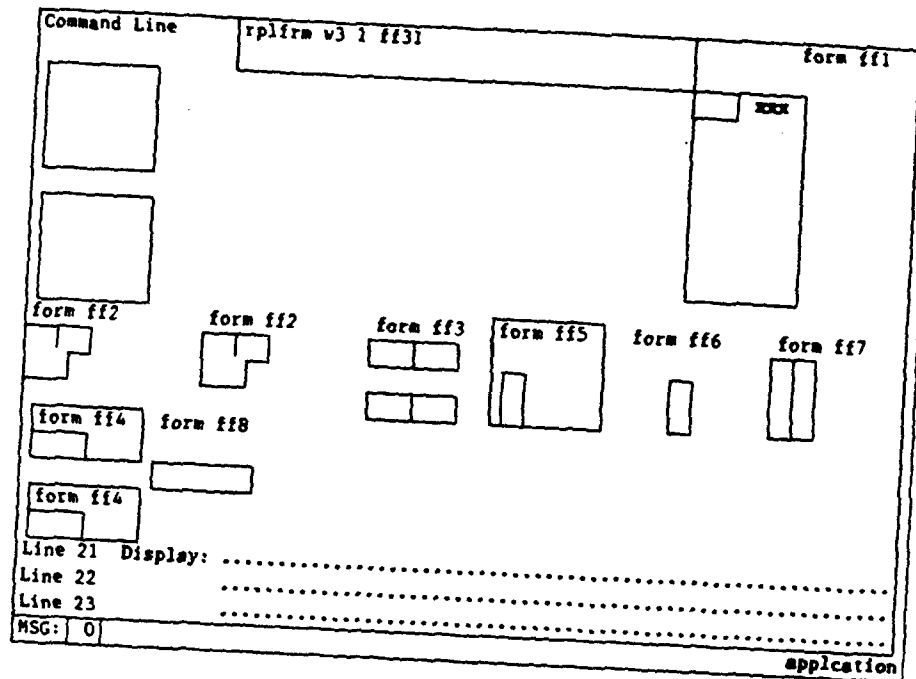


Figure 5-19b I3 Appears

Item I3 appears because the criterion evaluates to true.

Command Line		pdata w3.ff31.i1 " 5"		form ff1	
				XXXX	
form ff2		form ff2	form ff3	form ff5	form ff6
form ff4		form ff8			form ff7
form ff4					
Line 21 Display:					
Line 22					
Line 23					
MSG: 0		application			

Figure 5-19c Change I1 Value

Set the value of I1 to "5".

Command Line		pdata v3.ff31.11 " 5"		form ff1	
				5 5	
form ff2		form ff2		form ff3	
form ff4		form ff8		form ff5	
form ff4				form ff6	
Line 21 Display:		Line 22		Line 23	
MSG: 0				application	

Figure 5-19d I3 Does Not Appear

Item I3 does not appear because the criterion evaluates to false.

Command Line		pdata w3.ff31.i1 " 11"		form ff1	
		5 5			
form ff2	form ff2	form ff3	form ff5	form ff6	form ff7
form ff4	form ff8				
form ff4					
Line 21 Display:					
Line 22					
Line 23					
MSG:	0	application			

Figure 5-19e Change I1 Value

Set the value of I1 to "11".

Command Line		pdata v3.ff31.i1 " 11"		form ff1	
				11 XXX 11	
form ff2		form ff2		form ff3	
form ff4		form ff8		form ff5	
form ff4				form ff6	
Line 21 Display:				form ff7	
Line 22					
Line 23					
MSC:	0			application	

Figure 5-19f I3 Appears

Item I3 appears because the criterion evaluates to true.

Command Line		rplfrm v3 1 ff32		form ff1							
				<table border="1"> <tr> <td>11</td> <td>xxx</td> </tr> <tr> <td>11</td> <td></td> </tr> </table>		11	xxx	11			
11	xxx										
11											
form ff2		form ff2		form ff3							
<table border="1"> <tr> <td></td> <td></td> </tr> </table>				<table border="1"> <tr> <td></td> <td></td> </tr> </table>				<table border="1"> <tr> <td></td> <td></td> </tr> </table>			
form ff4		form ff8		form ff5							
<table border="1"> <tr> <td></td> <td></td> </tr> </table>				<table border="1"> <tr> <td></td> <td></td> </tr> </table>				<table border="1"> <tr> <td></td> <td></td> </tr> </table>			
form ff4				form ff6							
<table border="1"> <tr> <td></td> <td></td> </tr> </table>						<table border="1"> <tr> <td></td> <td></td> </tr> </table>					
form ff4				form ff7							
<table border="1"> <tr> <td></td> <td></td> </tr> </table>						<table border="1"> <tr> <td></td> <td></td> </tr> </table>					
Line 21 Display:											
Line 22											
Line 23											
MSG: 0		application									

Figure 5-20a Test Case 12

CRITERION: Item I3 APPEARS IF 'I1' != 11 AND 'I1' >= 10

Command Line		rplfrm v3 1 ff32		form ff1	
form ff2		form ff2		form ff3	
				form ff5	
				form ff6	
form ff4		form ff8		form ff7	
form ff4					
Line 21 Display:					
Line 22					
Line 23					
MSG: 0		application			

Figure 5-20b I3 Does Not Appear

Item I3 does not appear because the criterion evaluates to false.

The diagram illustrates a terminal window layout. At the top, a 'Command Line' box contains the text 'pdata v3.ff32.i1 = 12'. To its right is a box labeled 'form ff1'. Below the command line, there are several other forms: two boxes labeled 'form ff2' on the left, a box labeled 'form ff3' in the center, a box labeled 'form ff5' to its right, and two boxes labeled 'form ff6' and 'form ff7' on the far right. Below these, there are boxes labeled 'form ff4' and 'form ff8'. At the bottom left, there is a box labeled 'form ff4' and a status area with 'Line 21 Display:', 'Line 22', 'Line 23', and 'MSG: 0'. The bottom right corner is labeled 'application'.

Figure 5-20c Change I1 Value

Set the value of I1 to "12".

Command Line		pdata v3.ff32.11 " 12"		form ff1	
				12 xxx	
				12	
form ff2		form ff2		form ff3	
form ff4		form ff8		form ff5	
form ff4				form ff6	
				form ff7	
Line 21 Display:					
Line 22					
Line 23					
MSG: 0		application			

Figure 5-20d I3 Appears

Item I3 appears because the criterion evaluates to true.

Command Line		pdata w3.ff32.i1 = 11"		form ff1	
				12 XXXX 12	
form ff2		form ff2	form ff3	form ff5	form ff6
form ff4		form ff8			form ff7
form ff4					
Line 21 Display:					
Line 22					
Line 23					
MSG: 0		application			

Figure 5-20e Change I1 Value

Set the value of I1 to "11".

Command Line		pdata v3.ff32.i1 " 11"		form ff1	
		11 11			
form ff2	form ff2	form ff3	form ff5	form ff6	form ff7
form ff4	form ff8				
form ff4					
Line 21 Display:					
Line 22					
Line 23					
MSG:	0	application			

Figure 5-20f I3 Does Not Appear

Item I3 does not appear because the criterion evaluates to false.

Command Line		addfrm vl(1) ff33		form ff1	
				11 11	
form ff2		form ff2		form ff3	
form ff4		form ff8		form ff5	
form ff4				form ff6	
form ff4				form ff7	
Line 21 Display:					
Line 22					
Line 23					
MSG: 0		application			

Figure 5-21a Test Case 13

CRITERION: Item I3 APPEARS IF GWINDO('w3') > 1

Command Line		addfrm vl(1) ff33		form ff1	
		11 11			
form ff2	form ff2	form ff3	form ff5	form ff6	form ff7
1	1	1	1		
form ff4	form ff8				
1					
form ff4					
1					
Line 21 Display:					
Line 22					
Line 23					
MSG:	0	application			

Figure 5-21b I3 Does Not Appear

Item I3 does not appear because the criterion evaluates to false.

Command Line		addfrm v3 ff33		form ff1	
				11 11	
form ff2		form ff2		form ff3	
form ff4		form ff8		form ff5	
form ff4				form ff6	
Line 21 Display:		Line 22		Line 23	
MSG: 0				application	

Figure 5-21c Create Page 2 in W3

Command Line		addfrm v3 ff33		form ff1	
xxx				xxx	
form ff2		form ff2		form ff3	
form ff4		form ff8		form ff5	
form ff4				form ff6	
Line 21 Display:		Line 22		Line 23	
MSG: 0				application	

Figure 5-21d I3 Appears

Item I3 appears because the criterion evaluates to true.

Command Line		rmvpag w3		form ff1	
XXXX				XXXX	
form ff2		form ff2		form ff3	
form ff4		form ff8		form ff5	
form ff4				form ff6	
form ff4				form ff7	
Line 21 Display:					
Line 22					
Line 23					
MSG:	0	application			

Figure 5-21e Remove Page 2 in W3

Command Line		rmvpag v3		form ff1	
				11 11	
form ff2		form ff2		form ff3	
form ff4		form ff8		form ff5	
form ff4				form ff6	
Line 21 Display:				form ff7	
Line 22					
Line 23					
MSG: 0				application	

Figure 5-21f I3 Does Not Appear

Item I3 does not appear because the criterion evaluates to false.

Command Line		rplfrm v3 1 ff34		form ff1	
				11 11	
form ff2		form ff2	form ff3	form ff5	form ff6
form ff4		form ff8			
form ff4					
Line 21 Display:					
Line 22					
Line 23					
MSG: 0		application			

Figure 5-22a Test Case 14

CRITERION: Item I3 APPEARS IF CURSOR('i2')

Command Line		rplfrm v3 1 ff34		form ff1	
form ff2		form ff2		form ff3	
form ff4		form ff8		form ff5	
form ff4				form ff6	
Line 21 Display:		Line 22		Line 23	
MSG: 0				application	

Figure 5-22b I3 Does Not Appear

Item I3 does not appear because the criterion evaluates to false.

Move the cursor to Item I2 and press the <ENTER> key.

Command Line		rplfrm v3 1 ff34		form ff1	
				XXX	
form ff2		form ff2		form ff3	
form ff4		form ff8		form ff5	
form ff4				form ff6	
Line 21 Display:		Line 22		Line 23	
MSG: 0				application	

Figure 5-22c I3 Appears

Item I3 appears because the criterion evaluates to true.
Move the cursor out of Item I2 and press the <ENTER> key.

Command Line		rplfrm w3 1 ff34		form ff1	
form ff2		form ff2	form ff3	form ff5	form ff6
form ff4		form ff8			form ff7
form ff4					
Line 21 Display:					
Line 22					
Line 23					
MSG: 0		application			

Figure 5-22d I3 Does Not Appear

Item I3 does not appear because the criterion evaluates to false.

Command Line		addfrm w1(1) ff35		form ff1	
form ff2		form ff2		form ff3	
form ff4		form ff8		form ff5	
form ff4				form ff6	
Line 21 Display:		Line 22		Line 23	
MSG: 0				application	

Figure 5-23a Test Case 15

CRITERION: Item I3 APPEARS IF GPAGE('w3',1) = "ff3"

Command Line		addfrm vl(1) ff35		form ff1	
form ff2		form ff2		form ff3	
form ff4		form ff8		form ff5	
form ff4				form ff6	
Line 21 Display:				form ff7	
Line 22					
Line 23					
MSG: 0				application	

Figure 5-23b I3 Does Not Appear in W1

Item I3 does not appear because the criterion evaluates to false.

Command Line		rplfrm w3 1 ff3		form ff1	
form ff2	form ff2	form ff3	form ff5	form ff6	form ff7
form ff4	form ff8				
form ff4					
Line 21 Display:					
Line 22					
Line 23					
MSG: 0		application			

Figure 5-23c Change Contents of Page 1 in W3

Replace form ff35 on Page 1 of W3 with ff3.

Command Line		rplfrm v3 1 ff3		form ff1	
xxx		form ff3			
form ff2	form ff2	form ff3	form ff5	form ff6	form ff7
form ff4	form ff8				
form ff4					
Line 21 Display:					
Line 22					
Line 23					
MSG: 0	application				

Figure 5-23d I3 Appears in W1

Item I3 appears because the criterion evaluates to true.

Command Line

rplfrm v3 1 ff17

form ff1

form ff3

form ff2

form ff2

form ff3

form ff5

form ff6

form ff7

form ff4

form ff8

form ff4

Line 21 Display:

Line 22

Line 23

MSG: 0

application

Figure 5-23e Change Contents of Page 1 in W3

Replace ff3 in Page 1 of W3 with ff17.

Command Line		rplfrm v3 1 ff17		form ff1	
				xxx	
form ff2		form ff2	form ff3	form ff5	form ff6
form ff4		form ff8			form ff7
form ff4					
Line 21 Display:					
Line 22					
Line 23					
MSG:	0	application			

Figure 5-23f I3 Does Not Appear in W1

Item I3 does not appear because the criterion evaluates to false.

Command Line		rplfrm v3 1 ff36		form ff1	
				XXXX	
form ff2		form ff2	form ff3	form ff5	form ff6
form ff4		form ff8			form ff7
form ff4					
Line 21 Display:					
Line 22					
Line 23					
MSG:	0	application			

Figure 5-24a Test Case 16

CRITERION: Item I3 APPEARS IF GETATT ('I1', 0) != "INPUT"

Command Line		rplfrm v3 1 ff36		form ff1	
form ff2		form ff2		form ff3	
form ff4		form ff8		form ff5	
form ff4				form ff6	
Line 21 Display:		Line 22		Line 23	
MSG: 0				application	

Figure 5-24b I3 Does Not Appear

Item I3 does not appear because the criterion evaluates to false.

Command Line rplfrm v3 1 ff37

form ff1

form ff2 form ff2 form ff3 form ff5 form ff6 form ff7

form ff4 form ff8

form ff4

Line 21 Display:
Line 22
Line 23

MSG: 0 application

Figure 5-25a Test Case 17

CRITERION: Item I3 APPEARS IF NOT GETATT('I1', 0) != "INPUT"

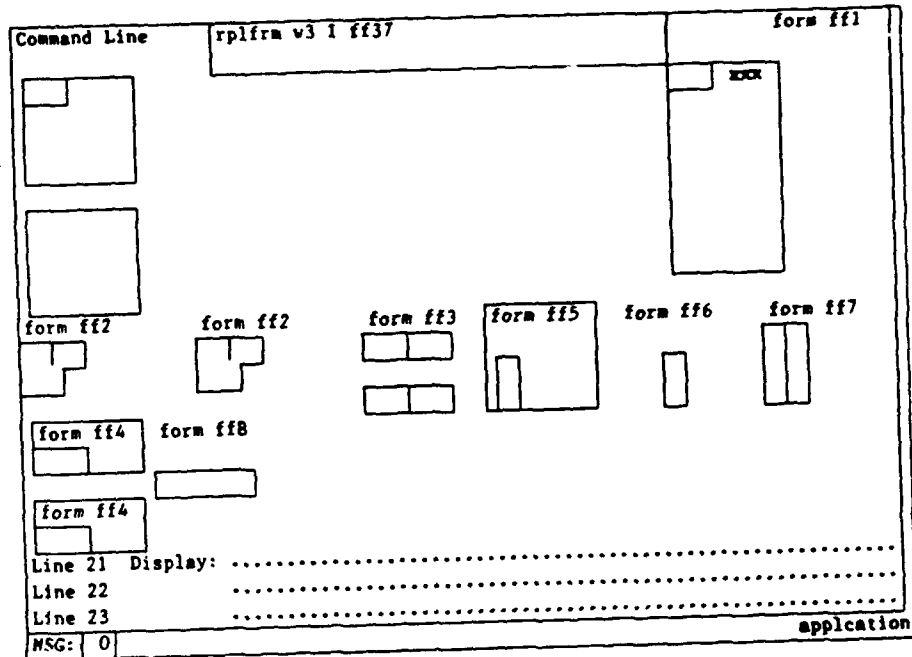


Figure 5-25b I3 Appears

Item I3 appears because the criterion evaluates to true.

Command Line		rplfrm v3 1 ff39		form ff1	
				xxx	
form ff2		form ff2		form ff3	
form ff4		form ff8		form ff5	
form ff4				form ff6	
form ff7					
Line 21 Display:					
Line 22					
Line 23					
MSG: 0				application	

Figure 5-26a Test Case 18

CRITERION: Item I3 APPEARS IF NOT ROLE("manager")

Command Line		rplfrm v3 1 ff39		form ff1	
				xxx	
form ff2		form ff2		form ff3	
form ff4		form ff8		form ff5	
form ff4				form ff6	
Line 21 Display:		Line 22		Line 23	
MSG: 0				application	

Figure 5-26b I3 Appears

Item I3 appears because the criterion evaluates to true.

Command Line		rplfrm v3 1 ff23		form ff1	
form ff2		form ff2		form ff3	
form ff4		form ff8		form ff5	
form ff4				form ff6	
form ff4				form ff7	
Line 21 Display:					
Line 22					
Line 23					
MSG: 0		application			

Figure 5-27a Test Case 19

CRITERION: Item I3 APPEARS IF
IN(BETWEEN('I1', 1, 10), 1, 2, 3, 4)
I3 is defined as numeric for this test.

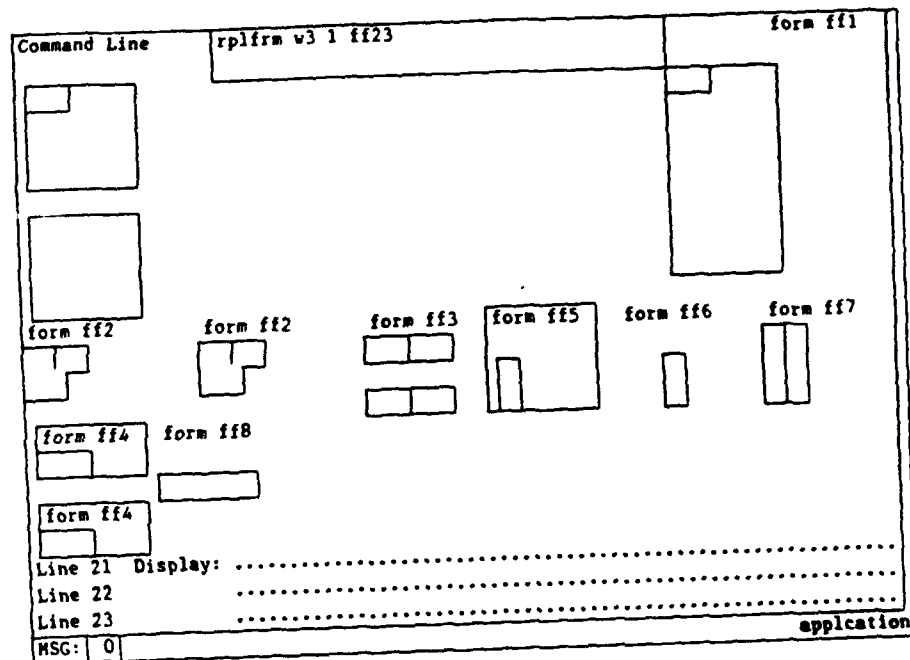


Figure 5-27b I3 Does Not Appear

Item I3 does not appear because the criterion evaluates to false.

Command Line		pdata v3.ff23.i1 = 5		form ff1	
form ff2		form ff2	form ff3	form ff5	form ff6
form ff4		form ff8			form ff7
form ff4					
Line 21 Display:					
Line 22					
Line 23					
MSG:	0	application			

Figure 5-27c Change I1 Value

Set the value of I1 to "5".

Command Line		pdata v3.ff23.i1 " 5"		form ff1	
		5 XXX 5			
form ff2	form ff2	form ff3	form ff5	form ff6	form ff7
form ff4	form ff8				
form ff4					
Line 21 Display:					
Line 22					
Line 23					
MSG: 0		application			

Figure 5-27d I3 Appears

Item I3 appears because the criterion evaluates to true.

Command Line		pdata v3.ff23.i1 " 11"		form ff1	
				5 xxx 5	
form ff2		form ff2		form ff3	
form ff4		form ff8		form ff5	
form ff4				form ff6	
Line 21 Display:		Line 22		Line 23	
MSG: 0				application	

Figure 5-27e Change I1 Value

Set the value of I1 to "11".

Command Line		pdata v3.ff23.i1 = 11"		form ff1	
				11 11	
form ff2		form ff2	form ff3	form ff5	form ff6
form ff4		form ff8			form ff7
form ff4					
Line 71 Display:					
Line 22					
Line 23					
MSG: 0		application			

Figure 5-27f I3 Does Not Appear

Item I3 does not appear because the criterion evaluates to false.

Command Line		rplfrm v3 1 ff24		form ff1	
				11 11	
form ff2		form ff2		form ff3	
				form ff5	
form ff4		form ff8		form ff6	
				form ff7	
form ff4					
Line 21 Display:					
Line 22					
Line 23					
MSG: 0		application			

Figure 5-28a Test Case 20

CRITERION: Item I3 APPEARS IF
"CCC"), 1, 2, 3, 4)

IN(BETWEEN('i1', "AAA",

Command Line		rplfrm w3 1 ff24		form ff1	
form ff2		form ff2	form ff3	form ff5	form ff6
form ff4		form ff8			
form ff4					
Line 21 Display:					
Line 22					
Line 23					
MSG: 0		application			

Figure 5-28b I3 Does Not Appear

Item I3 does not appear because the criterion evaluates to false.

Command Line		pdata v3.ff24.i1 "CCD"		form ff1	
form ff2		form ff2		form ff3	
form ff4		form ff8		form ff5	
form ff4				form ff6	
Line 21 Display:		Line 22		Line 23	
MSG: 0				application	

Figure 5-28c Change I1 Value

Set the value of I1 to "CCD".

Command Line		pdata v3.ff24.11 "CCD"		form ff1	
				CCD CCD	
form ff2		form ff2	form ff3	form ff5	form ff6
form ff4		form ff8			form ff7
form ff4					
Line 21 Display:					
Line 22					
Line 23					
MSG: 0		application			

Figure 5-28d I3 Does Not Appear

Item I3 does not appear because the criterion evaluates to false.

Command Line		pdata v3.ff24.i1 "BBB"		form ff1	
				CCD CCD	
form ff2		form ff2		form ff3	
form ff4		form ff8		form ff5	
form ff4				form ff6	
Line 21 Display:		Line 22		Line 23	
MSG: 0				application	

Figure 5-28e Change I1 Value

Set the value of I1 to "BBB".

Command Line		pdata v3.ff24.i1 "BBB"		form ff1	
				BBB xxx BBB	
form ff2		form ff2	form ff3	form ff5	form ff6
form ff4		form ff8			form ff7
form ff4					
Line 21 Display:					
Line 22					
Line 23					
MSG: 0		application			

Figure 5-28f I3 Appears

Item I3 appears because the criterion evaluates to true.

Command Line		rplfrm v3 1 ff29		form ff1	
				BBB xxx	
form ff2	form ff2	form ff3	form ff5	form ff6	form ff7
form ff4	form ff8				
form ff4					
Line 21 Display:					
Line 22					
Line 23					
MSG:	0	application			

Figure 5-29a Test Case 21

CRITERION: Item I3 APPEARS IF (('I1' >= 1) ?
 (('I1' = 5) ? 1 : 0) : 1)

Command Line		rplfrm w3 1 ff29		form ff1	
form ff2		form ff2		form ff3	
form ff4		form ff8		form ff5	
form ff4				form ff6	
Line 21 Display:		Line 22		Line 23	
MSG: 0				application	

Figure 5-29b I3 Appears

Item I3 appears because the criterion evaluates to true.

Command Line		pdata v3.ff29.i1 " 2"		form ff1	
				xxx	
form ff2		form ff2		form ff3	
form ff4		form ff8		form ff5	
form ff4				form ff6	
Line 21 Display:		Line 22		Line 23	
MSG: 0				application	

Figure 5-29c Change I1 Value

Set the value of I1 to "2".

Command Line		pdata w3.ff29.i1 " 2"		form ff1	
				2 2	
form ff2	form ff2	form ff3	form ff5	form ff6	form ff7
form ff4	form ff8				
form ff4					
Line 21 Display:					
Line 22					
Line 23					
MSG:	0	application			

Figure 5-29d I3 Does Not Appear

Item I3 does not appear because the criterion evaluates to false.

Command Line		pdata v3.ff29.i1 = 5"		form ff1	
				2 2	
form ff2		form ff2		form ff3	
form ff4		form ff8		form ff5	
form ff4				form ff6	
Line 21 Display:		form ff7			
Line 22					
Line 23					
MSG: 0				application	

Figure 5-29e Change I1 Value

Set the value of I1 to "5".

Command Line		pdata v3.ff29.i1 = 5"		form ff1	
				5 5	
form ff2		form ff2		form ff3	
form ff4		form ff8		form ff5	
form ff4				form ff6	
Line 21 Display:				form ff7	
Line 22					
Line 23					
MSG: 0				application	

Figure 5-29f I3 Appears

Item I3 appears because the criterion evaluates to true.

Command Line		rplfrm w3 1 ff30		form ff1	
				5 5 xxx	
form ff2		form ff2		form ff3	
form ff4		form ff8		form ff5	
form ff4				form ff6	
				form ff7	
Line 21 Display:					
Line 22					
Line 23					
MSG: 0		application			

Figure 5-30a Test Case 22

CRITERION: Item I3 APPEARS IF NOT IN(((('I1' >= 1) ?
 1, 2, 3) (('I1' = 5) ? 1 : 0) : 1),

Command Line rplfrm w3 1 ff30

form ff1

form ff2 form ff2 form ff3 form ff5 form ff6 form ff7

form ff4 form ff8

form ff4

Line 21 Display:
Line 22
Line 23

MSG: 0 application

Figure 5-30b I3 Does Not Appear

Item I3 does not appear because the criterion evaluates to false.

Command Line pdata v3.ff30.i1 = 2 form ff1

form ff2 form ff2 form ff3 form ff5 form ff6 form ff7

form ff4 form ff8

form ff4

Line 21 Display:
Line 22
Line 23

MSG: 0 application

Figure 5-30c Change I1 Value

Set the value of I1 to "2".

Command Line		pdata v3.ff30.i1 " 2"		form ff1	
				2 2 xxx	
form ff2		form ff2		form ff3	
form ff4		form ff8		form ff5	
form ff4				form ff6	
				form ff7	
Line 21 Display:					
Line 22					
Line 23					
MSG: 0		application			

Figure 5-30d I3 Appears

Item I3 appears because the criterion evaluates to true.

Command Line		pdata v3.ff30.i1 " 5"		form ff1	
				2 2 XXXX	
form ff2		form ff2		form ff3	
form ff4		form ff8		form ff5	
form ff4				form ff6	
				form ff7	
Line 21 Display:					
Line 22					
Line 23					
MSG: 0		application			

Figure 5-30e Change I1 Value

Set the value of I1 to "5".

Command Line		pdata v3.ff30.i1 " 5"		form ff1	
				5 5	
form ff2		form ff2		form ff3	
form ff4		form ff8		form ff5	
form ff4				form ff6	
				form ff7	
Line 21 Display:					
Line 22					
Line 23					
MSG: 0		application			

Figure 5-30f I3 Does Not Appear

Item I3 does not appear because the criterion evaluates to false.

The following test case tests the APPEARS IF criterion for the form field F1.

Command Line		rplfrm v3 1 ff38		form ff1	
				5 5	
form ff2		form ff2		form ff3	
form ff4		form ff8		form ff5	
form ff4				form ff6	
form ff4				form ff7	
Line 21 Display:					
Line 22					
Line 23					
MSG: 0		application			

Figure 5-31a Test Case 23

CRITERION: Form F1 APPEARS IF 'I1' > 10 ? 1 : 0

Command Line		rplfrm v3 1 ff38		form ff1	
				ff38	
form ff2	form ff2	form ff3	form ff5	form ff6	form ff7
form ff4	form ff8				
form ff4					
Line 21 Display:					
Line 22					
Line 23					
MSG: 0		application			

Figure 5-31b F1 Does Not Appear

Form F1 does not appear because the criterion evaluates to false.

Command Line		pdata v3.ff38.i1 " 15"		form ff1	
				ff38	
form ff2		form ff2	form ff3	form ff5	form ff6
form ff4		form ff8			form ff7
form ff4					
Line 21 Display:					
Line 22					
Line 23					
MSG: 0		application			

Figure 5-31c Change I1 Value

Set the value of I1 to "15".

Command Line		pdata v3.ff38.i1 " 15"		form ff1	
		ff38 15 15 F1			
form ff2	form ff2	form ff3	form ff5	form ff6	form ff7
form ff4	form ff8				
form ff4					
Line 21 Display:					
Line 22					
Line 23					
MSG: 0		application			

Figure 5-31d F1 Appears

Form F1 appears because the criterion evaluates to true.

Command Line		pdata v3.ff38.i1 = -1		form ff1	
				ff38 15 15 F1	
form ff2		form ff2		form ff3	
form ff4		form ff8		form ff5	
form ff4				form ff6	
Line 21 Display:				form ff7	
Line 22					
Line 23					
MSG: 0				application	

Figure 5-31e Change I1 Value

Set the value of I1 to "-1".

Command Line		pdata v3.ff38.i1 " -1"		form ff1	
				ff38 -1 -1	
form ff2		form ff2		form ff3	
form ff4		form ff8		form ff5	
form ff4				form ff6	
form ff4				form ff7	
Line 21 Display:					
Line 22					
Line 23					
MSG: 0		application			

Figure 5-31f F1 Does Not Appear

Form F1 does not appear because the criterion evaluates to false.

The following test case tests the APPEARS IF criterion for the window field W1.

Command Line pdata ff1.ff6.i1 "xxxx" form ff1

form ff2 form ff3 form ff5 form ff6 form ff7

form ff4 form ff8

Line 21 Display:
Line 22
Line 23
MSG: 0 application

Figure 5-32a Test Case 24

CRITERION: Window W1 APPEARS IF 'ff1.ff6.i1' < "1111"
Set the value of FF6.I1 to "xxxx".

Command Line		pdata ff1.ff6.i1 * *		form ff1	
				ff3 -1 -1	
form ff2	form ff2	form ff3	form ff5	form ff6	form ff7
form ff4	form ff8				
form ff4					
Line 21 Display:					
Line 22					
Line 23					
MSC: 0		application			

Figure 5-32c Change FF6.I1 Value

Set the value of FF6.I1 to blank.

The screenshot displays a graphical user interface with a 'Command Line' at the top containing the text 'pdata ff3.ff6.11 *'. Below the command line, there are several windows. A large window labeled 'form ff1' is in the top right, containing a sub-window labeled 'ff38' with the values '-1' and '-1'. Other windows labeled 'form ff2' through 'form ff8' are arranged in a grid-like fashion. At the bottom, there is a status bar with the text 'Line 21 Display: ...', 'Line 22 ...', 'Line 23 ...', 'MSG: 0', and 'application'.

Figure 5-32d W1 Appears

Window W1 appears because the criterion evaluates to true.

This concludes the tests for the APPEARS IF syntax. Press the <QUIT> key twice to terminate ARTEST and return to the system prompt.

5.2 Graph Test Description

Two test programs are used to test the Graph definition Language (GDL). The test program GRFTST uses explicit FP calls to place the form within a window, place data within the form fields where the graph data is to be located, display the graph form, and remove the graph form from the window. Since the program issues the pdata using data from internal arrays, no data entry is required by the tester.

The test program GRAFDE is an interactive application that is generated using the Rapid Application Generator. GRAFDE represents user entered data as a pie, bar, or line graph.

5.2.1 Graph Test Control

As outlined, this unit test is a manual test which may be done by anyone. The required input data for each function being tested, the resulting successful output and the order of the testing are completely specified below. Accurate observation of the resulting successful output must be made to ensure the unit test was done properly.

5.2.2 Graph Test Procedures

To run the unit test, you must be logged on to an IISS account. The NTM must be up and running and the UI symbolic names IISSFLIB, IISSULIB and IISSMLIB must be defined as described in the host specific sections. For the IBM version, please reference Section 5.1.3.

5.2.2.1 Graph VAX Test Procedures

To run the unit test plan in the VAX/VMS environment as outlined below, one must be logged onto an IISS account. The NTM must be up and running and the UI logical names IISSFLIB, IISSULIB, IISSSLIB, and IISSMLIB must be set properly at the group level. IISSFLIB points to the directory containing system form definitions (FD files). IISSULIB points to the directory containing the user's form definitions (FD files). IISSSLIB points to the directory containing the user's form definition source files (FDL files). IISSMLIB points to the directory containing the UI error and help messages (MSG files). To perform this test IISSULIB and IISSSLIB must be pointing to the default directory.

Assuming the NTM is up and running, an IISS user may start this test as follows:

```
$ SET DEF <to directory containing NTM environment>  
$ TEK4100
```

These commands start up the TEK4100 device driver.

5.2.2.1.1 Access to GDL Test Programs

Following entry of the system command "TEK4100" which activates the User Interface the following form appears:

USER ID: _____

PASSWORD: _____

ROLE: _____

Msg: 0

application

Figure 5-33 IISS Logon Screen

- (1) USER ID is the identification name of the user, and is 1 to 10 alpha-numeric characters. USER ID is input as "MORENC".
- (2) PASSWORD must be the password associated with the USER ID, and is 1 to 10 alpha-numeric characters. PASSWORD was input as "STANLEY".
- (3) ROLE is any of the identifiers which are associated with the USER ID, and is 1 to 10 alpha-numeric characters. It will be checked against functions and applications which are selected by the user. ROLE is input as "MANAGER".

When this form is correctly completed and the <ENTER> key is pressed, the IISS Function Screen is displayed.

I I S S T E S T B E D V E R S I O N 2.3			
DATE: __/__/__	TIME__:__:__	USER ID: _____	ROLE: _____
FUNCTION: _____		DEVICE TYPE: _____	DEVICE NAME: _____
Msg: 0		application	

Figure 5-34 IISS Function Screen

When this form appears, the cursor is located in the input field labeled FUNCTION. The items in the form are summarized below:

- (1) DATE contains the current date. This may not be changed by the user.
- (2) TIME contains the current time. This may not be changed by the user.
- (3) USER ID is the user's identification that was entered in the previous form. This may not be changed by the user.
- (4) ROLE is the currently active role and was entered in the previous form. This may be changed at any time.
- (5) FUNCTION is the function the user desires to activate.

To run the GDL test programs, proceed as described in the following sections.

5.2.2.1.2 Running the GRFTST Program

To run the GRFTST program, enter "GRFTST" in the FUNCTION field on the IISS Function Screen and press the <ENTER> key. This program produces the 27 graphs shown in Appendix C. Test Graph A is displayed when the program begins. Each succeeding graph is displayed by repeatedly pressing the <ENTER> key. Before proceeding to the next graph, the graph displayed on the terminal screen should be compared with the corresponding graph in Appendix C. When all 27 graphs have been displayed and compared, a final press of the <ENTER> key terminates the program and redisplay the IISS Function Screen.

5.2.2.1.3 Running the GRAFDE Program

To run the GRAFDE program, enter "GRAFDE" in the FUNCTION field on the IISS Function Screen and press the <ENTER> key. The following screen is displayed.

	Cur.Yr.	Cur.Yr.-1	Cur.Yr.-2	Cur.Yr.-3
Rework:	██	██	██	██
Scrap :	██	██	██	██
Misc :	██	██	██	██

Enter data and press <PF5> - Pie , <PF6> - Bar, <PF7> - Line

MSS: 0 application

Figure 5-35 Initial GRAFDE Screen

Enter the data as shown in Figure 5-36 and press the appropriate function key to produce the desired graph as described in Table 5-1.

ENGINEERING CHANGE ANALYSIS CENTER					DATE: 6/14/88
CHANGE COST GRAPH					TIME: 10:54:28
	Cur.Yr.	Cur.Yr.-1	Cur.Yr.-2	Cur.Yr.-3	
Rework:	0	0	5	10	
Scrap :	10	15	10	10	
Misc :	10	10	10	10	

Enter data and press <PF5> - Pie , <PF6> - Bar, <PF7> - Line

MSG: application

Figure 5-36 Test Data for GRAFDE

A total of six separate screens may be presented using the data. To display the appropriate graph, press the indicated function key.

PFKEY	APPENDIX FIGURE	DESCRIPTION
5	B-1	Pie chart with percentages outside
6	B-2	Horizontal bar chart
7	B-3	Line graph
9	B-4	Pie chart with percentages inside and labels
10	B-5	Vertical bar chart
11	B-6	Line chart with area under curves shaded
4		Quit application

Table 5-1 PFKEY and Figure Correlation

The screens displayed should be compared with the indicated graph figures in Appendix D. Only the time/date stamps should differ.

5.3 2-D Graphics Test Description

A test program is used to test the 2-D graphics on forms (icons). The test program ICONTST, written in FDL, is an application that is generated using the Rapid Application Generator. ICONTST will display an icon, a graphics form with all of the supported 2-D graphics primitives, and allow the scrolling of graphics on a form within a window.

5.3.1 2-D Graphics Test Control

As outlined, this unit test is a manual test which may be done by anyone. The required input data for each function being tested, the resulting successful output and the order of the testing are completely specified below. Accurate observation of the resulting successful output must be made to ensure the unit test was done properly.

5.3.2 2-D Graphics Test Procedures

To run the unit test, you must be logged on to an IISS account. The NTM must be up and running and the UI symbolic names IISSFLIB, IISSULIB and IISSMLIB must be defined as described in the host specific sections. For the IBM version, please reference Section 5.1.3.

5.3.2.1 2-D Graphics VAX Test Procedures

To run the unit test plan in the VAX/VMS environment as outlined below, one must be logged onto an IISS account. The NTM must be up and running and the UI logical names IISSFLIB, IISSULIB, IISSSLIB, and IISSMLIB must be set properly at the group level. IISSFLIB points to the directory containing system form definitions (FD files). IISSULIB points to the directory containing the user's form definitions (FD files). IISSSLIB points to the directory containing the user's form definition source files (FDL files). IISSMLIB points to the directory containing the UI error and help messages (MSG files). To perform this test IISSULIB and IISSSLIB must be pointing to the default directory.

Assuming the NTM is up and running, an IISS user may start this test as follows:

```
$ SET DEF <to directory containing NTM environment>  
$ TEK4100
```

These commands start up the TEK4100 device driver.

5.3.2.1.1 Access to 2-D Graphics Test Programs

Following entry of the system command "TEK4100" which activates the User Interface the following form appears:

+-----+-----+	
USER ID:	_____
PASSWORD:	_____
ROLE:	_____
Msg: 0	application
+-----+-----+	

Figure 5-37 IISS Logon Screen

- (1) USER ID is the identification name of the user, and is 1 to 10 alpha-numeric characters. USER ID is input as "MORENC".
- (2) PASSWORD must be the password associated with the USER ID, and is 1 to 10 alpha-numeric characters. PASSWORD was input as "STANLEY".
- (3) ROLE is any of the identifiers which are associated with the USER ID, and is 1 to 10 alpha-numeric characters. It will be checked against functions and applications which are selected by the user. ROLE is input as "MANAGER".

When this form is correctly completed and the <ENTER> key is pressed, the IISS Function Screen is displayed.

I I S S T E S T B E D V E R S I O N 2.3			
DATE: __/__/__	TIME__:__:__	USER ID: _____	ROLE: _____
FUNCTION: _____		DEVICE TYPE: _____	DEVICE NAME: _____
Msg: 0		application	

Figure 5-38 IISS Function Screen

When this form appears, the cursor is located in the input field labeled FUNCTION. The items in the form are summarized below:

- (1) DATE contains the current date. This may not be changed by the user.
- (2) TIME contains the current time. This may not be changed by the user.
- (3) USER ID is the user's identification that was entered in the previous form. This may not be changed by the user.
- (4) ROLE is the currently active role and was entered in the previous form. This may be changed at any time.
- (5) FUNCTION is the function the user desires to activate.

To run the 2-D graphics test programs, proceed as described in the following sections.

5.3.2.1.2 Running the INCONTST Program

ACTIVITY A:

To run the ICONTST program, enter "ICONTST" in the FUNCTION field on the IISS Function Screen and press the <ENTER> key. Figure 5-39 is displayed when the program begins.

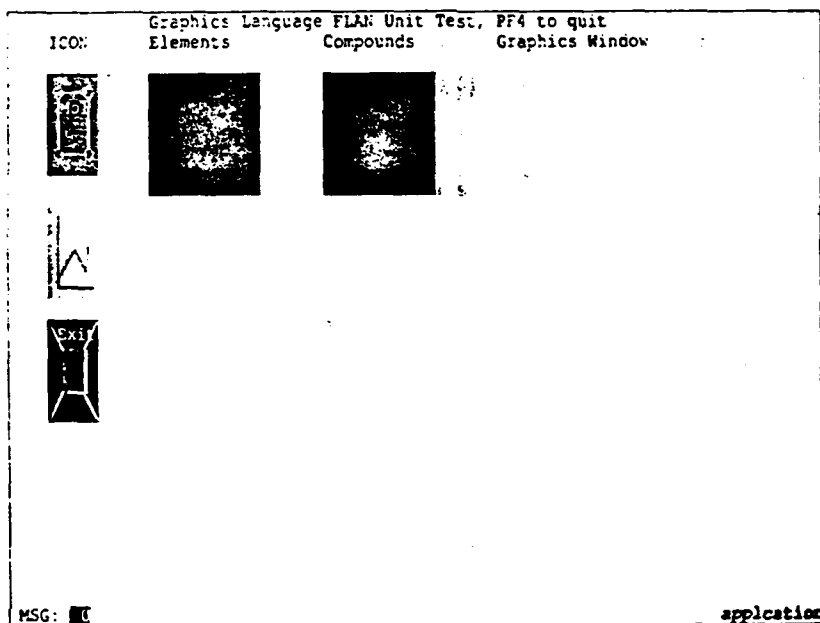


Figure 5-39 ICONTST startup screen

ACTIVITY B:

Input the data shown in figure 5-40 into the appropriate fields as shown.

ICON	Graphics Language Elements	FLAN Unit Test, Compounds	PF4 to quit Graphics Window
	CARBON HYDROGEN OXYGEN	BENZENE PROPANE ETHANOL GLUCOSE	
			
			

Figure 5-40 Forms Data Input screen

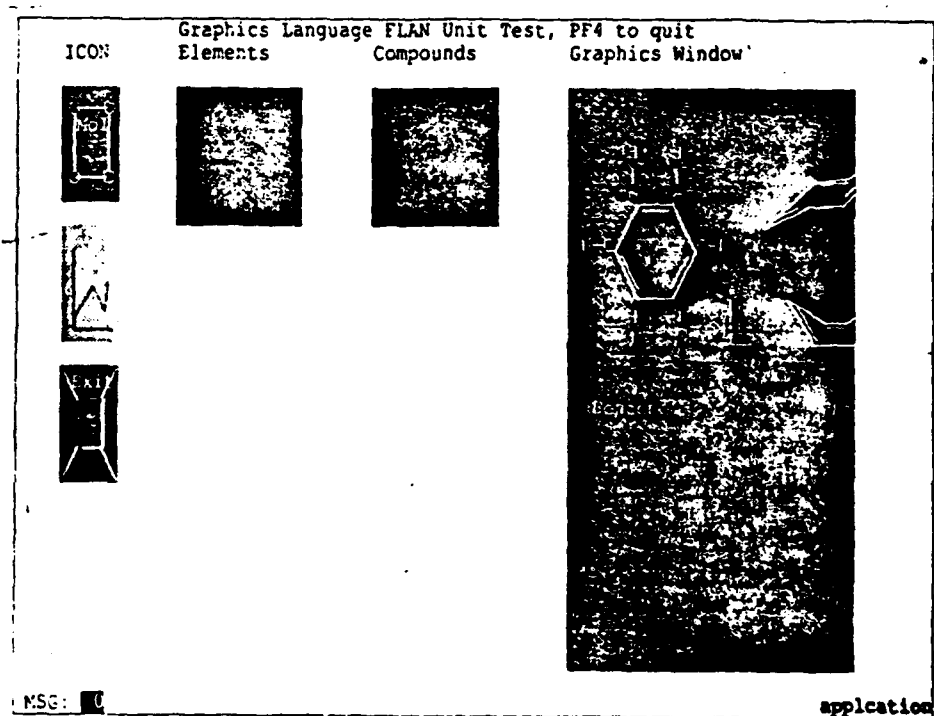
ACTIVITY C:

Move the cursor to the ICON labeled "Mol." (Molecule) and pick the ICON by pressing the <ENTER> key. The form in Figure 5-41, will be partially displayed in the Graphics Window (Figure 5-42). With the mode key, select the window manager function. Place the cursor into the Graphics Window and press the Select key. The Graphics Window may now be scrolled to show the remainder of Figure 5-41 using the scroll window keys.



Figure 5-41 Molecule Graphics form

Figure 5-42 Example display of Molecule Graphics



ACTIVITY D:

Move the cursor to the ICON labeled "Sales" and pick the ICON by pressing the <ENTER> key. The form Figure 5-43, will be partially displayed in the Graphics Window (Figure 5-44). Using the Window manager function as in Activity C, scroll the Graphics Window to show the remainder of Figure 5-43.

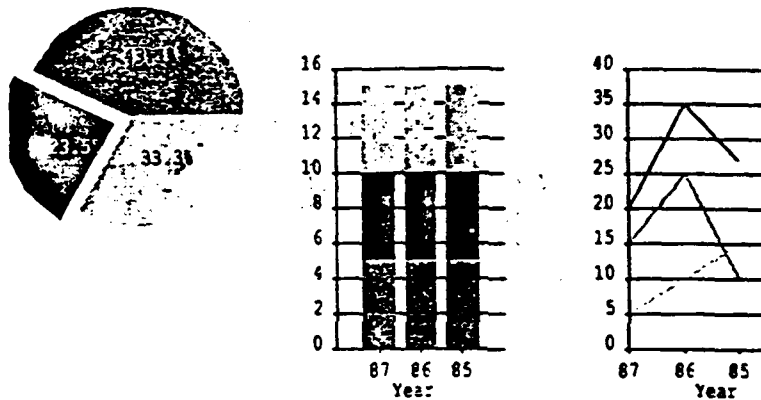


Figure 5-43 Sales Graphs from

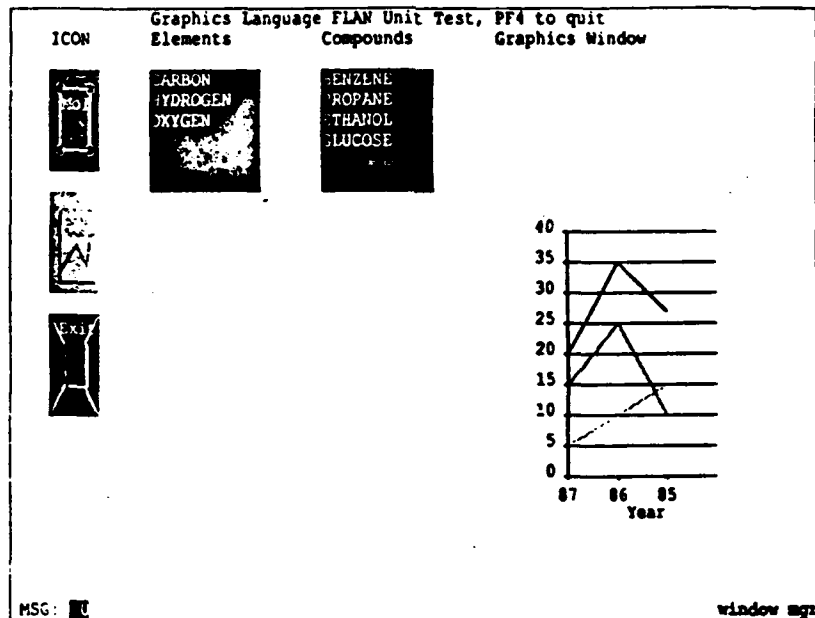


Figure 5-44 Example display of Sales Graphs

This completes the ICONTEST program to exit, place the cursor into the "exit" ICON, and press the <ENTER> key.

APPENDIX A

FLAN1.FDL

FLAN input file with correct syntax and semantics to test all features.

```
/* test forms for the flan compiler */

create form testform
  prompt center at 2 below i3 and column 6 "array" /* form
prompt */

item i1                                /* item field */
  size 1 at 2 3                        /* field size */
  display as input                     /* field display attribute */
  value "1"                            /* item value */
  prompt at 1 2 "size/display"        /* field prompt */

item i2
  size 2 by 2
  at below i1
  display as output
  value "2222"

item i3
  size 3 by 2
  at below i2
  display as text
  value "333333"

item i4 (2 v, 3 h 2, 2 v 2)           /* array */
  at 3 below i3 and column 2
  size 1
  display as input

form fat1                             /* forms */
  at 3 below i3 and column 12
  size 6
  prompt at above "forms"

form fat2
  at below fat1
  size 6
```

```
window w1                                /* windows */
  at 3 right of fat1
  size 5
  background white
  prompt at above "windows"

window w2
  at below w1
  size 5
  background black

item i5                                /* domains */
  at 2 15
  size 2
  display as input
  domain (must enter must fill numeric)
  prompt at right "(must enter must fill numeric)"
  prompt at 1 above and col 15 "domains"

item i6
  at below i5
  size 4
  display as input
  domain (left lower)
  prompt at right "(left lower)"

item i7
  at below i6
  size 4
  display as input
  domain (right upper)
  prompt at right "(right upper)"

item i8
  at below i7
  size 4
  display as input
  domain (max 10 min 0)
  prompt at right "(max 10 min 0)"
```

```
item i9                                /* help */
  at 2 60
  size 1
  display as input
  help "help message for i9"
  prompt at right "message"
  prompt at 1 above "help"

item i10
  at below i9
  size 1
  display as input
  help i10help
  prompt at right "form"

item i10                                /* location tests */
  at 13 40
  size 5 by 5
  display as input
  prompt at 4 above "location"

item i11
  size 2 by 2
  display as input
  bottom right at 1 above i10 and 2 left of i10
  value "1111"

item i12
  size 2 by 2
  display as input
  bottom left at 2 above top left of i10
  value "1212"

item i13
  size 2 by 2
  display as input
  bottom right at above top right of i10
  value "1313"

item i14
  size 2 by 2
  display as input
  bottom left at 1 above i10 and 2 right of i10
  value "1414"
```

item 15
size 2 by 2
display as input
top right at left of top left of 10
value"1515"

item 16
size 2 by 2
display as input
bottom right at 2 left of bottom left of 10
value"1616"

item 17
size 2 by 2
display as input
top right at 1 below 10 and 2 left of 10
value"1717"

item 18
size 2 by 2
display as input
top left at 1 below bottom left of 10
value"1818"

item 19
size 2 by 2
display as input
top right at 2 below bottom right of 10
value"1919"

item 1a
size 2 by 2
display as input
top left at 1 below 10 and 2 right of 10
value"1a1a"

item 1b
size 2 by 2
display as input
top left at 2 right of top right of 10
value"1b1b"


```
item lc
  size 2 by 2
  display as input
  bottom left at right of bottom right of 10
  value"lc1c"
```

```
create form i10help
  size 80 by 23
  prompt center at 10 40 "help form form item i10"
```

```
create form fat1                                /* form background and size */
  background white
  size 5
  prompt at 1 2 "fat1"
```

```
create form fat2
  background black
  size 5
  prompt at 1 2 "fat2"
```

APPENDIX B

FLAN2.FDL

FLAN input file to test all semantic error messages.

/* flan forms to force all semantic error messages */

```
create form testerr
size 1 /*("form %s too narrow: fields extend to column %d",
  ("form %s too short: fields extend to row %d", */
prompt at left "testerr" /*("must specify relative field
name");*/
prompt at 25 2 "off bottom"
```

```
item a /*("size not specified or invalid");*/
at 1 2
display as input
```

```
item b /*("value too big for field");*/
size 1
value "22"
display as input
```

```
item cc /*("no display attribute specified");*/
size 1
at 1 4
```

```
item bb /*("field %s referenced in %s %s%s not defined",*/
at below nothing
size 1
display as input
```

```
item cd /*("circular reference in location of %s %s%s",*/
at below dc
size 1
display as input
```

```
item dc
at above cd
size 1
display as input
```

```
item e /*("overlap between %s %s%s and %s %s%s",*/
at 2 2
size 1
display as input
```

item f
at 2 2
size 1
display as input

item g /*("%s %s%s off top of screen", */
at -1 10
size 1
display as input

item hh /*("%s %s%s off left of screen", */
at 1 -1
size 1
display as input

item i /*("unterminated string");*/
at 1 6
size 1
display as input
value "hello

item j /*("string too long");*/
at 1 8
size 150
display as input
value
"12345678911234567892123456789312345678941234567895123456789612
345 67897123
456789812345678991234567890123456789112345678921234567893123456
7894"

item j /*("duplicate field name: %s", */
at 3 2
size 1
display as input

item k /*("duplicate display attribute specified");*/
at 3 4
size 1
display as input
display as input

item l /*("unknown display attribute: %s", */
at 3 6
size 1
display as ugly

```
window m at 3 8
size 1
display as black
domain (upper) /*("domain only legal for items");*/

item n /*("duplicate justification specified");*/
at 3 10
size 1
display as input
domain (left right)

item o /*("duplicate case specified");*/
at 3 12
size 1
display as input
domain (upper lower)

item p /*("duplicate minimum specified");*/
at 3 14
size 1
display as input
domain (min 10 min 2)

item q /*("duplicate maximum specified");*/
at 3 16
size 1
display as input
domain (max 10 max 2)

window rr /*("help only legal for items"); */
at 3 18
size 1
display as black
help "hello"

create form testform
item s /*("duplicate help specified");*/
at 3 20
size 1
display as input
help "hello"
help "hello"
```

```
item t /*("help message too long, truncated");*/  
at 3 22  
size 1  
display as input  
help  
"12345678911234567892123456789312345678941234567895123456789612  
34567897"
```

```
window u /*("value only legal for items");*/  
at 3 24  
size 1  
display as black  
value "hello"
```

```
create form testform  
item vv /*("duplicate value specified");*/  
at 3 26  
size 10  
display as input  
value "hello"  
value "hello"
```

```
item w /*("unknown function %s", */  
at 3 38  
size 20  
display as input  
value func('hello')
```

```
item x /*("invalid argument for INDEX");*/  
at 3 60  
size 20  
display as input  
value index(1)
```

```
item y /*("duplicate size specified");*/  
at 4 2  
size 1  
size 1  
display as input
```

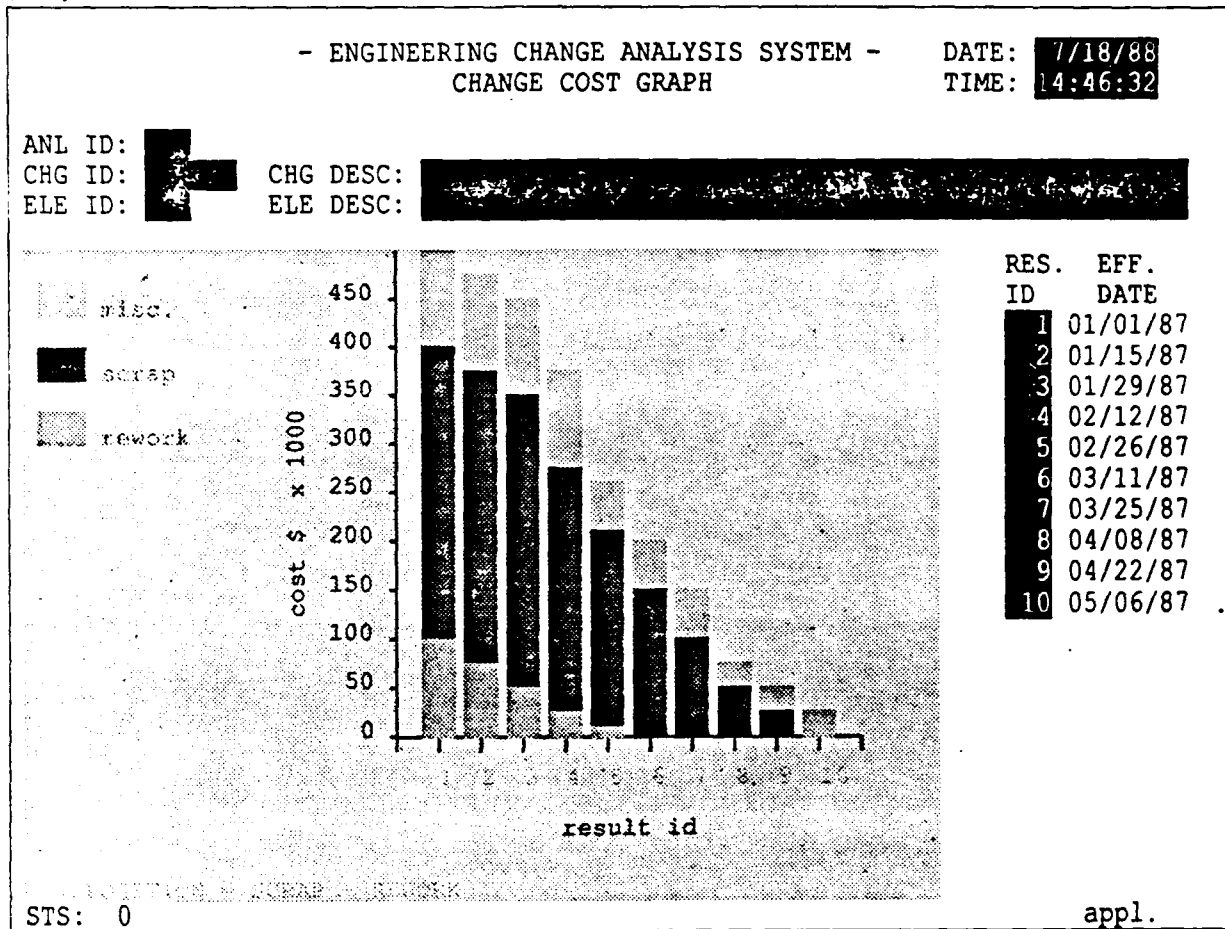
```
create form endless  
/* else if (c == EOF) {fatal("unterminated comment"); return  
c;}
```

APPENDIX C

SCREENS AND GDL FOR GRFTST

This appendix contains all the screens for the first test of the Graph Definition Language. The necessary FDL follows the screens.

Figure C-1 GDL Test Activity A: and corresponding GDL



```
create form grftst1
  size 80 by 30
  prompt at 2 20 "- ENGINEERING CHANGE ANALYSIS SYSTEM -"
  prompt at 3 30 "CHANGE COST GRAPH"
  attribute out (background white, display blue, guarded,
                nowrite)
  attribute out2 (background blue, display yellow, guarded)
  attribute out3 (background red, display black, guarded)
  attribute nosee (guarded, hidden)

item curdat
  at 2 68
  size 8
  prompt at 2 62 "DATE:"
  value '._date'
  display as out

item curtim
  at 3 68
  size 8
  prompt at 3 62 "TIME:"
  value '._time'
  display as out

item anlid
  at 5 10
  size 3
  prompt at 5 2 "ANL ID:"
  display as out2

item chgid
  at 6 10
  size 6
  prompt at 6 2 "CHG ID:"
  display as out2

item chgdsc
  at 6 28
  size 50
  prompt at 6 18 "CHG DESC:"
  display as out3

item eleid
  at 7 10
  size 3
  prompt at 7 2 "ELE ID:"
  display as out2

item eledsc
  at 7 28
  size 50
  prompt at 7 18 "ELE DESC:"
  display as out3
```



```
graph cstgrf
  at 9 2
  display as blue
  size 60 by 21

form csttab
  at 9 65
  display as black
  size 16 by 21

create bar graph cstgrf
  using ('csttab.ids' axis ax1)
  attribute a line (display yellow)
  attribute b prompt (display white)
  attribute c prompt (display green)
  attribute d prompt (display red)
  legend at 2 2
  label display as d, at 20 2 "DISPOSITION = SCRAP + REWORK"

curve rework
  'csttab.rewcst' using axis ax2
  legend c "rework"
  absolute

curve misc
  'csttab.msccst'
  additive using curve scrap
  legend c "misc."

curve scrap
  'csttab.scrbst'
  additive using curve rework
  legend c "scrap"
```

```
axis ax1
  horizontal
  display as a
  at 16 25
  min 0
  size 30
  label b "          result id"
  tick every 1 d " " "1" "2" "3" "4" "5" "6" "7" "8" "9" "10"

axis ax2
  at 16 25
  size 15
  label b "          cost $ "
  vertical
  min 0
  display as a

create form csttab
  prompt at 1 2 "RES."
  prompt at 2 2 "ID"
  prompt at 1 8 "EFF."
  prompt at 2 8 "DATE"
  attribute hid (hidden, guarded)

item dates (10 v 0)
  size 8
  at 3 6
  display as magenta

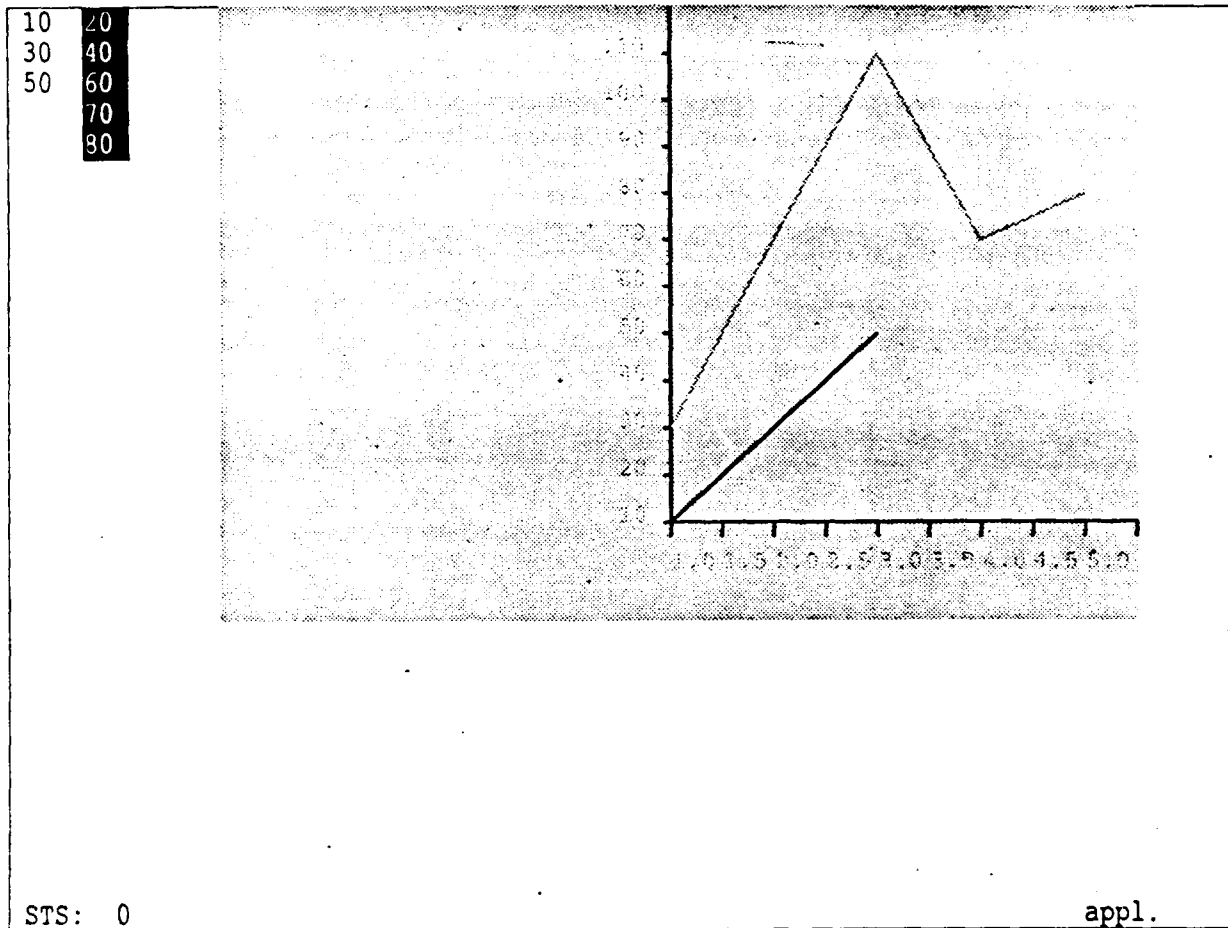
item ids (10 v 0)
  size 3
  at 3 2
  domain (numeric)
  display as cyan

item mscbst (10 v 0)
  size 6
  at 3 15
  display as hid
  domain (numeric)

item scrcst (9 v 0)
  at 3 35
  domain (numeric)
  display as hid
  size 6

item rewcst (5 v 0)
  at 3 45
  size 6
  domain (numeric)
  display as hid
```

Figure C-2 GDL Test Activity b: and corresponding GDL



```
create form grftst2
    size 80 by 30

item i1 (3 v 0)
    display as red
    at 1 2
    size 3
    domain (numeric)

item i2 (5 v 0)
    display as yellow
    at 1 6
    size 3
    domain (numeric)

graph grf1
    at 1 15
    size 60 by 20
    display as blue

create line graph grf1
    using (1, 2, 3, 4, 5 axis ax1)
    attribute a fill (display cyan)
    attribute b line (display magenta)
    attribute xy prompt (display yellow)
    attribute x line (display yellow)
    attribute c prompt (display white)
    attribute d line (display green)
    background blue

curve aaa
    'grftst2.i1' using axis ax2
    absolute

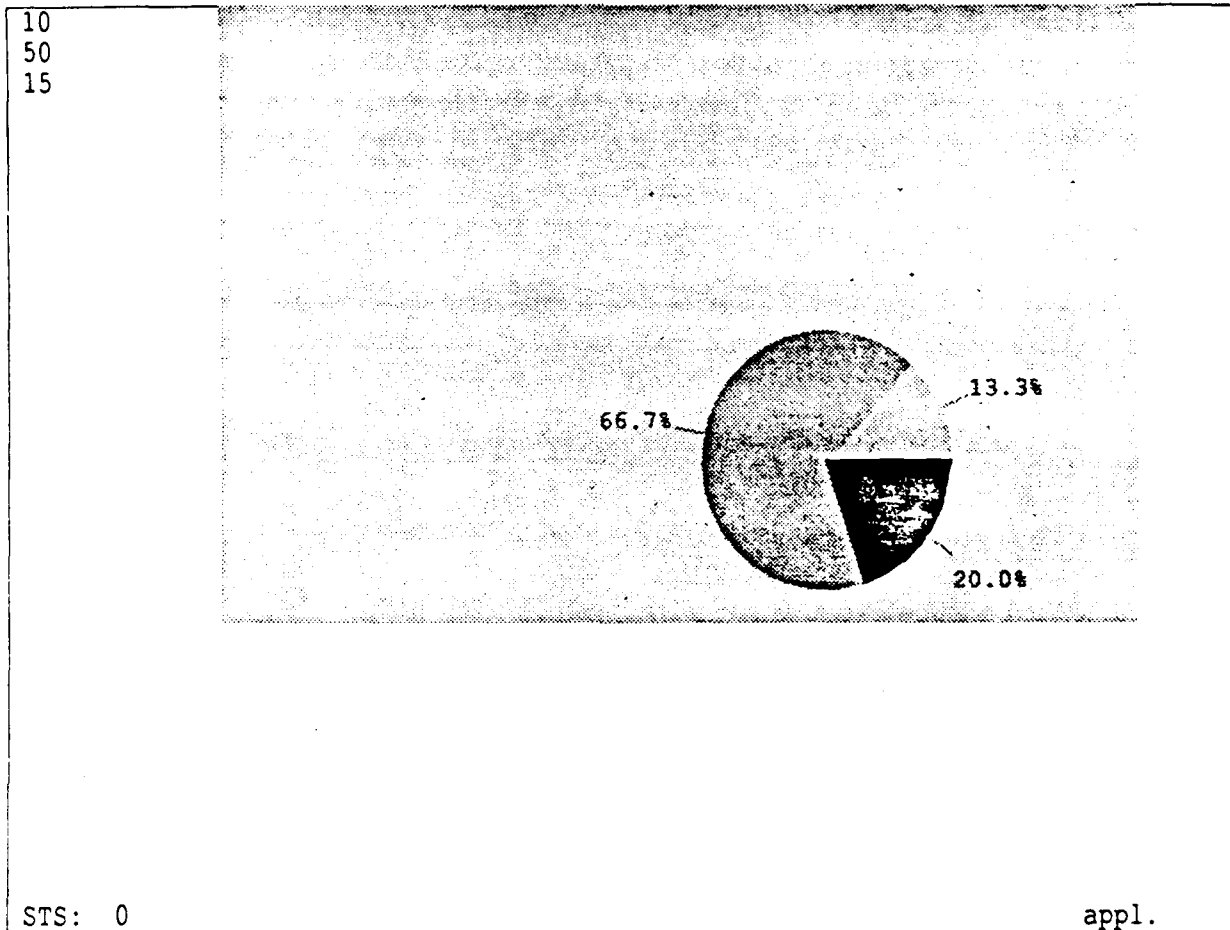
curve two
    'grftst2.i2'
    additive using curve aaa

axis ax1
    horizontal
    display as x
    at 15 30
    size 30
```

UTP620344401
30 September 1990

axis ax2
at 15 30
size 15
vertical
display as x

Figure C-3 GDL Test Activity C: and corresponding GDL



```
create form grftst3
    size 80 by 30

form fgrf (3 v 0)
    at 1 1
    size 5 by 1

graph grf2
    at 1 15
    size 60 by 20
    display as blue

create pie graph grf2
    at 10 30
    size 20 by 8
    using ('grftst3.fgrf(*) .i1')

pie 1
    shade color red

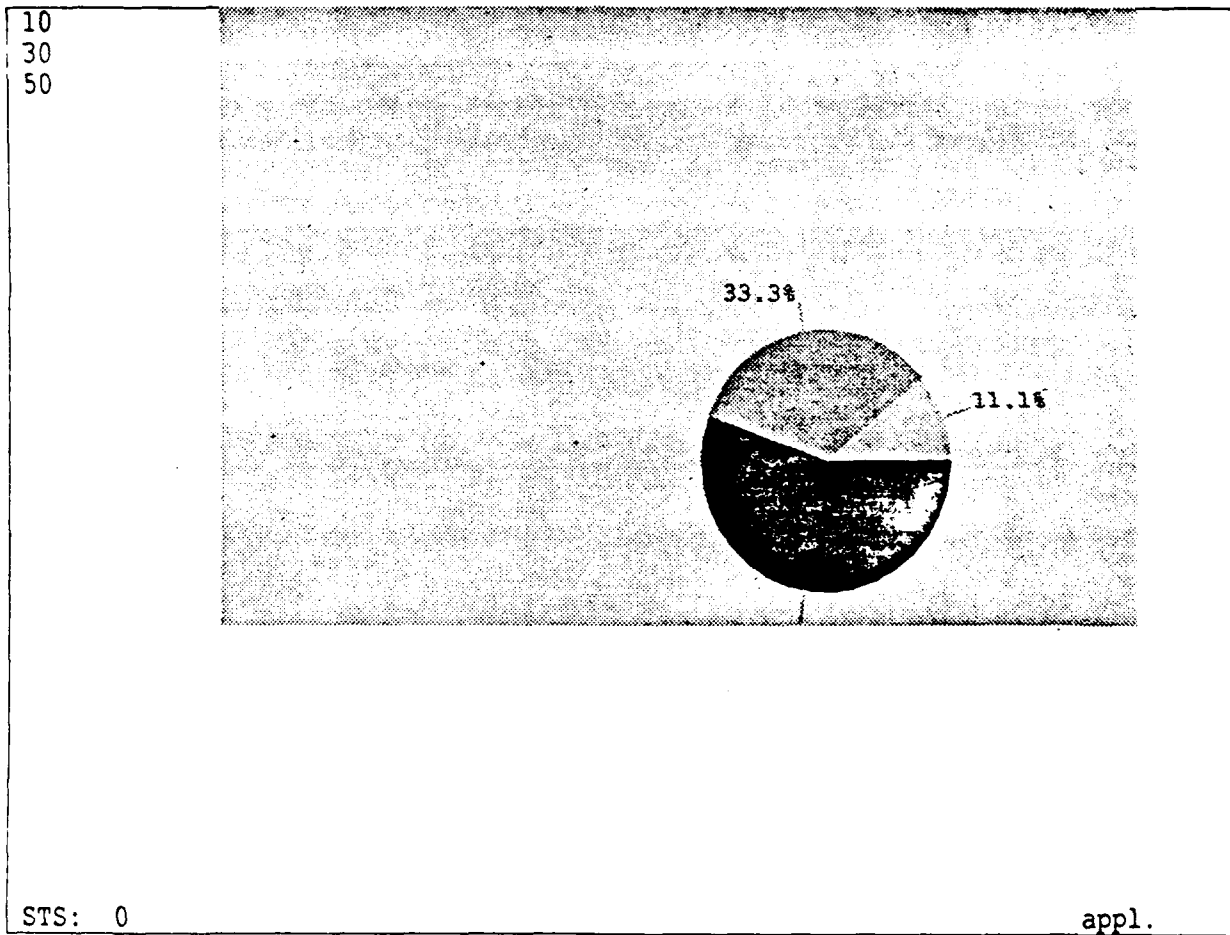
pie 2
    shade color magenta

pie 3
    shade color white

create form fgrf

item i1
    display as red
    at 1 2
    size 3
    domain (numeric)
```

Figure C-4 GDL Test Activity D: and corresponding GDL




```
create form grftst4
    size 80 by 30

item i1 (3 v 0)
    display as red
    at 1 2
    size 3
    domain (numeric)

graph grf3
    at 1 15
    size 60 by 20
    display as blue

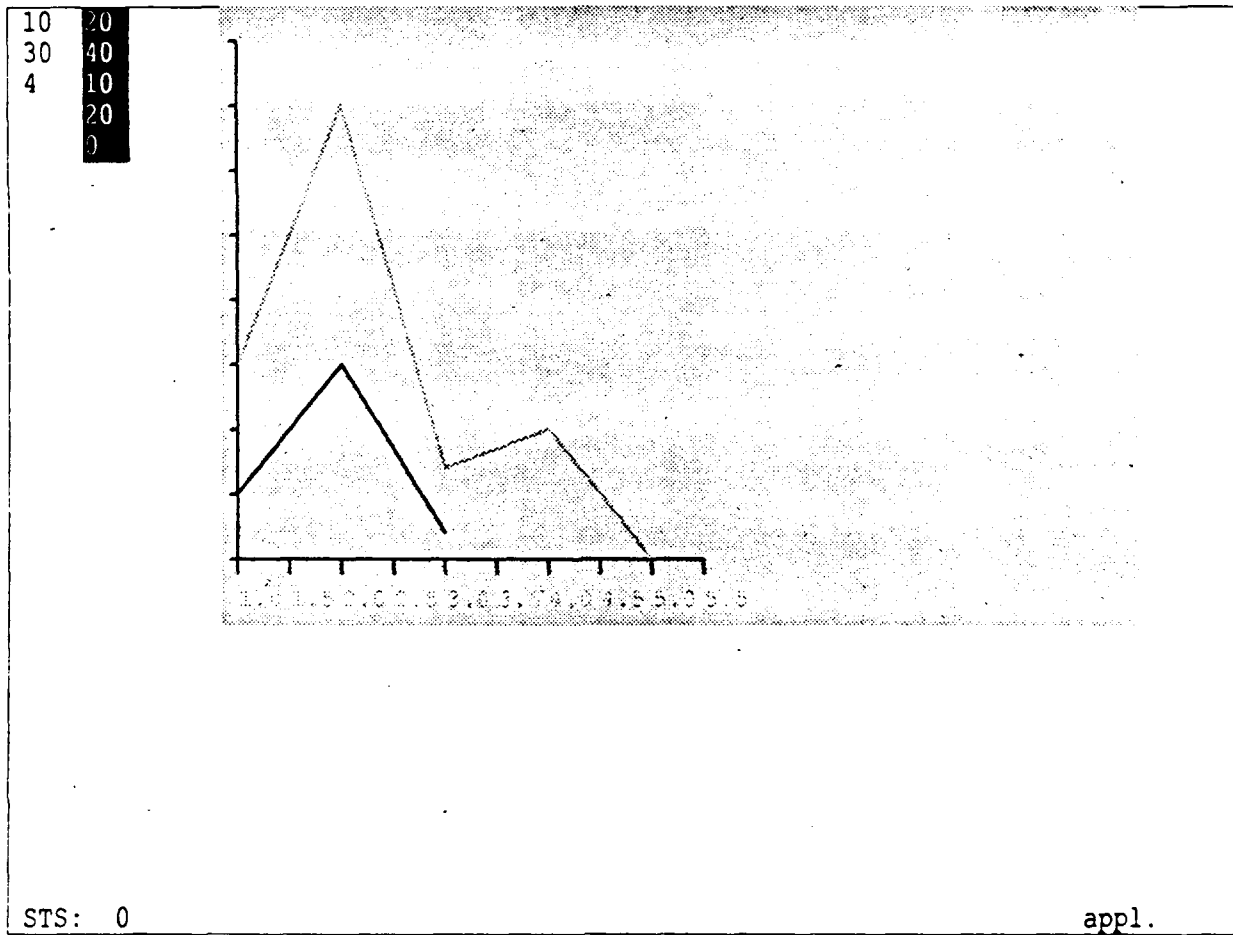
create pie graph grf3
    at 10 30
    size 20 by 8
    using ('grftst4.i1')

pie 1
    shade color red

pie 2
    shade color magenta
    explode 2

pie 3
    shade color white
```

Figure C-5 GDL Test Activity E: and corresponding GDL



```
create form grftst5
    size 80 by 30

item i1 (3 v 0)
    display as red
    at 1 2
    size 3
    domain (numeric)

item i2 (5 v 0)
    display as yellow
    at 1 6
    size 3
    domain (numeric)

graph grf4
    at 1 15
    size 60 by 20
    display as blue

create line graph grf4
    using (1, 2, 3, 4, 5 axis ax1)
    attribute a fill (display cyan)
    attribute b line (display magenta)
    attribute xy prompt (display yellow)
    attribute x line (display yellow)
    attribute c prompt (display white)
    attribute d line (display green)
    background blue

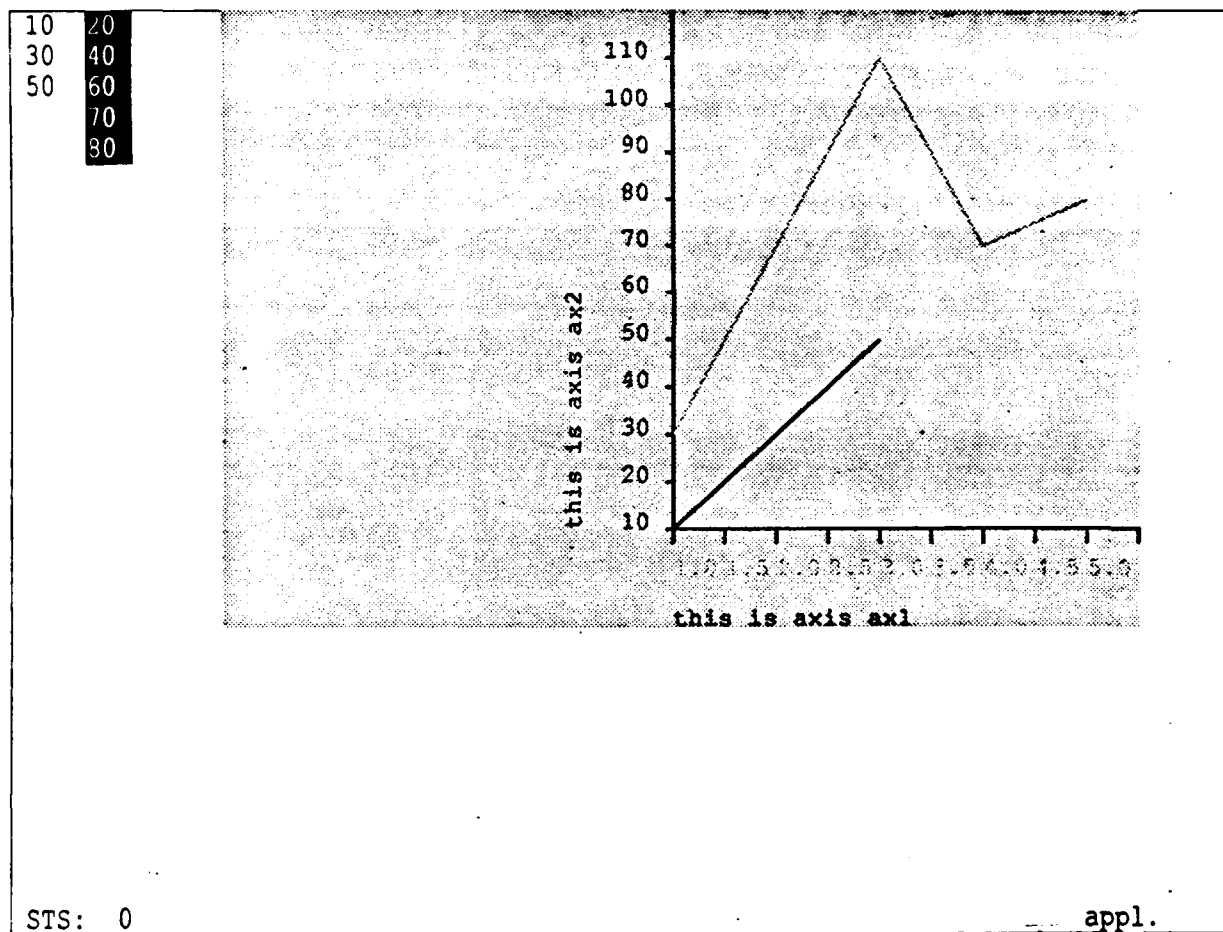
curve aaa
    'grftst5.i1' using axis ax2
    absolute

curve two
    'grftst5.i2'
    additive using curve aaa

axis ax1
    horizontal
    display as x
    at 18 2
    size 30
    label c "this is a label"
```

```
axis ax2  
  at 18 2  
  size 15  
  label c "this is a label"  
  vertical  
  display as x
```

Figure C-6 GDL Test Activity F: and corresponding GDL



```
create form grftst6
  size 80 by 30

item i1 (3 v 0)
  display as red
  at 1 2
  size 3
  domain (numeric)

item i2 (5 v 0)
  display as yellow
  at 1 6
  size 3
  domain (numeric)

graph grf5
  at 1 15
  size 60 by 20
  display as blue

create line graph grf5
  using (1, 2, 3, 4, 5 axis ax1)
  attribute a fill (display cyan)
  attribute b line (display magenta)
  attribute xy prompt (display yellow)
  attribute x line (display yellow)
  attribute c prompt (display white)
  attribute d line (display green)
  background blue

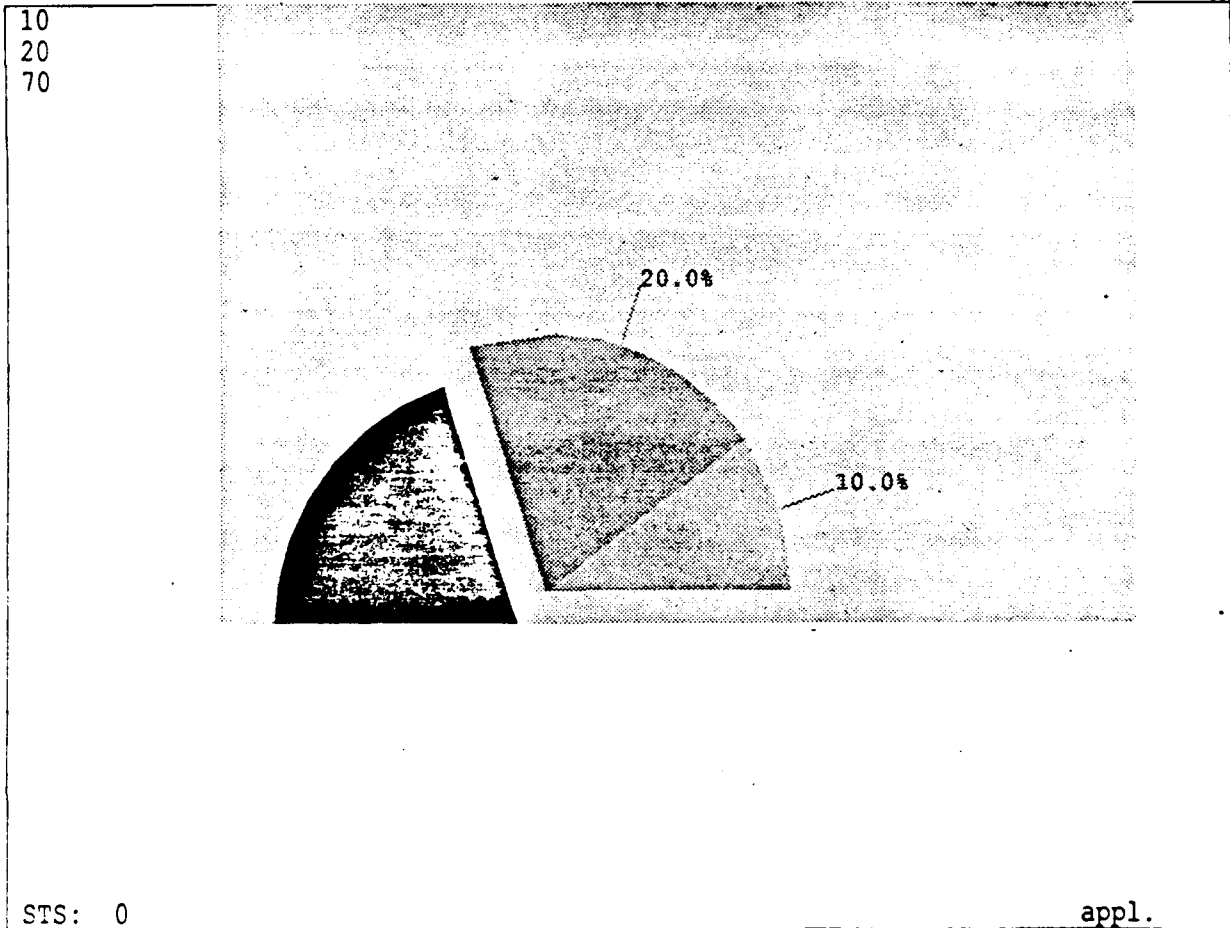
curve aaa
  'grftst6.i1' using axis ax2
  absolute

curve two
  'grftst6.i2'
  additive using curve aaa

axis ax1
  horizontal
  display as x
  label c "this is axis ax1"
  at 15 30
  size 30
```

```
axis ax2  
  at 15 30  
  size 15  
  vertical  
  display as x  
  label xy "this is axis ax2"
```

Figure C-7 GDL Test Activity G: and corresponding GDL




```
create form grftst7
    size 80 by 30

item i1 (3 v 0)
    display as red
    at 1 2
    size 3
    domain (numeric)

graph grf6
    at 1 15
    size 60 by 20
    display as blue

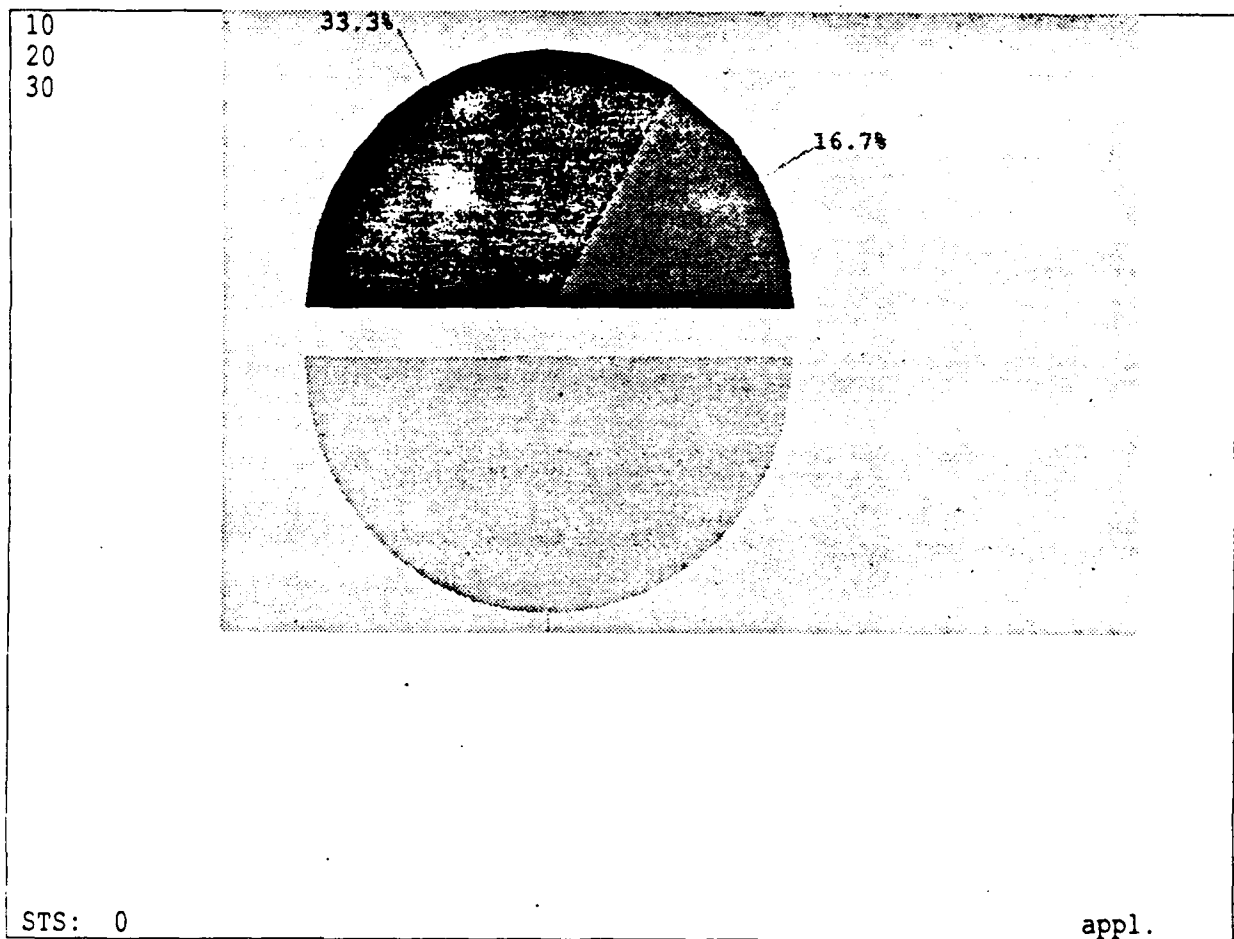
create pie graph grf6
    at 10 2
    size 40 by 16
    using ('grftst7.i1')

pie 1
    shade color red

pie 2
    shade color magenta

pie 3
    shade color white
    explode 20
```

Figure C-8 GDL Test Activity H: and corresponding GDL



```
create form grftst8
    size 80 by 30

item i1 (3 v 0)
    display as red
    at 1 2
    size 3
    domain (numeric)

graph grf7
    at 1 15
    size 60 by 20
    display as blue

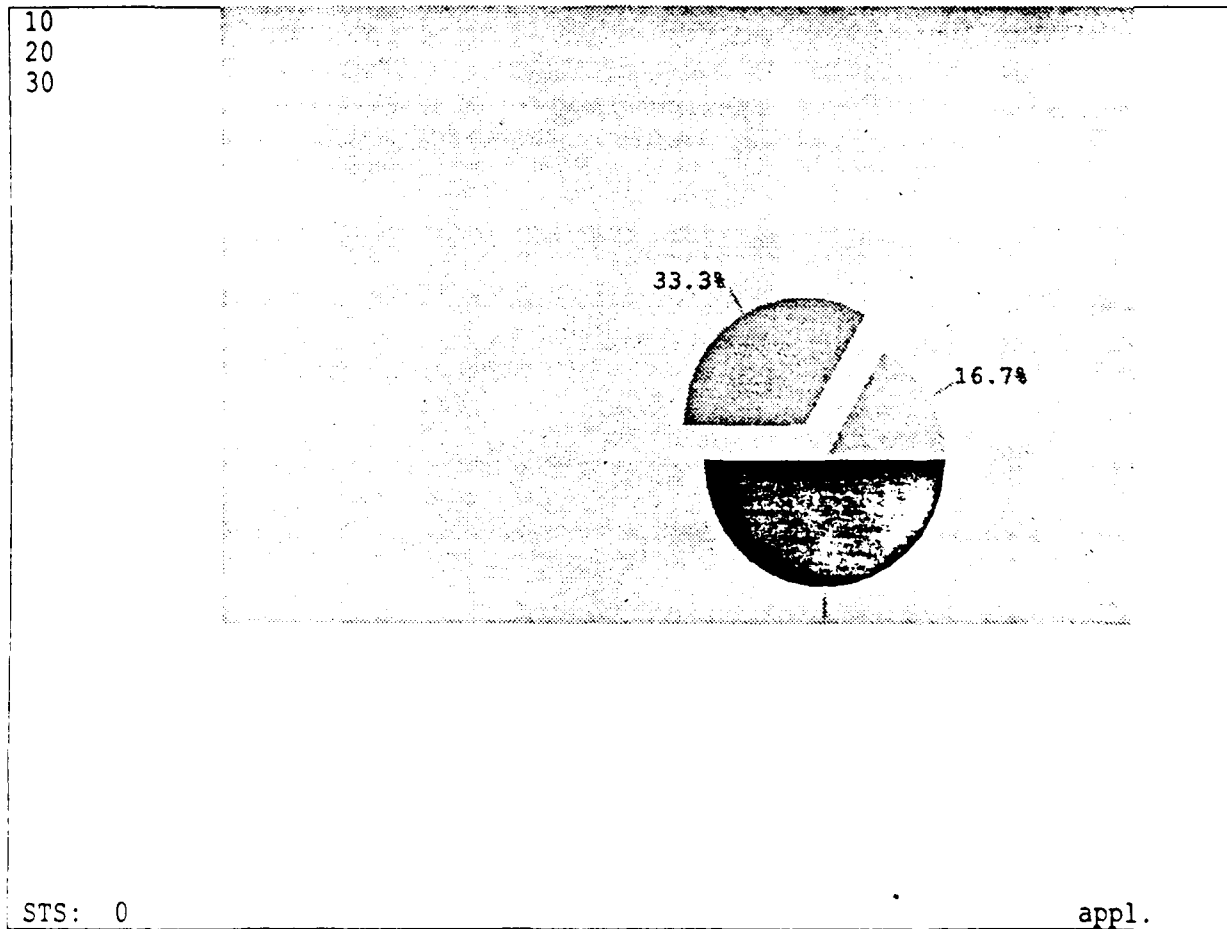
create pie graph grf7
    at 2 2
    size 40 by 16
    using ('grftst8.i1')

pie 1
    shade color yellow

pie 2
    shade color white

pie 3
    shade color red
    explode 20
```

Figure C-9 GDL Test Activity I: and corresponding GDL



```
create form grftst9
    size 80 by 30

item i1 (3 v 0)
    display as red
    at 1 2
    size 3
    domain (numeric)

graph grf8
    at 1 15
    size 60 by 20
    display as blue

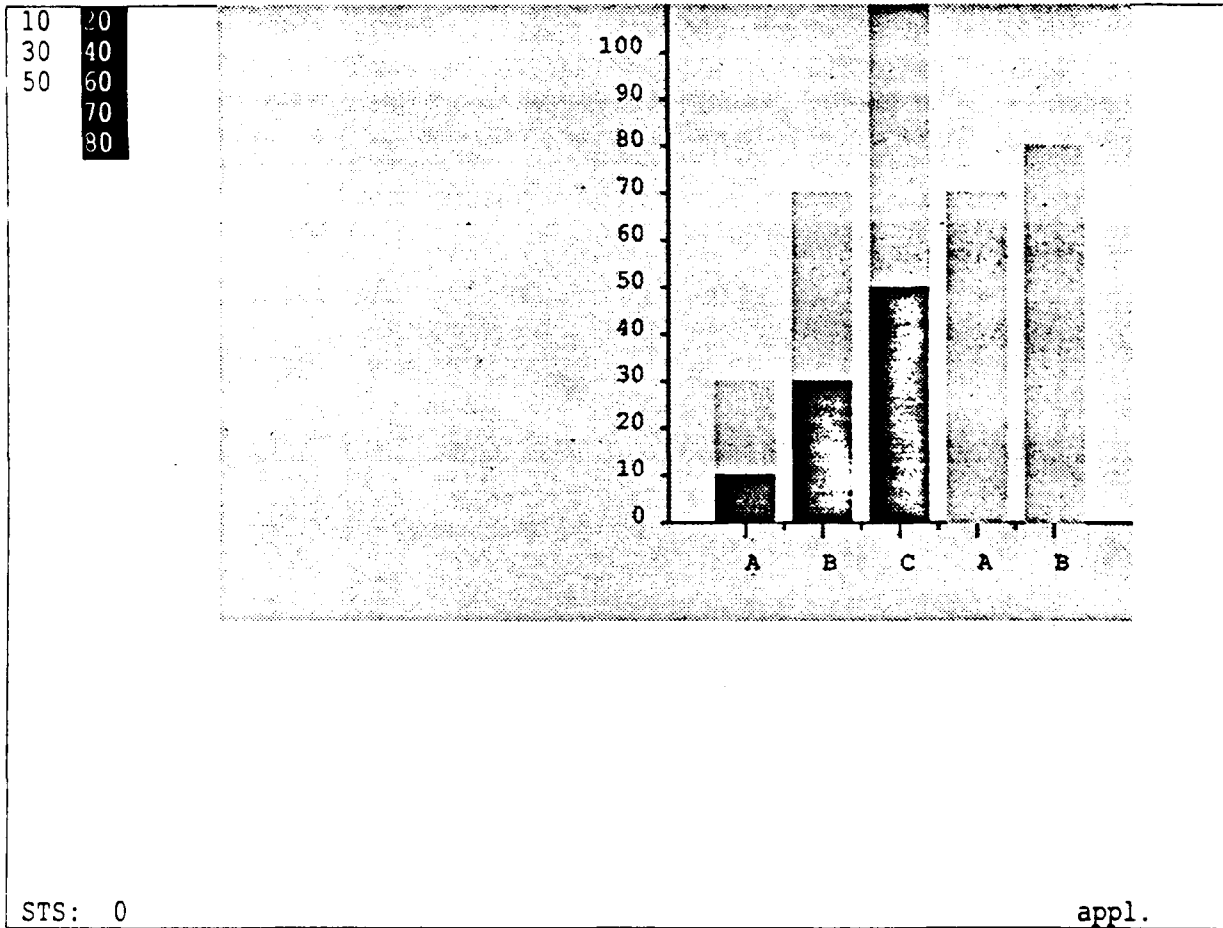
create pie graph grf8
    at 10 30
    size 20 by 8
    using ('grftst9.i1')

pie 1
    shade color red

pie 2
    shade color magenta
    explode 35

pie 3
    shade color white
```

Figure C-10 GDL Test Activity J: and corresponding GDL



```
create form grftst10
    size 80 by 30

item i1 (3 v 0)
    display as red
    at 1 2
    size 3
    domain (numeric)

item i2 (5 v 0)
    display as yellow
    at 1 6
    size 3
    domain (numeric)

graph grf9
    at 1 15
    size 60 by 20
    display as blue

create bar graph grf9
    using (1, 2, 3, 4, 5 axis ax1)
    attribute a fill (display cyan)
    attribute b line (display magenta)
    attribute xy prompt (display yellow)
    attribute x line (display yellow)
    attribute c prompt (display white)
    attribute d line (display green)
    background blue

curve aaa
    'grftst10.i1' using axis ax2
    absolute

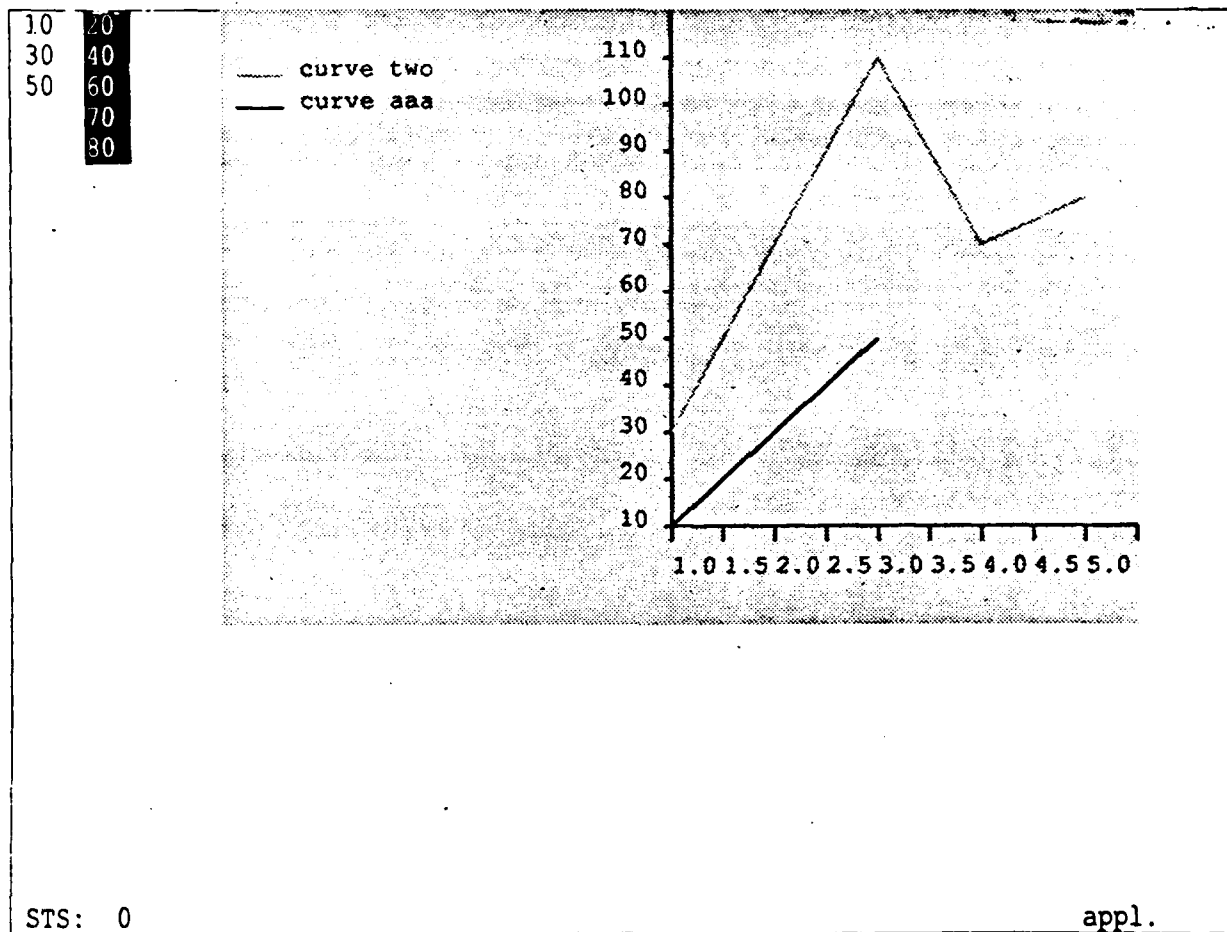
curve two
    'grftst10.i2'
    additive using curve aaa

axis ax1
    horizontal
    display as x
    at 15 30
    tick 5 1 c "A" "B" "C"
    size 30
```

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axis ax2
at 15 30
size 15
vertical
display as x

Figure C-11 GDL Test Activity K: and corresponding GDL



```
create form grftst11
  size 80 by 30

item i1 (3 v 0)
  display as red
  at 1 2
  size 3
  domain (numeric)

item i2 (5 v 0)
  display as yellow
  at 1 6
  size 3
  domain (numeric)

graph grf10
  at 1 15
  size 60 by 20
  display as blue

create line graph grf10
  using (1, 2, 3, 4, 5 axis ax1)
  attribute a fill (display cyan)
  attribute b line (display magenta)
  attribute xy prompt (display yellow)
  attribute x line (display yellow)
  attribute c prompt (display white)
  attribute d line (display green)
  legend at 2 2
  background blue

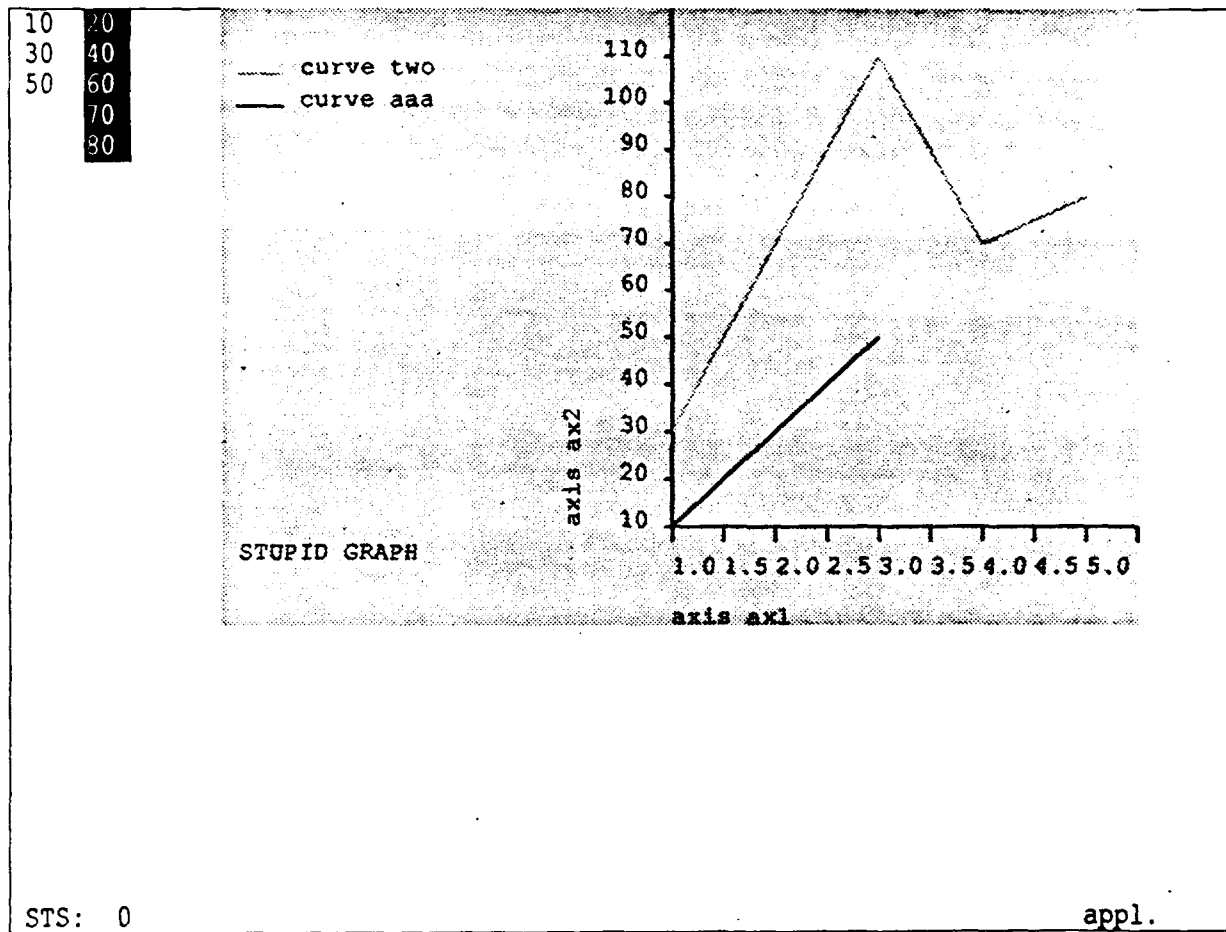
curve aaa
  'grftst11.i1' using axis ax2
  absolute
  legend xy "curve aaa"

curve two
  'grftst11.i2'
  additive using curve aaa
  legend xy "curve two"

axis ax1
  horizontal
  display as x
  at 15 30
  size 30

axis ax2
  at 15 30
  size 15
  vertical
  display as x
```

Figure C-12 GDL Test Activity L: and corresponding GDL



```
create form grftst12
  size 80 by 30

item i1 (3 v 0)
  display as red
  at 1 2
  size 3
  domain (numeric)

item i2 (5 v 0)
  display as yellow
  at 1 6
  size 3
  domain (numeric)

graph grf11
  at 1 15
  size 60 by 20
  display as blue

create line graph grf11
  using (1, 2, 3, 4, 5 axis ax1)
  attribute a fill (display cyan)
  attribute b line (display magenta)
  attribute xy prompt (display yellow)
  attribute x line (display yellow)
  attribute c prompt (display white)
  attribute d line (display green)
  legend at 2 2
  label display as c, at 15 2 "STUPID GRAPH"
  background blue

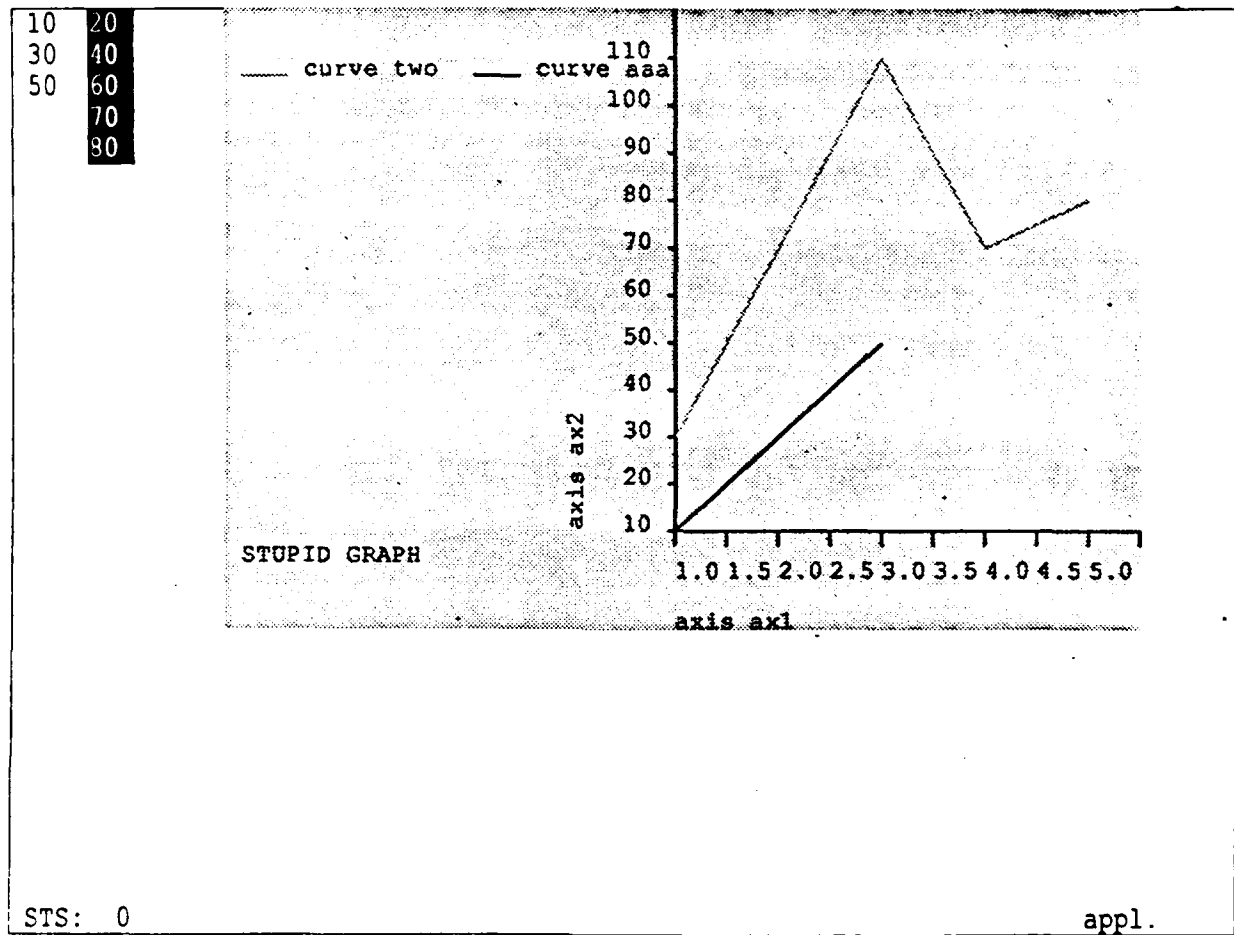
curve aaa
  'grftst12.i1' using axis ax2
  absolute
  legend xy "curve aaa"

curve two
  'grftst12.i2'
  additive using curve aaa
  legend xy "curve two"
```

```
axis ax1
  horizontal
  display as x
  at 15 30
  size 30
  label c "axis ax1"
```

```
axis ax2
  at 15 30
  size 15
  label c "axis ax2"
  vertical
  display as x
```

Figure C-13 GDL Test Activity M: and corresponding GDL



```
create form grftst13
    size 80 by 30

item i1 (3 v 0)
    display as red
    at 1 2
    size 3
    domain (numeric)

item i2 (5 v 0)
    display as yellow
    at 1 6
    size 3
    domain (numeric)

graph grf12
    at 1 15
    size 60 by 20
    display as blue

create line graph grf12
    using (1, 2, 3, 4, 5 axis ax1)
    attribute a fill (display cyan)
    attribute b line (display magenta)
    attribute xy prompt (display yellow)
    attribute x line (display yellow)
    attribute c prompt (display white)
    attribute d line (display green)
    legend h at 2 2
    label display as c, at 15 2 "STUPID GRAPH"
    background blue

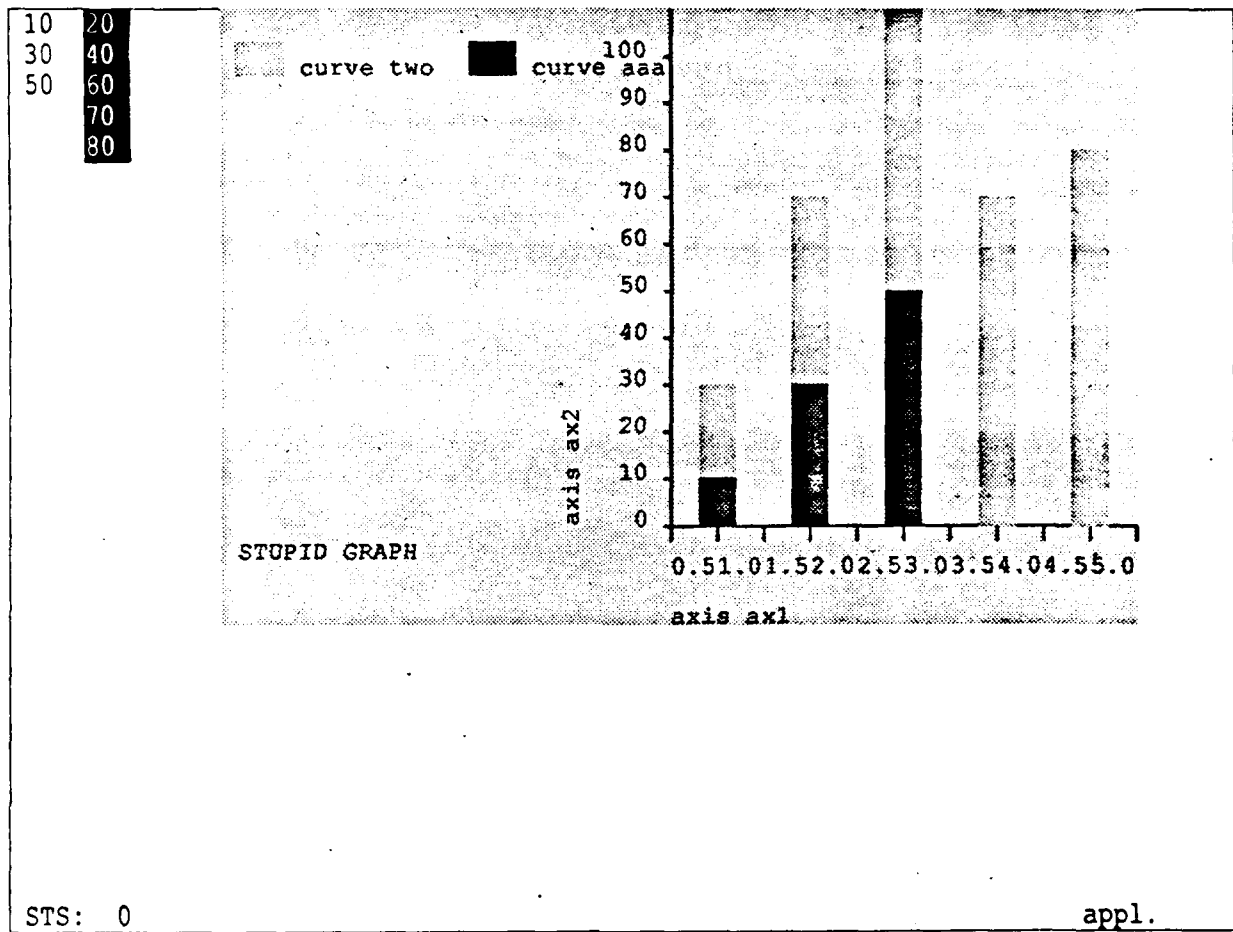
curve aaa
    'grftst13.i1' using axis ax2
    absolute
    legend xy "curve aaa"

curve two
    'grftst13.i2'
    additive using curve aaa
    legend xy "curve two"
```

```
axis ax1
  horizontal
  display as x
  at 15 30
  size 30
  label c "axis ax1"
```

```
axis ax2
  at 15 30
  size 15
  label c "axis ax2"
  vertical
  display as x
```


Figure C-14 GDL Test Activity N: and corresponding GDL



```
create form grftst14
  size 80 by 30

item i1 (3 v 0)
  display as red
  at 1 2
  size 3
  domain (numeric)

item i2 (5 v 0)
  display as yellow
  at 1 6
  size 3
  domain (numeric)

graph grf13
  at 1 15
  size 60 by 20
  display as blue

create bar graph grf13
  using (1, 2, 3, 4, 5 axis ax1)
  attribute a fill (display cyan)
  attribute b line (display magenta)
  attribute xy prompt (display yellow)
  attribute x line (display yellow)
  attribute c prompt (display white)
  attribute d line (display green)
  legend h at 2 2
  label display as c, at 15 2 "STUPID GRAPH"
  background blue

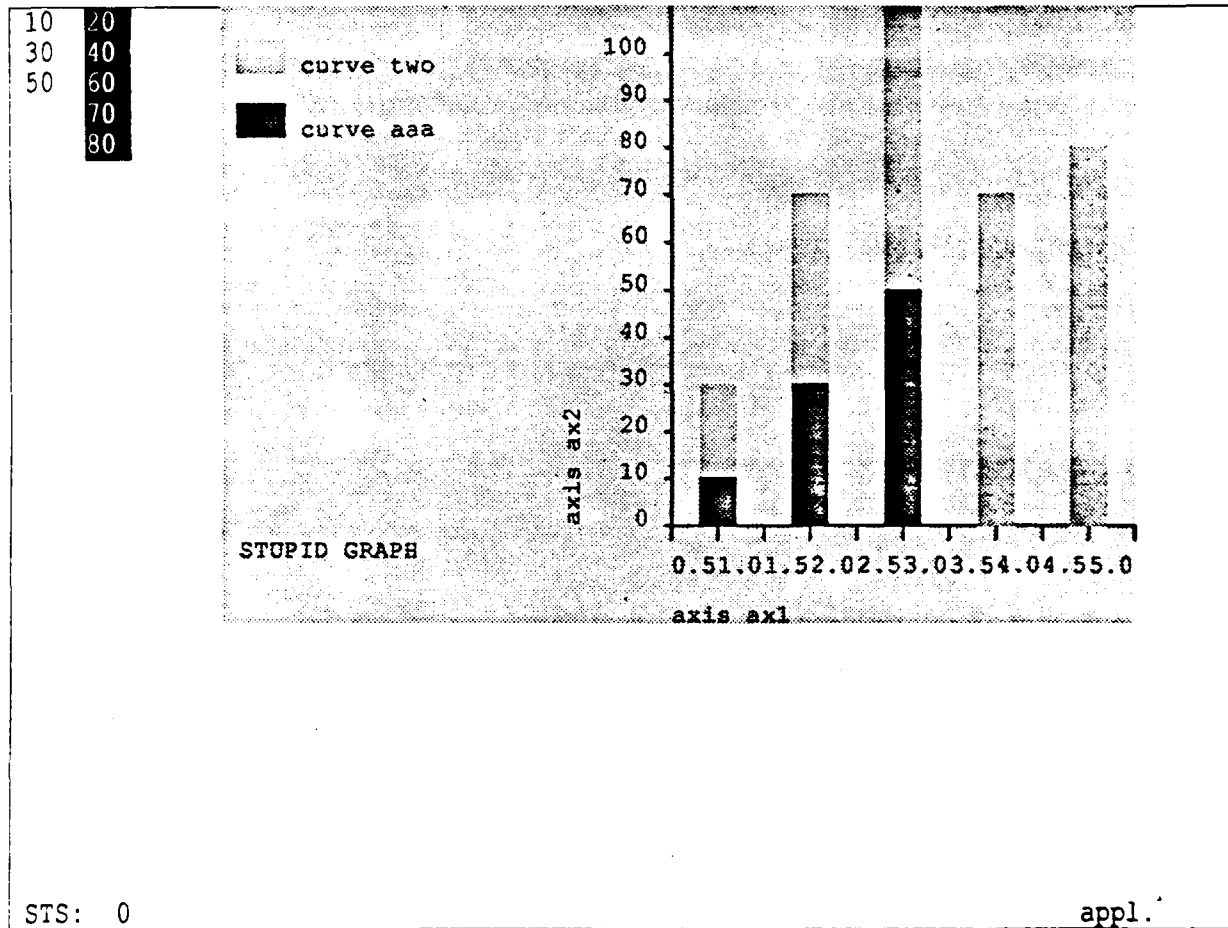
curve aaa
  'grftst14.i1' using axis ax2
  absolute
  legend xy "curve aaa"

curve two
  'grftst14.i2'
  additive using curve aaa
  legend xy "curve two"
```

```
axis ax1
  horizontal
  display as x
  at 15 30
  size 30
  label c "axis ax1"
```

```
axis ax2
  at 15 30
  size 15
  label c "axis ax2"
  vertical
  display as x
```

Figure C-15 GDL Test Activity 0: and corresponding GDL



```
create form grftst15
    size 80 by 30

item i1 (3 v 0)
    display as red
    at 1 2
    size 3
    domain (numeric)

item i2 (5 v 0)
    display as yellow
    at 1 6
    size 3
    domain (numeric)

graph grf14
    at 1 15
    size 60 by 20
    display as blue

create bar graph grf14
    using (1, 2, 3, 4, 5 axis ax1)
    attribute a fill (display cyan)
    attribute b line (display magenta)
    attribute xy prompt (display yellow)
    attribute x line (display yellow)
    attribute c prompt (display white)
    attribute d line (display green)
    legend at 2 2
    label display as c, at 15 2 "STUPID GRAPH"
    background blue

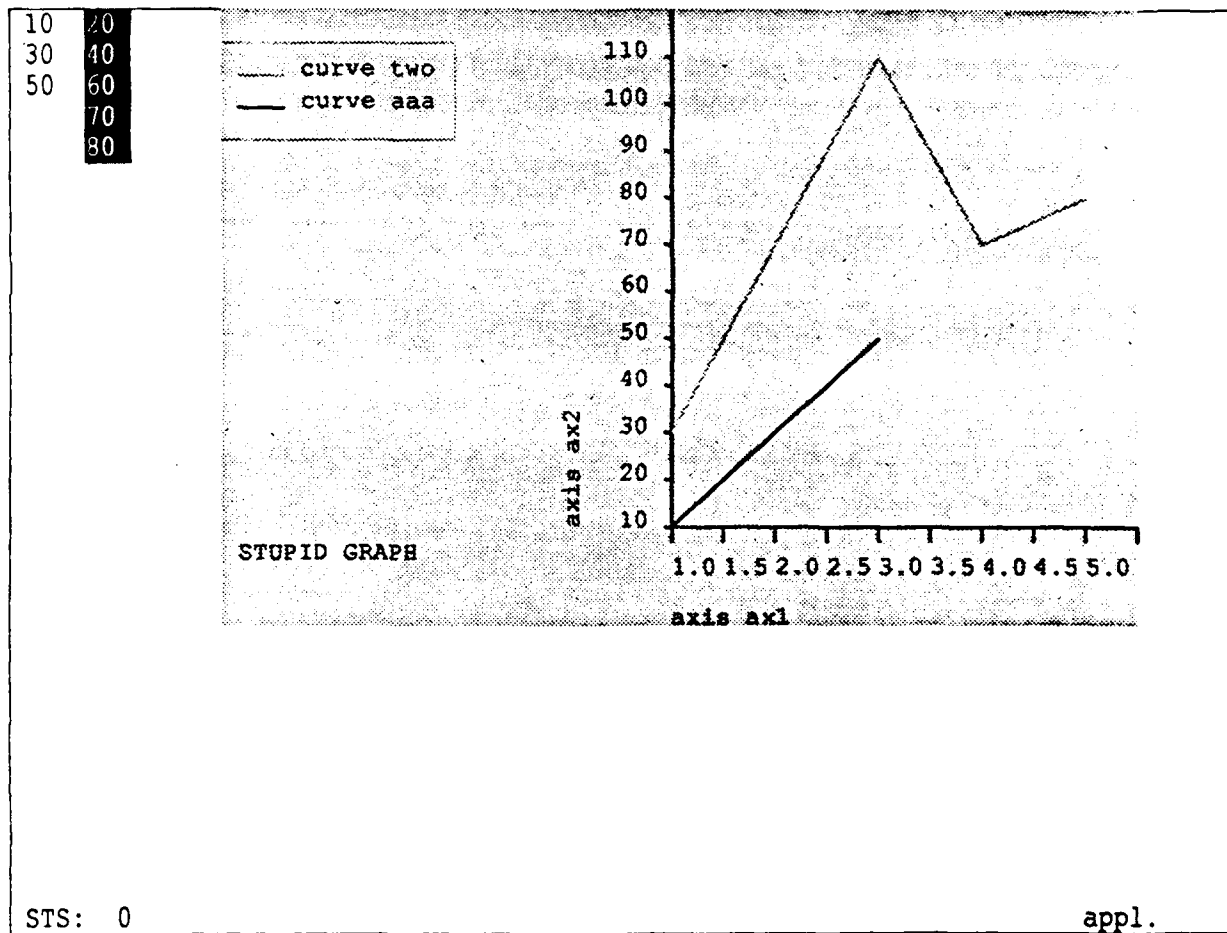
curve aaa
    'grftst15.i1' using axis ax2
    absolute
    legend xy "curve aaa"

curve two
    'grftst15.i2'
    additive using curve aaa
    legend xy "curve two"
```

```
axis ax1
  horizontal
  display as x
  at 15 30
  size 30
  label c "axis ax1"
```

```
axis ax2
  at 15 30
  size 15
  label c "axis ax2"
  vertical
  display as x
```

Figure C-16 GDL Test Activity P: and corresponding GDL



```
create form grftst16
    size 80 by 30

item i1 (3 v 0)
    display as red
    at 1 2
    size 3
    domain (numeric)

item i2 (5 v 0)
    display as yellow
    at 1 6
    size 3
    domain (numeric)

graph grf15
    at 1 15
    size 60 by 20
    display as blue

create line graph grf15
    using (1, 2, 3, 4, 5 axis ax1)
    attribute a fill (display cyan)
    attribute b line (display magenta)
    attribute xy prompt (display yellow)
    attribute x line (display yellow)
    attribute c prompt (display white)
    attribute d line (display green)
    legend at 2 2 box
    label display as c, at 15 2 "STUPID GRAPH"
    background blue

curve aaa
    'grftst16.i1' using axis ax2
    absolute
    legend xy "curve aaa"

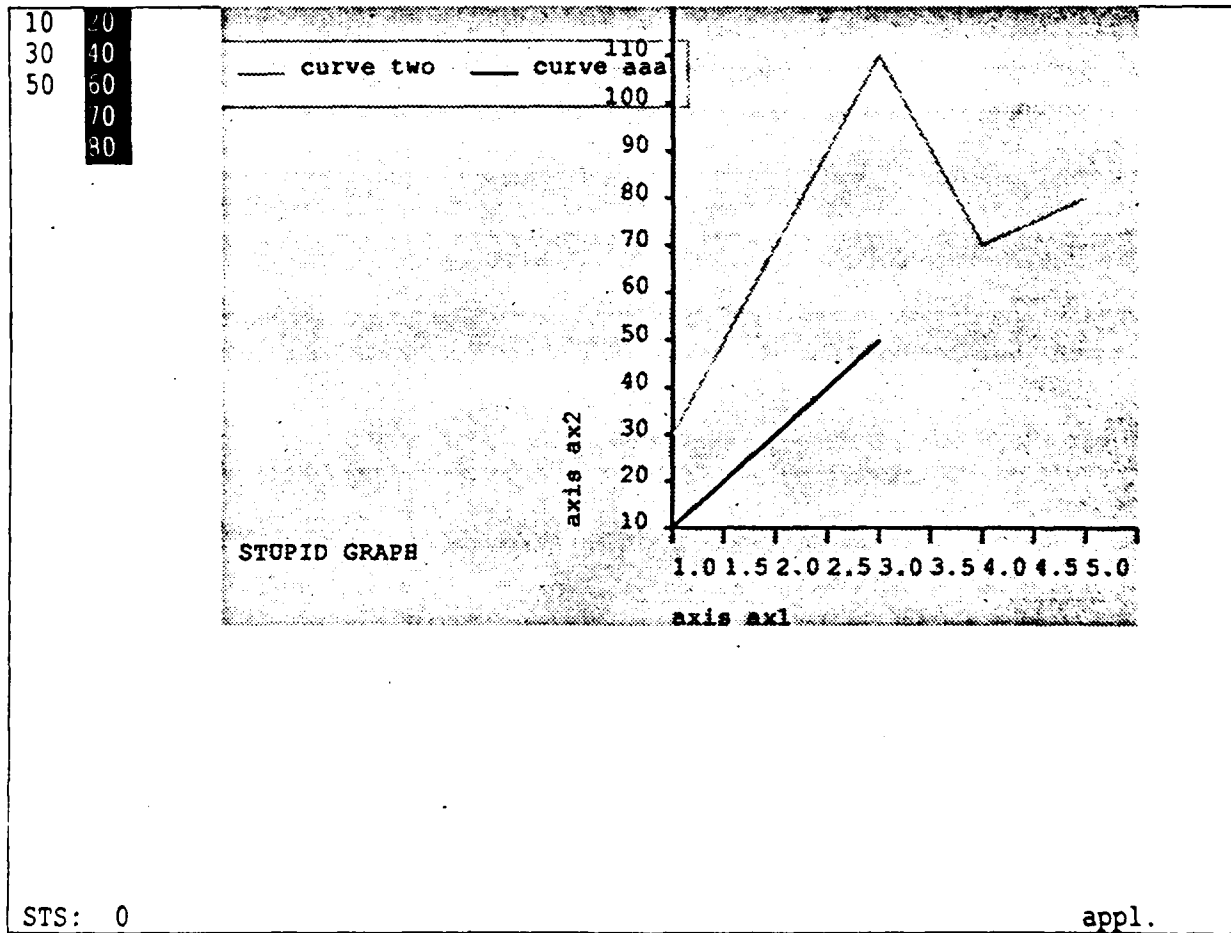
curve two
    'grftst16.i2'
    additive using curve aaa
    legend xy "curve two"
```



```
axis ax1
  horizontal
  display as x
  at 15 30
  size 30
  label c "axis ax1"
```

```
axis ax2
  at 15 30
  size 15
  label c "axis ax2"
  vertical
  display as x
```

Figure C-17 GDL Test Activity Q: and corresponding GDL



```
create form grftst17
    size 80 by 30

item i1 (3 v 0)
    display as red
    at 1 2
    size 3
    domain (numeric)

item i2 (5 v 0)
    display as yellow
    at 1 6
    size 3
    domain (numeric)

graph grf16
    at 1 15
    size 60 by 20
    display as blue

create line graph grf16
    using (1, 2, 3, 4, 5 axis ax1)
    attribute a fill (display cyan)
    attribute b line (display magenta)
    attribute xy prompt (display yellow)
    attribute x line (display yellow)
    attribute c prompt (display white)
    attribute d line (display green)
    legend h at 2 2 box
    label display as c, at 15 2 "STUPID GRAPH"
    background blue

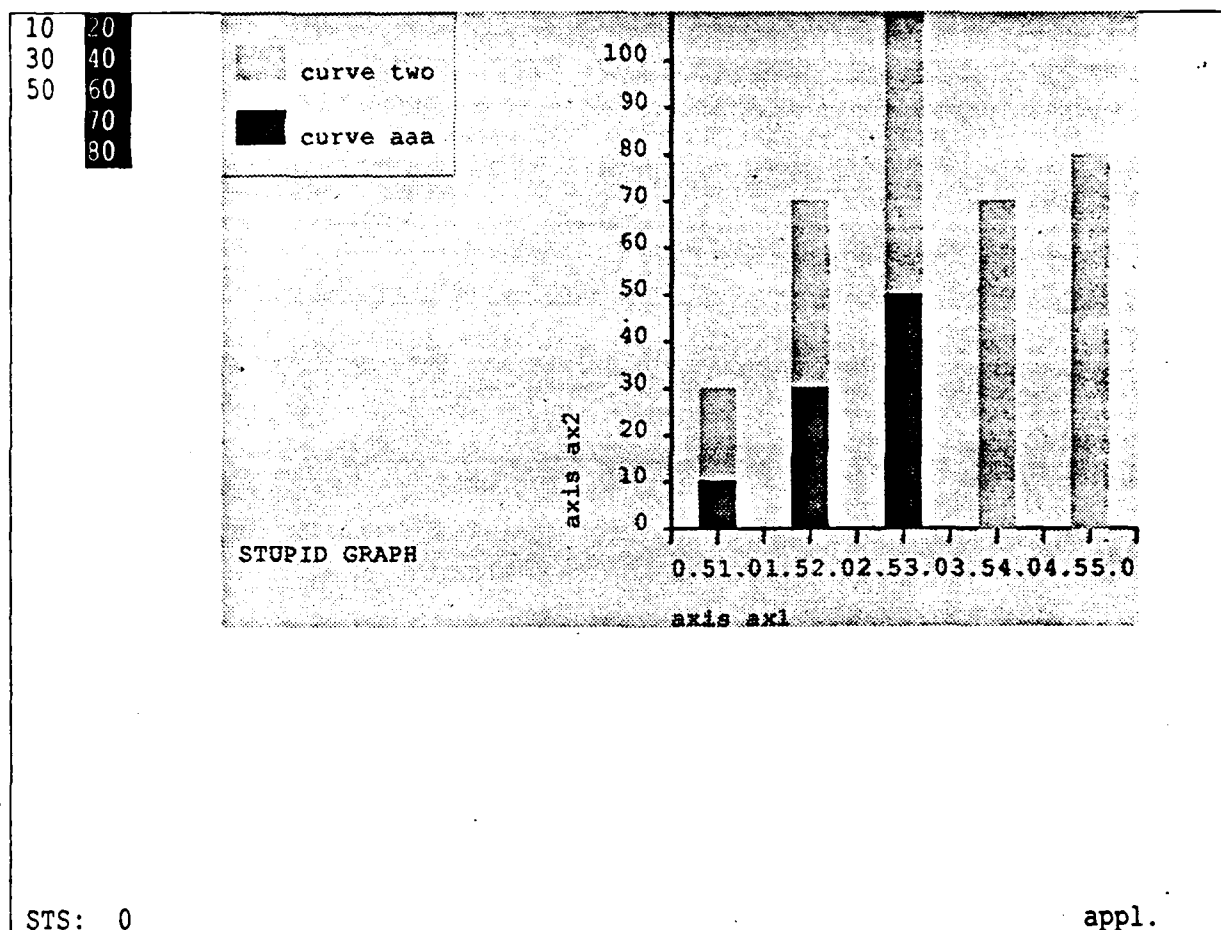
curve aaa
    'grftst17.i1' using axis ax2
    absolute
    legend xy "curve aaa"

curve two
    'grftst17.i2'
    additive using curve aaa
    legend xy "curve two"
```

```
axis ax1
  horizontal
  display as x
  at 15 30
  size 30
  label c "axis ax1"
```

```
axis ax2
  at 15 30
  size 15
  label c "axis ax2"
  vertical
  display as x
```

Figure C-18 GDL Test Activity R: and corresponding GDL



```
create form grftst18
    size 80 by 30

item i1 (3 v 0)
    display as red
    at 1 2
    size 3
    domain (numeric)

item i2 (5 v 0)
    display as yellow
    at 1 6
    size 3
    domain (numeric)

graph grf17
    at 1 15
    size 60 by 20
    display as blue

create bar graph grf17
    using (1, 2, 3, 4, 5 axis ax1)
    attribute a fill (display cyan)
    attribute b line (display magenta)
    attribute xy prompt (display yellow)
    attribute x line (display yellow)
    attribute c prompt (display white)
    attribute d line (display green)
    legend at 2 2 box
    label display as c, at 15 2 "STUPID GRAPH"
    background blue

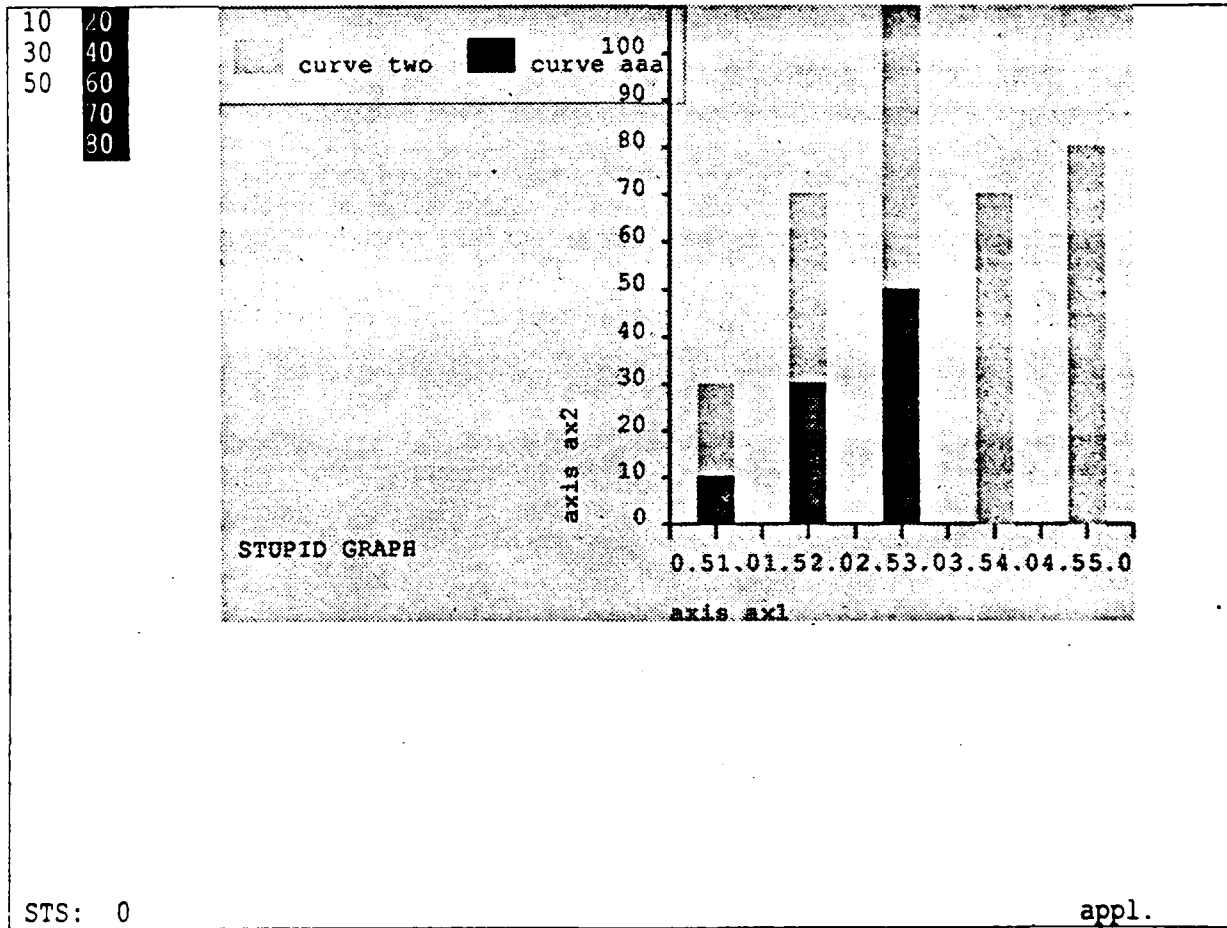
curve aaa
    'grftst18.i1' using axis ax2
    absolute
    legend xy "curve aaa"

curve two
    'grftst18.i2'
    additive using curve aaa
    legend xy "curve two"
```

```
axis ax1
  horizontal
  display as x
  at 15 30
  size 30
  label c "axis ax1"
```

```
axis ax2
  at 15 30
  size 15
  label c "axis ax2"
  vertical
  display as x
```

Figure C-19 GDL Test Activity S: and corresponding GDL




```
axis ax1
  horizontal
  display as x
  at 15 30
  size 30
  label c "axis ax1"
```

```
axis ax2
  at 15 30
  size 15
  label c "axis ax2"
  vertical
  display as x
```

```
create form grftst20
  size 80 by 30

tem i1 (3 v 0)
  display as red
  at 1 2
  size 3
  domain (numeric)

item i2 (5 v 0)
  display as yellow
  at 1 6
  size 3
  domain (numeric)

graph grf19
  at 1 15
  size 60 by 20
  display as blue

create bar graph grf19
  using (1, 2, 3, 4, 5 axis ax1)
  attribute a fill (display cyan)
  attribute b line (display magenta)
  attribute xy prompt (display yellow)
  attribute x line (display yellow)
  attribute c prompt (display white)
  attribute d line (display green)
  legend h at 6 2 box
  label display as c, at 15 2 "STUPID GRAPH"
  background blue

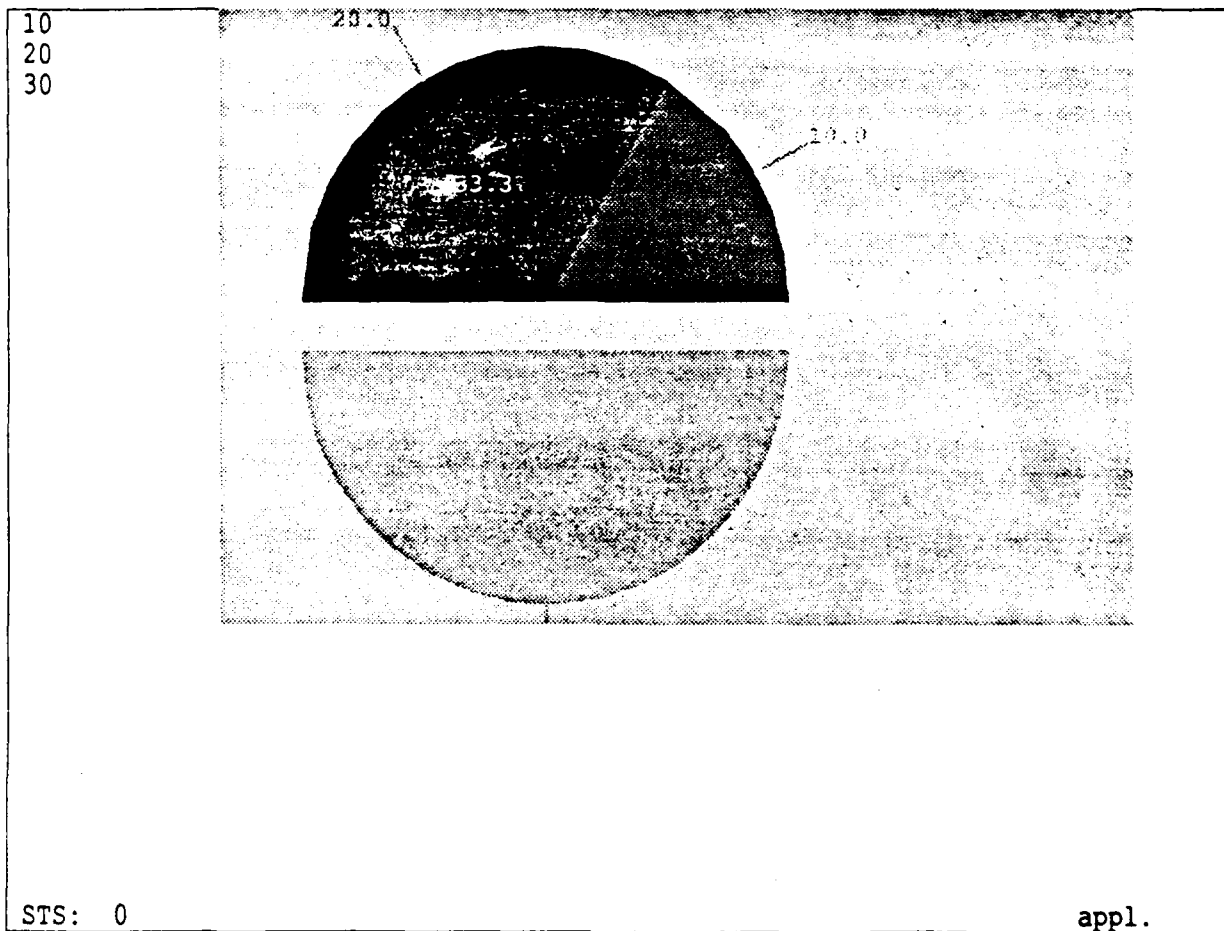
curve aaa
  'grftst20.i1' using axis ax2
  absolute
  legend xy "curve aaa"

curve two
  'grftst20.i2'
  additive using curve aaa
  legend xy "curve two"
```

axis ax1
horizontal
display as x
at 15 30
size 30
label c "axis ax1"

axis ax2
at 15 30
size 15
label c "axis ax2"
vertical
display as x

Figure C-21 GDL Test Activity U: and corresponding GDL



```
create form grftst21
  size 80 by 30

item i1 (3 v 0)
  display as red
  at 1 2
  size 3
  domain (numeric)

graph grf20
  at 1 15
  size 60 by 20
  display as blue

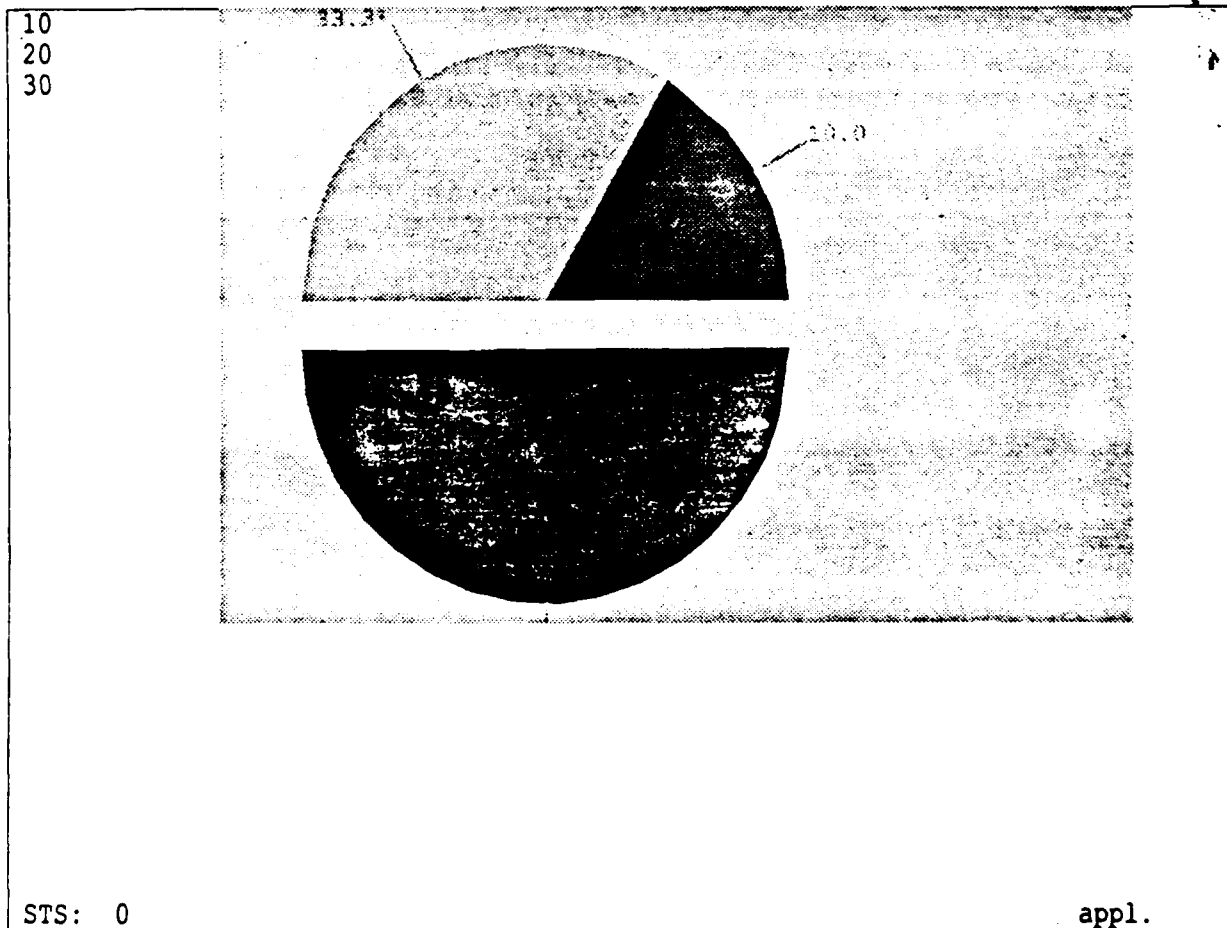
create pie graph grf20
  at 2 2
  size 40 by 16
  using ('grftst21.i1')
  attribute c prompt (display magenta)

pie 1
  quantity c outside
  shade color yellow

pie 2
  percent c inside
  quantity c outside
  shade color white

pie 3
  shade color red
  explode 20
```

Figure C-22 GDL Test Activity V: and corresponding GDL



```
create form grftst22  
    size 80 by 30
```

```
item i1 (3 v 0)  
    display as red  
    at 1 2  
    size 3  
    domain (numeric)
```

```
graph grf21  
    at 1 15  
    size 60 by 20  
    display as blue
```

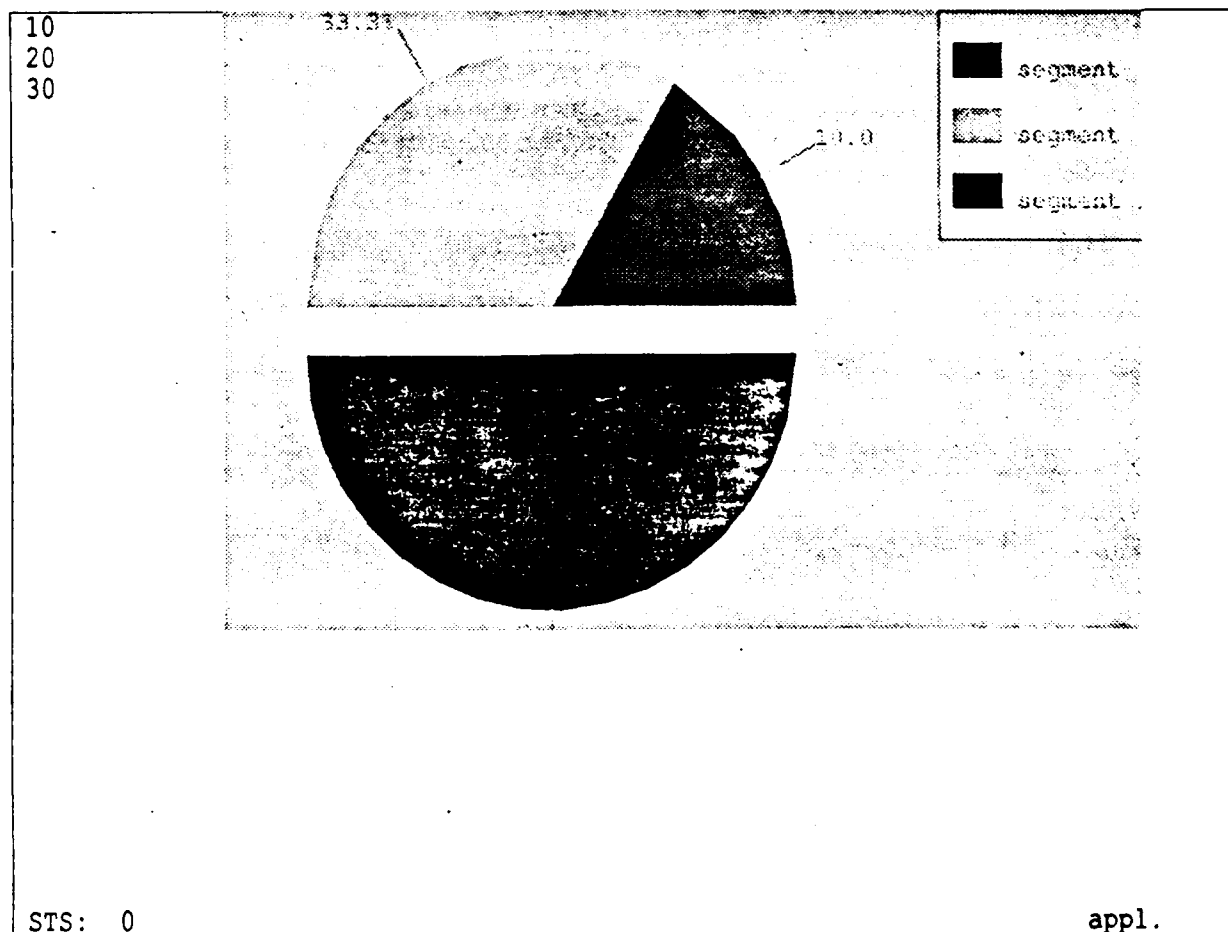
```
create pie graph grf21  
    at 2 2  
    size 40 by 16  
    using ('grftst22.i1')  
    attribute c prompt (display magenta)
```

```
pie 1  
    quantity c outside  
    shade color yellow
```

```
pie 2  
    shade color red
```

```
pie 3  
    percent c outside  
    quantity c outside  
    label c "this is a white pie slice"  
    shade color white  
    explode 20
```

Figure C-23 GDL Test Activity W: and corresponding GDL




```
create form grftst23
    size 80 by 30

item i1 (3 v 0)
    display as red
    at 1 2
    size 3
    domain (numeric)

graph grf22
    at 1 15
    size 60 by 20
    display as blue

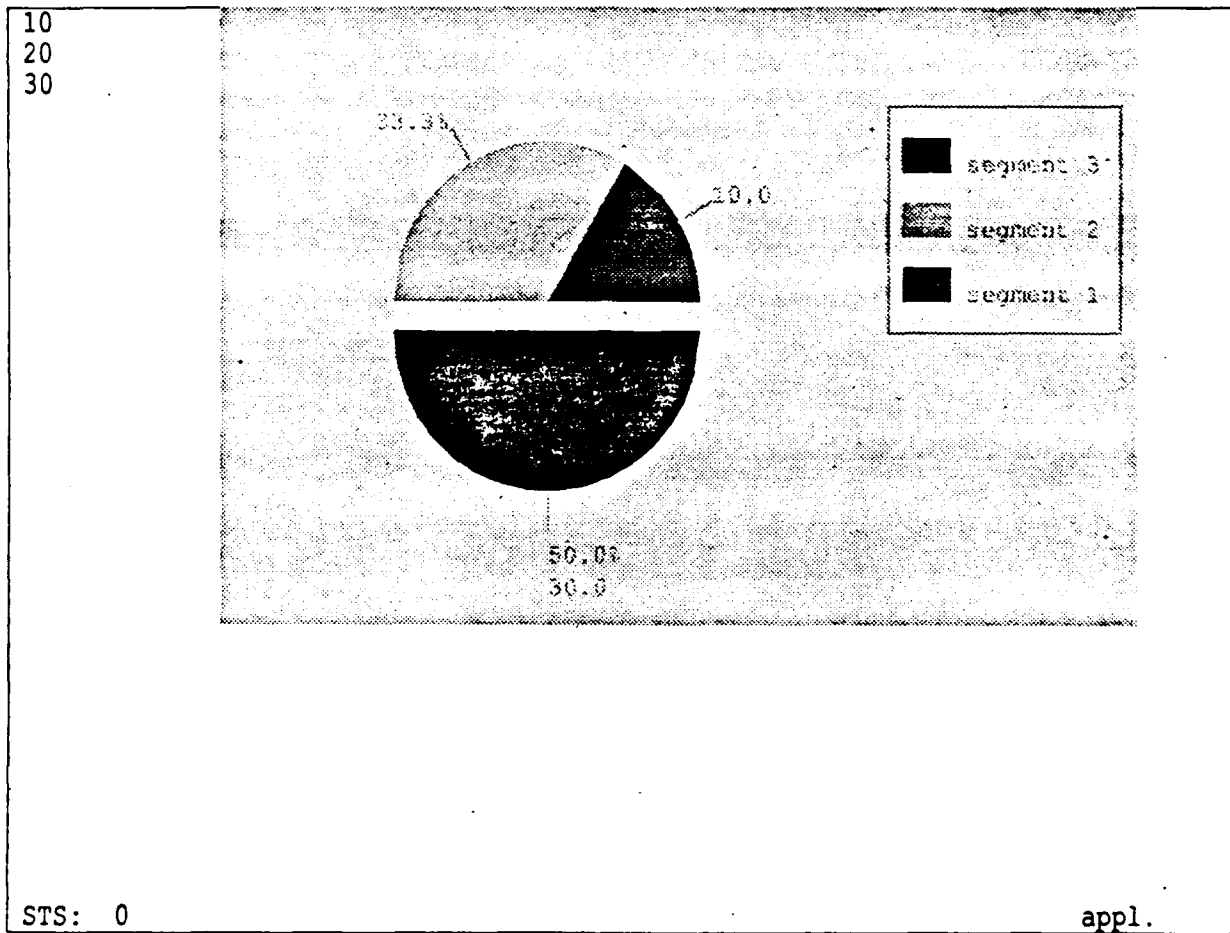
create pie graph grf22
    at 2 2
    size 40 by 16
    using ('grftst23.i1')
    attribute c prompt (display magenta)
    legend at 2 48 box

pie 1
    quantity c outside
    shade color yellow
    legend c "segment 1"

pie 2
    shade color red
    legend c "segment 2"

pie 3
    percent c outside
    quantity c outside
    shade color white
    legend c "segment 3"
    explode 20
```

Figure C-24 GDL Test Activity X: and corresponding GDL



```
create form grftst24
    size 80 by 30

item i1 (3 v 0)
    display as red
    at 1 2
    size 3
    domain (numeric)

graph grf23
    at 1 15
    size 60 by 20
    display as blue

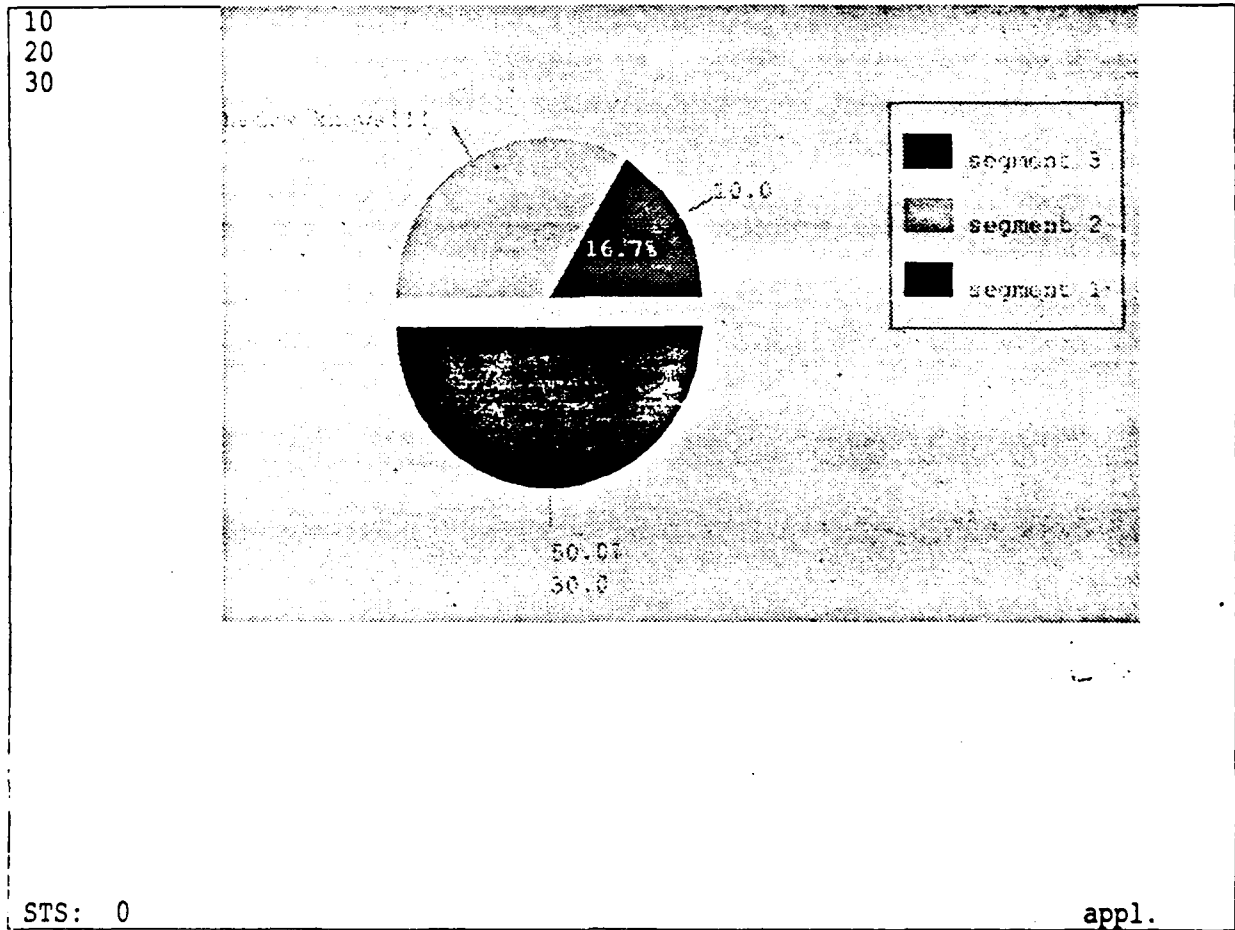
create pie graph grf23
    at 5 2
    size 40 by 10
    using ('grftst24.i1')
    attribute c prompt (display magenta)
    legend at 5 45 box

pie 1
    quantity c outside
    shade color yellow
    legend c "segment 1"

pie 2
    shade color red
    legend c "segment 2"

pie 3
    percent c outside
    quantity c outside
    shade color white
    legend c "segment 3"
    explode 20
```

Figure C-25 GDL Test Activity Y: and corresponding GDL



```
create form grftst25
    size 80 by 30

item i1 (3 v 0)
    display as red
    at 1 2
    size 3
    domain (numeric)

graph grf24
    at 1 15
    size 60 by 20
    display as blue

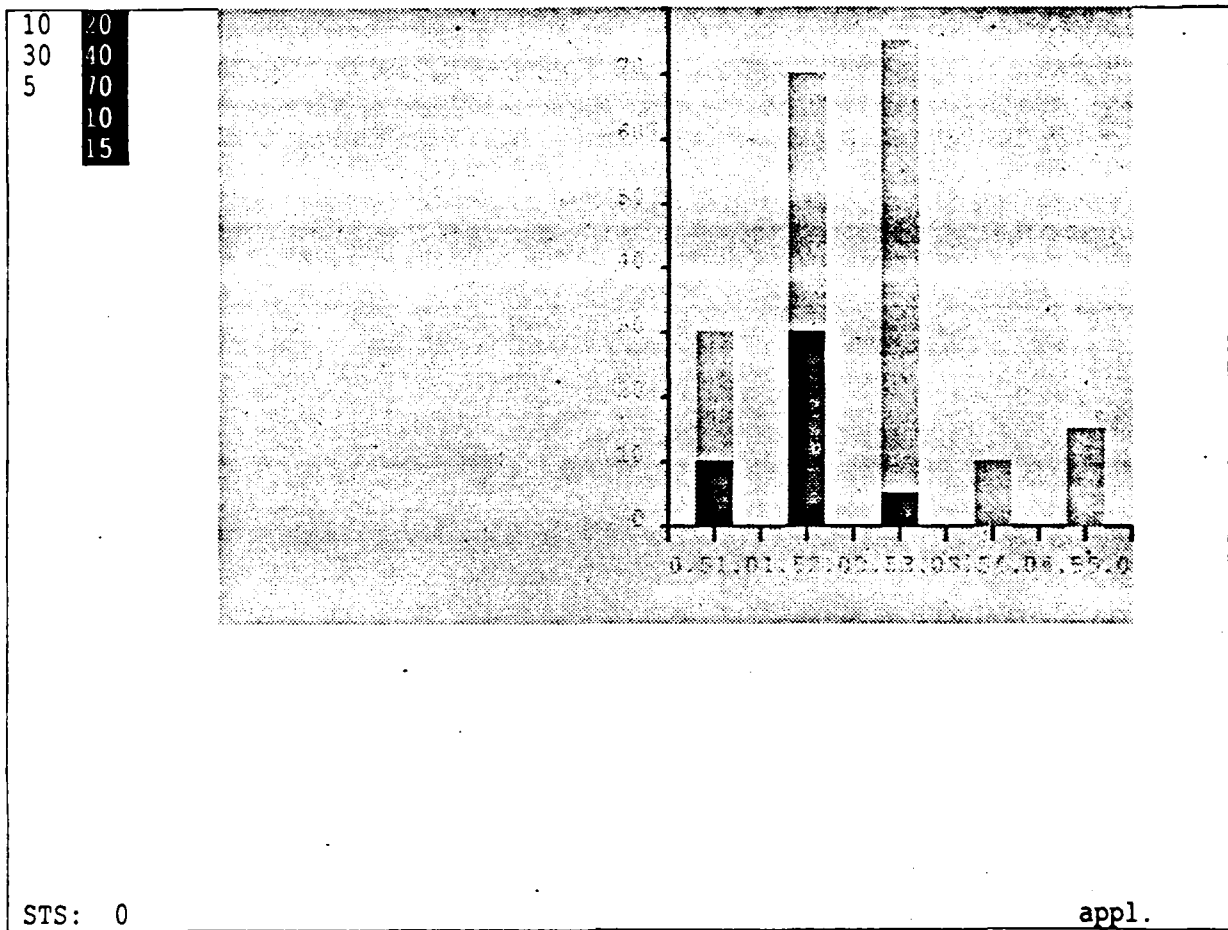
create pie graph grf24
    at 5 2
    size 40 by 10
    using ('grftst25.i1')
    attribute a prompt (display red)
    attribute b prompt (display blue)
    attribute c prompt (display magenta)
    legend at 5 45 box

pie 1
    quantity c outside
    shade color yellow
    percent b inside
    legend c "segment 1"

pie 2
    shade color red
    label a "The Shadow knows!!!"
    legend c "segment 2"

pie 3
    percent c outside
    quantity c outside
    shade color white
    label c "Who knows what evil lurks"
    label c "  in the hearts of men?"
    legend c "segment 3"
    explode 20
```

Figure C-26 GDL Test Activity Z: and corresponding GDL



```
create form grftst26
    size 80 by 30
```

```
item i1 (3 v 0)
    display as red
    at 1 2
    size 3
    domain (numeric)
```

```
item i2 (5 v 0)
    display as yellow
    at 1 6
    size 3
    domain (numeric)
```

```
graph grf25
    at 1 15
    size 60 by 20
    display as blue
```

```
create bar graph grf25
    using (1, 2, 3, 4, 5 axis ax1)
    attribute a fill (display cyan)
    attribute b line (display magenta)
    attribute xy prompt (display yellow)
    attribute x line (display yellow)
    attribute c prompt (display white)
    attribute d line (display green)
    background blue
```

```
curve aaa
    'grftst26.i1' using axis ax2
    absolute
```

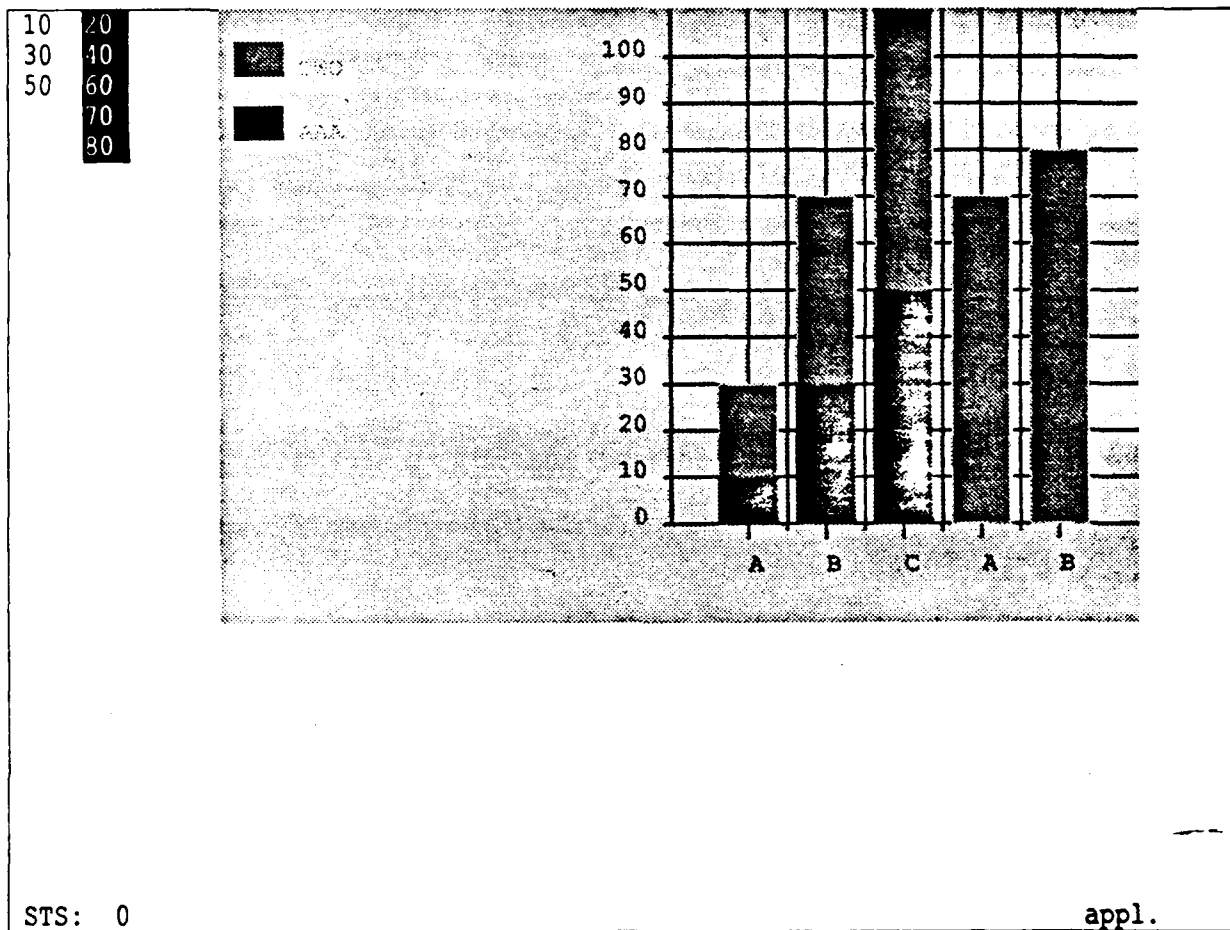
```
curve two
    'grftst26.i2'
    additive using curve aaa
```

```
axis ax1
    horizontal
    display as x
    at 15 30
    size 30
```

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axis ax2
at 15 30
size 15
vertical
display as x

Figure C-27 GDL Test Activity AA: and corresponding GDL



```
create form grftst27
  size 80 by 30

item i1 (3 v 0)
  display as red
  at 1 2
  size 3
  domain (numeric)

item i2 (5 v 0)
  display as yellow
  at 1 6
  size 3
  domain (numeric)

graph grf26
  at 1 15
  size 60 by 20
  display as blue

create bar graph grf26
  using (1, 2, 3, 4, 5 axis ax1)
  attribute a line (display cyan)
  attribute e line (display red)
  attribute b line (display magenta)
  attribute xy prompt (display yellow)
  attribute x line (display yellow)
  attribute c prompt (display white)
  attribute d line (display green)
  legend at 2 2
  background blue

curve aaa
  'grftst10.i1' using axis ax2
  absolute
  shade color yellow
  display as a

curve two
  'grftst10.i2'
  additive using curve aaa
  shade color green
  display as e
```

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```
axis ax1
  horizontal
  display as x
  at 15 30
  tick 5 1 c "A" "B" "C"
  size 30
  fine grid
```

```
axis ax2
  at 15 30
  size 15
  vertical
  display as x
  grid
  maximum 110
```