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## **IBM Series/1**

### **Multi-Function Attachment Feature Initialization User's Guide**

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**IBM Series/1**  
**Multi-Function Attachment Feature**  
**Initialization User's Guide**

**First Edition (July 1981)**

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## PREFACE

This publication describes how to use the initialization diskette and the information on the diskette or a user-designed operating system to load attachment storage for the IBM Series/1 Multi-Function Attachment Feature. The reader should be an experienced Series/1 assembler-language programmer, who writes, maintains, and debugs machine-level-language programs. The reader should also be familiar with binary and hexadecimal numbering systems, and stored-program concepts.

The information is presented in four chapters and two appendixes:

- Chapter 1, "Introduction," introduces the reader to the methods described in this book for configuring attachment-storage loads and initializing the attachment.
- Chapter 2, "Initialization Diskette User Options," describes how to use the initialization diskette by providing step-by-step instructions for each of the diskette options.
- Chapter 3, "How to Modify a Copy of the Default Attachment Storage load," provides information about the attachment storage locations that may be modified by the user.
- Chapter 4, "Loading a User-Designed Operating System," describes methods available for placing attachment storage loads into a user-designed operating system.
- Appendix A, "Loader Program Coding Example," contains a coding example that may be used as a guide for writing an attachment storage load to attachment storage.
- Appendix B, "Halt Codes," contains a list of the halt codes that may occur while using the initialization diskette.

#### PREREQUISITE PUBLICATIONS

- IBM Series/1 Multi-Function Attachment Feature and 4975 Printer Description, GA34-0144
- Refer to the IBM Series/1 Graphic Bibliography, GA34-0055, for the name and order number of the appropriate product description manual for your processor.

#### RELATED PUBLICATIONS

- IBM Series/1 System Selection Guide, GA34-0143
- IBM Series/1 System Summary, GA34-0035
- IBM Series/1 Reference Summary, GA34-0034

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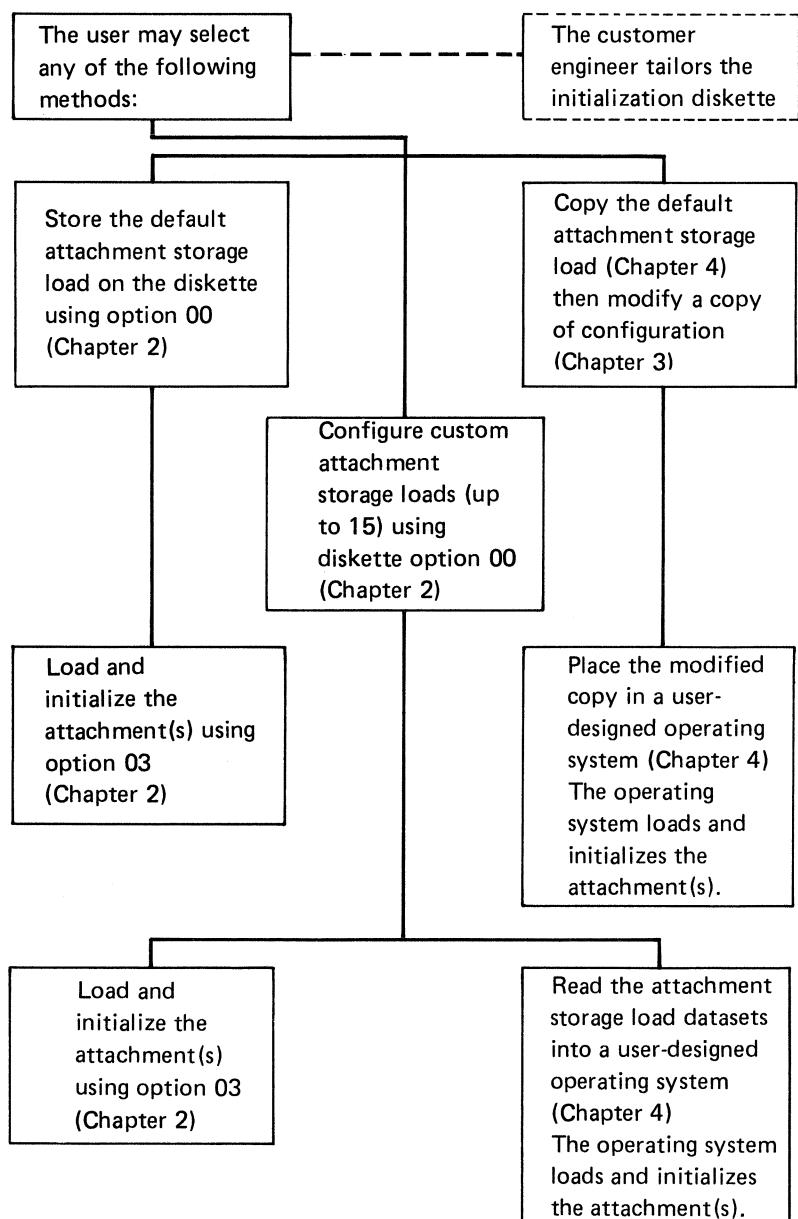
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## CHAPTER 1. INTRODUCTION

This book describes how the Multi-Function Attachment Feature may be initialized using the initialization diskette or a user-designed operating system. The customer engineer must tailor the diskette before the procedures in this book can be used.

The following flowchart illustrates the methods described in this book.



## INITIALIZATION DISKETTE DESCRIPTION

The initialization diskette is a two-sided diskette that:

- Contains one default attachment storage load in basic exchange format (see Note 1), which may be used to load and initialize the attachment or which may be copied and modified by a user-designed operating system.
- Contains a control program, which allows the user to select options from a menu. The control program must be the only program in control of all Series/1 system resources.

The control program menu provides the options and functions shown in the following chart:

Option	Function
00	Create attachment storage loads
01	Delete attachment storage loads
02	List attachment storage loads
03	Load and initialize the attachment(s)
04	Terminate the control program

- Contains the attachment storage loads (see Note 2) created using option 00.

### **Notes:**

1. Basic exchange format has the following characteristics: the data set is organized sequentially, the records are in fixed-length format, the physical record length is 256 bytes, and the data set identifier (field 5 of HDR1) is a name of up to eight characters. For information about the header labels, including HDR1, refer to "Diskette Description and Format" in Chapter 4.
2. The attachment storage loads stored on the diskette may also be referred to as datasets. Each data set is associated with a header label. For information about the header labels, including HDR1, refer to "Diskette Description and Format" in Chapter 4.

Up to 15 sections (or blocks) of information, called attachment storage loads, may be created; however, only one attachment storage load may be assigned to each multi-function attachment feature. Each attachment storage load is stored on the initialization diskette when the procedure in Chapter 2, "How to Configure Attachment Storage Loads," is performed.

#### HARDWARE REQUIREMENTS

The following describes the minimum system hardware configuration required to use the initialization diskette.

- A Series/1 processor
- 16K bytes of processor storage
- A programmer console or alternate console (see Note)
- An IBM 4964 Diskette Unit, 4965 Diskette Unit, 4966 Diskette Magazine Unit, or 4962 Disk Storage Unit Model 2, 2F, or 4

**Note:** A console is assigned when the customer engineer tailors the initialization diskette.

If an IBM 3101 Display Terminal is used as the alternate console attached to the multi-function attachment card, the set up switches on the 3101 are set as follows:

#### 3101 Setup Switches

	Group 1	Group 2	Group 3	Group 4
	12345678	12345678	12345678	12345678
On	x xx	xx	xxxx	x x
Off	x x xxx	xxxxxx	xxxx	xx xxxx

If the communications indicator panel is connected to the multi-function attachment card, the DISPLAY/FUNCTION SELECT switches must be set in the down position (00000) during attachment initialization.



## CHAPTER 2. INITIALIZATION DISKETTE OPTIONS

The initialization diskette provides the following options:

- Option 00—Configures attachment storage loads.
- Option 01—Deletes attachment storage loads.
- Option 02—Lists attachment storage loads.
- Option 03—Loads and initializes the attachment(s).
- Option 04—Terminates the initialization diskette control program.

### HOW TO CONFIGURE ATTACHMENT STORAGE LOADS

This section provides step-by-step instructions for option 00.

1. Identify the multi-function attachment's configuration for each attachment card installed. (The user should list the base device address and the devices that are connected to the multi-function attachment card. For each communications device, the user may list the modem options desired before beginning this procedure.)
2. Initial program load (IPL) the initialization diskette.

In this procedure, a statement about a message displayed on a display terminal is shown followed by a halt code in parentheses, such as (halt E601). The halt code appears in the indicators if the programmer console is connected.

An option menu is displayed (halt E601).

```
MFA INITIALIZATION DISKETTE CONTROL PROGRAM MENU
00=CONFIGURE ATTACHMENT STORAGE LOAD MODULE
01=DELETE ATTACHMENT STORAGE LOAD MODULE
02=LIST ATTACHMENT STORAGE LOAD MODULE CONFIGURATIONS
03=LOAD ATTACHMENT STORAGE LOAD MODULES AND INITIALIZE
04=TERMINATE
SELECT ONE OPTION
ENTER
```

3. When the option menu is displayed (halt E601), select option 00 as follows:

- If a display terminal is assigned: type F00; then, press the Enter or Return key.
- If the programmers console is assigned, enter:  
(B) 1F (I)  
(B) 0000 (I) (I)

**Note:** A (B) means to press the Data Buffer key on the programmer console. Enter 1F on the programmer console keypad. An (I) means to press the Console Interrupt key on the programmer console once. For more information on how to use the programmer console, refer to IBM Series/1 Operator's Guide, GA34-0039.

4. The following is displayed (halt E620).

#### BASE ADDRESS

5. Enter the base device address of the multi-function attachment to be configured in the format Fxx, as follows.

- If a display terminal is assigned: type FFC (if the base device address is FC); then, press the Enter or Return key.
- If the programmer console is assigned and the base device address is FC, enter:  
(B) 1F (I)  
(B) FC00 (I) (I)

The following is displayed (halt E622):

#### DEFAULT CONFIGURATION?

The default configuration is:

Base address = Binary synchronous device  
leased line and data terminal ready  
(DTR) are selected  
Base address + 1 = 3101 display terminal  
or asynchronous/synchronous  
communications  
Base address + 2 = 4975 model 02L  
Base address + 3 = 4975 model 01L

6. Enter **yes** to use the default configuration. Enter **no** to create a custom attachment storage load. Use the following format to respond to the message or halt code:

- If a display terminal is assigned: type 1 for a **yes** response or 0 for a **no** response; then, press the Enter or Return key.
- If the programmer console is assigned enter:  
(B) 1 (I) (I) for a **yes** response  
(B) 0 (I) (I) for a **no** response

**Note:** Use the format previously described to enter **yes** or **no** responses to messages or halts shown in this book. (The format is not repeated in this procedure.)

7. Go to step 8 if you answered **no** to the previous question.

If you answered **yes** to the previous question, the default attachment storage load is stored on the diskette. The configuration is complete, and the option menu is displayed (halt E601). Select another option or go to "How to Terminate the Initialization Diskette Control Program," described later in this chapter.

8. The following is displayed (halt E623):

DEVICE COUNT 01, 02, 03 or 04

9. Enter the device count that matches the number of devices that you want to activate, as follows:

- If a display terminal is assigned: type F01, F02, F03, or F04 (for a device count of 1, 2, 3, or 4); then, press the Enter or Return key.
- If the programmer console is assigned and the device count is 1, enter:  
(B) 1F (I)  
(B) 0100 (I) (I)

10. The following is displayed (halt E624):

DEVICE TYPE 1

11. Enter the device type for the base device address (associated with port 0) of the multi-function attachment feature, as follows.

- If a display terminal is assigned as the console: type Fxxxx (see the list of device types); then, press the Enter or Return key.
- If the programmer console is assigned and the device type is xxxx (see the following chart for a list of device types):  
(B) 1F (I)  
(B) xxxx (I) (I)

**Note:** If you are using the programmer console, the device type number 1, 2, 3, or 4 (associated with port 0, 1, 2, or 3) is located in processor register 3 level 3 when the E624 halt occurs. Press the Stop key on the programmer console; then, press the R3 key to display the contents of processor register 3. After you have displayed and recorded the contents of register 3, press the Start key and continue this procedure.

Select the desired device type from the following chart.

(Go to the step that corresponds to the device type that you entered.)

Device type	Enter	Go to step
Binary synchronous communications	1006	12
3101 display terminal or asynchronous/synchronous communications	2016	25
4975 models 01L and 01R	0208	34
4975 models 02L and 02R	020A	34

12. The following is displayed (halt E62C) because device type 1006 (BSC) was assigned to this device address:

LEASED LINE?

Do you want the leased line option selected? Enter yes or no.

13. If you answered **yes** (leased line) to the previous question, go to step 15. If you answered **no**, continue.

14. The following is displayed (halt E62D):

ANSWERTONE?

Do you want the ansuertone option selected? Enter **yes** or **no**.

15. The following is displayed (halt E628):

DTR?

Do you want the data-terminal-ready (DTR) option selected? Enter **yes** or **no**.

16. The following is displayed (halt E629):

RTS?

Do you want the request-to-send (RTS) option selected? Enter **yes** or **no**.

17. The following is displayed (halt E62E):

DISABLE IPL?

Do you want the disable-IPL option selected? Enter **yes** or **no**.

18. The following is displayed (halt E62F):

MP TRIB?

Do you want the multipoint-tributary option selected? Enter **yes** or **no**.

19. If you answered **no** to the previous question go to step 24. If you answered **yes** to the previous question continue.

20. The following is displayed (halt E630):

SECONDARY STATION ADDRESS 1 IN HEX

Enter the first secondary-station address in hexadecimal form, as follows.

- If a display terminal is assigned as the console and the first secondary-station address is C1, type FC1; then, press the Enter or Return key.
- If the programmer console is assigned, enter:  
(B) 1F (I)  
(B) C100 (I) (I)

**Note:** The secondary-station address number 1, 2, 3, or 4 requested by the program is located in processor register 3, level 3 at the time of the E630 halt. Press the Stop key on the programmer console; then, press the R3 key to display the contents of processor register 3. After you have displayed and recorded the contents of processor register 3, press the Start key and continue this procedure. (This process may be used in this and the next three steps.)

21. The following is displayed (halt E630):

SECONDARY STATION ADDRESS 2 IN HEX

Enter the next secondary-station address in hexadecimal form. (Use the same format described in step 20.)

**Note:** If you do not have another secondary-station address for this and the next two steps, repeat the last secondary-station address used. All four secondary-station addresses must contain a value other than 0.

22. The following is displayed (halt E630):

SECONDARY STATION ADDRESS 3 IN HEX

Enter the next secondary-station address in hexadecimal form. (Use the same format described in step 20.)

23. The following is displayed (halt E630).

SECONDARY STATION ADDRESS 4 IN HEX

Enter the next secondary-station address in hexadecimal form. (Use the same format described in step 20.)

24. If a device count of 1 (selected previously in this procedure) was specified, the configuration is complete and the option menu (E601) is displayed. Select another option or go to "How to Terminate the Initialization Diskette Control Program," described later in this chapter.

If a device count of more than 1 was specified, the following is displayed (E624); go to step 48.

DEVICE TYPE 2

25. The following is displayed (halt E626) (because you assigned a device type of 2016 to device type 1):

RS232C?

Enter **yes** to select an EIA<sup>1</sup> RS232C interface, or enter **no** if you have an EIA RS422 interface.

26. If you answered **yes** to the previous question, skip to step 27.

If you answered **no** to the previous question, the device is assigned an EIA RS422 interface. If a device count of 1 (selected previously in this procedure) was specified, the configuration is complete and the option menu (E601) is displayed. Select another option or go to "How to Terminate the Initialization Diskette Control Program," described later in this chapter.

If a device count of more than 1 was specified, the following is displayed (E624); go to step 48.

DEVICE TYPE 2

27. The following is displayed (halt E627):

MODEM?

Enter **yes** if a modem is used with the connected device or enter **no** if a modem is not used.

---

<sup>1</sup> Electronic Industries Association.

28. If you answered **yes** to the previous question, skip to step 29.

If you answered **no** to the previous question, continue. If a device count of 1 (selected previously in this procedure) was specified, the configuration is complete and the option menu (E601) is displayed. Select another option or go to "How to Terminate the Initialization Diskette Control Program," described later in this chapter.

If a device count of more than 1 was specified, the following is displayed (E624); go to step 48.

#### DEVICE TYPE 2

29. The following is displayed (halt E62C):

LEASED LINE?

Enter **yes** if you have a leased line, or enter **no** if you do not have a leased line.

30. The following is displayed (halt E628):

DTR?

Do you want the data-terminal-ready (DTR) option selected? Enter **yes** or **no**.

31. The following is displayed (halt E629):

RTS?

Do you want the request-to-send (RTS) option selected? Enter **yes** or **no**.

32. The following is displayed (halt E62A):

DRS?

Do you want the data-rate-select option selected?  
Enter yes or no.

(Data-rate select may also be called half-rate select  
on some modems.)

33. If a device count of 1 (selected previously in this  
procedure) was specified, the configuration is com-  
plete and the option menu (E601) is displayed.  
Select another option or go to "How to Terminate the  
Initialization Diskette Control Program," described  
later in this chapter.

If a device count of more than 1 was specified, the  
following is displayed (E624); go to step 48.

DEVICE TYPE 2

34. The following is displayed (halt E626) (because you  
assigned a device type of 0208 or 020A to device type  
1):

RS232C?

Enter yes if the device is connected using an EIA  
RS232C interface, or enter no if the device is con-  
nected using an EIA RS422 interface.

35. If you answered yes to the previous question, skip to  
step 36.

If you answered no to the previous question,  
continue. If a device count of 1 (selected previous-  
ly in this procedure) was specified, the configura-  
tion is complete and the option menu (E601) is  
displayed. Select another option or go to "How to  
Terminate the Initialization Diskette Control  
Program," described later in this chapter.

If a device count of more than 1 was specified, the  
following is displayed (E624); go to step 48.

DEVICE TYPE 2

36. The following is displayed (halt E627):

MODEM?

Enter **yes** if the device is connected using a modem; enter **no** if the device is connected without a modem.

37. If you answered **yes** to the previous question (MODEM?) skip to step 41.

If you answered **no** to the previous question no modem is used.

If the device type previously selected is a 4975 model 02R (device type 020A) the following is displayed (halt E625):

LINE SPEED

Go to step 39 if LINE SPEED is displayed (halt E625); otherwise, go to step 38.

38. A 4975 model 01R (device type 0208) was previously selected. The line speed is set to 1200 bps.

If a device count of 1 (selected previously in this procedure) was specified, the configuration is complete and the option menu (E601) is displayed. Select another option or go to "How to Terminate the Initialization Diskette Control Program," described later in this chapter.

If a device count of more than 1 was specified, the following is displayed (E624); go to step 48.

DEVICE TYPE 2

39. The following is displayed (halt E625):

LINE SPEED

The device type previously selected is 020A. Select the entry value for the desired line speed for the 4975 model 02R from the following chart.

Line speed	Enter
1200	F1200
2400	F2400
4800	F4800

40. If a device count of 1 (selected previously in this procedure) was specified, the configuration is complete and the option menu (E601) is displayed. Select another option or go to "How to Terminate the Initialization Diskette Control Program," described later in this chapter.

If a device count of more than 1 was specified, the following is displayed (E624); go to step 48.

DEVICE TYPE 2

41. The following is displayed (halt E628):

DTR?

Do you want the data-terminal-ready (DTR) option selected? Enter yes or no.

42. The following is displayed (halt E629):

RTS?

Do you want the request-to-send (RTS) option selected? Enter yes or no.

43. The following is displayed (halt E62B):

INTERNAL CLOCK?

Do you want the internal clocking option selected? Enter yes or no.

44. If you answered **no** to the previous question, skip to step 47.

If you answered **yes** to the previous question, continue.

45. If the device type previously selected is 020A, the following is displayed (halt E625):

LINE SPEED

Go to step 46 if line speed (halt E625) is displayed; otherwise, go to step 47.

46. Device type 020A was previously selected. The following is displayed (halt E625):

LINE SPEED

Select the entry value for the desired line speed for the 4975 model 02R from the following chart:

Line speed	Enter
1200	F1200
2400	F2400
4800	F4800

47. If a device count of 1 (selected previously in this procedure) was specified, the configuration is complete and the option menu (E601) is displayed. Select another option or go to "How to Terminate the Initialization Diskette Control Program," described later in this chapter.

If a device count of more than 1 was specified, the following is displayed (E624); go to step 48.

DEVICE TYPE 2

48. The following is displayed (halt E624):

DEVICE TYPE 2

Enter the device type for the device connected to, or the function associated with, the base device address +1 (port 1).

- If a display terminal is assigned as the console: type Fxxxx (see the following chart for a list of device types); then, press the Enter or Return key.
- If the programmer console is assigned and the device type is xxxx (see the list of device types):  
(B) 1F (I)  
(B) xxxx (I) (I)

**Note:** If you are using the programmer console, the device type number 1, 2, 3, or 4 (associated with ports 0, 1, 2, or 3) is located in processor register 3, level 3, when the E624 halt occurs. Press the Stop key on the programmer console; then, press the R3 key to display the contents of processor register 3. After you have displayed and recorded the contents of register 3, press the Start key and continue this procedure.

Select the desired device type from the following chart:

Device type	Enter
3101 display terminal or asynchronous/synchronous communications	2016
4975 model 01L	0208
4975 model 02L	020A

49. If a device count of 2 (selected previously in this procedure) was specified, the configuration is complete and the option menu (E601) is displayed. Select another option or go to "How to Terminate the Initialization Diskette Control Program," described later in this chapter.

If a device count of more than 2 was specified, the following is displayed (E624).

#### DEVICE TYPE 3

- If a display terminal is assigned as the console: type Fxxxx (see the following chart for a list of device types); then, press the Enter or Return key.
- If the programmer console is assigned and the device type is xxxx (see the following chart for a list of device types), enter:  
(B) 1F (I)  
(B) xxxx (I) (I)

**Note:** If you are using the programmer console, see the note in step 48 to display the device type number 1, 2, 3, or 4.

Select the desired device type from the following chart:

Device type	Enter
3101 display terminal or asynchronous/synchronous communications	2016
4975 model 01L	0208
4975 model 02L	020A

50. If a device count of 3 (selected previously in this procedure) was specified, the configuration is complete and the option menu (E601) is displayed. Select another option or go to "How to Terminate the Initialization Diskette Control Program," described later in this chapter.

If a device count of more than 3 was specified, the following is displayed (E624):

DEVICE TYPE 4

- If a display terminal is assigned as the console: type Fxxxx (see the following chart for a list of device types); then, press the Enter or Return key.
- If the programmers console is assigned and the device type is xxxx (see the list of device types), enter:  
(B) 1F (I)  
(B) xxxx (I) (I)

**Note:** If you are using the programmer console, see the note in step 48 to display the device type number 1, 2, 3, or 4.

Select the desired device type from the following chart:

Device type	Enter
3101 display terminal or asynchronous/synchronous communications	2016
4975 model 01L	0208
4975 model 02L	020A

51. After the device type for device type 4 is entered, the configuration is complete and the option menu (E601) is displayed. Select another option or go to "How to Terminate the Initialization Diskette Control Program," described later in this chapter.

## HOW TO DELETE ATTACHMENT STORAGE LOADS

This section provides step-by-step instructions for option 01.

### 1. IPL the initialization diskette.

In this procedure, a statement about the message displayed on a display terminal is shown followed by a halt code, such as E601, in parenthesis. The halt code appears in the indicators if the programmers console is connected.

An option menu is displayed (halt E601):

```
MFA INITIALIZATION DISKETTE CONTROL PROGRAM MENU
00=CONFIGURE ATTACHMENT STORAGE LOAD MODULE
01=DELETE ATTACHMENT STORAGE LOAD MODULE
02=LIST ATTACHMENT STORAGE LOAD MODULE CONFIGURATIONS
03=LOAD ATTACHMENT STORAGE LOAD MODULES AND INITIALIZE
04=TERMINATE
SELECT ONE OPTION
```

### 2. When the option menu is displayed (halt E601), select option 01, as follows:

- If a display terminal is assigned: type F01; then, press the Enter or Return key.
- If the programmers console is assigned, enter:  
(B) 1F (I)  
(B) 0100 (I) (I)

**Note:** A (B) means to press the data buffer key on the programmer console. Press 1F on the programmers console keypad. An (I) means to press the Console Interrupt key on the programmer console once. For more information on how to use the programmers console, refer to IBM Series/1 Operator's Guide, GA34-0039.

3. The following is displayed (halt E640):

ADDRESS TO DELETE

Enter the base device address of the attachment associated with the attachment storage load that you want to delete in the following format Fxx, as follows.

- If a display terminal is assigned: type FFC (if the base device address is FC); then, press the Enter or Return key.
- If the programmers console is assigned and the base device address is FC, enter:  
(B) 1F (I)  
(B) FC00 (I) (I)

4. The following is displayed (E642):

ADDRESS XX DELETED

5. The attachment storage load associated with the attachment address XX is deleted. The option menu (halt E601) is displayed.

## HOW TO LIST ATTACHMENT STORAGE LOADS

This section provides step-by-step instructions for option 02.

The user must have previously used option 00 from the initialization diskette control program menu (described earlier in this chapter) to store either the default attachment storage load, or at least one custom attachment storage load on the diskette before performing this procedure.

### 1. IPL the initialization diskette.

In this procedure, a statement about the message displayed on a display terminal is shown followed by a halt code, such as E601, in parenthesis. The halt code appears in the indicators if the programmer console is connected.

An option menu is displayed (halt E601):

```
MFA INITIALIZATION DISKETTE CONTROL PROGRAM MENU
00=CONFIGURE ATTACHMENT STORAGE LOAD MODULE
01=DELETE ATTACHMENT STORAGE LOAD MODULE
02=LIST ATTACHMENT STORAGE LOAD MODULE CONFIGURATIONS
03=LOAD ATTACHMENT STORAGE LOAD MODULES AND INITIALIZE
04=TERMINATE
SELECT ONE OPTION
```

### 2. When the option menu is displayed (halt E601), select option 02 as follows:

- If a display terminal is assigned: type F02; then, press the Enter or Return key.
- If the programmers console is assigned, enter:  
(B) 1F (I)  
(B) 0200 (I) (I)

**Note:** A (B) means to press the Data Buffer key on the programmer console. Press 1F on the programmer console keypad. An (I) means to press the Console Interrupt key on the programmer console once. For more information on how to use the programmer console, refer to IBM Series/1 Operator's Guide, GA34-0039.

The following is displayed (halt E652):

```
ADR TYPE1 TYPE2 TYPE3 TYPE4 DSCRP SEC STATION ADR
AA  BBBB  CCCC  DDDD  EEEE  XXXX  FF GG HH JJ
```

The meaning of this message follows.

AA = Base device address of the multi-function attachment (which is configured)  
BBBB = The device type\* assigned to the base device address (port 0)  
CCCC = The device type\* assigned to the base device address +1 (port 1)  
DDDD = The device type\* assigned to the base device address +2 (port 2)  
EEEE = The device type\* assigned to the base device address +3 (port 3)

\* Device types are:

1006 for binary synchronous communications  
2016 for 3101 display terminal or  
asynchronous/synchronous communications.  
0208 for 4975 models 01L and 01R.  
020A for 4975 models 02L and 02R.

where FF, GG,  
HH, JJ = The secondary-station addresses assigned

where xxxx = The description of the device on the RS232C interface (if a device is assigned). See the following bit definitions.

Bits
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15

Bit(s)	Meaning
0	External clock
1	Data rate select (DRS)
2	Data terminal ready (DTR)
3	Request to send (RTS)
4	Leased line
5	Switched line
6	Multipoint tributary
7	Disable IPL
8	Answer-tone
9	1200 bps (for 4975 using internal clocking)
10	2400 bps (for 4975 model 02R using internal clocking)
11	4800 bps (for 4975 model 02R using internal clocking)
12	Direct connect (for 4975 models 01R and 02R directly connected without a modem using an EIA RS232C interface)
13-15	Not used

If you are using the programmer console, processor register 3, level 3, contains the processor-storage address of the first word of the message at the time of the E652 halt.

**Note:** Press the Stop key on the programmer console; then, press the R3 key to display the contents of processor register 3 level 3. After you have displayed and recorded the contents of each processor-storage location in the processor-storage block, press the Start key; then, enter (B) 6 (I) (I) to continue.

See the following illustration for the meanings of the block of 8 words in processor storage:

Processor storage block	
Word	
1	00AA (base device address)
2	BBBB (device type for port 0)
3	CCCC (device type for port 1)
4	DDDD (device type for port 2)
5	EEEE (device type for port 3)
6	XXXX (description of device on RS232C)
7	FFGG (secondary-station addresses)
8	HHJJ (secondary-station addresses)

0

15

3. The option menu (halt E601) is displayed.

Select another option or go to "How to Terminate the Initialization Diskette Control Program," described later in this chapter.

## HOW TO LOAD AND INITIALIZE THE ATTACHMENT

This section provides step-by-step instructions for option 03.

This chapter describes how to load and initialize attachment storage from the initialization diskette, using a display terminal or the programmer console.

The user must have previously used option 00 on the initialization diskette control program menu (described earlier in this chapter), to store either the default attachment storage load or to create at least one custom attachment storage load, before performing this procedure.

**Note:** If the communications indicator panel is connected to the attachment card, the DISPLAY/FUNCTION SELECT switches must be placed in the down position (00000) during attachment initialization.

### 1. IPL the initialization diskette.

In this procedure, a statement about the message displayed on a display terminal is shown followed by a halt code, such as E601, in parenthesis. The halt code appears in the indicators if the programmers console is connected.

An option menu is displayed (halt E601):

```
MFA INITIALIZATION DISKETTE CONTROL PROGRAM MENU
00=CONFIGURE ATTACHMENT STORAGE LOAD MODULE
01=DELETE ATTACHMENT STORAGE LOAD MODULE
02=LIST ATTACHMENT STORAGE LOAD MODULE CONFIGURATIONS
03=LOAD ATTACHMENT STORAGE LOAD MODULES AND INITIALIZE
04=TERMINATE
SELECT ONE OPTION
```

2. When the option menu is displayed (halt E601), select option 03 to load and initialize attachment storage, as follows.
  - If a display terminal is assigned: type F03; then, press the Enter or Return key.
  - If the programmer console is assigned, enter:  
(B) 1F (I)  
(B) 0300 (I) (I)

The following is displayed (halt E663):

ALL ADDRESSES LOADED

3. The following is displayed (halt 3005):

PT (program terminated)

All attachment storage loads are loaded. Select another option or go to "How to Terminate the Initialization Diskette Control Program," described later in this chapter.

## HOW TO TERMINATE THE INITIALIZATION DISKETTE CONTROL PROGRAM

This section provides step-by-step instructions for option 04.

An option menu is displayed (halt E601):

```
MFA INITIALIZATION DISKETTE CONTROL PROGRAM MENU
00=CONFIGURE ATTACHMENT STORAGE LOAD MODULE
01=DELETE ATTACHMENT STORAGE LOAD MODULE
02=LIST ATTACHMENT STORAGE LOAD MODULE CONFIGURATIONS
03=LOAD ATTACHMENT STORAGE LOAD MODULES AND INITIALIZE
04=TERMINATE
SELECT ONE OPTION
```

1. When the option menu is displayed (halt E601), select option 04, as follows:

- If a display terminal is assigned: type F04; then, press the Enter or Return key.
- If the programmers console is assigned, enter:  
(B) 1F (I)  
(B) 0400 (I) (I)

**Note:** A (B) means to press the Data Buffer key on the programmer console. Press 1F on the programmer console keypad. An (I) means to press the Console Interrupt key on the programmer console once. For more information on how to use the programmers console, refer to IBM Series/1 Operator's Guide, GA34-0039.

2. The following is displayed (halt 3005):

PT (program terminated)



### CHAPTER 3. HOW TO MODIFY A COPY OF THE DEFAULT ATTACHMENT STORAGE LOAD

The user may copy or read the default attachment storage load from the initialization diskette using any of the methods described in this chapter. After the default attachment storage load is available to the user-designed operating system, the user's program may modify individual attachment storage locations.

The default attachment storage load contains 3,840 (decimal) bytes of data which must be loaded into attachment storage addresses 4080 through 4F7F (hexadecimal).

The following chart shows the attachment storage locations which may be modified by the user. A checksum word (in attachment storage location 4F7E) must be calculated by the user's program if any of the attachment storage locations are modified. All other attachment storage locations must not be modified.

Attachment storage address	Number of bytes	Name
4080	1	Modem control byte (see Note)
4081	1	Multipoint-tributary address 1
4082	1	Multipoint-tributary address 2
4083	1	Multipoint-tributary address 3
4084	1	Multipoint-tributary address 4
4100	2	Device 0
4104	1	Modem information byte
4105	1	Line-speed information
4200	2	Device 1
4205	1	Line-speed information
4300	2	Device 2
4305	1	Line-speed information
4400	2	Device 3
4405	1	Line-speed information
4F7E	2	Checksum word

**Note:** The modem control byte description follows.

## MODEM CONTROL BYTE

Attachment storage location 4080:

Bits

0	1	2	3	4	5	6	7
---	---	---	---	---	---	---	---

The following two charts are used to determine the contents of the modem control byte:

Modem control byte bit(s)	Meaning
0	Device 0 line speed control*
1	Device 1 line speed control*
2	Device 2 line speed control*
3	Device 3 line speed control*
4**	Set to 1 for external-clocking option (This bit may be set to 1 for 4975 and binary synchronous communications only.)
5**	Set to 1 for data-rate-select option (This bit may be set to 1 for asynchronous/synchronous communications only.)
6**	Set to 1 for data-terminal-ready option (This bit may be set to 1 for binary synchronous communications, asynchronous/synchronous communications, and 4975.)
7**	Set to 1 for request-to-send option (This bit may be set to 1 for binary synchronous communications, asynchronous/synchronous communications and 4975.)

\*For the 4975, set bit(s) 0, 1, 2, or 3 as described in the chart that follows. For asynchronous/synchronous communications and binary synchronous communications set bit(s) 0, 1, 2, or 3 to 0.

\*\* Bits 4, 5, 6, and 7 control only device 0. Device 0 must use the EIA RS232C interface if any of these bits is set to 1.

The line speed for the 4975 determines the setting of control bits 0, 1, 2, or 3. Use the following chart:

Line speed	Modem control byte bits 0, 1, 2, or 3
1200	1
2400	0
4800	1
External clocking	0

#### MULTIPPOINT-TRIBUTARY ADDRESSES

Attachment storage location 4081:

Bits

8	9	10	11	12	13	14	15
---	---	----	----	----	----	----	----

Attachment storage location 4082:

Bits

0	1	2	3	4	5	6	7
---	---	---	---	---	---	---	---

Attachment storage location 4083:

Bits

8	9	10	11	12	13	14	15
---	---	----	----	----	----	----	----

Attachment storage location 4084:

Bits

0	1	2	3	4	5	6	7
---	---	---	---	---	---	---	---

Up to four different hexadecimal secondary-station addresses may be specified. If the multi-function attachment is a tributary station in a multipoint network (bit 1 is a 1 in the modem information byte located at attachment-storage address 4104), the attachment recognizes the multipoint-tributary addresses when polled by a host system.

**Note:** If less than four different multipoint-tributary addresses are required, the last address assigned should be repeated so that none of the four bytes contain 0's. If none of the multipoint-tributary addresses are required, these bytes should be set to 0's.

#### DEVICE 0 (PORT 0)

Attachment Storage Locations 4100 and 4101:

Bits

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
---	---	---	---	---	---	---	---	---	---	----	----	----	----	----	----

Any of the following devices (or device types) may be assigned to port 0:

- 4975 printer
- Asynchronous/synchronous communications
- Binary synchronous communications
- No device connected (port 0 not used)

The following chart shows the contents of attachment-storage locations 4100 and 4101 for each device that may be connected or assigned to port 0.

Device type	Hexadecimal value
4975 Models 01L and 01R	0208
4975 Models 02L and 02R	020A
Asynchronous/synchronous communications	2016
Binary synchronous communications	1006
No device attached	FFFF

## MODEM INFORMATION BYTE (PORT 0)

Attachment Storage Location 4104:

Bits

0	1	2	3	4	5	6	7
---	---	---	---	---	---	---	---

The modem information byte is used in conjunction with port 0 (the base device address) of the attachment, but only if the EIA RS232C interface is used. If the EIA RS422 interface is used, set bits 0-7 to 0's. If a bit is set to 1, the selected option is active, and if a bit is set to 0, the selected option is not active.

The following chart shows the bit assignments for the modem information byte:

Modem information byte bit(s)	Meaning
0	Set to 1 for a leased-line modem or if an asynchronous/synchronous device is directly connected to port 0
1	Set to 1 if a multipoint-tributary address is used
2	Not used; set to 0
3	Set to 1 for a 4975 model 01R or 02R directly connected to an EIA RS232C interface.
4	Not used; set to 0
5	Set to 1 to select the disable-IPL option
6	Set to 1 to select the answer-tone option (binary synchronous communications only)
7	Set to 1 for a switched-line modem

## LINE SPEED INFORMATION BYTE (PORT 0)

Attachment Storage Location 4105:

Bits

8	9	10	11	12	13	14	15
---	---	----	----	----	----	----	----

The contents of the line-speed information byte is determined by the speed of the device and the interface used as shown in the following chart.

**Note:** If the device type stored in attachment-storage location 4100 is 2016 (for asynchronous/synchronous communications), the line-speed information byte must contain 0's.

Line speed	Hexadecimal value	Device
1200	03	Used for 4975 models 01R and 02R if connected using an EIA RS232C interface and internal clocking is selected.
2400	03	Used for a 4975 model 01L if connected using an EIA RS422 interface. Also used for a 4975 model 02R if connected using an EIA RS232C interface and internal clocking is selected.
4800	02	Used for a 4975 model 02L only if connected using an EIA RS422 interface. Also used for a 4975 model 02R if connected using an EIA RS232C interface and internal clocking is selected.
External clocking (BSC)	00	Used for binary synchronous communications only
External clocking (4975)	01	Used for 4975 models 01R and 02R on an EIA RS232C interface when using a synchronous modem.

### DEVICES 1, 2, AND 3 (PORTS 1, 2 AND 3)

Attachment Storage Locations 4200 and 4201:

Bits

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
---	---	---	---	---	---	---	---	---	---	----	----	----	----	----	----

Attachment Storage Locations 4300 and 4301:

Bits

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
---	---	---	---	---	---	---	---	---	---	----	----	----	----	----	----

Attachment Storage Locations 4400 and 4401:

Bits

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
---	---	---	---	---	---	---	---	---	---	----	----	----	----	----	----

Any of the following devices (or device types) may be assigned to ports 1, 2, or 3:

- 4975 printer
- Asynchronous/synchronous communications
- No device connected (port 1, 2, or 3 not used)

The following chart shows how to determine the contents of attachment-storage locations 4200 and 4201, 4300 and 4301, or 4400 and 4401 for each device that may be connected or assigned to ports 1, 2 or 3:

Device type	Hexadecimal value
4975 Model 01L	0208
4975 Model 02L	020A
Asynchronous/synchronous communications	2016
No device attached	FFFF

## LINE SPEED INFORMATION BYTES (PORT 1, 2, AND 3)

Attachment Storage Locations 4205, 4305, and 4405:

Bits

8	9	10	11	12	13	14	15
---	---	----	----	----	----	----	----

The contents of the line speed information byte is determined by the speed of the device and the interface used, as shown in the following chart:

**Note:** If the device type stored in the corresponding attachment-storage location 4200, 4300, or 4400 (for ports 1, 2, or 3) is 2016 (for asynchronous/synchronous communications), the line-speed information byte must contain 0's.

Line speed	Hexadecimal value	Device
2400	03	Used for 4975 model 01L on an EIA RS422 interface
4800	02	Used for 4975 Model 02L on an EIA RS422 interface

## CHECKSUM WORD

Attachment Storage Locations 4F7E and 4F7F:

Bits

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
---	---	---	---	---	---	---	---	---	---	----	----	----	----	----	----

The checksum word must be calculated by the program whenever the default attachment storage load (copied from the initialization diskette) is modified by the user. The checksum must be stored in attachment storage for comparison to the hardware calculated checksum. The following steps are required for the calculation:

1. Load a work register with 0's.
2. Load the contents of bytes 4080 and 4081 (one word) into another work register.
3. Add 1 to the value loaded into the second work register.
4. Subtract the contents of the second work register from the contents of the first work register.
5. Test the results to see if a borrow occurs. If a borrow occurs, subtract 1 from the first work register.
6. Load the contents of bytes 4082 and 4083 (one word) into the second work register.
7. Add 1 to the value in the second work register.
8. Subtract the contents of the second work register from the contents of the first work register.
9. Test the results to see if a borrow occurs. If a borrow occurs, subtract 1 from the first work register.
10. Continue this process, by repeating steps 6 through 9, for each successive word to be checksummed in attachment storage, up to and including attachment-storage locations 4F7C and 4F7D.
11. Subtract 1 from the contents of the first work register.
12. Store the contents of the first work register (the checksum word) into attachment-storage locations 4F7E and 4F7F.

The following coding example may be used as a guide to calculate the checksum word:

```
*****  
*  
* Calculate the Checksum  
*****  
  
CHECKSUM EQU *  
          MVBI 0,R3      CLEAR THE SUM REG  
          MVBI 0,R5      CLEAR THE WORK REG  
          MVWI LOADDR,R6  POINT TO FIRST WORD TO  
*                                BE CHECKSUMMED*  
  
CKSMLP  EQU *  
          MVW  (R6),R3    MOVE IT TO R3  
          AWI  ONE,R3    ADD 1  
          SW   R3,R5    SUBTRACT IT FROM R5  
          SCY  R5      SUBTRACT THE BORROW (IF ANY)  
          AWI  TWO,R6    INCREMENT THE POINTER  
          CWI  HIADDR,R6  LAST WORD PROCESSED?**  
          JNE  CKSMLP   NO  
          SWI  ONE,R5    YES. SUBTRACT 1 FROM THE SUM  
          MVW  R5,(R6)   STORE THE CHECKSUM
```

\* LOADDR is the processor storage location that contains the data to be loaded into attachment-storage address 4080.

\*\* HIADDR is the processor storage location that contains the data to be loaded into attachment-storage address 4F7E.

## CHAPTER 4. LOADING A USER-DESIGNED OPERATING SYSTEM

A user-designed operating system can load the attachment storage load(s) required by the multi-function attachment(s). (One attachment storage load is associated with each multi-function attachment.) The Series/1 operator can then simply load (IPL) the operating system rather than loading programs from the initialization diskette. The operating system must:

- Have access to all attachment storage loads required by the multi-function attachments
- Have a loader program for the multi-function attachment on the Series/1 system

After the user configures an attachment storage load using the initialization diskette, the attachment storage load is stored on the initialization diskette. The user may copy these attachment storage loads into a user-designed operating system.

Two methods exist to obtain a copy. The user's program may:

- Read the configured program from the initialization diskette into processor storage and then transfer the copy to the operating system.

**Note:** This method is the most flexible of the two. It places the least number of restrictions on the operating system and the operator.

- Use a copy utility program to copy the attachment storage loads, also called datasets, from the initialization diskette to a selected area of processor storage; the user's program then loads the operating system with the copied information.

## HOW TO READ AN ATTACHMENT STORAGE LOAD

The header records are examined by the user program to determine the locations of the attachment storage loads on the initialization diskette.

In the header record, the beginning-of-extent field defines the start (first-used sector) of the attachment storage load dataset. The end-of-extent field defines the end (last-used sector) of the attachment storage load dataset. Both fields are defined in five bytes as follows:

CC	=	cylinder	01-76 in decimal EBCDIC
H	=	head	0 or 1 in EBCDIC
RR	=	record	01-15 in decimal EBCDIC

The length of the program can be found by using the starting sector and the ending sector.

The operating system must have a loader program for the multi-function attachment feature. (See Appendix A for an example of a loader program.)

## DISKETTE DESCRIPTION AND FORMAT

The diskette contains 77 cylinders numbered 00 (outermost) to 76 (innermost).

Each track is divided into 15 sectors, with 256 bytes per sector. Cylinder 0 is divided into 26 sectors with 128 bytes per sector. Sector numbers begin with 01 for the first sector after the index.

The volume label (VOL1), located on cylinder 0 sector 7 (read with head 0), is used to identify the volume, the owner, the security classification, the sequence, and the length of the physical records on the tracks of the volume.

VOL1 is a required label, formatted as shown on the following page.

Character position	Field name	Length	Usage
000	Label identifier	3	Required
003	Label number	1	Required
004	Volume identifier	6	Required
010	Accessibility	1	Required
011	Reserved for future standardization	13	*
024	System code	13	Optional
037	Owner identifier	14	Optional
051	Reserved for future standardization	20	*
071	Volume surface indicator	1	Required
072	Extent arrangement indicator	1	Optional
073	Special requirements indicator	1	Optional
074	Reserved for future standardization	1	*
075	Physical record length of available space	1	**
076	Physical record sequence code	2	**
078	Reserved for future standardization	1	*
079	Label standard version	1	Required
080	Reserved for future standardization	48	*

\* Reserved fields must be recorded as spaces; however, no assumptions should be made regarding their content on input.

\*\* Required only when formatting and initializing a diskette.

The HDR1 header labels (or data-set labels) are used to identify the data sets and describe their locations on the volume. The header labels also describe attributes and processing requirements of the data sets. There is one header label for the default attachment storage load and one label for each of the custom attachment storage loads (up to 15).

The header labels have the following format:

Character position	Field name	Length	Usage
000	Label identifier	3	Required
003	Label number	1	Required
004	Reserved for future standardization	1	*
005	MFACSI da**	17	Required
022	Block length	5	Required
027	Record attribute	1	Optional
028	Beginning of extent	5	Required
033	Physical record length	1	Required
034	End of extent	5	Required
039	Record/block format	1	Optional
040	Bypass indicator	1	***
041	Data set security	1	Optional
042	Write protect indicator	1	Required
043	Exchange type indicator	1	Required
044	Multi-volume data set indicator	1	****
045	Volume sequence number	2	Optional
047	Creation date	6	Optional
053	Record length	4	Optional
057	Offset to next record space	5	Optional
062	Reserved for future standardization	4	*
066	Expiration date	6	Required
072	Verify/copy indicator	1	Optional
073	Data set organization	1	Optional
074	End of data address	5	Required
079	Reserved for future standardization	16	*
095	System code	13	Optional
108	File application type	2	Optional
110	Reserved for future standardization	18	*

\* Reserved fields must be recorded as space characters; however, no assumptions should be made regarding their content on input.

\*\* da=Base device address of the multi-function attachment.

\*\*\* This field must contain a space character to enable the data set to be transmittable.

\*\*\*\* Support for this field is required if the "volume sequence number" is supported.

## COPYING AN ATTACHMENT STORAGE LOAD USING A COPY UTILITY

The copy utility must be compatible with diskettes that contain:

- Standard Volume 1 labels
- Standard HDR1 header labels
- Data written 256 bytes-per-sector on both sides of the diskette

The following characteristics apply to the attachment storage loads on the initialization diskette:

- The volume identifier for the diskette is MFA
- The data set label for the default attachment storage load is MFACSIDT and is located on cylinder 0 sector 8 (read with head 0).
- The data set labels for each custom attachment storage load have the following format: MFACSIDa, where da is equal to the base device address of the multi-function attachment associated with the load. The data set labels are located on cylinder 0 sectors 9-23 (read with head 0). If da=xx, this describes an empty data set.

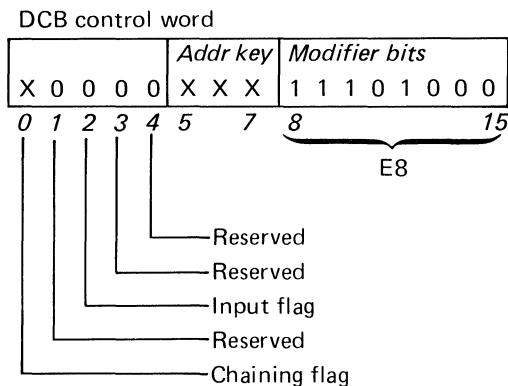
## LOADING AN ATTACHMENT STORAGE LOAD TO AN ATTACHMENT

The user may load attachment storage using the operations defined by the Start Control command if:

- An attachment storage load has been previously configured using the initialization diskette and the attachment storage load has been copied to a user-designed operating system.
- The default attachment storage load has been copied to a user-designed operating system.

**Note:** If the communications indicator panel is connected to the attachment, the DISPLAY/FUNCTION SELECT switches must be set off (00000) during attachment initialization.

### **Load Attachment Storage**



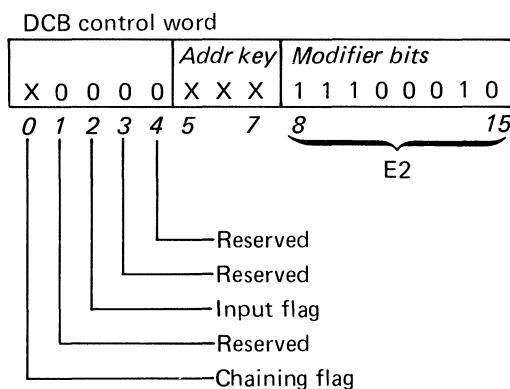
This operation loads attachment storage with the data located at the address specified in DCB word 7. The data is loaded into attachment storage at the location specified in DCB word 1 (start address).

The attachment storage load operation resets attachment initialization. The DCB associated with an attachment storage load must specify the following:

- Bit 2 of the DCB control word is off.
- The byte count in DCB word 6 is within the maximum of F00 (3,840 decimal) bytes.
- The start address in DCB word 1 is hexadecimal 4080 or above up to and including 4F7F.

A device end interrupt follows successful operation. If the boundaries of the attachment storage are exceeded, a DCB specification check occurs.

#### INITIALIZE ATTACHMENT

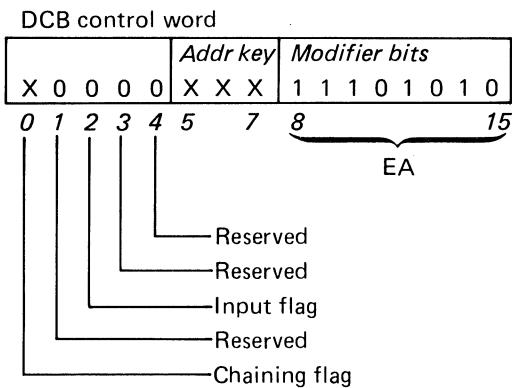


Attachment storage must be loaded with an attachment storage load before the attachment can be initialized (successfully execute an initialize attachment operation). An initialize attachment operation must be issued before the attachment responds to operations other than those initiated by the Start Control command.

Bit 2 of DCB control word 0 must be 0, and the byte count must be 0; otherwise, a DCB specification check occurs.

The attachment performs an attachment storage checksum; and if it is not correct, an exception interrupt occurs.

## LOAD ATTACHMENT STORAGE AND INITIALIZE



**Note:** Attachment storage must be loaded before the attachment can be initialized.

This operation performs a load attachment storage operation followed by an initialize attachment operation.

If a hardware failure occurs during any of the tests or checks that occur during this operation, the attachment does not initialize and an exception interrupt, with device-dependent status in the ISB is presented.

The attachment can exit the initialized state only after one of the following:

- A power-on reset
- Acceptance of a Start Control command that specifies a load attachment storage operation

## APPENDIX A. LOADER PROGRAM CODING EXAMPLE

The following shows an example of a multi-function attachment loader and initialization program. It may be used as a guide when writing the multi-function storage load to the Multi-function attachment storage.

### Write the storage load setup:

MVW	DEVAD,R2	GET DEVICE ADDRESS
MVB	R2,PRE1	PREPARE IDCB
MVB	R2,RDI1	READ ID IDCB
MVB	R2,WRC1	WRITE STORAGE LOAD TO ATTACH IDCB
MVB	R2,RES1	RESET AND HALT IDCB
SLL	ONE,R2	DOUBLE DEVICE ADDRESS VALUE
MVA	(R2,DEVIT),R2	SAVE VECTOR
MVW	R2,SVTA	ADDRESS
MVW	(R2),SVTV	SAVE VECTOR VALUE
MVA	VRAM,R1	SET INTERRUPT
MVW	R1,(R2)	VECTOR ADDRESS
MVA	IRAM,R1	ADDRESS OF
MVW	R1,VRAM	INTERRUPT ROUTINE

### Set up prepare to interrupt on the current level. This prevents the loss of registers across the interrupt

CPCL	R1	GET CURRENT LEVEL
SLL	ONE,R1	POSITION LEVEL INDICATORS
OW	R1,PRE2	SET IN PREPARE IDCB
IO	PREP	PREPARE THE ATTACHMENT
BNCC	SEVEN,STOPC	BR/BAD CC
IO	RDIID	READ ID TO THE ATTACHMENT
BNCC	SEVEN,STOPC	BR/BAD CC
MVW	RDI2,RDIDA	PASS ACTUAL READ ID RECEIVED
RBTWI	MMFA,RDI2	TURN OFF DEVICE COUNT
CWI	MFA,RDI2	IS THIS THE RIGHT ATTACHMENT
BNE	STOPE	BR/NOT CORRECT READ ID VALUE
IO	RESET	ISSUE RESET

**Note:** After the Reset is issued, a time delay of at least 50 milliseconds is required before issuing the next command.

Write storage load and initialize to attachment

MVW	RAMAD,R2	START ADDRESS OF STORAGE LOAD DATA
MVW	R2,R2DAD	SET IN DCB
MVA	R2DCB,R2	ADDRESS OF STORAGE LOAD
MVW	R2,WRC2	AND INITIALIZE DCB
MVA	WRSL,R4	WRITE STORAGE LOAD AND INITIALIZE IDCB
JAL	IORAM,R5	GO DO IT
MVW	SVTA,R2	RESTORE
MVW	SVTV,(R2)	VECTOR ADDRESS
B	RETRN	RETURN TO CALLING PROGRAM

Common routine to issue I/O to write storage load and initialize

IORAM	EQU *	
IO	(R4)	ISSUE WRITE TO ATTACHMENT
BNCC	SEVEN,STOPF	BR/BAD CC
LEX	ZERO	WAIT FOR INTERRUPT

Interrupt routine:

IRAM	EQU *	
BNCC	THREE,STOPG	BR/BAD CC ON INTERRUPT
B	(R5)	RETURN TO CALLER

Constants and storage areas for use by the attachment write routine:

VRAM	DC	A(*-*)	INTERRUPT ROUTINE ADDRESS
SVTA	DC	A(*-*)	SAVE VECTOR ADDRESS
SVTV	DC	A(*-*)	SAVE VECTOR DATA
PREP	DC	X'6000'	PREPARE
	DC	A(1)	IDCB
PRE1	EQU	PREP+ONE	
PRE2	EQU	PREP+TWO	
RDID	DC	X'2000'	READ ID
	DC	A(*-*)	IDCB
RDI1	EQU	RDID+ONE	
RDI2	EQU	RDID+TWO	
WRSL	DC	X'7C00'	WRITE STORAGE LOAD
	DC	A(*-*)	IDCB
WRC1	EQU	WRSL+ONE	
WRC2	EQU	WRSL+TWO	
RESET	DC	X'6F00'	RESET
	DC	A(0)	IDCB
RES1	EQU	RESET+ONE	
R2DCB	DC	X'00EA'	WRITE STORAGE LOAD AND
*			INITIALIZE
	DC	X'4080'	ATTACHMENT STORAGE ADDRESS
	DC	A(0)	
	DC	A(3840)	BYTE COUNT
R2DAD	DC	A(*-*)	
FINIS	EQU	*	LAST ADDRESS
	END		



## APPENDIX B. HALT CODES

3000 RDY ENTER

The initialization control program is ready to accept a command.

3001 (No message is displayed.) A hardware error occurred on the alternate console. To continue, enter: (B) 6 (I) (I)  
Retry the procedure in process when the error occurred.

3002

A possible hardware error occurred. Retry the procedure in process when the error occurred.

3003

A possible hardware error occurred. Retry the procedure in process when the error occurred.

3004

A hardware error occurred. Retry the procedure in process when the error occurred.

3005 PT

The control program is terminated.

3006 INVALID REQUEST

The initialization diskette control program cannot execute the requested dataset.

3007 ALTERNATE CONSOLE OFF

The alternate console is offline. If the alternate console is an IBM 3101 Display Terminal and option 03 or 04 is selected from the initialization diskette control program menu, the alternate console is placed offline.  
Messages are displayed on the programmer console and are answered using the programmer console.

3009

A possible hardware error occurred. Retry the procedure in process when the error occurred.

300B DISKETTE ERROR

A possible hardware error occurred. Retry the procedure in process when the error occurred.

300C PNF

Program not found.

3010 NO REPLY EXPECTED

A reply was received from the alternate console and the initialization control program was not expecting a reply.

3015 NO MESSAGE

A possible hardware error occurred. Retry the procedure in process when the error occurred.

FFFF

The command reply is accepted by the initialization control program. The halt code is displayed until the reply is processed.

E602 MODULE COULD NOT BE LOADED

A possible hardware error occurred. To continue, enter: (B) 6 (I) (I)  
Retry the procedure in process when the error occurred.

E603 ENTRY NOT VALID

To continue, enter: (B) 6 (I) (I)  
The initialization control program requests another entry.

E631 MODULE COULD NOT BE LOADED

A possible hardware error occurred. To continue, enter: (B) 6 (I) (I)  
Retry the procedure in process when the error occurred.

E632

An error occurred. To continue,  
enter: (B) 6 (I) (I)  
Retry the procedure in process when the error  
occurred.

E633 ADDRESS XX ALREADY CONFIGURED

If the programmer console is used, processor  
register 3, level 3 contains XX00; where  
xx= the base device address of the attachment.  
To continue, enter: (B) 6 (I) (I)  
The initialization control program returns to  
the option menu.

E634 CONFIGURATION FULL

There are fifteen multi-function attachment  
storage loads stored on the diskette. No more  
attachments may be configured. To continue,  
enter: (B) 6 (I) (I)  
The initialization control program returns to  
the option menu.

E636 ERROR OCCURRED

An error occurred. To continue,  
enter: (B) 6 (I) (I)  
Retry the procedure in process when the error  
occurred.

E641 ADDRESS XX NOT FOUND

Where XX = the base device address.  
If the programmer console is used,  
processor register 3, level 3 contains XX00, where  
XX is the base device address. The requested  
base device address does not have an associated  
attachment storage load configured on the diskette.  
To continue, enter: (B) 6 (I) (I)  
The initialization control program returns to the  
option menu.

E650 NO ADDRESSES TO LIST

There are no addresses configured on the diskette.  
To continue, enter: (B) 6 (I) (I)  
The initialization control program returns to  
the option menu.

E661 NO ADDRESSES TO LOAD

There are no addresses configured on the diskette.  
To continue, enter: (B) 6 (I) (I)  
The initialization control program returns to  
the option menu.

E662 THESE ADDRESSE COULD NOT BE LOADED

XX XX XX XX XX

An error occurred. The addresses, represented  
by the XX's in the message could not be loaded.  
If the programmer console is used,  
processor register 3, level 3 contains the  
address of the processor storage location that  
contains the number of addressed that could not  
be loaded. The next processor storage location  
contains the addresses that could not be loaded.

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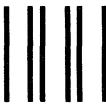
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