TITLE Title Page
IBM 4684 Store Loop Adapter/A:

Installation,
Testing,
Problem Determination,
and Technical Reference

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This is the first edition of the *IBM* 4684 Store Loop Loop Adapter/A:
Installation, Testing, Problem Determination, and Technical Reference.

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against harmful interference when the equipment is operated in a
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Properly shielded and grounded cables and connectors must be used in
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equipment.

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make the connections.

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This equipment does not exceed Class A limits per radio noise
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a residential area may cause unacceptable interference to radio and TV
reception requiring the owner or operator to take whatever steps are
necessary to correct the interference.

**Avis de conformité aux normes du ministère des Communications du
Canada**

Cet équipement ne dépasse pas les limites de Classe A d'émission de
bruits radioélectriques pour les appareils numériques, telles que
prescrites par le Règlement sur le brouillage radioélectrique établi
par le ministère des Communications du Canada. L'exploitation faite
en milieu résidentiel peut entraîner le brouillage des réceptions
radio et télé, ce qui obligerait le propriétaire ou l'opérateur à
prendre les dispositions nécessaires pour en éliminer les causes.

FRONT_3 *General Safety Considerations (U.S. English)*

DANGER
```
+----------------------------------------------------------------+
¦ Never connect or disconnect a cable during an electrical storm.   ¦
+----------------------------------------------------------------+
```

CAUTION:

For your safety, you must connect the power cable of any equipment to
a correctly wired and grounded receptacle. An incorrectly wired
receptacle can place a hazardous voltage on accessible metal parts of
the equipment. If you are unsure of the receptacle wiring, have a
qualified electrician check the receptacle prior to connecting any
equipment or working on any equipment connected to it.

This product is equipped with a 3-wire power cord and plug for the
user's safety. Use this power cord in conjunction with a properly
grounded electrical outlet to avoid electrical shock.

1.0 Chapter 1. Introduction

This manual contains installation and testing instructions for installing
or replacing an IBM 4684 Store Loop Adapter/A in supported models of an
IBM 4684 Point of Sale Terminal used as a store controller to run a store
loop. This manual also includes problem determination procedures and
technical reference information.

Use this manual with the *4684 Reference Diskette* for your IBM 4684 Point
of Sale Terminal. The reference diskette must be a version 3.0 or higher
in order to support an IBM 4684 Store Loop Adapter/A.

Save this manual for future use after installing an IBM 4684 Store Loop
Adapter/A.

Subtopics
1.1 Related Publications

1.1 Related Publications

The following publications contain additional information that may assist
you with the store loop:

> *IBM 4680 Store System: Messages Guide - SC30-3521*
> *IBM 4680 Store System: Problem Determination Guide - SY27-0316*
> *IBM 4683/4684 Point of Sale Terminal: Maintenance Manual - SY27-0295*
> *IBM 4684 Point of Sale Terminal: Problem Determination Guide -*
> *SY27-0314*
> *IBM 4684 Point of Sale Terminal: Installation Guide - SA27-3837.*

2.0 Chapter 2. Installation Instructions

The IBM 4684 Store Loop Adapter/A is installed similar to other option
adapters and PS/2 option adapters that are supported in an IBM 4684 Point
of Sale Terminal. Use the steps that follow to assist you with
installation of the adapter.

Note: Before you begin to install this adapter, be sure that you have a
        backup copy of the *IBM 4684 Point of Sale Terminal: Reference
        Diskette*, version 3.0 or higher. Refer to the *IBM 4684 Point of
        Sale Terminal: Installation Guide* or to the *IBM 4684 Point of Sale
        Terminal: Problem Determination Guide* for instructions on creating
        the backup copy of the reference diskette.

Subtopics
2.1 Installation Steps

Subtopics

2.1 Installation Steps

1. Switch **POWER OFF** on the IBM 4684 Point of Sale Terminal and disconnect
    the power cord from the electrical outlet, if not previously done.

    Switch **POWER OFF** and disconnect any power cords from the electrical
    outlets of any attached devices that have their own power cord.

    PICTURE 1

2. Check the cover lock at the front of the system unit and be sure that
    the lock is in the unlocked position. Lift straight up on the back
    panel at the rear of the system unit and remove the rear panel.

    Disconnect all cables at the rear of the system unit. You should note
    the socket location for each cable you remove to allow correct cable
    replacement later.

    Warning: Do not open the anti-static bag on any adapter until
    instructed to do so. Some adapters can be damaged by static
    discharge. To prevent this damage, the adapters are wrapped in
    anti-static bags.

3. Turn the thumbscrew [1] to loosen the system unit cover. Remove the
    system unit cover by sliding it forward approximately
    2.5 cm (1 in.) and lifting it.

    Continue to step 4.

    PICTURE 2

4. Do you have a Feature Card Expansion [1] from Box 1C to install?
    - OR -
    Do you have a Feature Card and Memory Expansion Adapter [2] from Box
    1D to install?

    Note: Either the Feature Card Expansion or the Feature Card and
           Memory Expansion Adapter must be present to allow for
           installation of the IBM 4684 Store Loop Adapter/A option.

    NO (already installed) Continue to step 6.

    YES   Continue to step 5.

5. Install the Feature Card Expansion from Box 1C or the Feature Card and
    Memory Expansion Adapter from Box 1D as shown in the diagram. Be sure
    the card is firmly seated in place.

    Note: If you have an expandable memory card, you may need to install
           memory modules onto the card before you install the card into
           the machine. Adapters vary in their instructions.

    [1] Feature Card Expansion
    [2] Feature Card and Memory Expansion Adapter

    PICTURE 3

    PICTURE 4

6. Unpack the IBM 4684 Store Loop Adapter/A from the box.

    Hold the adapter (still wrapped in its anti-static bag) in one hand.
    With your other hand, touch an unpainted metal part on the rear of the
    terminal. This will discharge any static buildup.

    Carefully slide the anti-static bag back from the end of the adapter
    and remove the anti-static bag. Handle the adapter only by the edges;
    do not touch the connectors, components, or solder connections.

There are two slots (**1** or **2**) in the system unit that can be used for
option adapters. You may use either slot **1** or slot **2** for the store
loop adapter.

7. Loosen the thumbscrews [1] that hold the small blank cover strip at
    the position where you will install the store loop adapter.

    Remove and discard the cover strip.

8. The store loop adapter has blue tabs on two corners.

    Install the store loop adapter by holding the blue tabs as shown in
    the diagram.

9. Hold and maneuver the adapter behind the slot entrance. Check to see
    that each adapter is firmly seated in its socket.

    Tighten the thumbscrew (where the blank cover strip was removed
    earlier) to secure the adapter in position.

10. Replace the system unit cover by placing it approximately 2.5 cm (1
    in.) from the rear and sliding it on.

    Turn the thumbscrew [1] to secure the cover.

    Continue to step 11.

    PICTURE 5

    PICTURE 6

    PICTURE 7

    PICTURE 8

11. When you have finished installing all devices, options, and cables:

    a. Connect all previously disconnected cables to the system unit.

    b. Connect the store loop adapter cables to the proper store loop
        adapters.

        Note: To run the adapter tests, you must have the store loop
                adapter CABLE connected to the adapter, BUT disconnected
                from the store loop receptacle.

        CAUTION:
        This product is equipped with a 3-wire power cord and plug for the
        user's safety. Use this power cord in conjunction with a properly
        grounded electrical outlet to avoid electrical shock.

    c. Connect all external device power cords to their power outlets.

    d. Connect the power cable to the 4684 terminal and plug the power

cable into an electrical outlet.

This completes the installation of the IBM 4684 Store Loop Adapter/A.

Continue with Chapter 3 to ensure that the adapter is configured and operating correctly.

3.0 Chapter 3. Configuring and Testing the Store Loop Adapter

Before you begin to configure or test this adapter, be sure that you have
a backup copy of the *IBM 4684 Point of Sale Terminal: Reference Diskette*,
Version 3.0 or higher.

To run the adapter tests, you must have the store loop adapter CABLE
connected to the adapter, BUT disconnected from the store loop receptacle.

DANGER
+---+
¦ Never connect or disconnect a cable during an electrical storm.   ¦
+--3.0-1--------+

Subtopics
3.1 Configuration and Verification Tests

Subtopics

3.1 Configuration and Verification Tests

1. Insert the backup copy of the 4684 Reference Diskette, Version 3.0 or
    higher, in the 4684 diskette drive and switch power ON. Follow the
    instructions that appear on the screen.

    If the 4684 terminal stops with message "**165**" displayed, press the **S1**
    or the **ESC** key. Then, follow the instructions on the display.

2. When message "**M0101**" is displayed, answer **YES**. Automatic
    configuration will begin.

3. When the question "**Do you want to activate the new configuration now?**"
    is displayed, answer **YES**, and follow the instructions on the screen.

    PICTURE 9

4. When **Menu-M1** is displayed, select "**Start Tests**".

5. When **Menu-T1** is displayed, select "**Verification Tests**".

        The verification tests check the memory, the display, the IBM 4684
        Store Loop Adapter/A, and other components of the system.

        If an error occurs, make note of any components that fail the
        tests, and record any messages.

6. When testing is complete, be sure to connect the store loop cables to
    the proper store loop receptacles.

4.0 Chapter 4.   Problem Determination Procedures

This chapter lists error symptoms and failing components related to the
store loop adapter. The error symptoms can occur during power-on
self-test or while running tests. When using the chapter, note that:

    x in an error message can be any number.
    The index lists the component that is most likely to be failing first.

Subtopics
4.1 Running Tests
4.2 Failures During the Power-On Self-Test (POST)
4.3 Failures During Diskette Testing

4.1 Running Tests

Before you begin to test a terminal, be sure that you have a backup copy
of the *IBM 4684 Point of Sale Terminal: Reference Diskette*, Version 3.0
or higher.

DANGER
+--+
¦ Never connect or disconnect a cable during an electrical storm.   ¦
+--+

Note: If your terminal is connected to a store loop, through a store loop
          adapter, you must have the store loop adapter CABLE connected to
          the adapter, BUT disconnected from the store loop receptacle.

To run tests on your 4684 terminal, see "Running Tests" in Chapter 1 of
the *IBM 4684 Point of Sale Terminal: Problem Determination Guide*.

**Always replace an IBM 4684 Store Loop Adapter/A in the same system unit
slot from which a store loop adapter was removed.**

4.2 Failures During the Power-On Self-Test (POST)

Run diagnostics from the backup copy of the *IBM 4684 Point of Sale Terminal: Reference Diskette* (Version 3.0 or higher) to isolate the failure.

```
+--------------------------------------------+
¦ Symptom ¦ Failing Component                ¦
+---------+----------------------------------¦
¦ C0000   ¦ System unit or an option card    ¦
+---------+----------------------------------¦
¦ C4000   ¦ System unit or an option card    ¦
+---------+----------------------------------¦
¦ C8000   ¦ System unit or an option card    ¦
+---------+----------------------------------¦
¦ CC000   ¦ System unit or an option card    ¦
+---------+----------------------------------¦
¦ D0000   ¦ System unit or an option card    ¦
+---------+----------------------------------¦
¦ D4000   ¦ System unit or an option card    ¦
+--------------------------------------------+
```

Subtopics
4.2.1 Store Loop Adapter Failure

4.2.1 Store Loop Adapter Failure

Run the IBM 4684 Store Loop Adapter/A test and follow the instructions on
the screen to isolate the failure. *xx* in an error message can be any
number.

```
+-------------------------------------------+
¦ Symptom ¦ Failing Component                ¦
+---------+---------------------------------¦
¦ 62xx    ¦ Store loop adapter               ¦
+-------------------------------------------+
```

4.3 Failures During Diskette Testing

Run diagnostics from the backup copy of the *IBM 4684 Point of Sale
Terminal: Reference Diskette* (Version 3.0 or higher) to isolate the
failure.

Subtopics
4.3.1 Store Loop Diagnostic Errors

4.3.1 Store Loop Diagnostic Errors

```
+-------------------------------------------+
¦ Symptom ¦ Failing Component                ¦
+---------+---------------------------------¦
¦ 6210    ¦ Store loop adapter               ¦
+---------+---------------------------------¦
¦ 6270    ¦ Store loop adapter cable or      ¦
¦         ¦ store loop adapter               ¦
+-------------------------------------------+
```

4.3.1 Store Loop Diagnostic Errors

```
+-------------------------------------------+
¦ Symptom ¦ Failing Component                ¦
+---------+---------------------------------¦
¦ 6210    ¦ Store loop adapter               ¦
+---------+---------------------------------¦
¦ 6270    ¦ Store loop adapter cable or      ¦
¦         ¦ store loop adapter               ¦
+-------------------------------------------+
```

5.0 Chapter 5.   Technical Reference

5.1 Store Loop Adapter Cable Diagram

This figure shows a store loop adapter cable and a diagram of the cable
wiring.

PICTURE 10

5.2 Adapter Loop Relay Diagram

This figure is a diagram of the loop relay circuitry located in a store
loop adapter.

PICTURE 11

5.2 Adapter Loop Relay Diagram

This figure is a diagram of the loop relay circuitry located in a store
loop adapter.

5.3 Store Loop Adapter Block Diagram

This figure is a block diagram of an IBM 4684 Store Loop Adapter/A.

PICTURE 12

5.3 Store Loop Adapter Block Diagram

This figure is a block diagram of an IBM 4684 Store Loop Adapter/A.

5.4 *Store Loop Adapter Storage Map*

These tables illustrate the store loop adapter storage areas. The values
for memory addresses are in hexadecimal. You can find the actual address
values for your adapter by finding the "base address" of your adapter and
then adding the "base address plus" value.

Base Address	Adapter Default
C0000	First
C4000	Second
C8000	Third
CC000	Fourth
D0000	Fifth
D4000	Sixth

Base Address Plus	Start Memory Usage
0000	ROS
2800	Shared Buffer
2FFF	System Status Byte
3FF0	Failure Status Bytes
3FFF	End

5.5 POST Test Store Loop Adapter Errors

+---+
¦ Table 5-1. POST Test Store Loop Errors   ¦
+---¦
¦ **Symptom**   ¦ **Cause**   ¦
+------------------+--------------------------¦
¦ 6211 - 6218   ¦ Multiple errors   ¦
+------------------+--------------------------¦
¦ 6221 - 6228   ¦ 8051 POR errors   ¦
+------------------+--------------------------¦
¦ 6231 - 6238   ¦ Latch test errors   ¦
+------------------+--------------------------¦
¦ 6241 - 6248   ¦ Shared buffer errors   ¦
+---+

5.6 Adapter Failure Status Bytes

The store loop adapter failure status bytes appear on the screen when the
diagnostics detect a failure in a store loop adapter.

XX represents a FAILURE STATUS BYTE. It may be any number depending on
the type of store loop adapter failure that occurred.

PICTURE 13

The tables on the following pages define the meaning of the store loop
adapter failure status bytes. These bytes are displayed only when a
failure is detected by the store loop adapter tests.

**Use this table to find information on the store loop adapter failure
status bytes**.

+---+
¦ **For**   ¦ **Go to**   ¦
+---------+---¦
¦ Byte 0 ¦ "Store Loop Adapter Error Code" in topic 5.7.1.   ¦
+---------+---¦
¦ Byte 1 ¦ "Store Loop Adapter Microprocessor Status Codes" in   ¦
¦   ¦ topic 5.8.1.   ¦
+---------+---¦
¦   ¦ "Shared Buffer Latch Error Codes and Extended Data" in   ¦
¦ Byte 2 ¦ topic 5.9.1.   ¦
¦ and   ¦   ¦
¦ Byte 3 ¦   ¦
¦   ¦   ¦
+---------+---¦
¦   ¦ "Shared Buffer Error Codes and Test Patterns" in   ¦
¦ Byte 4 ¦ topic 5.10.1.   ¦
¦ and   ¦   ¦
¦ Byte 5 ¦   ¦
¦   ¦   ¦
+---------+---¦
¦ Byte 6 ¦ Not used   ¦
+---------+---¦
¦ Byte 7 ¦ Not used   ¦
+---------+---¦
¦ Byte 8 ¦ Contains the EC level of the store loop adapter   ¦
¦   ¦ microprocessor.   ¦
+---------+---¦
¦ Byte 9 ¦ Contains the EC level of the store loop adapter power-on   ¦
¦   ¦ self test microcode in ROS.   ¦
+---+

5.7 Failure Status Byte 0

Subtopics
5.7.1 Store Loop Adapter Error Code

5.7.1 Store Loop Adapter Error Code

This table defines the meaning of each bit of failure status byte 0 of the
store loop adapter failure status bytes.

Bit	Error	Values
7	Cable wrap	0 = Good 1 = Bad
6	Reserved	0 = Good 1 = Bad
5	ROS scan error	0 = Good 1 = Bad
4	Store loop adapter microprocessor status	0 = Good 1 = Bad
3	Shared buffer latch error code	0 = Good 1 = Bad
2	Shared buffer error code	0 = Good 1 = Bad
1	Reserved	0 = Good 1 = Bad
0	Reserved	0 = Good 1 = Bad

5.8 Failure Status Byte 1

Subtopics
5.8.1 Store Loop Adapter Microprocessor Status Codes

5.8.1 Store Loop Adapter Microprocessor Status Codes

This table defines the meaning of failure status byte 1 of the store loop
adapter failure status bytes.

Byte 1 Status Code	Definition
00	No errors occurred
30	The store loop adapter microprocessor internal diagnostic test failed.
33 thru 56	The store loop adapter microprocessor internal diagnostic test failed.
60	Microprocessor instruction time-out has occurred.
61	A serializer overrun occurred.
62	A tag overrun occurred.
63	A deserializer overrun occurred.
65	A loop shut-off command occurred.
66	The "Beacon Timer" has expired in secondary mode.
67	The "End-Of-Poll Timer" has expired in primary mode.
68	A CRC error occurred in a message received from the system unit microprocessor.
69	A store loop adapter microprocessor internal buffer overflow occurred.
6A	A store loop adapter microprocessor external buffer overflow occurred.
71 to 77	The store loop adapter microprocessor internal diagnostic test failed.
85	The store loop adapter microprocessor internal diagnostic test failed.

Table 5-2. Store Loop Adapter Microprocessor Status Codes

5.9 Failure Status Bytes 2 and 3

Subtopics
5.9.1 Shared Buffer Latch Error Codes and Extended Data

5.9.1 Shared Buffer Latch Error Codes and Extended Data

This table defines the meaning of failure status bytes 2 and 3 of the
store loop adapter failure status bytes.

Table 5-3. Shared Buffer Latch Error Codes and Extended Data

Byte 2 Error Code	Byte 3 Extended Data	Definition
00	00	No errors detected
01	Store loop adapter system status byte. See page 5.11.	The store loop adapter microprocessor was not at a "ready and not enabled" condition after initial POR was complete.
02	Store loop adapter interrupt flag byte. See page 5.14.	A level 7 software interrupt was not received when expected.
03	Store loop adapter system status byte. See page 5.11.	A level 7 hardware interrupt was not received when expected.
04	Shared buffer request byte. See page 5.12.	The 4684 microprocessor was unable to find the shared buffer after initial POR was complete.
05	Store loop adapter system status byte. See page 5.11.	The store loop adapter microprocessor was not at a "ready and not enabled" condition after initial POR was complete.
06	Shared buffer request byte. See page 5.12.	The 4684 microprocessor was unable to return the shared buffer to the store loop adapter microprocessor after initial POR was complete.
07	Store loop adapter system status byte. See page 5.11.	The 4684 microprocessor was unable to acquire the shared buffer for a software POR request.
08	Shared buffer request byte. See page 5.12.	The 4684 microprocessor was unable to find the shared buffer after acquiring it for a software POR request.
09	Store loop adapter system status byte. See page 5.11.	A level 7 hardware interrupt was not received from a software POR request.
0A	Store loop adapter system status byte. See page 5.11.	The store loop adapter microprocessor internal diagnostic test failed to complete during the software POR.
0B	Shared buffer	The alternate shared buffer failed.

	error codes. See page 5.10.1.	
0C	Shared buffer error codes. See page 5.10.1.	The primary shared buffer failed.
10	Store loop adapter system status byte. See page 5.11.	The 4684 microprocessor was unable to acquire the shared buffer for a software POR request.
11	Store loop adapter system status byte. See page 5.11.	The software POR request failed.
12	Store loop adapter system status byte. See page 5.11.	The 4684 microprocessor was unable to acquire the shared buffer for a Read EC Level request.
13	Store loop adapter system status byte. See page 5.11.	The read EC level request failed.
14	Store loop adapter system status byte. See page 5.11.	The 4684 microprocessor was unable to acquire the shared buffer for terminal quiesce procedure.
15	Store loop adapter system status byte. See page 5.11.	The store loop circuit was open during the terminal quiesce procedure.
16	Store loop adapter system status byte. See page 5.11.	The 4684 microprocessor was unable to acquire the shared buffer for loop wrap setup.
17	Store loop adapter system status byte. See page 5.11.	The 4684 microprocessor was unable to acquire the shared buffer while performing the data wrap test.
18	Data message count	Retransmit retry count exhausted.
19	Data message count	Data wrap receive error. See page 5.8.1.
1A	Data message count	Data wrap compare error.
1B	Store loop adapter system status	The 4684 microprocessor was unable to acquire the shared buffer for the offline procedure.

	byte. See page 5.11.	
20	Store loop adapter system status byte. See page 5.11.	Timeout while waiting for a level 7 hardware interrupt.
30	Store loop adapter system status byte. See page 5.11.	Timeout while waiting for a response from a request to acquire the shared buffer for a software POR request.
31	Store loop adapter system status byte. See page 5.11.	Timeout while waiting for a response from a software POR request.
32	Store loop adapter system status byte. See page 5.11.	Timeout while waiting for a response from a request to acquire the shared buffer for a read EC level request.
33	Store loop adapter system status byte. See page 5.11.	Timeout while waiting for a response from a read EC level request.
40	Store loop adapter interrupt flag byte. See page 5.14.	A level 7 interrupt was received with unexpected status.
70	Store loop adapter system status byte. See page 5.11.	The 4684 microprocessor was unable to acquire the shared buffer for a software POR request.
71	Store loop adapter system status byte. See page 5.11.	The software POR request failed.
72	Store loop adapter system status byte. See page 5.11.	The 4684 microprocessor was unable to acquire the shared buffer for a read EC level request.
73	Store loop adapter system status byte. See page 5.11.	The read EC level request failed.
80	Store loop adapter interrupt flag byte. See page 5.14.	A level 7 interrupt was received when not expected.
90	Store loop adapter interrupt flag byte.	A level 7 interrupt was received when not expected.

	See page 5.14.	
94	Store loop adapter interrupt flag byte. See page 5.14.	The 4684 microprocessor was unable to acquire the shared buffer for terminal quiesce procedure.
95	Store loop adapter interrupt flag byte. See page 5.14.	The store loop circuit was open during the terminal quiesce procedure.
96	Store loop adapter interrupt flag byte. See page 5.14.	The 4684 microprocessor was unable to acquire the shared buffer for loop wrap setup.
97	Store loop adapter interrupt flag byte. See page 5.14.	The 4684 microprocessor was unable to acquire the shared buffer while performing the data wrap test.
98	Store loop adapter interrupt flag byte. See page 5.14.	Retransmit retry count exhausted.
99	Store loop adapter interrupt flag byte. See page 5.14.	Data wrap receive error. See page 5.8.1.
9B	Store loop adapter interrupt flag byte. See page 5.14.	The 4684 microprocessor was unable to acquire the shared buffer for the offline procedure.
C0	Store loop adapter interrupt flag byte. See page 5.14.	A level 7 interrupt was received when not expected.
F0	Store loop adapter system status byte. See page 5.11.	The 4684 microprocessor was unable to acquire the shared buffer for a software POR request.
F1	Store loop adapter system status byte. See page 5.11.	The software POR request failed.
F2	Store loop adapter system status byte. See page 5.11.	The 4684 microprocessor was unable to acquire the shared buffer for a read EC level request.
F3	Store loop adapter system status	The read EC level request failed.

```
¦           ¦ byte.  See ¦                                                      ¦
¦           ¦ page 5.11. ¦                                                      ¦
+------------------------------------------------------------------------------+
```

5.10 Failure Status Bytes 4 and 5

Subtopics
5.10.1 Shared Buffer Error Codes and Test Patterns

5.10.1 Shared Buffer Error Codes and Test Patterns

This table defines the meaning of failure status bytes 4 and 5 of the
store loop adapter failure status bytes.

```
+---------------------------------------------------------------------+
¦ Table  5-4. Shared Buffer Error Codes and Test Patterns             ¦
¦---------------------------------------------------------------------¦
¦ Byte   ¦ Byte  ¦                                                    ¦
¦ 4      ¦ 5     ¦                                                    ¦
¦ Error  ¦ Test  ¦ Definition                                        ¦
¦ Code   ¦ Patter¦                                                    ¦
¦--------+-------+--------------------------------------------------- ¦
¦ 00     ¦ 00    ¦ No errors detected.                               ¦
¦--------+-------+--------------------------------------------------- ¦
¦ 01     ¦ 01    ¦ Data test pattern failed.                         ¦
¦--------+-------+--------------------------------------------------- ¦
¦ 02     ¦ 02    ¦ Data test pattern failed.                         ¦
¦--------+-------+--------------------------------------------------- ¦
¦ 03     ¦ 04    ¦ Data test pattern failed.                         ¦
¦--------+-------+--------------------------------------------------- ¦
¦ 04     ¦ 08    ¦ Data test pattern failed.                         ¦
¦--------+-------+--------------------------------------------------- ¦
¦ 05     ¦ 10    ¦ Data test pattern failed.                         ¦
¦--------+-------+--------------------------------------------------- ¦
¦ 06     ¦ 20    ¦ Data test pattern failed.                         ¦
¦--------+-------+--------------------------------------------------- ¦
¦ 07     ¦ 40    ¦ Data test pattern failed.                         ¦
¦--------+-------+--------------------------------------------------- ¦
¦ 08     ¦ 80    ¦ Data test pattern failed.                         ¦
¦--------+-------+--------------------------------------------------- ¦
¦ 09     ¦ FE    ¦ Data test pattern failed.                         ¦
¦--------+-------+--------------------------------------------------- ¦
¦ 0A     ¦ FD    ¦ Data test pattern failed.                         ¦
¦--------+-------+--------------------------------------------------- ¦
¦ 0B     ¦ FB    ¦ Data test pattern failed.                         ¦
¦--------+-------+--------------------------------------------------- ¦
¦ 0C     ¦ F7    ¦ Data test pattern failed.                         ¦
¦--------+-------+--------------------------------------------------- ¦
¦ 0D     ¦ EF    ¦ Data test pattern failed.                         ¦
¦--------+-------+--------------------------------------------------- ¦
¦ 0E     ¦ DF    ¦ Data test pattern failed.                         ¦
¦--------+-------+--------------------------------------------------- ¦
¦ 0F     ¦ BF    ¦ Data test pattern failed.                         ¦
¦--------+-------+--------------------------------------------------- ¦
¦ 10     ¦ 7F    ¦ Data test pattern failed.                         ¦
¦--------+-------+--------------------------------------------------- ¦
¦ 11     ¦ F1    ¦ Buffer address 0400 failed.                       ¦
¦--------+-------+--------------------------------------------------- ¦
¦ 12     ¦ 02    ¦ Buffer address 0200 failed.                       ¦
¦--------+-------+--------------------------------------------------- ¦
¦ 13     ¦ F3    ¦ Buffer address 0100 failed.                       ¦
¦--------+-------+--------------------------------------------------- ¦
¦ 14     ¦ 04    ¦ Buffer address 0080 failed.                       ¦
¦--------+-------+--------------------------------------------------- ¦
¦ 15     ¦ F5    ¦ Buffer address 0040 failed.                       ¦
¦--------+-------+--------------------------------------------------- ¦
¦ 16     ¦ 06    ¦ Buffer address 0020 failed.                       ¦
¦--------+-------+--------------------------------------------------- ¦
¦ 17     ¦ F7    ¦ Buffer address 0010 failed.                       ¦
¦--------+-------+--------------------------------------------------- ¦
¦ 18     ¦ 08    ¦ Buffer address 0008 failed.                       ¦
¦--------+-------+--------------------------------------------------- ¦
¦ 19     ¦ F9    ¦ Buffer address 0004 failed.                       ¦
¦--------+-------+--------------------------------------------------- ¦
¦ 1A     ¦ 0A    ¦ Buffer address 0002 failed.                       ¦
¦--------+-------+--------------------------------------------------- ¦
¦ 1B     ¦ FB    ¦ Buffer address 0001 failed.                       ¦
¦--------+-------+--------------------------------------------------- ¦
¦ 1C     ¦ 0C    ¦ Buffer address 0000 failed.                       ¦
¦--------+-------+--------------------------------------------------- ¦
¦ 1D     ¦ 0E    ¦ Buffer address 0400 failed.                       ¦
¦--------+-------+--------------------------------------------------- ¦
¦ 1E     ¦ FD    ¦ Buffer address 0200 failed.                       ¦
¦--------.--------+--------------------------------------------------- ¦
¦ 1F     ¦ 0C    ¦ Buffer address 0100 failed.                       ¦
¦--------+-------+--------------------------------------------------- ¦
¦ 20     ¦ FB    ¦ Buffer address 0080 failed.                       ¦
¦--------+-------+--------------------------------------------------- ¦
¦ 21     ¦ 0A    ¦ Buffer address 0040 failed.                       ¦
¦--------+-------+--------------------------------------------------- ¦
¦ 22     ¦ F9    ¦ Buffer address 0020 failed.                       ¦
¦--------+-------+--------------------------------------------------- ¦
¦ 23     ¦ 08    ¦ Buffer address 0010 failed.                       ¦
```

24	F7	Buffer address 0008 failed.
25	06	Buffer address 0004 failed.
26	F5	Buffer address 0002 failed.
27	04	Buffer address 0001 failed.
28	F3	Buffer address 0000 failed.

5.11 Store Loop Adapter System Status Byte

This table describes the bits of the store loop adapter system status byte
(SSB). The values in the SSB represent the current state of the store
loop adapter hardware.

Table 5-5. Store Loop Adapter System Status Byte	
Bit	**Definition**
Bit 7 (Read only)	Reserved
Bit 6 (Read/write)	**1 =** Generate(d) a store loop adapter POR. **0 =** Reset the POR mechanism.
Bit 5 (Read/write)	Reserved
Bit 4 (Read only)	Reserved
Bit 3 (Read/write)	**1 =** Enable the interrupt mechanism. **0 =** Disable the interrupt mechanism.
Bit 2 (Read only)	**1 =** Level 7 interrupt is active. **0 =** Level 7 interrupt is inactive.
Bit 1 (Read/write)	**1 =** Shared buffer access is complete. **0 =** Shared buffer return is complete.
Bit 0 (Read/write)	**1 =** Request(ed) shared buffer access. **0 =** Shared buffer return is complete.

5.12 Shared Buffer Request Byte

This table describes the bits of the shared buffer request bytes. This
byte is updated by the 4684 microprocessor after each access of the
message buffer.

```
+----------------------------------------------------------------------+
¦ Table  5-6. Shared Buffer Request Byte                               ¦
+----------------------------------------------------------------------¦
¦ Bit    ¦ Definition                                                  ¦
+-------+--------------------------------------------------------------¦
¦ Bit 7 ¦ 1 =  Diagnostic self-test request.                           ¦
+-------+--------------------------------------------------------------¦
¦ Bit 6 ¦ 1 =  Read and process the "timer function" bytes.            ¦
+-------+--------------------------------------------------------------¦
¦ Bit 5 ¦ 1 =  Read and process the "loop mode" byte.                  ¦
+-------+--------------------------------------------------------------¦
¦ Bit 4 ¦ 1 =  Process the "transmit message(s)" held in the shared    ¦
¦       ¦       buffer.                                                 ¦
+-------+--------------------------------------------------------------¦
¦ Bit 3 ¦ 1 =  Read and process the "timer/transmit function" bytes.   ¦
+-------+--------------------------------------------------------------¦
¦ Bit 2 ¦ 1 =  Internal 8051 storage dump request.                     ¦
+-------+--------------------------------------------------------------¦
¦ Bit 1 ¦ 1 =  Read EC level request.                                  ¦
+-------+--------------------------------------------------------------¦
¦ Bit 0 ¦ 1 =  Read and process the "loop address" bytes.              ¦
+----------------------------------------------------------------------+
```

5.13 Shared Buffer Status Byte

This table describes the bits of the shared buffer status byte. This byte
is updated by the store loop adapter microprocessor before it interrupts
the 4684 microprocessor.

```
+------------------------------------------------------------------------+
¦ Table  5-7. Shared Buffer Status Byte                                  ¦
+------------------------------------------------------------------------¦
¦ Bit   ¦ Definition                                                     ¦
+-------+----------------------------------------------------------------¦
¦ Bit 7 ¦ 1 =  The diagnostic self-test is complete.                     ¦
+-------+----------------------------------------------------------------¦
¦ Bit 6 ¦ 0 =  All commands are complete.                                ¦
¦       ¦ 1 =  Busy                                                      ¦
+-------+----------------------------------------------------------------¦
¦ Bit 5 ¦ 1 =  Poll received.                                            ¦
+-------+----------------------------------------------------------------¦
¦ Bit 4 ¦ 1 =  Loop message received.                                    ¦
+-------+----------------------------------------------------------------¦
¦ Bit 3 ¦ 1 =  An error message is present.                              ¦
+-------+----------------------------------------------------------------¦
¦ Bit 2 ¦ 1 =  An internal 8051 storage dump is present.                 ¦
+-------+----------------------------------------------------------------¦
¦ Bit 1 ¦ 1 =  An EC level message is present.                           ¦
+-------+----------------------------------------------------------------¦
¦ Bit 0 ¦ Reserved                                                       ¦
+------------------------------------------------------------------------+
```

5.14 *Store Loop Adapter Interrupt Flag Byte*

This table describes the bits of the store loop adapter interrupt flag
byte. This byte is updated by the software interrupt service routine when
a level 7 hardware interrupt occurs.

```
+------------------------------------------------------------------------+
¦ Table  5-8. Store Loop Adapter Interrupt Flag Byte                     ¦
+------------------------------------------------------------------------¦
¦ Bit   ¦ Definition                                                     ¦
+-------+----------------------------------------------------------------¦
¦ Bit 7 ¦ 1 =  The level 7 interrupt is not from the store loop adapter. ¦
+-------+----------------------------------------------------------------¦
¦ Bit 6 ¦ 1 =  An interrupt occurred when not expected (Bit 0 = 0).      ¦
+-------+----------------------------------------------------------------¦
¦ Bit 5 ¦ 1 =  More than one interrupt occurred when only one was        ¦
¦       ¦      expected (Bit 0 = 1).                                     ¦
+-------+----------------------------------------------------------------¦
¦ Bit 4 ¦ Not used, always zero (0).                                     ¦
+-------+----------------------------------------------------------------¦
¦ Bit 3 ¦ Not used, always zero (0).                                     ¦
+-------+----------------------------------------------------------------¦
¦ Bit 2 ¦ Not used, always zero (0).                                     ¦
+-------+----------------------------------------------------------------¦
¦ Bit 1 ¦ 1 =  A store loop adapter level 7 hardware interrupt has       ¦
¦       ¦      occurred.                                                 ¦
+-------+----------------------------------------------------------------¦
¦ Bit 0 ¦ 1 =  A store loop adapter level 7 hardware interrupt is        ¦
¦       ¦      expected.                                                 ¦
+------------------------------------------------------------------------+
```

A.0 Appendix A. Parts Catalog

Assembly 1: IBM 4684 Store Loop Adapter/A

PICTURE 14

Asm – Index	Part Number	Units	Description
1 – 1	92F5844	AR	Adapter card
– 2	6316840	AR	Adapter cable

Additional Service Aids

Part Number	Units	Description
96X4967	AR	Wrap plug

B.0 Appendix B. Warranty Information

Subtopics
B.1 International Business Machines Corporation   Armonk, New York 10504
B.2 STATEMENT OF LIMITED WARRANTY

Warranty Exhibit to IBM Statement of Limited Warranty

IBM 4684 Store Loop Adapter/A

If you purchased this Machine directly from International Business Machines Corporation (IBM) or another IBM organization under an agreement for purchase of IBM Machines, the warranty provisions therein shall prevail and this Warranty Exhibit and the IBM Statement of Limited Warranty (Z125-3744) shall not apply.

If you purchased this Machine from a Remarketer, the warranty service described in the IBM Statement of Limited Warranty is available only for Machines purchased and located in the United States or Puerto Rico.

If you purchased this Machine from a supplier authorized by an IBM organization to market this Machine in other than the United States or Puerto Rico, warranty information is available only from such supplier.

1. **Date of Installation (Warranty start date):**
   IBM, and IBM Remarketer or an IBM authorized supplier will supply the Date of Installation to you. The Warranty Period will commence on this Date.

2. **Warranty Duration:**
   Three months.

3. **Type of Service:**
   IBM On-Site Repair (IOR)

4. **Provider of Warranty Service:**
   IBM or Remarketer may provide warranty service for this Machine.

5. **Period of Warranty Service Availability:**
   Contact a Remarketer to determine the available periods of warranty service.

   Contact IBM for warranty service 24 hours a day, 7 days a week by calling 1-800-428-2569.

This Machine is a Customer Set-Up (CSU) Machine. You are responsible to set up this Machine in accordance with the instructions furnished by IBM.

You may be required to present proof of purchase for this Machine to IBM or a Remarketer to obtain warranty service.

If you have any questions about warranty service, contact a Remarketer for this Machine. You may also call IBM Direct at 1-800-IBM-2468.

```
+----------------------------------------------------------------------+
¦ International Business Machines          ¦    Armonk, New York, 10504 ¦
¦ Corporation                             ¦                            ¦
+----------------------------------------------------------------------+
```

B.2 STATEMENT OF LIMITED WARRANTY

**International Business Machines Corporation (IBM) gives you the following
limited warranty for this IBM Machine. IBM gives you this limited
warranty only if this Machine was originally purchased for use, and not
resale, from an IBM Authorized Dealer, IBM Authorized Industry Remarketer
or an IBM approved Reseller. The Dealer, Remarketer or Reseller must be
authorized or approved by IBM to market this Machine. The Warranty
Exhibit to this Statement identifies this Machine and specifies other
important information. This Machine will be subject to this Statement of
Limited Warranty only if purchased and located in the United States or
Puerto Rico.**

Subtopics
B.2.1 DEFINITIONS
B.2.2 LIMITED WARRANTIES
B.2.3 Service and Parts Warranty
B.2.4 Types of Service
B.2.5 Additional Provisions for Features and Model Conversions
B.2.6 Additional Provisions for Machine Elements and Accessories
B.2.7 Travel Expense
B.2.8 Services for Additional Charge During the Warranty Period
B.2.9 Other Warranty Provisions and Exclusions
B.2.10 LIMITATION OF REMEDIES

B.2.1 DEFINITIONS

The term "Remarketer" shall mean an IBM Authorized Dealer, IBM Authorized
Industry Remarketer or IBM approved Reseller for this Machine unless the
context requires individual reference.

The term "Machine" shall mean a machine and/or its features, model
conversions, machine elements and accessories unless the context requires
individual reference.

The term "failing machine" shall mean a machine or machine element
requiring warranty service as initially determined by you and, as
applicable, verified by IBM.

The term "exchange machine" shall mean a machine or machine element
provided to you by IBM under an Exchange Type of Service.

B.2.2 LIMITED WARRANTIES

A Machine subject to this Statement of Limited Warranty will be 1) newly
manufactured by or for IBM from new and serviceable used parts which are
equivalent to new in performance in the Machine, 2) assembled by or for
IBM from serviceable used parts, or 3) a Machine which has been previously
installed.

IBM warrants that on this Machine's Date of Installation it will be in
good working order and will conform to IBM's official published
specifications. IBM will make these specifications available to you upon
request.

The Warranty Period for this Machine commences on its Date of
Installation. The Warranty Period duration is specified in the Warranty
Exhibit. If the Warranty Period expires on a Friday or Saturday, IBM will
extend the Warranty Period so that its last day will be the following
Sunday.

IBM or a Remarketer will notify you of the Date of Installation. IBM
reserves the right to correct any error in such date.

B.2.3 Service and Parts Warranty

IBM agrees to provide the availability of warranty service for the
duration of the Warranty Period at no additional charge except as set
forth in this Statement. IBM will provide warranty service, as required,
by 1) repairing this machine, model upgrade or feature addition or 2)
exchanging the machine or machine element. IBM will render repair or
exchange under one of the Types of Service described in this Statement.
IBM will specify the specific Type of Service for this Machine during its
Warranty Period in the Warranty Exhibit. For certain Machines, IBM offers
a Warranty Option that provides an alternate method of obtaining warranty
service under another Type of Service. Any such Warranty Option is
available under the IBM Maintenance Agreement.

IBM shall have full, free and safe access to this Machine to provide
On-Site Types of Service. You shall promptly inform IBM of any change in
this Machine's location during its Warranty Period.

You are responsible to initially determine that the machine or machine
element requires warranty service. Before requesting such service, you
shall follow IBM's problem determination, problem analysis and service
request procedures.

You are responsible to remove and control funds contained in a Machine.
IBM will service a Machine containing funds only when you cannot open the
cash container. If so, you will remove the funds as soon as the container
is, or can be, opened.

IBM will render a Repair or Exchange Type of Service only when you present
a failing machine to IBM.

Under a Repair Type of Service, IBM will provide remedial maintenance to
restore the Machine to good working order. IBM may also provide
preventive maintenance based on the specific needs of the Machine as
determined by IBM. IBM may also lubricate, adjust and replace parts when
IBM considers it necessary. IBM will install parts, which may be used
parts, on an exchange basis. IBM will acquire title to the replaced
parts. You are responsible to remove or protect all programs, data and
removable storage media before IBM repairs the Machine.

Under an Exchange Type of Service, IBM will provide an exchange machine
which may not be new but will be in good working order. You will acquire
title to it at the time of exchange. IBM will acquire title to the failing
machine at the time of exchange. IBM reserves the right to verify that a
failing machine is acceptable for exchange. You are responsible to remove
all non-IBM parts, options, alterations and attachments before you
present a failing machine for exchange. You give up all rights to any such
items not removed. You will not present IBM a failing machine for
exchange which is defaced, altered, in need of a repair not included in
warranty service, or damaged beyond repair. IBM will inspect the failing
machine to determine if the failing machine is in such condition. If so,
IBM will nullify the exchange and each party will return to the other the
machine or machine element in its possession. You will ensure that a
failing machine is free of any encumbrances at the time you present it to
IBM under an Exchange Type of Service.

The Period of Warranty Service is 24 hours a day, 7 days a week for IBM
On-Site Types of Service. The Period of Warranty Service for all other
Types of Service is the normal business hours of the IBM designated
location.

If you request, and IBM provides, an On-Site Type of Service in place of
the Type of Service then in effect, you shall pay IBM's then generally
available charge for the service provided.

Warranty service does not assure uninterrupted operation of this Machine.

During the Warranty Period, IBM will control and install engineering
changes IBM determines to be applicable to this Machine. You may, by
providing notice subject to IBM's written confirmation, elect to have only
IBM designated mandatory engineering changes installed on this Machine.

B.2.4 Types of Service

IBM On-Site Repair (IOR): IBM will provide warranty service for the
failing machine at your location.

IBM On-Site Exchange (IOE): IBM will 1) deliver the exchange machine to
your location, 2) disconnect the failing machine, 3) connect the exchange
machine, 4) verify its operation, and 5) remove the failing machine from
your location.

Customer On-Site Exchange (COE): IBM will have an exchange machine
delivered to your location. You will 1) disconnect the failing machine
and prepare it for shipment to IBM, 2) connect the exchange machine, and
3) verify its operation. You will follow IBM's instructions regarding
shipment of the failing machine to IBM. IBM will pay the shipment
expense.

Customer Carry-In Repair (CCR): You will 1) deliver the failing machine
to an IBM designated location, 2) pick up the machine or machine element,
following any repairs, and take it to your location, 3) connect it, and 4)
verify its operation.

In place of such delivery and pickup, you may ship the failing machine,
prepaid, in the original shipping container, or equivalent, to an IBM
location designated to receive such shipment. Following any repairs, IBM
will ship the machine or machine element to your location, prepaid, within
the United States or Puerto Rico.

Customer Carry-In Exchange (CCE): You will 1) deliver the failing machine
to an IBM designated location, 2) pick up the exchange machine and take it
to your location, 3) connect it, and 4) verify its operation.

In place of such delivery and pickup, you may ship the failing machine,
prepaid, in the original shipping container, or equivalent, to an IBM
location designated to receive such shipment. Following receipt of the
failing machine, IBM will ship the exchange machine to your location,
prepaid, within the United States or Puerto Rico.

You are responsible for risk of loss of, or damage to, the Machine during
the period such Machine is in transit to and from IBM. However, IBM is
responsible for risk of loss of, or damage to, 1) IBM-owned Machines
and/or 2) a Machine owned by other than IBM while in IBM's possession or
in transit from IBM to you by an IBM-selected carrier whose charges IBM
prepays. In addition, IBM is responsible for loss or damage due to IBM's
negligence.

B.2.5 Additional Provisions for Features and Model Conversions

IBM's warranty for each feature addition or model upgrade requires that
the machine on which such addition or upgrade is installed meets certain
conditions. The machine must 1) be at a proper engineering-change level,
as IBM determines, 2) be the specific serial-numbered machine for which
you ordered such addition or upgrade, and 3) have been modified only with
changes obtained from IBM specifically for that serial-numbered machine.
If these conditions are not met, IBM will attempt to install a non-CSU
feature addition and/or model upgrade on the machine. If such attempt
results in a correctly functioning machine, this Statement will apply. If
such attempt results in an incorrectly functioning machine, upon your
request, IBM will remove the feature addition and/or model upgrade and
restore the machine to its prior condition. In such case, IBM will
invoice you IBM's generally available charges, including travel expenses.
If the feature addition or model upgrade did not involve the removal of
parts which became IBM's property, such feature addition or model upgrade
remains your property. If the feature addition or model upgrade involved
the removal of parts which became IBM's property, such feature addition or
model upgrade becomes IBM's property and the restored parts become your
property.

IBM will provide a three-month parts warranty for additional parts
supplied by IBM for a feature removal, model downgrade or reinstallation
of a previously purchased feature or model conversion.

B.2.6 Additional Provisions for Machine Elements and Accessories

A machine element, which you separately purchased, or an accessory has a
three-month Warranty Period unless IBM specifies a longer duration.
During the Warranty Period, you will remove any such machine element or
accessory which fails in normal use. You will then ship it, prepaid, to
the IBM location designated to receive such shipment. IBM will repair or
replace, at its option, such machine element or accessory. IBM's shipment
to you will be prepaid within the United States or Puerto Rico.

B.2.7 Travel Expense

There will be no additional charge for travel expense associated with
warranty service except when the site at which the Machine is located is
inaccessible to the IBM service representative by both private automobile
and scheduled public transportation.

B.2.8 Services for Additional Charge During the Warranty Period

Warranty service does not include repair of certain Machine failures.
These failures are those which are caused by an unsuitable environment,
accident, disaster, transportation, vandalism, misuse, abuse, another
product or device not under IBM warranty or IBM agreement service, non-IBM
modification, or service of the Machine by other than IBM. In addition,
warranty service does not include inspection of the Machine, including
inspection of an altered Machine, or repair of damage caused by use of,
inadequate use of, or failure to use, supplies. If service not included
in warranty service is available, and IBM provides such service, it will
be provided for an additional charge. IBM shall determine such charge by
using IBM's 1) then generally available hourly service rates and minimum
charges for service time, including travel and waiting time, 2) parts and
material prices then generally in effect, and 3) charges for travel and
shipping expense, all as applicable.

B.2.9 Other Warranty Provisions and Exclusions

This limited warranty does not include any service which is impractical
for IBM to render because of alterations in, or attachments to, this
Machine. IBM will replace a part not provided by IBM for this Machine
only with a directly interchangeable IBM part. If so, IBM will charge you
as described in the preceding paragraph. IBM will not replace any part
which is included in an alteration.

If you transfer this Machine to another user, IBM will provide the
availability of warranty service under this Statement to that user. Such
warranty service will be available for the remainder of the Warranty
Period. Therefore, you should transfer the proof of purchase and this
Statement to that user.

**THE FOREGOING WARRANTIES ARE IN LIEU OF ALL OTHER WARRANTIES, EXPRESS OR
IMPLIED, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF
MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE.**

B.2.10 LIMITATION OF REMEDIES

Your sole remedy under this Statement of Limited Warranty is set forth in
this Section. For any claim concerning performance or nonperformance by
IBM, an IBM Authorized Dealer, or an IBM Authorized Industry Remarketer
for this Machine under this Statement of Limited Warranty, you may recover
actual damages up to the limit set forth in the following paragraph.

The limit of IBM's liability for actual damages to you for an individual
event based on any cause whatsoever shall be the greater of 1) $100,000 or
2) the amount you paid for the Machine which caused the damages. This
limitation of liability will not apply to claims for personal injury or
damage to real property or tangible personal property caused by IBM's
negligence. In no event will IBM be liable to you for any damages caused
by your failure to fulfill your responsibilities under this Statement of
Limited Warranty. In no event will IBM be liable for any lost profits,
lost savings, incidental damages, or other consequential damages. This is
true even if you advised IBM or a Remarketer of the possibility of such
damages. IBM is not liable for any claim by you based on any third party
claim.