*FRONT*

PICTURE 1

September 30, 1992

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**Safety Information**

Refer to the *Hardware Maintenance Reference General Information* pamphlet in this manual for the following information:

- General Safety
- Electrical Safety

**First Edition (September 1992)**

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*1.0 Product Description*

The IBM (*) 3550 Expansion Unit Model 001 (hereafter referred to as the expansion unit) expands the capability of the IBM Personal System/2* N51 SLC notebook computer (hereafter referred to as the *computer*), using the IBM Micro Channel (*) architecture. Features include:

- Security:
  - Security lock
  - Security hook
- System board
  - Two full-size Micro Channel 16-bit slots
  - Serial connector
  - Parallel connector
  - Small computer system interface (SCSI) controller with an internal and external connector
  - Keyboard or numeric keypad connector
  - Mouse or pointing device connector
- External display connector
- 98-watt power supply, automatically switchable to 100 - 125 V ac or 200 - 240 V ac, 50 or 60 Hz

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Subtopics
1.1 Security
1.2 System Board
1.3 External Display Connector
1.4 Power Supply
1.5 Testing Programs and System Utilities

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*1.1 Security*

The expansion unit has two features to secure it from unauthorized persons from using the expansion unit.

Subtopics
1.1.1 Security Lock
1.1.2 Security Hook

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*1.1.1 Security Lock*

The security lock is located on the left side of the expansion unit's front panel, and can be unlocked with a user's key. This security lock provides the following protections:

- **Cover Lock** to prevent unauthorized access to the devices and options inside the expansion unit.

- **Key Controlled Power** to prevent unauthorized operation on the expansion unit and unauthorized access to the data stored on the internal SCSI device through the external SCSI connector.

The key lock has three positions.

PICTURE 2

- Extreme Right Position ( PICTURE 3 )

  - Locks Main Cover
  - Locks Stopper
  - Enables Expansion Unit Power

- Middle Position ( PICTURE 4 )

  - Unlocks Main Cover
  - Unlocks Stopper
  - Enables Expansion Unit Power

- Extreme Left Position ( PICTURE 5 )

  - Locks Main Cover
  - Locks Stopper
  - Disables Expansion Unit Power

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### *1.1.2 Security Hook*

A hook for a security cable is located on the rear of the expansion unit.

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*1.2 System Board*

The major features of the system board are:

- Two full-size Micro Channel 16-bit slots
- Serial connector
- Parallel connector
- SCSI device controller
- Keyboard or numeric keypad connector
- Mouse or pointing device connector

Subtopics
1.2.1 Serial Connector
1.2.2 Parallel Connector
1.2.3 SCSI Device Controller
1.2.4 Keyboard or Numeric Keypad Connector
1.2.5 Mouse or Pointing Device Connector

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### *1.2.1 Serial Connector*

This connector is a fully programmable serial connector that supports asynchronous communications. The 9-pin, D-shell connector provides the signals to drive a serial (or EIA-232D) device. The connected device is identified by the system configuration as either SERIAL 1 (primary) or SERIAL 2 (alternate) address.

**Note:** Conflicts occur when using multiple devices if two or more devices have the same address. Use the system programs stored on the system hard disk drive and verify that no ports have the same address (see the instructions supplied with your computer).

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### *1.2.2 Parallel Connector*

The parallel connector allows the attachment of devices that accept 8 bits of parallel data at standard transistor-transistor logic (TTL) levels. The port has a 25-pin, D-shell connector and is designed primarily for printers. However, the connector can be used as a general input/output port for any device or application that matches its input/output capabilities. The expansion unit can support four different devices, each addressed separately as PARALLEL 1, PARALLEL 2, PARALLEL 3, or PARALLEL 4.

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### *1.2.3 SCSI Device Controller*

The SCSI device controller is an interface that transfers system data to and from SCSI devices. The SCSI controller has two connectors: a 50-pin, internal device connector that allows the attachment of an internal SCSI device, and a 60-pin, external device connector that allows the attachment of external SCSI devices. A total of seven SCSI devices are supported.

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### *1.2.4 Keyboard or Numeric Keypad Connector*

The 6-pin connector on the rear of the expansion unit allows the attachment of a keyboard or numeric keypad. The keyboard or numeric keypad connector is marked with a small keyboard symbol.

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### *1.2.5 Mouse or Pointing Device Connector*

The 6-pin connector on the rear of the expansion unit is for a pointing device (mouse). The mouse or pointing device connector is marked with a small mouse symbol.

**Note:** A mouse or pointing device will not work if either is connected to the mouse connector of the numeric keypad.

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*1.3 External Display Connector*

The external display connector is used to mechanically extend the signal line of the system display connector. Color and monochrome analog direct-drive displays which are supported by the system can be attached to this connector.

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*1.4 Power Supply*

The power supply can switch to either the 100 - 125 V ac or the 200 - 240 V ac range automatically when the power cord is plugged into an power outlet. The power supply converts ac to dc that supply the expansion unit and computer with the proper operating voltages.

When the expansion unit is turned off and then turned on, the power supply generates a 'power good' signal that resets the system logic. The presence of the 'power good' signal indicates that the power supply is operating properly.

The 'power good' signal turns on the green power-good light on the front of the expansion unit, indicating that all system-board power requirements have been met.

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*1.5 Testing Programs and System Utilities*

The expansion unit requires the computer to perform the power-on self test (POST) and diagnostic programs. If the Reference Diskette supplied with the expansion unit is an updated version than the one supplied with your Personal System/2 N51 SLC computer, the system partition of the computer must be updated with this new Reference Diskette supplied with the expansion unit.

To update the system partition, do the following:

1. Start the computer with the Reference Diskette supplied with the expansion unit.
2. Select **Backup/Restore system programs** from the Main Menu.
3. Select **Restore the system partition** to update the programs on the system partition and follow the instructions on the screen.

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*2.0 Option Compatibility*

The expansion unit supports several options that are designed for IBM Personal System/2 Micro Channel computers. Most of these options are listed in the parts section of the *Hardware Maintenance Service* pamphlet.

Subtopics
2.1 SCSI Devices
2.2 Terminators

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*2.1 SCSI Devices*

The SCSI controller on the system board supports up to seven SCSI devices. One of these devices can be installed inside the expansion unit.

**Note:** The total length of all SCSI cables attached to a SCSI controller can not exceed 6 m (19.7 ft.). Configurations that exceed this maximum length are not supported. The total length includes all internal and external SCSI cables. The expansion unit internal SCSI cable lenth is 0.4 m (1.3 ft.).

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*2.2 Terminators*

Terminator requirements for SCSI devices:

- The last device in an external SCSI chain must have the terminator installed. Some devices might require more than one terminator.
- All other SCSI devices must have the terminators removed.
- The internal SCSI device must have the terminator removed.

The location and appearance of the terminators may vary from device to device. An identification label or tag (usually "T-RES") is attached to each terminator for easy identification on SCSI devices.

**Note:** The expansion unit features active terminators to terminate the external SCSI connector automatically. The terminators on the system board of the expansion unit do not require installation or removal.

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*3.0 Specifications*

**Size**

- Width: 330 mm (13 in.)
- Depth: 410 mm (16.1 in.)
- Height:
  - Without the display stand: 117 mm (4.6 in.)
  - With the display stand: 142 mm (5.6 in.)

**Weight**

- Without the display stand: 7.2 kg (15.9 lb.)
- With the display stand: 8.9 kg (19.6 lb.)

**Environmente**

- Temperature:
  - Power on: 10.0° to 35.0°C (50.0° to 95.0°F)
  - Power off: 10.0° to 43.0°C (50.0° to 110.0°F)
- Humidity:
  - Power on: 8% to 80%
  - Power off: 8% to 80%
- Maximum altitude: 2133 m (7000 ft.)

**Heat output**

Base configuration: 134 British Thermal Units (BTUs) per hour
Maximum configuration: 495 BTUs/hr

**Electrical**

- Input Voltage - Sinewave input (50 or 60 Hz)
  - Low Range:
    - Minimum: 100 V ac
    - Maximum: 125 V ac
  - High Range:
    - Minimum: 200 V ac
    - Maximum: 240 V ac
- Input kilovolt-amperes (k·VA) (approximately)
  - Configuration as shipped from IBM: 0.069 k·VA
  - Maximum configuration: 0.22 k·VA

**Others**

- The display stand can hold up to 19 kg (41.9 lb.).

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*4.0 Special Tools*

The following special tools are required to service the expansion unit.

**Volt-Ohm Meter**

A meter similar to the Triplet Model 310 (1).

**Screwdriver Kit**

Use small screwdrivers (IBM part 95F3598) when removing and replacing FRUs.

**Wrap Plug**

The tri-connector wrap plug (IBM part 72X8546) is used during advanced diagnostic tests of:

- Serial Connectors
- Parallel Connectors

PICTURE 6

(1) Manufactured by Triplett Corporation, Bluffton, Ohio 45817, U.S.A.

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*5.0 Removals and Replacements*

This section contains information on removals and replacements, and locations.

- The arrows in the removals and replacements show the direction of movement to remove a field replaceable unit (FRU), or to turn a screw to release the FRU. The arrows are marked in numeric order to show the correct sequence of removal.

- When other FRUs must be removed before removing the failing FRU, they are listed at the top of the page. Go to the removal procedure for each FRU listed, remove the FRU, and then continue with the removal of the failing FRU.

- To replace a FRU, reverse the removal procedure and follow any notes that pertain to replacement. See "Locations" for internal cable connections and arrangement information.

CAUTION:
Before removing any FRU, turn off the expansion unit, remove the computer, unplug all power cords from electrical outlets, then disconnect any interconnecting cables.

CAUTION:
In the U.K., by law, the telephone cable must be connected after or disconnected before the power cord.

Warning: The system board-main, adapters, and circuit boards on the drives are sensitive to, and can be damaged by, electrostatic discharge. Establish personal grounding by touching a ground point with one hand before touching these units.

**Note:** An electrostatic discharge (ESD) strap can be used to establish personal grounding.

Subtopics


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*5.1 1010 Display Stand*

PICTURE 7

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*5.2 1020 Main Cover*

- Display Stand **(1010)**

PICTURE 8

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*5.3 1030 System Board-Main*

- Display Stand **(1010)**
- Main Cover **(1020)**

PICTURE 9

PICTURE 10

**Note:**

- When replacing the system board-main, connect the system board-sub connector A by pressing it down firmly until both edges of the connector snap into place.
- When the system board-main is removed from the system board-sub connector A or a new system board is installed, be sure to set the system configuration data by running automatic configuration.

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*5.4 1040 Option Adapters*

- Display Stand **(1010)**
- Main Cover **(1020)**

PICTURE 11

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*5.5 1050 System Board-Sub*

- Display Stand **(1010)**
- Main Cover **(1020)**
- System Board-Main **(1030)**
- Option Adapters **(1040)**

PICTURE 12

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*5.6 1060 Power Supply*

- Display Stand **(1010)**
- Main Cover **(1020)**

PICTURE 13

**1060 Power Supply (continued)**

PICTURE 14

**1060 Power Supply (continued)**

PICTURE 15

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*5.7 1070 Backup Battery*

CAUTION:
The backup battery is a lithium battery and presents a fire, explosion, or sever burn risk. Do not recharge it, remove its polarized connector, disassemble it, heat it above 100°C (212°F), incinerate it, or expose its cell contents to water. Dispose of the battery as required by local ordinances or regulations. When replacing the backup battery, use only Part No. 49G2661. Use of another battery could result in ignition or explosion of the battery. Replacement batteries can be ordered from IBM or IBM Authorized Dealers.

- Display Stand **(1010)**
- Main Cover **(1020)**
- Option Adapters **(1040)**

PICTURE 16

- Be sure to set the system configuration data by running automatic configuration.

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*5.8 1080 Wire Assembly*

- Display Stand **(1010)**
- Main Cover **(1020)**
- Option Adapters **(1040)**

PICTURE 17

PICTURE 18

**Note:** When replacing the wire assembly, make sure:

- The microswitch is positioned so that the screw hole A is on the right side. If the position of this switch is incorrect, the security lock will not work properly.

  PICTURE 19

- The tabs on the power switch are placed over the opening of the base frame, before the screw is tightened.

  PICTURE 20

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*5.9 1090 Docking Frame*

- Display Stand **(1010)**
- Main Cover **(1020)**
- System Board-Main **(1030)**

PICTURE 21

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*5.10 1100 SCSI Storage Device*

- Display Stand **(1010)**
- Main Cover **(1020)**

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*6.0 Locations*

Subtopics


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*6.1 Front View*

1 120-pin Connector
2 Power Control Switch Actuator
3 15-pin Connector
4 Release Lever
5 Power Switch
6 Internal Storage Device Location
7 Stopper
8 Status Indicators
9 Security Lock
10 Identification Label

PICTURE 23

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*6.2 Rear View*

1 External Display Connector
2 External SCSI Connector
3 9-Pin Serial Connector
4 Security Hook
5 25-Pin Parallel Connector
6 Mouse or Pointing Device Connector
7 Keyboard or Numeric Keypad Connector
8 Expansion Slots
9 Power-Cord Connector

PICTURE 24

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*6.3 Interior View*

1 Display Stand
2 Main Cover
3 System Board-Main
4 Docking Frame
5 Power Supply
6 Base Frame
7 System Board-Sub
8 Backup Battery
9 Wire Assembly

PICTURE 25

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*6.4 System Status Indicators*

**Note:** The indicators on the expansion unit that are not listed are not used.

1 Diskette Drive In-Use
2 Hard Disk Drive In-Use
3 Power

PICTURE 26

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*6.5 System Board-Main*

| Key | Connector |
|---|---|
| 1 | External SCSI Connector |
| 2 | Serial Connector |
| 3 | Parallel Connector |
| 4 | Mouse or Pointing Device Connector |
| 5 | Keyboard or Numeric Keypad Connecter |
| 6 | 120-Pin Connector |
| 7 | System Board-Sub Connector |
| 8 | Power Supply Connectors |
| 9 | Internal SCSI Cable Connector |

PICTURE 27

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*6.6 System Board-Sub*

| Key | Connector |
|---|---|
| 1 | System Board-Main Interface |
| 2 | Wire Assembly Connector |
| 3 | Backup Battery |
| 4 | 16-bit Expansion Slots |

PICTURE 28

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