



**Hardware Maintenance Service
for Service Level A**

Machine Type 2284

**Personal
Computer**

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Voltage Supply Switch Settings

Your IBM Personal Computer might have voltage switches, which must be set correctly for your voltage supply. If your monitor or system unit has a voltage switch, complete these steps to make sure each switch is set correctly:

1. Determine the correct voltage switch setting for your area:

Voltage Supply Range	Voltage Switch Setting
100-127 V	115 V
200-240 V	230 V

2. Locate the voltage switch on the back of your monitor or system unit. If the setting shown on the switch is:
 - Correct: start setting up your IBM computer.
 - Incorrect: change the voltage switch setting.

Safety Information



DANGER

To avoid a shock hazard, do not connect or disconnect any cables or perform installation, maintenance, or reconfiguration of this product during an electrical storm.

To avoid shock hazard:

- The power cord must be connected to a properly wired and earthed receptacle.
- Any equipment to which this product will be attached must also be connected to properly wired receptacles.

When possible, use one hand to connect or disconnect signal cables to prevent a possible shock from touching two surfaces with different electrical potentials.

Electrical current from power, telephone, and communications cables is hazardous. To avoid shock hazard, connect and disconnect cables as described following when installing, moving, or opening covers of this product or attached devices.

To Connect	To Disconnect
1. Turn Everything OFF.	1. Turn Everything OFF.
2. First, attach all cables to devices.	2. First, remove power cord(s) from outlet.
3. Attach signal cables to receptacles.	3. Remove signal cables from receptacles.
4. Attach power cord(s) to outlet.	4. Remove all cables from devices.
5. Turn device ON	

IMPORTANT:

When replacing the battery, use only IBM Part Number 33F8354 or an equivalent type battery recommended by the manufacturer. If your system has a module containing a lithium battery, replace it only with the same module type made by the same manufacturer. The

battery contains lithium and can explode if not properly used, handled, or disposed of.

Do not:

- Throw or immerse into water
- Heat to more than 100°C (212°F)
- Repair or disassemble

Dispose the battery as required by local ordinances or regulations.



IMPORTANT:

When a CD-ROM drive is installed, note the following.

Use of controls or adjustments or performance of procedures other than those specified herein might result in hazardous radiation exposure.

Removing the covers of the CD-ROM drive could result in exposure to hazardous laser radiation. There are no serviceable parts inside the CD-ROM drive. Do not remove the CD-ROM drive covers.

DANGER

Some CD-ROM drives contain an embedded Class 3A or Class 3B laser diode. Note the following.

Laser radiation when open. Do not stare into the beam, do not view directly with optical instruments, and avoid direct exposure to the beam.



IMPORTANT:

Electrical current from power, telephone, and communication cables can be hazardous. To avoid personal injury or equipment damage, disconnect the attached power cords, telecommunications systems, networks, and modems before you open the server covers, unless instructed otherwise in the installation and configuration procedures.



PERIGO:

Para evitar choques elétricos, não conecte ou desconecte nenhum cabo, nem efetue instalação, manutenção ou reconfiguração deste produto durante uma tempestade com raios.

Para evitar choques elétricos:

- O cabo de alimentação deve ser conectado a um receptáculo corretamente instalado e aterrado.
- Todos os equipamentos aos quais este produto será conectado devem também ser conectados a receptáculos corretamente instalados.

Quando possível, utilize uma das mãos para conectar ou desconectar cabos de sinal, para evitar um possível choque ao tocar duas superfícies com potenciais elétricos diferentes.

A corrente elétrica proveniente de cabos de alimentação, de telefone e de comunicação é perigosa. Para evitar choques elétricos, conecte e desconecte os cabos conforme descrito a seguir, ao instalar, movimentar ou abrir tampas deste produto ou de dispositivos conectados.

Para Conectar	Para Desconectar
1. DESLIGUE tudo.	1. DESLIGUE tudo.
2. Conecte primeiro todos os cabos nos dispositivos.	2. Remova primeiro o(s) cabo(s) de alimentação das tomadas.
3. Conecte os cabos de sinal nos receptáculos.	3. Remova os cabos de sinal dos receptáculos.
4. Conecte o(s) cabo(s) de alimentação nas tomadas.	4. Remova todos os cabos dos dispositivos
5. LIGUE o dispositivo	

**CUIDADO:**

Ao substituir a bateria, utilize apenas o Número de Peça IBM 33F8354 ou um tipo de bateria equivalente recomendado pelo fabricante. Se seu sistema possuir um módulo com uma bateria de lítio, substitua-o apenas pelo mesmo tipo de módulo, produzido pelo mesmo fabricante. A bateria contém lítio e pode explodir se não for utilizada, manuseada e descartada de forma adequada.

Não:

- Jogue ou coloque na água
- Aqueça a mais de 100°C (212°F)
- Conserte nem desmonte.

Descarte a bateria conforme requerido pelas disposições e regulamentações locais.

**CUIDADO:**

Quando uma unidade de CD-ROM estiver instalada, observe o seguinte.

A utilização de controles ou ajustes ou a execução de procedimentos diferentes daqueles especificados nesta publicação pode resultar em exposição perigosa à radiação.

A remoção das tampas da unidade de CD-ROM pode resultar em exposição a radiação perigosa de laser. Não existem peças que possam ser consertadas no interior da unidade de CD-ROM. Não remova as tampas da unidade de CD-ROM.

PERIGO:

Algumas unidades de CD-ROM contém um diodo de laser da Classe 3A ou da Classe 3B. Observe o seguinte.

Radiação de laser quando aberto. Não olhe diretamente para o feixe de laser, não olhe

diretamente com instrumentos óticos, e evite exposição direta ao raio.



CUIDADO:

A corrente elétrica proveniente de cabos de alimentação, de telefone e de comunicação é perigosa. Para evitar ferimentos pessoais ou danos aos equipamentos, desconecte os cabos de alimentação, sistemas de telecomunicação, redes e modems antes de abrir as tampas do servidor, a menos que receba outras instruções nos procedimentos de instalação e configuração.

声明 10



注意！

电源线、电话线以及通信电缆中的电流非常危险。为避免人身伤害或设备损坏，除非在安装和配置过程中特别指明，请在打开服务器外盖前断开已连接的全部电源线、电信系统、网络及调制解调器。

声明 1



危险！

为避免电击危险，请不要在暴风雨期间连接或断开任何电缆，或是进行此产品的安装、维护或重新配置操作。

为避免电击危险：

- 电源线必须连接到适当的电线及接地插座。
- 此产品将要连接的所有设备也必须连接到正确接线的插座上。

如果可能，请使用一只手连接或断开连接信号电缆，以避免在接触两个具有不同电势的表面时遭到电击。

电源线、电话线以及通信电缆中的电流非常危险。为避免电击，请在安装、移动或打开本产品或连接设备的外盖时，按照下述步骤连接或断开电缆。

要连接电缆

1. 关闭所有设备。
2. 首先将所有电缆与设备连接。
3. 将信号线连接到插座。
4. 将电源线连接到电源插座。
5. 打开设备。

要断开电缆

1. 关闭所有设备。
2. 首先从电源插座拔下电源线。
3. 从插座拔下信号电缆。
4. 从设备上拔下所有电缆。

声明 2



注意！

当更换电池时，仅可使用 IBM 部件号为 33F8354 的产品或由制造商推荐的同等电池。如果系统中有包含锂电池的模块，则只能使用由相同制造商制造的相同类型模块更换。该电池含有锂，如果使用、操作或处理不当会发生爆炸。

不要：

- 将其投入或浸于水中
- 加热超过100°C (212°F)
- 修理或拆卸

应按照当地法规和条例对此电池进行处理。

声明 3



注意！

在已安装 CD-ROM 驱动器的情况下，请注意下面的内容。

不遵循此处指定的控制、调整、或操作过程的操作将可能导致危险的辐射泄漏。

取下 CD-ROM 驱动器的外盖会导致危险的激光辐射泄漏。CD-ROM 驱动器内没有可以使用的部件。请不要取下 CD-ROM 驱动器的外盖。

声明 4

危险！

一些 CD-ROM 驱动器中包含内置的 3A 类或 3B 类激光二极管。
请注意下述内容。

打开驱动器会产生激光辐射。请不要凝视激光束，请不要使用光学仪器直接观看激光束，同时也要避免人体直接暴露在激光束下。

• 聲明 10



注意：
電源、電話及通信電纜上均有電流通。在安裝及架構之時，若非專家指導，為了避免人員受傷、設備受損，在開啓伺服器蓋子之前，請切斷電源線、電信系統、網路及數據機。

• 聲明 1



危險

為了避免雷擊，在閃電期間，請勿連接或拔掉本裝置上的任何電纜線，或請勿安裝、維修或重新架構本產品。

為了避免雷擊：

- 電源線必須連接到接線及接地正確的插座。
- 本產品所連接的設備也必須連接到接線正確的插座。

儘可能使用單手來連接或拔掉信號電纜，以避免因接觸兩不同電位的平面，而受到電擊。

電源、電話及通信電纜上均有電流通。為了避免電擊，在安裝、移動本產品，或開啓本產品的蓋子或與本產品連接之裝置的蓋子時，請依照下列「連接」及「拔掉」電纜線的步驟操作。

連接

1. 關掉所有開關。
2. 首先，將所有電纜線連接到裝置。
3. 將信號電纜連接到信號插座。
4. 將電源線連接到電源插座。
5. 開啓裝置電源。

拔掉

1. 關掉所有開關。
2. 首先，自電源插座拔掉電源線。
3. 拔掉信號插座上的所有信號電纜。
4. 拔掉裝置上的所有電纜線。

• 聲明 2



注意：

更換電池時，只可使用 IBM 零件編號 33F8354 的電池，或廠商建議的相當類型的電池。如您系統中的模組含有鋰電池，更換時，請使用相同廠商製造的相同模組類型。如未正常使用、處理或捨棄含有鋰的電池時，可能會造成爆炸。

嚴禁：

- 丟入或浸入水中
- 加熱超過攝氏100度（華氏 212 度）
- 修補或拆解

處理廢棄電池時，請遵照當地法令規章處理。

• 聲明 3



注意：

安裝光碟機時，請注意下列事項：

不依此處所指示的控制、調整或處理步驟，恐有遭致輻射之虞。

移開光碟機蓋子，恐有遭致雷射輻射之虞。光碟機中沒有需要維修的部分。請勿移開光碟機的蓋子。

• 聲明 4



危險

光碟機含有內嵌式 Class 3A 或 Class 3B 雷射二極體時，請注意下列事項：

開啓時會產生雷射輻射。請勿凝視光束，不要使用光學儀器直接觀察，且應避免直接暴露在光束下。



PERIGO:

Pour éviter tout risque de choc électrique, ne manipulez aucun câble et n'effectuez aucune opération d'installation, d'entretien ou de reconfiguration de ce produit au cours d'un orage.

Pour éviter tout risque de choc électrique :

- Les cordons d'alimentation du présent produit et de tous les appareils qui lui sont connectés doivent être branchés sur des socles de prise de courant correctement câblés et mis à la terre.

Afin d'éviter tout risque de choc électrique provenant d'une différence de potentiel de terre, n'utilisez qu'une main, lorsque cela est possible, pour connecter ou déconnecter les cordons d'interface.

Le courant électrique passant dans les câbles de communication, ou les cordons téléphoniques et d'alimentation peut être dangereux. Pour éviter tout risque de choc électrique, lorsque vous installez ou que vous déplacez le présent produit ou des périphériques qui lui sont raccordés, reportez-vous aux instructions ci-dessous pour connecter et déconnecter les différents cordons.

Connexion	Déconnexion
1. Mettez les unités hors tension.	1. Mettez les unités hors tension.
2. Commencez par brancher tous les cordons sur les unités.	2. Commencez pas débrancher les cordons alimentation des socles de prise de courant.
3. Branchez les câbles d'interface sur les prises.	3. Débranchez les câbles d'interface des prises.
4. Branchez les cordons d'alimentation sur un socle de prise de courant.	4. Débranchez tous les câbles des unités.
5. Mettez les unités sous tension.	

**ATTENTION:**

Remplacez la pile usagée par une pile de référence identique exclusivement - voir la référence IBM - ou par une pile équivalente recommandée par le fabricant. Si votre système est doté d'un module contenant une pile au lithium, vous devez le remplacer uniquement par un module identique, produit par le même fabricant. La pile contient du lithium et présente donc un risque d'explosion en cas de mauvaise manipulation ou utilisation.

- Ne la jetez pas à l'eau.
- Ne l'exposez pas à une température supérieure à 100°C.
- Ne cherchez pas à la réparer ou à la démonter.

Pour la mise au rebut, reportez-vous à la réglementation en vigueur.

**ATTENTION:**

Si une unité de CD-ROM est installée, prenez connaissance des informations suivantes :

Pour éviter tout risque d'exposition au rayon laser, respectez les consignes de réglage et d'utilisation des commandes, ainsi que les procédures décrites dans le présent document.

Pour éviter une exposition directe au rayon laser, n'ouvrez pas l'unité de CD-ROM. Vous ne pouvez effectuer aucune opération de maintenance à l'intérieur.

PERIGO:

Certaines unités de CD-ROM contiennent une diode laser de classe 3A ou 3B. Prenez connaissance des informations suivantes :

Rayonnement laser lorsque le carter est ouvert.
Évitez de regarder fixement le faisceau ou de

l'observer à l'aide d'instruments optiques. Évitez une exposition directe au rayon.



ATTENTION:

Le courant électrique circulant dans les câbles de communication et les cordons téléphoniques et d'alimentation peut être dangereux. Pour votre sécurité et celle de l'équipement, avant de retirer les carters du serveur, mettez celui-ci hors tension et déconnectez ses cordons d'alimentation, ainsi que les câbles qui le relie aux réseaux, aux systèmes de télécommunication et aux modems (sauf instruction contraire mentionnée dans les procédures d'installation et de configuration)

.



VORSICHT:

Aus Sicherheitsgründen bei Gewitter an diese Gerät keine Kabel anschließen oder lösen. Ferner keine Installations-, Wartungs- oder Rekonfigurationsarbeiten durchführen.

Aus Sicherheitsgründen:

- Gerät nur an eine Schutzkontaktsteckdose mit ordnungsgemäß geerdetem Schutzkontakt anschließen.
- Alle angeschlossenen Geräte ebenfalls an Schutzkontaktsteckdosen mit ordnungsgemäß geerdetem Schutzkontakt anschließen.

Signalkabel möglichst einhändig anschließen oder lösen, um einen Stromschlag durch Berühren von Oberflächen mit unterschiedlichem elektrischem Potential zu vermeiden.

Elektrische Spannungen von Netz-, Telefon- und Datenübertragungsleitungen sind gefährlich. Um einen Stromschlag zu vermeiden, nur nach den Anweisungen arbeiten, die für Installation, Transport oder Öffnen von Gehäusen dieses Produkts oder angeschlossenen Einheiten gelten.

Kabel anschließen	Kabel lösen
1. Alle Geräte ausschalten und Netzstecker ziehen.	1. Alle Geräte ausschalten.
2. Zuerst alle Kabel an Einheiten anschließen.	2. Zuerst Netzstecker von Steckdose lösen.
3. Signalkabel an Anschlußbuchsen anschließen.	3. Signalkabel von Anschlußbuchsen lösen.
4. Netzstecker an Steckdose anschließen.	4. Alle Kabel von Einheiten lösen.
5. Gerät einschalten.	

**ACHTUNG:**

Eine verbrauchte Batterie nur durch eine Batterie mit der IBM Teilenummer 33F8354 oder durch eine vom Hersteller empfohlene Batterie ersetzen. Wenn Ihr System ein Modul mit einer Lithium-Batterie enthält, ersetzen Sie es immer mit dem selben Modultyp vom selben Hersteller. Die Batterie enthält Lithium und kann bei unsachgemäßer Verwendung, Handhabung oder Entsorgung explodieren.

Die Batterie nicht

- mit Wasser in Berührung bringen.
- über 100 C erhitzen.
- reparieren oder zerlegen.

Die örtlichen Bestimmungen für die Entsorgung von Sondermüll beachten.

**ACHTUNG:**

Wenn ein CD-ROM-Laufwerk installiert ist, beachten Sie folgendes. Steuer- und Einstellelemente sowie Verfahren nur entsprechend den Anweisungen im vorliegenden Handbuch einsetzen. Andernfalls kann gefährliche Laserstrahlung auftreten.

Das Entfernen der Abdeckungen des CD-ROM-Laufwerks kann zu gefährlicher Laserstrahlung führen. Es befinden sich keine Teile innerhalb des CD-ROM-Laufwerks, die vom Benutzer gewartet werden müssen. Die Verkleidung des CD-ROM-Laufwerks nicht öffnen.

VORSICHT:

Manche CD-ROM-Laufwerke enthalten eine eingebaute Laserdiode der Klasse 3A oder 3B. Die nachfolgend aufgeführten Punkte beachten.

Laserstrahlung bei geöffneter Tür. Niemals direkt in den Laserstrahl sehen, nicht direkt mit optischen

Instrumenten betrachten und den Strahlungsbereich meiden.



ACHTUNG:

An Netz-, Telefon- und Datenleitungen können gefährliche elektrische Spannungen anliegen. Um eine Gefährdung des Benutzers oder Beschädigung des Geräts zu vermeiden, ist der Server auszuschalten. Die Verbindung zu den angeschlossenen Netzkabeln, Telekommunikationssystemen, Netzwerken und Modems ist vor dem Öffnen des Servergehäuses zu unterbrechen (sofern in Installations- und Konfigurationsanweisungen nicht anders angegeben)



PERICOLO:

Per evitare il pericolo di scosse elettriche durante i temporali, non collegare o scollegare cavi, non effettuare l'installazione, la manutenzione o la riconfigurazione di questo prodotto.

Per evitare il pericolo di scosse elettriche:

- collegare il cavo di alimentazione ad una presa elettrica correttamente cablata e munita di terra di sicurezza;
- collegare qualsiasi apparecchiatura collegata a questo prodotto ad una presa elettrica correttamente cablata e munita di terra di sicurezza.

Quando possibile, collegare o scollegare i cavi di segnale con una sola mano per evitare il rischio di scosse derivanti dal contatto con due superfici a diverso potenziale elettrico.

La corrente elettrica circolante nei cavi di alimentazione, del telefono e di segnale è pericolosa. Per evitare scosse elettriche, collegare e scollegare

icavi come descritto quando si effettuano l'installazione, la rimozione o l'apertura dei coperchi di questo prodotto o durante il collegamento delle unità.

Per collegare	Per scollegare
1.SPEGNERE tutti i dispositivi.	1.SPEGNERE tutti i dispositivi.
2.Collegare prima tutti I cavi alle unità.	2.Rimuovere prima il(i) cavo(i) di alimentazione dalla presa elettrica.
3.Collegare i cavi di segnale alle prese.	3.Rimuovere i cavi di segnale dalle prese.
4.Collegare il(i) cavo(i) di alimentazione alla presa elettrica.	4.Rimuovere tutti i cavi dalle unità.
5.ACCENDERE le unità.	



ATTENZIONE:

Quando si sostituisce la batteria, utilizzare solo una batteria IBM o batterie dello stesso tipo o di tipo equivalente consigliate dal produttore. Se il sistema di cui si dispone è provvisto di un modulo contenente una batteria al litio, sostituire tale batteria solo con un tipo di modulo uguale a quello fornito dal produttore. La batteria contiene litio e può esplodere se utilizzata, maneggiata o smaltita impropriamente.

Evitare di:

- Gettarla o immergerla in acqua
- Riscaldarla ad una temperatura superiore ai 100°C
- Cercare di ripararla o smaltirla

Smaltire secondo la normativa in vigore (D.Lgs 22 del 5/2/97) e successive disposizioni nazionali e locali.

**ATTENZIONE:**

Quando è installata un'unità CD-ROM, notare quanto segue:

L'utilizzo di controlli, regolazioni o l'esecuzione di procedure non descritti nel presente manuale possono provocare l'esposizione a radiazioni pericolose.

L'apertura di un'unità CD-ROM può determinare l'esposizione a radiazioni laser pericolose. All'interno dell'unità CD-ROM non vi sono parti su cui effettuare l'assistenza tecnica. Non rimuovere i coperchi dell'unità CD-ROM.

PERICOLO:

Alcune unità CD-ROM contengono all'interno un diodo laser di Classe 3A o Classe 3B. Prestare attenzione a quanto segue:

Aperto l'unità vengono emesse radiazioni laser. Non fissare il fascio, non guardarlo direttamente con strumenti ottici ed evitare l'esposizione diretta al fascio.

**ATTENZIONE:**

La corrente circolante nei cavi di alimentazione, del telefono e di segnale è pericolosa. Per evitare situazioni pericolose per le persone o danneggiamenti all'apparecchiatura, scollegare i cavi di alimentazione, i sistemi di telecomunicazioni, le reti e ed i modem prima di aprire i coperchi del server se non diversamente indicato nelle procedure di installazione e configurazione.



주의:

전원, 전화 및 통신 케이블로부터 흘러 나오는 전류는 위험합니다. 설치 및 구성 절차에 다른 지시가 없으면, 다치거나 장비 손상이 생기지 않게 하기 위해 서버 덮개를 열기 전에 접속된 전선, 원격 통신 시스템, 네트워크 및 모뎀의 연결을 끊으십시오.

경고문 1



위험

전기 충격을 피하려면 날씨가 나쁠 때(예: 눈 또는 비가 오거나 천둥 번개가 칠 때)는 케이블을 연결하거나 끊지 않도록 하고 이 제품의 설치, 유지보수 또는 재구성 등의 작업을 수행하지 않도록 하십시오.

전기 충격을 피하려면 다음과 같아야 합니다.

- 고압선은 적절한 배선 및 접지 상태의 콘센트로 연결되어야 합니다.
- 이 제품이 접속될 모든 장비도 적절한 배서 상태의 콘센트로 연결되어야 합니다.

다른 전위를 가진 두 표면을 만졌을 때 발생할 수 있는 전기 충격을 피하려면 한 손으로 신호선을 연결하거나 끊으십시오.

전원, 전화 및 통신 케이블로부터 흘러 나오는 전류는 위험합니다. 전기 충격을 피하려면 이 제품이나 접속 장치를 설치, 이동 및 덮개를 열 때 다음 설명에 따라 케이블을 연결하고 끊도록 하십시오.

연결하려면	연결해제하려면
1. 모든 스위치를 켜다.	1. 모든 스위치를 끈다.
2. 먼저 모든 케이블을 장치에 연결한다.	2. 먼저 모든 케이블을 장치에 제거한다.
3. 신호선을 콘센트에 연결한다.	3. 신호선을 콘센트에서 제거한다.
4. 전원을 콘센트에 연결한다.	4. 장치에서 모든 케이블을 제거한다.
5. 장치 스위치를 켜다.	

경고문 2



주의:

배터리를 교체할 때는 IBM 부품 번호 &PN, 또는 제조업체에서 추천하는 동등한 유형의 배터리를 사용하십시오. 시스템에 리튬 배터리를 포함하는 모듈이 있으면 이것은 동일한 제조업체에서 생산된 동일한 모듈 유형으로만 교체하십시오. 배터리에 리튬이 포함되어 있으므로 제대로 사용, 처리 또는 처분하지 않으면 폭발할 수 있습니다.

다음을 주의하십시오.

- 던지거나 물에 담그지 않도록 하십시오.
- 100°C(212°F) 이상으로 가열하지 않도록 하십시오.
- 수리하거나 분해하지 않도록 하십시오.

지역 법령이나 규정의 요구에 따라 배터리를 처분하십시오.

경고문 3



주의:

CD-ROM 드라이브가 설치되어 있으면 다음 사항을 명심하십시오.

여기에서 지정하지 않은 방식으로 CD-ROM 드라이브를 제어 또는 조절하거나 다른 절차로 사용하면 위험한 방사능 노출이 발생할 수 있습니다.

CD-ROM 드라이브의 덮개를 제거하면 위험한 레이저 방사능이 노출될 수 있습니다. CD-ROM 드라이브 내에는 정비할 수 있는 부품이 없습니다. CD-ROM 드라이브 덮개를 제거하지 않도록 하십시오.

경고문 4

위험

일부 CD-ROM 드라이브에는 클래스 3A 또는 3B 레이저 2급 진공관(다이오드)이 들어 있습니다. 다음 사항을 명심하십시오.

열면 레이저 방사능이 노출됩니다. 광선을 주시하거나 광학 기계를 직접 쳐다보지 않도록 하고 광선에 노출되지 않도록 하십시오.



PELIGRO:

Para evitar una posible descarga eléctrica, no conecte ni desconecte los cables ni lleve a cabo ninguna operación de instalación, de mantenimiento o de reconfiguración de este producto durante una tormenta eléctrica.

Para evitar una posible descarga:

- El cable de alimentación debe conectarse a un receptáculo con una instalación eléctrica correcta y con toma de tierra.
- Los aparatos a los que se conecte este producto también deben estar conectados a receptáculos con la debida instalación eléctrica.

Cuando sea posible, utilice una sola mano para conectar o desconectar los cables de señal a fin de evitar una posible descarga al tocar dos superficies con distinto potencial eléctrico.

La corriente eléctrica de los cables de comunicaciones, teléfono y alimentación puede resultar peligrosa. Para evitar una posible descarga, siga las indicaciones de conexión y desconexión de los cables siempre que tenga que instalar, mover o abrir las cubiertas de este producto o de los dispositivos acoplados.

Instrucciones de conexión	Instrucciones de desconexión
1. Apague todos los componentes (OFF).	1. Encienda todos los componentes (ON).
2. En primer lugar, conecte todos los cables a los dispositivos.	2. En primer lugar, retire los cables de alimentación de las tomas.
3. Conecte los cables de señal a los receptáculos.	3. Retire los cables de señal de los receptáculos.
4. Conecte los cables de alimentación a las tomas.	4. Retire todos los cables de los dispositivos.
5. Encienda el dispositivo (ON).	

**IMPORTANT:**

Al cambiar la batería, utilice únicamente la batería IBM Número de pieza 33F8354 o un tipo de batería equivalente recomendado por el fabricante. Si el sistema tiene un módulo que contiene una batería de litio, sustitúyalo únicamente por el mismo tipo de módulo del mismo fabricante. La batería contiene litio y puede explotar si no se utiliza, manipula o desecha correctamente.

Lo que no debe hacer

- Tirar o sumergir el producto en agua.
- Exponer el producto a una temperatura superior a 100°C.
- Reparar o desmontar el producto.

Cuando quiera desechar la batería, siga las disposiciones y reglamentaciones locales.

**IMPORTANT:**

Cuando instale una unidad de CD-ROM, tenga en cuenta la siguiente información.

Si se llevan a cabo controles o ajustes o se utilizan métodos que no se atengan a lo aquí especificado, se puede producir una exposición peligrosa a las radiaciones.

Si se retiran las cubiertas de la unidad de CD-ROM, se puede producir una peligrosa exposición a radiaciones de láser. Dentro de la unidad de CD-ROM no existen piezas reparables. No retire las cubiertas de la unidad de CD-ROM.

PELIGRO:

Algunas unidades de CD-ROM tienen incorporado un diodo de láser de Clase 3A o de Clase 3B. Tenga en cuenta la siguiente información.

Cuando la unidad está abierta se generan emisiones de rayos láser. No dirija la mirada al haz, no lo observe directamente con instrumentos ópticos y evite la exposición directa.

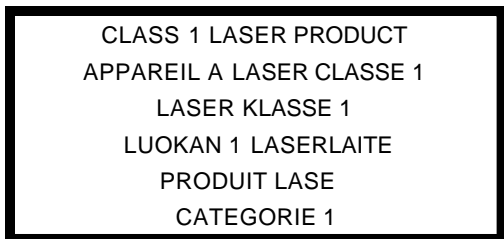


IMPORTANT:

La corriente eléctrica de los cables de comunicaciones, de teléfono y de alimentación puede resultar peligrosa. Para evitar posibles lesiones o daños del aparato, desconecte los cables de alimentación, los sistemas de telecomunicaciones, las redes y los módems antes de abrir las cubiertas del servidor, salvo que se indique lo contrario en las instrucciones de las operaciones de instalación y configuración.

Laser Compliance Statement

The CD-ROM drive in the computer is a laser product. The CD-ROM drive's classification label (sample shown below) is located on the drive.



The CD-ROM drive is certified in the U.S. to conform to the requirements of the Department of Health and Human Services 21 Code of Federal Regulations (DHHS 21 CFR) Subchapter J for Class 1 laser products.

In other countries, the drive is certified to conform to the requirements of EN60825.

Class 1 laser products are not considered to be hazardous. The CD-ROM drive has an internal Class 1, 0.5-milliwatt, aluminum gallium-arsenide laser that operates at a wavelength of 760 to 810 nanometers.

The design of the laser system and the CD-ROM drive ensures that there is no exposure to laser radiation above a Class 1 level during normal operation, user maintenance, or servicing conditions.

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OS/2

Personal System/2

PS/1

PS/2

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Preface

This manual contains service information for the **2284 Service Level A (SL-A)** model of the IBM Personal Computer, worldwide. This manual is intended to be used as a stand-alone document to service machine type 2284 products. It is divided into the following chapters:

Notices contains important safety information and notices required to service this computer.

General Information contains a brief description of this manual.

Check Procedures provides step-by-step instructions that aid in locating the failing Field Replaceable Unit (FRU).

Diagnostic Aids explains how to use the diagnostics tools for isolating failures.

Repairing Information contains illustrations and descriptions to disassemble and reassemble the computer.

Parts/Test Point Locations contains illustrations and descriptions of the locations of the major parts, jumpers, and connectors.

Safety Inspection Guide contains information about inspecting a machine for safety problems before putting the machine under a Maintenance Agreement.

Parts Catalog contains descriptions, illustrations, and part numbers for individual FRUs.

Appendix A, FRU Number Index contains part numbers listed in numerical order.

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Introduction

This chapter gives a general overview of the Personal Computer Type 2284, describes the standard and optional features, and details its functional and environmental specifications.

Product Overview

Personal Computer Type 2284 has three PCI slots and supports the AMD K7 Duron processor family with Socket A processor package type.

The Personal Computer Type 2284 supports Accelerated Graphics Port (AGP) 2X / 4X, which allows installed system memory to be used as texture memory, yielding a huge texture footprint to enhance 3D graphical display performance.

Listed below are 2284 system features:

Processor

- Socket A connector.
- Detachable CPU fan sink.
- 128 KB of on-chip level one (L1) cache
- 64 KB level two (L2) cache support for Duron
- AMD K7 processor; 200MHz front side bus, 600/700MHz, 0.18 Microns, with 3DNow!™ technology
- Multiple parallel x86 instruction decoders

Memory

- 168-pin Synchronous Dynamic Random Access Memory (SDRAM), Dual in-line Memory Module (DIMM) sockets.
 - 3 memory sockets.
 - 8MB, 16MB, 32MB, 64MB, 128MB and 256MB DIMM.
 - PC-100/133 (8-128 M-bit, ECC, 133MHz, 3.3volt) DIMMs with gold contacts
 - Maximum memory is 768MB

External Port

- 2x/4x AGP video card (15-pin VGA connector)
- Multi-Mode Parallel port (25-pin D-type connector)
- Serial port (9-pin D-sub connector). 2284 has one serial ports, serial port 1
- Keyboard and mouse port
- Four USB ports (2 on port bracket, the other 2 on the front panel)
- Game/MIDI port (15-pin D-sub connector)
- Microphone-in jack
- Speaker-out jack
- Line-in jack
- Telephone line-out connector (modem adapter card available)
- Telephone line-in connector (modem adapter card available)
- RJ-45 connector (adapter card available)

Diskette Drive

- 3.5 " drive for 2.88MB, 1.44MB or 720KB diskette
- 5.25" drive for 1.2MB or 360KB diskette
- Support 3-mode drive

Hard Disk Drive

- 3.5-in., 1-in. height IDE drive. (3.5-in may be in acoustic mounting bracket), and 7200rpm.
- 128 KB "look-ahead" cache memory inside the hard disk drive.
- Average and minimum 12 ms seek time, access time varies for the hard disk drive and the hard disk drive manufacturer.

DVD-ROM Drive

- 5.25-in. high-performance, 8X/40X DVD-ROM IDE/AT drive.
- Read data and audio play from standard, mini DVD-ROM and audio compact discs (audio CDs). DVD media supported on DVD models.

Multimedia

- A pair of external active speakers with a power adapter or a pair of passive speakers.
- Noise canceling microphone available.

Power Management

- Support both ACPI (Advanced Configuration and Power Interface) and legacy (APM) power management.
- ACPI v1.0 and APM v1.2 compliant
- CPU clock throttling and clock stop control for complete ACPI S1 and S5 state support
- PCI bus clock run, Power Management enable (PME) control, PCI/CPU color generator stop control.
- Power-on Switch must support Soft-Off and Full-Off.
 - Touch for 1 second or less to put system on Suspend state.
 - Touch and hold for 4 seconds to put system on Full-Off state (Power Supply standby remains).
- System enters standby mode if any of following conditions are met:
 - Execute standby from Windows 98 Start menu
 - Press system power button if it sets to act as standby function
 - System is idle and the standby timer set in the Windows 98 Power Management Property elapses
- 8 bytes of BIOS scratch register

Power Supply

- PC-98 compatible 145W ATX power supply
- Switchable high/low voltage selection

Internal Cabling

- Two 40-pin ribbon cables for hard disk drives and CD/DVD-ROM drive.
- One 34-pin ribbon cable for AT diskette drive.
- One 4-pin (2-wire) cable for hard disk drive light-emitting diode (LED).
- One 3-pin (3-wire) cable for power light-emitting diode (LED).
- One 2-pin (2-wire) cable for power switch.

Monitor (Not included with some models)

- Super Video Graphics Array (SVGA) monitor.
- VESA power saving mode compliant.
- Connector for a detachable grounded 3-wire power cord
- 1.8-m (5.8-ft.) signal cable attached
- Auto-sensing power input for 100 Vac to 240 Vac
- 15" (13.7" viewable image size) monitor
 - 0.28-mm dot pitch
 - Automatic scanning horizontal frequencies from 30 KHz to 54 KHz or 30 KHz to 69 KHz (for Japan)
 - Vertical frequencies between 50 Hz and 120 Hz.
 - DDC2A/B or DDC1/2B+ support (for Japan)
 - OSD (On-Screen Display) menu (for Japan)
- 17" (15.7" viewable image size) monitor
 - 0.28-mm or 0.27-mm dot pitch (for Japan)
 - Automatic scanning horizontal frequencies from 30 KHz to 69 KHz or 30 KHz to 72 KHz (for Japan)
 - Vertical frequencies between 50 Hz and 120 Hz.
 - DDC1/2B+ support and OSD (On-Screen Display) menu

Keyboard

- 104-key, rubber dome Rapid Access™ II keyboard with 1.8-m (5.8-ft.) cable

Mouse

- 4 Button PS/2 Sleek or ScrollPoint™ II mouse with 1.8-m (5.8-ft.) cable

Hardware Interfaces

The following peripheral interfaces for adapters, options, and drives are supported in the system unit.

Item	Interface
Expansion slot for I/O adapter cards	Three PCI (Peripheral Component Interconnect) v2.2 compatible expansion slots that operates at 33 MHz bus speed.
Hard disk drives	Four PCI local bus Enhanced IDE v1.0 compatible hard disk drive interfaces that support: <ul style="list-style-type: none">- PIO mode up to 6 mode- DMA 32-bit access- Ultra 33/66 Synchronous DMA (33/66M bytes/sec).
DVD-ROM drive	5.25-in. high-performance, 8X/40X DVD-ROM IDE/AT drive. Support Bootable CD-ROM Format specification version 1.0. Compliant to Audio-CD, Video-CD, CD-ROM/XA, Karaoke-CD, and Photo-CD (both single and multi session) format.
Diskette drive	AT diskette interface
Video	Physical interface is compatible with the IBM Personal System/2 (PS/2) VGA interface. Support Accelerated Graphics Port (AGP)
Modem	One 56.6 Kbps PCI modem adapter card with data/fax/voice or non-voice features.
Audio	Compatible to AC99
Pointing device	IBM PS/2-compatible mouse
Keyboard device	IBM PS/2-compatible keyboard
Serial port	Support one high speed NS 16C550 compatible UARTs with send/receive 16 bytes FIFOs RS232D electrical interface compliant

Item	Interface
Parallel port	Supports SPP (IBM PC/XT, PC/AT, PS/2) compatible, EPP (IEEE 1284 compliance), ECP (IEEE 1284 compliance) interface. IEEE 1284 compliant
Game port	Game port interface for joystick. It also supports MIDI.
USB	Supports Universal UHCI Specification for USB 1.1

CMOS Reset

This system does not deny access to Configuration/Setup Utility, if Administrative Password is not set. Execute "Load BIOS Default Settings" in BIOS Configuration/Setup Utility to clear the corrupted CMOS data. See "Loading Default Settings" on page 16.

Power-On Password

A power-on password denies access to the system by an unauthorized user when the system is powered on. When a power-on password is active, the password prompt appears on the screen each time the system is powered on. The system starts after the proper password is entered. See “Power-On password” on page 21 for more information about how to change, remove and set password in Configuration/Setup Utility.

In some cases, you might be required to service a system with an active and unknown power-on password. To clear a password from the system, follow these steps.

1. Turn off system unit.
2. Unplug power cable from the electrical outlet.

IMPORTANT: Do not attempt these steps with the power cord plugged into the electrical outlet. The power supply maintains +5 Vdc of standby power when the power cord is plugged.

System damage might result if the power cord is not unplugged during jumper setting.

3. Set JP14 to 2-3 position to clear BIOS setting as original manufacture setting. See “System Board Jumpers and Connectors” on page 109.
4. Set JP7 back to the 1-2 position to enable password check process. See “System Board Jumpers and Connectors” on page 109.

IMPORTANT: To reinstall the password, the user must enter a password in the Configuration/Setup Utility. If Enhanced Security is enabled and the password is forgotten, the system board must be replaced.

Flash (BIOS) Update Procedure

NOTE: The flash update procedure does not change the model number and serial number information in BIOS.

1. Prepare a bootable DOS diskette with AWDFLASH.EXE, and one XXXXXXXX.BIN files

NOTE: The AWDFLASH.EXE are flash utility programs. The one VXXYYZZ.RN file has the BIOS checksum information. The XXXXXXXX.BIN is BIOS source code binary file.

2. Insert the diskette and boot from drive A.

WARNING: Do not boot with any memory related driver such as HIMEM.SYS, EMS.SYS....

3. At the DOS prompt, type **A:> AWDAFLASH XXXXXXXX.BIN /PY/SN/CD/CP** then press **Enter**.
4. The program updates the BIOS automatically.

IMPORTANT: Verify the BIOS checksum value shown on screen is the same as the one in VXXYYZZ.RN file.

WARNING: Do not turn off the system power while the BIOS is programming, or the flash ROM will be destroyed.

5. Power off system after the BIOS is completely updated.

BIOS-contained Model Number and Serial Number

The model number and serial number information is stored in BIOS ROM and displayed in the “Product Data” of Configuration/Setup Utility main menu. If a service repair is completed by replacing a new system board or a new BIOS ROM, then you are required to input the original system's model number and serial number into the new BIOS ROM.

Follow these steps to input the model number and serial number to BIOS:

1. Prepare a diskette with DMICFG.EXE file.
2. At the DOS prompt, type **A:>DMICFG.exe**.
3. When update system product name, at the DOS prompt type **A:>DMICFG.EXE/ type 01 05 [String]**.

For example:

[String] : Type 2284

type **A:>DMICFG.EXE/ type 01 05 “Type 2174”**.

NOTE: You can type a maximum of 32 characters. If you have a string with spaces, type “ ” to quote the string.

4. When update system serial number, at the DOS prompt type **A:>DMICFG.EXE/type 01 07 [String]**.

NOTE: Enter the serial number and press **Enter** to continue. You can type a maximum of 32 characters (without spaces).

5. Enter BIOS setting to display and verify your input product number and serial number information.

BIOS Configuration/Setup Utility

The Configuration/Setup Utility lets you review and change important information about the computer and its hardware.

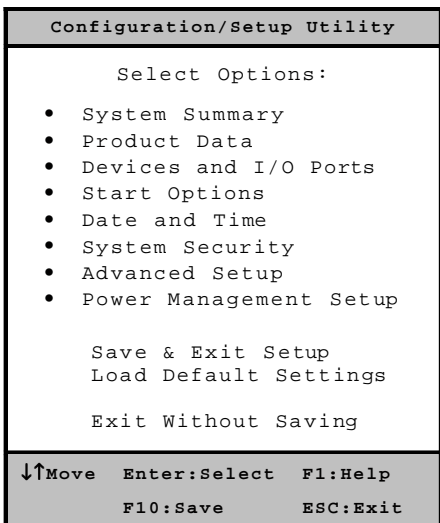
Working with the Configuration/Setup Utility Menu

Starting the Configuration/Setup Utility

Follow these steps to enter Setup when the computer is off:

1. Turn on your monitor.
2. Press and hold **F1**.
3. Turn on the system unit.

If you have previously set a password, you are prompted to type in the password after you press the **F1** key. Refer to the Configuration/Setup Utility Main Menu below.



The following table lists specific keys on the keyboard that will help you move through the Configuration/Setup Utility Menus:

Keys	Function
Down- or up- arrow key	Use these arrow keys to highlight an option on the menu. (Press the Enter key to choose the option.)
Left- or right- arrow key	Use these arrow keys to make a selection and change an option's setting. On some menus, you can use these keys to move from one field to another.
F1	Press this key if you want help for a selected menu option.
Esc	After viewing or making changes to the settings on a menu, press this key to exit the menu.
Enter	Press this key to choose a highlighted option from a menu
F10	Press this key if you want to save the current settings for a line
F7	Press this key if you want to load the factory default settings from the selected brackets.
F5	Press this key if you want to restore item previous setting

Changing Parameter Settings

In the Configuration/Setup Utility Menus, the configuration information that you can change is enclosed in brackets like these: []. You cannot change any information that is not enclosed in brackets. Use the up- or down- arrow keys to highlight options then press **Enter** to display a menu. When changing the setting of a particular parameter, highlight the setting then use the left- or right- arrow key to change the setting. Refer to the Configuration/Setup Utility help for details on the configurable parameters in each menu.

Save & Exit Settings

After changing any parameter in the Setup Configuration setting, return to Configuration/Setup Utility main menu and select Save & Exit Setup to save all the settings you have changed. Then, exit the Configuration/Setup Utility menu.

Loading Default Settings

The computer is already configured for use. The original configuration settings, also called factory or default settings, are stored in the CMOS. Setup includes an option Load Default Settings that lets you reload the original configuration at any time.

To load the default settings, follow these steps:

1. Use down-arrow key to select load default settings. A dialog box appears confirming if you want to load the default settings.
2. Use the left-arrow key to select Yes, then press **Enter**.
3. Press **Esc** to exit Setup. A dialog box appears confirming if you want to save the settings (in this case, the default settings that you reloaded).
4. Use the left-arrow key to select Yes, then press **Enter** to save the changes in Configuration/Setup Utility.

You must load the Setup default settings in the following instances:

- When you replace the system battery.
- When you customize the system configuration settings and some resource assignments conflict causing the computer to stop responding.

Exiting Without Saving

Press **Esc** to return to the Main Menu when you have finished viewing settings and making changes. From this location, you can exit Setup but without saving your changes.

Viewing System Information, and Product Data

To view general hardware information about your computer, select the System Summary option from the Configuration/Setup Utility main menu. The items displayed in the System Summary menu are not configurable.

Setup automatically updates this menu when you do either of the following:

- Add or change hardware on your computer
- Make changes to other menus in Setup and save those changes

To view the computer information such as the machine type/model, flash EEPROM revision level, system serial number, BIOS version, BIOS date, and BIOS mode, select the Product Data option from the Configuration/Setup Utility main menu. Like in the System Summary menu, the items displayed are not configurable.

Devices and I/O ports

If you install USB devices, video, IDE drives, audio, or network drive, BIOS auto-detects the presence of these devices. Enter Configuration/Setup Utility to identify or verify the type of drive installed in the computer.

Diskette Drive A

This option displays the size and storage capacity of the currently installed diskette drive. The default is 1.44 MB, 3.5 in..

Diskette Drive B

This option displays the size and storage capacity of the currently installed diskette drive. Empty drive bays are indicated with a "None" default setting.

Serial Port Setup

Onboard Serial Port 1

It comes with one 9-pin serial ports. This parameter will be allowed to set Auto, Disabled, or the base address such as 3F8/IRQ4, 2F8/IRQ3, 3E8/IRQ4, or 2E8/IRQ3 for serial port. The default is set to Auto.

Parallel Port Setup

Onboard Parallel Port

Your computer comes with one parallel port. This parameter shows the base address to activate the parallel port. The default base address is 378h and the default IRQ is 7.

Onboard Parallel Mode

There are four selection for this parameter Normal, EPP, ECP, ECP/EPP. The default setting is Normal.

ECP Mode Use DMA

When Onboard parallel Mode is set to ECP or ECP/EPP, this parameter becomes configurable. Otherwise, it will be unchangeable and the default setting is 3.

Parallel Port EPP Type

When Onboard parallel Mode is set to EPP or ECP/EPP, this parameter becomes configurable. Otherwise, it will be unchangeable and the default setting is EPP1.9.

USB Setup

Onboard USB

The item Universal Serial Bus (USB) parameter is allowed to set as Enabled and Disabled . The default setting is Enabled.

USB Keyboard Support

The default setting is set to Disabled while the parameter Onboard USB is Enabled. If Onboard USB is set to Disabled, this item is not configurable.

USB Mouse Support

This parameter enables or disables the use of a USB keyboard outside of Windows. The default is Disabled. It is not configurable if Onboard USB is set to Disabled.

IDE Drives Setup

IDE Prefetch Mode

The default setting is Enabled. IDE prefetch mode can improve performance of your system for fast drive accesses. If install a primary and/or secondary add-in IDE interface, set this field to Disabled if the interface does not support prefetch.

Audio Setup

Onboard Sound

This parameter enables or disables the onboard audio controller chipset. This item does not appear in the menu if there is no physical audio chipset on the system board. The default setting is Enabled.

Onboard Legacy Audio

This parameter enables or disables the onboard audio controller chipset to function in DOS environment. The default is Enabled.

IMPORTANT: When onboard legacy audio is set to Enabled, the below six parameters can be configurabled as I/O base address and IRQ assignment and so on.

Sound Blaster

The default is Disabled.

SB I/O Base Address

The default is set to 220H.

SB IRQ Select

The default is IRQ5.

MPU-401 --Enabled

The default is Enabled.

MPU-401 I/Q Address

NOTE: The default is 330-333H

Game Port (200-207H)

NOTE: The default is Enabled.

Startup Options

From the Configuration/Setup Utility main menu, select Start Options to view or change start-up configuration settings.

Startup Sequence

The startup sequence is used when the system is powered on by the power switch. The startup device will include Floppy, LS120, HDD-0, SCSI, CDROM, HDD-1, HDD-2, HDD-3, ZIP100, LAN and Disabled.

First Boot Device

The default is set to Floppy.

Second Boot Device

The default setting is HDD-0.

Third Boot Device

The default is CD-ROM.

Boot Other Device

The default value is Enabled.

Keyboard NumLock Status

This parameter displays when the NumLock function on the keyboard turns on automatically each time you turn your computer on. You can set this to On or Off. The default is On.

Disketteless Operation

When enabled, the BIOS issues the seek command to the diskette drive during POST to move diskette drive head forward and backward. The default is enabled.

Keyboardless Operation

When enabled, the BIOS issues the seek command to the keyboard to move faster during POST. The default is enabled.

Power On Self Test

When set to Enabled, which is the default, this parameter allows the system to boot faster by skipping some power-on self-test (POST) routines.

Date and Time

From the Configuration/Setup Utility main menu, select the Date and Time option to view or change the system clock from the Date and Time menu. If you want to change the system date, enter the date in the format shown on the screen.

If you change the time, enter the time in 24-hour format (hours, minutes, seconds). For example:

- 12 midnight is 00:00:00
- 12 noon is 12:00:00
- 1 p.m. is 13:00:00

When setting date and time, press the **up-** or **down-arrow key** to highlight a field. The date and time are saved as you type it.

Power-On password

Select this parameter and press the **down arrow key** to display the Power-on Password window. In this window, you can set up a password to restrict the use of your computer. You can also change or remove the password.

If you set up a power-on password, you must type this password each time you turn on your computer. If you do not key in the correct password, you cannot use your computer. You must also type this password if you want to enter Setup.

Setting a Power-On Password

1. Press **F1** to enter Configuration/Setup Utility.
2. From the Configuration/Setup Utility main menu, select System Security and then [Power-On Password].
3. Highlight the [Power-On Password] parameter and press the **Enter** key to display the Power-On

Password window.

4. Type a password consisting of up to eight characters, then press **Enter**.
5. Retype the password then press **Enter**.
6. Press **Enter** again to confirm the setting of the password. Pressing **Esc** aborts the password setting.
After pressing **Enter**, the Power-On Password window disappears. The [Power-On Password] parameter automatically is set completely.
7. Press **Esc** to return to Configuration/Setup Utility main menu.
8. Press **Esc** to exit Setup and reboot the system.
Answer Yes when prompted to save settings.

The next time you turn on the system, and If you press **F1** during POST to enter Configuration/Setup Utility, you must key in the password.

If you were not able to set a password after performing the above procedure, or should you encounter any error message when setting a password, refer to "Power-On Password" on page 11 about how to set the hardware jumper to clear password check.

Changing the Power-On Password

1. Enter Configuration/Setup Utility.
2. Key in your current password when prompted.
3. From the Configuration/Setup Utility main menu, select System Security, then [Power-On Password] Options.
4. Type in a new password then press **Enter**.
5. Retype the new password then press **Enter**.
6. Press **Esc** twice to return to the Configuration/Setup Utility main menu.
7. Press **Save Settings** to save the password and press **Exit** to exit Configuration/Setup Utility menu, and then reboot the system.

Delete Power-On Password

1. Enter Configuration/Setup Utility and select System Security Options, then [Power-On password] Options.
2. Leave empty on Power-on password windows,

and then press **Enter**. The message appears on the screen as below:

“PASSWORD DISABLED!!!“

Press any key to continue

3. Return to Configuration/Setup Utility main menu.
4. Select **Save and Exit Setup** to save and exit Setup and reboot the system.

Administrator Password

IMPORTANT: When both Power-On password and Administrator password are setup with password, you must enter Power-On password to get in the Configuration/Setup Utility. All the setting in the BIOS will not be configurable. Otherwise, after typing in administrator password and enter the Configuration/Setup Utility menu, you can change all the Setup settings.

For the basic administrator password setting, follow the same rule with Power-On Password to set up, change, or delete a password.

Advanced Setup

IMPORTANT: Items on the following menus control advanced hardware features. If they are configured incorrectly, the system might malfunction.

Cache Control

CPU Internal Cache

This parameter enables or disables the first-level or internal memory, that is, the memory integrated into the CPU. The default setting is Enabled.

External Cache

This parameter enables or disable the external cache is incorporated in the CPU module.

ROM Shadowing

Video BIOS Shadow

The default is Enabled. Video BIOS Shadow means to copy video display card BIOS into the DRAM area. This enhances system performance because DRAM access time is faster than ROM.

IMPORTANT: These six items are for shadowing ROM code on other expansion cards. Before you set these parameters, you need to know the specific addresses of that ROM code. If you do not know this information, enable all the ROM shadow settings.

C8000-CBFFF Shadow

The default is Disabled.

CC000-CFFFF Shadow

The default is set to Disabled.

D0000-D3FFF Shadow

The default is Disabled.

D4000-D7FFF Shadow

The default is Disabled.

D8000-DBFFF Shadow

The default is Disabled.

DC000-DFFFF Shadow

The default is set to Disabled.

Power Management Setup

ACPI function

The ACPI (Advanced Configuration and Power Interface) feature enables the operating system to monitor and control the amount of power supplied to each device attached to the system. When enabled, ACPI uses the OS (operating system) to turn off the peripheral devices (such as a CD-ROM) that are not in use. The default setting is Enabled.

APM

Power Management

This parameter allows you to select the type (or degree) of power saving such as User Define, Min. Saving, and Max. Saving as well as is directly effected on the following modes HDD Power Down, Doze Mode and Suspend Mode.

The default of Power Management is set to User Define, so it allows you to set each mode individually.

HDD Power Down

Whatever Power Management is set, the ranges are from 1 min. to 15 min. and Disabled. The default is Disabled.

Doze Mode

While Power Management is set to User Define, this ranges are from 1 min. to 1 hour. and Disabled. The default is Disabled.

While Power Management is set to Min Saving, this parameter will be 1 min.

While Power Management is set to Max Saving, this parameter will be 1 hour.

Suspend Mode

While Power Management is set to User Define, this ranges are from 1 min. to 1 hour. and Disabled. The default is Disabled.

While Power Management is set to Min Saving, this parameter will be 1 min.

While Power Management is set to Max Saving, this parameter will be 1 hour.

PM Control by APM

When set to Yes, an Advanced Power Management device will be activated to enhance the Max. Power Saving mode and stop the CPU internal clock.

When set to No, the Max. Power Saving is not enabled.

Video Off Option

Based on an inactivity time-out, the system will enter power saving management modes. There are three modes, Always On, Suspend -> Off, and All Modes -> Off, to determine whether turn off the monitor. The default is Suspend -> Off.

Video Off Method

This determines the manner in which the monitor is blanked. The default is set to V/H SYNC+Blank.

When V/H SYNC+Blank is chosen, this selection will cause the system to turn off the vertical and horizontal synchronization ports and write blanks to the video buffer.

The parameter is set to DPMS Support, it will initial display power management signaling.

When set to Blank Screen, this option only writes blanks to the video buffer.

Activity Monitor

VGA The default is OFF. When set to On, you can set the LAN to awaken the system.

LPT & COM When LPT/COM is selected, any activity from one of the listed system peripheral devices or IRQs wakes up the system. LPT/COM is selected as the default.

HDD & FDD When the HDD & FDD is set to On, any activity from one of the listed system peripheral devices wakes up the system. The default is On.

PCI Master When PCI Master is set to On, any activity from one of the list system peripheral devices wakes up the system. The default is Off.

Primary INTR

This item is used to enable or disable the detection of IRQ3-15 or NMI interrupt events for power down state transition. Normally, this is applied to the network card. The default is On.

IMPORTANT: The following are used to enable or disable the IRQ resources which assign each system interrupt a type, depending on the type of device using the interrupt.

IRQ3 (COM2) The default is Enabled.

IRQ4 (COM1) The default is Enabled.

IRQ5 (LPT2) The default is Enabled.

IRQ6 (Floppy Disk) The default is Enabled.

IRQ7 (LPT 1) The default is Enabled.

IRQ8 (RTC Alarm) The default is Enabled.

IRQ9 (IRQ2 Redir) The default is Disabled.

IRQ10 (Reserved) The default is Disabled.

IRQ11 (Reserved) The default is Disabled.

IRQ12 (PS/2 Mouse) The default is Enabled.

IRQ13 (Coprocessor) The default is Enabled.

Automatic Power On

Power On by PCI Card

This option allows the user to boot from the PCI device after the system is turned on. The default is Disabled.

Modem Ring Resume

This parameter enables or disables an input signal on the serial Ring Indicator (RI) line (an incoming call on the modem) to awaken the system from a soft off state. The default is Disabled.

RTC Alarm Resume.

When Enabled, you can set the date and time at which the RTC (real-time clock) alarm wakes the system from suspend mode. The default is Disabled.

Date (Month)

When RTC Alarm Resume is set to Disabled, it is not configurable.

Resume Time (hh:mm:ss)

When RTC Alarm Resume is set to Disabled, it is not configurable.

Soft-Off by PWRBTW

When the power button is pressed for more than 4 seconds, it forces the system to enter the Soft-Off state when the system has "hung". The default is set to Instant-Off.

ACPI Suspend Type

When ACPI mode is set to S1(POS), all the components are working normally, only the processor

is in suspend state. When it is set to S3(STR), only the system memory is working, the rest of the components are in suspend state. The default is S3(STR).

Specifications

Dimension (width x depth x height)

- System unit: 190mm x 370 mm x 384 mm

Weight

- System unit: 12.7kg (28lb)

Environment

- Temperature for system unit:
 - Operating: 10° to 35°C (50° to 95°F)
 - Non-operating: -10° to 60°C (14° to 140°F)
: -20° to 60°C (-4° to 140°F)
(Storage package)
- Humidity for system unit:
 - Operating: 20% to 80% RH
 - Non-operating: 20% to 80% RH, unpacked
:20% to 80% RH, Storage package
- Vibration
 - Operating : 5~16.2 Hz ; 0.38mm (peak to peak)
16.2~250 Hz ; 0.2 G
 - Non-operating : 5~27.1 Hz; 0.6G
27.1~50 Hz; 0.4mm(peak to peak)
50~500 Hz; 2.0 G

Power consumption

- System unit: Maximum 95 Watts

Electrical input

- Input voltage for system unit (Sine-wave input is required)
- Low Range: 100 to 120 Vrms
- High Range: 200 to 240 Vrms

Operating Requirements

All machines require two power inputs: one for the system unit and one for the monitor display.

The system unit comes with a voltage selector switch, allowing selection of voltage of either 115 Vac or 230 Vac. This switch must be in the 230 Vac position when the machine is plugged into a 230 Vac electrical outlet.

The required power input for the monitor (Not included with some models) shipped with the system unit is auto-sensing type and does not require any voltage switch adjustment.

Check Procedures

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Introduction

This chapter contains the check procedures used to diagnose the causes of product failures. The diagnostic information consists of:

Start: This is the starting point for any diagnostic action. Based on high-level symptoms, the check procedure directs you to more detailed procedures to help resolve machine failures.

Index of Symptoms, Messages, Error Codes, or Beeps: The tables for BIOS Error Messages, Codes, Beeps, and Error Symptoms list symptoms along with their probable causes, and direct you to the applicable check procedures to help resolve machine failures. These tables also list the field replaceable units (FRUs) most likely to cause a particular problem.

Check Procedures: When the Start check procedure or the Index of Symptoms, Messages, Error Codes, or Beeps tables point you to a specific check procedure, proceed to that section. If there are any notes or instructions at the top of the page, read them before you begin with the procedure. Carefully read each step of the check procedure and perform the steps as instructed. If you do not remember the location of a specific part or test point, or an adjustment or removal procedure, see the chapter that contains that information. Always return to the check procedure after you do this. In some cases, you are referred to other check procedures to detect the cause of the failure.

Start

This is the entry point for all check procedures. The check procedures use failure symptoms, Power-On Self Test (POST) error codes, or beeps to help determine the defective field replaceable unit (FRU). Follow the suggested check procedures or use the diagnostics diskette to determine the problem FRU.

IMPORTANT: Replace FRUs ONLY when it is determined that the error is not a result of software, loose contacts, or dirty component surfaces. Any FRU change should be verified by running a complete test ("Diagnostics - All Tests" in PC-Doctor diagnostics program).

This book comes with a diagnostic program diskette. This diskette should be used ONLY with **2284 Service Level A (SL-A)** IBM Personal Computers. Do not use this diskette on other models.

POST error codes and error messages are displayed on the screen after the IBM logo. Meanwhile, error beeps could be issued to help diagnose system problem. Please refer to "Index of Symptoms, Messages, Error Codes, or Beeps" on page 38 for additional help.

All voltages in the check procedures are positive unless otherwise indicated. Use frame ground for all voltage checks unless otherwise specified.

IMPORTANT: There is a Power Override switch located at the back of the machine, just above the connector for the power cable. If the system does not power on after pressing the power button situated on the front of the machine, please check the power cable and the Power Override switch. If the Power Override switch is switched on, no power is supplied to the system.

NOTE: If the check procedures instruct you to replace a FRU and the error message persists, an option adapter card might be causing the failure. Remove all option adapter cards, one at a time, until the error changes or the problem is no longer apparent. Replace the last option adapter card removed.

The hard disk drive contains pre-loaded software. Be sure to reload the software on the primary hard disk drive (Drive C) when replacing it.

IMPORTANT: The drives in the system you are servicing may have been rearranged, or the drive startup sequence has changed. Be extremely careful during write operations, such as copying, saving, or formatting. Data or programs can be overwritten if you select an incorrect drive. **Ask the customer to back up any additional software from the hard disk drive before you reload the software.**

How to Diagnose Combined FRUs: If an adapter or device consists of more than one FRU, any of the FRUs might cause an error code. Before replacing the device or adapter, remove the FRUs one by one to see if the symptoms change.

If a newly replaced FRU does not correct the problem: If you have reached this point of the check procedures and were instructed to replace a FRU but doing so did not correct the problem, reinstall the original FRU and go through "Start" again.

If you want to print a copy of a Configuration/Setup Utility screen to an attached printer, press **Print Screen** key while the following screen is displayed.

READ THE FOLLOWING:

Human Error is a cause for concern when applied to check procedures. It exists in every first time set of analysis procedures. It is therefore essential for effective and time-efficient servicing that each stage of every procedure be verified. (For example: When a symptom is found, or when a symptom appears to have been cured; the preceding steps should be repeated for accuracy of analysis.)

001 - START

- To begin, note the following:
- Disable the setting of "Fast POST Mode" in Configuration/Setup Utility.
- To disable or reset the power-on password, see "Power-On Password" on page 11.
- Disconnect all external cables and devices

including speakers and microphone from the system unit, except for the keyboard, mouse, and monitor.

- Power off the system unit (unplug the power cord) before moving it or when replacing FRUs.
- Remove all adapter cards, except for the factory-installed modem adapter card and any other IBM Personal Computer factory-installed adapter cards.
- Disconnect all drives except:
 - 3.5-in. diskette drive
 - Hard disk drive
 - IBM Personal Computer factory-installed devices (such as a CD-ROM drive)
- Ensure that all power cords and cables are connected properly.
- Ensure that the monitor brightness and contrast controls are not turned down.
- Power on the system unit.

NOTE: Some monitors have a detachable system I/O signal cable between the monitor and the system unit. In this case, check this signal cable before replacing the unit. See "Monitor Port Signals" on page 127 for pin identification.

- Ensure correct monitor refresh rate.
- Note any symptoms, messages, error codes, or beeps.
- Make sure that there are no diskette or CD in the drives.

002 - DOES AN IBM LOGO SCREEN APPEAR? (YES, READ AHEAD. NO, GO TO STEP 004.)

- Insert diagnostics diskette in the diskette drive.

003 - DOES SYSTEM LOAD THE DIAGNOSTICS PROGRAM FROM THE DISKETTE DRIVE? (YES, READ AHEAD. NO, GO TO STEP 004.)

- Follow the instructions on the screen and select Utility from the diagnostics program menu.
- Select Tech Support Form from the menu, press **F5** to execute, then generate a system configuration report.

- Compare the system configuration list with the actual devices installed in system.

NOTE: If necessary, remove the machine cover and visually compare the devices installed in system to those shown in the system configuration report.

- Go to step 006.

004 - DO ANY MESSAGES, ERROR CODES, OR SYMPTOMS APPEAR? (YES, READ AHEAD. NO, GO TO STEP 005)

- Go to “Index of Symptoms, Messages, Error Codes, or Beeps” on page 38.
- End.

005 -

- If the keyboard responds incorrectly, go to “Keyboard” on page 66.
- If monitor problems appear, such as jittering, shifting, or being out of focus, go to “Monitor” on page 72.

006 - DOES THE SYSTEM CONFIGURATION REPORT CORRECTLY IDENTIFY THE DEVICES INSTALLED IN SYSTEM? (YES, READ AHEAD. NO, GO TO STEP 007.)

- Select Diagnostics from the diagnostics program menu.
- Select and execute **All Tests**.
 - Go to step 008.

007 -

- The system configuration report shows only those devices supported by the diagnostics diskette.
- If a device is missing from the list and is not factory installed, refer to the service manual provided for that device.

008 - DO THE DIAGNOSTICS FINISH WITHOUT ANY ERRORS? (YES, READ AHEAD. NO, GO TO STEP 009.)

- If the Diagnostics\ All Tests did not detect a failure but the system still indicates a failure:

- Check all adapter card jumper settings.
 - Check all adapter card switch settings.
 - Check all adapter card cables and connectors. Make sure that all of the above are set correctly and show the correct voltages and continuity. Replace any defective cables or adapter cards. See "Parts/Test Point Locations" on page 107.
 - Run the Diagnostics \ All Tests again.
 - If an error or other symptom is displayed, go to "Index of Symptoms, Messages, Error Codes, or Beeps" on page 38.
 - If no error can be detected or the symptom is intermittent, go to "Undetermined Problems" on page 74.
- End

009 -

- If the last test stops and you cannot continue, first make sure all switches, power connectors, cables, and jumpers are set correctly and show the correct voltages and continuity.
- Take note of any messages, error codes, beeps, or new symptoms. Go to "Index of Symptoms, Messages, Error Codes, or Beeps" on page 38.
- If there is no error symptom or the error symptom is intermittent, go to "Undetermined Problems" on page 74.

Index of Symptoms, Messages, Error Codes, or Beeps

How to Use Error Messages: Use the messages, error codes, and beeps combinations that occur to diagnose failures. If more than one failure occurs, begin the diagnosis from the first failure that appeared. The cause of the first failure can result in false messages, error codes, or beeps. If you did not receive any messages, error codes, or beeps, see if the symptom is listed in "Table 2-3 Error Symptoms List" on page 45.

CAUTION: When you have deemed it necessary to replace a FRU, and have done so, you must run a total system check to ensure that no other activity has been affected by the change. This system check can be done through the diagnostics program (Select Diagnostics, then select and execute All Tests from PC-Doctor).

POST: Some diagnostic aids are resident in the machine, such as the Power-On Self Test (POST). The machine performs the POST each time it is powered on. Use this information throughout the diagnostic procedures. The POST is a series of system checks and initializations that verify the correct operation of the base system.

After a successful POST, the system attempts to load operating system. The system can be customized for different startup (boot) methods by the Configuration/Setup Utility. "Startup Options" on page 20.

The system's default startup sequence automatically looks for the operating system files in the hard disk if these files are not found in the diskette.

WARNING: Remember that POST does not test all areas, but only those that allow the system to operate well enough to run the diagnostics program.

Table 2-1 lists BIOS error codes, messages, and their possible causes. Table 2-2 lists BIOS beeps and their possible causes. Table 2-3 lists error symptoms and their possible causes. The most likely cause is listed first. Make sure you complete all items in the cause or "Action/FRU" column. When servicing a system, always begin with "Start" on page 33.

If you are unable to correct the problem using these two index tables, go to “Undetermined Problems” on page 74.

NOTE:

1. If an error message and incorrect audio response occur, diagnose the error message first.
2. If you cannot run the diagnostics program tests but did receive a POST error code and message, use “Table 2-1 POST Error Codes and Messages List” on page 40 to diagnose system problems.
3. If you cannot run the diagnostics program tests but did receive a POST error beeps, use See “Table 2-2 BIOS Error Beeps List” on page 44 to diagnose system problems.
4. If you did not receive any error message, look for a description of your error symptoms in “Table 2-3 Error Symptoms List” on page 45.

IMPORTANT: Check all power supply voltages, switch, and jumper settings before you replace the system board. Also check the power supply voltages if you have a “system no-power” condition.

5. If you are unable to correct the problem by using the “BIOS Error Codes, Messages, And Beeps List” table and “Error Symptoms List” table, go to “Undetermined Problems” on page 74.

Table 2-1 POST Error Codes and Messages List

NOTE: To diagnose a problem, first find the BIOS error messages or codes in left column. If directed to a check procedure, replace the FRU indicated in the check procedure. If no check procedure is indicated, the first Action/FRU listed in right column is the most likely cause.

BIOS Error Codes, Messages	Action/FRU
Real Time Clock Error CMOS Battery Has Failed CMOS Checksum Error	<ol style="list-style-type: none"> 1. Enter Configuration/ Setup Utility and load the default settings. 2. CMOS battery. 3. System board.
Disk Boot Failure, Insert System Disk And Press Enter	<ol style="list-style-type: none"> 1. Insert a bootable floppy disk into floppy drive. 2. Check if floppy drive fails. 3. Check if system board fails.
Diskette Drives Or Types Mismatch Error-Run Setup	<ol style="list-style-type: none"> 1. Enter Configuration/ Setup Utility to reconfigure the drive type correctly.
Display Switch Is Set Incorrectly	<ol style="list-style-type: none"> 1. Enter Configuration/ Setup Utility to reconfigure Video Setting.
Display Type Has Changed Since Last Boot	<ol style="list-style-type: none"> 1. Enter Configuration/ Setup Utility to configure new display type. 2. Adapter Card
EISA Configuration Checksum Error Please Run EISA Configuration Utility	<ol style="list-style-type: none"> 1. No ESIA slot available.
EISA Configuration Is Not Complete Please Run EISA Configuration Utility	<ol style="list-style-type: none"> 1. No ESIA slot available.

Table 2-1 POST Error Codes and Messages List

NOTE: To diagnose a problem, first find the BIOS error messages or codes in left column. If directed to a check procedure, replace the FRU indicated in the check procedure. If no check procedure is indicated, the first Action/FRU listed in right column is the most likely cause.

BIOS Error Codes, Messages	Action/FRU
Error Encountered Initializing Hard Drive	<ol style="list-style-type: none"> 1. Enter Configuration/ Setup Utility to load the default setting 2. IDE hard disk drive power 3. IDE hard disk drive cable/ connection 4. IDE hard disk drive
Error Initializing Hard Disk Controller	<ol style="list-style-type: none"> 1. Enter Configuration/ Setup Utility to load the default setting 2. Check IDE drive jumper See "3.5-In. Hard Disk Drive Jumper Settings" on page 117. 3. IDE hard disk drive power 4. IDE hard disk drive cable/ connection 5. IDE hard disk drive 6. System board
Floppy Disk CNTRLR Error Or No CNTRLR Present	<ol style="list-style-type: none"> 1. Enter Configuration/ Setup Utility to load the default setting 2. Diskette drive cable/ connection 3. Diskette drive 4. System board
Invalid EISA Configuration Please Run EISA Configuration Utility	<ol style="list-style-type: none"> 1. No ESIA slot available
Keyboard Error or No Keyboard Present	<ol style="list-style-type: none"> 1. Re-connect keyboard 2. Enter Configuration/ Setup Utility and load the default settings 3. keyboard 4. System board

Table 2-1 POST Error Codes and Messages List

NOTE: To diagnose a problem, first find the BIOS error messages or codes in left column. If directed to a check procedure, replace the FRU indicated in the check procedure. If no check procedure is indicated, the first Action/FRU listed in right column is the most likely cause.

BIOS Error Codes, Messages	Action/FRU
Memory Address Error at Memory Parity Error at..... Memory Size Has Changed Since Last Boot Memory Verify Error at..... RAM Parity Error-Checking For Segment..	<ol style="list-style-type: none"> 1. Insert the memory modules in the DIMM sockets properly, then reboot the system 2. Memory module. See "005 -" on page 65 to replace memory module 3. System board
Offending Address Not Found Offending Segment	<ol style="list-style-type: none"> 1. Enter Configuration/ Setup Utility and load the default settings. 2. Remove all adapter cards that are NOT factory-installed, then reboot the system. 3. System board
Press A Key To Reboot	<ol style="list-style-type: none"> 1. Message Only
Should Be Empty But EISA Board Found Please Run EISA Configuration Utility	<ol style="list-style-type: none"> 1. No ESIA slot available
Should Have EISA Board But Not Found Please Run EISA Configuration Utility	<ol style="list-style-type: none"> 1. No ESIA slot available
Slot Not Empty	<ol style="list-style-type: none"> 1. No ESIA slot available
System Halted, (CTRL-ALT-DEL) To Reboot.....	<ol style="list-style-type: none"> 1. Message Only
Wrong Board in Slot Please Run EISA Configuration Utility	<ol style="list-style-type: none"> 1. No ESIA slot available

Table 2-1 POST Error Codes and Messages List

NOTE: To diagnose a problem, first find the BIOS error messages or codes in left column. If directed to a check procedure, replace the FRU indicated in the check procedure. If no check procedure is indicated, the first Action/FRU listed in right column is the most likely cause.

BIOS Error Codes, Messages	Action/FRU
Floppy Disk(s) Fail (80)	<ol style="list-style-type: none"> 1. Re-connect floppy disk drive 2. Enter Configuration/ Setup Utility and load the default settings. 3. Floppy disk drive 4. System board
Floppy Disk(s) Fail (40)	<ol style="list-style-type: none"> 1. Re-connect floppy disk drive 2. Enter Configuration/ Setup Utility and load the default settings. 3. Floppy disk drive
Hard Disk(s) Fail (80) Hard Disk(s) Fail (40)	<ol style="list-style-type: none"> 1. Enter Configuration/ Setup Utility and load the default setting 2. Check IDE drive jumper. See "3.5-In. Hard Disk Drive Jumper Settings" on page 117. 3. IDE hard disk drive power. 4. IDE hard disk drive cable/ connection. 5. IDE hard disk drive. 6. System board
Hard Disk(s) Fail (20) Hard Disk(s) Fail (10)	<ol style="list-style-type: none"> 1. Enter Configuration/ Setup Utility and load the default setting 2. IDE hard disk drive power. 3. IDE hard disk drive cable/ connection. 4. IDE hard disk drive.
Hard Disk(s) Fail (08)	<ol style="list-style-type: none"> 1. Hard disk drive

Table 2-1 POST Error Codes and Messages List

NOTE: To diagnose a problem, first find the BIOS error messages or codes in left column. If directed to a check procedure, replace the FRU indicated in the check procedure. If no check procedure is indicated, the first Action/FRU listed in right column is the most likely cause.

BIOS Error Codes, Messages	Action/FRU
Keyboard Is Lock Out-Unlock The Key	<ol style="list-style-type: none"> 1. Enter Configuration/ Setup Utility and load the default settings. 2. Keyboard 3. System board
Manufacturing POST loop	<ol style="list-style-type: none"> 1. Message only
BIOS ROM Checksum error-System Halted	<ol style="list-style-type: none"> 1. Clear CMOS and reboot again. 2. BIOS ROM 3. System board
Memory Test Fail	<ol style="list-style-type: none"> 1. Enter Configuration/ Setup Utility and load the default settings. 2. Memory 3. System board.

Table 2-2 BIOS Error Beeps List

NOTE: To diagnose a problem, first find the BIOS error beeps in left column. If directed to a check procedure, replace the FRU indicated in the check procedure. If no check procedure is indicated, the first Action/FRU listed in right column is the most likely cause.

BIOS Error Beeps (L:long beep, S:short beep)	Action/FRU
L-L.... (Repeatedly) System DRAM has error	<ol style="list-style-type: none"> 1. Insert the memory modules in the DIMM sockets properly, then reboot the system. 2. Memory module. See "005 -" on page 65 to replace memory module. 3. System board
L-S-S Video has error	<ol style="list-style-type: none"> 1. Video adapter card 2. System board

Table 2-3 Error Symptoms List

NOTE: To diagnose a problem, first find the error symptom in the left column. If directed to a check procedure, replace the FRU indicated in the check procedure. If no check procedure is indicated, the first Action/FRU listed in right column is the most likely cause.

Error Symptoms	Action/FRU
Processor / Processor Fan	
NOTE: Normally, the processor fan should be operative, and the processor clock setting should be exactly set to match its speed requirement before diagnosing any processor problems.	
Processor fan does not run but power supply fan runs.	<ol style="list-style-type: none"> 1. Ensure that the system is not in power saving mode and the "Stop CPU clock in sleep state" is not set to Yes. See "Power Management" on page 5. 2. With the system power on, measure the voltage of processor fan connector FN2. Its reading should be +12Vdc. See "System Board Jumpers and Connectors" on page 109. 3. Processor fan. 4. System board.
Processor test failed.	<ol style="list-style-type: none"> 1. Processor. 2. System board.
System Board and Memory	
NOTE: Ensure that the memory modules are installed properly and the contact leads are clean before diagnosing any system problems.	
Memory test failed.	<ol style="list-style-type: none"> 1. See "Memory" on page 65. 2. System board

Error Symptoms	Action/FRU
Incorrect memory size shown or repeated during POST.	<ol style="list-style-type: none"> 1. Insert the memory modules in the DIMM sockets properly, then reboot the system. 2. Memory module. See "005 -" on page 65 to replace memory module. 3. System board.
System works but fails to enter power saving mode when the Power Management Mode is set to [Enabled], and power saving timer set in BIOS has elapsed.	<ol style="list-style-type: none"> 1. Enter Configuration/Setup Utility and load default settings. 2. In Windows 98, check settings in Power Management Property of Control Panel. 3. Reload software from Recovery CD.
System hangs before system boot.	<ol style="list-style-type: none"> 1. See "Index of Symptoms, Messages, Error Codes, or Beeps" on page 38. 2. See "Undetermined Problems" on page 74
System hangs after system boot.	<ol style="list-style-type: none"> 1. Execute a system test ("Diagnostics / All Tests" in PC-Doctor diagnostics program) and set it to stop at "Halt on Error" to see the potential cause of the problem. 2. "Undetermined Problems" on page 74.
Blinking cursor only; system does not work.	<ol style="list-style-type: none"> 1. See "Start" on page 33. 2. Diskette/IDE drive connection/cables 3. Diskette/IDE disk drives 4. See "Undetermined Problems" on page 74 5. System board
Diskette Drive	
<p>NOTE: Ensure that the diskette drive is configured correctly in Configuration/Setup Utility and its read/write head is clean before diagnosing any diskette drive problems.</p>	

Error Symptoms	Action/FRU
Media and drive are mismatched.	<ol style="list-style-type: none"> 1. Ensure that the diskette drive is configured correctly in the Disk Drives of Configuration/Setup Utility. See "Hard Disk Drive" on page 4. 2. Ensure that the diskette drive is correctly formatted. 3. Diskette drive connection/cable 4. Diskette drive 5. System board
Diskette drive does not work.	<ol style="list-style-type: none"> 1. Ensure that the diskette drive is not set to [None] in the Disk Drives of Configuration/Setup Utility. See "Hard Disk Drive" on page 4. 2. Diskette drive power 3. Diskette drive connection/cable 4. Diskette drive 5. System board
Diskette drive read/write error.	<ol style="list-style-type: none"> 1. Diskette. 2. Ensure that the diskette drive is not set to [Write protect] in the Security Options of Configuration/Setup Utility. 3. Diskette drive cable. 4. Diskette drive. 5. System board.
Diskette drive LED comes on for more than 2 minutes when reading data.	<ol style="list-style-type: none"> 1. Diskette 2. Diskette drive connection/cable 3. Diskette drive 4. System board
Diskette drive LED fails to light, and the drive is unable to access for more than 2 minutes.	<ol style="list-style-type: none"> 1. Diskette 2. Diskette drive power 3. Diskette drive connection/cable 4. Diskette drive 5. System board

Error Symptoms	Action/FRU
Diskette drive test failed.	<ol style="list-style-type: none"> 1. Diskette 2. Diskette drive 3. Diskette drive cable 4. System board
Hard Disk Drive	
NOTE: Ensure hard disk drive is configured correctly in Configuration/Setup Utility, cable/jumper are set correctly before diagnosing any hard disk drive problems.	
Hard disk drive test failed.	<ol style="list-style-type: none"> 1. Enter Configuration/Setup Utility and Load default settings. 2. Hard disk drive cable. 3. Hard disk drive. 4. System board.
Hard disk drive format error.	<ol style="list-style-type: none"> 1. Enter Configuration/Setup Utility and Load default settings. 2. Hard disk drive cable. 3. Hard disk drive. 4. System board.
Hard disk drive write error.	<ol style="list-style-type: none"> 1. Enter Configuration/Setup Utility and Load default settings. 2. Hard disk drive.
Hard disk drive LED fails to light, but system operates normally.	<ol style="list-style-type: none"> 1. With the system power on, measure the voltage of hard disk LED connector CN6. The reading should be: CN6 HDD Idle /Active pin-1 pin-1 +5Vdc/ - pin-2 pin-2 +5Vdc/0Vdc pin-3 pin-3 +5Vdc/0Vdc pin-4 pin-4 +5Vdc/ - 2. See "System Board Jumpers and Connectors" on page 109. 3. Hard drive LED cable.

Error Symptoms	Action/FRU
CD/DVD-ROM Drive	
<p>NOTE: Ensure CD/DVD-ROM drive is configured correctly in Configuration/Setup Utility, cable/jumper are set correctly and its laser beam is clean before diagnosing any CD/DVD-ROM drive problems.</p>	
<p>CD/DVD-ROM drive LED flashes for more than 30 seconds before LED shutting off.</p> <p>Software asks to reinstall disc.</p> <p>Software displays a reading CD/DVD error.</p>	<ol style="list-style-type: none"> 1. CD/DVD may have dirt or foreign material on it. Check with a known good disc. 2. CD/DVD is not inserted properly. 3. CD/DVD is damaged.
<p>CD/DVD-ROM drive LED doesn't come on but works normally.</p>	<ol style="list-style-type: none"> 1. CD/DVD-ROM drive
<p>CD/DVD-ROM drive cannot load or eject when the system is turned on and its eject button is pressed and held.</p>	<ol style="list-style-type: none"> 1. See "CD-ROM Emergency-exit <option 1>" on page 120 and "CD-ROM Emergency-exit <option 2>" on page 120. 2. Disconnect all cables from CD/DVD-ROM drive except power cable, then press eject button to try to unload the disk. 3. CD/DVD-ROM drive power. 4. CD/DVD-ROM drive
<p>CD/DVD-ROM drive does not read and there are no error codes or messages are displayed.</p>	<ol style="list-style-type: none"> 1. CD may have dirt or foreign material on it. Check with a known good disc. 2. Ensure that the CD/DVD-ROM driver is installed properly. See "CD/DVD-ROM Drive" on page 63. 3. CD/DVD-ROM drive.

Error Symptoms	Action/FRU
CD/DVD-ROM drive can play audio CD but no sound output.	<ol style="list-style-type: none"> 1. Ensure that the headphone jack of the CD/DVD-ROM has an output, then check if the audio cable from CD/DVD-ROM drive to system board CN20 is connected properly. See "System Board Jumpers and Connectors" on page 109. 2. Turn up the sound volume. 3. Speaker power/connection/cable. 4. CD/DVD-ROM drive.
Real-Time Clock	
Real-time clock is inaccurate.	<ol style="list-style-type: none"> 1. Ensure that the information in the Date and Time of Configuration/Setup Utility is set correctly. See "Date and Time" on page 21. 2. Load default settings. 3. CMOS battery. 4. System board
Audio	
Audio software program invokes but no sound comes from speakers.	<ol style="list-style-type: none"> 1. Speaker power/connection/cable.
Modem	
Data/fax modem software program invokes but cannot receive/send data/fax	<ol style="list-style-type: none"> 1. See "Factory-Installed Modem Card" on page 58.
Fax modem software program invokes but has no sound output. (Data files are received normally; voice from modem cannot be produced, but system sound feature works normally.)	<ol style="list-style-type: none"> 1. Ensure that the modem voice-in cable from modem adapter card to system board CN21 is connected properly. See "System Board Jumpers and Connectors" on page 109. 2. "Factory-Installed Modem Card" on page 58.

Error Symptoms	Action/FRU
Modem ring cannot wake up system from suspend mode.	<ol style="list-style-type: none"> 1. Ensure the "Modem Wake-Up on Ring" in Configuration/Setup Utility is set to [Enabled]. "Power Management" on page 5. 2. If PCI modem card is used, reinsert the modem card to PCI slot firmly or replace modem card. 3. If ISA modem card is used, ensure the modem ring-in cable from the modem card to system board CN16 is connected properly. See "System Board Jumpers and Connectors" on page 109. 4. In Win 98 ensure that telephone application is configured correctly for your modem and set to receive messages and/or fax.
Video and Monitor	
Video memory test failed. Video adapter failed.	<ol style="list-style-type: none"> 1. Remove all non factory-installed cards. 2. Load default settings (if screen is readable). 3. System board
Display problem: - Incorrect colors - No high intensity - Missing, broken, or incorrect characters - Blank monitor(dark) - Blank monitor(bright) - Distorted image - Unreadable monitor - Other monitor problems	<ol style="list-style-type: none"> 1. Monitor signal connection/cable. 2. Monitor 3. Video adapter card 4. System board
Display changing colors.	<ol style="list-style-type: none"> 1. Monitor signal connection/cable 2. Monitor 3. System board

Error Symptoms	Action/FRU
Display problem not listed above (including blank or illegible monitor).	<ol style="list-style-type: none"> 1. "Monitor" on page 72. 2. Load default settings (if screen is readable). 3. System board
Parallel/Serial Ports	
NOTE: Execute "Load BIOS Default Settings" in Configuration/Setup Utility to confirm ports' presence before diagnosing any parallel/serial ports problems.	
Serial or parallel port loop-back test failed.	<ol style="list-style-type: none"> 1. Make sure that the LPT# or COM# you test is the same as is set in Configuration/Setup Utility 2. Loop-back. 3. System board.
Printing failed.	<ol style="list-style-type: none"> 1. Ensure that the printer driver is properly installed. 2. Refer to the service manual for the printer. 3. Printer 4. Printer cable. 5. System board.
Printer problems.	<ol style="list-style-type: none"> 1. Refer to the service manual for the printer.
Joystick	
Game port does not respond or does not work.	<ol style="list-style-type: none"> 1. Connect a joystick to the game port, then execute "Interactive Test/Joystick" test in PC-Doctor diagnostics program. 2. System board.
Diagnostic Program	
Diagnostics programs cannot be executed.	<ol style="list-style-type: none"> 1. Reboot the system from the diagnostics diskette. 2. Load default settings. 3. Diagnostics diskette. 4. Memory module. 5. System board.
Missing diagnostics file(s).	<ol style="list-style-type: none"> 1. Diagnostics diskette.
Keyboard	
Some or all keys on keyboard do not work.	<ol style="list-style-type: none"> 1. "Keyboard" on page 66.

Error Symptoms	Action/FRU
Power Supply	
Pressing power switch does not turn off system. (Only unplug power cord from electrical outlet can turn off system.)	<ol style="list-style-type: none"> 1. Power switch cable assembly 2. "Power Supply" on page 69
Pressing power switch does not turn on system.	<ol style="list-style-type: none"> 1. Ensure the power override switch (situated at the back of the machine, just above the connector for the power cable) is not set to off. 2. Power switch cable assembly
Executing software shutdown from Windows98 Start menu does not turn off system. (Only pressing power switch can turn off the system).	<ol style="list-style-type: none"> 1. Load default settings. 2. Reload software from Recovery CD.
No system power, or power supply fan is not running.	<ol style="list-style-type: none"> 1. "Power Supply" on page 69 2. System board.
Other Problems	
Any other problems.	<ol style="list-style-type: none"> 1. See "Undetermined Problems" on page 74

Troubleshooting

Failing Parts or Assemblies: The check procedures generally help you trace a problem to one part or assembly. The last step of the specific check procedure you are using indicates that a part or assembly is failing. You should inspect the part or assembly before you decide to replace it. It might be loose, dirty, or in need of a small repair. The check procedures might lead you to two, or even three, possible failing parts or assemblies. The parts that might be failing are listed in order of the most probable failure. Also, the FRU parts are defined as replaced units and are not repaired in the field.

Measuring Voltages: Some check procedure steps instruct you to measure voltages on cable plugs and electronic board connectors. If you are asked to measure voltage at several places on a plug or connector, a chart next to or near the instruction indicates the number of the plug or connector, the pin numbers you should measure, the signal name, and the correct voltage for the condition you are measuring. Measure the voltage only at the pins listed in the chart. Remember to set the meter on the correct scale and to put the meter leads in the correct position for the voltage you are asked to measure.

NOTE: Use frame ground as the ground reference. Attach the black (ground) lead of meter to frame ground, except where specified otherwise.

Factory-Installed Storage Devices

Use this check procedure to test any factory-installed drives, including Zip drives.

ATTENTION: The customer may have customized settings in the Configuration/Setup Utility (other than default settings) on the computer you are servicing. Running the Configuration/Setup Utility might alter those settings. Take note of the current settings and verify that the customer settings are in place when service is complete.

NOTE: If you cannot access the hard disk drive or load a diskette from Drive A or load a CD from the CD-ROM drive, make sure that the Configuration/Setup Utility has the startup sequence set with diskette, CD ROM, and hard disk drives.

001 - START

- Insert the diagnostics diskette into the diskette drive.
- Power-off then power-on the system unit.

002 - DO ANY POST MESSAGES, ERROR CODES, BEEPS, OR SYMPTOMS OCCUR? (YES, READ AHEAD. NO, GO TO STEP 003)

- Go to “Index of Symptoms, Messages, Error Codes, or Beeps” on page 38.
- End.

003 -

- Select Utility from the menu.
- Select and execute Tech Support Form from the menu to generate a system configuration report.
- Compare the system configuration list with the actual devices installed in system.

NOTE: If necessary, remove the cover and visually compare the devices installed in the system unit to those shown in the Tech Support Form.

004 - IF THE NUMBER OF DISKETTE, HARD DISK, OR CD-ROM DRIVE IS NOT CORRECT, READ AHEAD; OR GO TO STEP 005.

- Check the cable installation of all disk drives.(See “System Board Jumpers and Connectors” on page 109)
 - Diskette drive should be connected to the system board connector CN14.
 - IDE Primary Channel Master and Slave Drives in Configuration/Setup Utility should be connected to the system board connector CN13.
 - IDE Secondary Channel Master and Slave Drives in Configuration/Setup Utility should be connected to the system board connector CN12.

NOTE: The CD-ROM drive that comes with system unit should be configured as IDE Secondary Channel Master device.

- Check all power supply voltages, switch, and jumper settings before you replace the system board. (See “System Board Jumpers and Connectors” on page 109)
- Check the power supply voltages if you have a “system no-power” condition. See “Power Supply Connectors and Voltages” on page 111.
- Check the hard disk and CD-ROM drives jumper settings. See “3.5-In. Hard Disk Drive Jumper Settings” on page 117. Check the voltages of all disk drive power connectors. See “Power Supply Connectors and Voltages” on page 111.
- Correct the parameter settings under Disk Drives in the Configuration/Setup Utility. See “Hard Disk Drive” on page 4.
 - In the Configuration/Setup Utility, check that the correct drive size is set for the flagged drive shown in the System Information. See “Viewing System Information, and Product Data” on page 17.
- Enter Configuration/Setup Utility and load default settings.

If the problem remains, check the continuity on the drive and the cable and replace it if necessary. If that does not fix the problem, replace the system board.
- End.

005 -

- Select Diagnostics from the PC-Doctor diagnostics program main menu. Select and execute Floppy Disk Test if you want to test diskette drive. Select and execute Hard Disk Test if you want to test hard disk drive.
- Select Interactive Tests from the PC-Doctor diagnostics program main menu, then select and execute CD-ROM/DVD Test if you want to test CD-ROM drive.

- If the diagnostics program did not detect a failure, but the system still displays a failure:
 - If an error or other symptom appears, go to “Index of Symptoms, Messages, Error Codes, or Beeps” on page 38.
 - If no error can be detected or the symptom is intermittent, go to “Undetermined Problems” on page 74.
- End.

Factory-Installed Modem Card

NOTE: The factory-installed modem is a 56.6 Kbps modem with a cable of microphone-in and speaker-out from system board.

001 - START

- In Windows 98 Device Manager, ensure that the modem is not configured with a conflicting COM port and IRQ setting.
- Ensure that the communication software is configured with the correct COM and IRQ settings (same COM port and IRQ as the modem).
- Ensure that all communication parameters (baud rate, data, stop and parity bits) are properly configured and are identical on both sides.
- Connect the phone line to the LINE port of the modem card.
- Power off the system unit.

NOTE: Check the outside phone line by connecting a working telephone to the telephone wall jack. Listen for a dial tone to ensure that the phone line is good.

002 -

- Insert the diagnostics diskette into the diskette drive.
- Power on the system unit.
- Select Diagnostics menu.
- Select All Tests, then execute Modem test.

003 - DOES THE MODEMPASS THE TEST? (YES, READ AHEAD. NO, GO TO STEP 004.)

- Power off the system unit.
- Remove all adapter cards.
- Connect a hard disk drive with pre-loaded Windows 98.
- Power on the system unit.
- Perform the following steps under Windows 98.

NOTE: If an operating system other than Microsoft Windows 98 is installed, the program screens and icons may differ from these instructions.

1. Start Microsoft Windows 98.
2. Select the **Start** icon.
3. Select **Program**, then select **Accessories, Hyper Terminal**.
4. Select an on-line service station, dial and connect to it.

004 - CAN THE MODEM DIAL OUT AND CONNECT TO ANY BBS SUCCESSFULLY? (YES, READ AHEAD. NO, GO TO STEP 005.)

- The modem adapter functions normally.
- End.

005 -

- Ensure that Windows 98 is properly installed, then power off the system unit.
- Plug the modem adapter card into a different PCI expansion slot.
- Go to step 002.
- If the error symptom still remains, replace the modem adapter card.
- End.

Audio (Not Supported by Diagnostics Program)

IMPORTANT: Audio tests for the sound card cannot be carried out in the PC-Doctor DOS diagnostics program. It is, however, possible to carry out a dial tone test for the modem. While performing this check, you may need to enter and exit Microsoft Windows 98 several times. When instructed to select an icon or button, double click on the item with the mouse.

NOTE: For more information about using Microsoft Windows 98, see the user's guide that came with the computer. If an operating system other than Microsoft Windows 98 is installed, the program screens and icons may differ from these instructions.

001 - START

- Power off the system unit.
- Remove all adapter cards.
- Connect a hard disk drive with pre-loaded Windows 98.
- Power on the system unit.
- Load default settings in setup (audio may be disabled).

002 - DO ANY POST MESSAGES, ERROR CODES, BEEPS, OR SYMPTOMS APPEAR? (YES, READ AHEAD. NO, GO TO STEP 003)

- Go to "Index of Symptoms, Messages, Error Codes, or Beeps" on page 38.
- End.

003 - DO ANY MESSAGES OR ERROR CODES DISPLAY AFTER POST COMPLETES BUT BEFORE MICROSOFT WINDOWS 98 STARTS? (YES, READ AHEAD. NO, GO TO STEP 004)

NOTE: If POST does not complete, answer this question "No."

- Ensure that Windows 98 is properly installed.
- End.

004 -

- Perform the following under Windows 98.

NOTE: If an operating system other than Microsoft Windows 98 is installed, the program screens and icons may differ from these instructions.

1. Start Microsoft Windows 98.
2. Select the **Start** icon.
3. Select **Settings**, then select **Control Panel**.
4. Select the **Sound** icon.
5. In the Sound window, select chimes from the **Names** field. (To test other adapter card software, select an action from a menu in that software.)

005 - IS THE PREVIEW BUTTON, OR ACTION IN OTHER SOFTWARE, SELECTABLE ON THE SCREEN (SHOWN IN BLACK AND NOT GRAY)? (YES, GO TO STEP 006. NO, READ AHEAD.)

- Ensure that Windows 98 is properly installed.
- Go to step 001.

006 -

- Select the Preview button from the Sound window.

007 - DO YOU HEAR ANY SOUND FROM THE SPEAKER? (YES, READ AHEAD. NO, GO TO STEP 008.)

- The audio feature is functioning normally. Click Cancel to close the dialog box. Exit Microsoft Windows 98.
- If the symptom remains or has changed, go to “Index of Symptoms, Messages, Error Codes, or Beeps” on page 38.
- End.

008 -

- Make sure that the volume control is not turned low.
- Make sure that the speaker and its adapter are not damaged.
- Make sure that the speaker is plugged in speak-out jack. See “System Board Jumpers and Connectors” on page 109.

- If the error cannot be resolved, replace the system board.
- End.

CD/DVD-ROM Drive

001 - START

- Insert the diagnostics diskette into the diskette drive and ensure that there is no CD/DVD in the CD/DVD-ROM drive.
- Select **Interactive Tests** menu, then select and execute **CD/DVD-ROM Test**.

002 - DO YOU SEE A MESSAGE “NO CD/DVD-ROM DRIVE OR MSCDEX DEVICE DRIVER INSTALLED.”? (YES, READ AHEAD. NO, GO TO 003.)

- Exit the diagnostics program and power off the system
- Check and ensure that the CD/DVD-ROM drive power cable and audio and data cables are not damaged and are connected properly.
- Check and ensure that the CD/DVD-ROM drive driver is loaded correctly.
- Load default settings.

003 - DO THE TESTS OF OPEN/CLOSE TRAY BY DIAGNOSTICS PROGRAM AND BY DEPRESSING CD/DVD-ROM DRIVE BUTTON WORK? (YES, READ AHEAD. NO, GO TO STEP 006.)

- Load a known good data CD/DVD into the CD/DVD-ROM drive and try to read its content by typing DIR at DOS prompt.

004 - CAN A CD/DVD BE READ FROM THE CD/DVD-ROM DRIVE? (YES, THEN THE CD/DVD-ROM DRIVE FUNCTIONS NORMALLY. NO, READ AHEAD.)

- Try reading the CD/DVD with a known good CD/DVD-ROM drive.

**005 - IS THE CD/DVD STILL NOT READABLE?
(YES, READ AHEAD. NO, GO TO STEP 006.)**

- Replace system board.
- End.

006 -

- Replace CD/DVD-ROM drive.
- End.

Memory

001 - START

- Power off the system unit.
- Insert the diagnostics diskette into the diskette drive.
- Ensure that all DIMMs are installed correctly.
- Power on the system unit.
- Take note of any messages, error codes, or symptoms.

002 - DO YOU RECEIVE POST MEMORY ERROR MESSAGE? (YES, READ AHEAD. NO, GO TO STEP003)

- Enter Configuration/Setup Utility then reboot the system. Take note of any messages, error codes, or symptoms. If the error message remains, go to step 005.

003 -

- Follow the screen instructions to run the Memory test.

004 - DOES THE MEMORY TEST COMPLETE WITHOUT AN ERROR? (YES, READ AHEAD. NO, GO TO STEP005)

- The system memory is now functioning correctly. If you suspect an intermittent problem, run the Memory test again.
- End.

005 -

- Replace each DIMM, one at a time, with a known working DIMM of the same size and type.
- If the problem does not appear, it means that the last DIMM replaced is defective. If all DIMMs on the system board, have been replaced and the problem remains, replace system board.
- Go to step 001.

NOTE: If system board has no memory installed, you will hear L-L-S-S-S. (L: long beep, S: short beep) beeps during POST.

Keyboard

001 - START

- Power off system unit and ensure the keyboard plug is connected properly.

002 -

- Insert the diagnostics diskette into the diskette drive and power on the system unit.
- Select Interactive Tests menu, then execute Keyboard test.

003 - DOES THE KEYBOARD FUNCTION CORRECTLY? (YES, READ AHEAD. NO, GO TO STEP 004.)

- Keyboard is functioning normally.
- End.

004 - ARE THERE ANY STUCK KEYS OR ANY GRIME IN THE GAP OF KEYCAPS? (YES, READ AHEAD. NO, GO TO STEP 005.)

- Power off the system unit. Carefully remove the grime and solve the stuck keys problem.
- Go to step 001.

005 - ARE THERE ANY BROKEN PINS IN THE KEYBOARD PLUG? (YES, GO TO STEP 007. NO, READ AHEAD.)

- Try with a known good keyboard.

006 - DOES THE ERROR SYMPTOM STILL REMAIN? (YES, READ AHEAD. NO, GO TO STEP 007.)

- Replace the system board.
- End.

007 -

- Replace the keyboard.
- End.

Mouse

NOTE: A sticking key button can cause the mouse to operate incorrectly. If you suspect this, go to "Keyboard" on page 66.

001 - START

- Make sure that the mouse ball turns freely.
- Make sure that the mouse plug connects properly.

002 -

- Power off the system unit.
- Insert the diagnostics diskette into the diskette drive.
- Power on the system unit.
- Select Interactive Tests menu, then execute Mouse test.

003 - DO YOU SEE THE MOUSE CURSOR IN THE DIAGNOSTICS PROGRAM? (YES, READ AHEAD. NO, GO TO STEP 011)

- Test right (left) button and check if right (left) button works.

004 - DOES THE MOUSE BUTTON WORK? (YES, READ AHEAD. NO, GO TO STEP 007)

- Test mouse cursor movement.

005 - DOES THE MOUSE MOVE SMOOTHLY AND KEEP X AND Y COORDINATES CHANGED? (YES, READ AHEAD. NO, GO TO STEP 006)

- Mouse is functioned normally.
- End.

006 -

- Power off the system unit.
- Open mouse bottom cover and clean track ball.
- Go to step 002.

007

- Power off the system unit.
- Check the mouse plug.

008 - ARE THERE ANY BROKEN PINS IN THE MOUSE PLUG? (YES, GO TO STEP 010. NO, READ AHEAD.)

- Try with a known good mouse.

009 - DO THE ERROR SYMPTOMS STILL REMAIN? (YES, READ AHEAD. NO, GO TO STEP 010.)

- Replace the system board.
- End.

010 -

- Replace the mouse.
- End.

011 -

- Exit diagnostics program.
- Ensure that the mouse driver is properly installed.
- Go to step 002.

Power Supply

001 - START

ATTENTION: Check the Power Override switch, situated at the back of the machine, just above the connector for the power cable. If this switch is activated (switched to on), no power will be supplied to the system.

- Power off (unplug) the system unit. Check the power cord for continuity. Replace if necessary.
- Check for the correct line voltage from the power outlet, and verify that the voltage selector switch (if present) is set to the correct voltage.
- Power on the system unit.

002 - DOES THE POWER SUPPLY FAN RUN? (YES, GO TO STEP 003. NO, GO TO STEP 004.)

003 - DOES THE SYSTEM FAIL TO SHUT OFF WHEN THE ON/OFF SWITCH IS PRESSED? (YES, READ AHEAD. NO, GO TO STEP 005.)

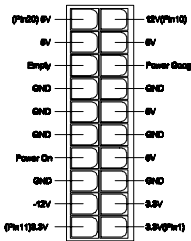
- You might have a damaged on/off switch cable assembly
- Disconnect the on/off switch cable assembly connector from the power supply connector and take an ohm reading.
- Go to step 007.

004 -

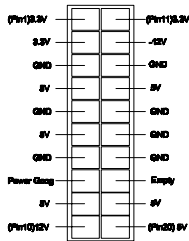
- Disconnect the power cord from the back of the system unit.
- Disconnect all power and switch cable connectors from the system board and the power supply.
- Disconnect the power connectors to all drives.
- Connect any one of the power connector to system board or drive as power load for driving up power supply.
- Reconnect the power cord and turn on the power supply.

**005 - DOES THE POWER SUPPLY FAN RUN?
(YES, READ AHEAD. NO, GO TO STEP 009)**

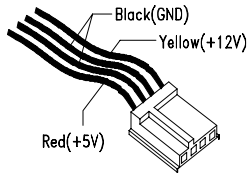
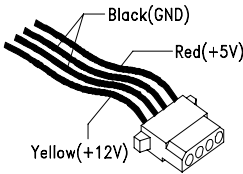
- With the system powered on and the power supply fan running, check the voltages of the power supply connectors for the system board and all drive connectors, as shown in the following figures.



Pin-hole side view



Cable side view



**006 - ARE THE VOLTAGES CORRECT AND DOES THE FAN RUN?
(YES, READ AHEAD. NO, GO TO STEP 009.)**

- The power supply is working normally.
- If you suspect the on/off switch cable assembly, see Step 003.
- If the fan continues to run when all connectors are plugged back in, go to See “Undetermined Problems” on page 74.
- If the fan stops running when a drive connector is plugged back in, go to “Start” on page 33.

007 - DO YOU HAVE AN OHM READING WHEN THE SWITCH IS PRESSED AND AN OPEN READING WHEN THE SWITCH IS RELEASED? (YES, READ AHEAD. NO, GO TO STEP 008.)

- Replace the on/off switch cable assembly.

008 -

- Replace the system board.
- End.

009 -

- Replace the power supply.
- End.

Monitor

First, set the system to VGA mode. To do this in Windows 98, depress the F8 function key during startup. Safe mode (VGA) will be set for Windows 98. Use the operating system's video setup to change the monitor resolution.

The monitors that come with the system are DDC2A/B or DDC1/2B+ (Display Data Channel) compliant. While starting Windows 98, the DDC2 monitor passes resolution and frequency information to the system. The system interprets the data and sets up the proper refresh rate.

If the monitor type is set to the power saving mode, the screen remains black and the LED lights or flashes in amber color. When the monitor is turned on alone, or is turned on and connected to a powered-off system unit, the monitor LED blinks in amber color. Under the normal operating conditions, the LED lights in green color.

NOTE: Some monitors have a detachable system I/O signal cable between the monitor and the system unit. Check the line voltage, power cord, and continuity for the system I/O signal cable before replacing the monitor. See "Monitor Port Signals" on page 127 for pin identification.

001 - START

- Power off the system unit and monitor.
- Remove all adapter cards.
- Make sure that the monitor I/O signal cable is properly connected to the system unit and monitor.
- Make sure that the power cords are properly connected to the system unit and monitor, and that the line voltage is correct.
- Make sure that the monitor contrast and brightness controls are not turned too low.
- Make sure that the diagnostics diskette is in the diskette drive.
- Power on the monitor, and wait 20 seconds.
- Power on the system unit.

NOTE: If the monitor was not sold together with the system unit, you may need to refer to the service information provided with the monitor.

002 - IS THE SCREEN READABLE? (YES, READ AHEAD. NO, GO TO STEP 004)

NOTE: If the screen shows a blinking cursor with no memory count running, answer this question "No."

- Select Interactive Tests from the Main Menu.
- Select and execute Video test from the menu.
- Follow the prompts and perform the video test.
- Go to "Index of Symptoms, Messages, Error Codes, or Beeps" on page 38.
- You might have to adjust the monitor controls to obtain the best image.

003 - DOES THE MONITOR SUCCESSFULLY PASS ALL TESTS? (YES, READ AHEAD. NO, GO TO STEP 004)

- You have successfully completed the video diagnostics tests. If the problem remains, go to "Index of Symptoms, Messages, Error Codes, or Beeps" on page 38
- End.

004 -

- Power off the system unit.
- Remove the hard disk drive system cable.
- Power on the system unit.

005 - IS THE SCREEN STILL NOT READABLE?

- Replace the monitor. If the symptom remains, replace the system board.
- End.

Undetermined Problems

If an error code, error message or error beeps is present, go to “Index of Symptoms, Messages, Error Codes, or Beeps” on page 38. If you did not receive any messages, error codes, or beeps, see if the symptom is listed in “Table 2-3 Error Symptoms List” on page 45. If you still cannot solve the problem, continue with this check:

1. Check the power supply voltages (See “Power Supply Connectors and Voltages” on page 111). If the voltages are correct, return here and continue with the following steps:
2. Power off the system unit.
3. Perform the following checks, one by one, until you have isolated the problem FRU (refer to “Parts/ Test Point Locations” on page 107 for locations):
 - Load default settings in setup.
 - Check all system board jumper positions and switch settings.
 - Check all adapter card jumper positions.
 - Check all device jumper positions.
 - Check all cables and connectors for proper installation.
4. If the jumpers, switch, and voltage settings are correct, continue with the following steps:
 - Remove or disconnect the following, one at a time:
 - Non-IBM devices
 - External devices
 - Any adapter card (modem card or video card, if installed)
 - CD-ROM drive
 - Diskette drive
 - Hard disk drive
 - DIMM
 - Processor
 - System board
5. Power on the system unit.
6. Repeat steps 2 through 5 until you find the failing device or adapter.
7. If software related, reload software from Recovery CD.

8. If the symptom changes, go to “Index of Symptoms, Messages, Error Codes, or Beeps” on page 38 or to the check procedure for the last item tested.

Replace the last item tested if the system operates normally after removing the last item.

Diagnostic Aids

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Introduction

This section explains the diagnostic aids, power-on self test (POST) and diagnostics program (PC-Doctor), that are available for troubleshooting problems on the system.

Power-On Self Test

Each time you power-on the system, the power-on self test (POST) is initiated. Several items are tested during POST, but is for the most part transparent to the user.

POST checks the following:

- System Board
- Memory
- SVGA Controller
- Hard Disk Drive(s)
- Floppy Diskette Drive(s)
- Keyboard
- Mouse
- Parallel Port(s)
- Serial Port(s)
- CD/DVD-ROM Drive(s)
- Sound Controller*

To start POST, turn on the monitor and then the system unit. The following will happen:

1. The IBM Personal Computer logo will appear on the screen.
2. At this time one of two hot-keys may be used. The F1 key will cause the system Configuration/Setup Utility menu to appear. The F9 key will switch the graphical IBM logo screen to the traditional text-based system startup screen, which displays BIOS version and system memory tested. For Personal Computer Type 2284, the F9 key will only work after exiting Configuration/Setup Utility.
3. If an error is detected during POST, the IBM logo screen will automatically switch to the text-based screen and display the error message or code with a beep. Depending on the criticality of the POST error, the system may halt and/or display the message "Press <F1> to enter to the Setup or <Enter> to continue..."

If this message appears, pressing the **Enter** key will allow the system to attempt to proceed despite the reported error; pressing **F1** will cause the system Configuration/Setup Utility menu to appear.

4. If no keyboard keys are pressed, and if POST is completed without errors, the system will then proceed with the loading of Windows98 or other operating system from a hard disk drive or diskette drive A or CD-ROM drive, depending on the Start options selected in the Configuration/Setup Utility.

If any errors are detected by POST, there will be an error message accompanied with an error code shown on display screen and a beep. See "Index of Symptoms, Messages, Error Codes, or Beeps" on page 38 to find the most likely cause and countermeasure.

Diagnostic Diskette

WARNING: This manual is intended to test the IBM Personal Computer Type 2284 machine type only. Testing devices which are not included with the original product package, including other IBM products, prototype cards, or modifying hardware settings may give false errors and invalid system responses. The diagnostics not specifically made for this model may also report incorrect errors and information.

The diagnostics program comes on a diskette along with this book. This version of PC-Doctor diagnostics program, developed by Watergate for IBM, is the primary method of testing the computer. You can use it to test the IBM components of the system and some external devices. The amount of time required to test components depends on the number of components installed and selected. The more devices you have attached to your system and selected in PC-Doctor, the longer the testing will take.

Using the Diagnostic Diskette

1. Power-off the system unit.
2. Insert diagnostic diskette in drive A.
3. Power-on the system unit.

NOTE: Do not press **F1** during POST. If any POST errors appear after POST, make a note of the errors.

4. DOS should load. During boot, verify that each driver loads successfully. For drivers that do not load successfully, verify that the device driver is associated with it and is installed properly.
5. Diagnostics program (PC-Doctor) will load, then follow the screen instructions to operate.

Using Diagnostic Program from Recovery CD

1. Insert the Personal Computer recovery CD into the CD-ROM drive then restart computer.
2. Depress **F1** while POST to enter Configuration/Setup Utility menu. Select and enter "Startup Options", set the first priority of boot sequence to CD-ROM. Save and exit from Configuration/Setup Utility.
3. When screen displays IBM Recovery Program menu, choose "Run Diagnostics" to execute diagnostic program.
4. Follow the instructions on the screen to operate the diagnostics program.

Diagnostics Program Features

Diagnostics program (PC-Doctor) includes the following features:

Table 3- 1 Diagnostic Program Main Menu Selections

Main Menu Selections	Submenu Selections
Diagnostics	<ul style="list-style-type: none"> • Run Normal Test • Run Quick Test • CPU/Coprocessor • System board • Video Adapter • Serial Ports • Parallel Ports • Fixed Disks • Diskette Drive • Other Devices • Zip Drive • HiFD Drive • LS-120 Drive • CD-ROM/DVD Drive • Memory Test-Full • Memory Test-Quick • Intel PNA Test
Interactive Tests	<ul style="list-style-type: none"> • Keyboard • Video • Internal Speaker • Mouse • Joystick Test • Diskette • Printer Test • CD-ROM/DVD Test • Stereo Speaker • Accton Test
Hardware Info	<ul style="list-style-type: none"> • System Configuration • Memory Contents • IRQ and DMA Use • Device Drivers • COM and LPT Ports • Physical Disk Drives • Logical Disk Drives

Table 3- 1 Diagnostic Program Main Menu Selections
(Continued)

Main Menu Selections	Submenu Selections
Hardware Info	<ul style="list-style-type: none"> • VGA Information • Software Interrupts • SCSI Devices • I/O Use • IDE Drive Info • PCI Information • PNPISA Information • SMBIOS Information • DIMM/RIMM Info
Utility	<ul style="list-style-type: none"> • Run External Test • Surface Scan Hard Disk • Benchmark System • DOS Shell • Tech. Support Form • Select Languages • View Test Log • Print Log • Save Log • View Stored Results
Quit	<ul style="list-style-type: none"> • Exit Diagnostics • Park HD • Reboot • About

Repair Information

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Removals and Replacements

BEFORE REMOVING ANY FRU, POWER-OFF THE COMPUTER, UNPLUG ALL POWER CORDS FROM ELECTRICAL OUTLETS, THEN DISCONNECT ANY INTERCONNECTING CABLES.

ATTENTION: The system board, processors, adapter cards, DIMMs, and upgrade processors can be damaged by electrostatic discharge. Use an electrostatic discharge (ESD) strap to establish personal grounding. If you don't have an ESD strap, establish personal grounding by touching a ground point with one hand before touching the static-sensitive FRUs.

The arrows in the removals and replacements procedures show the direction of movement to remove a field-replaceable unit (FRU), to turn a screw, or the direction to press a tab to release the FRU.

Begin all removals by removing the cover (and rear cover, if applicable).

When other FRUs must be removed prior to 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.

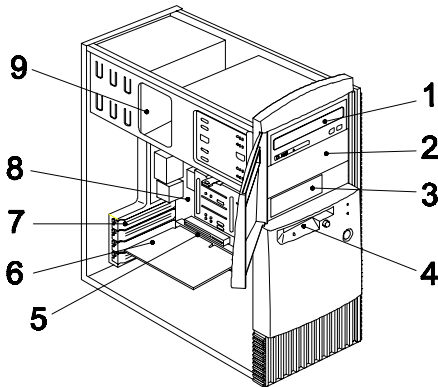
Before disconnecting any cables, note their location and orientation. Reinstall any new FRUs with cabling in their original location.

Handling ESD-Sensitive Parts

Many electronic parts are sensitive to electrostatic discharge (ESD). To prevent damage when working with ESD-sensitive parts, observe the following instructions. Do these in addition to taking all the usual precautions, such as switching off the power and unplugging the power cord.

- Keep the ESD-sensitive part in its original shipping container (or special ESD bag) until you are ready to install the part.
- Make the fewest possible movements with your body to prevent an increase of static electricity from clothing fibers, carpets, and furniture.
- Put the ESD wrist strap on your wrist. Ensure the machine is turned off. Connect the wrist strap to the serial bracket mounting screw. This discharges any static electricity in your body to the machine frame.
- Hold the ESD-sensitive part by its edge connector shroud (cover). Do not touch its pins. If you are removing a plug-able module, use the correct tools.
- Do not place the ESD-sensitive part on the machine cover or on a metal table. If you need to put down the ESD-sensitive part for any reason, put it into its original container.
- Machine covers and metal tables are electrical grounds. They increase the risk of damage because they make a discharge path from your body through the ESD-sensitive part. (Large metal objects can be discharge paths without being grounded.)
- Prevent ESD-sensitive parts from being accidentally touched by other persons. Reinstall machine covers when you are not working on the machine.
- If possible, keep all ESD-sensitive parts in a grounded metal cabinet.
- Be extra careful when working with ESD-sensitive parts while cold-weather heating is being used. Low humidity increases static electricity.

Identifying the Parts of the System Unit



This computer system has four bays that can hold 5.25-inch and 3.5-inch drives. Additional devices can be installed in the empty bays.

Diskette drives in this unit use the standard diskette advanced technology (AT) interface. Hard disk drives in this unit use an integrated drive electronics (IDE) AT interface. This computer supports the American National Standards Institute (ANSI) standard for AT attachment disk drives.

It also has interface slots for installation of additional cards devices. Industry Standard Architecture (ISA) and Peripheral Component Interconnect (PCI) adapter cards are both supported.

1. **Bay 1.**

This drive bay can hold a 5.25-inch half high drive or a 5.25-inch slim drive. A 3.5-inch drive can be accommodated with additional brackets. This bay can hold a CD-ROM, DVD-ROM, diskette, hard disk, tape, or Zip drive.

2. **Bay 2.**

This drive bay can hold a 5.25-inch half high drive or a 5.25-inch slim drive. A 3.5-inch drive can be accommodated with additional brackets. This bay can hold a CD-ROM, DVD-ROM, diskette, hard

disk, tape, or Zip drive.

3. **Bay 3.**

This drive bay can hold a 3.5-inch slim drive, such as a diskette, hard disk, tape, or Zip drive.

4. **Bay 4.**

This drive bay is designed for a 3.5-inch diskette drive.

5. **Adapter card connectors.**

Adapter card connectors are sockets on the system board into which adapter cards are installed. Your system board has four adapter card connectors. One of these connectors is for an ISA card and three are for PCI cards. Since two of these connectors are shared (one ISA and one PCI next to it), only three cards (excluding the AGP video card) can be installed at any time.

6. **Adapter cards.**

Adapter cards add to your computer's capabilities.

7. **Adapter card slots.**

Adapter card slots are the holes in the back of the tower that permit external access to adapter cards.

8. **System board.**

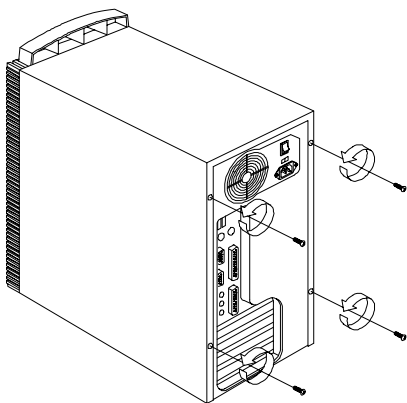
The system board is the main circuit board in your computer. It contains the processor, also known as the central processing unit (CPU), and the system battery. It also contains sockets for memory modules, connectors for adapter cards, and connectors for the cables that carry data to and from drives.

9. **Power supply.**

The power supply provides the electricity that is used by the other hardware components in your computer. This model may come with a 95 power supply.

Cover

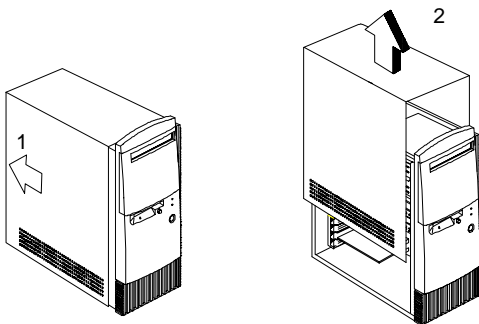
- Disconnect the system unit power cord.
- Remove the 4 screws at the back of the tower.



- Insert a screwdriver under one of the tabs on the back of the cover and gently pry the tower cover so that it separates from the tower.
- Slide the cover back about half inch (or 1.25 centimeters).
- Lift the cover up by the top front and back edges, pulling the sides out and away from the tower.

NOTE: To prevent the tower from tipping over, you may want to lay the tower on its side on a work surface, such as a table.

- Touch the bare metal frame of the system to dissipate any static electricity from your body (do not touch any of the components inside the frame until you have done this). Do not touch any component(s) with a voltage warning label.



NOTE: Replacing the Cover

- To replace the tower cover, lower the cover down over the tower, pressing in on the sides so the hooks inside the cover fit over the bottom ledge of the tower. Slide the cover forward into place. Secure the tower cover by replacing the screws you removed.

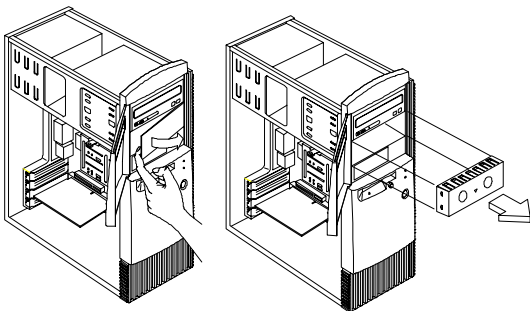
CAUTION: When you replace the cover, there are hooks inside the cover that help fit it to the tower.

Bay Panels

If you remove a drive from a bay and you do not intend to install a new drive immediately, reinstall the bay panel on the empty exposed drive bay.

Follow these steps to remove the plastic bay panel from the front of the system unit cover.

- Hold a bay panel and press either side to unlatch it from the front of the system unit cover.
- Pull the bay panel and EMI bay cover out

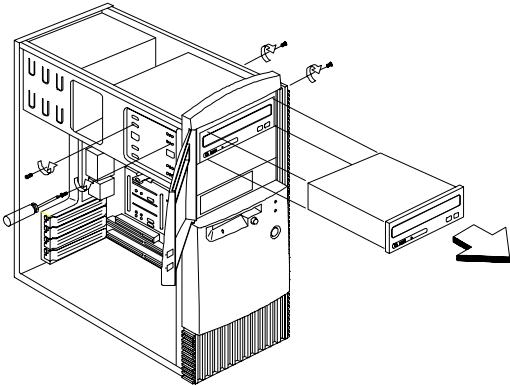


NOTE: Replace the EMI Bay Panel

- Replace the EMI bay cover.
- Insert a bay panel into the opening at the front of the system cover, aligning the panel latches with the sides of the unit.
- Push the panel back until you hear the latches click into place.

Bay 1- 5.25-In. Bay (Internal or External Access)

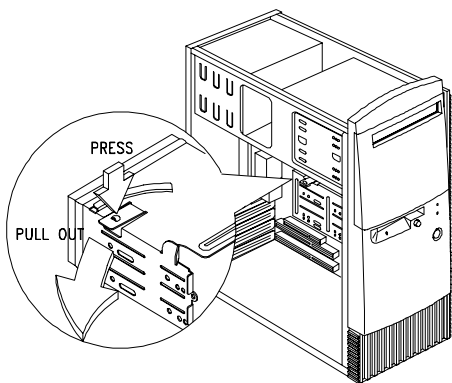
- Disconnect any cable on the drive (note location and orientation of cables).
- Remove the screws.
- Pull out the drive.



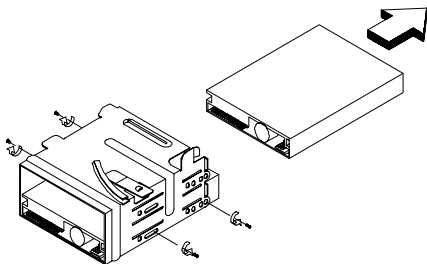
Bay 3 - 3.5-In. Bay (Internal or External Access)

Bay 4 - 3.5-In. Bay (External Access for Diskette Drive)

- Disconnect the cables (note location of cables).
- Press the lever and rotate outward.
- Pull carefully and slowly as soon as the warning arrow appears.
- The drive frame becomes free after the line behind the arrow appears. Remove the frame from the chassis

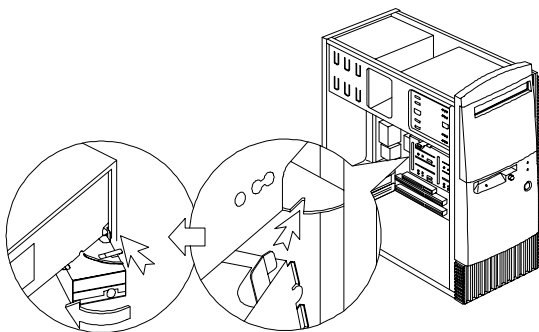


- Remove the screws located on both sides of the drive and slide the drive out.



NOTE: Reinstall the 3.5-in Drive Frame

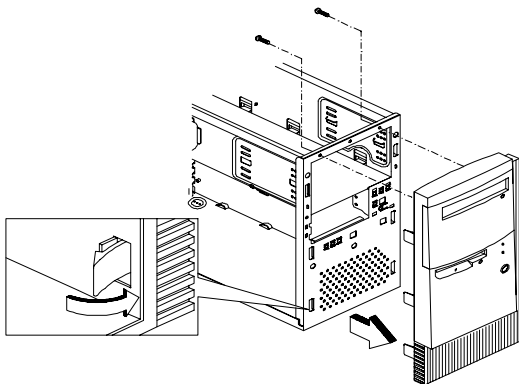
- Before reinstalling the drive frame into the main unit, make sure the upper and lower drive frames are properly reattached.
- Align the front notch of the drive frame with the system chassis
- Align the top rail of the drive frame with the system chassis and swing inward until it “clicks” to lock.



- Re-attach the power and signal cables to the drives.

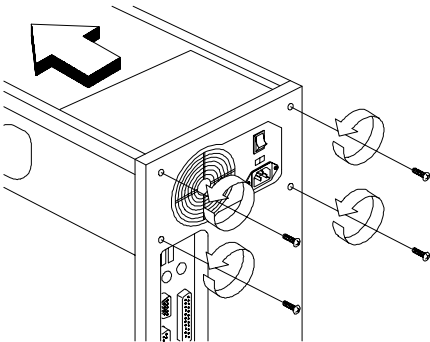
Front Panel

- Remove the 2 screws and release the 6 latches that holds the front panel.
- Gently remove the front panel from the tower.



Power Supply

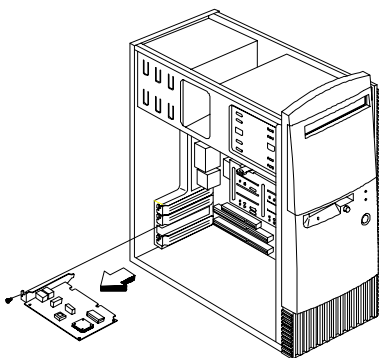
- Disconnect all cables necessary before removal (note location of cables).
- Remove the four screws from the chassis.
- Push the power supply forward towards the CD/DVD-ROM drive.
- Once it is sufficiently forward, place your hand underneath the power supply and push upwards to detach it from the chassis.



Adapter Cards

NOTE:

1. Before removing an adapter card, note the location of the adapter card and any cables. When removing an adapter card, install the replacement card in the same slot as the one you removed.
 2. If necessary, remove cards from the adjacent slots of the failed card.
- Position the system unit such that the card is accessible to you.
 - If the adapter card has cables, disconnect them. Be sure to take note where those cables are connected and how they are oriented. You will need to reconnect those cables when you reinstall the card.
 - Remove the adapter card screw.
 - Carefully pull the adapter card straight out of the slot so that the card does not bend.

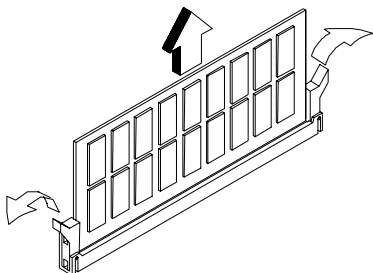


Memory(DIMM)

CAUTION: Memory modules are sensitive to static discharge.

- Press the levers on both sides of the socket down and outwards.
- Lift the DIMM to remove.

ATTENTION: Place your forefingers on the top of the DIMM before you press the holding clips to gently disengage the DIMM from the socket.

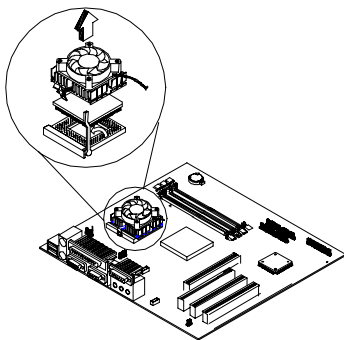


AMD K7 Duron Processor

NOTE: Determine the type of processor you are installing and make sure the jumpers are set correctly. Run the Configuration/Setup Utility after correctly installing a processor.

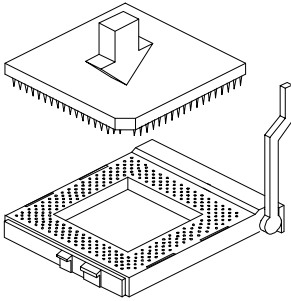
CAUTION: Processors are sensitive to static discharge.

- Remove adapter cards if applicable.
- Detach the heat sink cable from the fan connector.
- Remove the fan sink by pressing the release tab (rectangular end) and lifting it up from the Processor.
- Pull up the ZIF socket release lever.
- Lift the processor out of the socket.

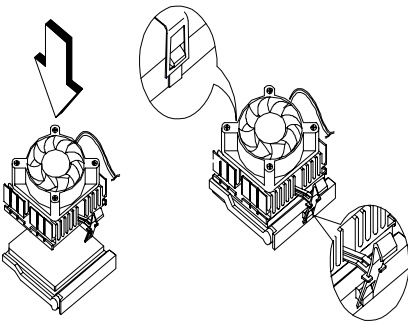


NOTE: Installing the processor

- Place the ZIF socket release lever to the release (up) position.
- Insert the new processor, matching the notched corner of the processor with the pin 1 indicator on the socket.



- Push down the lever to lock the processor to the socket.
- Place the processor heat sink fan over the processor
- Insert one side of fan brace onto the ZIF socket.
- Secure by latching the other side to the ZIF socket.
- Reconnect the processor fan sink cable to the connector FN1 on the system board.

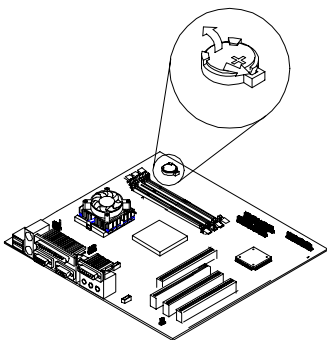


System Backup Battery

CAUTION: All BIOS configuration settings will be lost when the backup battery is removed!

ATTENTION: Be careful when removing the backup battery. If the metal lever is damaged or broken, the system board must be replaced.

- Gently pull the metal lever away from the backup battery.
- Lift the backup battery out.

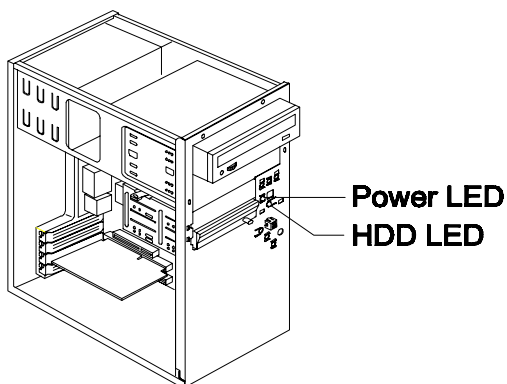


IMPORTANT: Make sure to insert the battery with the positive side facing up. A plus(+) sign indicates the positive side.

- If you replace the system battery, you need to reset the system date and time. You can perform this task from the Windows 98 desktop or from the Configuration/Setup Utility. To reset the system date and time in the Configuration/Setup Utility, select the Date and Time option from the Main Menu.

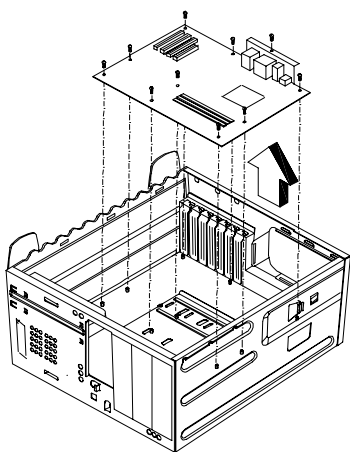
Indicator LED and Cable

- Push in on the indicator LED and remove from the rear.
- Disconnect the LED and cable from the system board.



System Board

- Remove all adapter cards.
- Disconnect all cables connected to the system board. Note the location and orientation of all cables.
- Remove the screws securing the system board to the chassis.
- Lift the system board to remove from chassis.
- Remove memory (DIMM) if applicable.
- Remove processor if necessary.



NOTE: System Board Installation

- Before reinstallation, position the housing on its side. When installing a new system board, push the board to the rear and align it with the front locating pin. Visually verify that the board is aligned properly, then press the board down.
- Be sure to reinstall the processor, DIMMs, I/O port bracket onto the new system board if applicable.
- After installing the system board, secure with original screws.
- Change all jumper settings to match those of the original board.
- Reinstall other components into the machine i.e. drives, power supply, cables, etc.

- Upgrade the BIOS version on the new system board using the BIOS upgrade utility.
- Change the Machine Type and Serial Number in the BIOS to match the original planar BIOS settings.
- Reboot the system and run the Configuration/Setup Utility.

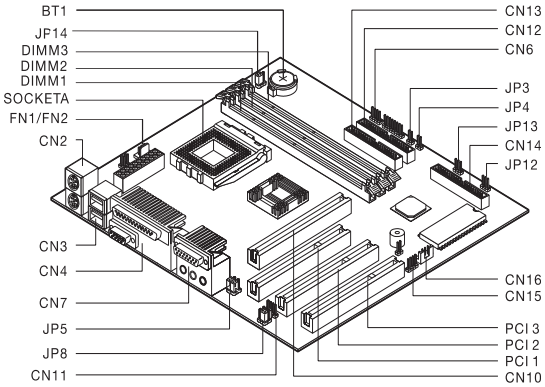
Parts/Test Point Locations

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Introduction

This chapter contains system board layouts and jumper settings. It is useful when you are asked to measure voltages. Use this information to help you locate parts such as electronic boards, connectors, pin numbers, and test points. This chapter also contains jumper settings for the hard disk drive, CD-ROM, and the connector information for modem adapter card.

System Board Jumpers and Connectors



NOTE: The blackened pin of a jumper represents pin 1.

System Board Jumper Setting

Jumper/Settings	Function
JP14	CMOS Setup
1-2	*Normal
2-3	Clear CMOS

System Board Connector Functions

Connector	Function	Connect to...
BT1	System battery connector	System battery
DIMM 1 DIMM 2 DIMM 3	System memory module connectors	Memory
FN1/FN2	Fan connector	Processor fan
PCI 1 PCI 2 PCI 3	PCI slots	Adapter cards
CN2	PS/2 keyboard and mouse connectors	Keyboard and mouse
CN3	USB connectors	USB device
CN4	Parallel and serial connectors	Printer, parallel and serial devices

CN6	HDD LED connector	HDD LED
CN7	Audio connector	
CN10	AGP video card connector	VGA card
CN11	CD-in connector	CD-ROM
CN12	Secondary IDE connector	CD-ROM
CN13	Primary IDE connector	Hard Disk Drive
CN14	Diskette drive connector	Diskette Drive
CN15	Front panel USB connector	USB device
CN16	Wake on LAN (WOL) connector	LAN card
JP3	Power Switch connector	Power switch
JP4	Reset switch connector	Reset switch
JP5 JP8	Headphone and line out jumpers	
JP12	Power LED connector	Power LED
JP14	CMOS setup	
Socket A	Processor connector	Processor

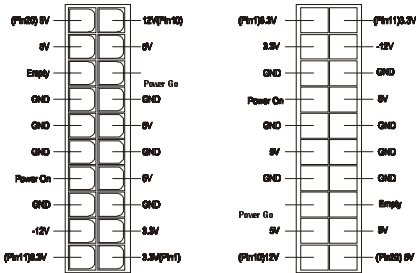
NOTE: The white corner of the jumper block represents pin 1.

Power Supply Connectors and Voltages

Refer to the following figures when checking for voltages on power supply cable connectors.

When checking voltages, the power supply fan must be running. To power-on the power supply without using the on/off switch, use a screwdriver or other tool to short the connector JP3 (with the switch cable disconnected from the connector on the system board), or use a connection (jumper) to short the black and green wires of the 20-pin connector on power supply.

20-pin Power Connector



Pin-hole side view

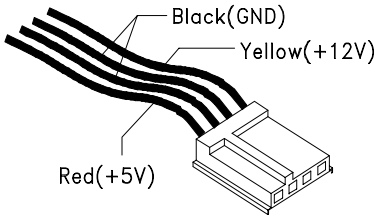
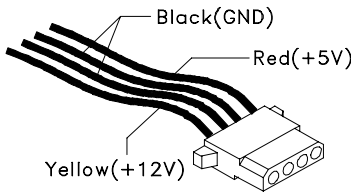
Cable side view

Power Supply Output Pin Assignment

Pin	Voltage	Cable Color
1	+3.3Vdc	Orange
2	+3.3Vdc	Orange
3	Ground	Black
4	Power-on	Red
5	Ground	Black
6	+5Vdc	Red
7	Ground	Black
8	Power Good	Gray
9	+5Vdc	Purple
10	+12Vdc	Yellow
11	+3.3Vdc	Orange
12	-12Vdc	Blue
13	Ground	Black

Power Supply Output Pin Assignment (Continued)

Pin	Voltage	Cable Color
14	+5Vdc	Green
15	Ground	Black
16	Ground	Black
17	Ground	Black
18	no connect	no connect
19	+5Vdc	Red
20	+5Vdc	Red

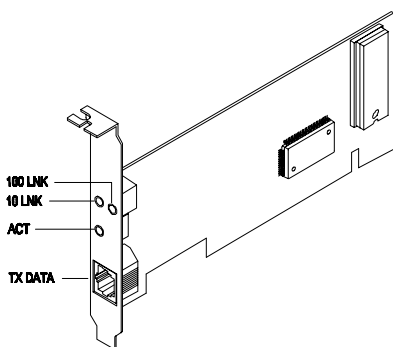


Network Cards

NOTE: While transferring the data, "Act" LED emits light to indicate a ready state and the link indicators "10 Link" or "100 Link" specifies the current line transmission speed. Depending on the 10Base-T/100Base-T connections to unshielded twisted-pair(10Base-T, UTP) or unshielded twisted-pair(100Base-T, Category 5), the transmission speed will be auto-detected.

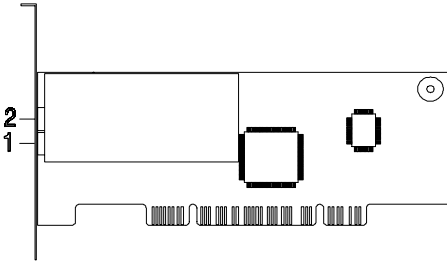
The RJ-45 connector is used.

Accton



NOTE: While transferring the data, "Act" LED emits light to indicate a ready state and the link indicators "10 Link" or "100 Link" specifies the current line transmission speed. Depending on the 10Base-T/100Base-T connections to unshielded twisted-pair(10Base-T, UTP) or unshielded twisted-pair(100Base-T, Category 5), the transmission speed will be auto-detected.

Factory-Installed Modem Card Layout

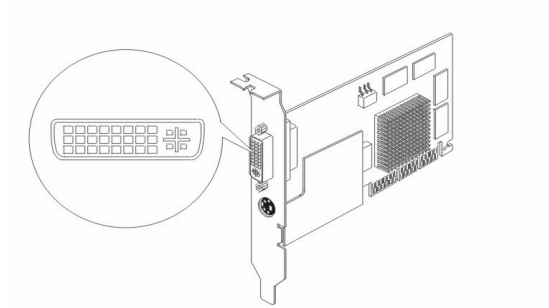


GVC Factory-Installed Modem Card Connector Functions

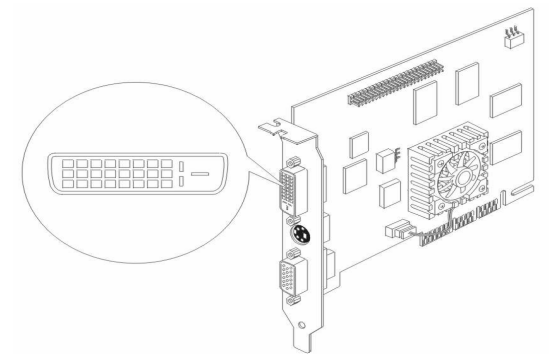
Item	Function	Connect to...
1	Telephone line-in	Telephone line
2	Telephone line-out Some modem adapters may come without this jack.	Telephone set

Video Cards

Nvidia M64 w/ TV Out, 32MB



Nvidia NV10 w/ TV Out, 32MB



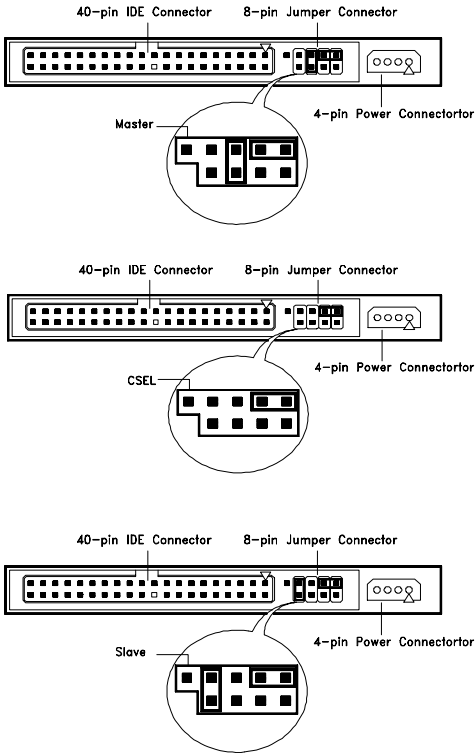
P&D-D Signal Pin Assignments

Pin	Signal	Pin	Signal
1	TMDS Data2 +	16	USB data +
2	TMDS Data2 -	17	USB data -
3	TMDS Data2 return	18	1394 outer shield (optional) & Charge Power return ²
4	Unused	19	1394 Vg
5	Unused	20	1394 Vp
6	Unused	21	TMDS Data0 +
7	TMDS Clock return	22	TMDS Data0 -
8	Charge power ¹ +	23	TMDS Data0 return
9	1394 pair A, data -	24	Unused
10	1394 pair A, data +	25	DDC return
11	TMDS Data1 +	26	DDC data (SDA)
12	TMDS Data1 -	27	DDC clock (SCL)
13	TMDS Data1 return	28	+5 VDC
14	TMDS Clock +	29	1394 pair B, Clock +
15	TMDS Clock -	30	1394 pair B, Clock -

¹ Optional output from monitor.

² Note: The IEEE-1394 internal cable bundle needs an outer shield to minimize internal crosstalk within the cable construction. The outer EMI containment shield for the IEEE-1394 function will be provided by the overall P&D cable shield. If the internal bundle shield for IEEE-1394 is required, this may be terminated to pin #18. It is recommended that this implementation be evaluated in the case where both Charge Power return and the IEEE-1394 internal cable bundle shield will be commoned to pin #18.

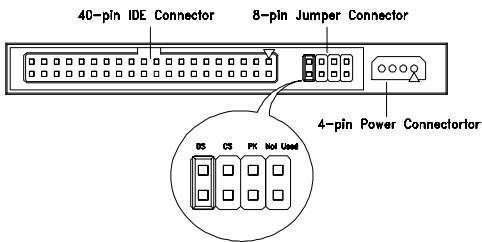
3.5-In. Hard Disk Drive Jumper Settings



3.5-In IBM Hard Disk

The configuration of the following jumpers control the drive's mode of operation:

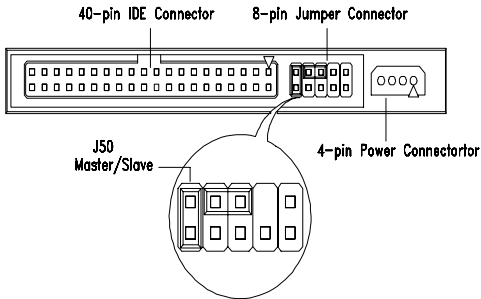
- Master
- Slave
- CSEL - Cable Select



3.5-In Quantum Fireball Series Hard Disk

The configuration of the following jumpers control the drive's mode of operation:

- DS - Drive Select (For Master only)
- CS - Cable Select
- PK - Park, used as a place to store a jumper



3.5-In Maxtor Hard Disk

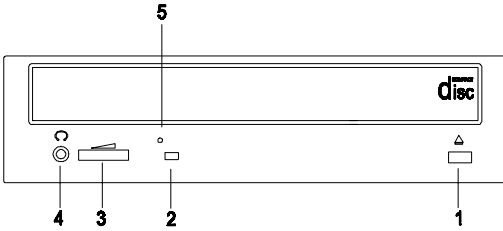
3.5-In Maxtor Hard Disk Drive Jumper Settings

J50	Description
On	Drive configured as Master or Drive configured as Master, with an attached Slave
Off	Drive configured as Slave.

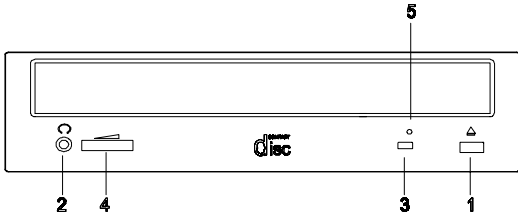
CD-ROM Drive

ATTENTION: Either <option 1> or <option 2> CD-ROM drive may come with your machine. Their front panel buttons, indicators and emergency eject method may be different.

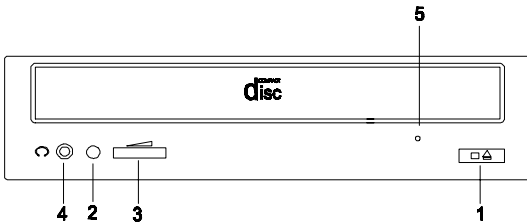
Lite-on



LG



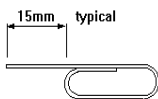
BTC



CD-ROM Front Panel Introduction

Item	Description
1	Load / eject button
2	Headphone jack
3	Power-on / busy indicator, lights up in green color while disc is set in ready state; lights up and flashes in amber color during data read or seek operation.
4	Headphone volume control
5	Emergency eject hole. See CD-ROM Emergency-exit <option 1> below. Disc tray and emergency eject See CD-ROM Emergency-exit <option 2> below.

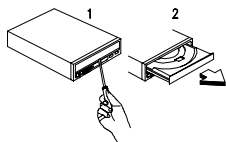
CD-ROM Emergency-exit <option 1>



If for any reason the tray does not eject automatically, insert and press an eject-bar inside the emergency eject hole to manually eject the tray. A straightened paper clip with a diameter of 1.2 mm (typical) can be used as an eject-bar.

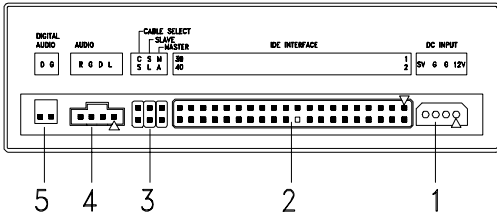
ATTENTION: Make sure to turn off the power before manual disc eject operation.

CD-ROM Emergency-exit <option 2>



Locate the bottom edge of the disc tray. Gently pry the disk tray open with a screwdriver. When the disc tray opens, simply remove the disc from the CD-ROM drive.

CD-ROM Drive Rear Panel Connectors and Jumpers



NOTE: CD-ROM drives may come with item no. 5 (digital audio output) connectors.

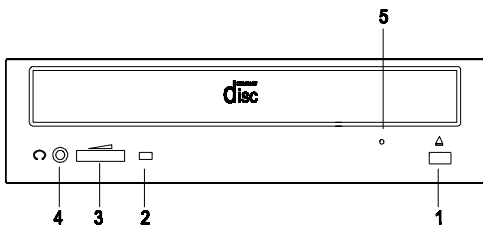
CD-ROM Drive Rear Panel Connectors and Jumpers

Item	Function	Connect to...
1	Power supply connector	Power supply
2	Interface connector	System board CN12: IDE 2
3	Configuration jumper. <u>CS</u> <u>SL</u> <u>MA</u> <u>Description</u> -- -- On Master -- On -- Slave. On -- -- Cable select	--
4	Audio line out connector	System board
5	Digital audio output	--

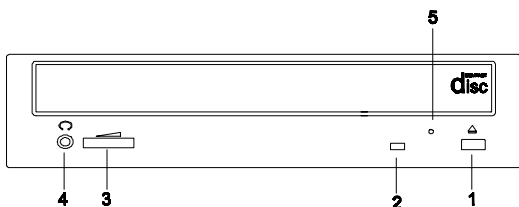
CD-ROM R/W Drive

ATTENTION: Either <option 1> or <option 2> CD-ROM R/W drive may come with your Personal Computer. Their front panel buttons, indicators and emergency eject methods may be different.

TEAC



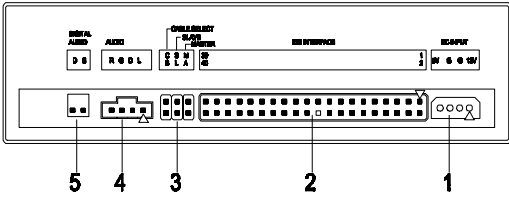
LG



CD-ROM R/W Front Panel Introduction

Item	Description
1	Load / eject button
2	Power-on / busy indicator, lights up in green color while disc is in ready state; lights up and flashes in amber color during data read or seek operation.
3	Headphone volume control
4	Headphone jack
5	Emergency eject hole. See "CD-ROM Emergency-exit <option 1>" on page 120 Disc tray and emergency eject See "CD-ROM Emergency-exit <option 2>" on page 120

CD-ROM R/W Drive Rear Panel Connectors and Jumpers



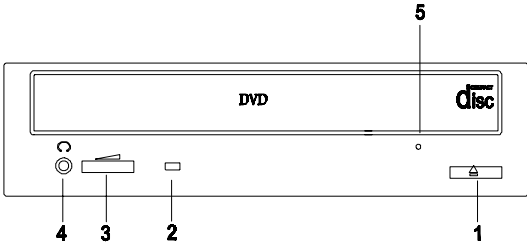
NOTE: CD-ROM R/W drives may come with item no. 5 (digital audio output and testing jumper) connectors.

CD-ROM R/W Drive Rear Panel Connectors and Jumpers

Item	Function	Connect to...
1	Power supply connector	Power supply
2	Interface connector	System board CN12: IDE 2
3	Configuration jumper. <u>CS</u> <u>SL</u> <u>MA</u> <u>Description</u> -- -- On Master -- On -- Slave. On -- -- Cable select	--
4	Audio line out connector	Depended on sound card
5	Digital audio output	--

DVD-ROM Drive

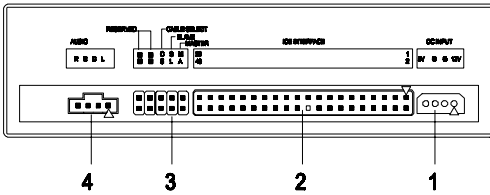
Front Panel and Emergency-Exit



DVD-ROM Front Panel Introduction

Item	Description
1	Open/Close Button
2	Disc Indicator
3	Headphone Volume Control
4	Headphone Jack
5	Emergency eject hole. See "CD-ROM Emergency-exit <option 1>" on page 120. Disc tray and emergency eject See "CD-ROM Emergency-exit <option 2>" on page 120

DVD-ROM Drive Rear Panel Connectors and Jumpers



DVD-ROM Drive Rear Panel Connectors and Jumpers

Item	Function	Connect to...																								
1	Power connector	Power supply																								
2	IDE Interface connector	System board CN12																								
3	Configuration jumper. <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>RD^a</th> <th>RD</th> <th>CS</th> <th>SL</th> <th>MA</th> <th>Description</th> </tr> </thead> <tbody> <tr> <td>--</td> <td>--</td> <td>--</td> <td>--</td> <td>On</td> <td>Master</td> </tr> <tr> <td>--</td> <td>--</td> <td>--</td> <td>On</td> <td>--</td> <td>Slave.</td> </tr> <tr> <td>--</td> <td>--</td> <td>On</td> <td>--</td> <td>--</td> <td>Cable select</td> </tr> </tbody> </table>	RD ^a	RD	CS	SL	MA	Description	--	--	--	--	On	Master	--	--	--	On	--	Slave.	--	--	On	--	--	Cable select	--
RD ^a	RD	CS	SL	MA	Description																					
--	--	--	--	On	Master																					
--	--	--	On	--	Slave.																					
--	--	On	--	--	Cable select																					
4	Audio Out	Depended on sound card																								

- a. RD -- Configuration jumper (RD indicates Reserved)

DIMM Configurations

The 2284 system board has three DIMM sockets. A maximum of 384MB memory may be installed. You can install 8MB, 16MB, 64MB or 128MB PC-100/PC-133 DIMM in any sockets and with any combinations.

NOTE: Some system boards require that DIMM socket number one be occupied. If after installing memory the system does not boot successfully and both DIMM sockets are not occupied, switch the DIMM to the unoccupied socket and reboot the system.

System Board Connector Pin Signals

Monitor Port Signals

Pin	Signal Name	I/O	Pin	Signal Name	I/O
1	Red Video	O	9	+5 V dc	
2	Green Video	O	10	Synch Ground	
3	Blue Video	O	11	Monitor ID Bit 0	
4	Monitor ID Bit 2	I	12	SDA	I
5	Synch Ground		13	Horizontal Synch	O
6	Red Ground		14	Vertical Synch	O
7	Green Ground		15	SCL	I
8	Blue Ground				

Serial Port Signals

Pin	Signal Name	I/O	Pin	Signal Name	I/O
1	Data Carrier Detect	I	6	Data Set Ready	I
2	Receive Data	I	7	Request T Send	O
3	Transmit Data	O	8	Clear T Send	I
4	Data Terminal Ready	O	9	Ring Indicator	I
5	Signal Ground				

Parallel Port Signals

Pin	Signal Name	I/O	Pin	Signal Name	I/O
1	Strobe	O	14	Auto Feed	N/A
2	Data Bit 0	I/O	15	Error	I
3	Data Bit 1	I/O	16	Initialize	O
4	Data Bit 2	I/O	17	Select (In)	O
5	Data Bit 3	I/O	18	Ground	P
6	Data Bit 4	I/O	19	Ground	Power
7	Data Bit 5	I/O	20	Ground	Power
8	Data Bit 6	I/O	21	Ground	Power
9	Data Bit 7	I/O	22	Ground	Power
10	Acknowledge	I	23	Ground	Power
11	Busy	I	24	Ground	Power
12	Paper Empty	I	25	Ground	Power
13	Select	O	--	--	--

Mouse Port Signals

Pin	Signal Name	I/O	Pin	Signal Name	I/O
1	Mouse Data	I/O	4	+5 V dc	Power
2	No Connection	--	5	Mouse Clock	I/O
3	Ground	Power	6	No Connection	--

Keyboard Port Signals

Pin	Signal Name	I/O	Pin	Signal Name	I/O
1	Data	I/O	4	+5 V dc	Power
2	No Connection		5	Clock	I/O
3	Ground	Power	6	No Connection	--

Diskette Drive Cable Connector Signals

Pin	Signal Name	I/O	Pin	Signal Name	I/O
1	Ground		18	Direction	O
2	Density Select	O	19	Ground	
3	No Connection		20	Step	O
4	No Connection		21	Ground	
5	Ground		22	Write Data	O
6	No Connection		23	Ground	
7	Ground		24	Write Enable	O
8	Index	I	25	Ground	
9	Ground		26	Track 0I	I
10	Motor Enable 0	O	27	Ground	
11	Ground		28	Write Protect	I
12	Drive Select 1	O	29	Ground	
13	Ground		30	Read Data	I
14	Drive Select 0	O	31	Ground	
15	Ground		32	Select Head 1	O
16	Motor Enable 1	O	33	Ground	
17	Ground		34	Diskette Change	I

IDE Cable Connector Signals

Pin	Signal Name	I/O	Pin	Signal Name	I/O
1	Host Reset	O	21	No Connection	
2	Ground		22	Ground	
3	Host Data 7	I/O	23	Host IOW	O
4	Host Data 8	I/O	24	Ground	Power
5	Host Data 6	I/O	25	Host IOR	O
6	Host Data 9	I/O	26	Ground	Power
7	Host Data 5	I/O	27	I/O Channel Ready	I
8	Host Data 10	I/O	28	No Connection	
9	Host Data 4	I/O	29	No Connection	
10	Host Data 11	I/O	30	Ground	Power
11	Host Data 3	I/O	31	Host IRQ	I
12	Host Data 12	I/O	32	No Connection	
13	Host Data 2	I/O	33	Host A1	O
14	Host Data 13	I/O	34	No Connection	
15	Host Data 1	I/O	35	Host A0	O
16	Host Data 14	I/O	36	Host A2	O
17	Host Data 0	I/O	37	Host CS0	O
18	Host Data 15	I/O	38	Host CS1	O
19	Ground	Power	39	ACTIVE ba	I
20	No Connection		40	Ground	Power

Safety Inspection Guide

General Guidelines 132

General Guidelines

The purpose of this Safety Inspection Guide is to help you identify possible unsafe conditions on machines that are being inspected for a Maintenance Agreement. Each machine has necessary functions items installed to provide the operators and service personnel with an acceptable level of safety. This guide lists only these items. Good judgment should be used to identify possible safety conditions not covered by this Safety Inspection Guide.

If any unsafe conditions are present, you must find out how serious the hazard is and if you can continue before you correct the hazard.

All current IBM Personal Computer service supplements outlining feature/model changes, along with the machine history, should be reviewed.

Check the following items:

- Damaged, missing, or changed parts, especially in the area of the On/Off switch and the power supply.
- Damaged, missing, or changed covers.
- Possible safety exposure from any non-IBM attachments.

Parts Catalog

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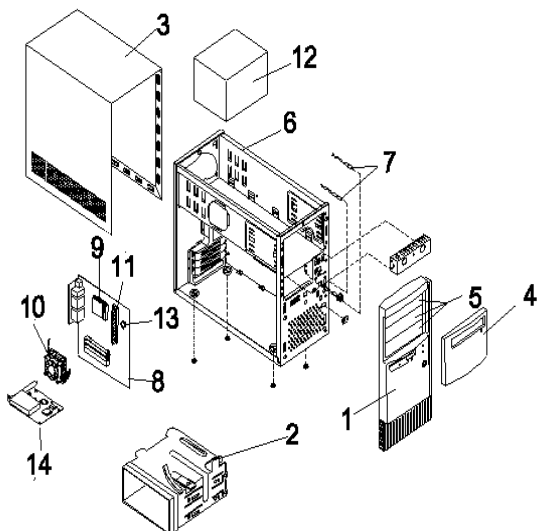
Abbreviations

In this chapter, the following abbreviations are used to identify country and language version:

Country	Language Version
AT	Austria
AU	Australia
BD	Belgium - Dutch
BF	Belgium - French
CA	Canada
CE	Canada - English
CF	Canada - French
CN	China
DK	Denmark - Danish
FI	Finland - Finish
FR	France
GE	Germany
HK	Hong Kong
IT	Italy
JP	Japan
LS	LA-Spanish
ND	Netherlands - Dutch
NL	Netherlands - Dutch
NO	Norway - Norwegian
SF	Swiss - French
SG	Swiss - German
SP	Spain
SW	Sweden - Swedish
TW	Taiwan
UK	United Kingdom
US	United States
SZ	Switzerland

System Assembly

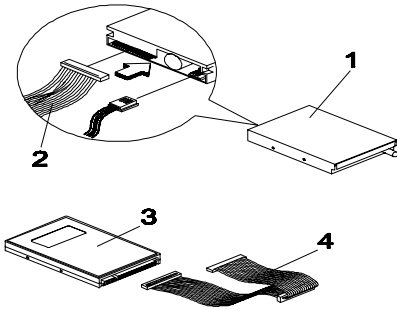
Assembly 1: System Unit



Asm-Index	FRU Number	Description
1-1	22P2260	Main Bezel (w/Front USB), Black
1-2	20L2197	3.5" FDD/HDD (Holder) Bracket
1-3	22P2256	Top Cover, Black
1-4	22P2257	Main Bezel Door, Black, NetVista
1-5	22P2258	Drive Bay Panel, Black
1-6	22P2261	Chassis Assembly, Lower Case (without SPS) w/power supply frame, drive frame, bracket port, w/ Front USB
1-7	20L2190	Power Switch/HDD-Pwr Led Cable Asm
1-8	19K3648	S21M - Micro ATX, Socket A, W/VIA KZ133 (system board)
1-9	19K3649	Socket K7 Duron 64K/200 600MHz
1-9	19K3650	Socket K7 Duron 64K/200 700MHz

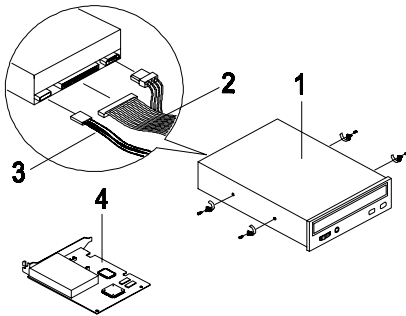
Asm-Index	FRU Number	Description
1-9	19K3651	Socket K7 Duron 64K/200 750MHz
1-9	19K3652	Socket K7 Athlon Thunderbird 256K/200 1.0GHz
1-10	19K3653	Fansink (Duron Processors)
1-10	19K3654	Fansink (Athlon Processors)
1-11	09N3351	64MB DIMM (PC133)
1-11	09N3352	128MB DIMM (PC133)
1-12	22P2275	145W PowerSupply (ForDuron) 5V Standby - 3A Current
1-12	19K3657	185W Power Supply (For Athlon)
1-13	01K4278	CMOS Backup Battery (CR2032)
1-NS	19K4309	Accton 10/100 Ethernet PCI Adapter Card
1-NS	01K4200	Port Bracket
1-NS	01N1961	Noise Canceling Andrea NC-8 w/ PC99 Color
1-NS	22P2262	Planar I/O Port EMC Shield (includes label)
1-NS	22P2264	USB Cable
1-NS	36L9138	HDD Tray (Mounts 3.5" HDD into 5.25" Bay)
1-NS	01N1940	Screw Pack

Assembly 2: Diskette and Hard Drive



Asm-Index	FRU Number	Description
2-1	02K2299	3.5", 3 mode MKE (JU256A276P)
2-2	02K2603	FDD Cable
2-3	19K1476	10GB HDD, 3.5" 5400 RPM, ATA66
2-3	19K1575	15GB HDD, 3.5" 5400 RPM, ATA66
2-3	19K1560	20GB HDD, 3.5" 5400 RPM, ATA66
2-3	19K1561	30GB HDD, 3.5" 5400 RPM, ATA66
2-3	19K1567	30GB HDD, 3.5" 7200 RPM, ATA100
2-3	19K1569	45GB HDD, 3.5" 7200 RPM, ATA100
2-3	19K1570	60GB HDD, 3.5" 7200 RPM, ATA100
2-4	22P2263	HDD Cable Supports ATA 66/100

Assembly 3: CD/DVD-ROM Drive, Adapter Card and Speaker



Asm-Index	FRU Number	Description
3-1	09N3357	48X CD-ROM, Black Bezel
3-1	09N3358	8X4X32X CD-RW (Read/Write),Black
3-1	22P2281	DVD-ROM 8X/40X , Black
3-1	19K3646	DVD-ROM 16X/40X , Black
3-3	22P2276	'Y' - CD-ROM/DVD-ROM Audio Cable - For use w/mdls that have both CD-RW and DVD-ROM Drives
3-3	22P2277	Audio Cable, CD-ROM
3-4	19K3631	GVC, F-1156IV/R9C, NA/LA/SA/ Japan/China/TW/HK, (Full Height Bracket)
3-4	19K3632	GVC WT, F-1156IV+/R9C, EMEA/ ANZ/Singapore/India, (Full Height Bracket)
3-4	19K3633	Askey, 1456VQH87, NA/LA/SA/ Japan/China/TW/HK, (Full Height Bracket)
3-4	19K3634	Askey INT, 1456VQH87 (INT1), EMEA/ANZ/Singapore/India, (Full Height Bracket)
3-NS	10K2940	Diamond S3 8MB 4X AGP
3-NS	10K2112	Nvidia NV10 w/TV Out, 32MB
3-NS	19K8168	Visiontek NVidia 32MB NV 15, VGA only
3-NS	10K2111	Nvidia M64 w/TV Out, 32MB

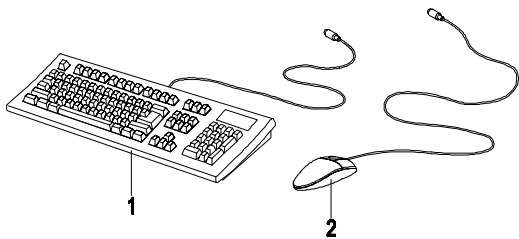
Asm-Index	FRU Number	Description
3-NS	19K3376	Adapter (Dongle used w/Nvidia M64 card) DVI-I to VGA
3-NS	19K7990	Creative Soundblaster Live
3-NS	00K8183	7FT Phone Cord
3-NS	60H6043	Modem Phone Cable Adapter, Spain/Southern Ireland
3-NS	60H6045	Modem Phone Cable Adapter, Austria
3-NS	60H6046	Modem Phone Cable Adapter, Belgium
3-NS	60H6047	Modem Phone Cable Adapter, Denmark
3-NS	60H6048	Modem Phone Cable Adapter, Norway/Finland
3-NS	60H6049	Modem Phone Cable Adapter, France
3-NS	60H6050	Modem Phone Cable Adapter, Germany
3-NS	60H6051	Modem Phone Cable Adapter, UK/Northern Ireland
3-NS	60H6052	Modem Phone Cable Adapter, Italy
3-NS	60H6053	Modem Phone Cable Adapter, Netherlands
3-NS	60H6054	Modem Phone Cable Adapter, Sweden
3-NS	60H6055	Modem Phone Cable Adapter, Switzerland
3-NS	19K3659	Altec Lansing 3 Piece Speaker Set , Black, Active (Intregated Power Adapter) IBM345W - US/Canada
3-NS	22P2250	Altec Lansing 3 Piece Speaker Set , Black, Active (Intregated Power Adapter) IBM345W - A, ANZ
3-NS	22P2251	Altec Lansing 3 Piece speaker Set, Black, active (Intregated Power adapter) IBM345W-E, Sweden, Norway, France, Netherlands, Germany, Finland, Italy, Spain, Denmark

Asm-Index	FRU Number	Description
3-NS	22P2252	Altec Lansing 3 Piece Speaker Set , Black, Active (Intregated Power Adapter) IBM345W - UK, United Kingdom
3-NS	22P2254	Altec Lansing 3 Piece Speaker Set , Black, Active (Intregated Power Adapter) IBM345W - HK, Hong Kong
3-NS	22P2255	Altec Lansing 3 Piece Speaker Set , Black, Active (Intregated Power Adapter) IBM345W - TW, Taiwan
3-NS	19K2664	Zylux Non Branded Tier 3, Passive (Black/Blue Grill)

Assembly 4: Power Cord

Asm-Index	FRU Number	Description
4-NS	6952301	Power Cord US, LA (Lo Volt), Canada, Mexico, Peru, Colombia, Ecuador, Venezuela, Bolivia, Panama, El Salvador, Honduras, Nicaragua, Dominican Republic, Guatemala, Taiwan, Saudi Arabia, Thailand
4-NS	36L8879	Power Cord APU Countries
4-NS	14F0032	Power Cord UK/HK/Singapore/United Arab Emirate (Dubai)Taiwan, Saudi Arabia, Thailand
4-NS	13F9978	Power Cord (Euro) France, Germany, Sweden, Norway, Netherlands, Finland, Belgium, Bosnia, Croatia, Egypt, Greece, Hungary, Poland, Portugal, Romania, Slovenia, Spain, Sweden, Turkey, LA (HI Volt
4-NS	14F0050	Power Cord Swiss
4-NS	13F9996	Power Cord Denmark
4-NS	14F0068	Power Cord Italy,Chile
4-NS	13F9939	Power Cord ANZ
4-NS	14F0086	Power Cord Israel
4-NS	14F0014	Power Cord South Africa

Assembly 5: Keyboard and Mouse



Asm-Index	FRU Number	Description
5-1	37L2613	104 US ENGLISH 103P, US/CE
5-1	37L2635	105 FRENCH CANADIAN 445
5-1	37L2615	105 LA SPANISH 171
5-1	37L2617	105 ARABIC 253
5-1	37L2618	105 BELGIUM UK 120, EURO
5-1	37L2619	105 DANISH 159, EURO
5-1	37L2620	105 DUTCH 143, EURO
5-1	37L2621	105 FRENCH 189, EURO
5-1	37L2622	105 GERMAN 129, EURO
5-1	37L2623	105 GREEK 319, EURO
5-1	37L2624	105 ITALIAN 142, EURO
5-1	37L2625	105 NORWEGIAN 155, EURO
5-1	37L2626	105 PORTUGUESE 163, EURO
5-1	37L2627	105 SPANISH 172, EURO
5-1	37L2628	105 SWEDISH/FINNISH 153, EURO
5-1	37L2629	105 SWISS 150, EURO
5-1	37L2630	105 UK ENGLISH 166, EURO
5-1	37L2634	105 BELGIUM FRENCH 120, EURO
5-1	37L2631	104 US ENGLISH-EMEA, ANZ/China
5-1	37L2632	109 JAPANESE 194
5-1	37L2633	104 CHINESE/US 467, HK/TW
5-2	28L1868	IBM Scroll Point II, Black
5-2	10L6149	Logitech Badger (2 Button), Black

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19K4309	1-NS	136
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Appendix B. Online Support Information

This section describes online technical support services available to help repair the Personal Computer.

This section covers:

- IBM PC Company Fax-Back Service (US and Canada only)
- IBM Online HelpCenter on America Online
- IBM useful sites on the World Wide Web (WWW)

Online technical support offers convenient and valuable information when you need it. IBM offers support areas on several online services where you can work with IBM technicians for solutions to your questions, download key files, and access database information for the personal computer.

The IBM PC Company offers online resources including several Internet World Wide Web sites, the IBM Online HelpCenter support areas, and a Fax-Back service.

The IBM PC Company Automated Fax-Back System offers a variety of IBM computer-related articles. To access this service, call 800-IBM-3395.

Technical support is offered through the IBM Online Help Centers on the America Online.

IBM online support areas on all of the services can assist with your technical questions. These areas offer message boards monitored by IBM technicians, databases of computer-related solutions, and file libraries.

You can reach the IBM Online Help Center on America Online using keyword: **IBM Connection**. For information about America Online, please call (800) 827-6364 (U.S. and Canada only). America Online have limited international availability.

To access the IBM PC Company Internet sites, you will need to acquire Internet access. Please check with your local Internet provider for more information. (Members of AOL can reach these sites through the Internet capabilities of the services.)

Here are some useful IBM Internet addresses for Personal Computer information:

<http://www.ibm.com/pc>

PC Company Home Page

<http://www.ibm.com/pc/us/netvista>

Netvista Home Page

<http://www.ibm.com/support>

IBM Support Site

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