## Dell® ${ }^{\text {L }}$ atitude ${ }^{\circledR}$ LM Service Manual Update

7 his document updates information contained in the Dell Latitude LM Service Manual.

## New System Features

Additional system features include:

- Now available with a $166-\mathrm{MHz}$ or $133-\mathrm{MHz}$ Intel ${ }^{\circledR}$ Pentium ${ }^{\circledR}$ microprocessor with MMX ${ }^{\text {TM }}$ technology in the Dell Latitude LM M166ST or Dell Latitude M133ST, which have the same features as other models of the computer.
- Support for a maximum of 72 MB of system memory by installing a matched pair of 32-MB memory modules in the memory upgrade sockets on the main board. (The standard minimum configuration is now 8 MB of nonremovable memory on the main board and two 4-MB memory modules in the memory upgrade sockets.)
- Support for extended-data out (EDO) memory. Available in 4, 8, 16, and 32 MB modules which must be installed in matched pairs.
- The Pentium microprocessor with MMX technology has twice the internal cache memory ( 32 KB ) as the standard Pentium microprocessor.
- A NeoMagic 2093 video controller for a video subsystem that includes 1.1 MB of video memory.
- 6X or 10X CD-ROM drives.


## Production Note!!!

Jeff, Do we want to mention CD-ROM speeds? Nancy Niland suggested that this line be removed, because the speeds change so often.

- Your computer may not appear exactly as shown in some of the figures in the Service Manual. Conductive sponges or EMI shields may have been added.


## Technical Specifications

The following information updates Table A-1, "Technical Specifications," in Appendix A.

## Technical Specifications

## Microprocessor

|  | Microprocessor |
| :--- | :--- |
| Microprocessor type/speed. . | Intel Pentium microprocessor with MMX tech- <br> nology/133 or 166 MHz or Intel Pentium <br> microprocessor/133 MHz |
| Internal cache $\ldots \ldots \ldots \ldots \ldots$ | 32 KB (Pentium microprocessor with MMX <br> technology) or 16 KB (133-MHz Pentium <br> microprocessor) |
| External cache $\ldots \ldots \ldots \ldots$ | 256-KB write-back SRAM |
| Math coprocessor $\ldots \ldots \ldots \ldots$ | internal to the microprocessor |

## Production Note!!!

Jeff, Jean, Are the memory access times correct?? They were 70 and 20ns.

| BIOS address $\ldots \ldots \ldots \ldots$ | F000:0000 |
| :--- | :--- |
|  | EDO Memory |

## Video

| Video type. | 64-bit (128-bit hardware accelerated) PCI |
| :---: | :---: |
| Video controller | NeoMagic 2093 (systems with MMX technology) or NeoMagic 2070 |
| Video memory | 1.1 MB (systems with MMX technology) or 896 KB |
|  | Battery |
| Type | lithium ion |
| Dimensions: |  |
| Height | 22.0 mm (0.86 inch) |
| Depth | 219.0 mm (8.62 inches) |
| Width | 57.8 mm (2.27 inches) |
| Weight. | $0.44 \mathrm{~kg}(0.97 \mathrm{lb})$ |
| Voltage | 10.8 VDC |
| Capacity | 42 WH |
| Charge time (approximate):* |  |
| Computer on. | 4 hours |
| Computer off | 3 hours |
| Operating time (approximate, with no power management features enabled)* $\qquad$ | 3 to 5 hours with one battery; <br> 6 to 10 hours with two batteries |
| Life span (approximate)* | 500 discharge/charge cycles |
| Temperature range: |  |
| Charge and discharge . . . | $5^{\circ}$ to $35^{\circ} \mathrm{C}\left(41^{\circ}\right.$ to $\left.95^{\circ} \mathrm{F}\right)$ |
| Storage . . . . . . . . . . . . . . | $-20^{\circ}$ to $50^{\circ} \mathrm{C}\left(-4^{\circ}\right.$ to $\left.122^{\circ} \mathrm{F}\right)$ |
|  | CD-ROM Drive |
| Form factor. | 5.25 inches |
| Interface | IDE |
| Memory . . . . . . . . . . . . . . . . | 128,000 bytes (data buffer memory) |

[^0]| CD-ROM Drive (continued) |  |
| :---: | :---: |
| Voltage | 5 V (single-voltage drive) |
| Access time. | $250 \mathrm{~m} / \mathrm{sec}$ |
| Data transfer rate: |  |
| Sequential | $150 \mathrm{~KB} / \mathrm{sec}$ <br> $900 \mathrm{~KB} / \mathrm{sec}$ ( 6 X velocity mode) <br> $1500 \mathrm{~KB} / \mathrm{sec}$ (10X velocity mode) |
| From buffer........ | $14.4 \mathrm{MB} / \mathrm{sec}$ |
| Physical: |  |
| Height | 17.0 mm ( 0.67 inch ) |
| Width. | 130.6 mm ( 5.14 inches) |
| Depth. | 140.6 mm (5.56 inches) |
| Weight (no CD in tray). | 0.35 kg (0.77 lb) |

## Additional Parts and Assemblies

Removal and replacement procedures for all parts and assemblies are the same as those described in Chapter 4, "Removing and Replacing Parts." However, some of the parts and assemblies used are different. The following information updates Table 4-1, "Factory Repair Parts and Assemblies," in Chapter 4.

Factory Repair Parts and Assemblies

| Part or Assembly Number | Order Number |
| :--- | :--- |
| Board Assemblies |  |
| Board assembly, 166-MHz, service kit | SVC,SYS,PLN,LMP166ST |
| Board assembly, 133-MHz, service kit | SVC,SYS,PLN,LMP133ST |
| Main board | SYS,PLN,TFT,LMM |
| Processor board, 166-MHz | CRD,PRCR,LMP166 |
| Processor board, 133-MHz | CRD,PRCR,LMP133 |
| Card, cache | CRD,L2,CACHE,LMP |
| Heat sink, microprocessor, | SUBASSY,HTSNK,CPU,LMM |
| subassembly |  |
| Screws, heat sink | SCR,2X,4X4,PHH,MS,ZPS |
| Spacer/Bumper, rubber, flex cable | BMPR,LCD,FPC,25X5X5M,LMP |

Factory Repair Parts and Assemblies (continued)

| Part or Assembly Number | Order Number |
| :---: | :---: |
|  | SHLD,EMI,AL,W/CNDCT |
| Foil, metal EMI | ADH,LMM |
| Insulator, power supply | INSUL,MYLAR,BD,CONV, |
|  | DC-DC.LMP |
| Board, power supply | CRD,CONV,DC-DC,LMM |
| Insulator, main board | INSUL,MYLAR,BD,CONV, |
|  | DC-DC,LMP |
|  | Boards and Cards |
| Cable, flex, audio jack | CBL,FLEX,JK,AUD,W/EMI,LM |

Production Note!!!
Need to check RSL to be sure the following data is correct!!!!!!!!!!!

| CD-ROM, service kit* | CUS,CD ROM,6X,LMP |
| :---: | :--- |
| CD-ROM drive | CD ROM,6X,LMP |
| CD-ROM, service kit* | CUS,CD ROM,I,INT,10X,LMP |
| CD-ROM drive | CD ROM,I,INT,10X,LM |

Hard-Disk Drive Assemblies

Hard-disk drive, 2.1-GB, service kit*
Hard-disk drive, 2.1-GB, subassembly

Hard-disk drive, 2.1-GB
Bracket, hard-disk drive
Screws, bracket

CUS,HD,2.1GB,I,F2,12.5MM
SUBASSY,HD,2.1G,F2, 12.5MM,NBK

HD,2.1GB,I,F2,12.5MM,IBM
BRKT,HD,12.5MM,LMP
SCR,M3,0x0,5,PHH,NPL

| LCD Assembly |  |
| :---: | :--- |
| LCD, IBM, service kit | SVC,LCD/FPC/INV,TFT,LMM,IBM |
| Cable, TFT flex | CBL,FLEX,LCD,TFT,IBM,W/ |
|  | EMI,LM |
| LCD, SA, service kit | SVC,LCD/FPC/INV,TFT,LMM, |
|  | SMSNG |
| LCD panel, active-matrix color <br> display (TFT), 12.1" | LCD,TFT,SVGA,12.1",LM,SMSNG |

Factory Repair Parts and Assemblies (continued)
Part or Assembly Number Order Number

* Customer-replaceable unit (CRU)

Factory Repair Parts and Assemblies (continued)

| Part or Assembly Number | Order Number |
| :---: | :---: |
| LCD Assembly (continued) |  |
| Board, TFT inverter | CRD,INVRTR,TFT,SMSNG,LM |
| Cable, TFT flex | CBL,FLEX,LCD,TFT,SMSNG,LM |
| Bezel, TFT back | CVR,BK,LCD,TFT,SMSNG,LM |
| LCD, LG, service kit | SVC,LCD/FPC/INV,TFT,LMM,LG |
| LCD panel, active-matrix color display (TFT), 12.1" | LCD,TFT,SVGA, 12.1",LMP,LG |
| Board, TFT inverter | CRD,INVRTR,TFT,LMP,LG |
| Cable, TFT flex | CBL,FLEX,LCD,TFT,LG, W/EMI,LM |
| Bezel, TFT back | CVR,BK,LCD,TFT,LMP,LG |
| Memory |  |
| Memory module, 64-MB SODIMM, service kit* | CUS,MEM,64M,LMP |
| Memory module, two 32-MB | DIMM,32MB,70NS,8X32,NBK,G |
| EDO memory module | DIMM,32MB,60NS,8X32,NBK,G |
| Miscellaneous Parts |  |
| Top cover, palmrest | PLMRST,PLSTC,BLK,W/EMI,LM |
| Top Case Assembly |  |
| Guide rail, hard-disk drive, left | RAIL,HD,LF,W/EMI PLD,LM |
| Guide rail, hard-disk drive, right | GDE, RL,RT,HD,LMP |
| Case, base bottom | CVR,BTM,PLSTC,BLK, W/EMI,LM |

* Customer-replaceable unit (CRU)


## Eмı Changes

The following EMI changes may have been made to your computer, and the sections in Chapter 4 should be updated to reflect these changes.

## Keyboard

The heat sink in your computer may be slightly different from the one shown in Figure 4-25. There may be a conductive sponge added to your computer.

## Top Assembly

If you have a Latitude MMX computer, use the following figure for the removal and replacement procedure. The top assembly has two hard-disk drive contact springs on the underside of the top assembly. There is also a conductive sponge added to the top assembly (see the following figure).


Top Assembly Removal

When you separate the top assembly from the bottom assembly, peal the kapton tape from the EMI foil.

Before replacing the top assembly, replace the old EMI foil with a new EMI foil and replace the old kapton tape with a new piece of kapton tape.

## Bottom Assembly

The bottom assembly in your computer may have an I/O EMI shield and conductive sponges in addition to the components shown in Figure 4-32.

## Audio Board

The audio cable may be wrapped in EMI cloth.

## Checking the Label

## Production Note!!!

Jeff, Jean: Is the info in the following paragraph still correct? Is the M1333ST system board also \#82224?

After replacing the old display, make sure the computer's display label on the back of the computer reflects the correct display in the computer by following these steps:

1. Open the computer's I/O panel door.
2. Check the label below the service tag (as you look at the back of the computer).

If the label has the correct code for the display in the computer, no further action is required.
If you replaced the display that was in the computer with a different display (for instance, an IB display was replaced with an LG display), cross out the preprinted code and write the code for the replacement display in the blank space on the label.
If the computer does not have a display type label, place the blank label (that came in the service kit) below the service tag and write in the code for the display-for instance, IB, SA, or LG.

## Main Board Switch

The following information supplements step 10 of the "Main Board" procedure in Chapter 4:

- If you reinstall the main board with a Revision 5a main board, make sure the DIP switch, SW2 (see the following figure), is set correctly for the type of display, STN or TFT, in your computer.
- For an STN display, switches 1 and 4 are on and switches 2 and 3 are off.
- For a TFT display, switches 1 and 4 are off and switches 2 and 3 are on.



## Main Board Switches

If you are replacing the main board (system board \#82224) in a Latitude LM M166ST, M133ST, or in a Latitude LM P133ST with the EMI cloth tape on the audio cable, use the following procedure to adjust the EMI cloth-covered audio cable:

1. Remove the main board from the shipping container.
2. Remove the foam pad by sliding it out from under the audio cable.
3. Install the main board in the computer.

[^0]:    * Battery performance features such as charge time, operating time, and life span can vary according to the conditions under which the computer and battery are used.

