

Dell[®] Latitude[®] LM Service Manual Update

This document updates information contained in the *Dell Latitude LM Service Manual*.

New System Features

Additional system features include:

- Now available with a 166-MHz Intel[®] Pentium[®] microprocessor with MMX[™] technology in the Dell Latitude LM M166ST, which has 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 non-removable memory on the main board and two 4-MB memory modules in the memory upgrade sockets.)
- 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.
- 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 type/speed. . .	Pentium microprocessor with MMX technology/166 MHz or Pentium microprocessor/133 MHz
Internal cache	32 KB (Pentium microprocessor with MMX technology) or 16 KB (133-MHz Pentium microprocessor)
External cache	256-KB write-back SRAM
Math coprocessor	internal to the microprocessor

Memory	
Architecture	fast-page mode, two-way interleaved
Memory module capacities	4, 8, 16, and 32 MB; memory modules must be installed in matched pairs (two 4-MB modules, two 8-MB modules, two 16-MB modules, or two 32-MB modules)
Standard RAM	16 MB (8 MB of nonremovable memory on the system board and two installed 4-MB memory modules)
Maximum RAM	72 MB
Memory access time:	
tRAC	70 ns
tCAC	20 ns
BIOS address	F000:0000

Technical Specifications (continued)

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 kg (0.97 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)*

3 to 5 hours with one battery;
6 to 10 hours with two batteries

Life span (approximate)* 500 discharge/charge cycles

Temperature range:

Charge and discharge 5° to 35°C (41° to 95°F)

Storage -20° to 50°C (-4° to 122°F)

CD-ROM Drive

Form factor 5.25 inches

Interface IDE

Memory 128,000 bytes (data buffer memory)

* 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.

Technical Specifications (continued)

CD-ROM Drive (continued)

Voltage 5 V (single-voltage drive)

Access time. 250 m/sec

Data transfer rate:

Sequential 150 KB/sec
900 KB/sec (6X)
1500 KB/sec (10X)

From buffer. 14.4 MB/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
Main board	SYS,PLN,TFT,LMM
Processor board, 166-MHz	CRD,PRCR,LMP166
Card, cache	CRD,L2,CACHE,LMP
Heat sink, microprocessor, subassembly	SUBASSY,HTSNK,CPU,LMM
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
Board Assemblies (continued)	
Foil, metal EMI	SHLD,EMI,AL,W/CNDCT 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
CD-ROM	
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*	CUS,HD,2.1GB,I,F2,12.5MM
Hard-disk drive, 2.1-GB, subassembly	SUBASSY,HD,2.1G,F2, 12.5MM,NBK
Hard-disk drive, 2.1-GB	HD,2.1GB,I,F2,12.5MM,IBM
Bracket, hard-disk drive	BRKT,HD,12.5MM,LMP
Screws, bracket	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 display (TFT), 12.1"	LCD,TFT,SVGA,12.1",LM,SMSNG

* *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
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)

EMI Changes

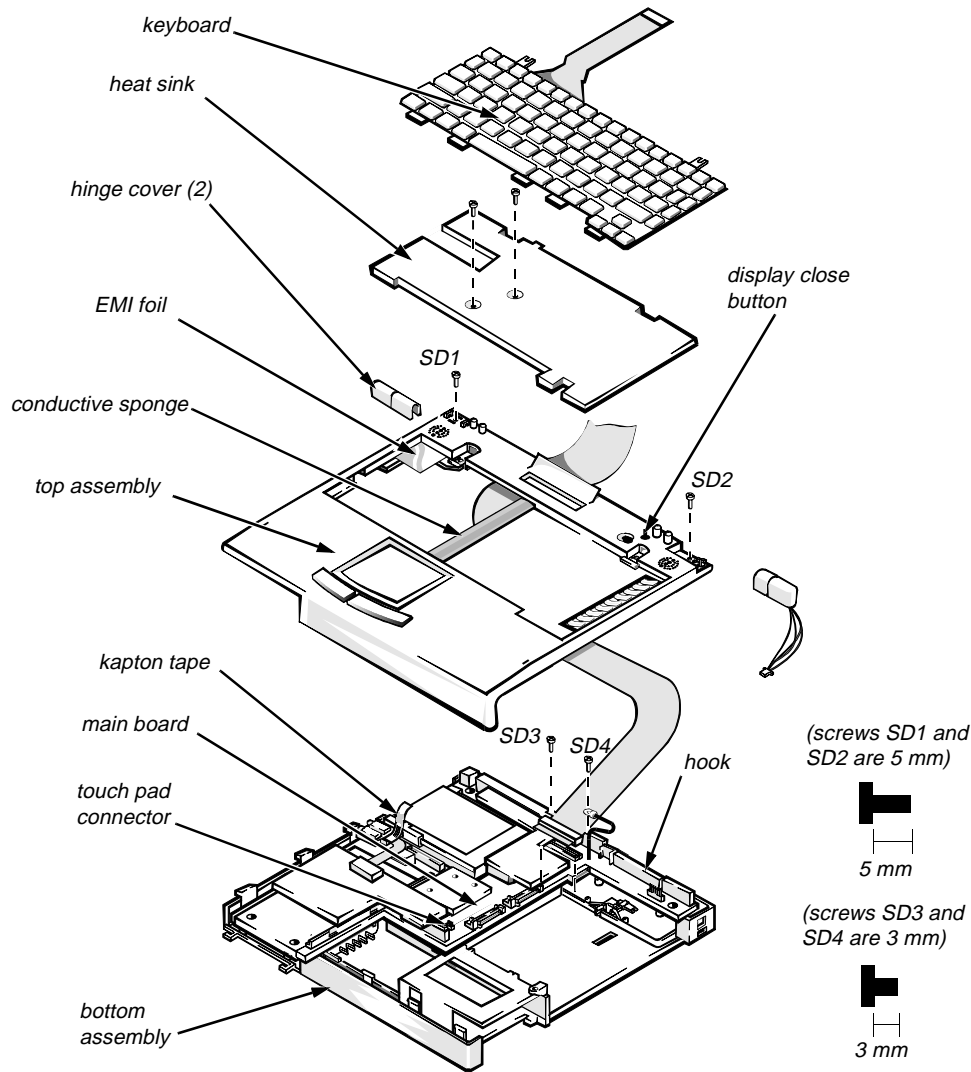
The following EMI changes may have been made to your computer, and the sections in Chapter 4 should be updated to reflect these changes.

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, peel 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

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.

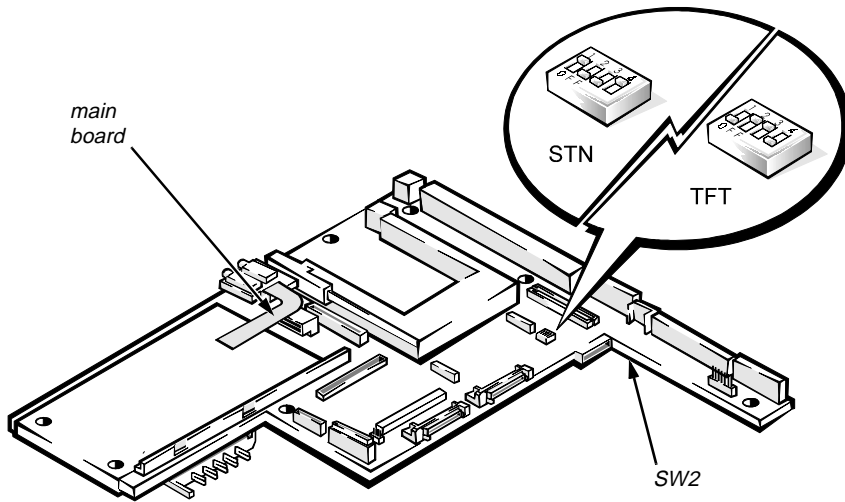
If you replaced the display that was in the computer with a different display (for instance, an IB display was replaced with an LG display), cross out the preprinted code and write the code for the replacement display in the blank space on the label.

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 in a Latitude LM M166ST or in a Latitude LM P133ST with the EMI cloth tape on the audio cable (system board #82224), 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.**