

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 or 133-MHz Intel[®] Pentium[®] microprocessor with MMX[™] 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 non-removable 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 type/speed. . .	Intel Pentium microprocessor with MMX technology/133 or 166 MHz or Intel 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	EDO
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); both EDO and fast-page-mode modules are supported in matched pairs.
EDO memory	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	60 ns
tCAC	15 ns
Production Note!!!	
<i>Jeff, Jean, Are the memory access times correct?? They were 70 and 20ns.</i>	

Technical Specifications (continued)

BIOS address F000:0000

EDO 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)

EDO memory 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 60 ns

tCAC 15 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 velocity mode) 1500 KB/sec (10X velocity mode)
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
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, 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	
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*	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

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Factory Repair Parts and Assemblies (continued)

Part or Assembly Number	Order Number
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* *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)

EMI Changes

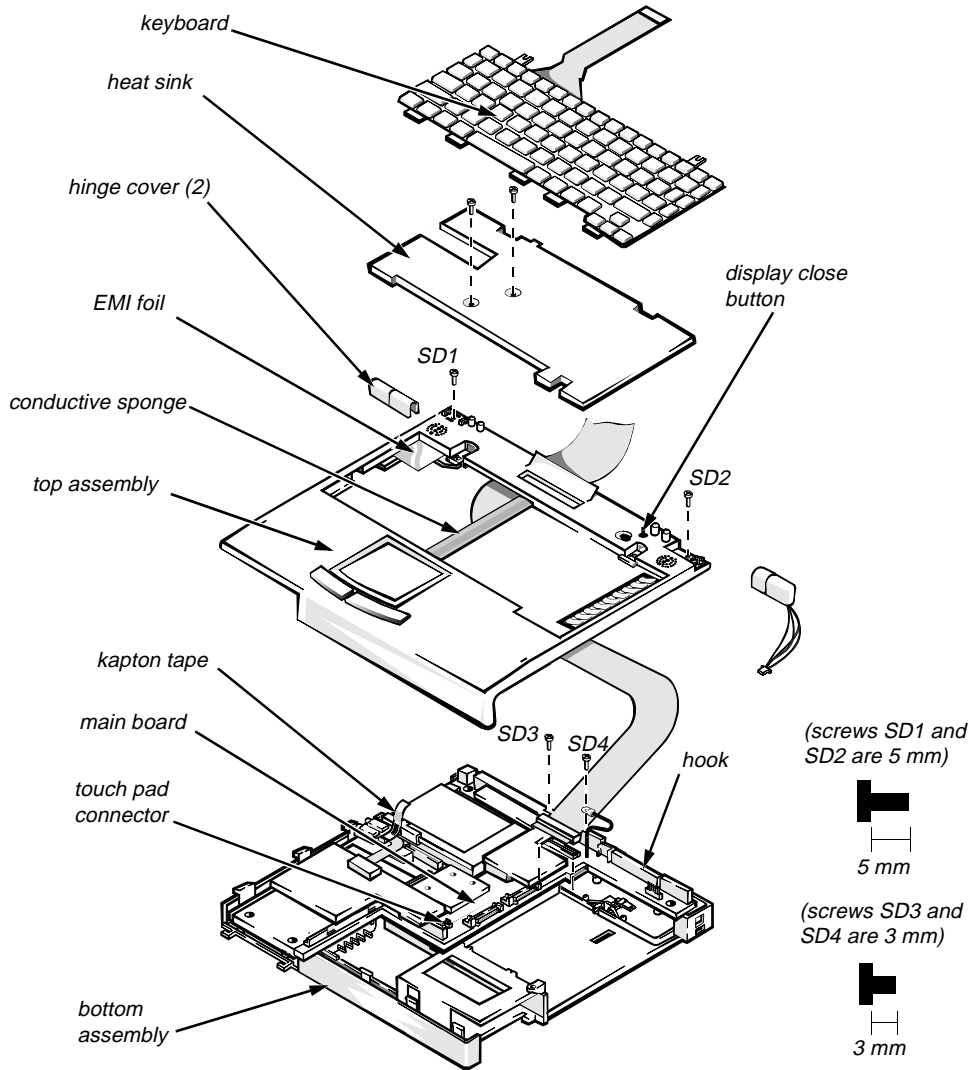
The following EMI changes may have been made to your computer, and the sections in Chapter 4 should be updated to reflect these changes.

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.

***C*hecking 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.

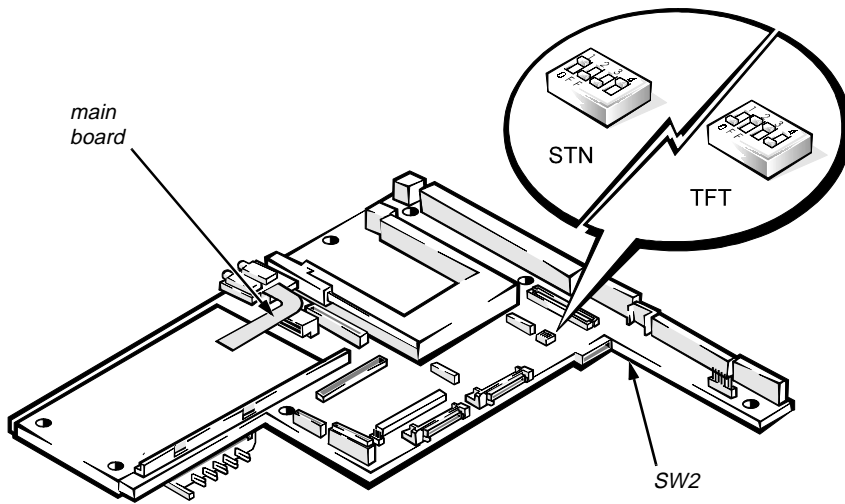
If the computer does not have a display type label, place the blank label (that came in the service kit) below the service tag and write in the code for the display—for instance, IB, SA, or LG.

***M*ain 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.**