Extensa 670

Service Guide

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About this Manual

Purpose

This service guide contains reference information for the Extensa 670 computer. It gives the system and peripheral specifications, shows how to identify and solve system problems and explains the procedure for removing and replacing system components. It also gives information for ordering spare parts.

Manual Structure

This service guide consists of six chapters and one appendices as follows:

Chapter 1   *General Description*

This chapter contains a general overview of the system, describes the standard and optional features, and identifies the major assemblies and subassemblies. This section also contains detailed functional and environmental specifications.

Chapter 2   *Installation*

This chapter contains unpacking and preparation for use instructions for the system.

Chapter 3   *Operating Instructions*

This chapter contains a summary of notebook operating procedures useful for maintenance operations.

Chapter 4   *Theory of Operation*

This chapter contains a general block diagram theory of operation description and major chips introductions.

Chapter 5   *Troubleshooting Procedures*

This chapter contains an overview of the fault isolation process, provides guidelines for isolating 67x series computer malfunctions to replaceable subassemblies and provides instructions for executing diagnostics and interpreting error messages.

Chapter 6   *Field Service*

This chapter contains the machine disassembly and unit replacement information.

Appendix A   *Maintenance Data*

This appendix contains the FRU information, jumper settings information and schematic diagrams of the system.

Related product information

Extensa 670 **User's Manual** contains system description and general operating instructions.

ALi M1521/M1523 Chipset Data Sheets contain information on the system core chips .

C&T 65550 Data Sheet contains detailed information on the VGA controller.

ALi M6377 Chipset Data Sheet contains detailed information on the power management controller.

ES1878 Data Sheet contains detailed information on the audio controller.

NS87336VJG Data Sheet contains detailed information on the super I/O controller.

TI1130 Data Sheet contains detailed information on the PCMCIA controller.

PCI0643 Data Sheets contain detailed information on the CMD PCI IDE controller.

T62.045.C.00 Data Sheets contain detailed information on the charger board component.

DAC-07B008 Data Sheets contain detailed information on the LCD inverter component

DC-R05 Data Sheets contain detailed information on the LCD ID board component

M38802 Data Sheet contains detailed information on the Phoenix keyboard controller.

Conventions

The following are the conventions used in this manual:

`Text entered by user`	Represents text input by the user.
`Screen messages`	Denotes actual messages that appear onscreen.
a , e , s , etc.	Represent the actual keys that you have to press on the keyboard.

NOTE
Gives bits and pieces of additional information related to the current topic.

WARNING
Alerts you to any damage that might result from doing or not doing specific actions.

CAUTION
Gives precautionary measures to avoid possible hardware or software problems.

IMPORTANT
Reminds you to do specific actions relevant to the accomplishment of procedures.

TIP
Tells how to accomplish a procedure with minimum steps through little shortcuts.

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General Description

1.1. Introduction

This chapter provides a general overview of the Extensa 67x Series, describes the standard and optional features, and identifies the major assemblies and subassemblies. This chapter also contains detailed functional and environmental specifications for the Extensa 67x Series Notebook Computers.
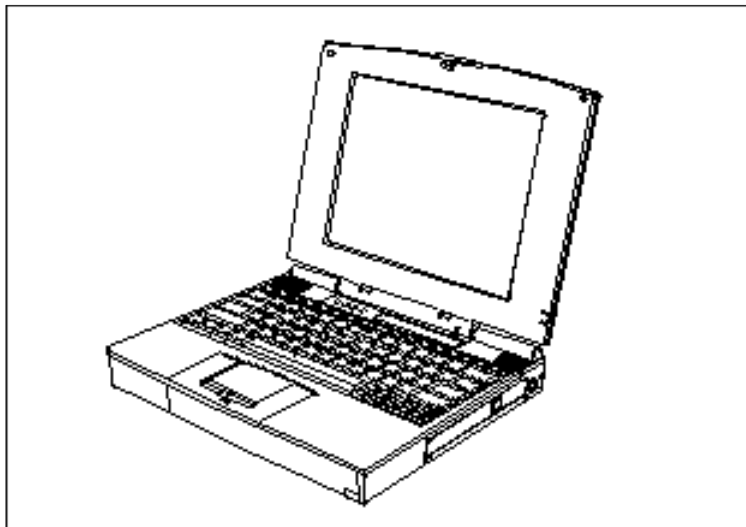
Figure 1-1   Extensa 67x Series Notebook Computers

1.2. Notebook Model Number Definition

The following figure contains a summary of the available models in the 67x Series.

670 XX - X X X

Code	Country	KB	PWR cord	Manual
0	Reserved			
1	USA	US	US(110v)	English
2	W Europe	US	EUR(220v)	English
3	Latin AM	US	US(110v)	Multi-language
4	Reserved			
5	Reserved			
6	Reserved			
7	Reserved			
8	Reserved			
9	Reserved			
A	Reserved			
B	Belgium	BEL	EUR(220v)	Multi-language
C	Taiwan	CHN	US(110v)	English
D	Denmark	US	EUR(220v)	Multi-language
E	Finland	SWD	EUR(220v)	Multi-language
F	France	FRA	EUR(220v)	Multi-language
G	Germany	GER	EUR(220v)	Multi-language
H	Asia	US	US(110v)	English
I	Italy	ITA	EUR(220v)	Multi-language
J	Japan	JPN	US(110v)	English
K	Korea	US	US(110v)	English
L	Latin AM	SPN	US(110v)	Multi-language
M	Dutch	US	EUR(220v)	Multi-language
N	Norway	NOR	EUR(220v)	Multi-language
P	Portugal	PORT	EUR(220v)	Multi-language
Q	Australia	US	AUS(250v)+UK(250v)	English
R	Reserved			
S	Spain	SPN	EUR(220v)	Multi-language
T	Reserved			
U	UK	UK	UK(250v)	Multi-language
V	Reserved			
W	Sweden	SWD	EUR(220v)	Multi-language
X	Sws/Ger	GER	EUR(220v)	Multi-language
Y	Sws/Fra	FRA	EUR(220v)	Multi-language
Z	Reserved			

Code	CPU	Batt	CD-ROM	Memory
0	w/o	w/o	10X	16MB
1	MMX-150	NiMH	10X	16MB
2	MMX-150	Li-Ion	10X	16MB
3	MMX-166	NiMH	10X	16MB
4	MMX-166	Li-Ion	10X	16MB
5	MMX-150	NiMH	10X	32MB
6	MMX-150	Li-Ion	10X	32MB
7	MMX-166	NiMH	10X	32MB
8	MMX-166	Li-Ion	10X	32MB

Code	Preload	HDD
0	w/o	w/o
1	Win95	1.6GB
2	Win95	2.1GB
3	WFW3.11	1.6GB
4	WFW3.11	2.1GB
5	NT4.0	1.6GB
6	NT4.0	2.1GB

Code	LCD
D	12.1" DSTN
DX	12.1" TFT

1.3. Product Overview

The Extensa 67x Series follows the 65x Series. The Extensa 67x notebook series is similar in construction and appearance, has similar operating controls and indicators and uses the same software. It uses a similar startup self test program (described in detail in Chapter 5 of this manual). There are differences at the board level which affect assembly/disassembly as described in Chapter 6 of this manual. There are also differences in Field-Replaceable Units (FRUs), particularly the Printed Circuit Boards, so separate FRU lists and logic diagram sets are provided in the appendices.

Table 1-1 summarizes some of the major differences between the 67x Series and the 65x Series Notebook Computers.

Table 1-1   Feature Comparison for 65x/67x Series Notebooks

Feature	65x Series	67x Series
CPU	133 MHz Pentium	150/166 MHz Pentium with MMX Technology
Standard Onboard Memory	16 MB	16 MB
Maximum Expandable Memory	80 MB	80 MB
HDD	1.3 GB or 1.6 GB	1.6 GB or 2.1 GB
LCD Display Type	DSTN or TFT	DSTN or TFT (new 12.1-inch DSTN and TFT LCDs)
Video Memory	2 MB	2 MB
Infrared Port	4 Mb/s FIR	4 Mb/s FIR
Internal Microphone	Yes	Yes
Port Replicator Option	Yes	Yes

The Extensa 67x Series Notebook Computers are large screen, high-performance, multimedia notebooks powered by the Intel® P55CLM Pentium® Processor Chip (150/166-MHz). Other major features of the 67x Series include:

- PCI Bus architecture

- 16 MB (Extended Data Out) memory onboard

- 2 MB video memory

- Fast video graphics accelerator

- 0-Volt Suspend, 5-Volt Suspend and Standby power saving modes

- No-reboot setup function

- STN or TFT color display (Model Dependent)

- 16-bit stereo audio

- Fast infrared communication

- Duracell NiMH (Nickel-Metal-Hydride) or optional Li-Ion (Lithium-Ion) battery pack

- 1.6/2.1 GB (or higher) capacity hard disk drive with Local Bus

- Internal touchpad pointing device

- Small, lightweight AC adapter

- Modular bay for expansion

- PS/2 port for connecting an external keyboard, numeric keypad, or mouse

- 9-pin serial port for connecting external devices such as a modem or mouse

- Simultaneous display with external CRT

- One Type III or two Type II/I Cardbus PC Card slots; lower slot accepts Zoomed Video port enabled PC cards

- Parallel port with EPP and ECP for connecting to a printer or the floppy disk drive module

- 8 MB, 16 MB and 32 MB EDO 64-bit type small outline dual inline memory module (soDIMM) upgrades

- Advanced PCI Card slot for installing a feature upgrade option
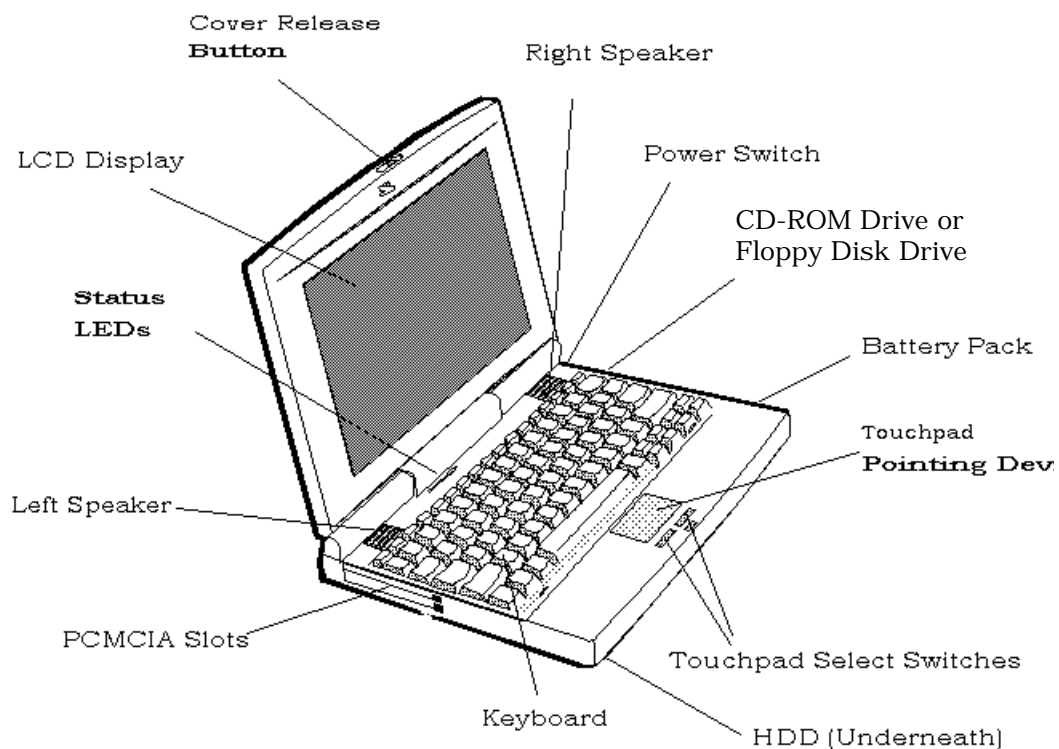
Figure 1-2   External Features

1.3.1 Video Display Features

The Extensa 67x Series Notebooks contain large screen internal LCD displays and can simultaneously drive an external CRT (SimulSCANTM mode). On all Extensa models, the LCD screen brightness, contrast, video mode of operation, etc. are adjustable from the keyboard as described in Paragraph 1.2.2.3.

1.3.1.1 Internal LCD

The Extensa 67x Series Notebooks contain one of the following LCDs (model dependent):

- 12.1-Inch DSTN display

- 12.1-Inch TFT display

1.3.1.2 External CRTs

The Extensa 67x Series Notebooks are equipped with a 15-pin SVGA connector that can drive an external CRT (either alone or simultaneously with the internal LCD).

When the notebook is set to the SimulSCAN mode, a minimum resolution of 800 x 600 x 256 colors is supported. When operating in the External CRT Mode, resolutions up to 1280 x 1024 x 256 colors are supported.

1.3.1.3 Display Hot Key Sequences

The display mode of operation (LCD only, Simultaneous LCD and external CRT and external CRT only modes) is keyboard-selectable using the following hot key sequences.

- Fn-Up Arrow and Fn-Down Arrow - control LCD screen brightness (higher brightness setting uses more battery energy)

- Fn-Right Arrow - lightens the LCD screen contrast

- Fn-Left Arrow - darkens the LCD screen contrast

- Fn-F12 - alternates between display modes (LCD, External CRT or both)

- Fn-F11 - turns off the LCD backlight; pressing any key turns the LCD backlight on.

Note: *In addition to the hot keys that control the notebook display functions, there are several other hot key functions that control other notebook functions such as turning the Touchpad on/off, etc. For these sequences, refer to Chapter 3.*

1.3.2 Software Features

As a standard feature, the Extensa 67x notebooks are factory loaded with Windows 95, Windows NT or Windows for Workgroups software to allow the user to configure the notebook's operating system environment as summarized in Table 1-2.

Table 1-2   Operating System Environments

Operating System	Description
Windows 95	Supports both desktop and mobile operation with Plug and Play capabilities and Advanced Power Management; multimedia options, and choice of wallpaper to customize different computer resources; variety of device drivers including C&T® 65550, ESS 1878 Sound Device Drivers, PC-Card Bus Socket Services and Card Services Device Drivers, TranXit™ Communication Utility for parallel/serial and FIR (IrDA™), 0V Suspend Utility PhDisk and SafeOFF Utility
Windows NT	Supports both desktop and mobile operation with Advanced Power Management; multimedia options, and choice of wallpaper to customize different computer resources; variety of device drivers including C&T® 65550, ESS 1878 Sound Device Drivers, PC-Card Bus Socket Services and Card Services Device Drivers, TranXit™ Communication Utility for parallel/serial and FIR (IrDA™)
Windows/DOS 6.22	This environment has some limitations in the Plug and Play area; includes utilities and various device drivers including C&T® 65550, ESS 1878 Sound Device Drivers, PC-Card Bus Socket Services and Card Services Device Drivers, and TranXit™ Serial Infrared (IrDA™) Device Drivers, etc.

1.3.3 67x Series External Ports

The Extensa 67x Series notebooks have a variety of external ports (connectors) for the desktop environment as shown in Figure 1-3 and summarized in Table 1-3.
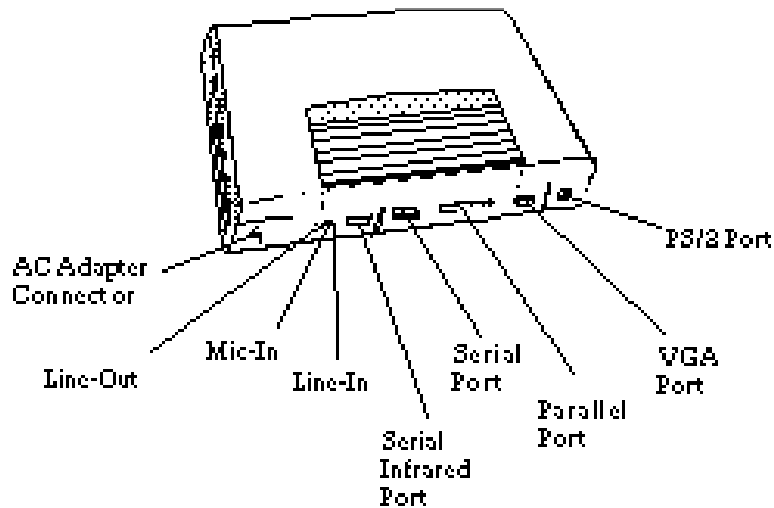
Figure 1-3   External Ports

Table 1-3   External Ports

Port Assignment	Description
External VGA Port	15-Pin Female connector used to attach an external SVGA monitor to the notebook.
Serial Port	9-Pin Male connector used to attach an RS-232 serial device to the notebook.
Parallel/Floppy Port	25-Pin Female connector used to attach a bidirectional printer or an external floppy disk drive (requires special cable for use with floppy disk drive).
PS/2® Port	6-Pin Circular connectors used to attach external keyboard/mouse devices to the notebook.
DC-IN Connector	Power in connector used to attach the output of the AC adapter to the notebook.
Fast Infrared Port	Fast Infrared Port (4 M/b) used for wireless communications between the notebook and an FIR-equipped device such as keyboard, another notebook, printer, etc.
Audio In/Out, Mic In Jacks	Provide for input of external sound source or audio output to drive external speakers
Expansion Bus	120-Pin PCI Bus that supports an external Port Replicator

1.3.4 Standard Peripheral Devices

As standard features, the Extensa notebooks include a user-removable internal hard drive, a 3.5-inch floppy disk drive, a CD-ROM drive and built-in point touchpad (mouse device). The FDD or CD-ROM drives is user removable.

1.3.5 Expansion Capabilities

The Extensa 67x Series Notebooks are designed with a variety of expansion features that permit substantial functionality and performance upgrades over the life of the product. The expansion capabilities built into the notebook are summarized in Table 1-4 and described in greater detail in the following paragraphs.

Table 1-4   Expansion Features Summary

Expansion Feature	Description
CD-ROM Drive	Reads from Audio CD, Photo CD or CD ROM
3.5-inch Diskette Drive Module	Provides convenient storage on a removable disk format
Memory Expansion Features	Main memory can be expanded from 16 MB to a maximum of 80 MB using soDIMM modules (8 MB, 16 MB or 32 MB configurations).
Flash ROM (hardware feature)	Permits new versions of BIOS to be downloaded into Flash ROM without physically having to replace the ROMs
PCMCIA Slots	Allows installation of any optional PCMCIA device such as speakerphone modems, Ethernet® cards, and full motion video cards.
Desktop Connectivity Ports	Permits attaching a variety of external devices to the notebook including external CRTs, keyboards, mouse devices, modems, printers, etc.
Port Replicator	Device that attaches to the Expansion Bus and provides the connectivity for the desktop environment. Removing and replacing the notebook from/to the desktop environment is greatly simplified using the Port Replicator option.

1.3.6 PCMCIA Card Options

The Notebook contains an onboard PCMCIA Controller and two 64-pin sockets that can accept up to two credit-card size (14.5 mm) Type I or Type II PCMCIA option cards or one Type III card. The

PCMCIA Card options install on the left side of the notebook (Figure 1-5) and are removed using the PCMCIA Release Buttons.

Figure 1-5   Installing PCMCIA Card Options

1.4. Standard Test Features

The Extensa 67x Series Notebook Computers use modular design and built-in test features to reduce the mean time to repair.

1.4.1 Power On Self Test

The Extensa line of notebook computers contain a BIOS-resident, Power On Self Test (POST) that automatically performs a test of memory and all major circuits each time the computer is powered up. In the event of a failure, the computer displays a descriptive error message and issues a series of coded beeps (in case the display subsystem is not functioning). If self test completes normally, the computer displays the amount of memory tested, loads the Operating System and Windows environment.

1.5. Extensa 67x Series Specifications

General specifications for the Extensa 67x Series Notebooks are provided in Table 1-5.

Table 1-5   Specifications

Characteristic	Model 670
CPU	Pentium P54CSLM, 133 MHz; 3.1 Volt,
Internal Hard Disk Drive Disk Storage Capacity Average access time Throughput	 1.6 GB, 2.1 GB 12 ms or less 11+ Million I/O's per second
DRAM Memory Size Maximum Expansion Size	 16 MB DRAM, 60-ns, EDO-type 80 MB
Flash ROM	256 KB
FDD Disk Storage Capacity: Disk Size Drive Height Mode	Media Bay Modular 1.44 MB 3.5-inch disk 12.5 mm Choice of 720 KB/1.2 MB or 1.44 MB
CD-ROM Drive	Media Bay
LCD Display	12.1-inch DSTN SVGA or 12.1-inch TFT SVGA
Software	Windows 95, Windows NT, or Windows for Workgroups 3.11
Internal Keyboard Numeric Keypad Key Travel Localization Features Key Spacing	84/85-Key, PS/2 and AT-Compatible Embedded 3 mm All major International Language Configurations 19 mm
Built-in Mouse Device	Touchpad built-in to the base of the keyboard (select buttons just below Touchpad)
Video Subsystem LCD Aspect Ratio Emulations Video Memory Size Video Bus LCD Resolution LCD Characters/Line LCD Lines/Screen LCD Brightness Control	 1-1 SVGA 2 MByte 32 bits 640x480 pixels bit-mapped at 16.77 million colors; 600x800 at 65K colors 80 25 Function hot key brightness and contrast control and SimulSCAN control
External CRT Monitor Interface Connector Type Monitors Supported	 15-Pin, female, D-type connector 640 x 480 with 16.7 million colors on CRT 800 x 600 with 16.7 million colors on CRT 1024 x 768 with up to 64K colors on CRT 1280 x 1024 with 256 colors on CRT (interlaced)

Table 1-5   Specifications

Characteristic	Model 670
RS-232-D Serial Port:	9-Pin, male, sub-D-type connector
Method Type Bits per second Parity Transmit/Receive Line control Data word 16550 UART Support Selectable Serial Port (BIOS Setup)	EIA RS-232-D Asynchronous transmission 110, 200, 300, 600, 1200, 2400, 4800, 9600, 19200 Odd, even, mark, space Data check: odd, even READY/BUSY, DC1/DC3 7- or 8-bit Yes COM1(IRQ4, 3F8h) COM2(IRQ3, 2F8h) COM3(IRQ4, 3E8h) COM4(IRQ4, 2E8h) Disable
Parallel Port	EPP/ECP Bidirectional
Connector Type FDD Support Selectable Parallel Port (BIOS Setup)	25-Pin, DB-25 Connector Yes, Hot Pluggable & Auto-Detection if BIOS Setup is set to 1.44 MB LPT 1 (IRQ5, 278h) LPT 2 (IRQ7, 378h) Disable
Fast I/R Port	Yes
Transfer Data Rate Transfer Distance Standard	4M bit/sec 100cm IrDA
Expansion Bus Port	128-pin

1.6. Regulatory Agency Approvals

All Extensa 67x Series products meet the following regulatory agency standards:

- Underwriter's Lab (UL) Standard 1950 (safety)

- Canadian Standards Association (CSA) Standard 950 or CUL (safety)

- FCC CFR 47, Part 15, Subpart B, FCC Level B (Emissions)

- Canadian Department of Communications (DOC) ICES, Class B (Emissions)

- VDE- EN60950 (Safety)

- EN 50082-1 (Immunity: ESD, RFI, EFT, and Surge)

- EN 50081-1 (Emissions: RFI, EMI, Harmonics, and Flicker)

- Approval Marks: UL, CUL, VDE, FCC, ICES, and CE

Installation

2.1. Introduction

This chapter contains unpacking and preparation for use instructions for the Extensa 67x Series Notebook Computers. This includes:

● Removing the computer and all manuals, options and accessories from the shipping container(s)

● Installing Internal Notebook Options

● Installing External Notebook Options

● Installing Battery Packs

● Installing Desktop Devices

● Installing the AC Adapter

● Checking Out the System

● Configuring the System

● Making Backups of System Software

● Loading Application Software

2.2. Unpacking Instructions

Unpack the computer using the following instructions:

1. Carefully cut the tape that seals the top flap of the shipping carton.

2. Remove the computer and the accessories Carton from the main shipping carton.

3. Remove all protective coverings from the computer.

4. Open the accessory box; remove the contents.

Note: *Save the two shipping containers and packaging for later reuse.*

2.3. Installing Internal Notebook Options

If you have no internal options to install at this time, skip to Paragraph 2.4. Otherwise, continue with Paragraph 2.3.1.

2.3.1 Installing Main Memory Expansion (Optional)

Main memory on the 67x Series Notebooks can be expanded using EDO Small Outline Dual Inline Memory Modules (EDO soDIMMs). These modules currently are available in 8 MB, 16 MB or 32 MB sizes and install in expansion memory slots on the Main Board accessed through the Memory Expansion Door on the bottom of the notebook. The installation process consists of the following steps:

Caution: *The EDO soDIMM module option contains components that are sensitive to static electricity. When handling the module and the internal parts of the computer, protect against static electricity by using wrist or ankle grounding straps and grounded working mats. When moving or storing items, use the anti-static bags supplied with the items.*
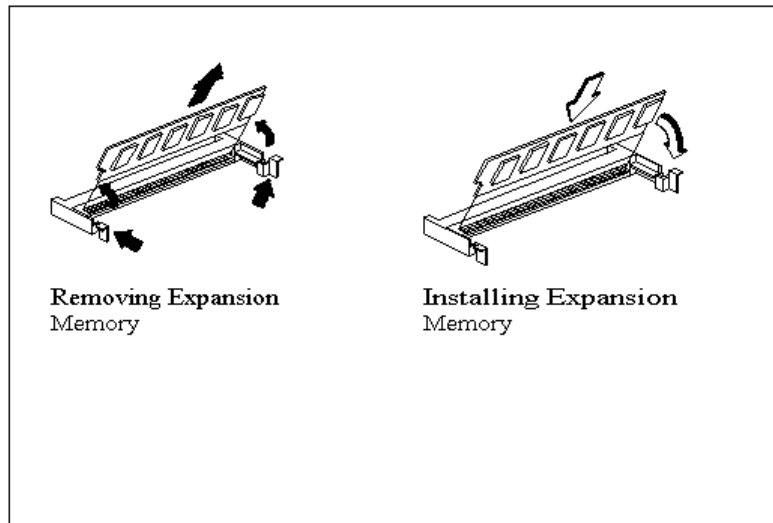
Figure 2-1   Memory Expansion Removal/Replacement

1. Ensure that the notebook is powered off and the AC adapter disconnected from the AC outlet. Also, ensure that the battery is out of the unit.

2. Disconnect any peripheral device interface cables from the external interface connectors and remove any installed PCMCIA options.

3. Turn the notebook over and locate the Expansion Memory Access Cover on the bottom of the notebook.

4. Remove the screw holding the Expansion Memory Access Cover and remove the cover.

5. Remove the EDO soDIMM module from its shipping container.

6. Refer to Figure 2-1. To install an soDIMM module, first align the connector edge of the memory module with the key in the connector. Insert the edge of the memory module board into the connector using a rocking motion to fully insert the module. Push downward on each side of the memory module until it snaps in place.

7. If installing a second soDIMM, repeat Step 6.

8. Reinstall the Expansion Memory Access Cover using the screw removed in Step 4.

9. Replace the Keyboard Assembly and any components previously removed. Replace the AC adapter.

10. Power up the notebook and reboot. If all of the installed memory is not recognized, try reseating the soDIMM module(s) and rebooting.

Note: *After installing expansion memory in your notebook, you must run the PHDISK utility in order for the Save-To-Disk or 0V Suspend functions to operate correctly.*

2.3.2 Setting up the Software

After installing expansion memory, perform the following procedure:

1. Run PHDISK.

- In Windows 95

    1. From the Taskbar, select Start, then Shut Down.

    2. Select the "Restart the Computer in MS-DOS mode" option.

    3. Click on Yes.

    4. Type PHDISK/C/F at the DOS prompt.

- In Windows for Workgroups and Windows NT

    1. Exit all applications and exit Windows to DOS.

    2. At the DOS command prompt, type PHDISK/C/F. This will create a file which can be used to save the contents of your memory system when you perform a 0V Suspend operation

2.4. Installing External Options

2.4.1 Installing PCMCIA Options

The Notebook has two connector slots for PCMCIA option cards. These two slots can be used to install one Type III or two Type I/II credit card size PCMCIA option cards. You can install a PCMCIA (PC card) without turning the computer off.

Use the following procedure to install a PCMCIA option:

1.   Review the installation instructions supplied with the PCMCIA option card(s).

2.   Hold the card at the end opposite the connector pins with the label side up. Insert the card into an unused slot on the left side of the Notebook.

3.   If the option requires external cabling (e.g. Modem option), connect external cabling at this time.

Note: *After installation of a PCMCIA option card, Windows 95 displays the New Hardware Found dialog box to help you configure the new device. To remove a card, click on the PCMCIA icon; then, press the appropriate PC Card Release Button (or press both buttons for a Type III device) and remove the option.*
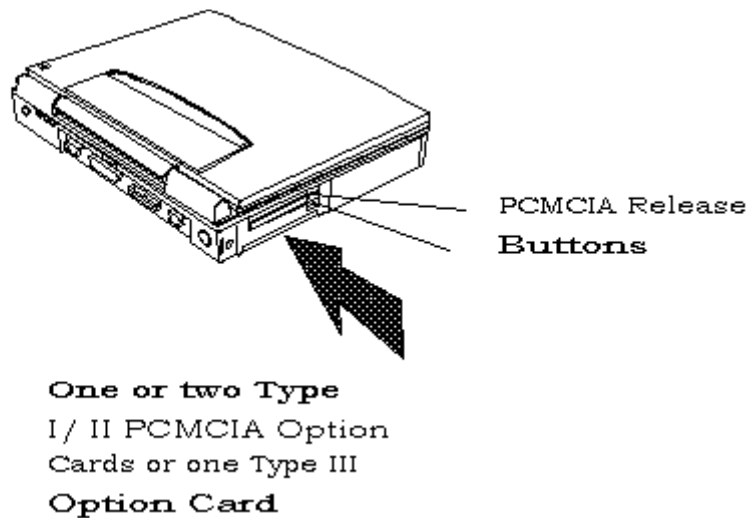
Figure 2-2   Installing PCMCIA Option Cards

2.5. Installing External Notebook Options

2.5.1 Installing Ext. Keyboard/Mouse/Numeric Keypad

A PS/2 compatible keyboard, mouse or an optional PS/2-compatible numeric keypad may be installed on the notebook via the mouse connector on the left rear port as shown in Figure 2-3.

Mouse/Keyboard Connector	
Pin No.	Signal Name
1	MDATA/KDATA
2	
3	MSGND
4	MSVcc
5	MCLK/KCLK
6	
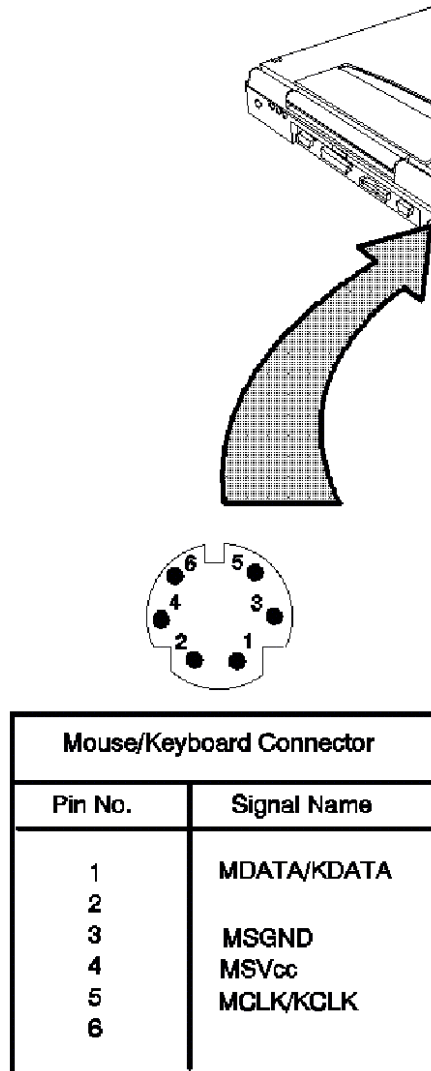
Figure 2-3   PS/2 Port Pinouts

2.5.2 Installing an External Parallel Printer or Floppy Drive

The Notebook is equipped with an external, bidirectional, ECC/EPP compatible, 25-pin parallel printer port. The connector pinouts and connector location are shown in Figure 2-4. When used with a special cable, an external floppy disk drive may also be attached to the notebook via the parallel port. When a floppy disk drive is connected to the parallel port, the floppy disk drive in the Modular Bay is disabled, if present.

PARALLEL PORT PINOUTS

	SIGNAL	EPP Mode
1	Strobe*	STB*
2	Data Bit 0	PD0
3	Data Bit 1	PD1
4	Data Bit 2	PD2
5	Data Bit 3	PD3
6	Data Bit 4	PD4
7	Data Bit 5	PD5
8	Data Bit 6	PD6
9	Data Bit 7	PD7
10	Acknowledge*	ACK*
11	Busy	BUSY
12	Paper Out	PE
13	Select	SLCT
14	Auto Line Feed*	AFD*
15	Error*	ERR*
16	Initialize Printer*	INIT*
17	Select In*	SLIN*
18	LFT 18	LFT18
19	VCC	VCC
20	MRP120	MRP120
21	MRP121	MRP121
22	MRP122	MRP122
23	FDD 5V	FDD 5V
24	FDD 5V	FDD 5V
25	LF125	LF125
25	Ground	Ground

Note: * Denotes Active Low

Figure 2-4   Parallel Port Pinouts

2.5.3 Installing an External Serial Port Device

The notebook contains an external RS-232 serial port with a 9-pin, male DB-9 connector as shown in Figure 2-5 (25-pin cables require the use of an adapter for use with the 9-pin port). The serial ports are used to interconnect such devices as:

- External Modem

- Serial Mouse

- Serial Printer

- Any device that uses an RS-232 interface

Caution: Never connect a parallel device to a serial port or a serial device to a parallel port or video port; this may cause damage to the notebook and/or external device. If you are uncertain of what type connector the external device has, refer to the technical manual for the external device.

SERIAL PORT PINOUTS

PIN	SIGNAL
1	DCD (CARRIER DETECT)
2	RXD (RECEIVE DATA)
3	TXD (TRANSMIT DATA)
4	DTR (DATA TERMINAL READY)
5	GND (GROUND)
6	DSR (DATA SET READY)
7	RTS (REQUEST TO SEND)
8	CTS (CLEAR TO SEND)
9	RI (RING INDICATOR)
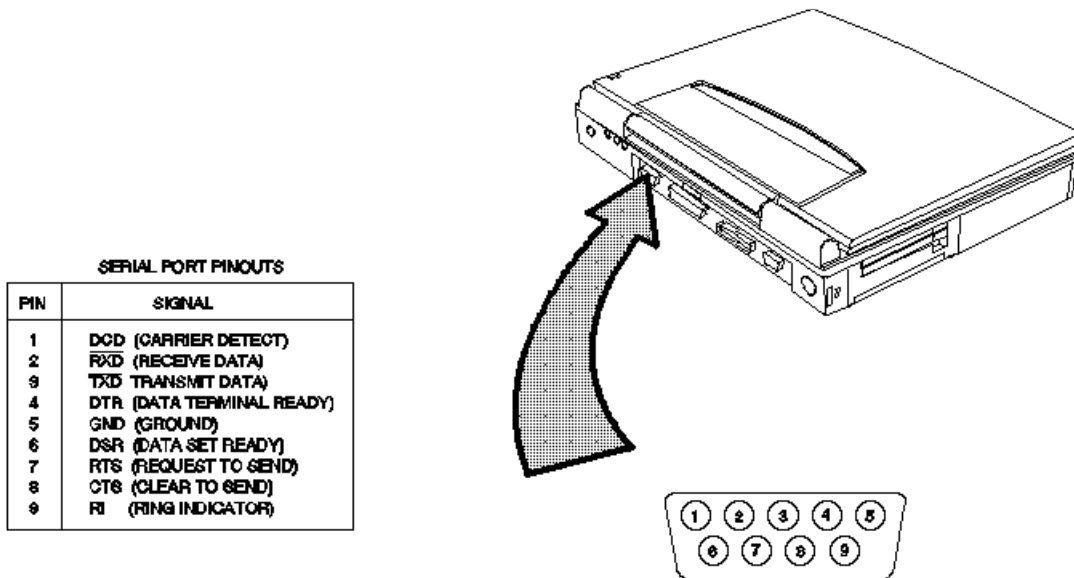
Figure 2-5   Serial Port Pinouts

2.5.4 Installing an External VGA Monitor

The notebook contains an external CRT port that can drive one of a variety of monitor resolutions and colors as summarized in Table 1-9. The associated connector location and pinouts are shown in Figure 2-6.

EXTERNAL VGA CONNECTOR PINOUTS

PIN	SIGNAL NAME	DIRECTION
1	RED VIDEO	OUTPUT
2	GREEN VIDEO	OUTPUT
3	BLUE VIDEO	OUTPUT
4	NOT USED	
5	GROUND	
6	RED RETURN	INPUT
7	GREEN RETURN	INPUT
8	BLUE RETURN	INPUT
9	NOT USED	
10	GROUND	
11, 12	NOT USED	
13	HORIZONTAL SYNC	OUTPUT
14	VERTICAL SYNC	OUTPUT
15	NOT USED	
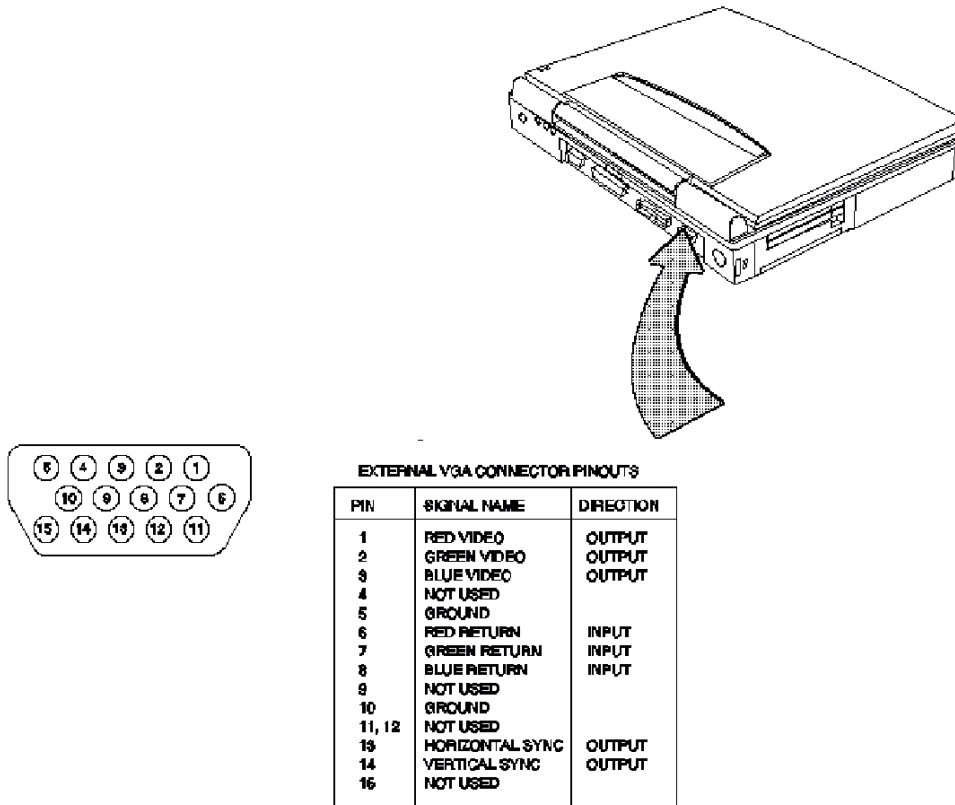
Figure 2-6   External VGA Pinouts

Use the following procedure to install an external monitor:

1. Turn off power to both the notebook and monitor.

2. Connect the 15-pin external VGA cable from the monitor to the VGA connector on the notebook computer (refer to Figure 2-6).

3. Power up the notebook computer first; then turn on power to the monitor.

4. Setup the notebook display mode for LCD only, simultaneous LCD and CRT or CRT only using the BIOS setup utility or hotkey (see Paragraph 1.2.2.3).

5. Install the correct driver if required (refer to the Monitor Installation Instructions supplied by the CRT vendor).

2.5.5 Installing the Security Lock Option

Use the following procedure to install the optional Kensington® security lock.

1.   Unpack the Kensington Lock Kit.

2.   Secure the loop end of the lock to a permanent fixture located such that the notebook can be installed in a desired location.

3.   Insert the lock into the slot on the left side of the computer.

4.   Rotate the key to its locked position and remove the key.

This completes the options installation subsection.

2.6. Battery Pack Installation

First turn off the computer and disconnect the AC adapter if attached to the computer; then follow these steps:

1. Unlatch the battery compartment door (right front corner of the unit) as shown in Figure 2-7.

2. Slide the battery compartment door out slightly and then swing the door outward as shown in Figure 2-7.

3. If changing batteries, grasp the loop attached to the battery and pull the battery out of the compartment.

4. Look for label "THIS SIDE UP" and insert the battery with label up until it snaps in place; then close the battery compartment door.
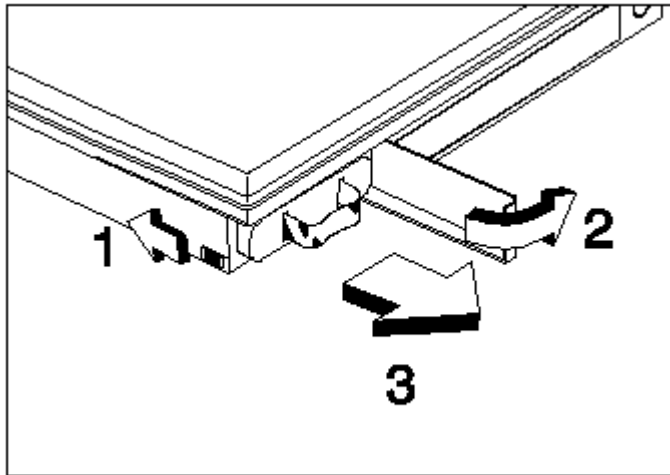
Figure 2-7   Battery Pack Installation

2.7. Installing the AC Power Adapter

Use the following procedures to connect the AC adapter to the system:

Caution: Use only the AC adapter supplied with the computer; other adapters can damage the unit.

1. Remove the AC adapter from the packaging. Connect the round coaxial connector supplied with the notebook to the **DC IN** power receptacle on the left rear of the notebook as shown in Figure 2-8 (a).

2. Connect the female side of the AC power cord to the AC adapter (b) and connect the male end to a grounded AC outlet (c).
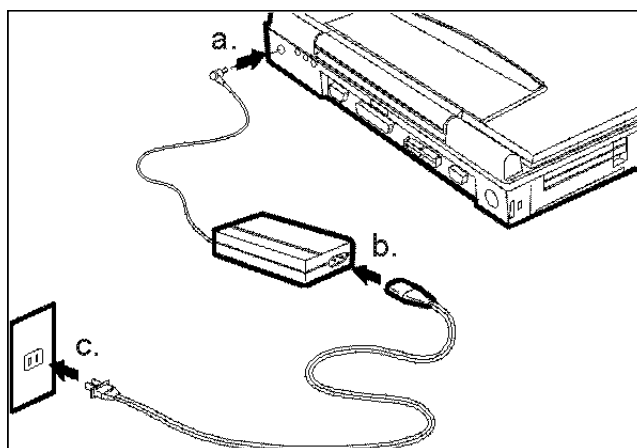
Figure 2-8   Installing the AC Adapter

2.8. Initial System Checkout

After you've installed all internal options and external cabling, you're ready for system checkout and software configuration.

To check out the system, press the power button on the left side of the notebook which initiates self test. During self test execution, the computer checks the operation of all key hardware including memory and CPU (and displays copyright and version number data during test execution).

Upon successful conclusion of self test, the computer automatically loads its operating system and windows environment. If self test fails to complete and an error message is displayed, try powering down the computer for a couple of minutes and turning power back on to repeat self test. If the error message persists, refer to Chapter 5 for troubleshooting information.

2.9. Making Backups of System Software

Immediately after completion of the installation procedures, make backups of all software. In the event of a disk problem, restore the system using the System Files Recovery disk and the set of backup disks.

Note: *Refer to the Extensa Series Notebook Computer User's Guide for additional information.*

Operating Instructions

3.1. Introduction

This chapter contains a summary of notebook operating procedures useful for maintenance operations. For additional detail, refer to the Extensa Series Notebook Computer User's Guide supplied with the notebook.

3.2. Controls/Indicators

The operating controls and indicators for the 67x Series Notebooks are identical (refer to Figure 3-1). A brief description of the controls and indicators is provided in the following paragraphs.
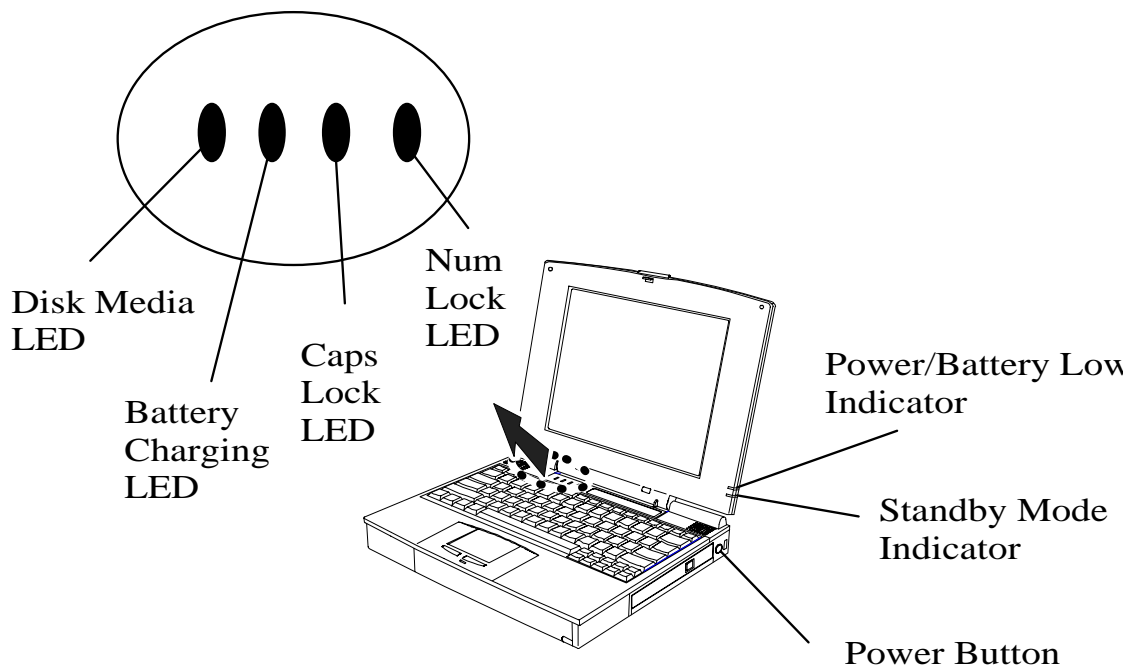
Figure 3-1   67x Operating Controls and Indicators

3.2.1 Power On/Off Switch

The notebook contains an alternate action power button located on the right side of the notebook as shown in Figure 3-1. On the first button depression, power is turned on to the notebook. On the second depression, power is turned off.

3.2.2 Notebook LEDs

The notebook contains four front indicator LEDs and two right side LEDs as shown in Figure 3-1 and described in Table 3-1.

Table 3-1   Indicators

Indicator Light	Description
Power/Battery-low	Lights when the system is on and there is power to the system.
	Flashes when the battery power is low. Connect a powered AC adapter to the computer as soon as possible.
Standby Mode	Lights when the computer is in Standby mode.
	Flashes when the computer is in 5V Suspend mode.
	The computer enters Standby mode if the Standby hot key (Fn+F4) is pressed or the STANDBY TIMEOUT parameter in Setup is enabled and expires.
	The computer enters 5V Suspend mode when you press the 5V Suspend hot key (Fn+F3) or the 5 VOLT SUSPEND TIMEOUT parameter in Setup is enabled and expires, or the display is closed.
Disk Media	Lights when the computer writes to or reads from the hard disk drive, or reads from the CD-ROM drive.
Battery Charging	Lights when a powered AC adapter connected to the computer is charging the battery.
	Flashes when there is a problem with the battery or the battery is not recognized by the smart charger.
	Turns off when there is no battery or the battery is fully charged.
Caps Lock	Lights when the caps lock function is toggled ON using the Caps Lock key.
Num Lock	Lights when the embedded numeric keypad is toggled ON using the Num Lock hot key (Fn+F7)

3.2.2.1 Hot Key Sequences

Table 3-2 contains a summary of hot key sequences useful when performing maintenance operations.

Table 3-2   Summary of Notebook Hot Key Sequences

Function	Key Sequence
Increase LCD screen brightness	Fn-Up Arrow
Decrease LCD screen brightness	Fn-Down Arrow
Lighten LCD screen contrast	Fn-Right Arrow
Darken the LCD screen contrast	Fn-Left Arrow
Alternate between display modes (LCD, Ext.l CRT or both)	Fn-F12 or Ctrl-Alt-F12
Enter 0V Suspend Mode	Fn-F2 or Ctrl-Alt-F2
Exit 0V Suspend Mode	Press Power Button
Enter 5V Suspend Mode	Fn-F3 or Ctrl-Alt-F3
Exit 5V Suspend Mode	Press any key
Enter Standby Mode	Fn-F4
Resume from Standby Mode	Press any key
Toggle speaker output on/off	Fn-End or Ctrl-Alt-S
Enter BIOS Setup (during POST)	F2
Numeric Lock	Fn-F7
Turn off the LCD backlight	Fn-F11
Turn on the LCD backlight	Press any key
Stop a command or application	Ctrl-Pause
Resume a command or application	Press any key
Send the contents of the screen to the printer	Shift-PrtSc

Table 3-2   *Summary of Notebook Hot Key Sequences*

Function	Key Sequence
Sets the notebook to echo keystrokes to the printer; prints a line when you press Enter; continues until you press Ctrl-P	Ctrl-P
Enable/disable the internal keypad	Fn-T
Toggle Scroll Lock function on/off	Fn-F6
Bring up the setup screen anytime	Fn-F1 or Ctrl-Alt-F1
Warm boot	Ctrl-Alt-Del
Start	Windows logo key
Activate next taskbar button	Windows logo key-Tab
Explore the computer	Windows logo key-E
Find files	Windows logo key-F
Minimize all	Windows logo key-M
Display run dialog box	Windows logo key-R
Display the application's context menu	Application key

Theory of Operation

4.1. Introduction

This chapter contains a general block diagram theory of operation description of the Extensa 67x Series Notebook Computers.

Note: *Various internal components may change on future models and busses/bus speeds are subject to change.*

4.2. Notebook Functional Overview

The Extensa 67x Series Notebook consist of:

- System Processor - implemented on the Motherboard Assembly

- Memory Subsystem - implemented on the Motherboard Assembly

- Processor/Memory/I/O Control - implemented on the Motherboard Assembly

- Keyboard Subsystem - implemented on the Motherboard and the Keyboard Assemblies

- Video Subsystem - implemented on the Motherboard and on the LCD Display Assembly

- Sound Subsystem - implemented on the Motherboard Assembly.

- Touchpad Mouse Subsystem- implemented on the Touchpad assembly and on the Motherboard Assembly

- Hard Disk Drive Subsystem - implemented on the Motherboard Assembly and the Hard Disk Drive Assembly

- Floppy Disk Drive Subsystem - implemented on the Motherboard and Floppy Disk Drive Assembly

- Power Subsystem - implemented on the Charger Board, Inverter Board, battery packs, and AC adapter

4.2.1 System Processor

The System Processor function for the notebook is implemented on the Motherboard in the form of an Intel Pentium P55-C Superscalar 586 Processor Chip. The processor operates in conjunction with RAM and ROM Memory and other control logic to process software instructions (BIOS, DOS, Windows, and applications). The processor communicates with the hard disk drive and the memory components using high speed busses.

The Processor also interacts with other hardware logic to provide the power savings features for the notebook. These features include controlling CPU clock speeds, reducing clock speeds whenever possible (e.g. when performing floppy disk drive accesses), powering down unused devices, etc.

4.2.2 Memory Subsystem

The memory subsystem comprises the following components:

- Main memory

- L2 Secondary Memory (cache)

- Flash ROM

The Extensa Series uses fast Extended Data Out (EDO) DRAM for main and video memory and high-speed synchronous, pipelined burst SRAM for L2 cache memory. Main BIOS and Video BIOS are stored in Flash ROM.

4.2.2.1 Main Memory

The 67x Series Notebooks come standard with 16 MB main memory, expandable to 80 MB. Memory expansion accommodations are provided via standard soDIMM connectors on the bottom of the Motherboard Assembly.

4.2.2.2 Flash ROM

All versions of the Extensa notebook family use a "Flash" ROM that contains both the main system BIOS and the VGA BIOS.

The Flash ROM execution is 8 bits wide. However, better performance can be attained by enabling the Shadow ROM in the CMOS setup routine. When the Shadow ROM is enabled, BIOS is copied into 32-bit high speed memory system.

4.2.3 Video Subsystem

The video subsystem is implemented on the Motherboard Assemblies.

The notebook contains a built-in 12.1 inch LCD and features simultaneous LCD and external VGA display.

The video subsystem includes a 2 MB DRAM memory, 32-bit DRAM bus, and separate display and memory clocks. An additional frame buffer/accelerator DRAM increases the available memory band width for CPU accesses. The video section also uses additional levels of write FIFOs, a read cache, page mode DRAM.

4.2.4 Sound Subsystem

The Extensa Series Notebook is equipped with a sound chip set that is Sound BlasterTM and Sound Blaster Pro compatible. Internal stereo speakers provide the Notebook with sound generation capabilities. A set of 3.5 mm connectors allow for external microphone and line inputs and headphone/speaker outputs.

The sound subsystem also includes a variety of sound utilities that combine to provide additional multi-media functions:

4.2.5 Keyboard Subsystem

The keyboard subsystem, implemented on the Keyboard Assembly and the Motherboard Assemblies Board, consists of the following major sections:

- Keyboard Assembly

- Keyboard Scanner

- Status LED Interface

4.2.6 Hard Disk Drive Subsystem

The Hard Disk Drive Subsystem, implemented on the Motherboard Board and on the associated hard disk drive module(s), provides disk storage for all system software and user files.

The notebook is equipped with an 1.6 GB or larger hard disk drive. The hard disk drive also features built-in power conservation features configured from the standard CMOS Setup Routine. An Automatic Power Down mode can be selected which powers down the drive motor during periods of inactivity. An additional level of power conservation may also be selected which powers down the motor plus all control circuits.

The hard disk drives are factory formatted as a single drive (Drive C:) and are preloaded with installation versions of Windows 95, Windows NT or Windows for Workgroups.

4.2.6.1 Hard Disk Drive Power Management

Both the internal hard disk drive and the hard disk drive installed in the media bay implement power savings features. From the CMOS setup routine, an automatic power down mode can be selected which enables the drive to turn off its motor after a specified period of inactivity. Additional Sleep modes can direct additional power savings during inactive periods by powering down the control circuitry.

4.2.7 Floppy Disk Drive Subsystem

The Extensa 67x Series notebooks contain provisions for supporting a Floppy Disk Drive installed internally or externally connected to the parallel port. The Floppy Disk Drive Subsystem consists of a Floppy Controller and the Floppy Disk Drive located either in the media bay or external to the notebook (not both).

The 3.5-inch floppy disk drive can read/write standard 3.5-inch disks (either1.44 MB or 2 MB capacity). The drive can also read a 720 KB disk (for interchange of data with other computers).

The data transfer rate for the floppy disk drive is 500 Kbits per second for high-density disks and 250 Kbits per second for double-density disks.

4.2.8 Power Subsystem

The notebook is equipped with a software/hardware monitored/controlled Power Subsystem that minimizes battery usage for prolonged battery operation and automatically recharges the batteries when the notebook is used with an AC adapter.

4.2.8.1 AC Power Adapter

The computer is equipped with a universal AC power adapter that converts AC voltage into DC voltage (approx. 46 Watts of power) used to operate the notebook and charge the batteries. The specifications for the AC adapter include:

- Input Voltage: 100 to 250 VAC

- Input Current: Approximately 1.5 Amps

- Input Frequency: 50 to 60 Hz

4.3. Detailed Circuit Theory

The remainder of this chapter provides chip-level circuit description for the Extensa Series Notebooks.

4.3.1 Major Components

Table 4-1 shows a listing the of the major components used in the Extensa Series Notebooks.

Table 4-1   Major Chips List

Component	Vendor	Description
M1521	Acer	PCI, cache and memory controller (Host-PCI Bridge)
M1523	Acer	System controller chip (PCI-ISA Bridge)
M6377	Acer	Power management controller
65550	C&T (Chips & Technology)	Video controller
TI1130	Texas Instruments	PCMCIA controller
NS87336VJG	NS (National Semiconductor)	Super I/O controller
ES1878	ESS Technology	Audio controller
T62.045.C.00	Ambit	Charger board
DAC-07B008	Delta	LCD inverter
DC-R05	Delta	LCD ID board
M38802	Phoenix	Keyboard encoder and decoder

4.3.2 System Architecture

Figure 4-1 shows the Extensa system architecture. The remainder of this chapter provides a detailed description of the major chips used in the Extensa Notebooks.
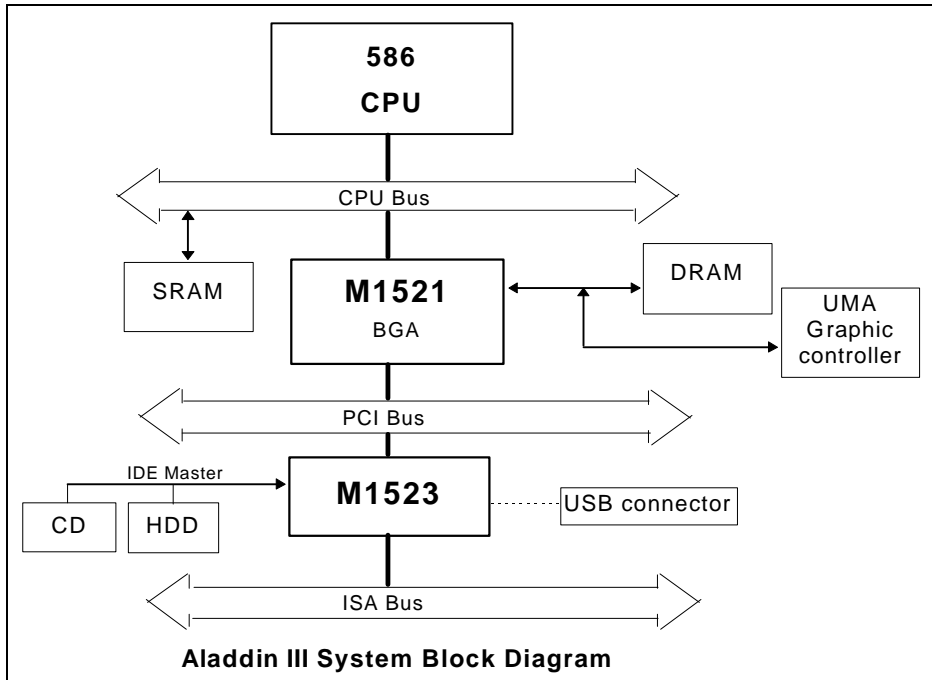

Figure 4-1   Extensa 670 System Architecture Diagram

4.3.3 ALI M1521 (PCI, Cache and Memory Controller)

The ALADDIN-III consists of tow chips, ALI M1521 and M1523 to give a 586 class system the complete solution with the most up-to-date feature and architecture for the new multimedia/ multithreading operating system. It utilizes the BGA package to improve the AC characterization, resolves system bottleneck and make the system manufacturing easier. The ALADDIN-III gives a highly-integrated system solution and a most up-to-date system architecture including the UMA, ECC, PBSRAM, SDRAM/BEDO and multi-bus with highly efficient, deep FIFO between the buses, such as the HOST/PCI/ISA dedicated IDE bus.

The M1521 provides a complete integrated solution for the system controller and data path components in a Pentium-based system. It provides a 64-bit CPU bus interface, 32-bit PCI bus interface, 64/72 DRAM data bus with ECC or parity, secondary cache interface including pipeline burst SRAM or asynchronous SRAM, PCI master to DRAM interface, four PCI master arbiters and a UMA arbiter. The M1521 bus interfaces are designed to interface with 3V and 5V buses.

The chip pinouts are provided in Figure 4-2.

KEY	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26
A	GND	GND	NC	AD29	AD25	AD23	AD21	FRAMEJ	AD17	CBE2J	TRDYJ	AD12	AD10	STOPJ	AD8	GNT2J	SERRJ	AD3	AD0	MD46	MD14	MD62	MD11	MD27	NC	GND
B	MREQJ	GND	AD31	AD27	PHLDJ	PHLDAJ	AD19	AD18	REQOJ	AD15	AD13	DEVSELJ	GNT1J	AD7	PAR	AD5	AD2	GNT3J	MD47	MD63	MD13	MD29	MD60	MD43	GND	GND
C	HD62	GND	GND	MGNTJ	AD30	AD26	CBE3J	LOCKJ	AD24	AD16	CBE1J	AD14	REQ1J	AD11	PCLKIN	CBEOJ	AD4	REQ3J	AD1	MD31	MD30	MD28	MD12	GND	MD59	PRIO
D	HD61	HD59	HD60	GND	AD28	VCC	AD22	AD20	GND	IRDYJ	VCC	GNTOJ	AD9	GND	REQ2J	VCC	AD6	MD15	GND	MD45	VCC	MD61	GND	MD58	MD57	MD10
E	HD52	HD55	HD57	HD58																			MD9	MD42	MD56	MD44
F	HD48	HD54	HD53	VCC																			VCC	MD26	RAS3J	MD41
G	HD51	HD47	HD50	HD56																			MD25	MD24	RAS1J	MD40
H	HD49	HD45	HD43	GND									M1521										MD8	MPD3	MPD1	MPD5
J	HD39	LOCKJ	HD46	HD41									388 PIN										GND	RAS2J	CAS6J	MPD7
K	HD44	HD40	HD36	MIOJ																			MPD6	RASOJ	CAS2J	MPD0
L	HD42	HD37	HD34	VCC							GND	GND	GND	GND	GND	GND							VCC	MPD4	MPD2	MD23
M	CACHEJ	HD38	KENJ	BE1J							GND	GND	GND	GND	GND	GND							CAS4J	MD55	MD54	CASOJ
N	BE2J	BEQOJ	BE4J	GND							GND	GND	GND	GND	GND	GND							CAS1J	CAS5J	HCLKIN	MD39
P	BE5J	AHOLD	BRDYJ	BE6J							GND	GND	GND	GND	GND	GND							GND	MD7	MD38	CAS3J
R	HD35	BE3J	HD33	NAJ							GND	GND	GND	GND	GND	GND							MD22	CAS7J	RAS4J	RAS6J
T	BE7J	HD32	HD29	VDD_5							GND	GND	GND	GND	GND	GND							VDD_5	MD6	MD37	MD53
U	HD30	HD31	HD28	HD27																			RAS7J	MD21	MD52	RAS5J
V	HD25	BOFFJ	EADSJ	GND																			MD4	MD5	MD48	MD20
W	HD23	HD26	HD7	HD19																			GND	MD19	MD51	MD36
Y	HD21	HD24	HD22	HD20																			MD49	MD35	MD50	MD18
AA	HD17	ADSJ	HD14	VCC																			VCC	MD1	MD2	MD3
AB	HD16	HD12	HD6	HD8																			MD33	MD16	MD17	MD34
AC	HD15	HD18	HD4	GND	HD3	VCC	A18	GND	A10	A5	VCC	A24	GND	A6	MWEJ	VCC	MA3	GND	COEJ	TIO1	VCC	BWEJ	GND	MD32	TIO0	MD0
AD	NC	HD5	GND	HD1	HD11	A19	A14	A9	A31	A27	WRJ	A22	A3	A4	MAAO	MA5	MA9	MA10	CADSJ	CCSJ	TIO3	TIO7	TIO9	GND	TIO10	TIO5
AE	GND	GND	SUSPENDJ	HD2	HD10	A17	A13	A16	A12	A7	HITMJ	A21	A28	SMIACTJ	A30	MAB1	MA6	MA2	MA11	RST J	TIO4	GWEJ	32K	TIO8	GND	NC
AF	GND	NC	HD0	HD9	HD13	A20	A15	A11	DCJ	A8	A25	A23	A26	A29	MAA1	MAB0	MA4	MA8	MA7	CADVJ	TWEJ	TIO2	TIO6	NC	GND	GND
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26

Figure 4-2   M1521 Pin Assignments

4.3.4 ALI M1523 (PCI, Cache and Memory Controller)

The M1523 is a bridge between PCI and ISA bus, providing full PCI and ISA compatible functions. The M1523 has Integrated System Peripherals (ISP) on-chip and provides advanced features in the DMA controller. This chip contains the keyboard controller, real-time clock and IDE master controller. This chip also supports the Advanced Programmable Interrupt controller (APIC) interface.

One eight-byte bidirectional line buffer is provided for ISA/DMA master memory read/writes. One 32-bit wide posted-write buffer is provided for PCI memory write cycles to the ISA bus. It also supports a PCI to ISA IRQ routing table and level-to-edge trigger transfer.

The chip has two extra IRQ lines and one programmable chip select for motherboard Plug and Play functions. The interrupt lines can be routed to any of the available ISA interrupts.

The on-chip IDE controller supports two IDE connectors for up to four IDE devices providing an interface for IDE hard disk and CD-ROMs. The ATA bus pins are dedicated to improve the performance of IDE master.

The M1523 supports the Super Green feature for Intel and Intel compatible CPUs. It implements programmable hardware events, software event and external switches (for suspend/turbo/ring-in). The M1523 provides CPU clock control (STPCLKJ). The STPCLKJ can be active (low) or inactive (high) in turn by throttling control.

A simplified block diagram of the M1523 chip is shown in Figure 4-3 and the associated pinouts are provided in Figure 4-4.
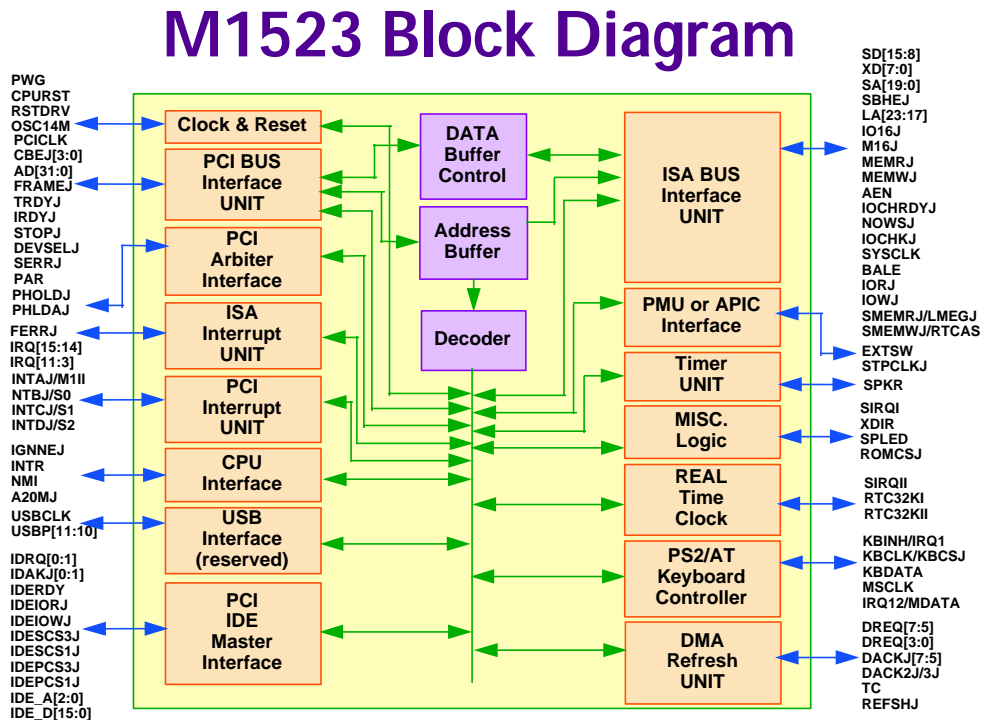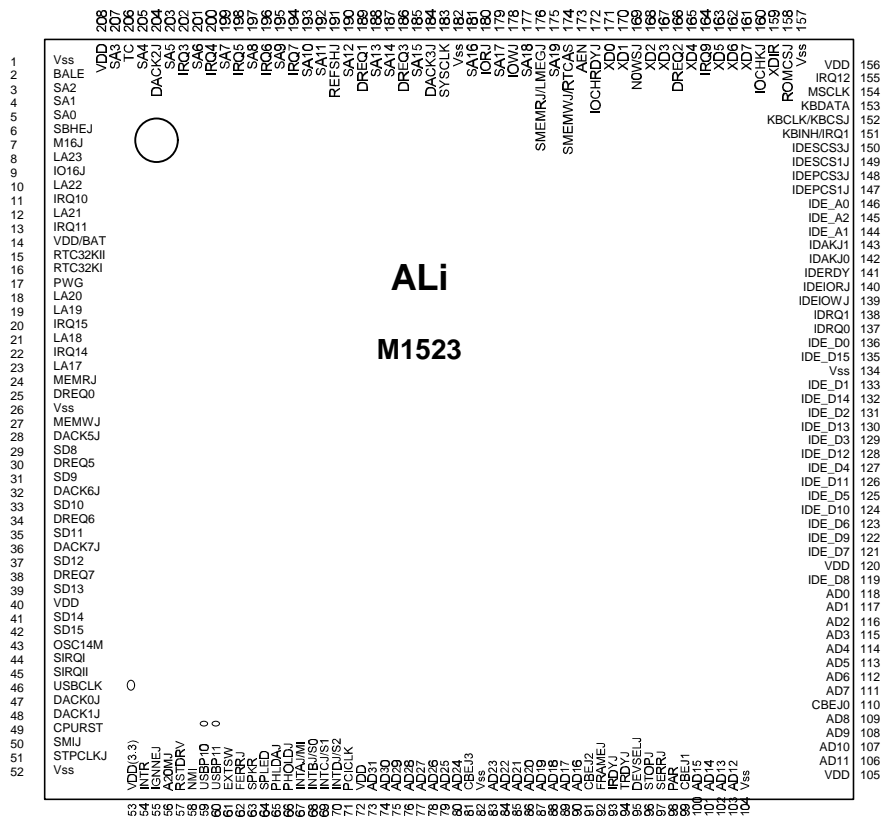

Figure 4-3   M1523 Chip Simplified Block Diagram

Figure 4-4   M1523 Chip Pinouts

4.3.5 ALI M6377 (Powre Management Unit)

- Three operation states

    - ON state

    - DOZE state

    - SLEEP state

- Programmable DOZE and SLEEP timers

- Programmable EL timer for backlight control

- Three output pins depending on operation state, each pin is programmable and power configurable

- Provide system activity monitoring, including:

    - video

    - hard disk

    - floppy disk

    - serial port

    - keyboard

    - parallel port

    - two programmable I/O groups activity monitor, each group contains 16/8 I/O addresses

    - one predefined I/O group activity monitor

- Multiple external wake up events from DOZE and SLEEP states:

    - External push button

    - RTC alarm

- Two levels battery warning monitor

- AC power monitoring to disable PMU function

A simplified block diagram of the M6377 Power Management Unit is provided in Figure 4-5. The chip pinouts are provided in Figure 4-6.
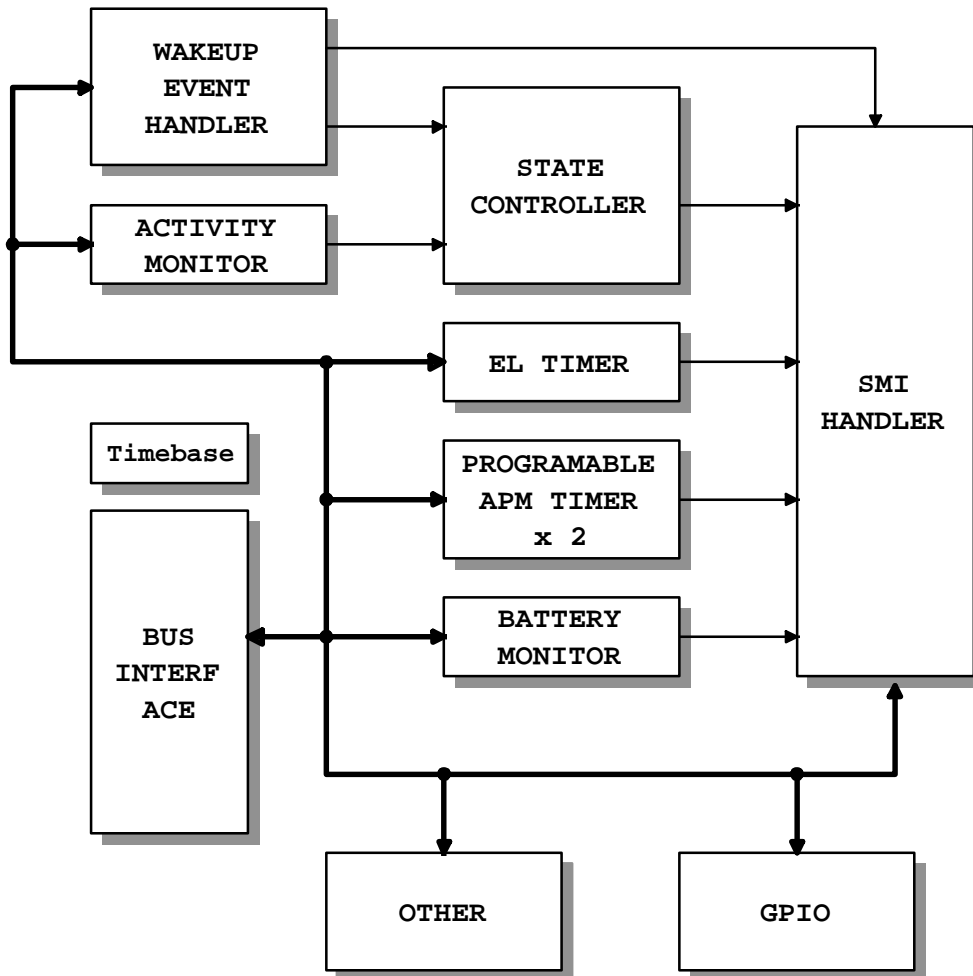
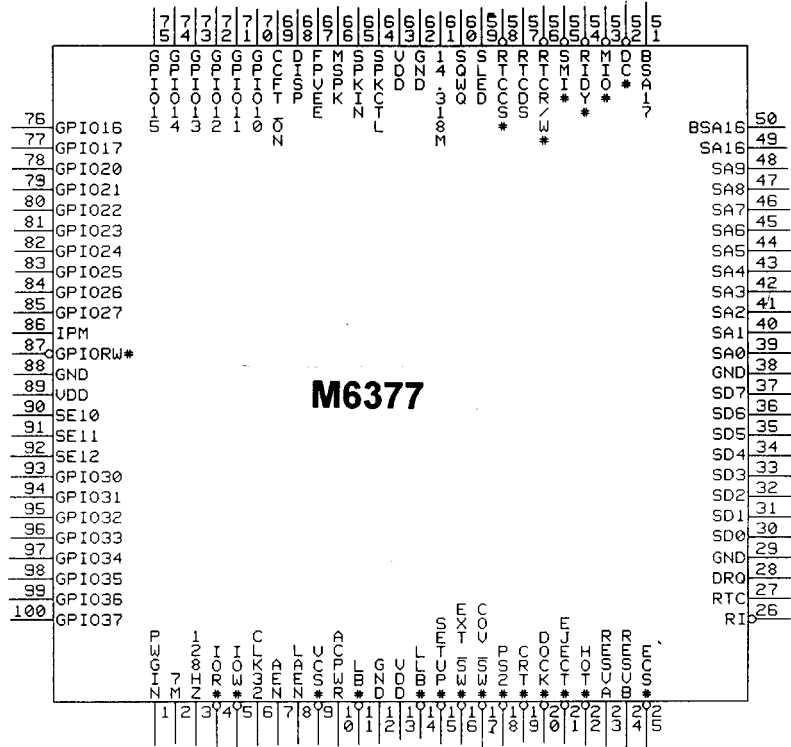*Figure 4-5   M6377 Chip Simplified Block Diagram*

M6377

Left pins:
76 GPIO16
77 GPIO17
78 GPIO20
79 GPIO21
80 GPIO22
81 GPIO23
82 GPIO24
83 GPIO25
84 GPIO26
85 GPIO27
86 IPM
87 GPIORW*
88 GND
89 VDD
90 SE10
91 SE11
92 SE12
93 GPIO30
94 GPIO31
95 GPIO32
96 GPIO33
97 GPIO34
98 GPIO35
99 GPIO36
100 GPIO37

Top pins:
75 GPIO15
74 GPIO14
73 GPIO13
72 GPIO12
71 GPIO11
70 GPIO10
69 CCFTON
68 DISP
67 FPVEE
66 MSPKIN
65 SPKCTL
64 VDD
63 GND
62 14.318M
61 SQWQ
60 SLED
59 RTCCS*
58 RTCDS*
57 RTCR/W*
56 SMI*
55 RDY*
54 MIO*
53 DC*
52 BSA17

Right pins:
50 BSA16
49 SA16
48 SA9
47 SA8
46 SA7
45 SA6
44 SA5
43 SA4
42 SA3
41 SA2
40 SA1
39 SA0
38 GND
37 SD7
36 SD6
35 SD5
34 SD4
33 SD3
32 SD2
31 SD1
30 SD0
29 GND
28 DRQ
27 RTC
26 RI

Bottom pins:
1 PWGIN
2 7M
3 128MHZ
4 IOR*
5 IOW*
6 CLK32
7 AEN
8 LAEN
9 AVCS*
10 ACPWR
11 LB*
12 GND
13 VDD
14 LB*
15 SETUP*
16 EXTSW
17 COV5W
18 PS2*
19 CRT
20 DOCK*
21 EJECT*
22 HOT
23 RESUMA
24 RESUMB
25 ECS*

Figure 4-6   M6377 Chip Pinouts

4.3.6 C&T 65550 High Performance Flat Panel / CRT VGA Controller

The C&T 65550 of high performance multimedia flat panel / CRT GUI accelerators extend CHIPS' offering of high-performance flat panel controllers for full-featured notebooks and sub-notebooks. The C&T 65550 offers 64-bit high performance and new hardware multimedia support features.

High Performance

Based on a totally new internal architecture, the C&T65550 integrates a powerful 64-bit graphics accelerator engine for Bit Block Transfer (BitBLT), hardware cursor, and other functions intensively used in graphical user interfaces (GUIs) such as Microsoft Windows™. Superior performance is also achieved through a direct 32-bit interface to the PCI local bus. The C&T65550 offers exceptional performance when combined with CHIPS advanced linear acceleration driver technology.

Hardware Multimedia Support

The C&T65550 implements independent multimedia capture and display systems on-chip. The capture system places data in display memory (usually off screen) and the displya system places it in a window on the screen.

The capture system can receive data from either the system bus or from the ZV enabled video port in either RGB or YUV format. The input data can also be scaled down before storage in display memory (e.g., from any size larger than 320x240 down to 352x248). Capture of input data may also be double buffered fro smoothing and to prevent image tearing.

The display system can independently place either RGB or YUV data from anywhere in display memory into an onscreen window which can be any size and located at any pixel boundary (YUV data is converted to RGB "on-the-fly" on output). Non-rectangular windows are supported via color keying. The data can be functionally zoomed on output up to 8x to fit the onscreen window and can be horizontally and vertically interpolated to scale or zoom artifacts. Interlaced and non-interlaced data are supported in both capture and display systems.

Versatile Panel Support

The C&T65550 supports a wide variety of monchrome and color Single-Panel, Single-Drive (SS) and Dual-Panel, Dual-Drive (DD) standard and high-resolution passive STN and active matrix TFT/MIM LCD and EL panels. For monchrome panels, up to 64 gray scales are supported. Up to 4096 different colors can be displayed on passive STN LCDs and up to 16M colors on 24-bit active matrix LCDs.

Low Power Consumption

The C&T65550 employs a variety of advanced power management features to reduce power consumption of the display sub-system and extend battery life. Although optimized for 3.3V operation. The C&T65550 controller's internal logic, memory interface, and panel interfaces can be independently configured to operate at either 3.3V or 5V.

Software Compatibility / Flexibility

The C&T65550 are fully compatible with VGA at the register, and BIOS levels. CHIPS and third-party vendors supply fully VGA-compatible BIOS, end-user utilites and drivers for common application programs.

The pin diagram is shown in Figure 4-7. Pin names in parentheses (...) indicate alternate functions.

Figure 4-7   *C&T65550 Chip Pinouts*

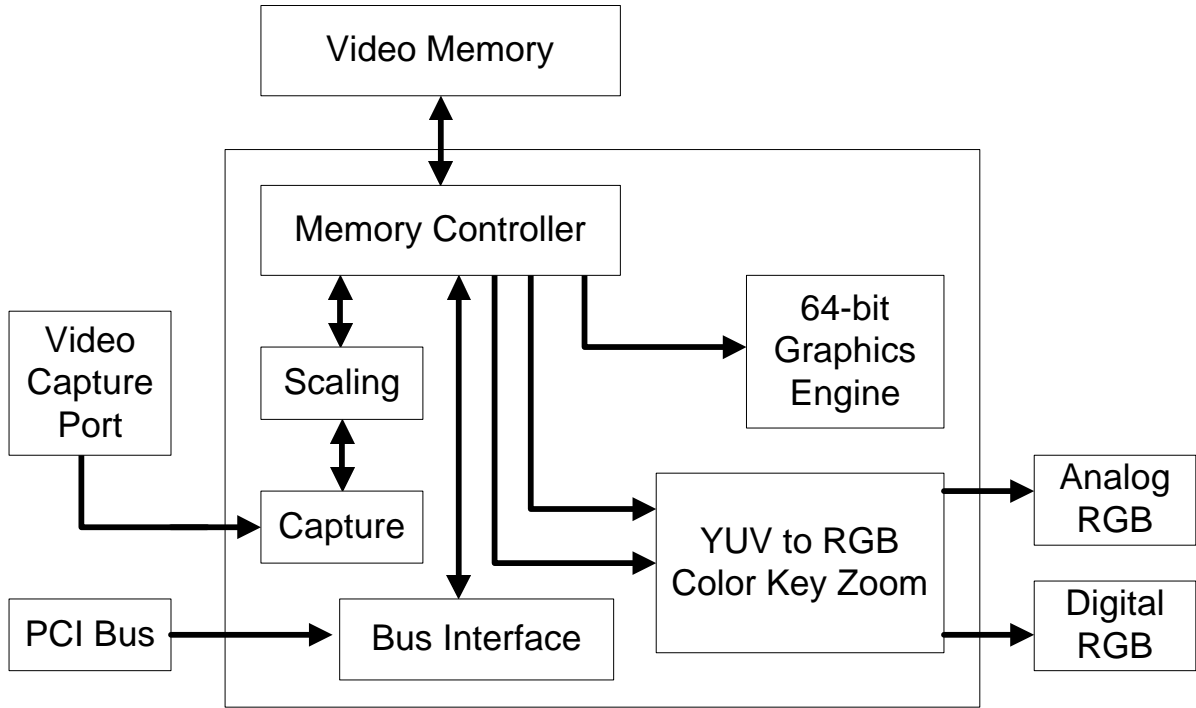A simplified block diagram of the C&T65550 is shown in Figure 4-8.

Figure 4-8   C&T65550 Chip Simplified Block Diagram

4.3.7 TI1130 PCMCIA Controller

The TI PCI1130 is a high-performance PCI-to-PC Card controller that supports two independent PC Card sockets compliant with the 1995 PC Card standard. The PCI1130 provides a set of features that make it ideal for bridging between PCI and PC Cards in both notebook and desktop computers. The 1995 PC Card standard retains the 16-bit PC Card specification defined in PCMCIA release 2.1 and defines the new 32-bit PC Card, called CardBUs, capable of full 32-bit data transfers at 33 MHz. The PCI1130 supports any combination of 16-bit and CardBus PC Cards in its two sockets, powered at 3.3V or 5V as required.

The PCI1130 is compliant with the PCI local bus specification revision 2.1 and its PCI interface can act as either a PCI master device or a PCI slave device. The PCI bus mastering is initiated during 16-bit PC Card DMA transfers or CardBus PC Card bus mastering cycles.

All card signals are internally buffered to allow hot insertion and removal without external buffering. The PCI1130 internal data path logic allows the host to access 8-, 16-, and 32-bit cards using full 32-bit PCI cycles for maximum performance. Independent 32-bit write buffers allw fast-posted writes to improve system-bus utilization.

An advanced CMOS process is used to achieve low system power consumption while operating at PCI clock rates up to 33 MHz. Several low power modes allow the host power-management system to further reduce power consumption.

The pin diagrams are shown in Figure 4-9 first for PCI-TO-PC CARD (16-BIT); then Figure 4-10 for PCI-TO-CARDBUS (32-BIT).
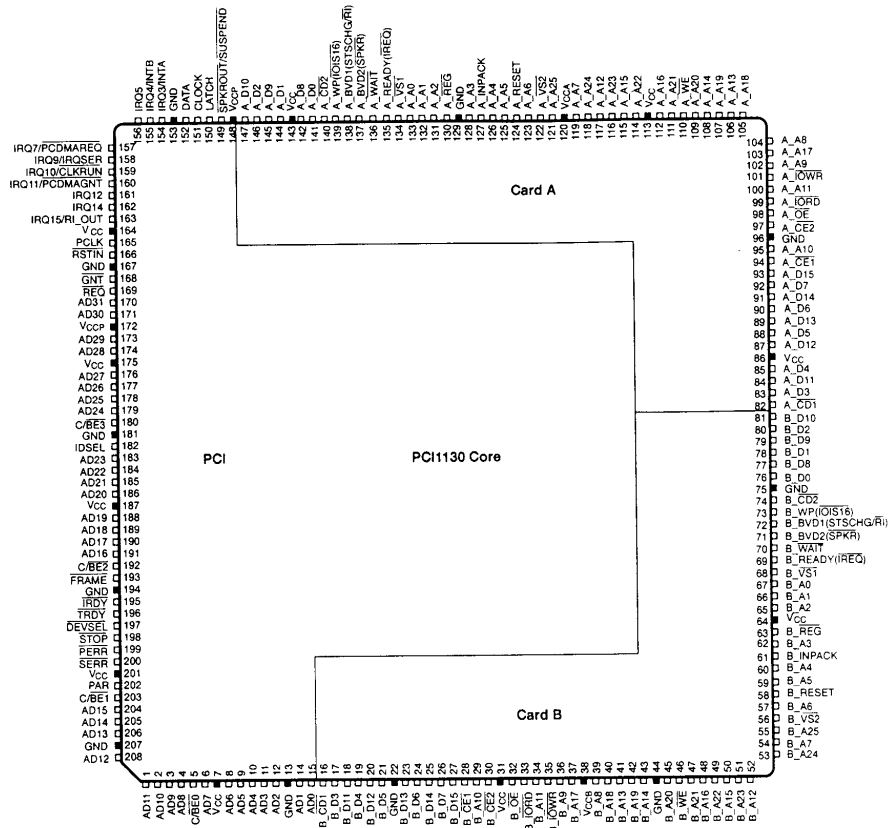

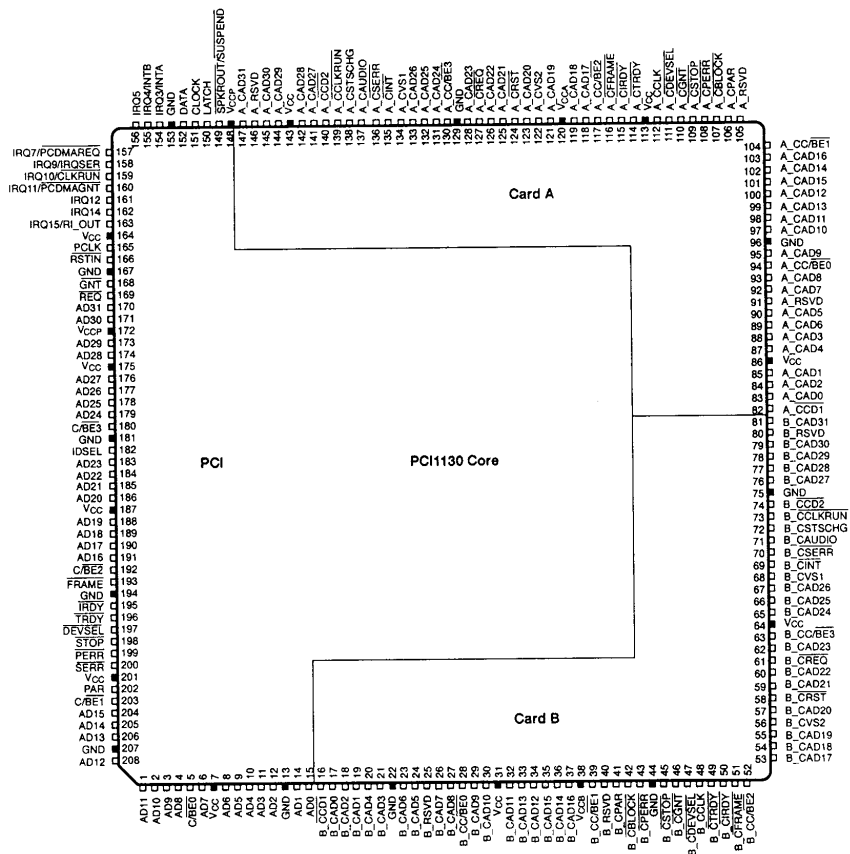*Figure 4-9   TI1130 Chip PCI-to-PC card (16-bit) Pinouts*

Figure 4-10   TI1130 Chip PCI-to-CardBus (32-bit) Pinouts

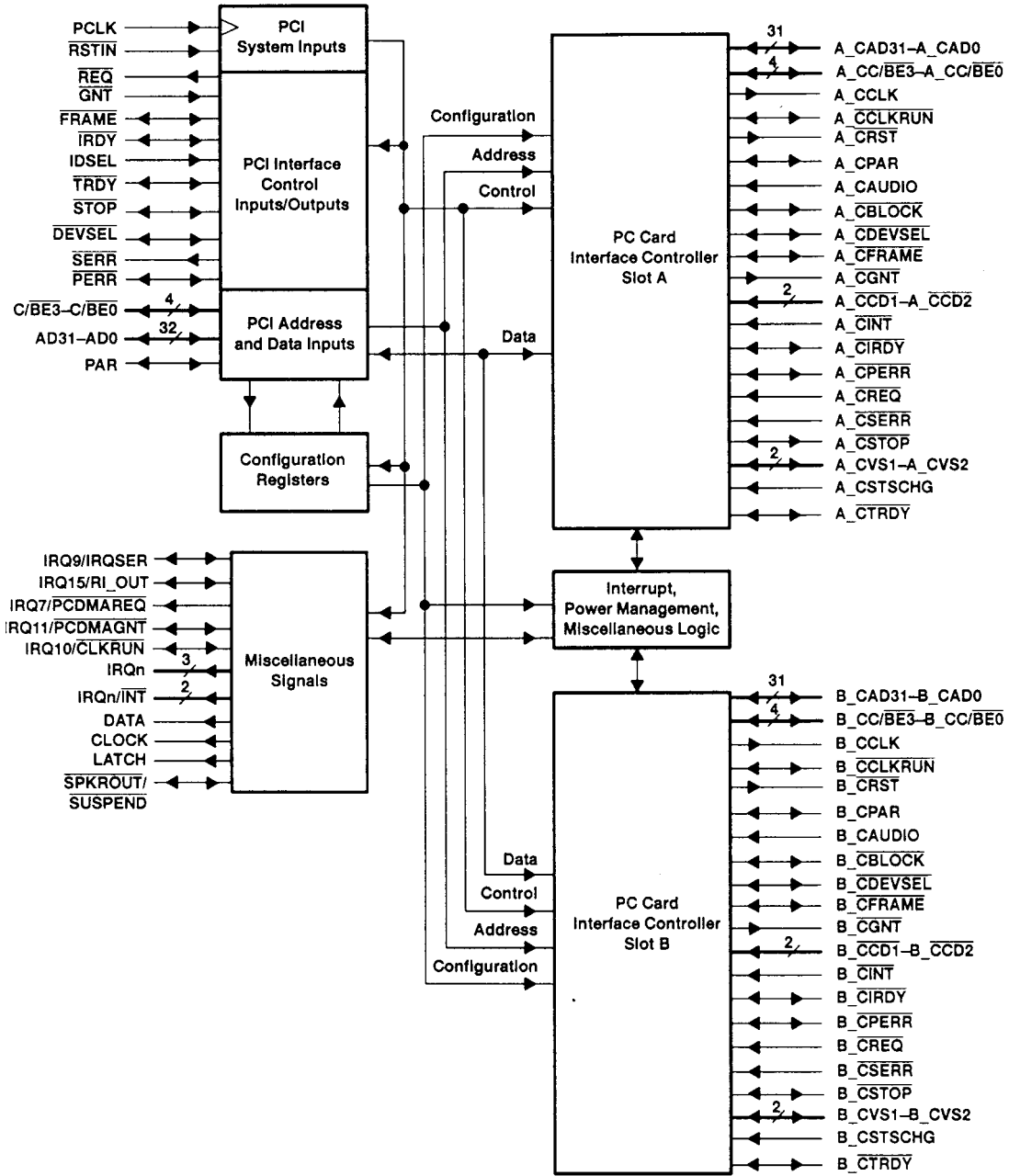A simplified block diagram of the PCMCIA Controller is shown in Figure 4-11.

Figure 4-11   TI1130 Chip Simplified Block Diagram

4.3.8 NS87336VJG Super I/O Controller

The PC87336VJG is a single chip solution for most commonly used I/O periherals in ISA< and EISA based comptuers. It incorporates a Floppy Disk Controller (FDC), two full featured UARTS, and an IEEE 1284 compatible parallel port Standard PC-AT address decoding for all the peripherals and a set of configuration registers are also implemented in this highly integrated member of the Super I/O family. Advanced power management features, mixed voltage operation and integrated Serial-Infrared (both IrDA and Sharp) support makes the PC87336 an ideal choice for low-power and/or portable personal computer applications.

The PC87336 FDC uses a high performance digital data separator eliminating the need for any external filter components. It is fully compatible with the PC8477 and incorporates a superset of DP8473, NEC PD765 and N82077 floppy disk controller functions. All popular 5.25" and 3.5" floppy drives, including the 2.88 MB 3.5" floppy drive, are supported. In addition, automatic media sense and 2 Mbps tape drive support are provided by the FDC.

The two UARTs are fully NS16450 and NS16550 compatible. Both ports support MIDI baud rates and one port also supports IrDAs the HP SIR and Sharp SIR compliant signaling protocol.

The parallel port is fully IEEE 1284 level 2 compatible. The SPP (Standard Parallel Port) is fully compatible with ISA dand EISA parallel ports. In addtion to the SPP, EPP (Enhanced Parallel Port) and ECP (Extended Capabilities Port) modes are supported by the parallel port.

A set of configuration registers are provided to control the Plug and Play and other various functions of the PC87336 . These registers are accessed using tow 98-bit wide index and data registers. The ISA I/O address of the register pari can be relocated using a power-up strapping option and the software configuration after power-up.

When idle, advanced power management features allow the PC87336 to enter extremely low power modes under software control. The PC87336 can operate from a 5V or a 3.3V power supply. A unique I/O cell structure allows the PC87336 to interface directly with 5V external components while operating from a 3.3V power supply.

Some of the major features include:

- 100% compatible with ISA and EISA architectures

- Floppy Disk Controller:

  - Software compatible with the DP8473, the 765A and the N82077

  - 16-byte FIFO (disabled by default)

  - Burst and non-burst modes

  - Perpendicular recording drive support

  - New high-performance internal digital data separator (no external filter components required)

  - Low-power CMOS with enhanced power-down mode

  - Automatic media-sense support, with full IBM TDR (Tape Drive Register) implementation

  - Supports fast 2 Mbps and standard 1 Mbps/500 kbps/250 kbps tape drives

- Parallel Port

  - Enhanced Parallel Port (EPP) compatible

- Extended Capabilitie Port (ECP) compatible, including level 2 support

- Bidirectional under either software or hardware control

- Compatible with ISA and EISA architectures

- Ability to multiplex FDC signals on parallel port pins allows use of an external Floppy Disk Drive (FDD)

- Includes protection circuit to prevent damage to the parallel port when a connected printer is powered up or is operated at a higher voltage

- UARTs:

  - Software compatible with the PC16550A and PC16450

  - MIDI baud rate support

  - Infared support on UART2 (IrDA and Sharp-compliant)

- Address Decoder

  - 6-bit or 10-bit decoding

  - External Chip Select capability when 10-bit decoding

  - Full relocation capability (no limitation)

- Enhanced Power Management

  - Special configuration registers for power-down

  - Enhanced programmable power-down FDC command

  - Auto power-down and wake-up modes

  - 2 special pins for power management

  - Typical current consumption during power-down is less than 10 µA

  - Reduced pin leakage current

- Mixed Voltage support

  - Supports standard 5V operation

  - Supports 3.3V operation

  - Supports mixed internal 3.3V operation with 3.3V/5V external configuration

- General Purpose Pins:

  - 2 pins the Bidirectional Parallel Port, for 2 separate programmable chip select decoders, can be programmed for game port control

- Plug and Play Compatible:

  - 16 bit addressing (full programmable)

  - 10 selectable IRQs

  - 3 selectable DMA Channels

  - 3 SIRQ Inputs allow external devices to mapping IRQs

- 100-pin TQFP package - PC87336VJG

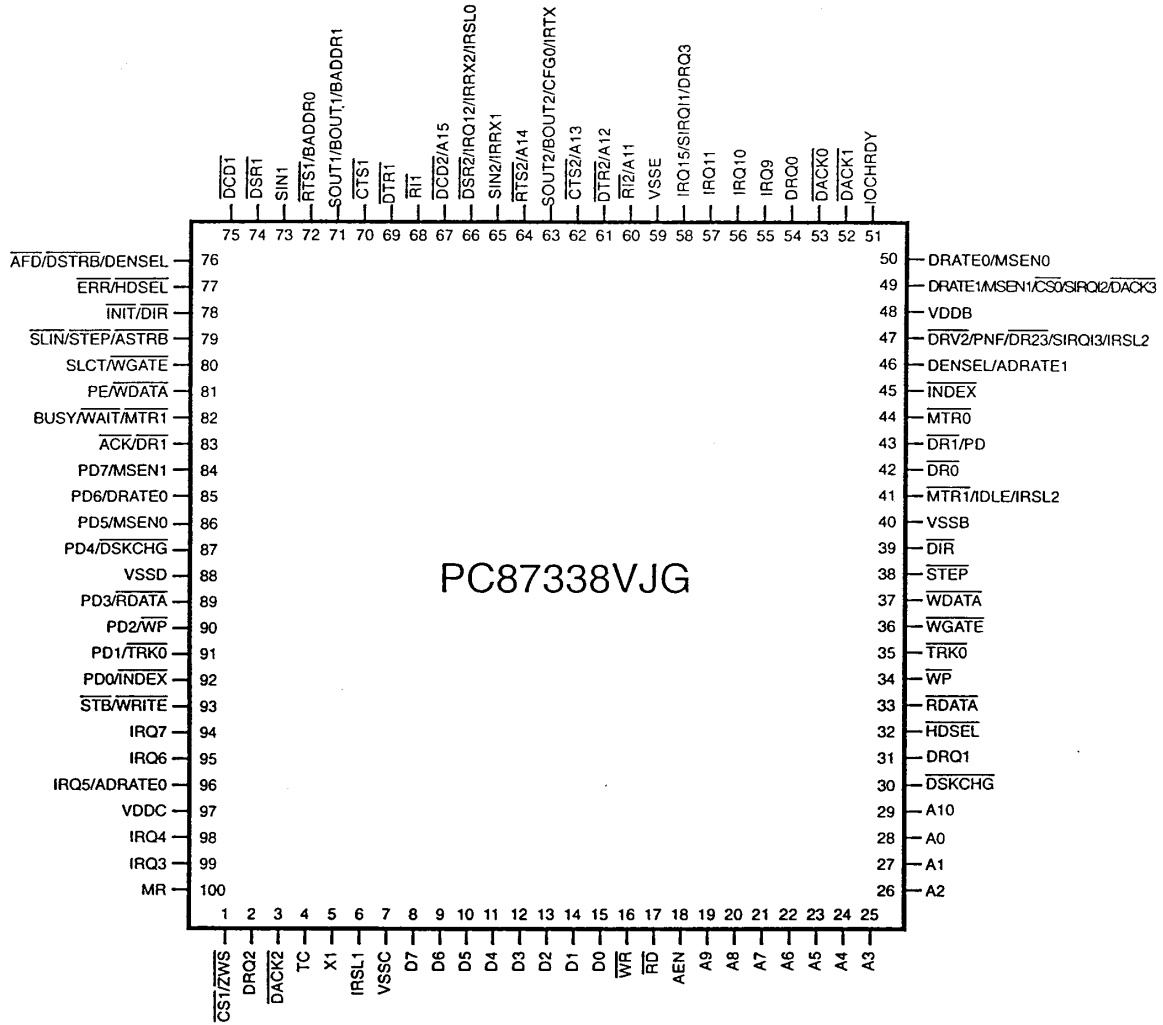The pin diagram is shown in Figure 4-12.

Figure 4-12   NS87336VJG Chip Pinouts

A simplified block diagram of the Super I/O controller is provided in Figure 4-13.
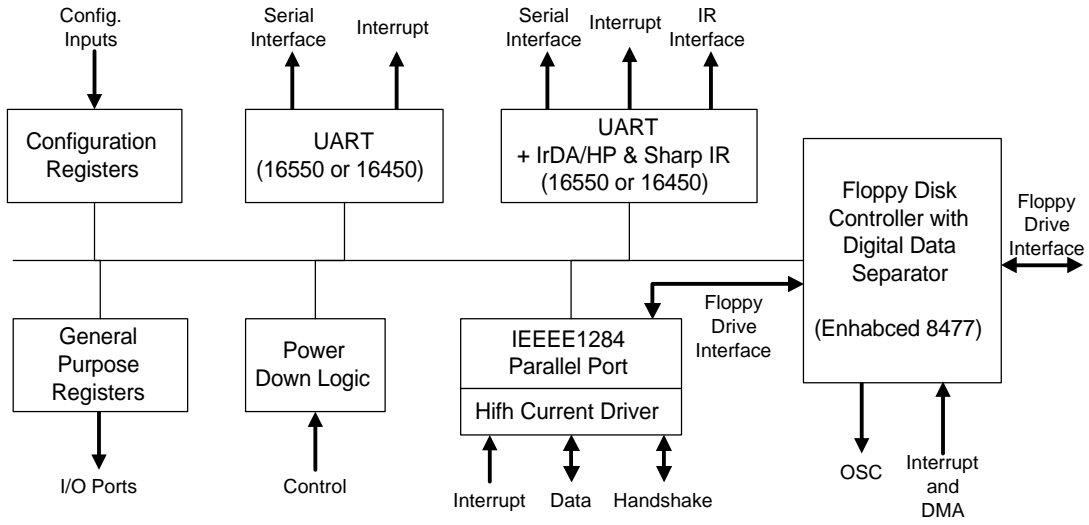

Figure 4-13   NS87336VJG Chip Simplified Block Diagram

4.3.9 ESS1878 Audio Controller with Interface to Expansion Audio Mixer

The ES1878 is a member of the ESS family of audio controllers that includes the ES1868. It shares most of the features of the ES1868. and includes new features, such as support for the expansion audio mixer chip, the ES978, and a new IIS serial port and stereo D/A converter. A 4-wire expansion analog bus and 2-wire serial control bus connect the ES1878 and the ES978

Features

- Hot-dock interface to expansion audio mixer (ES978)

- Plug-and-Play support using internal resource ROM.

- Monophonic full-duplex using two DMA channels.

- Self-timed joystick port ("digital joystick")

- Support for up to 7 general purpose outputs and 7 general purpose inputs that can be slaved with corresponding pins of ES978 in expansion unit

- IIS interface to internal stereo D/A for external ZV port or MPEG audio

- Completely general interrupt mapping, including sharing all interrupts
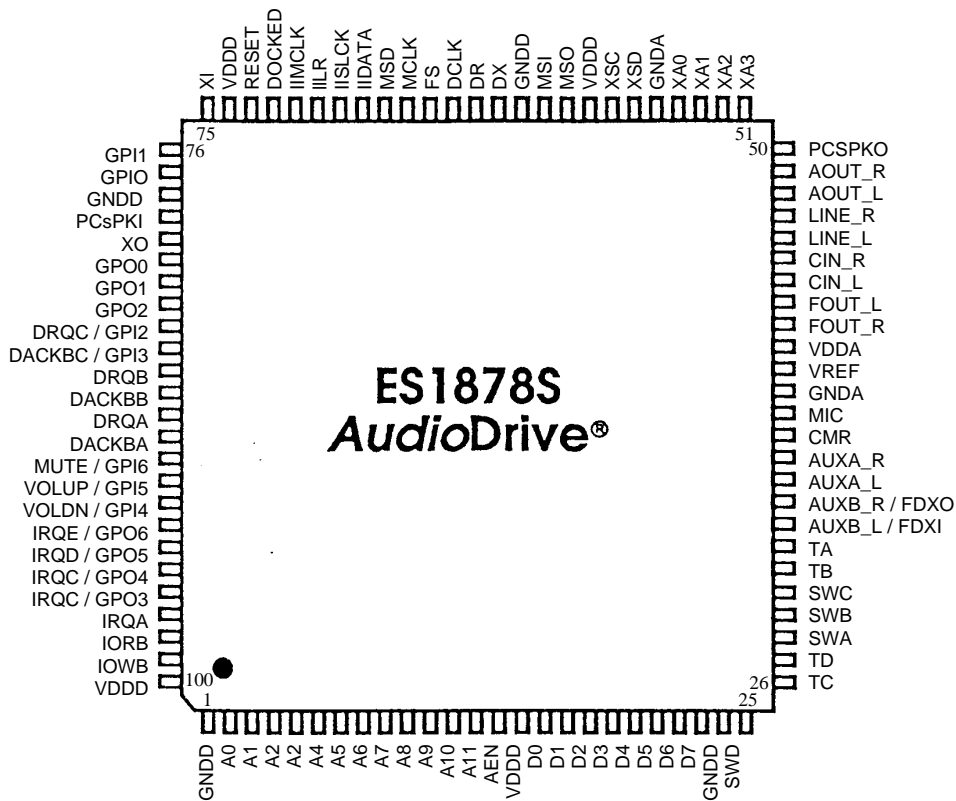
Figure 4-14   ES1878 Chip Pinouts

Troubleshooting Procedures

5.1. Introduction

This chapter provides an overview of the fault isolation process, provides guidelines for isolating 67x Series computer malfunctions to replaceable subassemblies and provides instructions for executing diagnostics and interpreting error messages.

5.2. Overview of Fault Isolation Process

The fault isolation process (summarized in Figure 5-1) consists of the following steps:

- Notebook power system (including battery packs and AC adapter connections)

- Switch settings (ensure **Power** is On)

- Press the Shift key to ensure that Notebook is not in Suspend mode

- Verify if computer is configured to boot from the A: Drive or C: Drive.

- Check LCD brightness adjustment (press Fn-Up Arrow keys to increase brightness)

- Ensure that computer is not set for external monitor (press Fn-F12 to select internal screen)

- Record and attempt to resolve any displayed error messages or error beeps (refer to Paragraph 5.2.3.1 and Tables 5-1 and 5-2)

- Try rebooting the system (**Ctrl-Alt-Del**)

- If the computer is capable of running the Setup program; check the serial and parallel port configurations, Sound System enable/disable, and other features that may affect system operation.

- Remove and replace suspect hardware (as described in Chapter 6 of this manual) and retest the system.

5.3. Troubleshooting Procedures

The built-in self test program and the disk resident diagnostics program (PC-Doctor) are useful tools in computer troubleshooting. However, if the computer has a power, keyboard or display problem, you must first solve this problem before running diagnostics. If the computer powers up and displays messages on the LCD or emits a series of beeps, skip to Paragraph 5.3.3 for further instructions.

5.3.1 Troubleshooting a Power Supply Problem

If the computer does not power up when the Power Switch is pressed ON, you most likely have a malfunction in the power subsystem (loss of power at the AC outlet, faulty AC adapter, discharged Battery Packs, or faulty Power Supply on the Main Board). With a power problem, all LEDs are extinguished, the LCD screen is blank, the system does not respond when the suspend switch is pressed several times consecutively and no drive activity can be heard. The computer is unable to load software and displays no visible signs of activity. To fault isolate a power problem, check the following:

- AC adapter and Battery - Plug in the AC adapter and double-check all connections on the adapter and computer. Ensure that the Notebook Power switch is set to the On position and that the system is not in Suspend or sleep mode.

- Measure the voltage at the AC outlet or plug in a known good appliance (e.g. a lamp) to verify that voltage is present. If the voltage is ok, try replacing the AC adapter.

- Check to see that the battery packs are installed correctly and that the battery charge indicators on the front of the battery packs indicate the batteries are charged (try using a new battery pack if batteries are discharged).

- If the AC outlet voltage, AC adapter, and battery packs test normal but the computer will not power up, try disconnecting the display cable from the base (refer to Chapter 6 for disassembly instructions) then connect an external monitor to see if a short in the display assembly has occurred.

5.3.2 Troubleshooting a Display Problem

If the LCD remains blank when you turn on the computer, and the status indicators light, check the following controls on the display):

- LCD suspend mode - press Shift to terminate Suspend mode.

- Brightness set too low - press Fn-Up Arrow keys to increase screen brightness

- Notebook Set for External Monitor - press Fn-F12 to switch to the internal screen.

- Faulty LCD - Replace the LCD panel as described in Chapter 6 of this manual.

Table 5-1 contains fault isolation information for Display Problems on the notebook. Symptoms are listed along the left side of the chart and the various Display FRUs are listed along the top of the chart. Within the body of the table are the probabilities of each of the FRUs causing that particular problem. For example, a single display line on the screen is most likely caused by the LCD Panel or Display Cable; other components have a low probability of causing the problem.

Table 5-1   Display Troubleshooting Guide

Problem Description	Inverter Board	LCD Panel	Display Cable	Mother Board	BIOS
Single line on LCD display (horizontal or vertical)	Low	High	Medium	Low	Low
Multiple lines on display (horizontal or vertical)	Low	Medium	Medium	Low	Low
Sections of the display are missing characters	Low	Medium	Medium	Low	Low
Scrambled Display	Low	Medium	Low	Medium	Medium
Intermittent characters on display	Low	Medium	Medium	Medium	Low
Bright display, no visible characters	Low	Medium	Medium	Medium	Low
Brightness level fluctuating or display blinking on/off	High	Low	Medium	Low	Low
Display goes dim over time	High	Medium	Low	Low	Low
Dim display but characters very visible	Medium	Medium	Low	Low	Low
Very dark display and characters are slightly visible when a light is directed at surface of the display	High	Low	Low	Low	Low
Very dark display and no characters are visible	Low	High	High	Medium	Low

5.3.3 Fault Isolation Using Self Test

When the computer is first powered up, it automatically performs a self test of its central hardware and memory functions. During self test (which lasts for a few seconds), the display shows copyright and version number information.

Note: *Some procedures in this paragraph require you to use keystroke sequences, such as Ctrl-Alt-Del. To execute a keystroke sequence such as this, you must press all three keys simultaneously.*

5.3.3.1 Self Test Error Messages

Upon successful completion of the self test, the computer automatically loads its operating system and other built-in utilities. If the self test fails to complete successfully, the display shows one of the error messages described in Table 5-2.

Note: *In the event of a hardware problem that affects the display, the Notebook also communicates errors via a series of beeps. The interpretation of the beep codes is provided in Table 5-3.*

Table 5-2   Self Test Error Messages

Error Message	Explanation
Diskette drive 0 failure	This message indicates the internal floppy disk (drive A) has failed (or is not installed on the computer). Press **Ctrl-Alt-Esc** to ensure that drive type is correctly set (3.5 inch, 1.44 MB) in BIOS Setup.
	Run the Diagnostics to check Drive A as described in Paragraph 5.4. Also try using a new, correctly formatted disk.

Table 5-2   Self Test Error Messages

Error Message	Explanation
Diskette read failure - strike F1 to try to retry boot	This message indicates the disk is defective or not formatted.
	Try another known good formatted disk and press **F1**. Fixed disk failure
	This message indicates the system disk drive failed to complete the self test or that the nonvolatile random-access memory (NVRAM) is configured incorrectly for the installed drive type.
	Ensure that the notebook is configured to boot from the C: Drive.
	Press **Ctrl-Alt-Esc** to ensure that the hard disk drive type is correctly identified in Setup (should be default for the internal hard disk drive).
	Press the **Ctrl-Alt-Del** keys to attempt to reboot the system. If the error occurs a second time, run the diagnostics as described in Paragraph 5.4.
Fixed disk read failure - strike F1 to retry boot	This message indicates that the hard disk drive improperly formatted, or that a hardware failure has occurred in the hard disk drive subsystem.
	Press **Ctrl-Alt-Esc** to ensure that the hard disk drive type is correctly identified in Setup (should be default for the internal hard drive).
	If the booting process still fails, run the diagnostics as described in Paragraph 5.4.
Invalid configuration information	This message indicates the computer has been configured incorrectly. Check the settings in the Setup program menu. Also, NVRAM battery failure (resulting in loss of configuration data) can generate this error message. Install an AC adapter and recharge the system. If the problem persists, replace Top Board.
Keyboard clock/data line failure	This message indicates either the keyboard or the external keyboard (if one is installed) is defective. If the computer has an external keyboard connected, check the connection to ensure that it is connected correctly.
Keyboard stuck key failure	This message indicates the self test has detected a stuck key on the keyboard. Try the keyboard keys to determine if they appear to be working properly and reboot the computer.
	Note: Also, ensure that no key is pressed during power up and that no keys are jammed.
	If the self test still fails, execute the diagnostics as described in Paragraph 5.4.
No boot device available - press F1 to retry boot.	This message indicates the system disk, the disk drive, or the disk is defective (if loading MS-DOS from disk) or that the NVRAM is not correctly configured for the installed disk drive type. Replace the disk and reboot the computer.
No boot sector on system disk - press F1 to retry boot	This message indicates the system disk is not formatted. Try powering down the system and re-running the self test. Press **Ctrl-Alt-Esc t**o ensure that the drive type is correctly set in Setup. Also, press **F1** to try loading MS-DOS from the hard disk drive again. If the message persists, the disk must be reformatted and software reloaded from disks (refer to Chapter 3).
Non-System Disk or Disk error. Replace and press any key when ready.	This message indicates the disk installed in floppy disk Drive A is not a bootable disk. Format an MS-DOS bootable disk and install the disk in Drive A, Reboot the computer. Also try pressing **Ctrl-Alt-Esc** to ensure the disk drive type is correctly set in Setup.
Time-of-day clock stopped	This message indicates that the battery sustaining the system configuration has failed. Reset the configuration.
	Note: The following messages are informational messages that do not necessarily indicate a self test failure.
NNN Main Memory, NNN Extended	This message lists the amount of standard memory and optional extended memory that has tested successfully during self test execution. This message is only displayed if Quick Boot is off in System Setup.
Memory tests terminated by keystroke	This message tells you that you have pressed the Space Bar while the memory tests were running. Pressing the Space Bar during memory testing stops the tests.

Table 5-2   Self Test Error Messages

Error Message	Explanation
Press F1 to continue	This message tells you that an error was found during self test execution. Press **F1** to attempt to reboot the computer.
Save-to-Disk file is too small	This message occurs when you add memory. Use the MS-DOS program PHDISK to increase the size of the save-to-disk file.
Save-to-disk file is missing	Use the MS-DOS program PHDISK to create a new save-to-disk file.
Swap File is missing	Use the MS-DOS program PHDISK to create a new swap file.

5.3.3.2 Self Test Beep Error Messages

In the event of a hardware problem that affects the display, the Notebook also communicates errors via a series of beeps. These codes may be heard over the system's speaker as three bursts of beeps. The interpretation of the beep codes is provided in Table 5-3.

To recover from a self test error, try cycling power to the computer. Also, press **Ctrl-Alt-Esc** to ensure that the Setup configuration is correct. In general, most of the failures are associated with the Motherboard and may require board removal/replacement.

Table 5-3   Self Test Beep Messages

Beep Code	Port 80h	Description
None	01h	CPU Register Test in Progress
1-1-3	02h	CMOS Write/Read Failure
1-1-4	03h	ROM BIOS Checksum Failure
1-2-1	04h	Programmable Interval Timer Failure
1-2-2	05h	DMA Initialization Failure
1-2-3	06h	DMA Page Register Write/Read Failure
1-3-1	08h	DRAM Refresh Verification Failure
None	09h	1ST 64K RAM Test in Progress
1-3-3	0Ah	1ST 64K RAM Chip or Data line Failure
1-3-4	0Bh	1ST 64K RAM Odd/Even Logic Failure
1-4-1	0Ch	Address Line Failure, 1ST 64K RAM
1-4-2	0Dh	Parity Failure, 1ST 64K RAM
2-1-1	10h	Bit 0, 1ST 64K RAM Failure
2-1-2	11h	Bit 1, 1ST 64K RAM Failure
2-1-3	12h	Bit 2, 1ST 64K RAM Failure
2-1-4	13h	Bit 3, 1ST 64K RAM Failure
2-2-1	14h	Bit 4, 1ST 64K RAM Failure
2-2-2	15h	Bit 5, 1ST 64K RAM Failure
2-2-3	16h	Bit 6, 1ST 64K RAM Failure
2-2-4	17h	Bit 7, 1ST 64K RAM Failure
2-3-1	18h	Bit 8, 1ST 64K RAM Failure
2-3-2	19h	Bit 9, 1ST 64K RAM Failure
2-3-3	1Ah	Bit A, 1ST 64K RAM Failure
2-3-4	1Bh	Bit B, 1ST 64K RAM Failure

Table 5-3   Self Test Beep Messages

Beep Code	Port 80h	Description
2-4-1	1Ch	Bit C, 1ST 64K RAM Failure
2-4-2	1Dh	Bit D, 1ST 64K RAM Failure
2-4-3	1Eh	Bit E, 1ST 64K RAM Failure
2-4-4	1Fh	Bit F, 1ST 64K RAM Failure
3-1-1	20h	Slave DMA Register Failure
3-1-2	21h	Master DMA Register Failure
3-1-3	22h	Master Interrupt Mask Register Failure
3-1-4	23h	Slave Interrupt Mask Register Failure
None	25h	Interrupt Vector Loading In Progress
3-2-4	27h	Keyboard Controller Test Failure
None	28h	CMOS Power Failure and Checksum in Progress
None	29h	CMOS Configuration Validation in Progress
3-3-4	2Bh	Screen Memory Test Failure
3-4-1	2Ch	Screen Initialization Failure
3-4-2	2Dh	Screen Retrace Test Failure
None	2Eh	Search for Video ROM in progress
1-2	2Eh	Cirrus Video Chip Failure
1-3	2Eh	Cirrus RAM DAC or Video RAM Failure
None	30h	Screen Believed Operable; running with Video ROM
None	31h	Monochrome Monitor Believed Operable
None	32h	Color Monitor (40 Column) Believed Operable
None	33h	Color Monitor (80 Column) Believed Operable
4-2-1	34h	No Time Tick
4-2-2	35h	Shutdown Failure
4-2-3	36h	Gate A20 Failure
4-2-4	37h	Unexpected Interrupt in Protected Mode
4-3-1	38h	Memory High Address Line Failure at 010000h-0A0000h
4-3-3	3Ah	Timer Chip Counter 2 Failed
4-3-4	3Bh	Time of Day Clock Stopped
4-4-1	3Ch	Serial Port Failure
4-4-2	3Dh	Parallel Port Failure
4-4-3	3Eh	Math Coprocessor Failure

5.3.4 PCMCIA Modem Problems

If an optional PCMCIA modem does not work properly, check the following items:

- Dialing problem or wrong number - Try dialing a number that you have previously dialed successfully.

- Faulty phone line - Connect a telephone to the line and listen for a dial tone.

- Software program - Check to ensure that you have installed the software correctly.

Field Service

6.1. Introduction

This chapter contains general preventive and corrective maintenance procedures that apply to all members of the Extensa 67x Series Notebook Computers. The first part of the chapter describes the computer cleaning procedures and preferred handling procedures for sensitive components (e.g. disk drives, batteries).

The second part of the chapter identifies all field-replaceable parts; the remainder of the chapter contains removal and replacement procedures for the field-replaceable parts.

6.2. Preventive Maintenance

Preventive maintenance is limited to cleaning the plastic case, keyboard and the display screen.

6.2.1 Cleaning the Computer

When it is necessary to clean the plastic case and keyboard use a soft, lint-free cloth, slightly dampened with a mild detergent solution or use the contents of any commercially available computer cleaning kit.

Caution: *Never spray any liquids directly on the computer case, keyboard, or screen. If the liquid-crystal display (LCD) screen has become smeared or dusty, clean the screen first with a soft, clean, lint-free cloth and gently wipe the glass. If the glass is still smeared, use distilled water or a 25% solution of alcohol and distilled water.*

Caution: *Do not use paper towels to clean the display screen. Paper can scratch the display screen matte.*

6.2.2 Handling the Computer

The notebook computer requires reasonable care and handling for extended life. Some of the precautions to follow to protect your computer against accidental damage include:

- Never pick up or carry the unit by the cover

- Do not force the cover beyond its fully opened position (about 180 degrees)

- Never subject the computer to harsh environments (dusty areas or areas of rapidly changing temperatures)

- Never place anything on top of the computer, particularly when it is operating or charging (could result in overheating and damage to the computer).

- Never move the computer while the hard drive is rotating (press the Suspend button to put the computer in a Sleep mode before closing cover).

- Never expose the computer hard disk drive(s) or disks to strong magnetic fields such as those generated by transformers, speakers, or telephone handsets.

6.2.3 Handling the Computer Battery Pack

The battery pack furnished with the computer requires reasonable care and handling to ensure efficient operation and maximum life. Periodically inspect the battery terminals and the batteries for evidence of corrosion and oxide build-up; clean if necessary.

To ensure that the battery packs endure normal life cycle, always observe the following precautions when handling the battery packs:

- Do not drop the battery pack or subject it to excessive shock and vibration.

- Do not expose the battery pack to direct sunlight, moisture, or chemical compounds.

- Do not disassemble the battery pack.

- Do not use the battery pack to power other devices.

- Do not short the battery leads or connect the battery with reversed polarity.

- Never attempt to charge the battery pack in any way other than as described in this manual.

- Always charge the battery pack as soon as possible after a low battery indication.

6.2.4 Password Caution

The notebook computer can be password protected to prevent unauthorized use. However, if the password is lost, the notebook must be returned to the Acer Incorporated manufacturing facility in Temple, Texas U.S.A. to restore access. This service is not covered by warranty.

6.3. Required Tools and Equipment

All Extensa 67x Series Notebook corrective maintenance procedures can be performed using the following tools:

- Tweezers

- Plastic Stick

- Small flat-blade screwdriver

- Small Phillips screwdriver

Caution: *All boards, options and peripherals contain components that are sensitive to static electricity. When handling any of these items, protect against static electricity by using wrist grounding straps and grounded working mats. When moving or storing items, use the anti-static bags supplied with the items.*

6.4. Notebook FRUs

For a listing and description of the notebook Field Replacement Units (FRUs), refer to the appendix A in this manual for the maintenance data.

6.5. FRU Removal/Replacement Procedures

The following paragraphs contain field service-level removal/replacement procedures for the 67x Series Notebook Computers.

Most FRU removal/replacement procedures involve connecting and disconnecting cable connectors. The Extensa series uses two types of connectors including:

- Locking-type connectors - use a plastic stick to unlock and lock these type of connectors as shown in Figure 6-1.

- Non-locking connectors
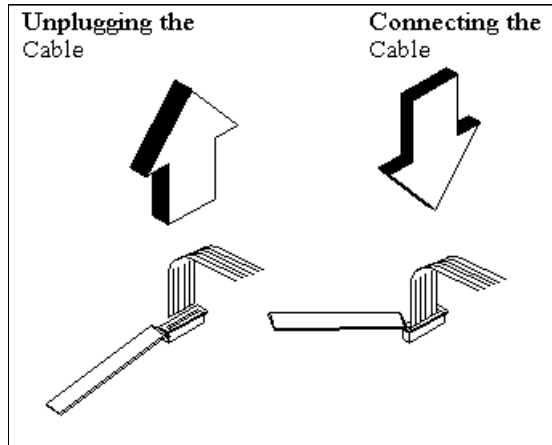
Figure 6-1   Removing/Installing Cables with Locking-Type Connectors

6.5.1 Removing/Replacing the Notebook Battery Pack

Before performing any of the assembly/disassembly procedures, always disconnect the AC adapter from the notebook and remove the battery pack. The procedure for removing and replacing the battery pack is as follows:

1. Turn off the computer and disconnect the AC adapter from the computer.

2. Unlatch the battery compartment door (right front corner of the unit) as shown in Figure 6-2.

3. Slide the battery compartment door out slightly and then swing the door outwards as shown in Figure 6-2.

4. Grasp the loop attached to the battery and pull the battery out of the compartment.

5. Insert the replacement battery with "THIS SIDE UP" label facing upwards until it snaps in place and then close the battery compartment door (reverse of Steps 2 and 3).
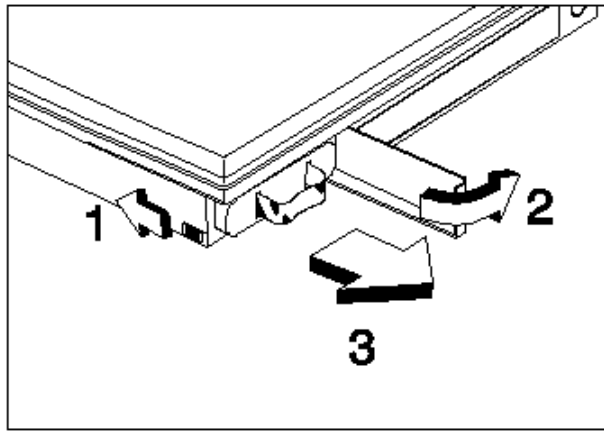
Figure 6-2   Battery Removal/Replacement

6.5.2 Removing/Replacing PCMCIA Options

The procedure for removing and replacing the PCMCIA options is as follows:

1. Turn off the computer and remove the battery pack as described in Paragraph 6.5.1.

2. Press the upper card eject button to eject the upper card, lower button controls the lower card and use both buttons for Type III devices.

3. To replace the PCMCIA device, remove any filler cards present and insert the device. Reinstall any external cabling required for the device.
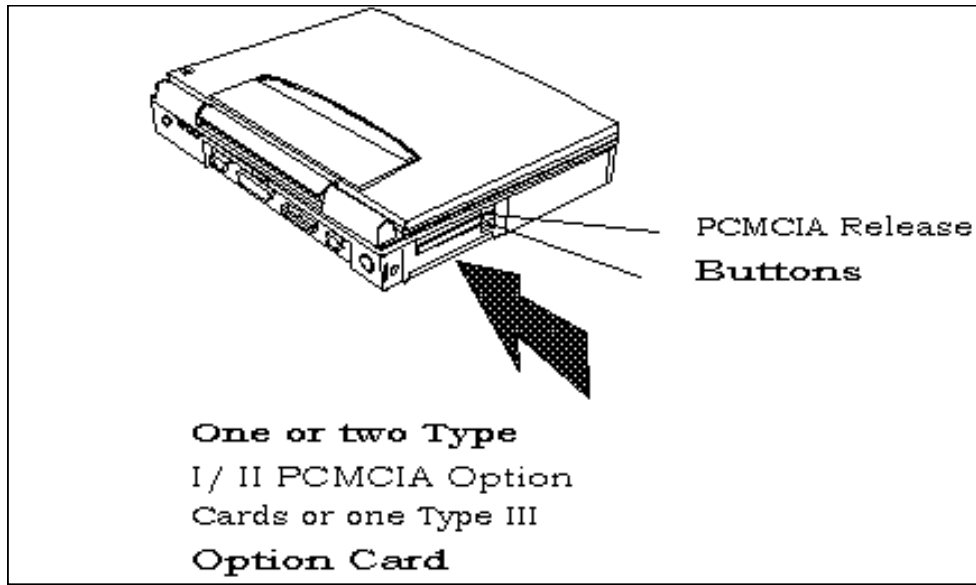
Figure 6-3   Installing/Removing PCMCIA Options

6.5.3 Removing/Replacing the Hard Disk Drive Assembly

The procedure for removing and replacing the Hard Disk Drive assembly is as follows:

1. Power down the notebook, disconnect the AC adapter, if installed, and remove the battery pack as described in Paragraph 6.5.1.

2. Disconnect any peripheral device interface cables from the external interface connectors and remove any installed PCMCIA options.

3. Turn the computer over and locate the release tab for the hard disk drive bay cover (refer to Figure 6-4).

4. While pressing slightly on the release tab (Figure 6-4), slide the cover to the right and set aside.
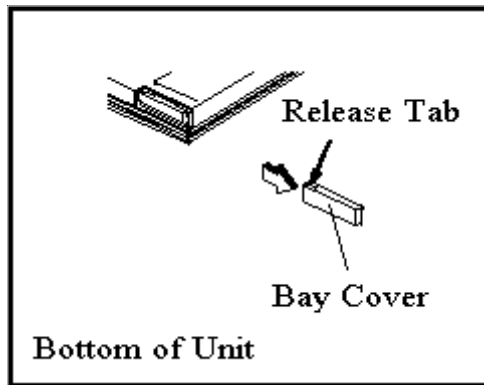
Figure 6-4   Removing the HDD Bay Cover
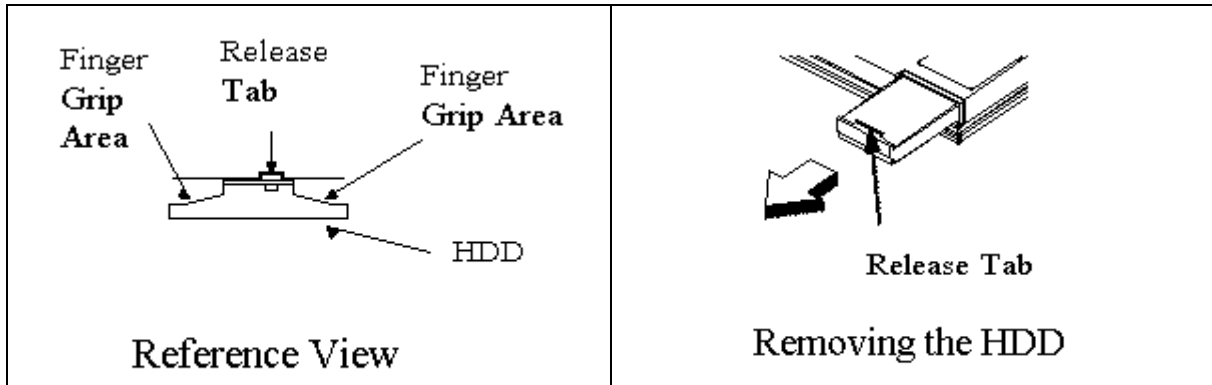
Figure 6-5   Removing/Replacing the Hard Disk Drive Module

5. While lifting upward on the HDD release tab (using your fingernails), use both finger grip areas (Figure 6-5) and pull the HDD module out of the notebook.

Caution: Exercise care to only handle the drive by its sides to prevent damage to the drive.

6. Store the HDD in an antistatic bag.

7. Replacement is the reverse of Steps 1 through 5.

6.5.4 Removing/Replacing the Keyboard Assembly

The procedure for removing and replacing the keyboard assembly is as follows:

1. Turn off the computer; disconnect the AC power adapter (if it is attached), and remove the battery pack as described in Paragraph 6.5.1.

2. Press the Cover Release Latch and open the notebook to a full 180 degree position as shown in Figure 6-6.

3. Slide each of the two display hinge covers out and pull upward to remove from the notebook.
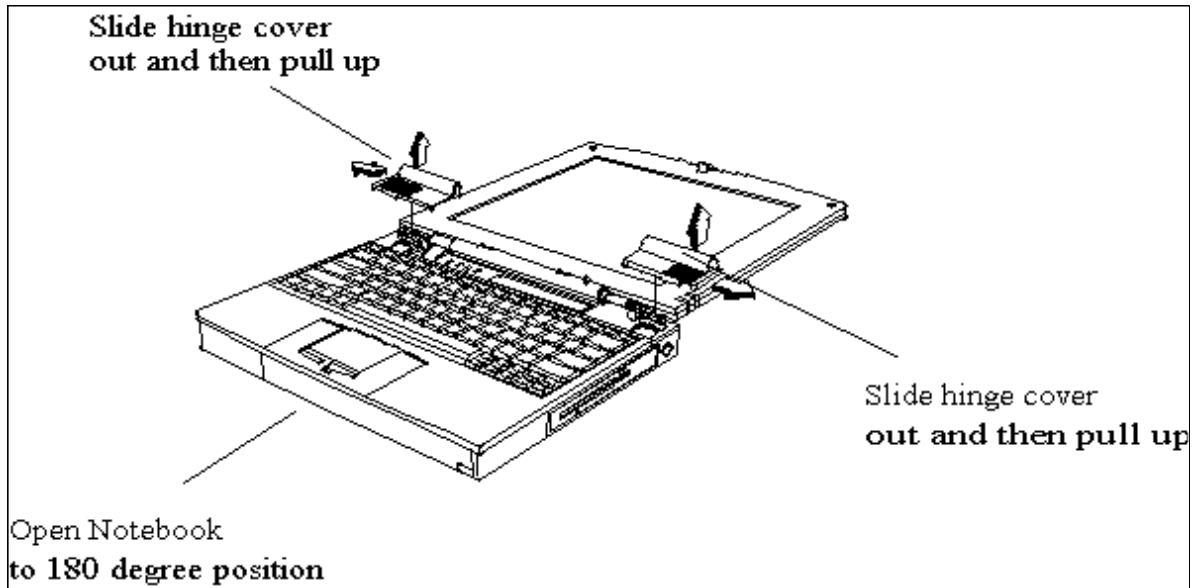
Figure 6-6   Removing the Display Hinge Covers

4. Pull up on the keyboard as shown in Figure 6-7 and disconnect the Keyboard cable connectors J0102 and J0103.

5. If you intend to remove further, then disconnect the Touchpad cable connector J0104.
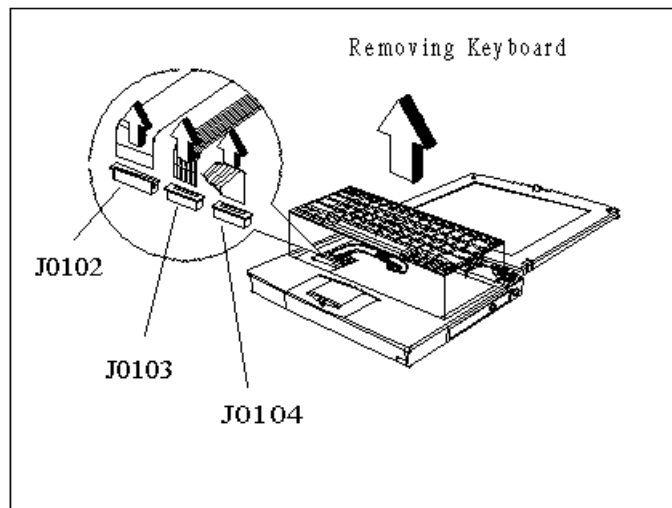
Figure 6-7   Removing/Replacing the Keyboard Assembly

6. Install the replacement keyboard assembly by reversing Steps 1 through 5.

6.5.5 Removing/Replacing Expansion Memory

To remove and replace an expansion memory module (soDIMM), perform the following procedure:

1. Power down the notebook, disconnect the AC adapter, and any installed battery packs.

2. Disconnect any peripheral device interface cables from the external interface connectors and remove any installed PCMCIA options.

3. Turn the notebook over and locate the Expansion Memory Access Cover on the bottom of the notebook.

4. Remove the screw holding the Expansion Memory Access Cover and remove the cover.

5. To remove a memory module, first release the slot locks located on each side of the Expansion Memory Connector to release the DIMM. Then pull the memory module out (refer to Figure 6-8).

6. To replace or install a DIMM module, first align the connector edge of the memory module with the key in the connector. Insert the edge of the memory module board into the connector using a rocking motion to fully insert the module. Push downward on each side of the memory module until it snaps in place.

7. Reinstall the Expansion Memory Access Cover using the screw removed in Step 4.
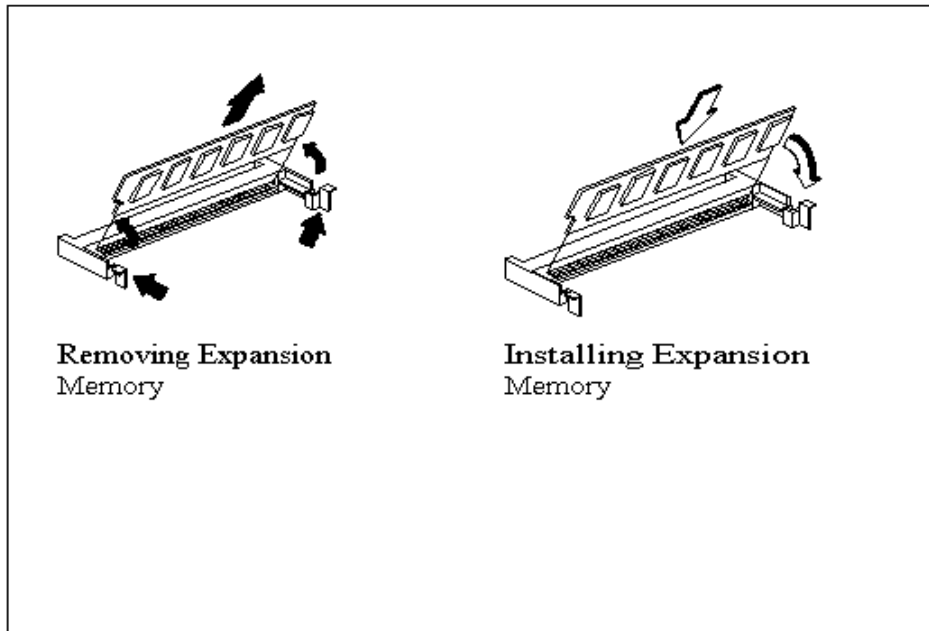
Figure 6-8   Memory Expansion Removal/Replacement

Note: After installing expansion memory in your notebook, you must run the PHDISK utility in order for the Save-To-Disk or 0V Suspend functions to operate correctly (refer to the procedure in Chapter 2 of this manual).

6.5.6 Removing the Heat Sink Assembly

Use the following procedure to remove and replace the Heat Sink Assembly:

1. Remove the Keyboard Assembly as described in Paragraph 6.5.4.

2. Remove the two screws that secure the heat plate to the housing as shown in Figure 6-9.

3. Replacement is the reverse of Steps 1 and 2.
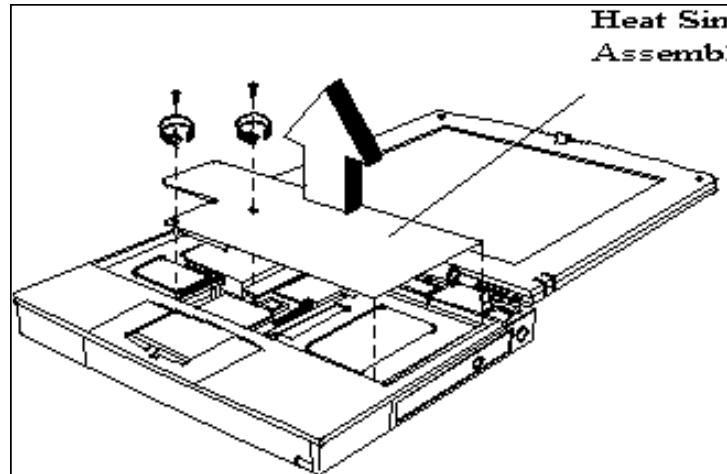
Figure 6-9   Removing/Replacing the Heat Sink Assembly

6.5.7 Removing/Replacing the CPU Chip

The CPU chip is installed in a Zero Insertion Force type socket to facilitate removal and replacement. To remove the CPU, refer to Figure 6-10 and use the following procedure:

1. Power down the notebook, remove the battery packs, and disconnect the AC Adapter, and remove the Heat Sink Assembly as described in Paragraph 6.5.7.

2. Refer to Figure 6-10. Insert a flat-blade screwdriver into the opening at the left end of the socket labeled OPEN and push toward the other end of the socket.

3. Pull out the CPU and insert the replacement unit. Ensure that the CPU is properly keyed before pressing it into the socket.

4. Insert a flat-bladed screwdriver into the opening at the right end of the socket labeled LOCK and push toward the opposite end to lock the socket.
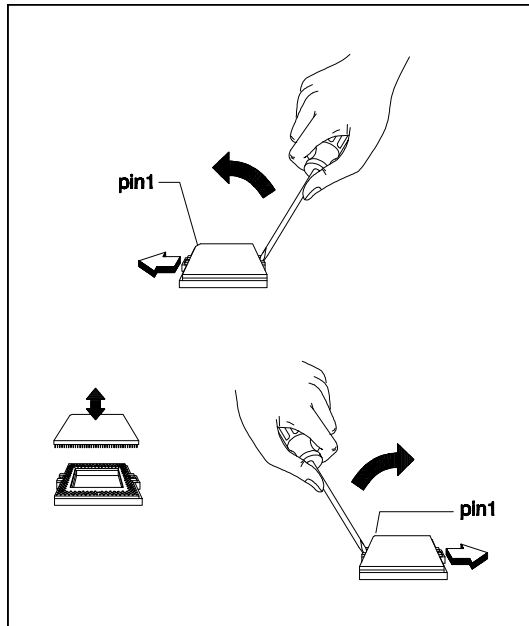
Figure 6-10   Removing/Replacing the CPU Chip

6.5.8 FDD/CD-ROM Drive Removal

1. Remove the battery and AC adapter as described in Paragraph 6.5.1.

2. Unlatch the module by pushing the Module Lock (Figure 6-11) toward the unlock icon.

3. Grasp the recessed grip area on the module and pull the module straight out.

4. Reinstall the module by reversing Step 3.
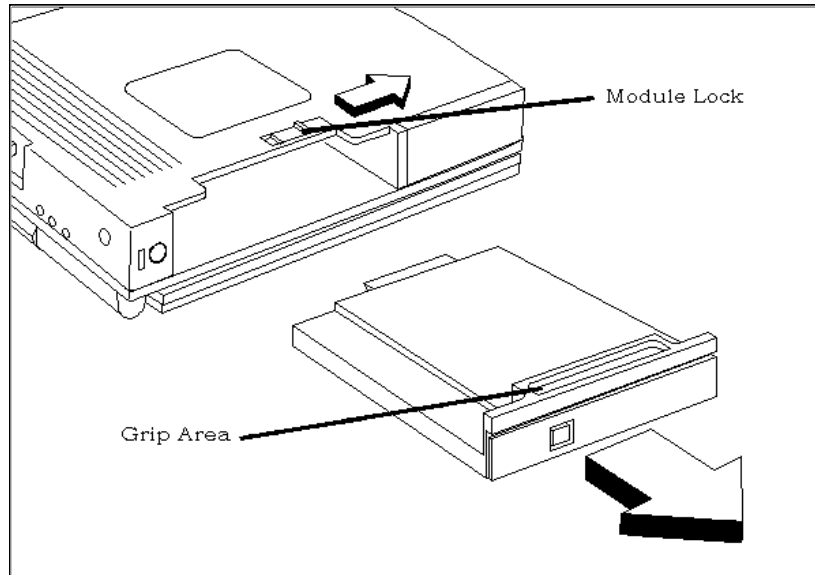
Figure 6-11   Removing/Replacing a Module

6.5.9 Removing/Replacing the Display Assembly

Use the following procedure to remove/replace the display assembly:

1. Remove the battery and AC adapter as described in Paragraph 6.5.1.

2. Refer to Figure 6-12 and remove the two screws that secure the display cable to the Motherboard assembly. Then unplug display cable J19
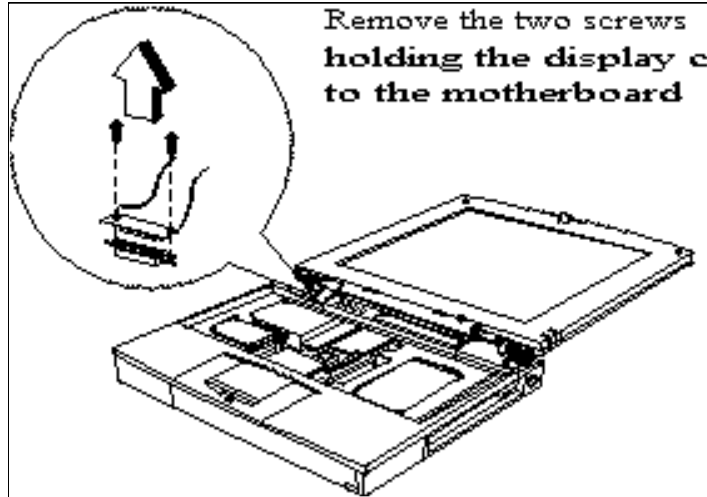
Figure 6-12   Unplugging the Display Cable

3. Remove the four display hinge screws (Figure 6-13) and separate the Display Assembly from the Base Assembly.

4. Installation is the reverse of Steps 1 through 3.
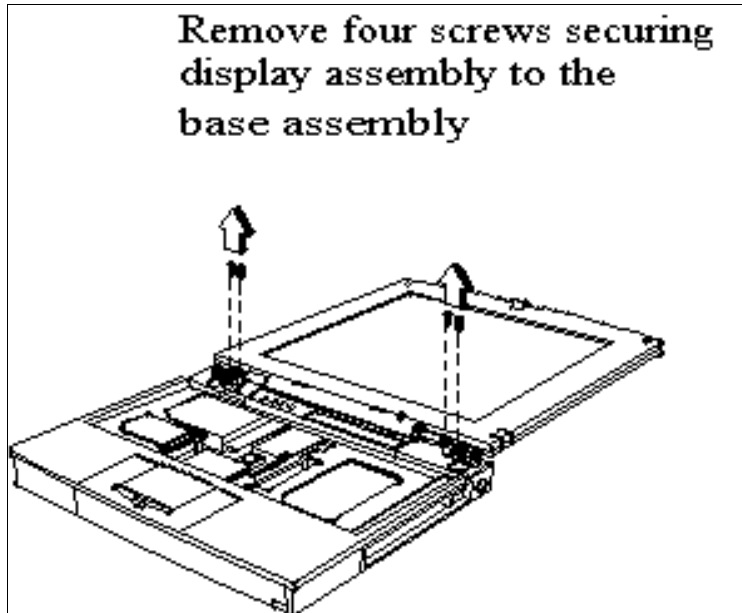
Figure 6-13   Removing the Display Hinge Screws

10 Removing/Replacing the Top Cover

1. Separa

2. Remove the two screws that secure the heat sink to the base assembly.

    Remove the two screws on the top and nine screws on the bottom that hold the top cover in place; unsnap and remove the top cover (refer to Figure 6-14).

    Replacement of the top cover is the reverse of Steps 1 through 3.

1. Remove two screws near display hinge screw holes.

2. Remove 9 screws from the bottom of the unit (1 circled screw is shorter).

3. Unsnap and remove the top cover.
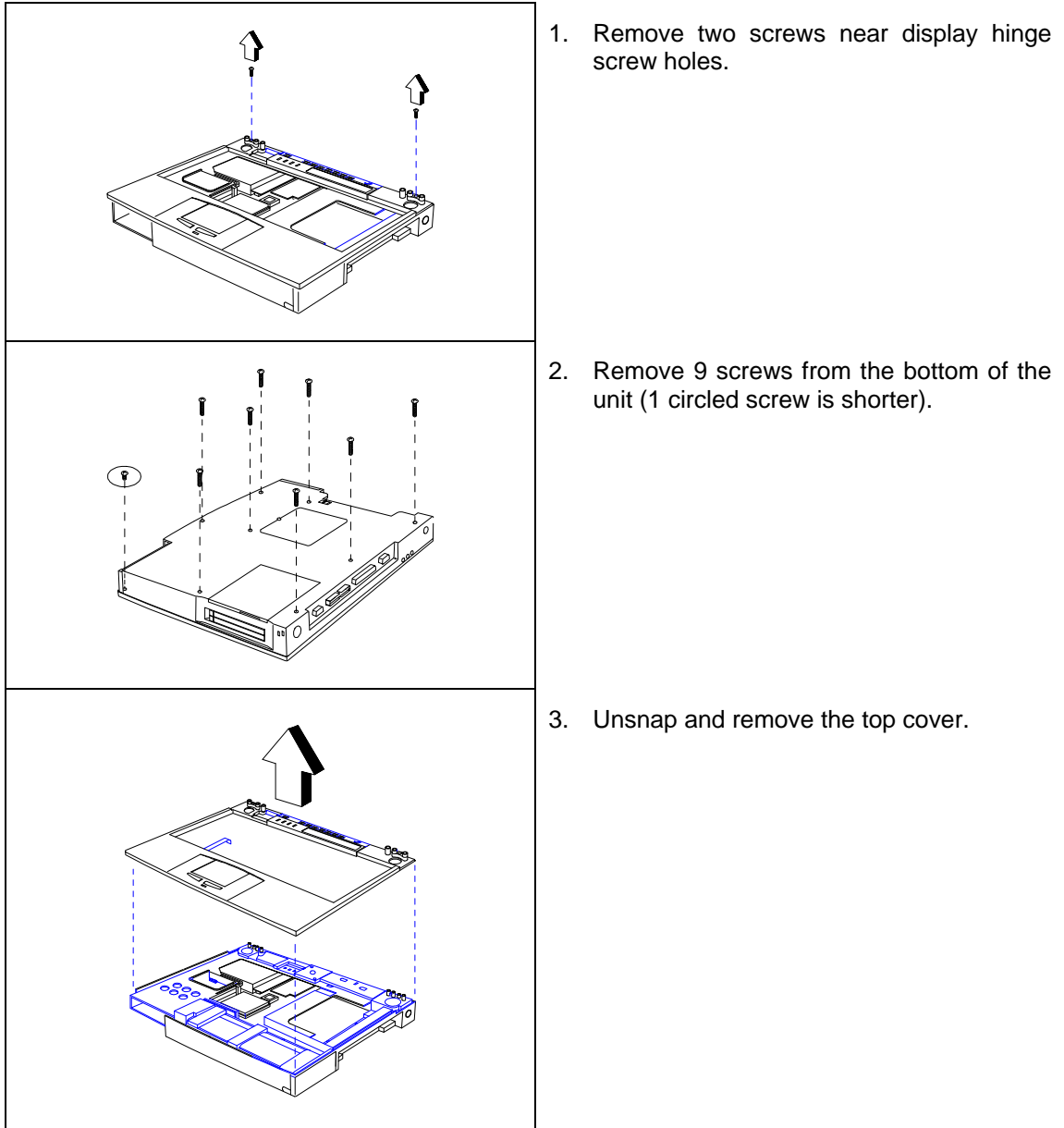
Figure 6-14   Removing/Replacing the Top Cover

6.5.11 Removing/Replacing FIR/Audio Board

Use the following procedure to remove/replace the FIR/Audio Board Assembly:

1. Remove the top cover and fan assemblies as described in Paragraph 6.5.10.

2. Separate the inside frame assembly from the base assembly.

3. Refer to Figure 6-15 and remove the following connectors:

    - Left Speaker Cable J4

    - Internal Microphone Cable J5

    - Fan Connector J6

    - Right Speaker Cable J7
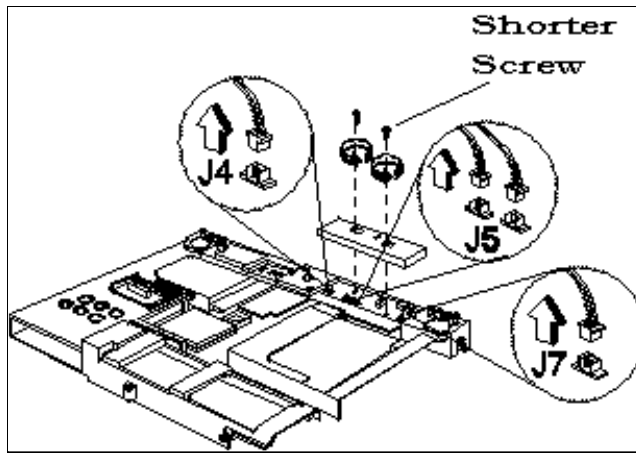
Figure 6-15   Unplugging Cables on FIR/Audio Board

4. Remove the two screws that secure the FIR/Audio Board to the Motherboard and remove the cover plate (refer to Figure 6-15).

5. Pull up and remove the FIR/Audio Board (Figure 6-16).

6. Replacement is the reverse of Steps 1 through 5.
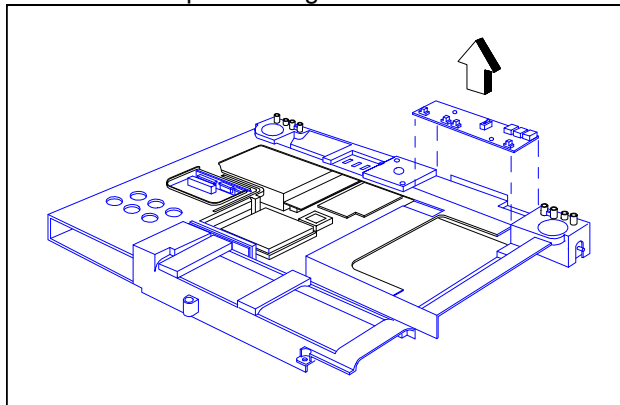
Figure 6-16   Removing/Replacing the FIR/Audio Board

6.5.12 Removing/Replacing the Fan Assembly

To remove and replace the fan assembly, perform the following procedure:

1. Remove the Top Cover Assembly as described in Paragraph 6.5.10.

2. Remove the two screws that secure the cover plate to the FIR/Audio Board.

3. Remove the two screws holding the fan assembly in place and unplug the fan cable connector J6 from the FIR/Audio Board (refer to Figure 6-17).

4. Remove the Fan Assembly.

5. Replacement is the reverse of Steps 1 through 4.
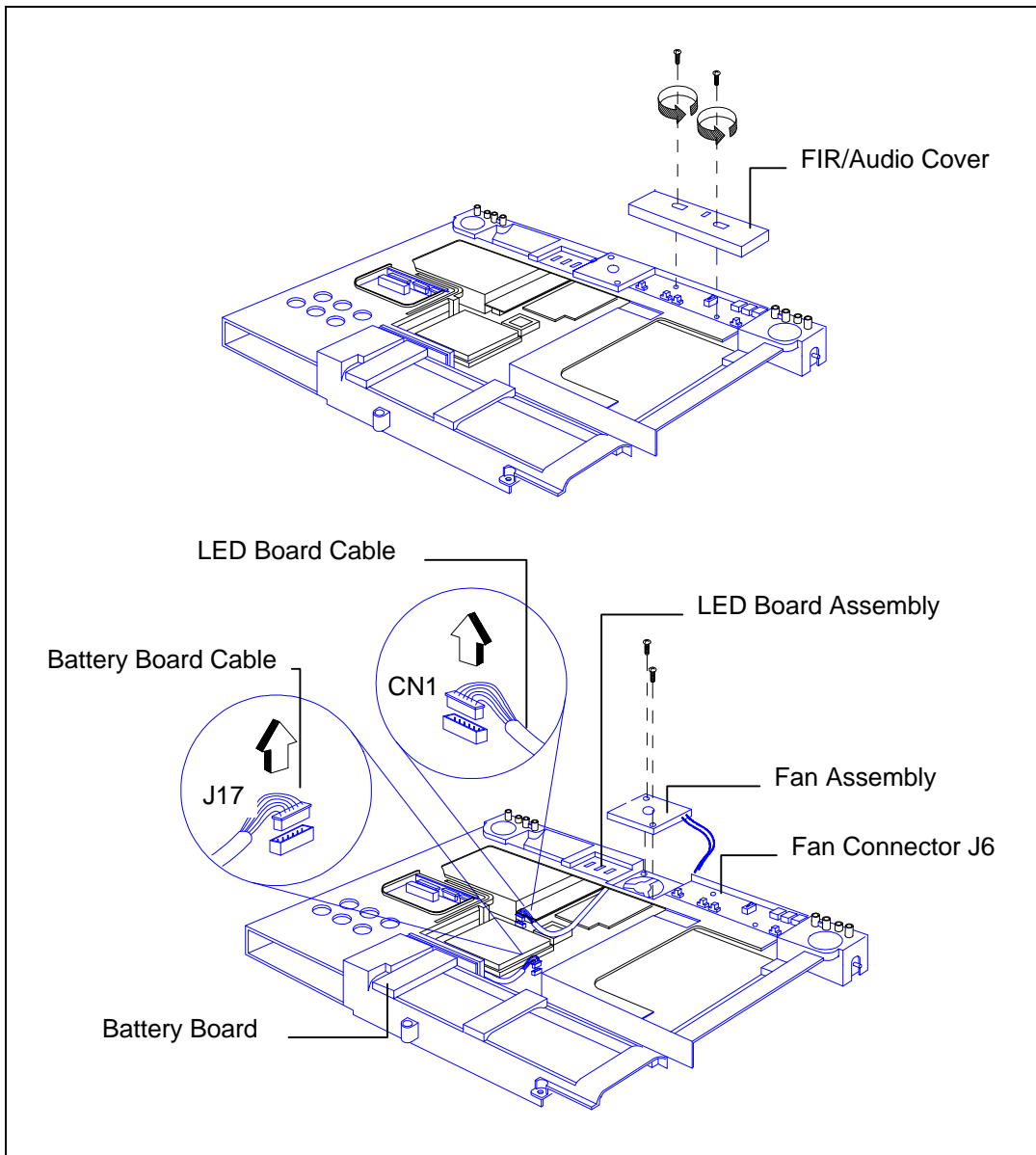
Figure 6-17   Internal Assemblies, Removal/Replacement

6.5.13 Removing/Replacing the LED Board

1. Remove the Top Cover Assembly as described in Paragraph 6.5.10.

2. Disconnect the LED cable from the Main Board (refer to Figure 6-17).

3. Remove the LED Board Assembly.

4. Replacement is the reverse of Steps 1 through 3.

6.5.14 Removing/Replacing Inside Frame Assy

Use the following procedure to separate the inside frame assembly from the base assembly:

1. Remove the Top Cover as described in Paragraphs 6.5.10.

2. Separate the inside frame assembly from the base assembly as shown in Figure 6-18.
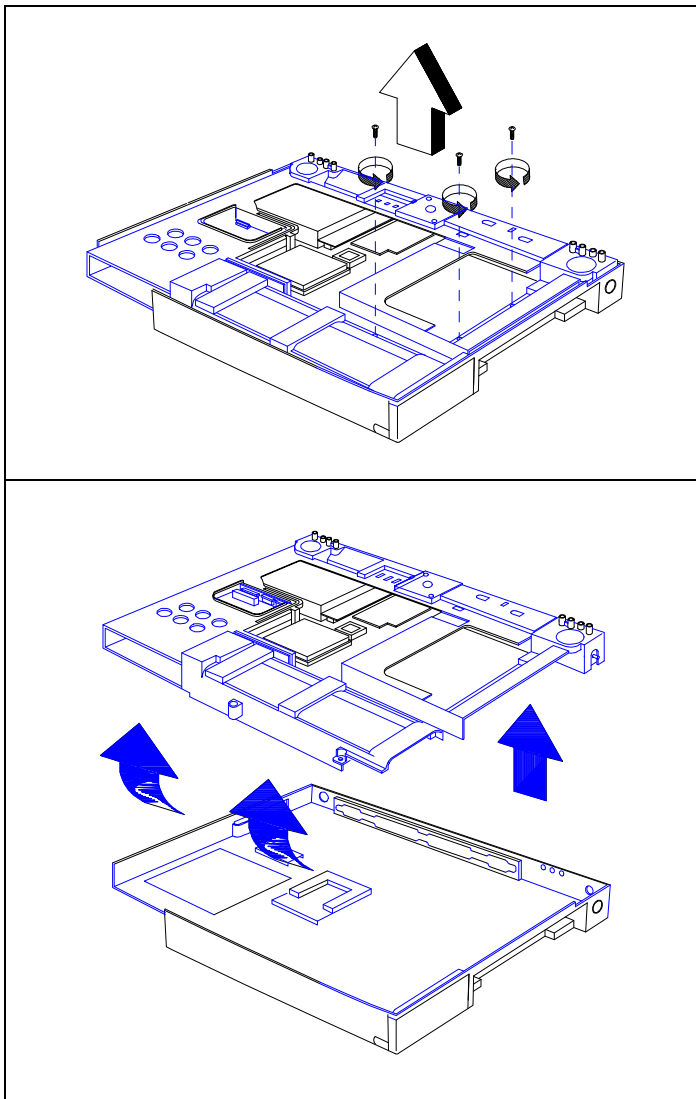
Remove three screws that secure the inside frame assembly to the base assembly.

Separate the inside frame assembly from the base assembly

Figure 6-18   Removing/Replacing the Inside Frame Assembly

6.5.15 Removing/Replacing the Battery Board

1.   Remove the Top Cover Assembly as described in Paragraph 6.5.10.

2.   Disconnect the Battery Board Cable from the Main Board (refer to Figure 6-17).

3.   Remove the two screws holding the Battery Board and remove the Battery Board Assembly (refer to Figure 6-19). .

4.   Replacement is the reverse of Steps 1 through 3.
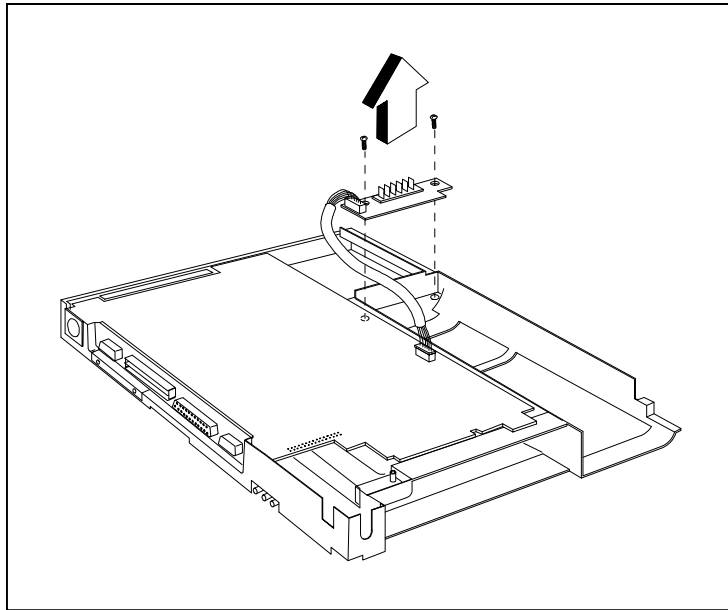
Figure 6-19   Removing/Replacing the Battery Board

6.5.16 Removing/Replacing the Charger Board

Use the following procedure to remove/replace the Charger Board:

1. Remove the Top Cover as described in Paragraphs 6.5.10 respectively.

2. Separate the inside frame assembly from the base assembly as shown in Figure 6-18.

3. Turn the unit over and remove the screw holding the Charger Board to the inside of the Frame Assembly (Figure 6-20). Remove the Charger Board.

4. To reinstall the Charger Board, reverse the removal procedure.
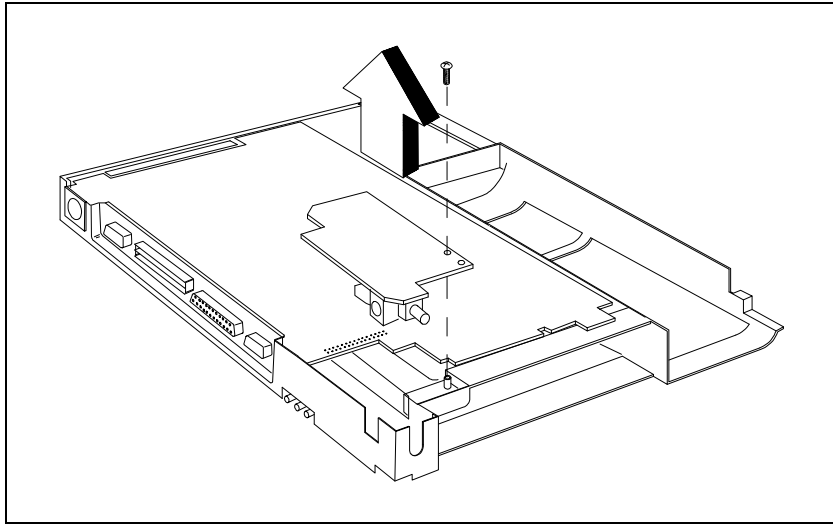
Figure 6-20   Removing/Replacing the Charger Board Assembly

6.5.17 Removing/Replacing the Motherboard and Keyboard Connection Board Assemblies

Use the following procedure to remove/replace the Motherboard Assembly:

1. Remove the Top Cover and Fan Assemblies as described in Paragraphs 6.5.10.

2. Unplug the Battery Board, LED Board Connector as described in paragraph 6.5.12.

4. Refer to Paragraph 6.5.16 and remove the Charger Board Assembly.

5. Remove the five screws that secure the motherboard to the inside assembly frame. Pull up on the Motherboard Assembly to release it from the inside assembly frame (refer to Figure 6-21).

6. Turn the motherboard over and remove the Keyboard Connection Board.
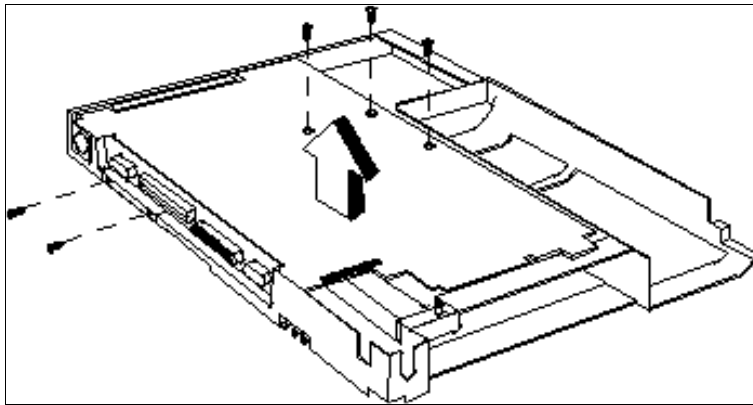
Figure 6-21   Detaching Motherboard from Inside Frame Assembly

6.5.18 Removing/Replacing the PCMCIA Connector Module

Use the following procedure to remove/replace the PCMCIA Connector Module:

1. Remove the Motherboard Assembly as described in Paragraph 6.5.17.

2. Remove the four screws securing the PCMCIA Module to the Motherboard Assembly (refer to Figure 6-22).

3. Replacement is the reverse of Steps 1 through 3.
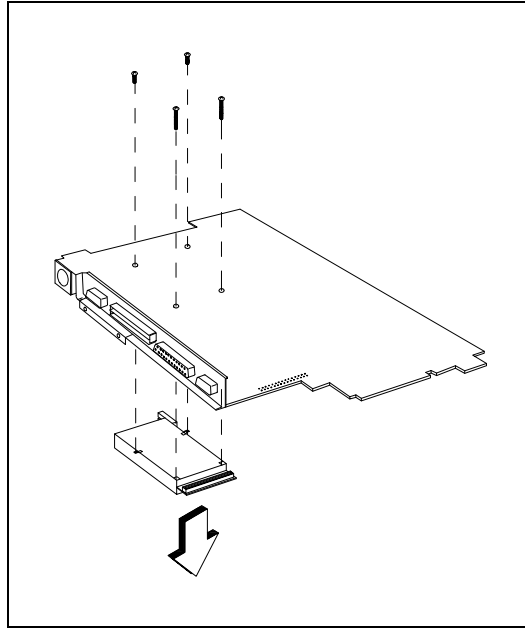
Figure 6-22   Removing/Replacing the PCMCIA Module

6.5.19 Removing/Replacing the Touchpad Assembly

Use the following procedure to remove/replace the Touchpad Assembly:

1.   Remove the Keyboard Assembly as described in Paragraph 6.5.4.

2.   Remove the Top Cover Assembly as described in Paragraph 6.5.10.

3.   Refer to Figure 6-23; remove the center screw and disconnect the Touchpad cable J1.

4.   Remove the Touchpad main sensor and connector unit.

5.   Remove the two side screws and remove the metal plate.

6.   Lift up and remove the Touchpad buttons.

7.   Lift up and remove the Touchpad.

8.   Replacement is essentially the reverse of Steps 1 through 7.

Remove 1 screw and disconnect J1
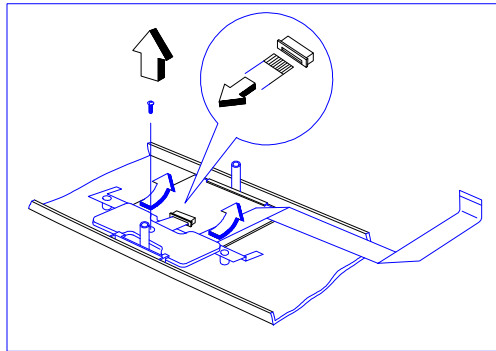
Lift up and remove touchpad buttons   Lift up and remove touchpad
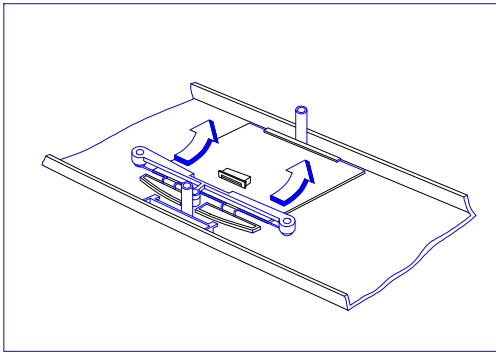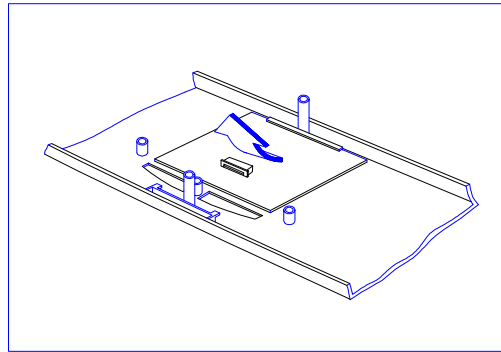
Figure 6-23   Removing/Replacing the Touchpad Assembly

Caution: *If the notebook is powered up with the LCD bezel removed, you can be exposed to high voltages which could result in shock and equipment damage. Ensure that the batteries and AC adapter are removed from the notebook when working on the LCD/Display assembly.*

6.5.20 Removing/Replacing the Display Bezel

To remove/replace the Display Bezel, use the following the procedure;

1. Remove the AC adapter and Battery Pack as described in Paragraph 6.5.1.

2. Remove the round LCD bumpers at the top of the display (refer to Figure 6-24).

3. Remove the left and right screws near the display hinges (note that the screw covers are not identical).

4. Remove four screws on the Display Bezel (Figure 6-24).

5. Pull out and remove the Display Bezel
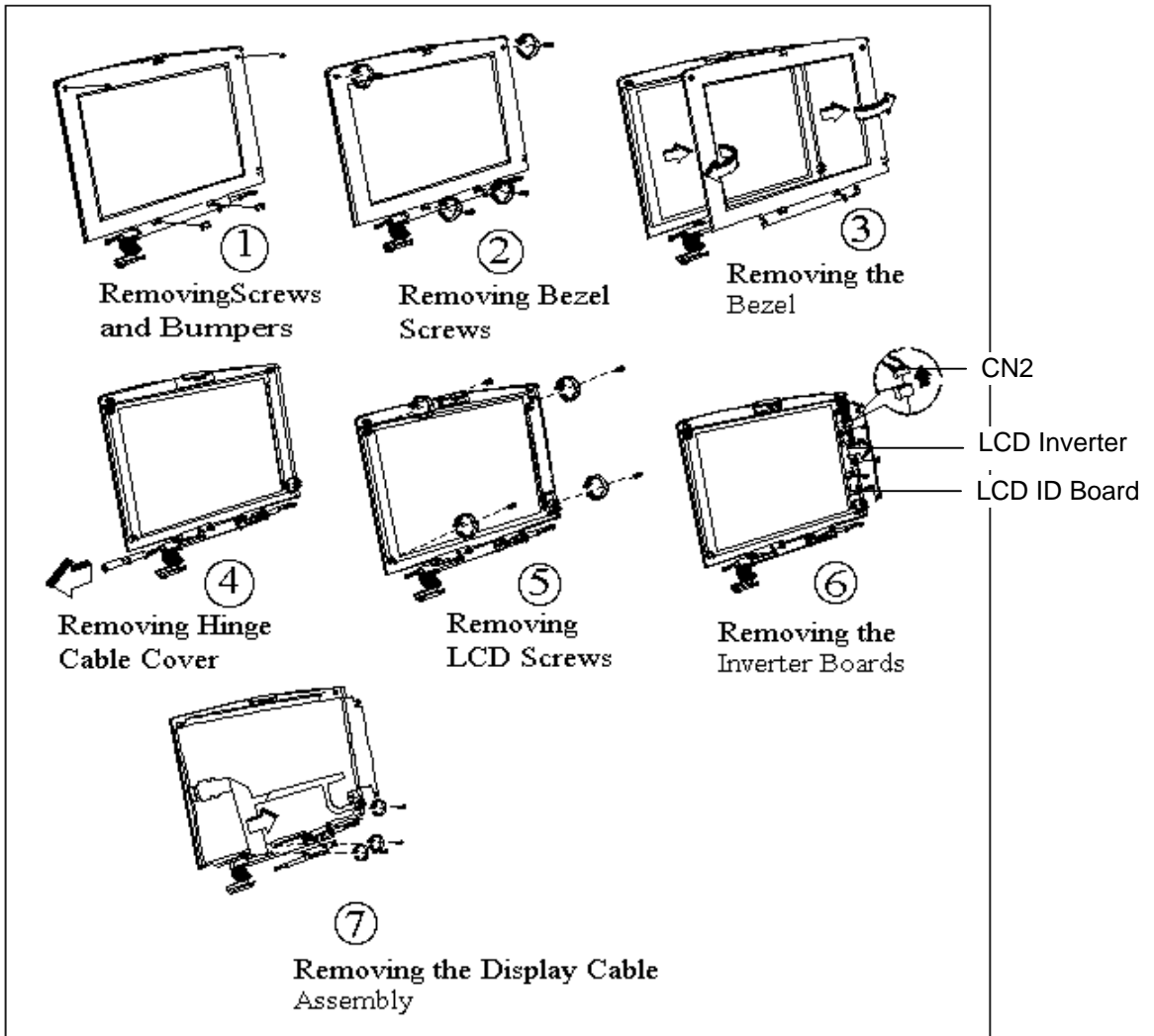
Figure 6-24   Display Unit Disassembly

6.5.21 Removing/Replacing the LCD Inverter and LCD ID Boards

To remove/replace the LCD Inverter or the LCD ID Board, use the following the procedure;

1. Remove the Display Bezel as described in Paragraph 6.5.20.

2. Gently fold back the foil around the LCD and unplug Inverter Cable CN2 (refer to Figure 6-24).

3. Remove the screws that secure the three Inverter Boards to the display back cover and remove the boards.

4. Replacement is essentially the reverse of Steps 1 through 3.

6.5.22 Removing/Replacing the LCD Panel

To remove/replace the LCD Panel, use the following the procedure;

1. Remove the Display Bezel as described in Paragraph 6.5.20.

2. Slide out and remove the Hinge Cable Cover (Figure 6-24).

3. Remove four screws on the four sides of the LCD panel (Figure 6-24).

4. Gently fold back the foil around the LCD and unplug Inverter Cable CN2.

5. Remove the three screws that secure the Inverter and LCD ID Boards to the display back cover and unplug the LCD ID board cable.

6. Refer to Figure 6-24 and tilt the LCD panel away from the Display Cover.

7. Unplug the LCD Panel from the Display Cable Assembly and remove the LCD Panel.

8. Replacement is the reverse of Steps 1 through 7.

Maintenance Data

A.1. Introduction

This chapter contains model-dependent maintenance data for the Extensa Model 67x Series Notebook Computers. For information common to all members of the Extensa 67x Series, refer to Chapter 1 through 6 of this manual.

A.2. Features Summary

The Extensa 67x Series Notebook Computers come standard with a 12.1-inch Super VGA Display, 1.6 or 2.1 GB Hard Drive and is powered by a 150 or 160 MHz Pentium processor. Refer to Chapter 1 for a more detailed description of Extensa 67x Series features.

A.3. Field-Replaceable Units (FRUs)

Note: For FRU removal/replacement procedures, refer to Chapter 6 of this manual.

As shown in Figure A-1, all members of the Extensa 67x Series Notebook Computers contain two major assemblies:

- System Base Assembly

- Cover-Display Assembly
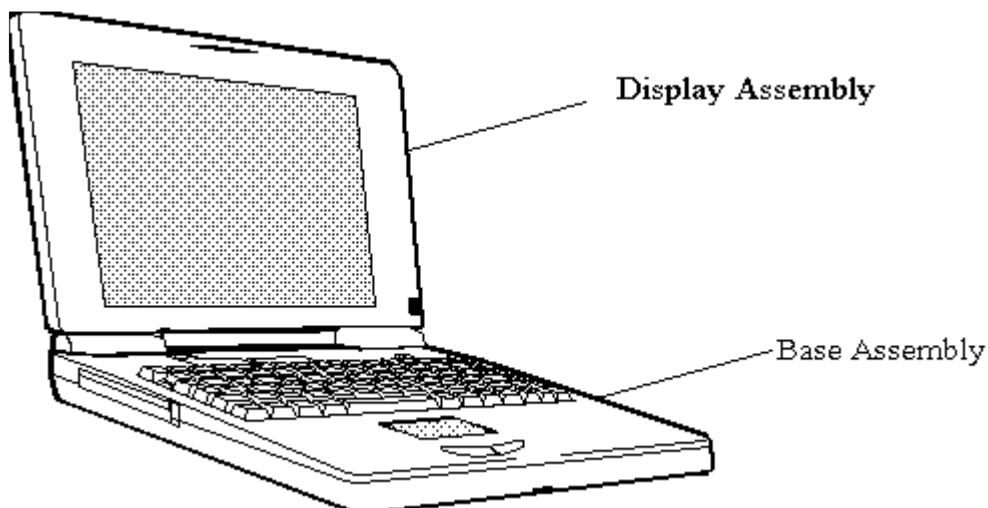
Figure A- 1   Extensa 67x Series Assemblies

A.3.1 Cover-Display Assembly

The Cover-Display Assembly shown in Figure A-2, contains the LCD screen, DC-AC Inverter Board Logic, DC-DC Inverter Board Logic, bezel LCD cover and various other components as listed in Table A-1.
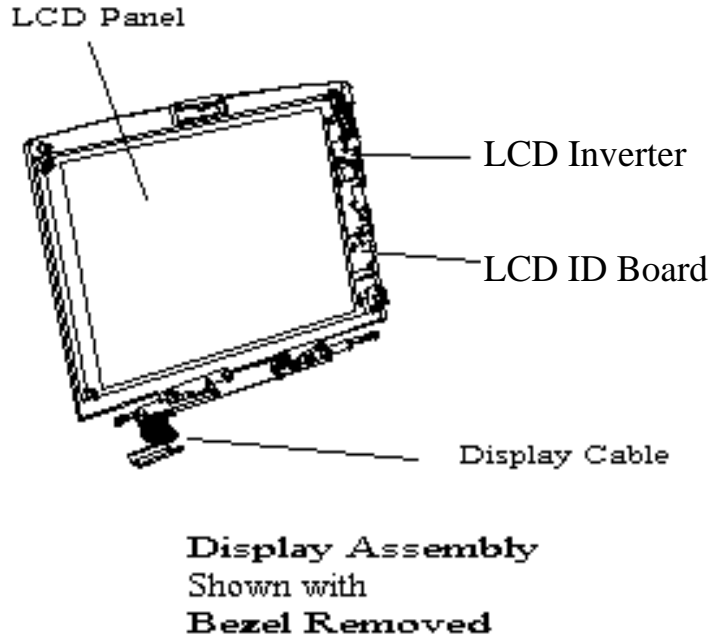
Figure A- 2   Display FRUs

Table A-1   Top Cover Assembly Field-Replaceable Units (FRUs)

FRU Description	Assembly/Disassembly Paragraph	Part No.
LCD Panel, 12.1", DSTN	6.5.22	56.07469.071
LCD Panel, 12.1", TFT	6.5.22	56.07530.011
Display Back Cover, 12.1"	6.5.22	
Display Bezel for 12.1", DSTN LCD	6.5.20	41.46913.001
Display Bezel for 12.1", TFT LCD	6.5.20	41.47003.001
LCD ID Board for 12.1", DSTN LCD	6.5.21	19.21018.111
LCD ID Board for 12.1", TFT LCD	6.5.21	19.21018.121
LCD Inverter for 12.1", TFT/DSTN LCD	6.5.21	19.21026.041
Display Cable Assembly, for 12.1", DSTN LCD	6.5.22	50.46915.021
Display Cable Assembly, for 12.1", TFT LCD	6.5.22	50.48405.021
LCD Screw Cover Left	Ref	47.46907.001
LCD Screw Cover Right	Ref	47.46904.001
Left Hinge	Ref	34.46909.001
Right Hinge	Ref	34.46919.001

A.3.2 System Base Assembly

As shown in Figure A-3, the System Base Assembly houses a variety of field-replaceable subassemblies and components. The various assemblies and reference paragraph numbers containing removal/replacement procedures are listed in Table A-2.
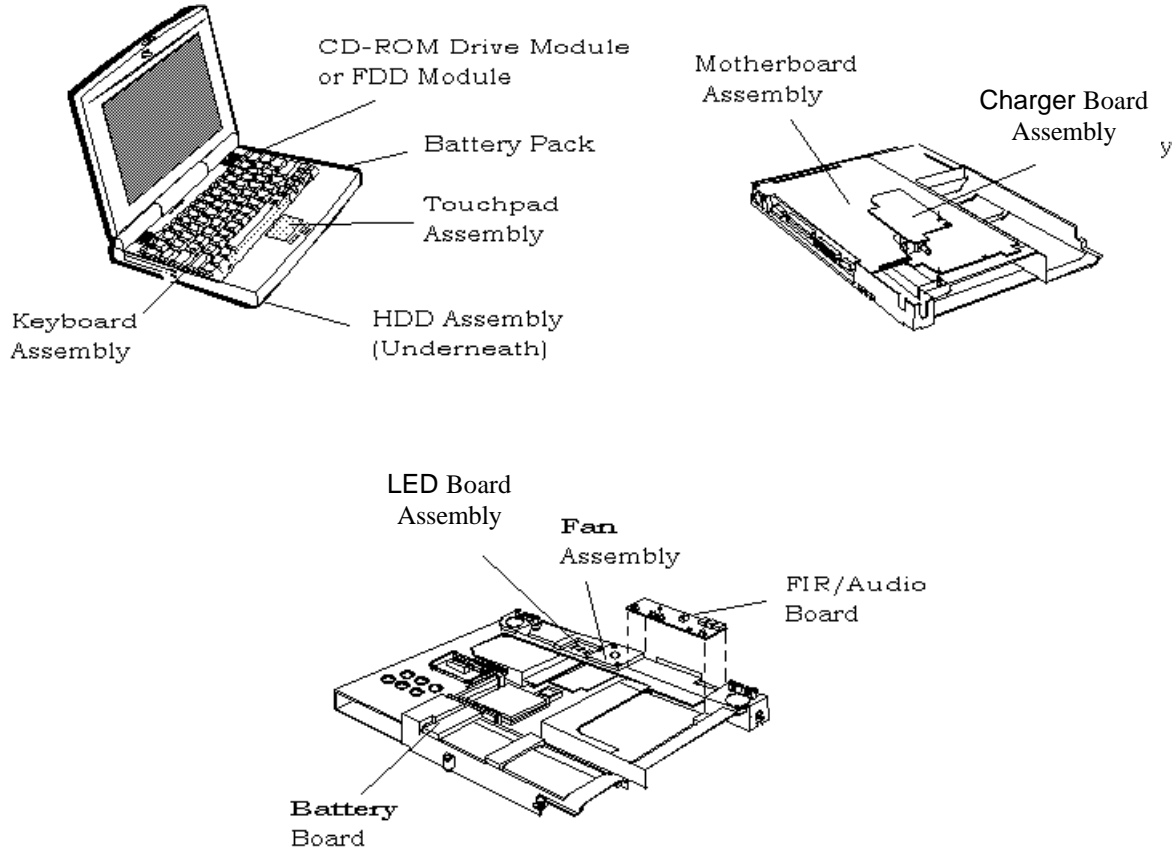
Figure A- 3   Base Assembly FRUs

Table A-2   Base Assembly Field-Replaceable Units (FRUs)

Base Assembly FRU Description	Assembly/Disassembly Paragraph	Part No.
PC Board Assemblies		
Motherboard	6.5.17	
Audio Baord	6.5.18	55.47002.001
LED Board	6.5.13	55.47003.001
Power Supply / Charger Board	6.5.16	05.62045.010
Battery Board W/Cable	6.5.15	55.46904.501
Keyboard Connection Board	6.5.17	55.46905.501
Touchpad Assembly	6.5.19	56.17469.011
Button Board Logic w/Cable Assembly	6.5.19	50.46912.001
KeyBoard Logic Assemblies		
KeyBoard Logic Assembly (U.S.)	6.5.4	90.46907.011
KeyBoard Logic Assembly (UK)	6.5.4	90.46907.00U
KeyBoard Logic Assembly (German)	6.5.4	90.46907.00G

Table A-2   Base Assembly Field-Replaceable Units (FRUs)

Base Assembly FRU Description	Assembly/Disassembly Paragraph	Part No.
KeyBoard Logic Assembly (French)	6.5.4	90.46907.00F
KeyBoard Logic Assembly (Spanish)	6.5.4	90.46907.00S
KeyBoard Logic Assembly (Swiss/German)	6.5.4	90.46907.007
KeyBoard Logic Assembly (Italian)	6.5.4	90.46907.00I
KeyBoard Logic Assembly (Portuguese)	6.5.4	90.46907.00P
KeyBoard Logic Assembly (Sweden)	6.5.4	90.46907.00W
KeyBoard Logic Assembly (Danish)	6.5.4	90.46907.00D
KeyBoard Logic Assembly (Norwegian)	6.5.4	90.46907.00N
KeyBoard Logic Assembly (Finnish)	6.5.4	90.46907.008
KeyBoard Logic Assembly (Belgian)	6.5.4	90.46907.00B
KeyBoard Logic Assembly (Chinese)	6.5.4	90.46907.00C
KeyBoard Logic Assembly (Korean)	6.5.4	90.46907.00K
KeyBoard Logic Assembly (Japanese)	6.5.4	90.46907.00J
Cables		
Internal CD-ROM FPC Cable	6.5.8	50.47002.001
Internal CD-ROM FPC Cable	6.5.8	50.47003.001
Peripherals		
FDD, 1.44 MB	6.5.8	56.01051.071
HDD, 1620 MB	6.5.3	56.02921.021
HDD, 2160 MB	6.5.3	56.02941.011
CD-ROM Drive, 8X	6.5.8	56.10019.011
Covers, Doors, Buttons		
Top Cover Assembly	6.5.10	60.47005.001
Memory Expansion Cover	6.5.5	34.46904.011
Left Hinge Cover	6.5.4	42.46925.001
Right Hinge Cover	6.5.4	42.46924.001
Hinge Cable Cover	Ref (Figure 6-24)	42.46921.001
HDD Cover	6.5.3	42.47003.001
Battery Door	6.5.1	60.47016.001
Misc.		
Base Assembly, 67x	6.5.10	60.47004.002
Battery, Duracell, Ni-MH, SMB, (10.8V, 3500 mAH)	6.5.1	23.20040.051
AC Power Adapter, 45W, ADP-45HB	Ref	25.10046.111
Fan	6.5.12	23.10029.011
Inside Frame Assembly	6.5.14	60.47003.002
Heat Sink Assembly, 67x	6.5.5	34.47007.002
CPU P55CLM 150 2.5V PPGA	6.5.7	01.IP55C.F00
CPU INT P55C-166 2.8V SPGA	6.5.7	01.IP55C.G60
Touchpad Buttons	6.5.19	42.46937.001
PCMCIA Connector Module	6.5.18	21.H0010.001

Table A-2   Base Assembly Field-Replaceable Units (FRUs)

Base Assembly FRU Description	Assembly/Disassembly Paragraph	Part No.
Right Speaker with cable	Ref	23.40015.021
Left Speaker with cable	Ref	23.40015.031
Cover, FIR/Audio Board	6.5.11	34.47005.001
Microphone W/Cable	Ref	60.47011.001

The motherboard is composed of the following spare parts/ components:

Table A-3   Mainboard Spare Parts/Components

Mainboard Assembly Component Description	Location	Part No.
CONVERTER DC-DC T62.050 V.C	J10	19.20084.021
CONNECTOR D ML 2R 9P RT HOLE	J3	20.10033.009
CONNECTOR D FML 3R 15P RT HOLE	J4	20.20058.015
CONNECTOR D FML 2R 25P RT HOLE	J2	20.20059.025
HEADER BLK 1R 6P ST D2 4S H6	J17	20.60076.106
CONN CTR ML 4R 120P RT D1.27	J5	20.80031.120
SKT MINI-DIN FML 6P RT SHIELD	J1	22.10021.011
SKT IC PGA 320P ZIF 91607-2		22.10197.320
SW SLIDE 12V0.3A RT DS-1200-02	SW3	22.40048.341
BTY LI 3V BR1225/H1A 48MAH	BT1	23.20004.071
BUZZER KSS-1201E 2048HZ D12	J13	23.60010.011
CONN CTR SMD ML 32P ST D0.8	J14	20.F0009.032
CONN D SMD 40P RT D0.635	J16	21.A0004.040
CONN D SMD 52P RT D0.635 H11	J15	21.A0006.052
HEAD SMD FML 2R 4P ST D2 4S	J9	21.E0004.202
HEAD SMD FML 2R 30P ST D2 4S	J8	21.E0004.215
CONN CTR SMD FML 80P ST D0.5	J7	21.F0010.080
SSKT DIMM 144P C-316310-1	J11	62.10024.001
IC BUS BRIDGE M1523 V.I QFP208		71.M1523.A0E
IC PWR STATE CTRL M6375 QFP64P	U20	71.M6375.00E
IC PWR MANAG. CTRL M6377 QFP100	U13	71.M6377.00E
PC PCI/CARDBUS CTRL PCI1130	U7	71.01130.00G
IC AUDIO CTRL ES1878S TQFP100P	U3	71.01878.00G
IC PWR INTF.SW TPS2202AIDF SOP	U18	71.02202.00N
IC CLK DRV CY2252 SSOP 28P	CK1	71.02252.00I
IC RTC BQ3285E SSOP 24P	U25	71.03285.00I
IC GUI ACCE 65550 VB 3.3V TQFP	U46	71.65550.B0G
IC SUPER I/O PC87338VJG A4	U46	71.87338.A0G
IC FEROM 28F020-12 256K*8 PLCC	U17	72.28020.053
IC SRAM 32K*32(UMC) PQFP	SM1 2	72.32588.L15
IC DRAM 416C254BT-6 256K*16 EDO	UM2 UM3	72.41254.209

Table A-3   *Mainboard Spare Parts/Components*

Mainboard Assembly Component Description	Location	Part No.
IC DRAM 2M*8-60 EDO 3.3V 2K/SR	DM1-8	72.48214.209
IC SRAM 7C1399 15NS 32K*8 SOJ	TG1	72.71399.23B
IC CMOS 74QST3384 QSOP 24P(TI)	QS1-9 11	73.03384.L13
IC CMOS CD4066BC SO-N 14P	U10	73.04066.091
IC TRANSCEIVER MAX213ECAI SSOP	U36	74.00213.0F9
IC V.R PST594CMT SO-N 4P	U32	74.00594.031
IC OP LM1458 SO-N 8P	U41	74.01458.011
IC PWR SW TPS2013D SO-N 8P	U37 38	74.02013.031
IC A.R. LP2951ACM SO-N 8P	U40	74.02951.A31
IC INTF. SW SI9706DY SO-N 8P	U39 45 47	74.09706.031
THERMOMETER DS1620 SO-N 8P	TH1	75.01620.041
RESO 8MHZ CSTC8.00MT CERAMIC	X1	82.10009.001
CRYSTAL 32.768KHZ 6PF MC306	X3 4	82.30001.001
CRYSTAL 14.31818 16P 10PPM	X2	82.30005.601

A.4. Jumper Options

The remainder of this appendix describes the jumper configuration options for the 670 Series boards.
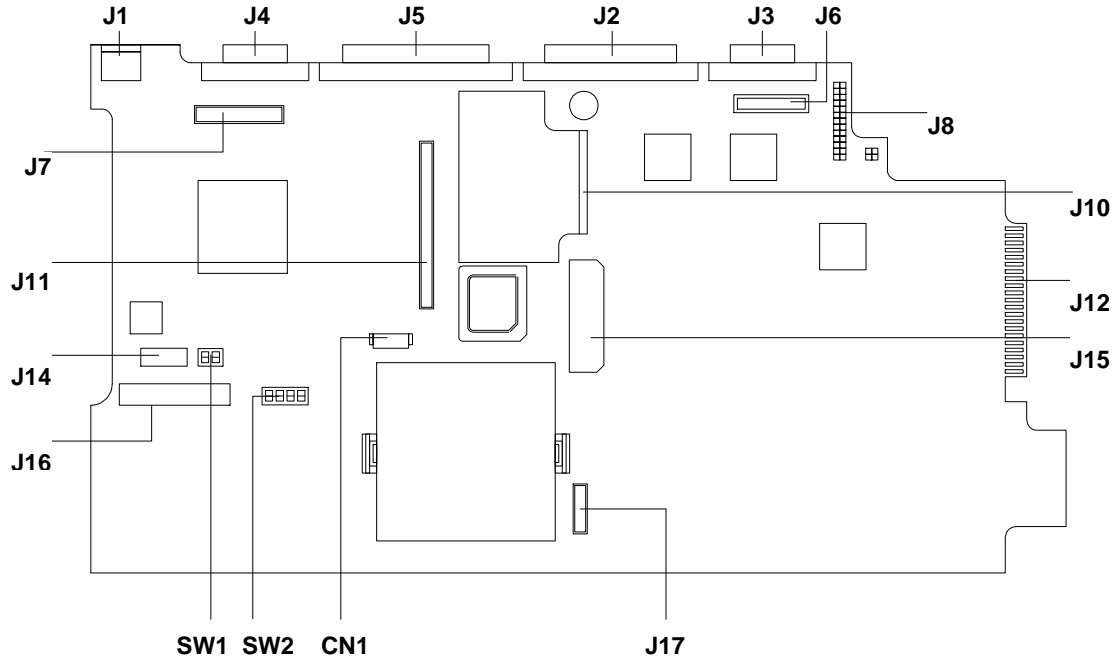
J1	External PS/2 mouse/keyboard port	
J4	External CRT port	
J5	Expansion port (port replicator)	
J2	Parallel port	
J3	Serial port	
J6	FIR/audio board connector	
J8	Charger connector	
J10	DC-DC converter connector	
J12	Debug card golden finger	

J15	CD-ROM/FDD connector
J17	Power supply board connector
CN1	LED board connector
SW2	CPU speed switch
SW1	Password switch
J16	HDD connector
J14	Keyboard transfer board connector
J11	PC Card connector
J7	Display cable connector

Password Switch (SW1)		
SW1	ON	OFF
switch 1	bypass	check
switch 2	-	reserved

CPU Speed Switch (SW2)			CPU Core Voltage (Switch on DC-DC converter))		
SW2	150 MHz	166 MHz		3.1V	2.9V
switch 1	ON	OFF	switch 1	OFF	ON
switch 2	OFF	ON	switch 2	OFF	ON
switch 3	ON	ON	switch 3	OFF	OFF
switch 4	ON	ON	switch 4	ON	OFF

Figure A- 4   Main Board Jumper Options (top side)
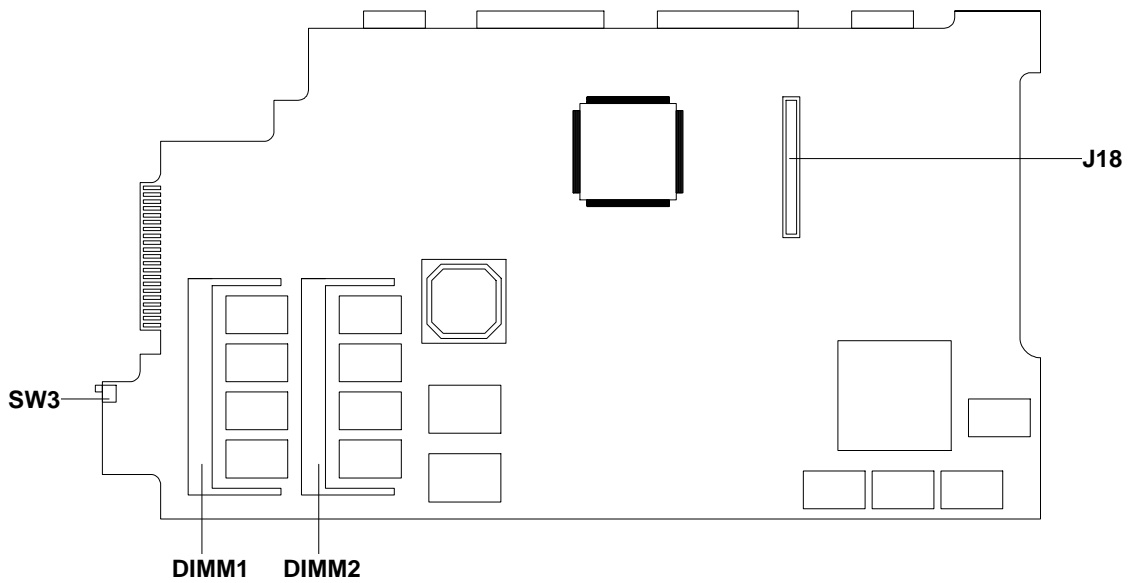
SW3   CD-ROM/FDD lock/unlock switch
DIMM2   DIMM slot 2
DIMM1   DIMM slot 1
J18   Feature board connector

Figure A-5   Main Board Jumper Options (bottom side)
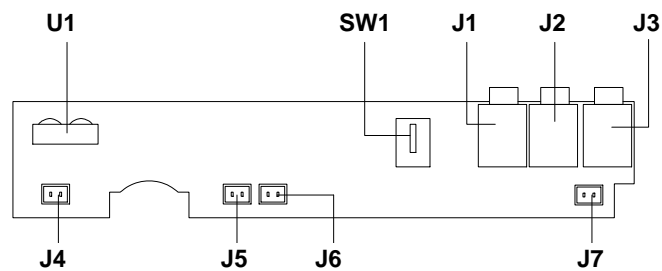
U1   FIR   J4   Left speaker connector
SW1 LCD cover switch   J5   Internal microphone connector
J1   Mic-in connector   J6   Fan connector
J2   Line-in connector   J7   Right speaker connector
J3   Line-out connector

Figure A-6   FIR/Audio Board Jumper Options

A.5. Logic Diagrams

The remainder of this chapter contains logic diagrams for the Extensa Model 67x Series. The following pages (36 sheets) contains the logic diagrams for the main board.
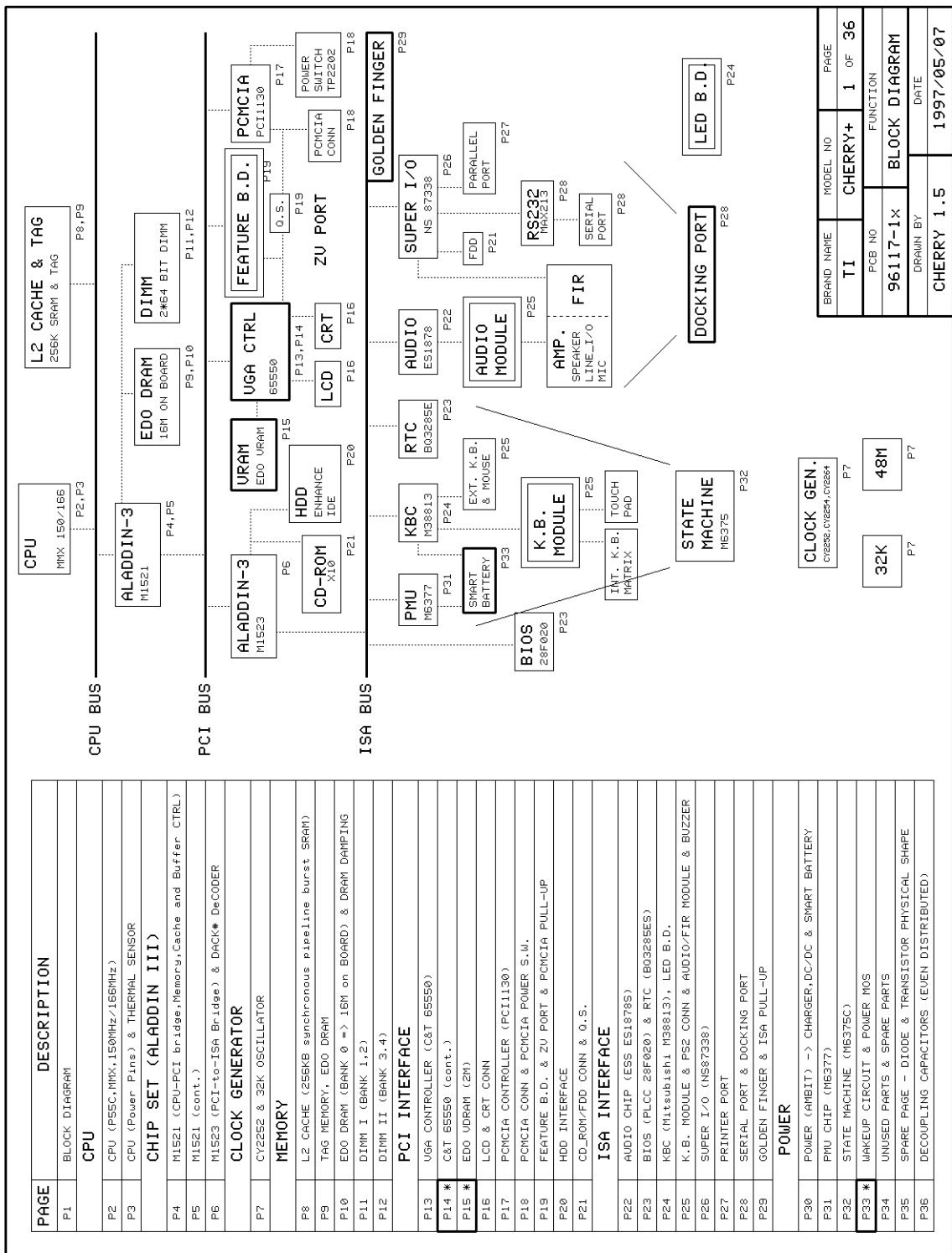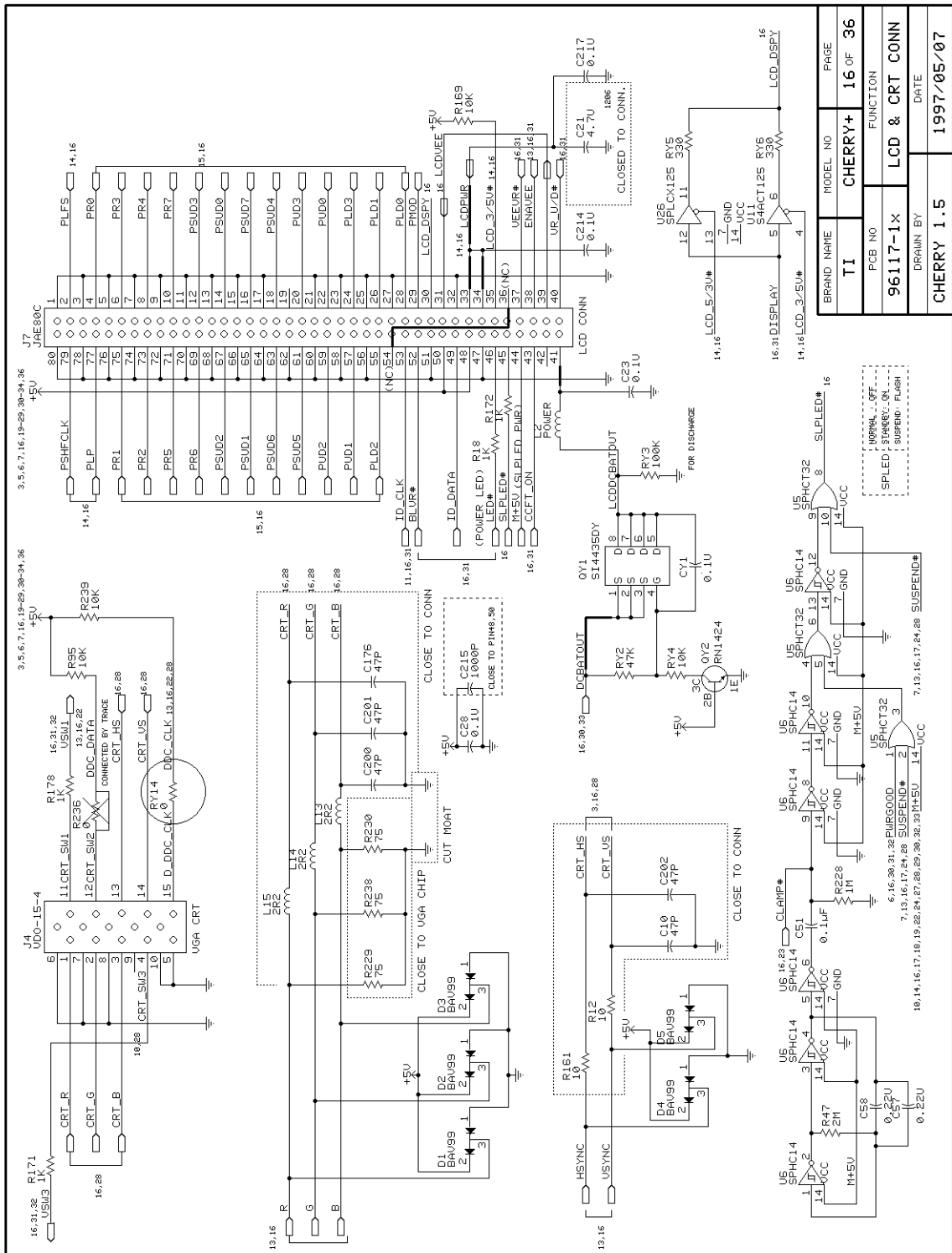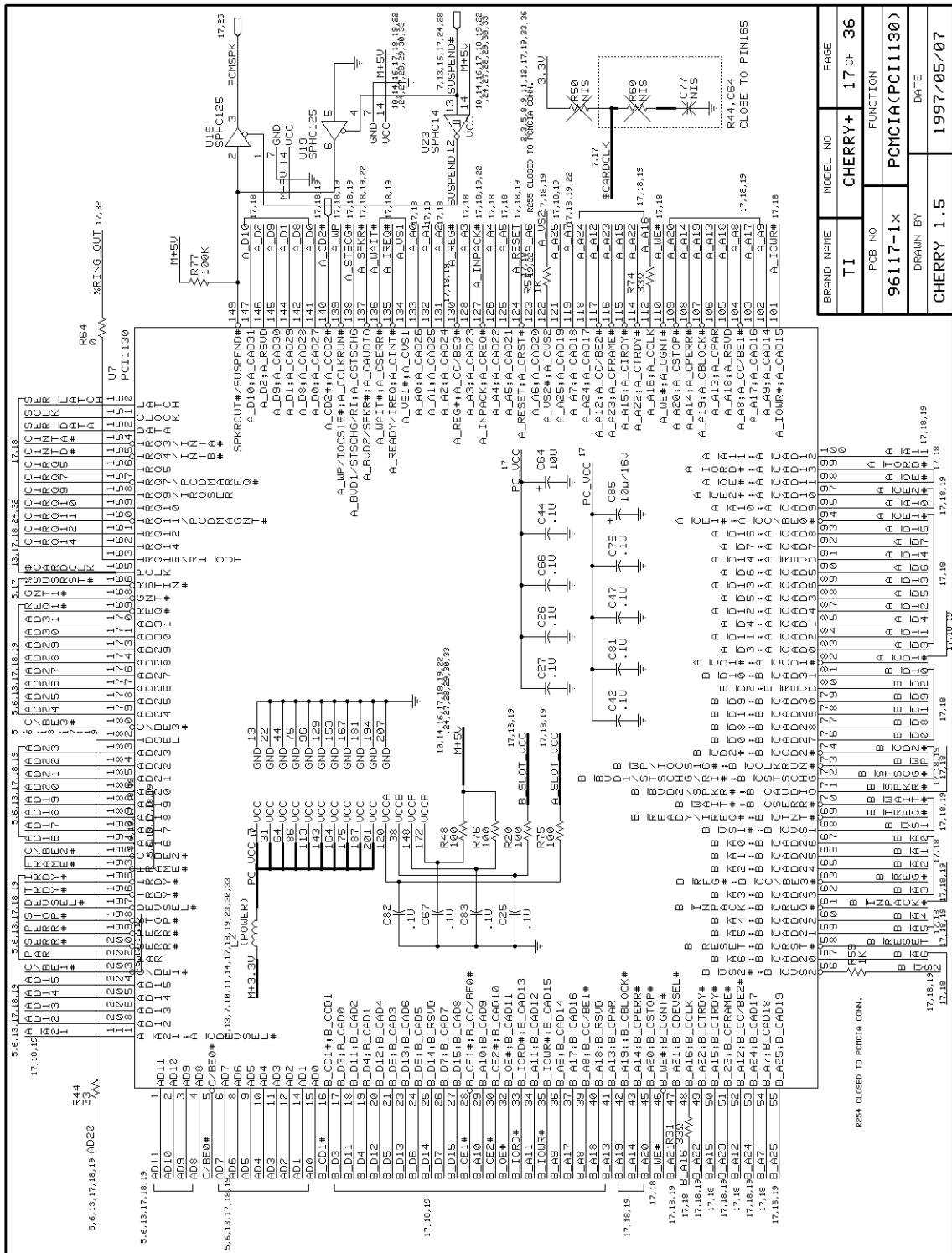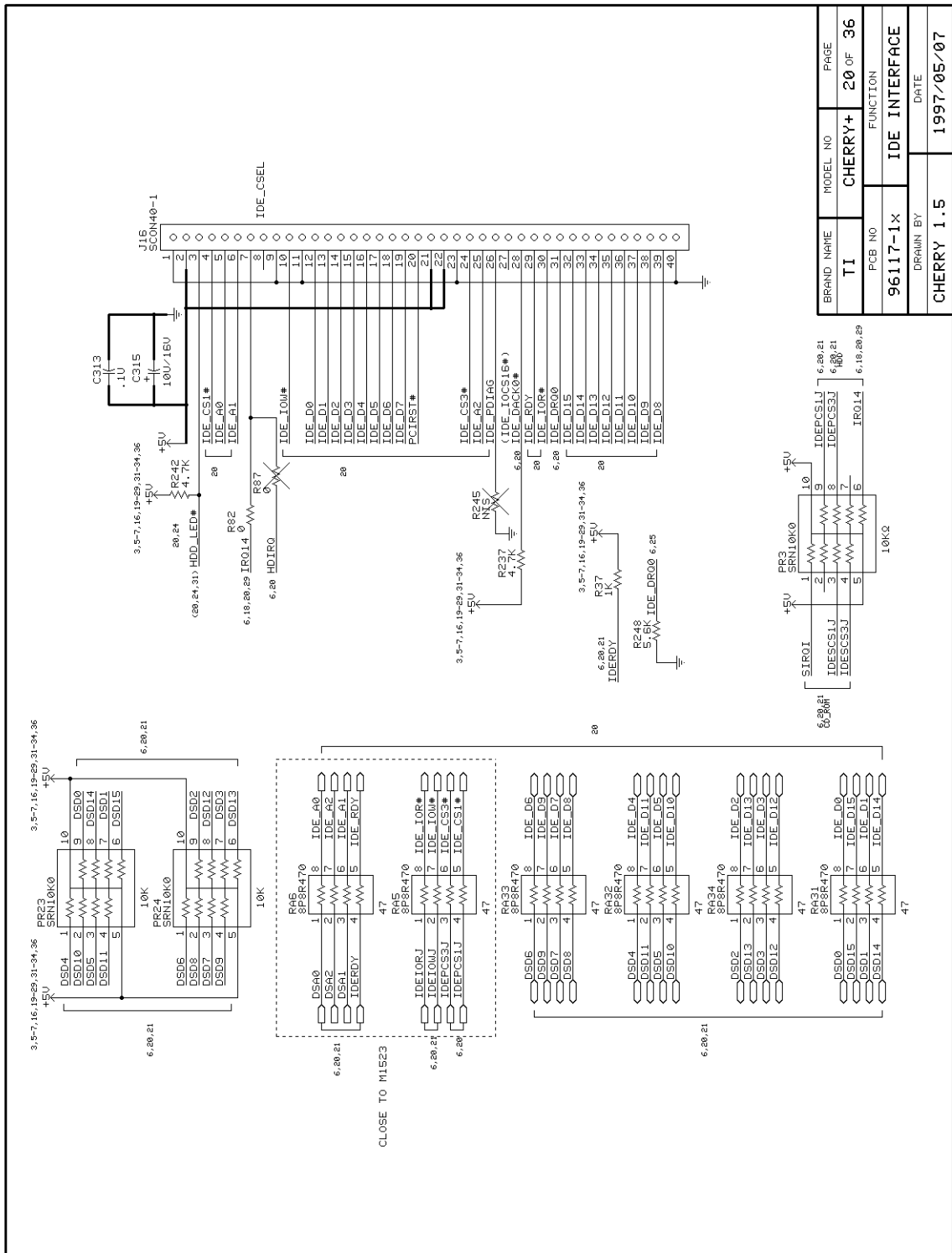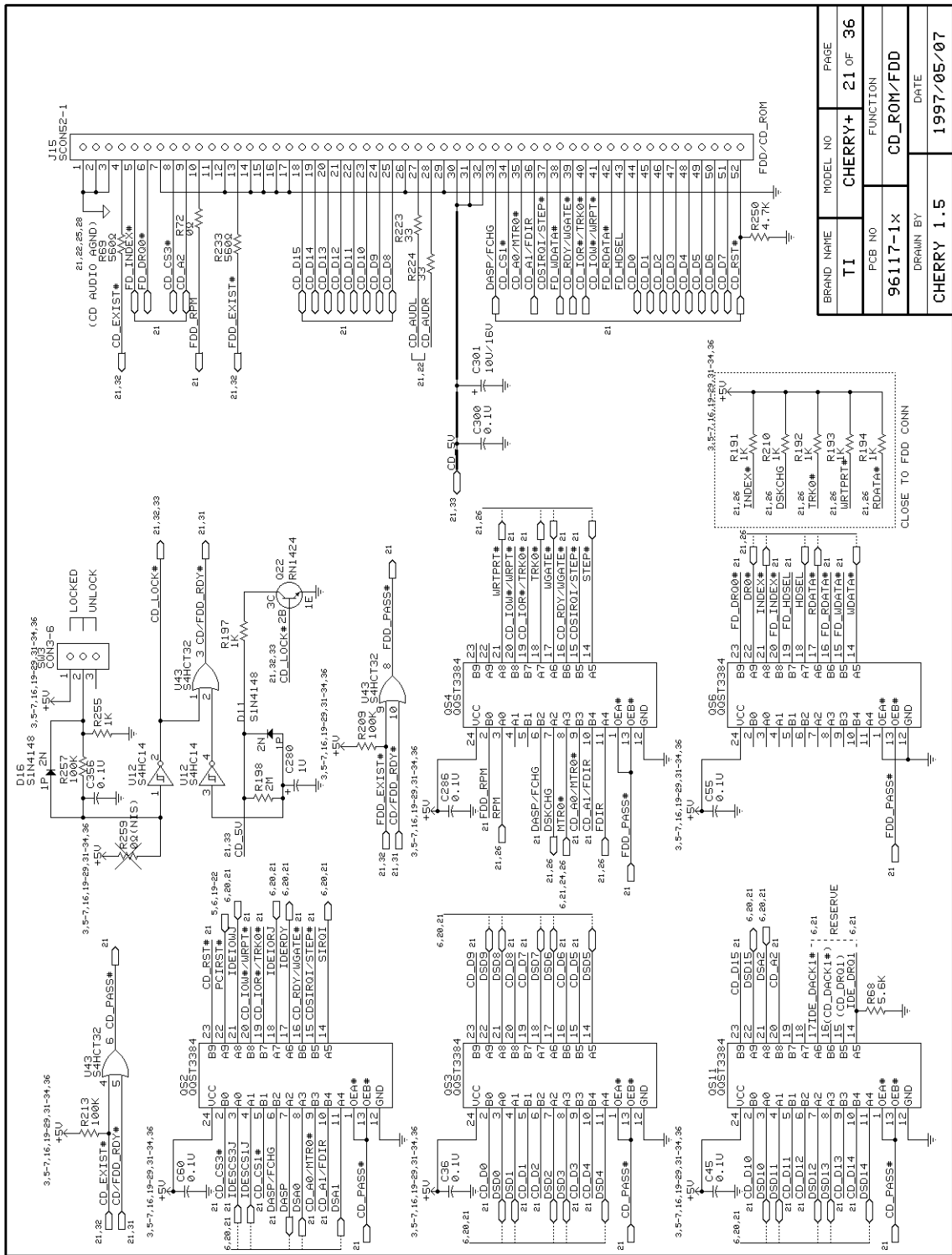
Figure A- 7   Main Board Logic Diagrams (Sheet 1 of 36)
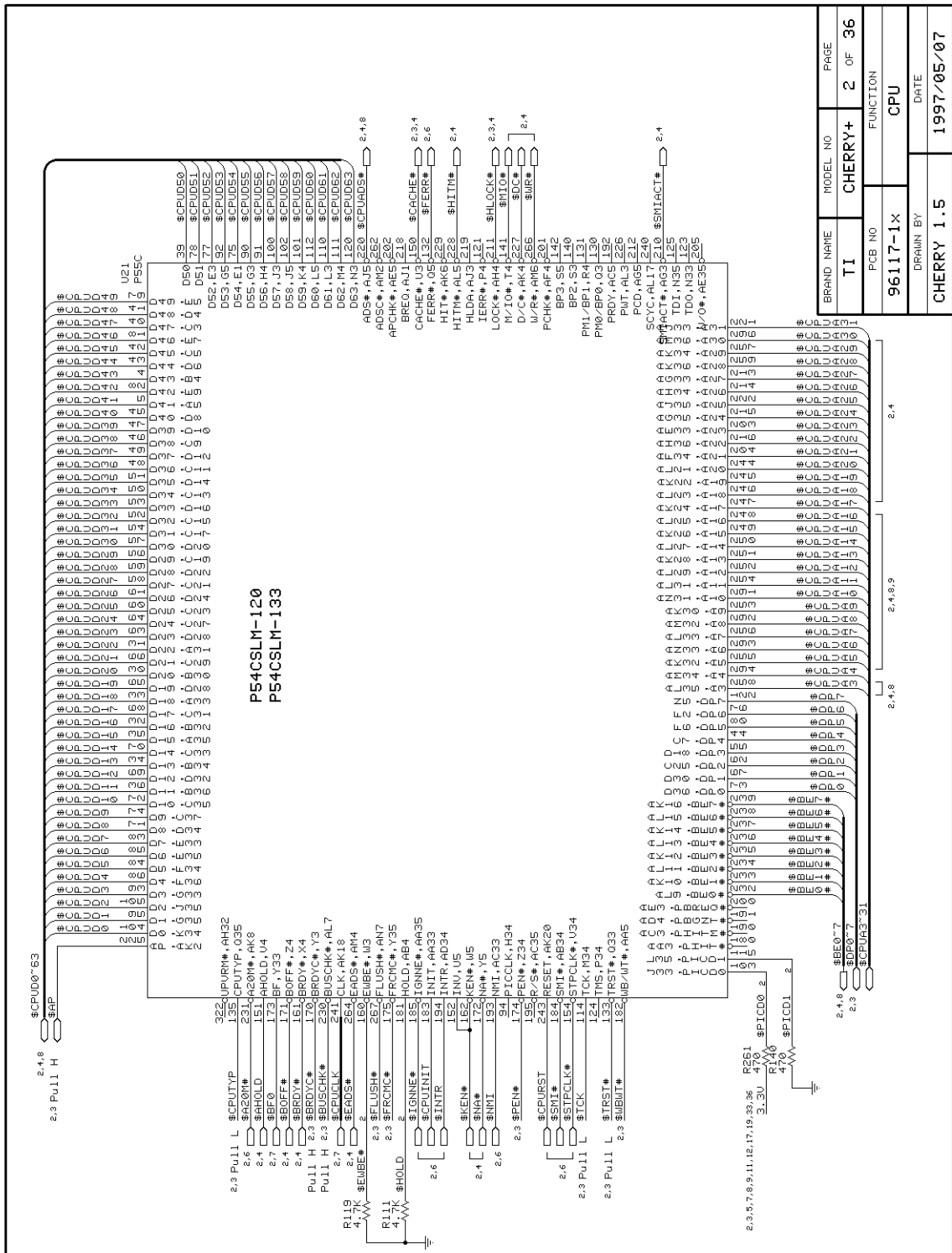
Figure A- 8   Main Board Logic Diagrams (Sheet 2 of 36)
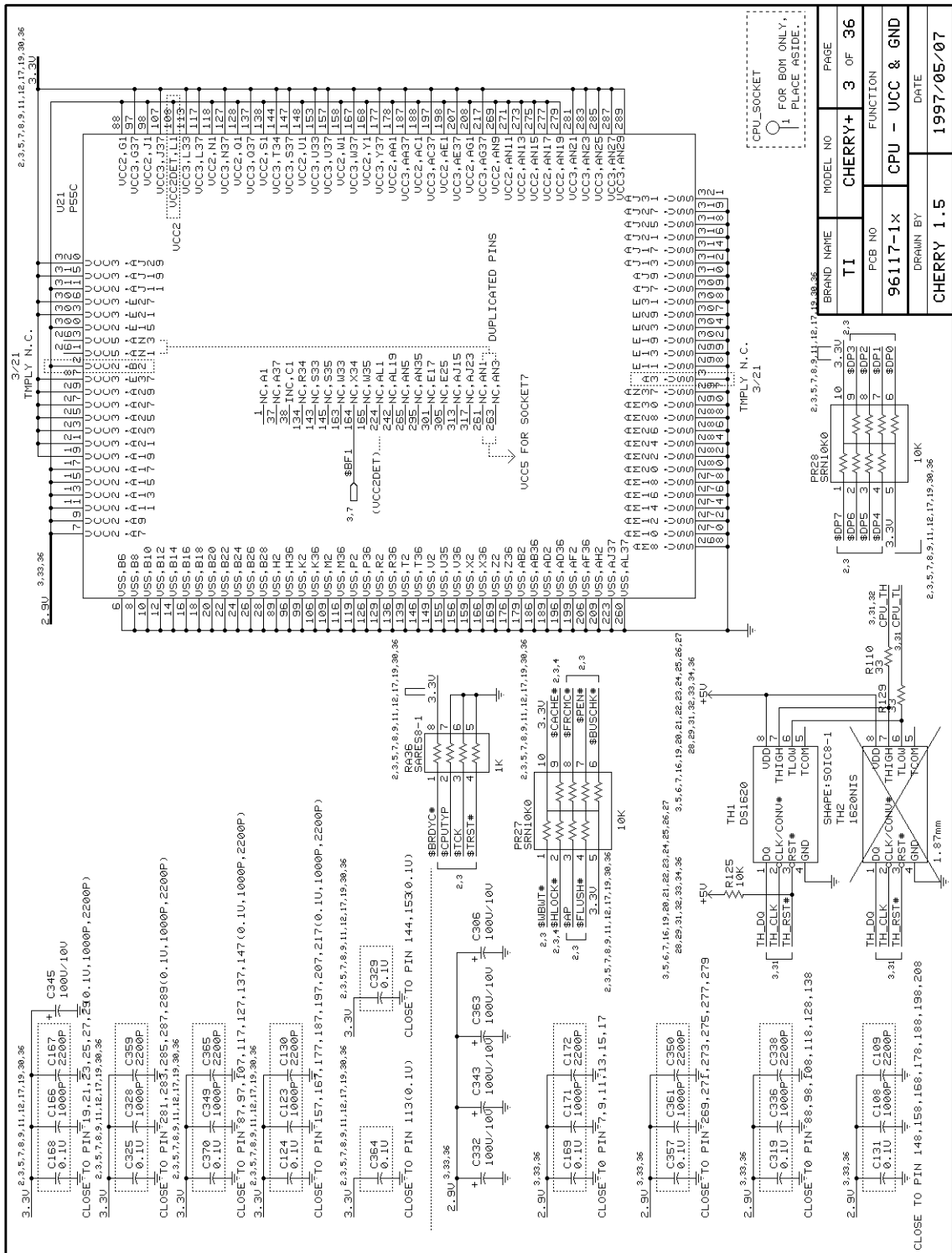
Figure A- 9   Main Board Logic Diagrams (Sheet 3 of 36)
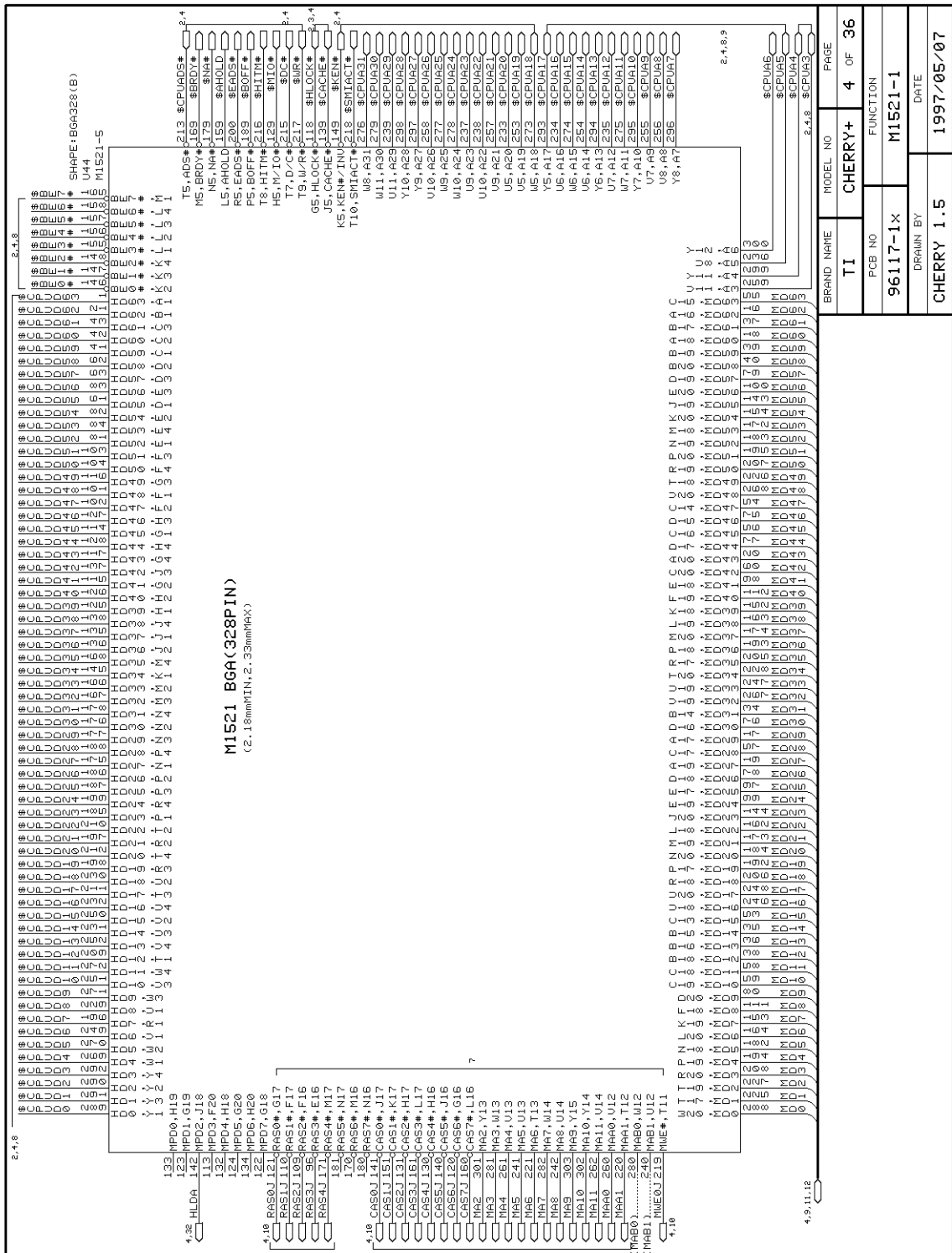
Figure A- 10   Main Board Logic Diagrams (Sheet 4 of 36)

Figure A- 11   Main Board Logic Diagrams (Sheet 5 of 36)

Figure A- 12   Main Board Logic Diagrams (Sheet 6 of 36)
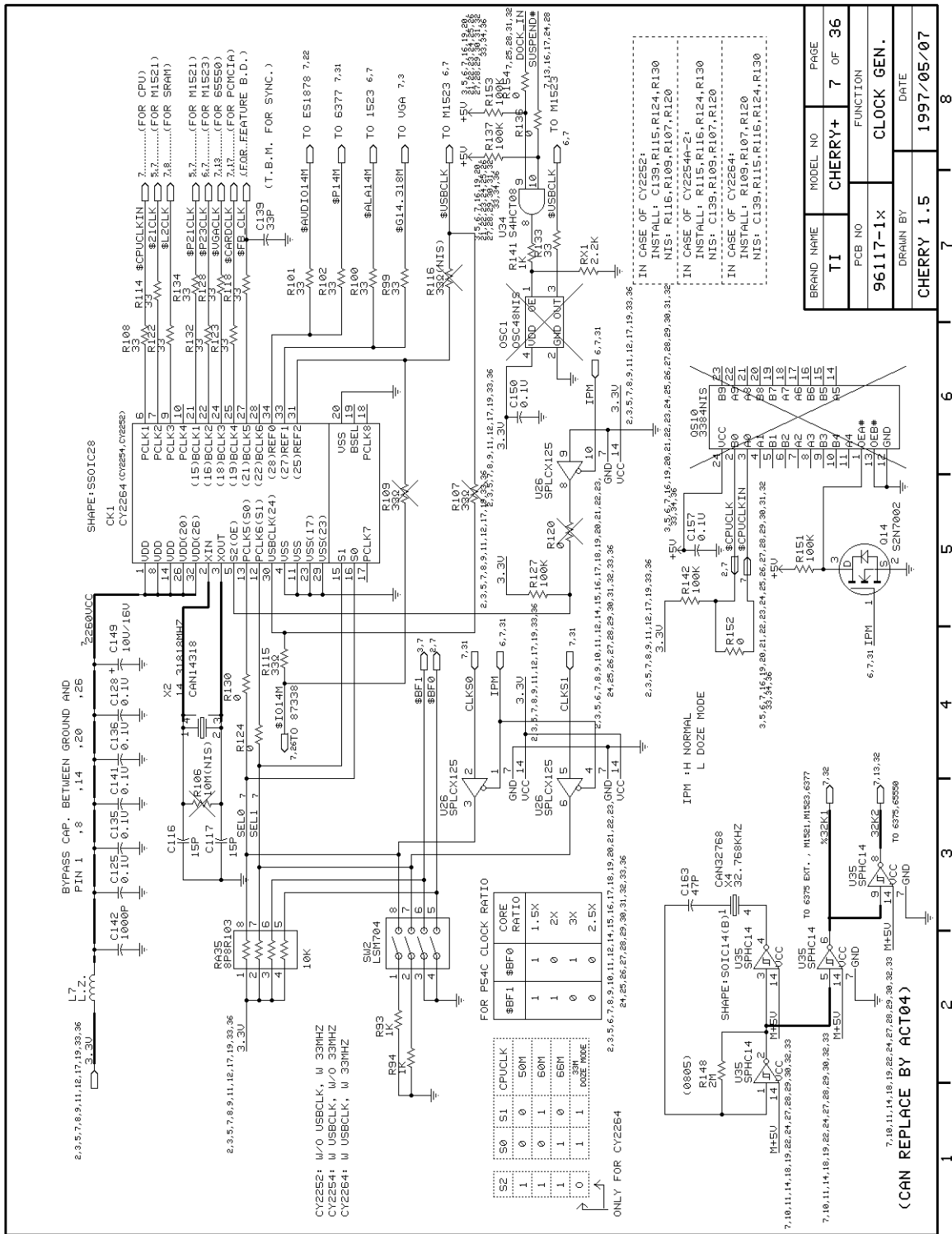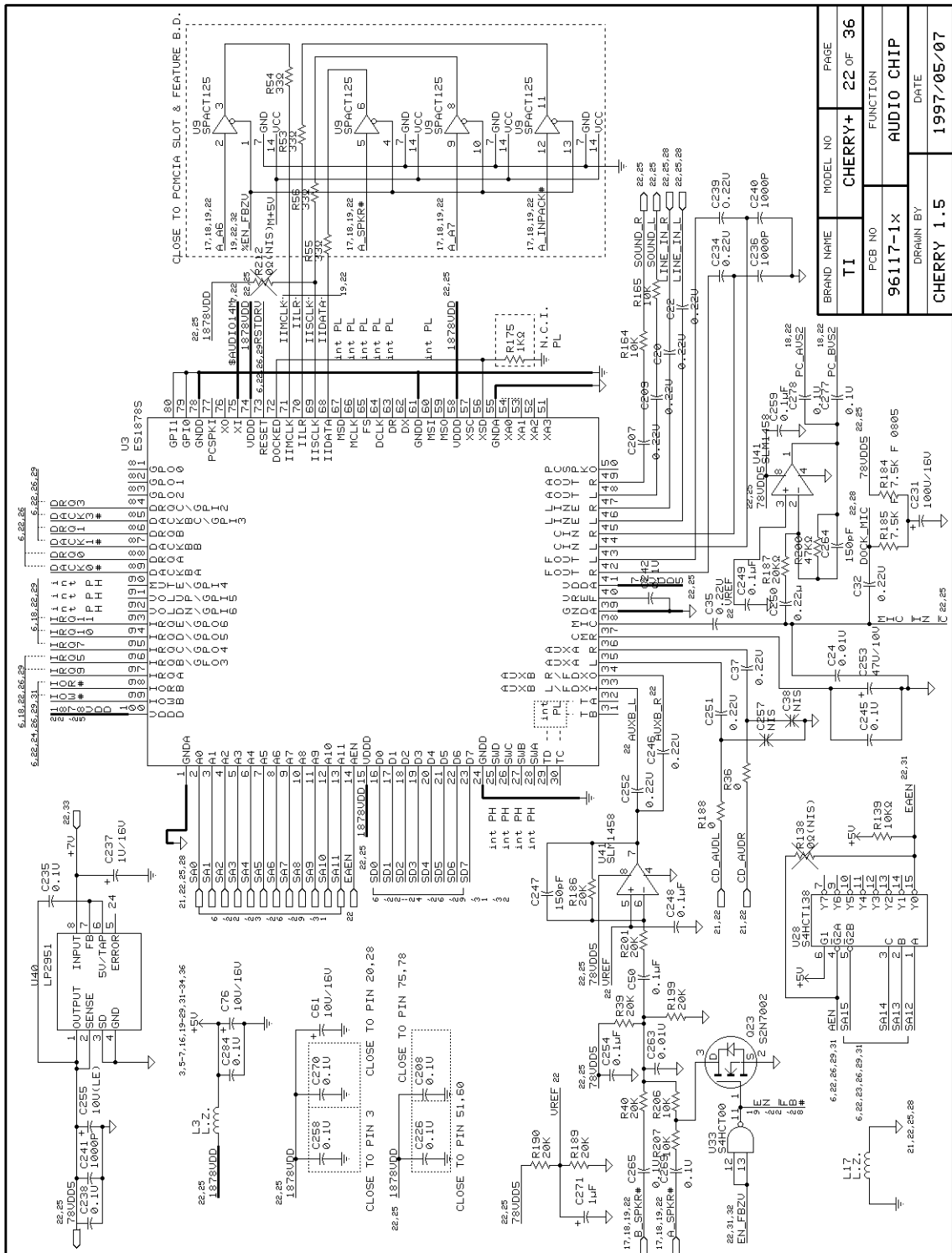
Figure A- 13   Main Board Logic Diagrams (Sheet 7 of 36)
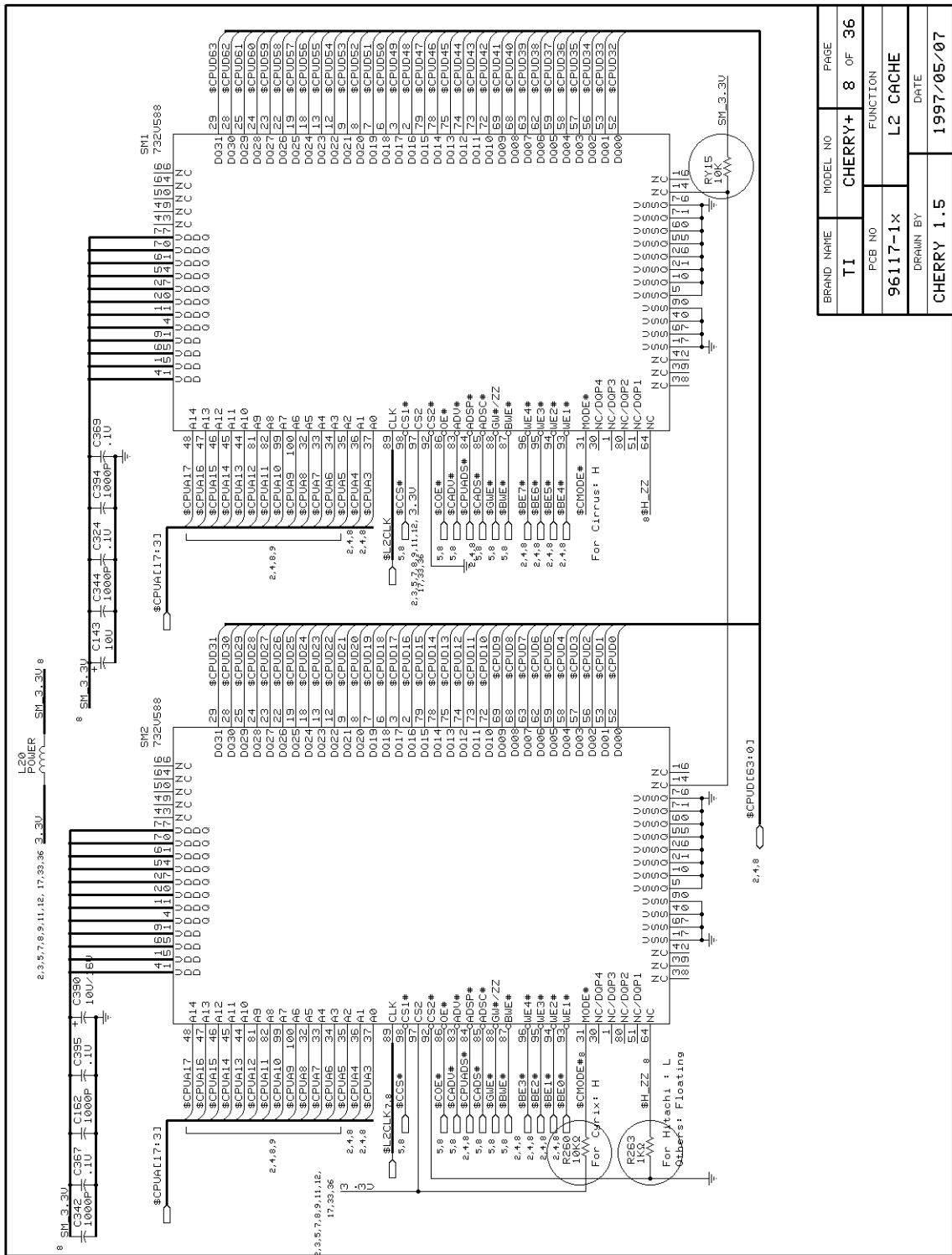
Figure A- 14   Main Board Logic Diagrams (Sheet 8 of 36)

Figure A- 15   Main Board Logic Diagrams (Sheet 9 of 36)

Figure A- 16   Main Board Logic Diagrams (Sheet 10 of 36)
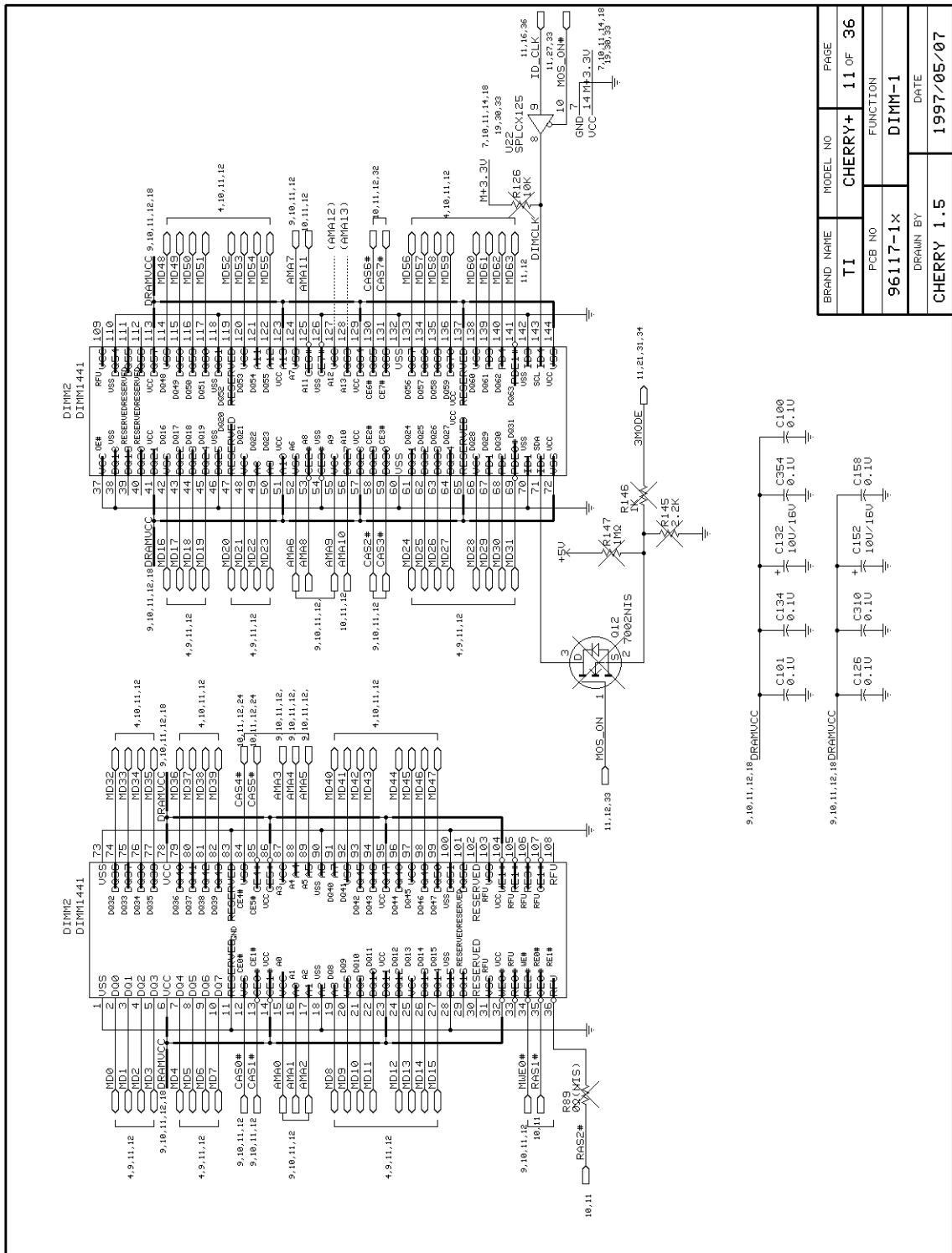
Figure A- 17   Main Board Logic Diagrams (Sheet 11 of 36)
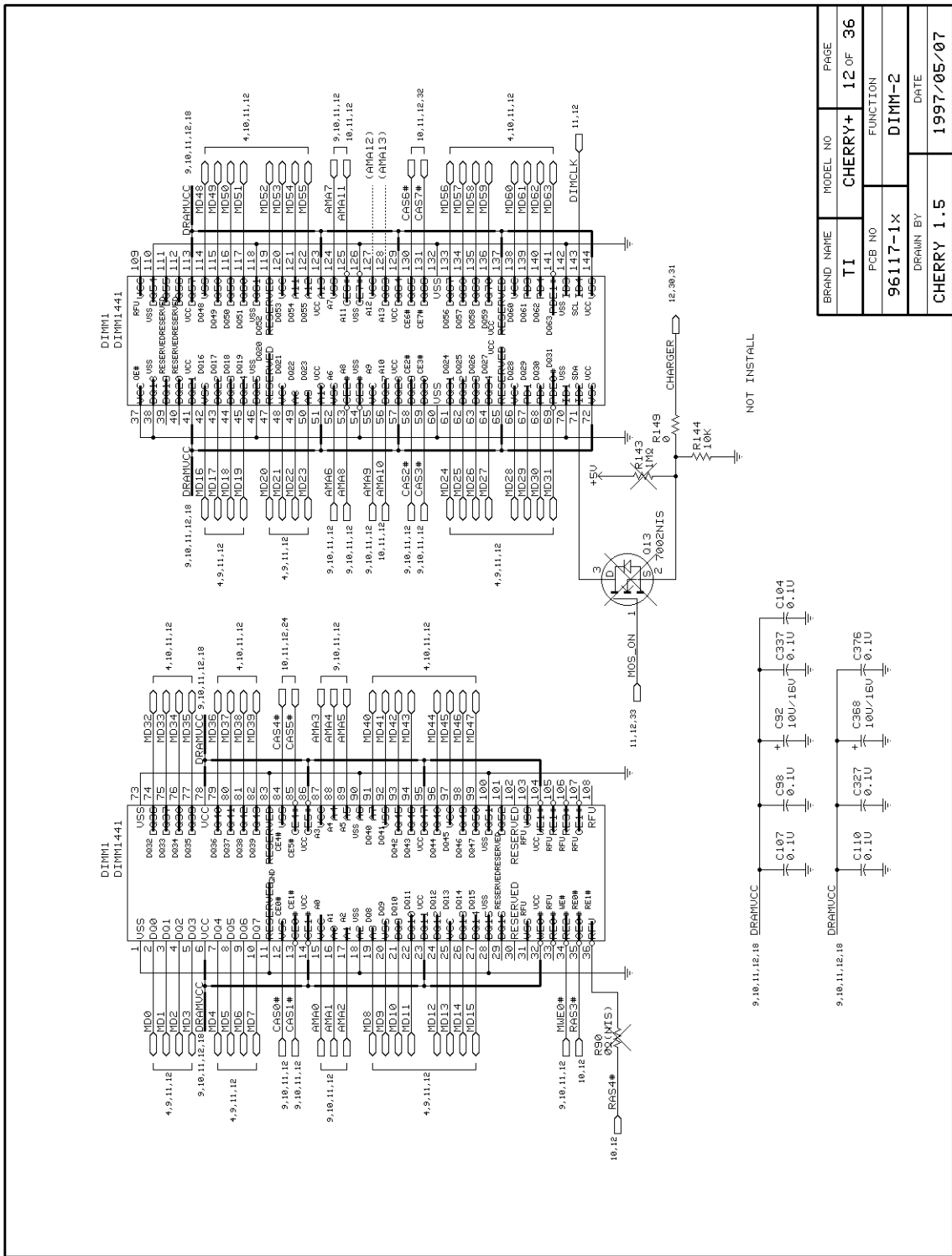
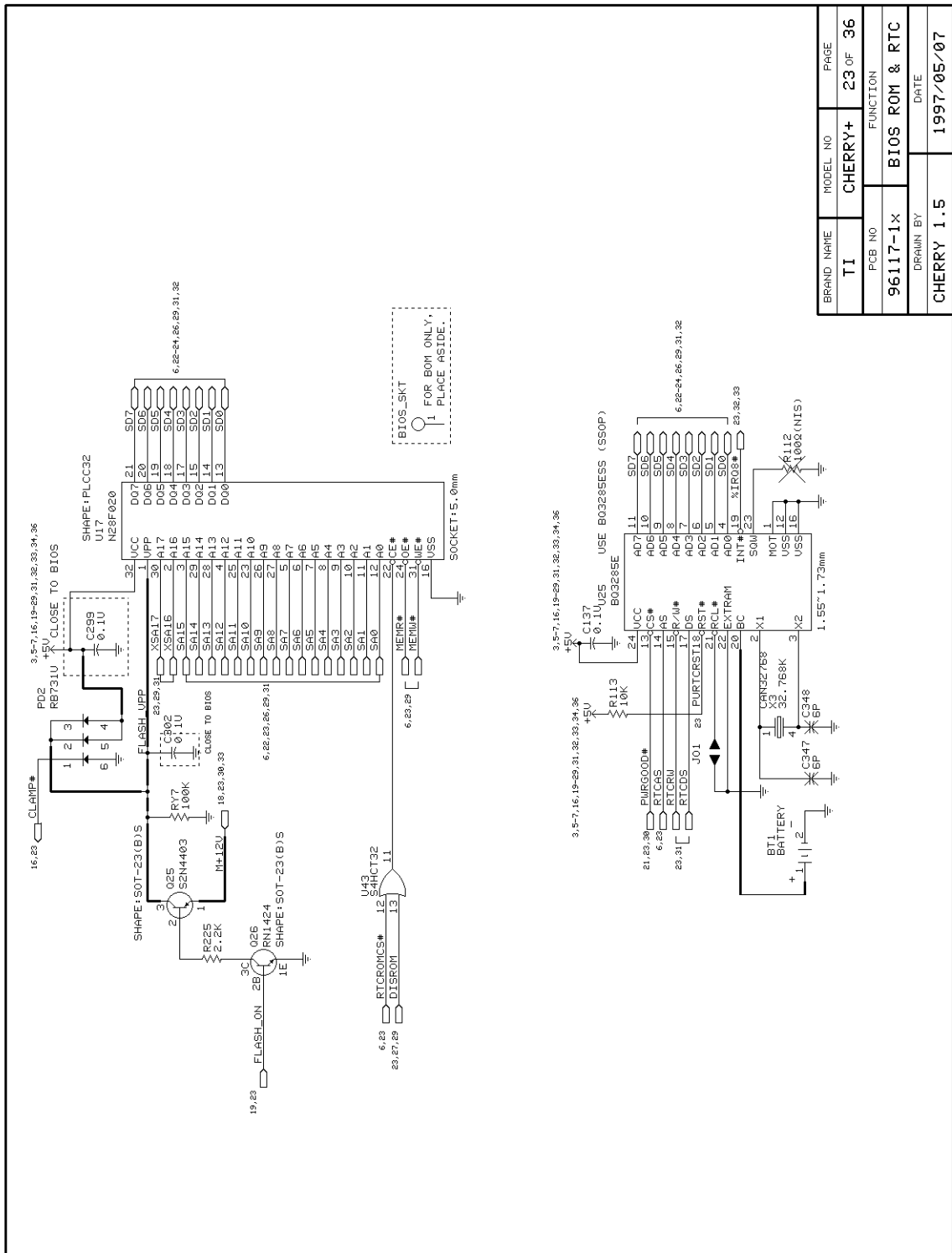*Figure A- 18   Main Board Logic Diagrams (Sheet 12 of 36)*

Figure A- 19   Main Board Logic Diagrams (Sheet 13 of 36)
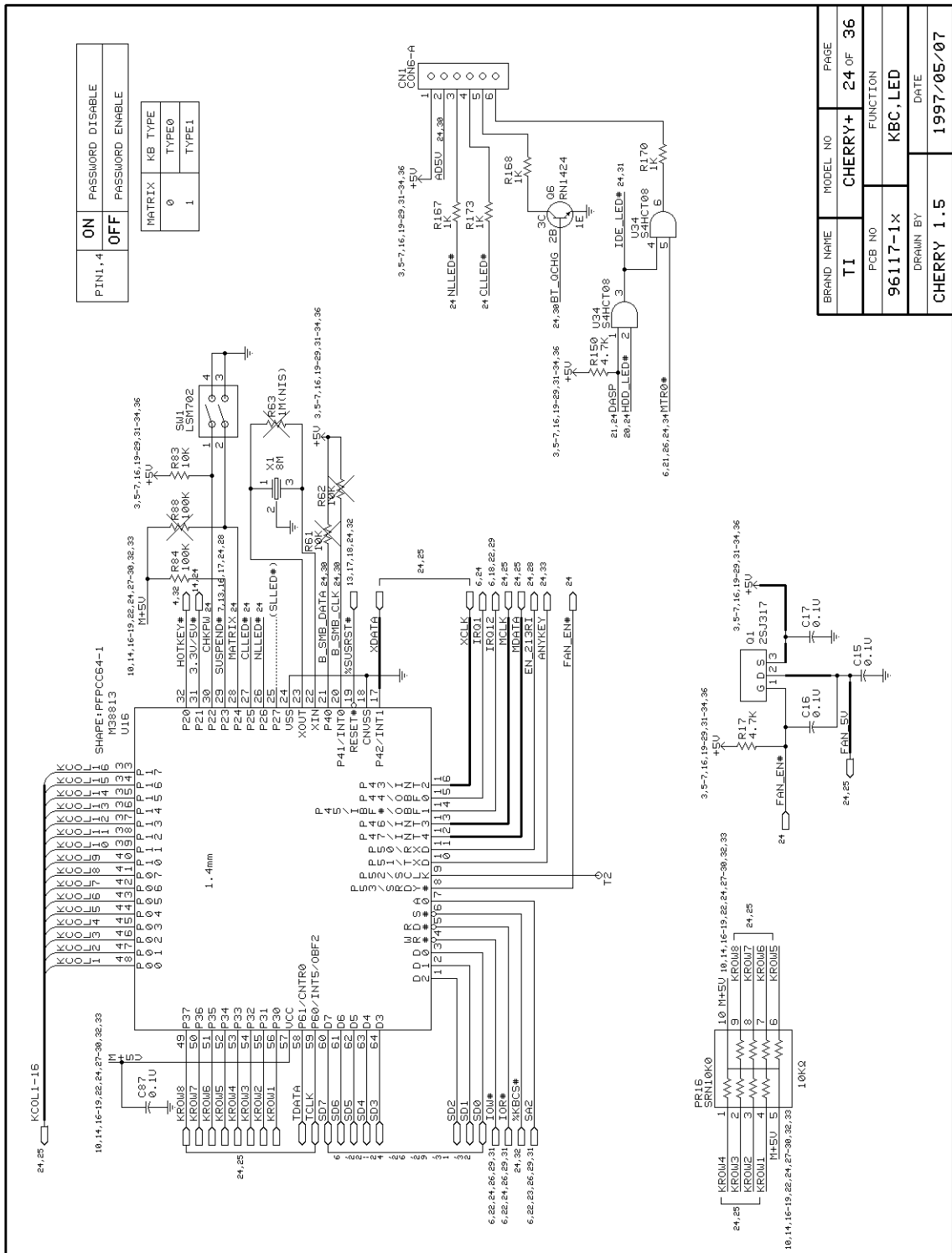
Maintenance Data

Figure A- 20   Main Board Logic Diagrams (Sheet 14 of 36)
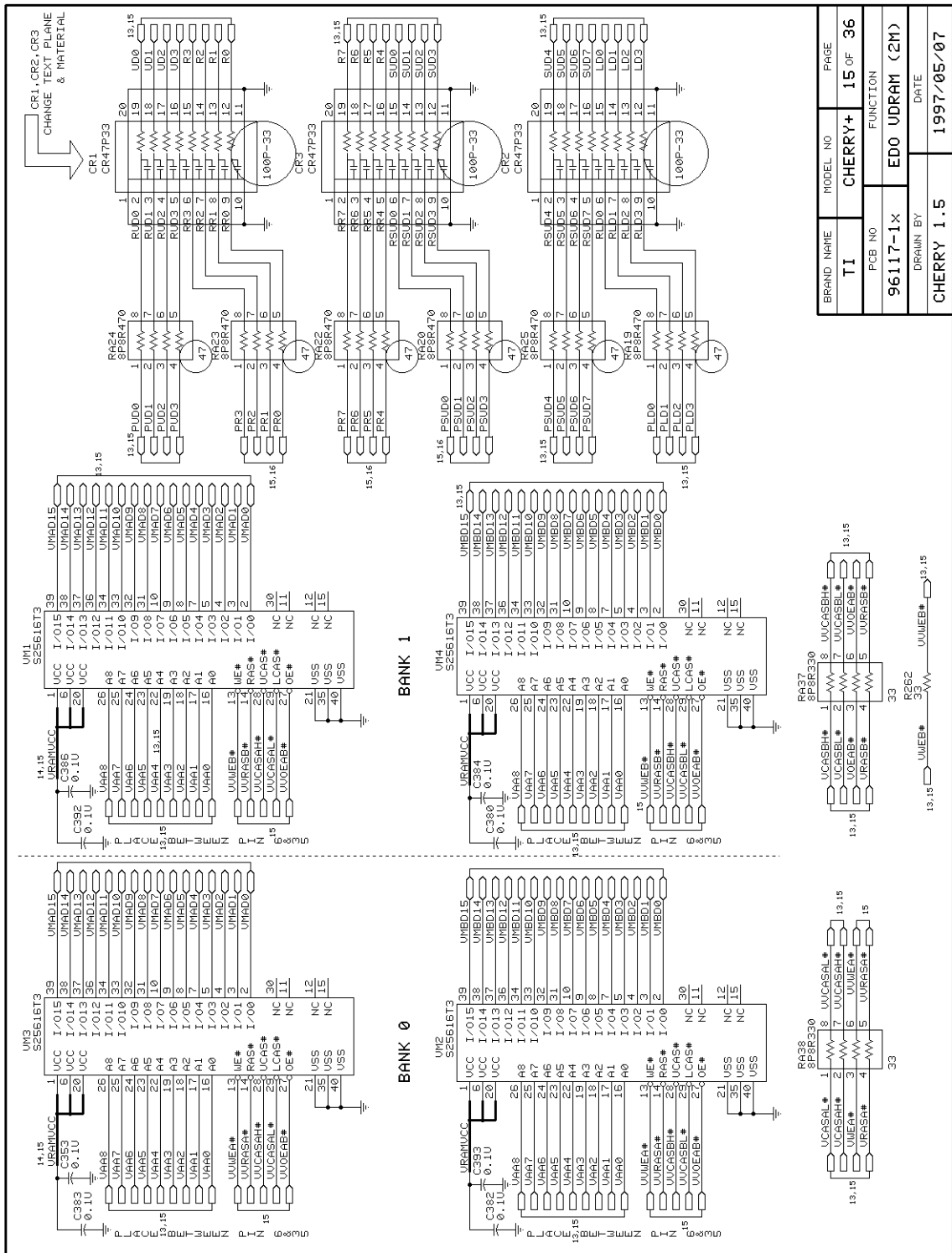
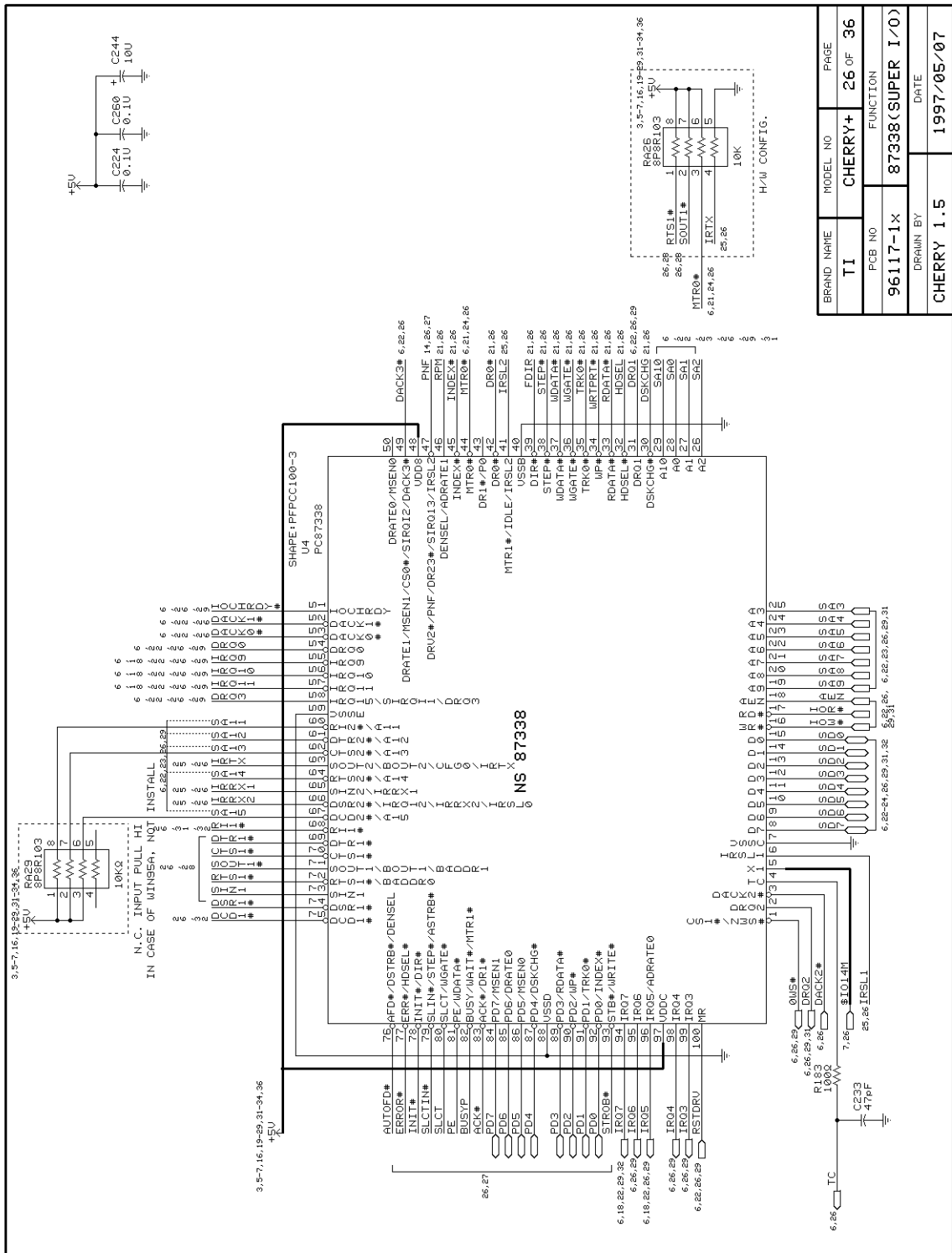*Figure A- 21   Main Board Logic Diagrams (Sheet 15 of 36)*

Figure A- 22   Main Board Logic Diagrams (Sheet 16 of 36)

Figure A- 23   Main Board Logic Diagrams (Sheet 17 of 36)

Figure A- 24   Main Board Logic Diagrams (Sheet 18 of 36)

Figure A- 25   Main Board Logic Diagrams (Sheet 19 of 36)

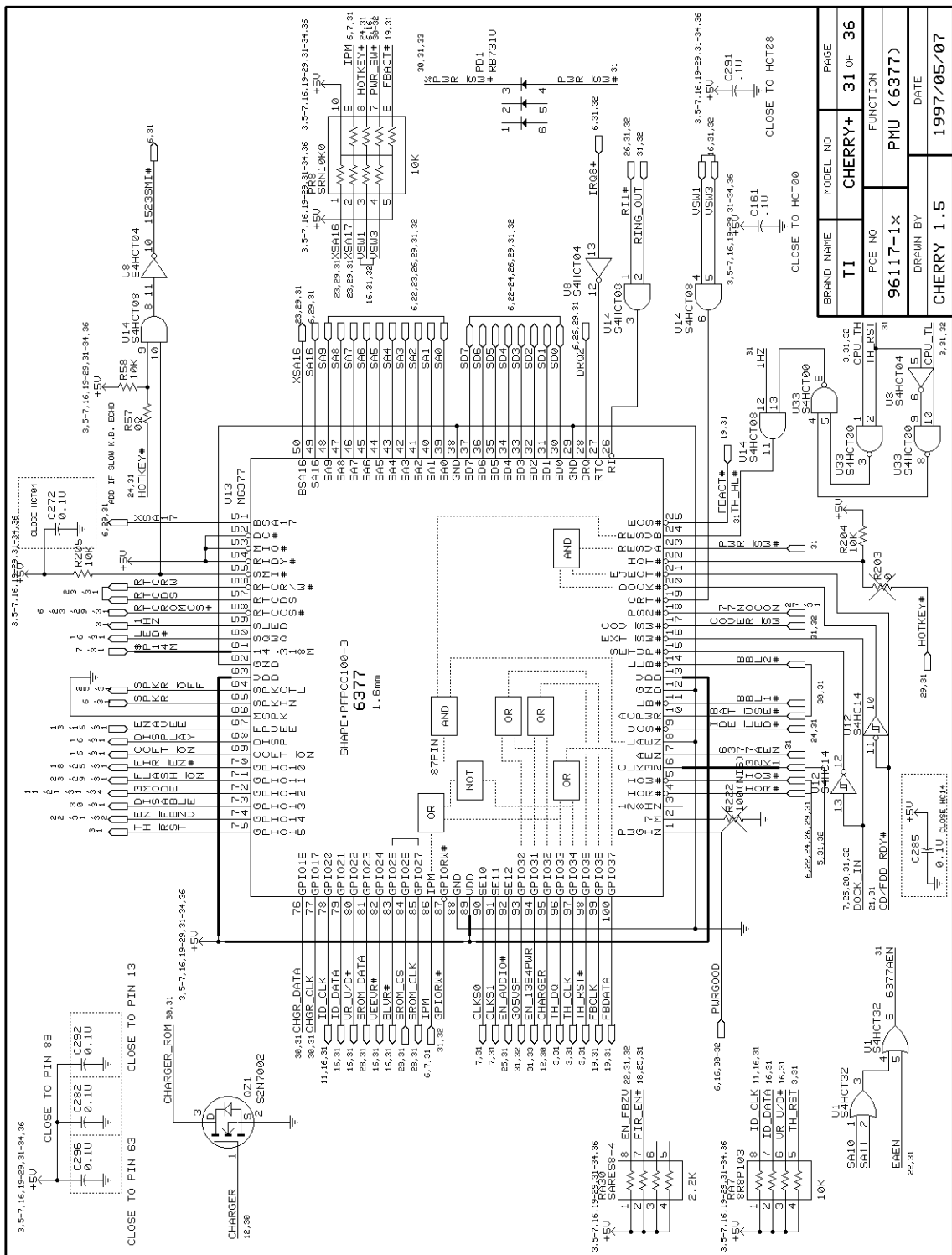*Figure A- 26   Main Board Logic Diagrams (Sheet 20 of 36)*

Figure A-27   Main Board Logic Diagrams (Sheet 21 of 36)

Figure A- 28   Main Board Logic Diagrams (Sheet 22 of 36)

Figure A- 29   Main Board Logic Diagrams (Sheet 23 of 36)

Figure A- 30   Main Board Logic Diagrams (Sheet 24 of 36)

Figure A- 31   Main Board Logic Diagrams (Sheet 25 of 36)

Figure A- 32   Main Board Logic Diagrams (Sheet 26 of 36)

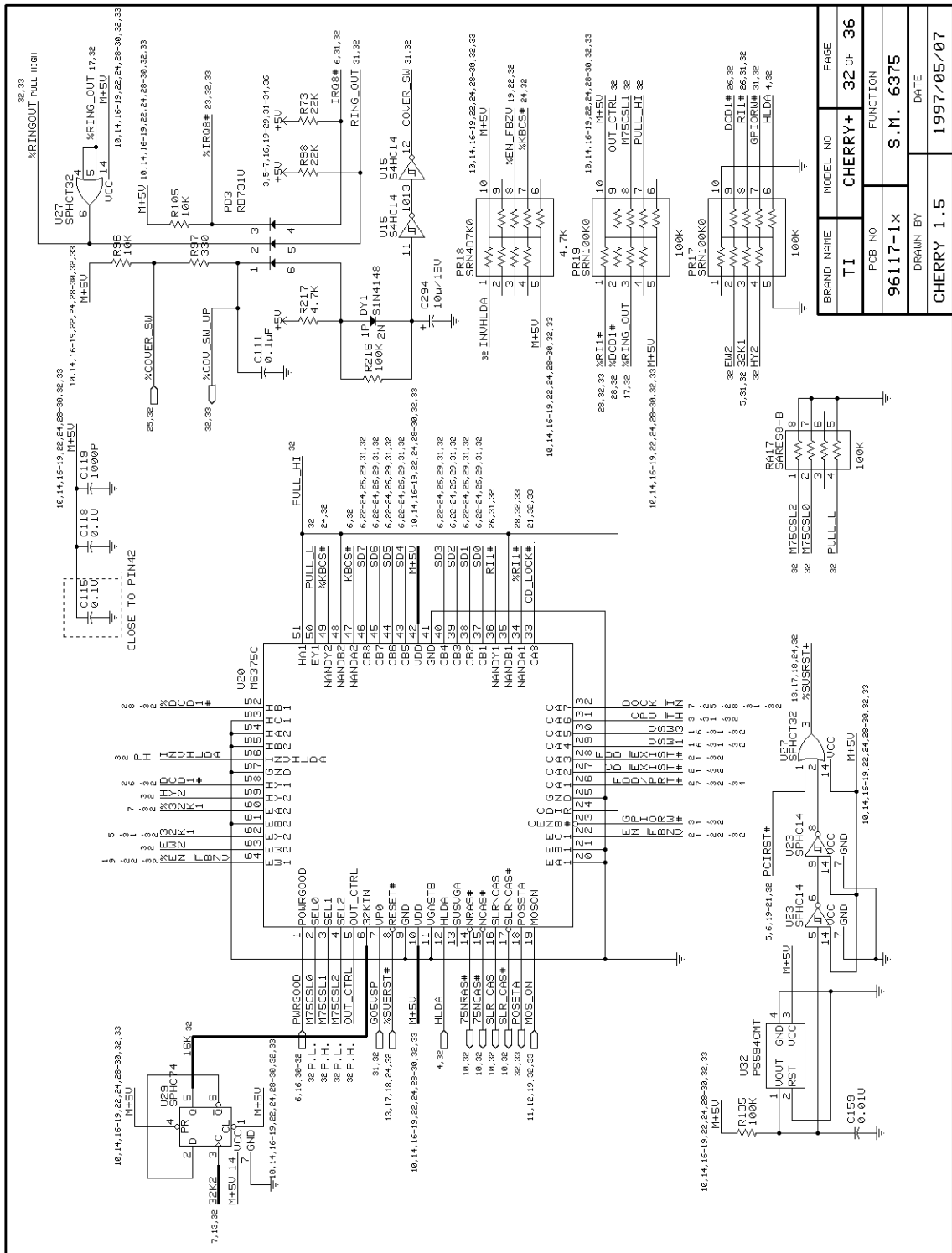*Figure A- 33   Main Board Logic Diagrams (Sheet 27 of 36)*

Figure A- 34   Main Board Logic Diagrams (Sheet 28 of 36)

Figure A- 35   Main Board Logic Diagrams (Sheet 29 of 36)

Figure A- 36   Main Board Logic Diagrams (Sheet 30 of 36)
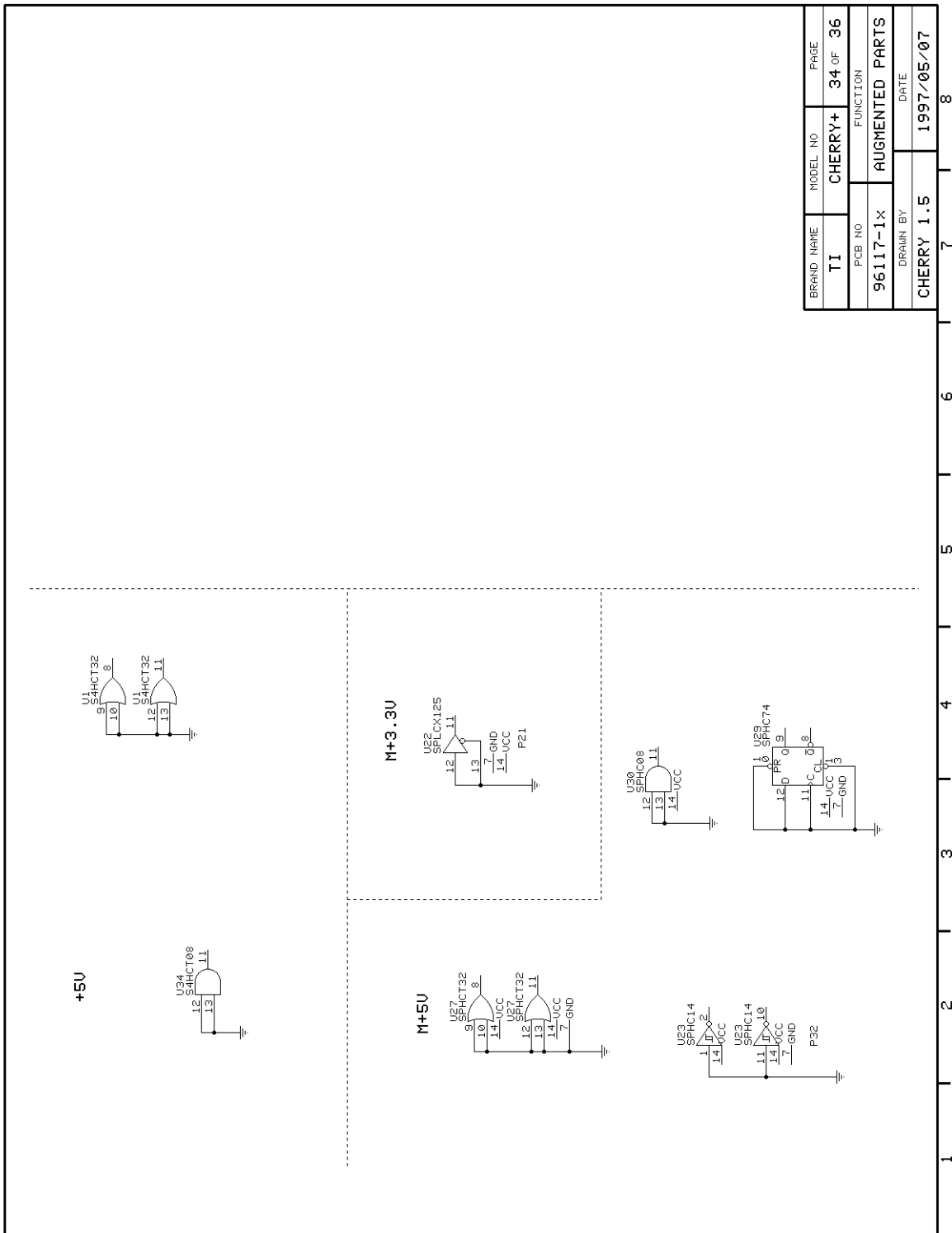
Figure A- 37   Main Board Logic Diagrams (Sheet 31 of 36)

Figure A- 38   Main Board Logic Diagrams (Sheet 32 of 36)

Figure A- 39   Main Board Logic Diagrams (Sheet 33 of 36)

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PAGE 34 OF 36
PCB NO 96117-1x
FUNCTION AUGMENTED PARTS
DRAWN BY CHERRY 1.5
DATE 1997/05/07
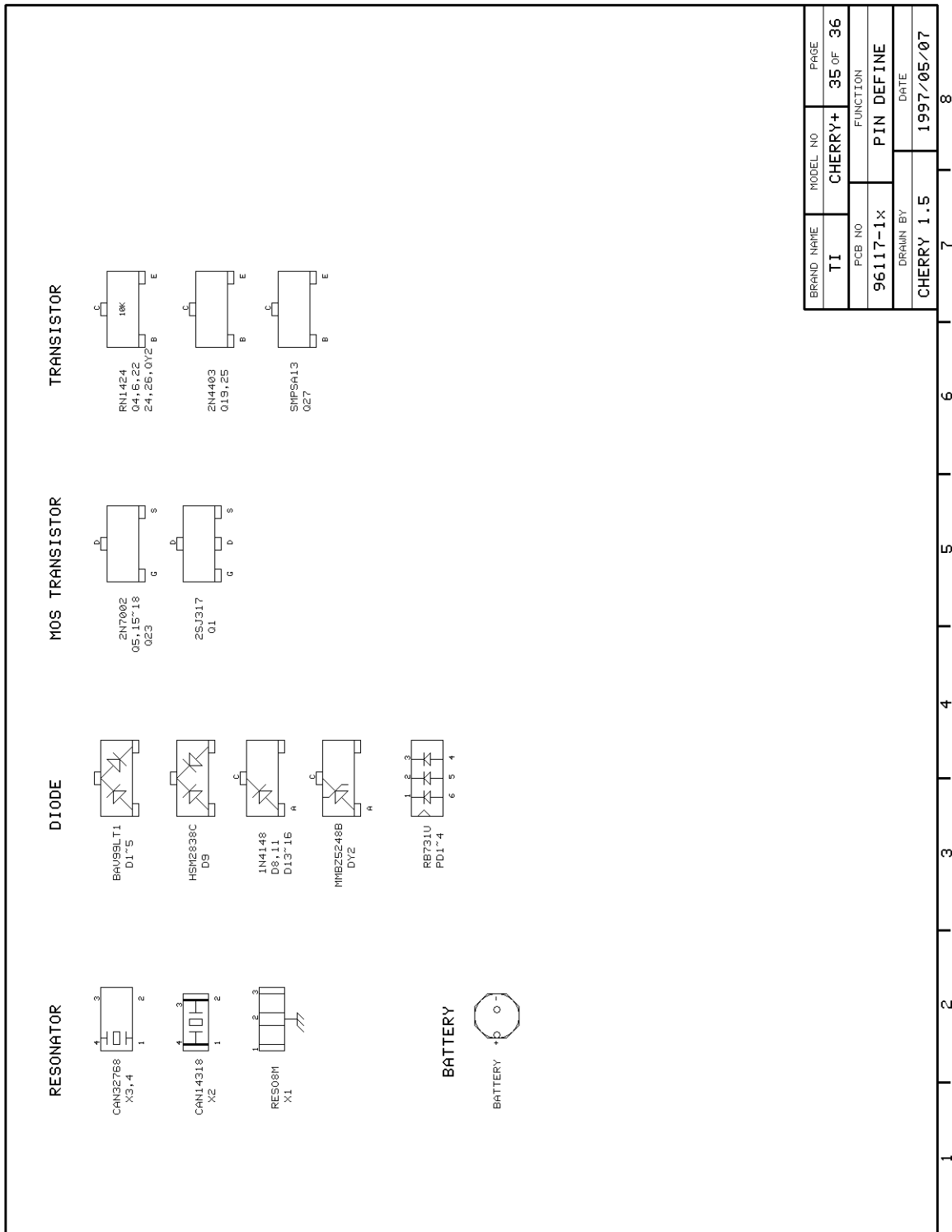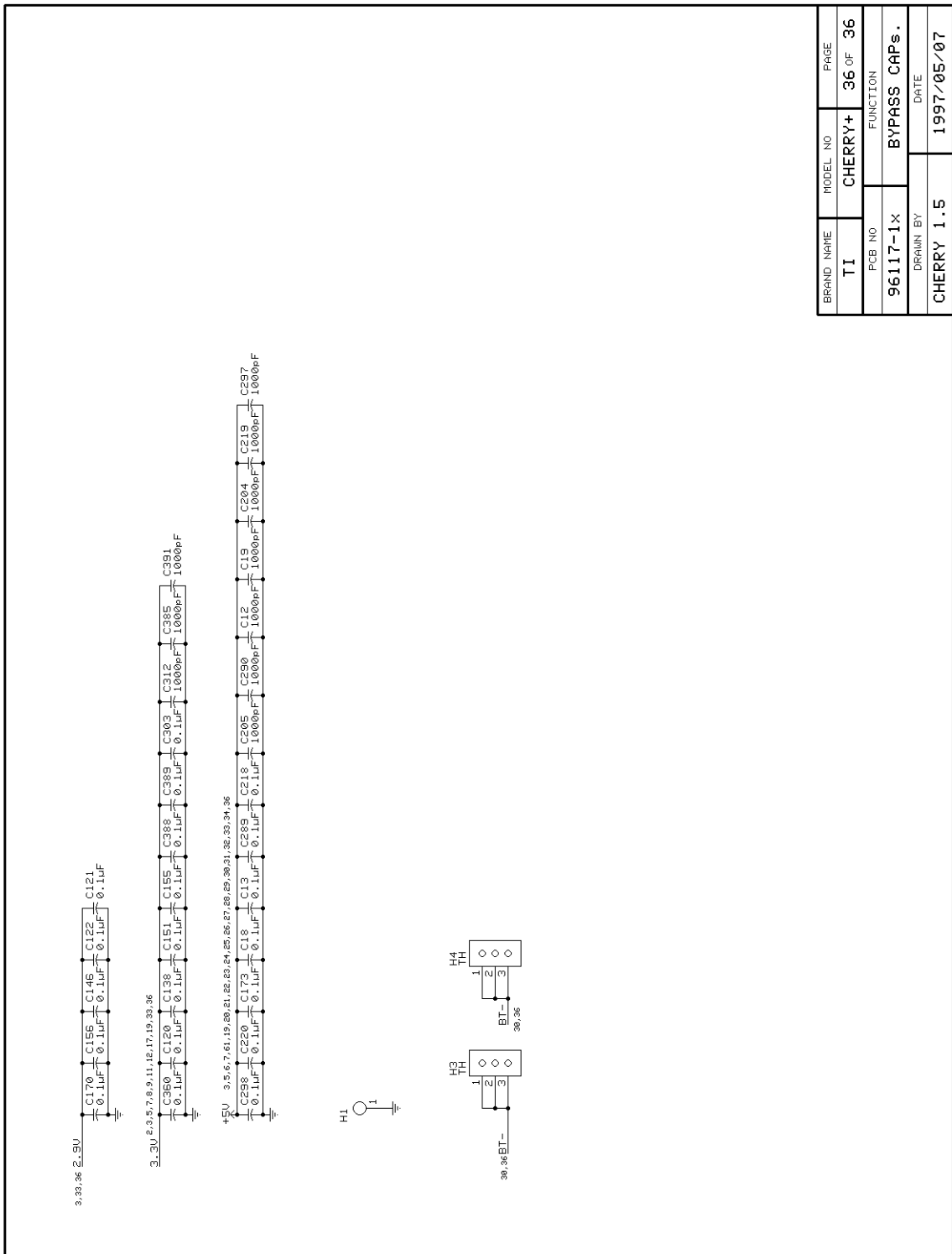
Figure A- 40   Main Board Logic Diagrams (Sheet 34 of 36)
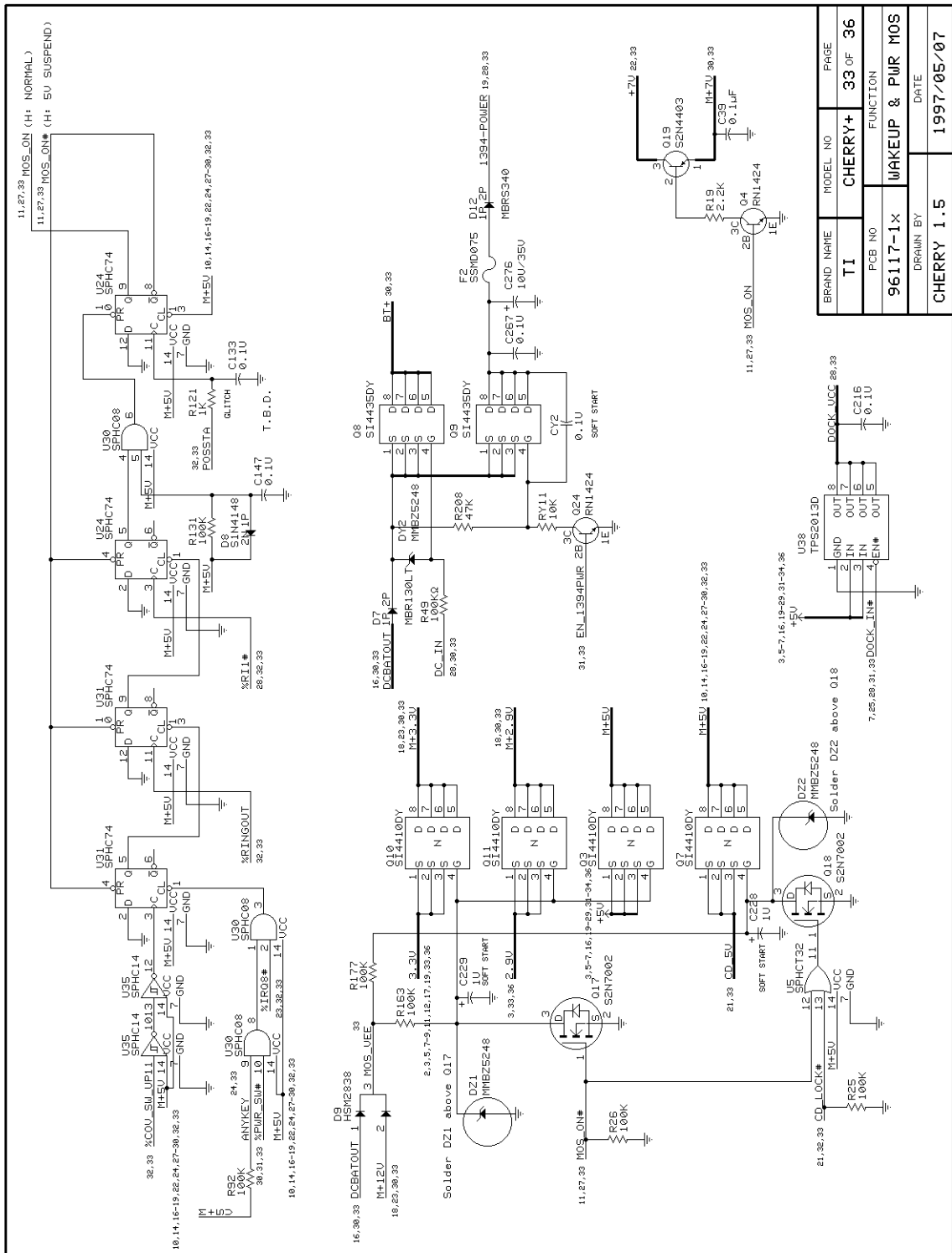
BRAND NAME	MODEL NO	PAGE
TI	CHERRY+	35 OF 36
PCB NO	FUNCTION	
96117-1x	PIN DEFINE	
DRAWN BY	DATE	
CHERRY 1.5	1997/05/07	

TRANSISTOR

RN1424
Q4,6,22
24,26,QY2

2N4403
Q19,25

SMPSA13
Q27

MOS TRANSISTOR

2N7002
Q5,15~18
Q23

2SJ317
Q1

DIODE

BAV99LT1
D1~5

HSM2838C
D9

1N4148
D8,11
D13~16

MMBZ5248B
DY2

RB731U
PD1~4

RESONATOR

CAN32768
X3,4

CAN14318
X2

RESO8M
X1

BATTERY

BATTERY

Figure A- 41   Main Board Logic Diagrams (Sheet 35 of 36)

Figure A- 42   Main Board Logic Diagrams (Sheet 36 of 36)