
User's Manual

LS486/L486 CPU Card

18555C

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- * Increase the separation between the equipment and receiver.
- * Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- * Consult the dealer or an experienced radio/TV technician for help.

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Changes or modifications not expressly approved by Texas Microsystems could void the user's authority to operate the equipment.

Preface

Texas Micro's Model LS486 CPU Card features multi-function I/O control, including IDE and floppy drive control and an on-board SCSI controller, plus 2 serial ports, 1 parallel port and an on-board header for connecting a VGA daughter board. The LS486 is functionally equivalent to the IBM/AT computer and can be inserted into a passive backplane configured in accordance with the IBM/AT Bus standard. Features of the LS486 include:

- On-board 80486SX-33 QFP processor
- Support for 80486 DX/DXII PGA processors
- Up to 32 MBytes of DRAM supported using SIMM modules
- 128 KBytes of flash Memory
- Auxiliary boot ROM (in instances of Flash programming error or failure)
- IDE (Integrated Device Electronics) hard drive controller
- Floppy drive controller
- SCSI (Small Computer System Interface) drive controller
- One (1) IBM PC/AT-compatible RS232 serial port
- One (1) RS232 or RS422, 485 (selectable) serial port
- One (1) parallel port with bi-directional transfer capability
- On-board headers for VGA daughter board connection

Note: The L486 version of this board does not contain an on-board SCSI controller.

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HOW TO USE THIS MANUAL

Thank you for purchasing Texas Micro's LS486 CPU Card.

Your LS486 User's Manual is designed to provide easy access to information you need to operate the LS486 CPU Card. It's also designed to accommodate all levels of users - from the novice to the experienced professional.

The LS486 is configured for operation at the Texas Micro factory. When you receive your LS486, it's ready to be installed and used. This manual will guide you step-by-step through the procedures required to operate the LS486.

INEXPERIENCED USERS

Computer novices should use this manual as a training and reference tool as well as an installation/operation guide. Begin by reading Chapter 1, *Getting Started*. This chapter will describe the LS486 and its components. It will also provide information necessary to verify the LS486's hardware configuration. Continue with Chapters 2, *LS486 Installation*, and 3, *Connecting Peripherals*. By completing the steps outlined in Chapters 1, 2 and 3, you will have prepared the LS486 for operation. Proceed with Chapter 4, *Power-up*.

Power-up will tell you what happens when power is introduced to the LS486 and will guide you to Chapter 5, *Using the Setup Utility*, which will tell you how to verify the LS486's configuration. After you complete this chapter, you will be ready to place the LS486 into operation. Later, you may decide that you need extra memory. Chapter 6, *Memory Configuration*, provides information.

Finally, Chapter 7, *General Maintenance*, provides guidelines for returning Texas Micro products for service or repair. If you have any questions, call our Technical Support Department (see page 3).

ADVANCED USERS

The LS486 User's Manual provides a "quickstart" path for advanced users. Read the *QuickStart* segment following Chapter 4. The *QuickStart* segment will give a short outline of the installation and startup procedure. It will direct you to check switch and jumper settings as well as the LS486 Setup Utility configuration. Appropriate chapters will be referenced.

Once you've verified the hardware configuration, installed the board, introduced power to the LS486 and checked the Setup Utility, you can place the LS486 into full operation. Then, you can use the manual as a reference guide.

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This section is designed to provide the novice with enough information to verify the configuration of the LS486 and prepare the board for installation and operation. Advanced users should skip to the *Quickstart for Advanced Users* segment immediately following Chapter 4.

Let's begin by describing some of the LS486's main components. Figure 1 is an overall view of the LS486.

1.1 LS486 Components

The LS486 contains the components normally found on a plug-in CPU card: a microprocessor, “headers” and “connectors,” a “dip switch” block, “jumper” blocks, “SIMM” sockets, etc. Figure 1 provides the location of these components.

The **microprocessor** is the “brain” of the LS486, where basic arithmetic, logic and control functions are processed. The LS486 supports a 33-66 MHz 486DX/DX2 microprocessor.

Headers (also called “header/connector”) are components used to connect peripherals (via connecting cables) to the LS486. For example, locate the “IDE Hard Drive” header on the LS486 (see Figure 1). This header serves as a hard drive controller; you would use an appropriate cable to connect an IDE hard drive to this header. Other headers located on the LS486 include:

- a SCSI hard drive controller header (not included on the L486 CPU Card)
- a floppy drive controller header
- a serial port header (also called “UART 2”) used to connect serial devices (monitor, mouse, etc.) to the LS486
- two keyboard headers

Connectors are also used to connect external components to the LS486, but, unlike headers, connectors are located on the I/O bracket at the end of the LS486 board (which will make them accessible when you install the board, as we will discuss later). These include a serial port connector (“UART 1”) and a parallel port connector.

The LS486 **dip switch block**, known as SW1, is located at the top of the board. It contains four (4) small dip switches, each of which controls a different function. These switches are discussed in detail in Section 1.2.1.

Jumper blocks (labeled “JP” in Figure 1) are small electronic components that contain pins, or small electronic leads, some of which are connected via “jumpers.” These jumper blocks control certain hardware options on the CPU Card. We’ll also discuss jumper blocks in Section 1.2.2.

SIMM (Single Inline Memory Module) sockets are located on the left side of the LS486 Board. SIMM’s are “sticks” of DRAM (**D**ynamic **R**andom **A**ccess **M**emory) that can be inserted into these sockets, providing extra memory. SIMM’s are discussed at length in Chapter 6.

1.2 Before You Install the LS486

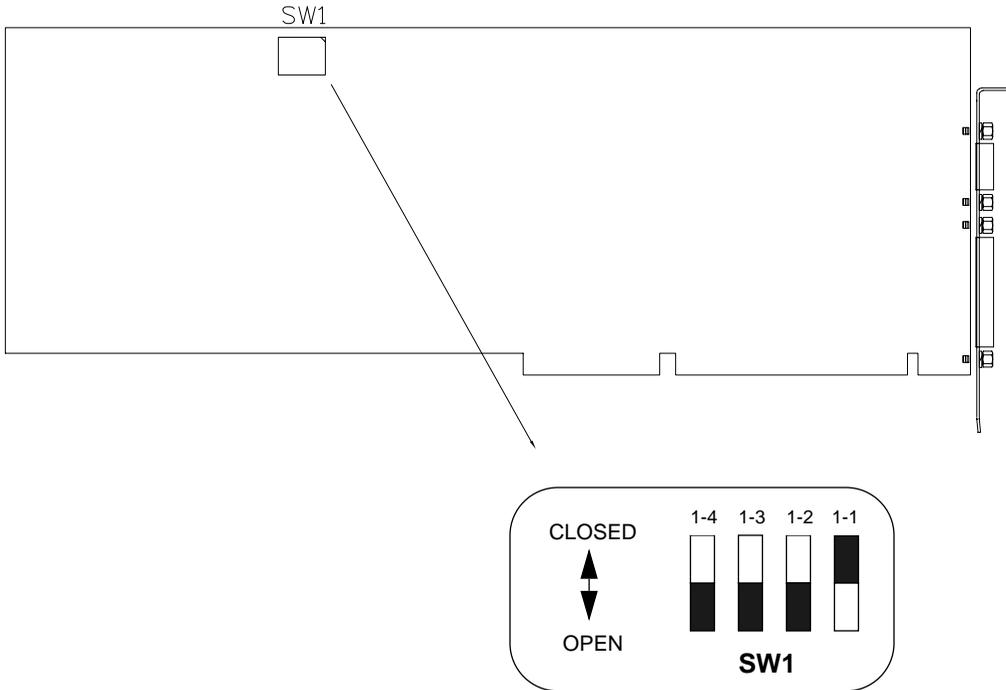
Now that you’re familiar with some key LS486 components, let’s discuss those components you’ll need to check before you install your LS486.

First, it is important to protect yourself and your equipment before you perform any of the following procedures. **Never touch the LS486 while it is installed in the chassis and power is ON.** You should check the LS486 configuration before you install the board. However, if the LS486 is already installed in your system, remove power by turning all power switches OFF and disconnecting all power cords from their power sources. Follow all safety precautions outlined by the chassis manufacturer. **Only qualified, experienced electronics personnel should access the unit’s interior.** Also, **do not touch the LS486 unless you are wearing a static-dissipative device such as a grounding wrist strap.** Static electricity can damage sensitive LS486 components.

Before you install the LS486, check the dip switch and jumper settings outlined in Sections 1.2.1 and 1.2.2. Pay particular attention to the dip switch settings; the jumpers are preconfigured at the factory and are appropriate for most applications. Memory SIMM’s are also installed at the factory.

1.2.1 Checking the Dip Switch Settings

Locate Switch Block SW1, the four-switch block positioned at the top of the LS486 board. Note that these switches are numbered, from right to left, one (1) through four (4). Thus, the switch on the far right side of the block is SW1, position 1, or SW1-1.



SW1-1 is used to set the default monitor type. When SW1-1 is **CLOSED**, the LS486 is configured to run with a **color** monitor. When it is **OPEN**, SW1-1 is set to the **monochrome** monitor position. **The LS486 is shipped with this switch CLOSED.** If you're using a **color** monitor, be sure that SW1-1 is **CLOSED**. If you're using a monochrome monitor, **OPEN** this switch (of course, make sure that no power is being fed to the LS486 before you touch the switch).

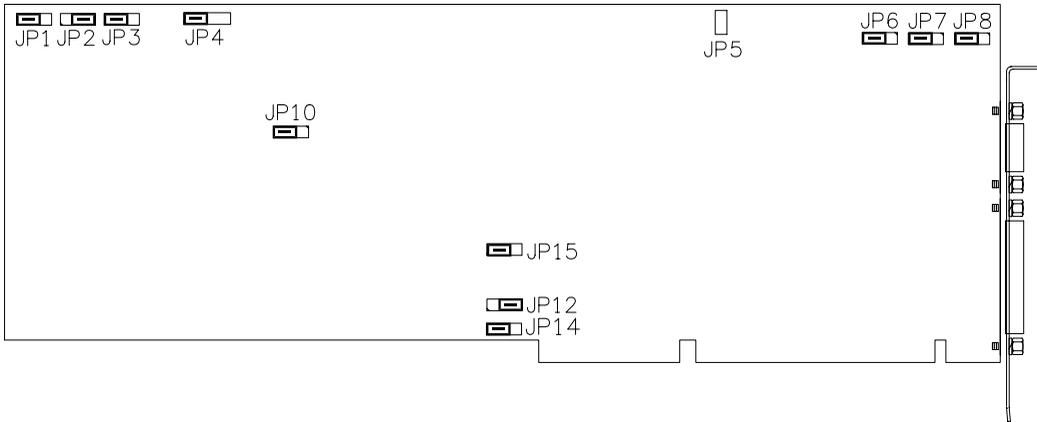
SW1-2 controls the on-board ROM access. If you OPEN this switch, the Flash memory is enabled and the auxiliary ROM is disabled. If this switch is CLOSED, the auxiliary ROM is enabled, and the Flash memory is disabled. **The LS486 is shipped with this switch OPEN.**

SW1-3 is used in special cases when the CMOS RAM (Complementary Metallic Oxide Semiconductor Random Access Memory) becomes corrupted. This condition is usually accompanied by a “lock-up” of the system. The factory default values for LS486 operation must then be reloaded into CMOS RAM. Under normal conditions, **SW1-3 should remain in the OPEN position.** However, when factory default values must be reloaded, see Section 5.3 for proper procedures.

SW1-4 controls the configuration register I/O address. OPEN this switch to set the I/O address to 270H. CLOSE this switch to set the I/O address to 370H. **The default for this switch is OPEN, selecting I/O address 270H.**

1.2.2 Checking the Jumper Block Settings

As discussed earlier, jumper blocks are small components containing electronic leads (called pins) sometimes connected by jumpers (small conductors). These blocks have specific functions that are affected by the presence and position of a jumper within the block. Locations of these blocks are shown in the figure below.

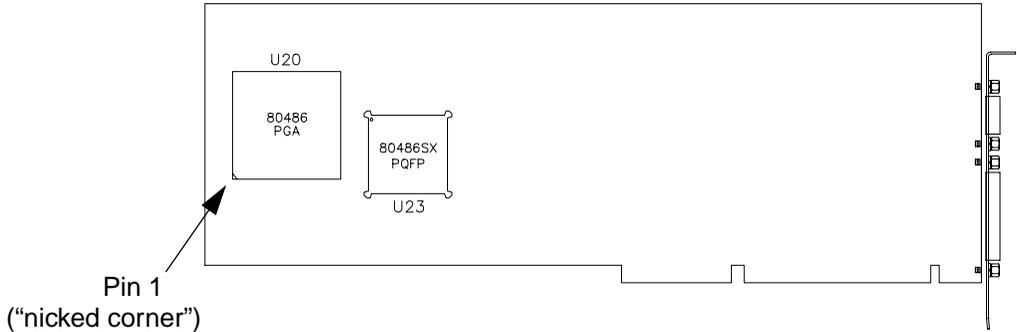


Note: While you are facing the board, Pin 1 is on the far left for Jumper Blocks JP1, JP2, JP3, JP4, JP12, JP14, and JP15. Pin 1 is on the far right for JP6, JP7, JP8, and JP10. Pin 1 is the top pin for JP5.

The following paragraphs provide more information about these jumper blocks. If, after reading the descriptions, you want to change the default jumper settings, do so with caution. **Only experienced electronics personnel should attempt to change these jumper settings. Make sure that no power is being fed to the LS486 and that you are wearing a grounding wrist strap or other static-dissipative device.** If you have questions, call Texas Micro's Technical Support Department (see page 3).

Jumper Block JP5 (located at the top of the board) is a two-pin header that provides output for connecting a light-emitting diode (LED) to indicate hard drive activity. Pin 1 (the top pin) of this block is the anode (the positive electrode); Pin 2 is the cathode.

Jumper Block JP10, a three-pin strip, is used to select the processor type. The LS486 is equipped with an on-board 80486SX PQFP processor, installed at location U23. However, an optional PGA processor can be installed in the U20 location illustrated below.



If you are using the on-board 80486SX PQFP processor, Pin 2 of JP10 should be jumpered to Pin 3. This is the factory default. However, if you are using an optional PGA processor installed in U20, Pin 1 should be jumpered to Pin 2.

Note: When installing a PGA processor, respect the orientation of Pin 1 (lower left corner) and use a heatsink. Ensure that all power has been removed. Only qualified personnel should install this chip.

If you are using an optional PGA processor, Jumper Blocks JP1, JP2 and JP3 are used to configure the LS486 to use the type of PGA processor installed in U20.

	<u>JP1</u>	<u>JP2</u>	<u>JP3</u>
486DX PGA	1-2	2-3	1-2
486SX PGA	2-3	1-2	2-3
487SX PGA	1-2	1-2	1-2

The factory default for these jumper blocks is the setting for the 486DX PGA processor.

Note: User installation of a 486DX, 486DX2 or 487SX processor could void the LS486/L486 warranty. Please contact Texas Micro's Technical Support department for information on upgrading.

Jumper Block JP4, a four-pin single-row block, allows you to select the type of backup battery source employed by the LS486. By jumpering Pin 1 to Pin 2, you select the LS486 on-board battery, which is capable of saving CMOS RAM contents and maintaining time of day for approximately 100,000 hours. If an external battery is to be used, it should be plugged onto JP4 such that the “positive” wire connects to Pin 1 and the “ground” wire connects to Pin 4. *Note: some external batteries come with a “plug” in Pin 2 (next to the “positive” wire) of the connector. This plug must be removed for use with a TMI CPU board.* **The factory default is Pin 1 jumpered to Pin 2, on-board battery enabled.** *NOTE: Battery voltage should be between 3.0 and 3.5 volts, with a 7.5 uA current drain at 3.5 volts.*

Jumper Blocks JP6, JP7, and JP8 are three-pin blocks used to select the configuration of UART2, the 10-pin header located at the top right corner of the board. Jumpering Pins 2 and 3 of these three blocks will configure UART2 for RS232 operation, while jumpering Pins 1 and 2 of these blocks will select RS485/422 operation. **The default is Pins 2 to 3 jumpered, RS232 operation.**

Jumper Blocks JP12 and JP14 control configuration and operation of the watchdog timer. The watchdog timer, when enabled, will automatically reset the processor if no bus activity is detected for a certain period of time. The watchdog timer is enabled by jumpering Pins 1 and 2 of JP12. Jumpering Pins 2 and 3 of JP12 will disable the watchdog timer. **The factory default of JP12 is Pins 2 and 3 jumpered, watchdog timer disabled.**

The watchdog timer reset time period is set by configuring JP14 according to the following:

JP14 - Pin 1 jumpered to Pin 2	1.2 seconds (default)
JP14 - Pin 2 jumpered to Pin 3	150ms
JP14 - No jumper	600ms

Jumper Block JP15 indicates the presence of the on-board SCSI controller. Jumpering Pins 1-2 indicates that the SCSI controller is present (LS486 board). Jumpering Pins 2-3 indicates that no SCSI controller is on board (L486 board). *This jumper block is preset at the factory and should remain in the factory default position.*

Once you have checked all switches and jumper blocks to ensure they match the desired configuration, you're ready to install the LS486 into an AT-compatible chassis backplane. However, before installing the LS486 Card, consult the documentation provided with the chassis. Installation instructions should be followed precisely.

CAUTION: *Always remove power from the system before installing the LS486. Follow all power-down procedures outlined in the chassis' user's manual. To ensure no injury occurs, disconnect the power cord from the power source. Only qualified, experienced electronics personnel should access the interior of a chassis.*

CAUTION: *The components of the LS486 Card are very sensitive to static discharge. Therefore, Texas Micro recommends using a grounding wrist strap to remove all static electricity before touching the components. While out of the unit, LS486 components should be placed on a static-dissipative surface or into a static-shielding bag.*

The procedure for installing the LS486 into a Texas Micro chassis is described below.

1. Remove power from the chassis and disconnect all power cords. Follow all power-down procedures outlined in your chassis' user's guide.
2. Remove the chassis cover, then detach the circuit card hold-down bracket. This bracket stretches across the tops of the circuit cards and holds them in place.
3. Locate the desired bus location for installation (user's choice, although it is suggested that a location providing maximum distance between boards is chosen to allow proper ventilation).
4. Remove the I/O bracket spacer from the rear of the chassis. This spacer occupies the area where the card's I/O bracket is accessed through the back of the chassis.
5. Attach the internal keyboard cable to the LS486. If you have purchased the video daughter board, you should install it and attach the video cable to it at this point.
6. Place the board ends into the appropriate card guide and card-end slot in the chassis. Lower the LS486 into position and carefully push the card-edge connector into the slot. Ensure that the I/O bracket is accessible through the back of the chassis.
7. Secure the card-edge I/O bracket to the hold-down lip.
8. Attach any required cables
9. After installing the LS486 and any other add-in cards desired, secure all PC boards by appropriately positioning the card hold-down bracket and securing it into place with the hardware provided for this purpose.

To install the LS486 into a passive backplane not manufactured by Texas Micro, follow the instructions provided in this manual and the installation information provided by the backplane manufacturer.

Note: If installing a Texas Micro CPU in a non-TMI chassis, be sure that the keyboard is correctly wired (connector J7). Refer to page 28 for the pinout of the keyboard connector.

Connecting Peripherals

The LS486 provides several headers/connectors for attaching peripheral devices to the board:

- Two (2) serial ports
- One (1) parallel port
- Two keyboard interface header/connectors
- An IDE hard drive header/connector
- A SCSI hard drive header/connector (not available on the L486 Card)
- A floppy drive header/connector
- An SVGA daughter board header/connector

This chapter supplies information and locations for each of these components. Pinouts of each connector are also included. A pinout identifies the function of each pin of a connector. Please note that, while this information is valuable to electronics personnel, it is not crucial to the everyday operation of the LS486. As long as the proper cable is used and the connecting plug is properly inserted, a supported peripheral should be operable when used with the LS486.

Please note the following cautions when connecting peripherals to the LS486 CPU.

CAUTION: Always remove power from the system before connecting peripherals to the LS486. To ensure no personal injury occurs, disconnect the power cord from the power source. **Only qualified, experienced electronics personnel should access the interior of a chassis.**

CAUTION: The components of the LS486 Card are very sensitive to static discharge. Therefore, Texas Micro recommends using a grounding wrist strap to remove all static electricity before touching the components. While out of the unit, LS486 components should be placed on a static-dissipative surface or into a static-shielding bag.

3.1 Serial Ports

Let's begin with the two serial ports. Serial ports allow you to connect serial devices (a serial mouse, serial printers, etc.) to the LS486 via appropriate serial cables. Serial ports are also known as UART (Universal Asynchronous Receiver/Transmitter) ports.

Note that one serial port (UART 1), labeled J5 on the CPU card, is located on the edge of the card (on the I/O bracket; see Figure 2). This means that you can access UART 1 through the back of the chassis after the LS486 is installed. UART 1 is an **RS232-only** connector.

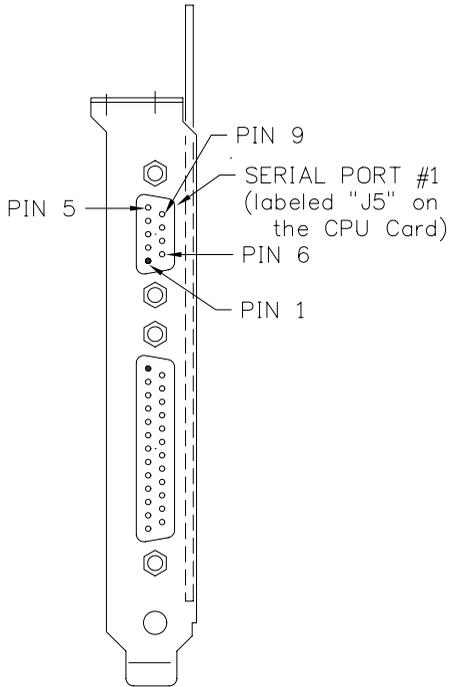
The other serial port (UART 2), labeled J4 in Figure 3, is located on the card's front surface. Accessing this port requires removal of the chassis cover. Consult your chassis documentation for procedures on removing the chassis cover, **but remember to remove power from the system and unplug the power cord before you access the interior of the chassis. Most importantly, only qualified, experienced electronics personnel should access the interior of a chassis.**

UART 2 can be configured as an **RS232 or an RS422/485** serial port via Jumper Blocks JP8, JP9 and JP10 (see Section 1.2.2). **The factory default is RS232.** Be sure to use the proper cable when connecting a serial device to the LS486 (9-pin DB9 interface connector - Part No. SCF1).

The graphic shown in Figure 2 describes the proper pin assignments when wiring a 25-pin connector to a 9-pin connector. If you have any questions about this procedure, call Texas Micro's Technical Support Department (see page 3).

More information about serial ports can be found in Section 5.2.2.

FIGURE 2



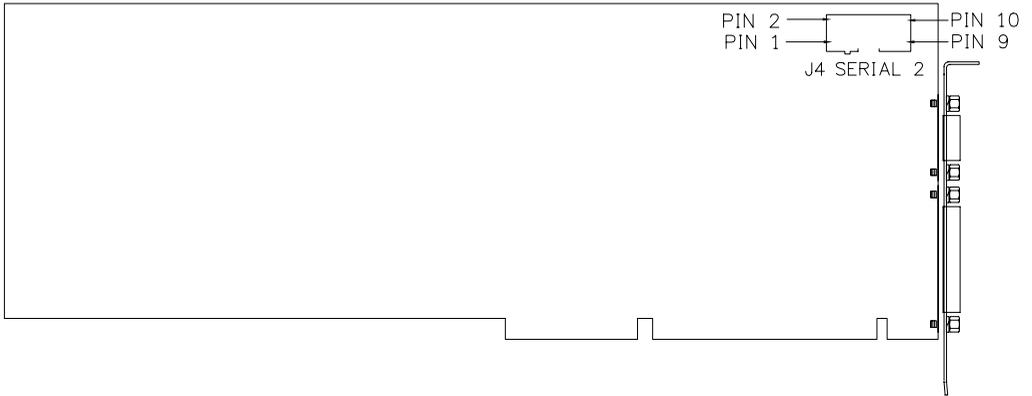
Pin Number	Description (RS232)
1	DCD (Data Carrier Detect)
2	RXD (Receive Data)
3	TXD (Transmit Data)
4	DTR (Data Terminal Ready)
5	GND (Signal Ground)
6	DSR (Data Set Ready)
7	RTS (Request To Send)
8	CTS (Clear To Send)
9	RI (Ring Indicator)

To wire a 25-pin connector to a 9-pin connector, use the following table:

DB9 Pin	DB25 Pin	Description
1	8	DCD (Data Carrier Detect)
2	3	RXD (Receive Data)
3	2	TXD (Transmit Data)
4	20	DTR (Data Terminal Ready)
5	7	GND (Signal Ground)
6	6	DSR (Data Set Ready)
7	4	RTS (Request To Send)
8	5	CTS (Clear To Send)
9	22	RI (Ring Indicator)

Serial Ports

FIGURE 3



RS232

RS422/485

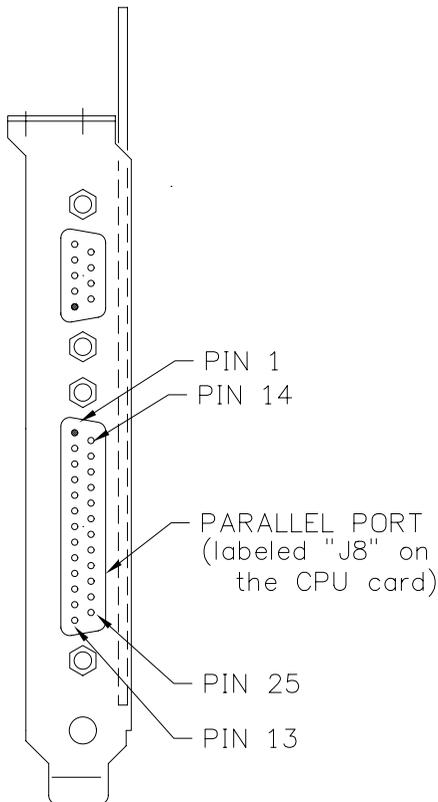
Pin No.	Description	Pin No.	Description
1	DCD (Data Carrier Detect)	1	Transmit -
2	DSR (Data Set Ready)	2	Transmit +
3	RX (Receive Data)	3	Receive +
4	RTS (Request To Send)	4	Not Connected
5	TX (Transmit Data)	5	Not Connected
6	CTS (Clear To Send)	6	Receive -
7	DTR (Data Terminal Ready)	7	Not Connected
8	RI (Ring Indicator)	8	Not Connected
9	GND (Signal Ground)	9	GND (Signal Ground)
10	VCC +5 (not used by RS-232 signaling)	10	VCC +5 (not used by RS-422 signaling)

3.2 Parallel Port

The parallel port (Connector J8 on the CPU card) is normally used for connecting a printer to the LS486. This port is a 25-pin connector located on the right edge of the LS486 (see Figure 4). Connect the printer cable to this port for printer operation (of course, only after removing system power and disconnecting the power cord).

More information on parallel ports and their configuration can be found in Section 5.2.2.

FIGURE 4



Pin Number	Description
1	-Strobe
2	+ Data Bit 0
3	+ Data Bit 1
4	+ Data Bit 2
5	+ Data Bit 3
6	+ Data Bit 4
7	+ Data Bit 5
8	+ Data Bit 6
9	+ Data Bit 7
10	- Acknowledge
11	+ Busy
12	+ Paper End
13	+ Select
14	- Auto Feed
15	- Error
16	- Init. Printer
17	- Select Input
18-25	Ground

3.3 Keyboard Header/Connector

The LS486 also provides an 8-pin shrouded AT-compatible keyboard header/connector at the bottom edge of the card. This pinout of this header is shown in Figure 5.

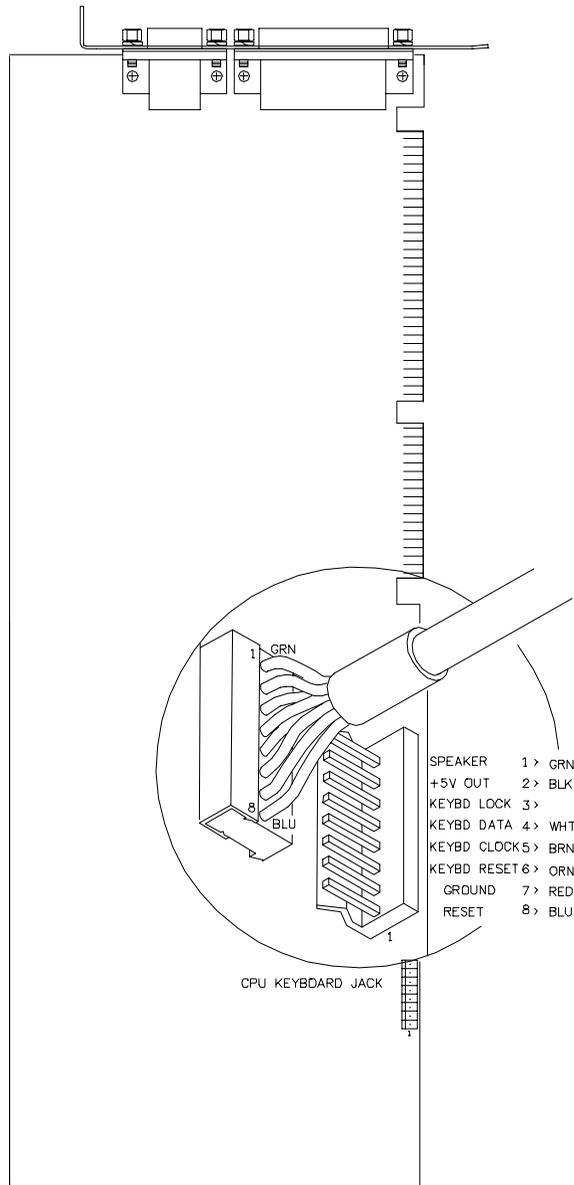
Some connector manufacturers have reverse pin numbers. For the LS486, Pin 1 is on the left (when viewing the chip side of the board with the I/O bracket to the right).

The sockets on the Texas Micro keyboard connector cable are numbered in reverse order when compared to the pinout of the LS486 Keyboard Connector. For example, Socket 8 of the connector cable corresponds with Pin 1 of the LS486 Keyboard Connector, Socket 7 of the cable corresponds with Pin 2 of the connector, etc.

Figure 5 provides proper connection procedures for the keyboard interface cable. Ensure that the pins on the keyboard connector correspond with the pins on the cable connector.

Connecting Peripherals

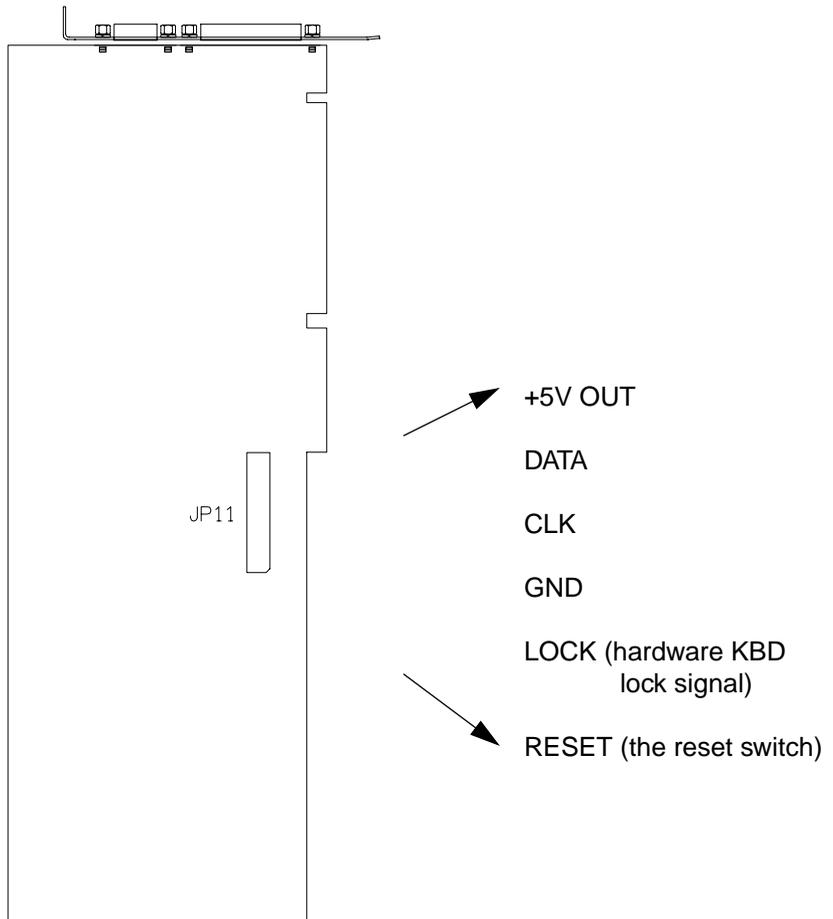
FIGURE 5



Keyboard Header/Connector

A second keyboard connector is available at Connector JP11. This is a non-standard connector; **do not attach a standard keyboard to this connector. Also, do not connect keyboards to this connector and the standard keyboard connector (J7) at the same time.** The pinout of this optional connector is provided below.

FIGURE 6

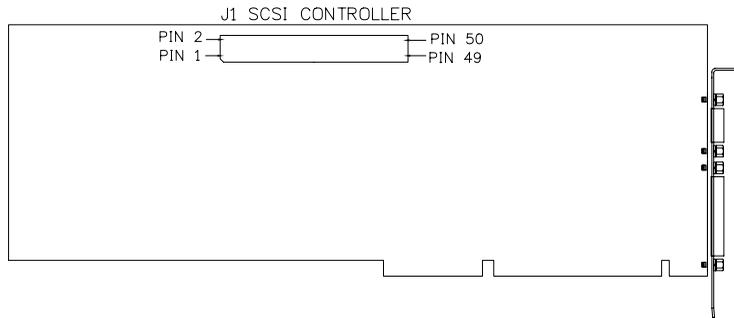


3.5 SCSI Hard Drive Header/Connector

Note: This header is not present on the L486 CPU Card.

Two (2) Small Computer System Interface (SCSI) hard drives can be attached to the LS486 via J1 and a 50-conductor cable. The pinout of J1 is provided in Figure 8. See Section 5.1.3 for more information. *Note: The "red stripe" on the cable must be plugged in so that it is next to Pins 1 and 2. Otherwise, the CPU, cable and/or SCSI drive may be damaged.*

FIGURE 8



Pin	Description	Pin	Description	Pin	Description
1	Ground	18	SCDP	35	Ground
2	SCD0	19	Ground	36	BSY
3	Ground	20	Ground	37	Ground
4	SCD1	21	Ground	38	ACK
5	Ground	22	Ground	39	Ground
6	SCD2	23	Ground	40	RST
7	Ground	24	Ground	41	Ground
8	SCD3	25	No connection	42	MSG
9	Ground	26	TERMPWR	43	Ground
10	SCD4	27	Ground	44	SEL
11	Ground	28	Ground	45	Ground
12	SCD5	29	Ground	46	C/D
13	Ground	30	Ground	47	Ground
14	SCD6	31	Ground	48	REQ
15	Ground	32	ATN	49	ATN
16	SCD7	33	Ground	50	I/O
		34	Ground		

*Note: SCSI devices are daisy-chained with a cable, and both ends of the cable are terminated. Terminators can be connected to either SCSI devices or SCSI cables. Devices connected to these chains must contain the correct number of terminators for proper operation and to prevent damage. No more than two terminators can exist in a chain of SCSI devices - one at each end of the physical chain. **If more than two SCSI devices are connected in a SCSI daisy chain, the middle device(s) in the control cable must have the terminator resistor packs removed.** On the LS486, these three (3) resistor packs are located just below the SCSI connector. A fuse for providing power to external terminating resistors is located at F1 on the LS486.*

3.6 Floppy Drive Header/Connector

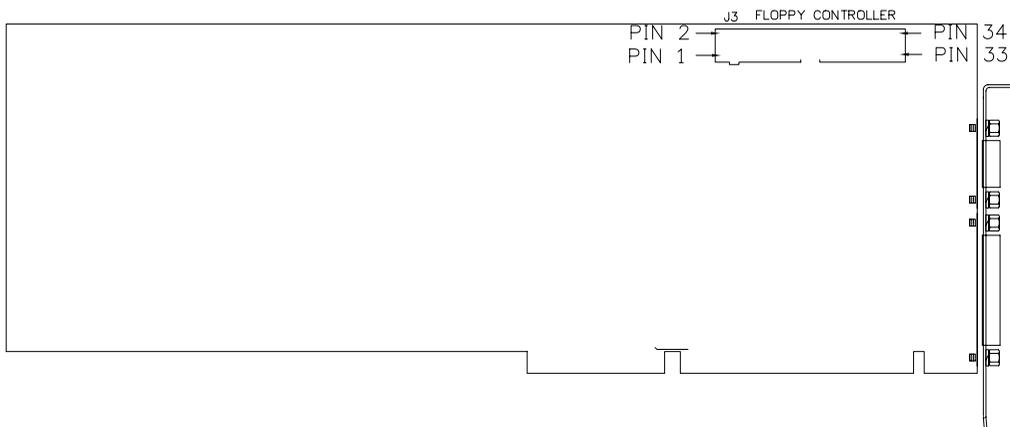
Two floppy disk drives can be attached to the LS486 at J3 with a 34-conductor flat cable no more than three (3) feet in length. Two connectors are spaced the desired distance at the drive end of the cable, with Conductors 10 through 16 separated from the remainder of the cable and twisted 180° between the two drive connectors.

The two installed drives may be any combination of 360 KByte and 1.2 MByte 5.25" drives or 720 KByte and 1.44 MByte 3.5" drives. Both drives should be jumper-configured as Drive 1. DOS controls the floppy disk drives; therefore, consult the DOS manual for detailed information on disk operations. Consult Figure 9 for the J3 pinout.

Note: The "red stripe" on the floppy cable should be near Pins 1 and 2. Otherwise, the floppy drive will not work correctly and the CPU and/or floppy drive may be damaged.

Floppy Drive Header/Connector

FIGURE 9

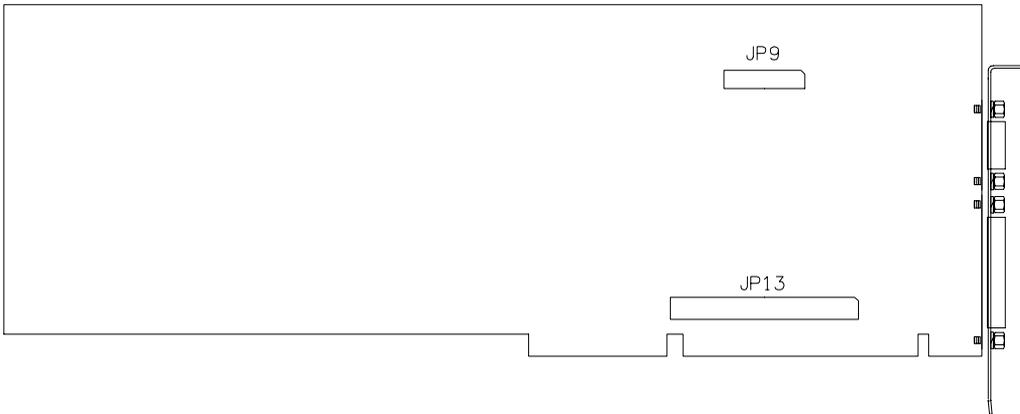


Pin Number	Description	Pin Number	Description
1	Ground	2	Disk speed change, output
3	Ground	4	No connection
5	Ground	6	No connection
7	Ground	8	Index detect, input, active low
9	Ground	10	Motor enable Drive A, output, active low
11	Ground	12	Select Drive B, output, active low
13	Ground	14	Select Drive A, output, active low
15	Ground	16	Motor enable Drive B, output, active low
17	Ground	18	Head step pulse, output, active low
19	Ground	20	Head step pulse, output, active low
21	Ground	22	Write data, output, active low
23	Ground	24	Write gate, output active low
25	Ground	26	Track 0 detect, input, active low
27	Ground	28	Write protect sense, input, active low
29	Ground	30	Read data, input, active high
31	Ground	32	Head select, output
33	Ground	34	Diskette change detect, input, active low

3.7 Video Daughter Board Connectors

The LS486 features two connectors (labeled JP9 and JP13) designated for L386VGA video daughter board connection. Locations of these connectors are provided below in Figure 10. More information about the L386VGA video daughter board can be found in the “L386VGA User’s Manual” provided with the board.

FIGURE 10



After all jumpers and switches have been checked, the LS486 has been installed and all desired peripheral devices have been connected to the board, the LS486 is ready for power-up. However, before you introduce power to the system, ensure that the operating system you will be using is available on either Drive C or a diskette in Drive A.

4.1 BIOS

When you power the system up, the LS486 BIOS (Basic Input Output System, a collection of driver and initialization software stored on the CPU card, will perform checks and diagnostics, then search for an operating system.

4.2 Diagnostics

Upon power-up, the BIOS performs initialization routines, calculating memory size and configuration data to load into CMOS (Complementary Metallic Oxide Semiconductor) memory. The BIOS then performs internal diagnostics to compare the LS486's current physical configuration with the configuration information recorded in CMOS memory during setup. If inconsistencies exist, BIOS error messages are displayed.

Some errors noted during power-up may be quickly corrected by verifying the setup information (see Chapter 5). Errors of greater complexity or a more technical nature may require the aid of trained technical personnel. Contact Texas Micro's Technical Support Department (see page 3). Upon completion of the power-on diagnostics tests, the LS486 loads the operating system from disk or other mass-storage device. However, if CMOS RAM contents are incorrect, the LS486 will prompt you to invoke the Setup Utility (see Chapter 5).

4.3 Rebooting the LS486

If you wish to reboot the LS486, three (3) methods are acceptable:

1. Cycle power off and on.
2. Press <Ctrl-Alt-Del>.
3. Depress the system's reset switch.

Using any of these methods to reboot the LS486 will result in system memory data loss. Therefore, it is suggested that, where possible, all processing be completed before reboot.

Next, you need to check all the configuration settings for the board before you begin using it. Turn to Chapter 5 for information on the LS486 Setup Utility.

QuickStart for Advanced Users

This segment of the manual provides a “quickstart” feature for advanced computer users. Included are procedures for:

- checking dip switch default settings
- checking jumper block default settings
- installing the LS486
- connecting peripherals to the LS486
- powering the system up
- accessing the Setup Utility

To configure the LS486 Board, perform the following:

1. Check dip switch settings.

Locate Switch Block SW1. The following are default settings.

- SW1-1 CLOSED - color monitor
- SW1-2 OPEN - flash ROM access
- SW1-3 OPEN - board uses setup configuration you provide through the Setup Utility (see Chapter 5)
- SW1-4 OPEN - I/O config address 270h

If you want to change any of these settings, see Section 1.2.1.

2. Check jumper defaults.

Locate the LS486 jumper blocks. The defaults for these blocks are as follows:

JP10 - Pin 2 jumpered to Pin 3 - using on-board 80486SX PQFP processor.

JP1, JP2, and JP3 - set for 80486DX PGA chip use (not applicable when on-board 486SX processor selected).

JP1 - Pin 1 jumpered to Pin 2

JP2 - Pin 2 jumpered to Pin 3

JP3 - Pin 1 jumpered to Pin 2

JP4 - Pin 1 jumpered to Pin 2 - on-board battery enabled.

JP6, JP7 and JP8 - Pin 2 jumpered to Pin 3 - UART 2 is RS232.

JP12 - Pin 2 jumpered to Pin 3 - watchdog timer disabled.

JP14 - Pin 1 jumpered to Pin 2 - 1.2 seconds for watchdog timer reset (not applicable with watchdog timer disabled).

If you want to change any of these settings, see Section 1.2.2.

Note: JP15 should remain in the factory default configuration.

3. Install the LS486.

To install the LS486:

- Remove power from the system by turning all power switches OFF and disconnecting the power cord from the power source. Only qualified, experienced electronics personnel should access the interior of a chassis.
- Remove static electricity by wearing a static-dissipative device (such as a grounding wrist strap). Place the board on static-dissipative surfaces ONLY.
- Remove the I/O bracket spacer from the rear of the chassis.
- Attach the keyboard cable to the CPU card. *Note: If you are using the L486VGA daughter board in conjunction with the LS486, it should be installed now.*
- Carefully lower and push the board into a card slot. Ensure that the I/O bracket is accessible through the back of the chassis.
- Secure the card-edge I/O bracket to the hold-down lip.

4. Attach any required cables to the CPU card.

5. Connect peripherals to the LS486.

Before you connect any peripherals to the LS486, make sure that no power is being applied to the LS486 Board and the peripherals.

CAUTION: Always remove power from the system and peripherals before connecting the peripherals. To ensure no injury occurs, disconnect all power cords from their power sources. Only qualified, experienced electronics personnel should access the interior of a chassis.

CAUTION: The components of the LS486 Card are very sensitive to static discharge. Therefore, Texas Micro recommends using a grounding wrist strap to remove all static electricity before touching the components. While out of the unit, the components should be placed on a static-dissipative surface or into a static-shielding bag.

Consult Chapter 3 for connector locations and pinouts.

6. Power the system up.

The BIOS will perform power-on checks, operate diagnostics and invoke the internal setup routine. It will then direct the media device to search for and load the operating system.

7. Access the Setup Utility.

The Setup Utility is a set of commands stored on the CPU card and used to set the computer time, date and configuration data. Configurable fields are stored in CMOS RAM. To access the Setup Utility, press <Ctrl-Alt-S> during the memory test at power-up.

Scan Chapter 5, *Using the Setup Utility*, paying particular attention to the “Basic Options” Menu, which is the first menu displayed when the Setup Utility is accessed. Using <UP ARROW> and <DOWN ARROW>, scroll through the Basic Options fields. If any values need to be changed, press <ENTER> on that field, then use the “hot” keys as described on the bottom line to make appropriate changes.

Note: If you are using a monochrome VGA monitor, press F5 to turn the color off to make the Setup Utility screen easier to read.

After you have configured the options in the Setup Utility, press <ESC> (to save the changes and reboot) to reload your operating system.

Using the Setup Utility

After all switches and jumpers have been checked, the LS486 has been installed, peripherals have been connected and power has been turned on, you are ready to access the LS486 Setup Utility.

The LS486 Setup Utility is a special set of commands that resides on the CPU card and is used to set the computer time, date and configuration data. The Setup Utility can be accessed in two ways:

- By pressing **<CTRL-ALT-DEL>** during memory tests, or
- By pressing **F2** when prompted by the BIOS during the power-up operation. This occurs if the BIOS encounters errors when trying to use the Setup Utility information (if desired, you may press the F1 key to instruct the BIOS to continue its diagnostics checks and attempt to load the operating system).

The LS486 Setup Utility begins by displaying the screen pictured in Figure 11. This screen is comprised of three (3) components:

- Options Menu
- Summary information
- Hot key descriptions

The Options Menu is located on the left side of the screen. This menu contains a list of system parameters you can modify to meet your system requirements. Use the UP/DOWN ARROW keys to move the cursor up and down the list. When the cursor is on the desired item, press the <ENTER> key to modify settings for that specific topic.

The “summary information” area displays current system settings and is located to the right of the Options Menu.

“Hot key” descriptions appear at the bottom of the screen. Press any of these keys to perform its assigned function.

Note: If the BIOS detects the presence of an Adaptec 6360 SCSI controller, the name of the board in all menus and sign-on scripts will be “LS486.” If no SCSI controller is present, the board will be referred to as an “L486.”

FIGURE 11

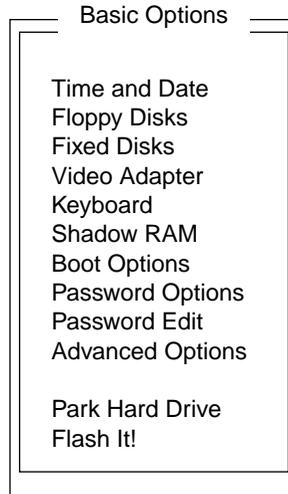
Texas Microsystems, Inc. Setup Utility
Model LS486-SX 33MHz BIOS Version 4.0.1.3

<p style="text-align: center;">Basic Options</p> <p>Time and Date Floppy Disks Fixed Disks Video Adapter Keyboard Shadow RAM Boot Options Password Options Password Edit Advanced Options</p> <p>Park Hard Drive Flash It!</p>	<p>Time 10:18:28 Date..... Aug 30, 1993 Weekday..... Monday</p> <p>Drive A..... 3 1/2 Inch, 1.44 MB Drive B..... Not Installed Hard Disk 1..... SCSI Installed Hard Disk 2..... Not Installed Video Adapter..... VGA/EGA</p> <p>Base Memory 640K Extended Memory 3072K Floating Point Unit Not Present Fast Boot No Boot Drive Sequence Drive A: then C: 101-Keyboard NumLock..... Off Password Protection..... None Boot Errors: Keyboard:..... On Floppy:..... On Video:..... On</p>
--	--

↑ (prev) ↓ (next) F5 (color on/off) Esc (save/reboot)

5.1 Basic Options Menu

Locate the “Basic Options” menu. This list outlines all the parameters you can change through the Setup Utility. This menu is pictured below.



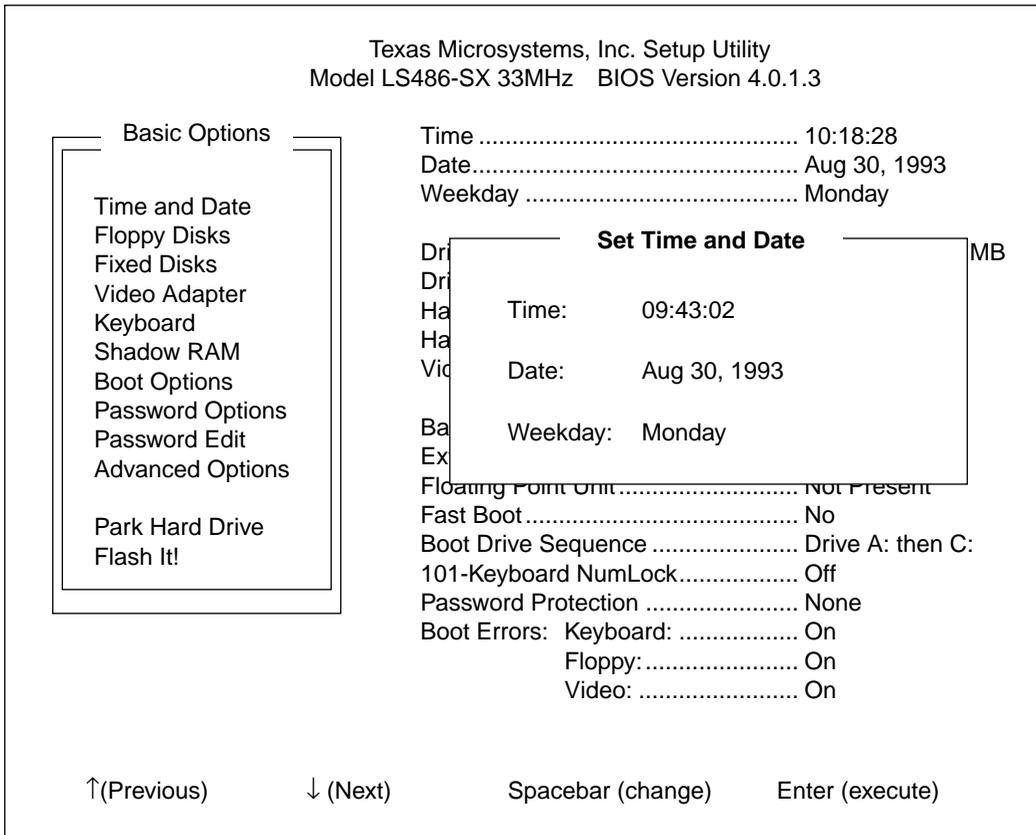
Note the “Advanced Options” item. Choosing this item will cause a new menu of options to be displayed. We’ll discuss this menu in Section 5.2. For now, let’s concentrate on each of the Basic Options menu items. Remember, use the UP/DOWN ARROW keys to highlight an item, then the <ENTER> key to select that item.

Basic Options Menu

5.1.1 Time and Date

This option allows you to set the time and date in the battery-backed clock/calendar, which is used to set the DOS time and date before the operating system is loaded.

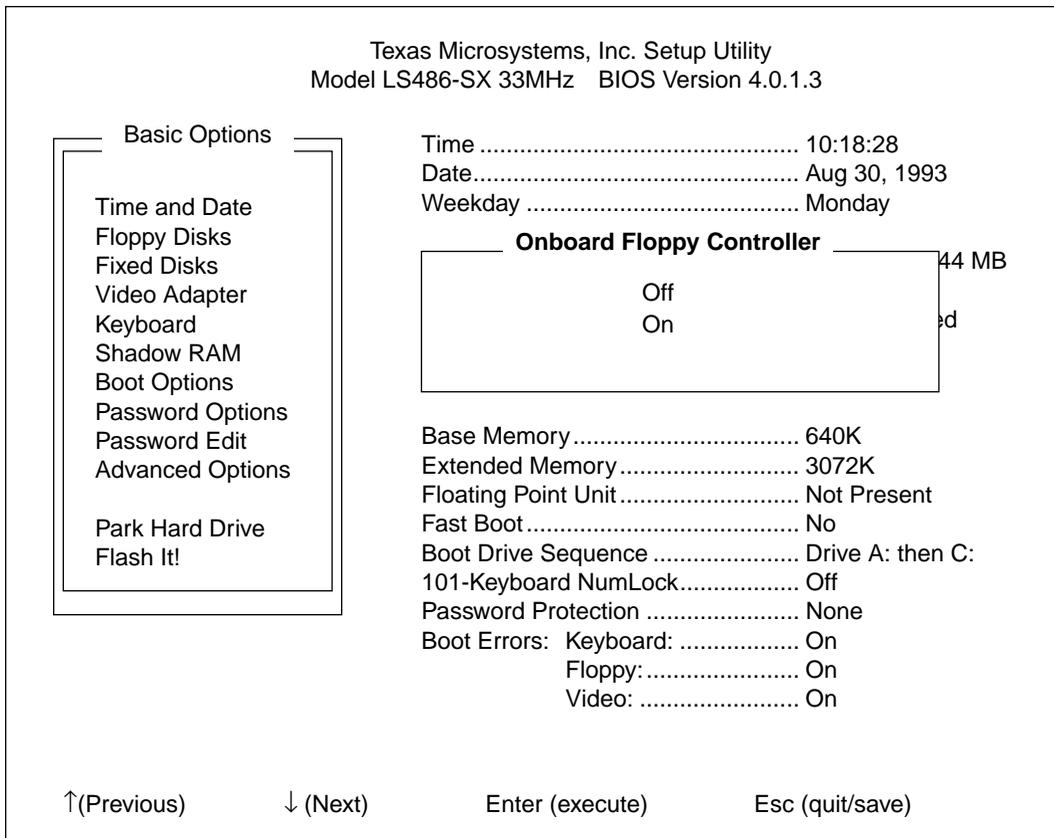
FIGURE 12



5.1.2 Floppy Disks

This feature allows you to configure the floppy drive subsystem. The first menu asks if you want to enable the LS486 on-board controller. In addition, the Setup Utility will request the drive types for floppy drives A: and B:. Finally, you will be asked if you want to enable or disable floppy drive configuration errors. If disabled, this option allows you to run the system without a floppy disk drive.

FIGURE 13 - A



Basic Options Menu

FIGURE 13 - B

Texas Microsystems, Inc. Setup Utility
Model LS486-SX 33MHz BIOS Version 4.0.1.3

<div style="border: 1px solid black; padding: 5px;"><p style="text-align: center;">Basic Options</p><p>Time and Date Floppy Disks Fixed Disks Video Adapter Keyboard Shadow RAM Boot Options Password Options Password Edit Advanced Options</p><p>Park Hard Drive Flash It!</p></div>	<p>Time 10:18:28 Date Aug 30, 1993 Weekday Monday</p> <div style="border: 1px solid black; padding: 5px;"><p style="text-align: center;">Select Drive A: Type</p><p>Not Installed 44 MB 5 1/4 Inch, 360 KB ed 5 1/4 Inch, 1.2 MB 3 1/2 Inch, 720 KB 3 1/2 Inch, 1.44 MB</p></div> <p>Extended Memory.....3072K Floating Point Unit.....Not Present Fast Boot.....No Boot Drive Sequence.....Drive A: then C: 101-Keyboard NumLockOff Password ProtectionNone Boot Errors: Keyboard:On Floppy:On Video:On</p>
--	---

↑(Previous) ↓(Next) Enter (execute) Esc (quit/save)

Using the Setup Utility

FIGURE 13 - C

Texas Microsystems, Inc. Setup Utility
Model LS486-SX 33MHz BIOS Version 4.0.1.3

<p style="text-align: center;">Basic Options</p> <p>Time and Date Floppy Disks Fixed Disks Video Adapter Keyboard Shadow RAM Boot Options Password Options Password Edit Advanced Options</p> <p>Park Hard Drive Flash It!</p>	<p>Time..... 10:18:28 Date..... Aug 30, 1993 Weekday..... Monday</p> <p>Select Drive B: Type</p> <table border="1" style="border-collapse: collapse;"><tr><td>Drive</td><td>Not Installed</td><td>MB</td></tr><tr><td>Hard</td><td>5 1/4 Inch, 360 KB</td><td></td></tr><tr><td>Hard</td><td>5 1/4 Inch, 1.2 MB</td><td></td></tr><tr><td>Video</td><td>3 1/2 Inch, 720 KB</td><td></td></tr><tr><td>Base</td><td>3 1/2 Inch, 1.44 MB</td><td></td></tr></table> <p>Extended Memory 3072K Floating Point Unit Not Present Fast Boot No Boot Drive Sequence..... Drive A: then C: 101-Keyboard NumLock Off Password Protection None Boot Errors: Keyboard:..... On Floppy: On Video: On</p>	Drive	Not Installed	MB	Hard	5 1/4 Inch, 360 KB		Hard	5 1/4 Inch, 1.2 MB		Video	3 1/2 Inch, 720 KB		Base	3 1/2 Inch, 1.44 MB	
Drive	Not Installed	MB														
Hard	5 1/4 Inch, 360 KB															
Hard	5 1/4 Inch, 1.2 MB															
Video	3 1/2 Inch, 720 KB															
Base	3 1/2 Inch, 1.44 MB															

↑(Previous) ↓(Next) Enter (execute) Esc (quit/save)

Basic Options Menu

FIGURE 13 - D

Texas Microsystems, Inc. Setup Utility
Model LS486-SX 33MHz BIOS Version 4.0.1.3

Basic Options

- Time and Date
- Floppy Disks
- Fixed Disks
- Video Adapter
- Keyboard
- Shadow RAM
- Boot Options
- Password Options
- Password Edit
- Advanced Options

- Park Hard Drive
- Flash It!

Time 10:18:28
Date..... Aug 30, 1993
Weekday Monday

Floppy Configuration Errors

- Off 44 MB
- On ed

video Adapter VGA/EGA

Base Memory 640K
Extended Memory 3072K
Floating Point Unit Not Present
Fast Boot No
Boot Drive Sequence Drive A: then C:
101-Keyboard NumLock..... Off
Password Protection None
Boot Errors: Keyboard: On
 Floppy:..... On
 Video: On

↑(Previous) ↓ (Next) Enter (execute) Esc (quit/save)

5.1.3 Fixed Disks

This option allows the user to configure the fixed (hard) disk sub-system, including the on-board SCSI controller. When you select this field, you will be asked whether you want to turn the LS486 on-board IDE controller on or off. In addition, the Setup Utility will request the drive type for hard disk 1 (C:) and hard disk 2 (D:)

An “Auto ID” feature is invoked if you press F2 while the “Hard Disk 1” menu is displayed. This option will analyze your hard drive and provide a drive type ID, gleaned from the standard hard drive parameter table (HDPT), that most closely matches the characteristics of your hard drive. *Note: This option is also available for the “Hard Disk 2” menu.* To accept this drive type ID, press ENTER. Pressing the PgUp key will invoke a search through the HDPT for the next closest match.

If you continue to press the PgUp key, the menu will eventually display the user-configurable types “46” and “47.” Types 46 and/or 47 will also be offered if no HDPT match is found when the “Auto ID” feature is invoked. These types allow you to set the hard disk configuration fields to match the characteristics of your hard disks.

If you want to change any of the fields offered by type 46 or 47, press ENTER to accept the values shown. Invoke the “Fixed Disks” option from the “Basic Options” menu, then re-enter the “Set Hard Drive” menu. You may now set the fields to the desired values.

Note: The remainder of this section pertains to LS486 users only. The L486 board does not contain an on-board SCSI controller.

The on-board SCSI controller is the Adaptec 6360 single-chip I/O processor. With a 128-byte data FIFO, the 6360 can burst data at up to 10 MBytes/second across the host bus. On the SCSI bus, it can support synchronous data transfers at up to 10 MBytes/second.

The LS486 on-board SCSI BIOS can be disabled or enabled at E0000. If enabled, the SCSI BIOS will enable the on-board 6360 SCSI controller chip. The on-board SCSI can also be used by booting from another disk and loading a driver for the 6360 controller.

Basic Options Menu

The IRQ for the on-board SCSI controller can be selected as IRQ9, IRQ10, IRQ11, IRQ12, or NONE. If the on-board SCSI controller is not being used, be sure to select NONE.

The base I/O port address for the on-board SCSI controller can be selected as either 140 or 340. If the SCSI controller is used for the bootable drive, select 340 as the SCSI controller I/O base address, and use the on-board ROM at E000. If the on-board SCSI controller is not using the on-board ROM, but instead is using a driver or another ROM, the SCSI controller I/O base address can be 340 or 140. Be sure this address does not conflict with other port addresses (especially other SCSI controllers).

FIGURE 14 - A

Texas Microsystems, Inc. Setup Utility
Model LS486-SX 33MHz BIOS Version 4.0.1.3

Time 10:18:28
Date..... Aug 30, 1993
Weekday Monday

Basic Options

- Time and Date
- Floppy Disks
- Fixed Disks
- Video Adapter
- Keyboard
- Shadow RAM
- Boot Options
- Password Options
- Password Edit
- Advanced Options
- Park Hard Drive
- Flash It!

Onboard IDE Interface

Off 44 MB
On d

Base Memory 640K
Extended Memory 3072K
Floating Point Unit Not Present
Fast Boot No
Boot Drive Sequence Drive A: then C:
101-Keyboard NumLock..... Off
Password Protection None
Boot Errors: Keyboard: On
 Floppy: On
 Video: On

↑(Previous) ↓(Next) Enter (execute) Esc (quit/save)

Using the Setup Utility

FIGURE 14 - B

Texas Microsystems, Inc. Setup Utility
Model LS486-SX 33MHz BIOS Version 4.0.1.3

Basic Options

- Time and Date
- Floppy Disks
- Fixed Disks
- Video Adapter
- Keyboard
- Shadow RAM
- Boot Options
- Password Options
- Password Edit
- Advanced Options

Park Hard Drive
Flash It!

Time 10:18:28
Date..... Aug 30, 1993
Weekday..... Monday

Set Hard Disk 1 Type

Type	44	44 MB
Cylinders	820	ed
Heads.....	6	
Landing Zone	820	
Write Precomp	-1	
Sectors.....	17	
Size	40	

Fast Boot No
Boot Drive Sequence Drive A: then C:
101-Keyboard NumLock..... Off
Password Protection..... None
Boot Errors: Keyboard:..... On
 Floppy:..... On
 Video:..... On

Pg Up (next) Pg Down (previous) F2 (Auto ID) Enter (execute)

Basic Options Menu

FIGURE 14 - C

Texas Microsystems, Inc. Setup Utility
Model LS486-SX 33MHz BIOS Version 4.0.1.3

Time 10:18:28
Date Aug 30, 1993
Weekday Monday

Basic Options

- Time and Date
- Floppy Disks
- Fixed Disks
- Video Adapter
- Keyboard
- Shadow RAM
- Boot Options
- Password Options
- Password Edit
- Advanced Options

- Park Hard Drive
- Flash It!

Auto ID

Drive Reports:

Cylinders.....	1024
Heads	2
Sectors.....	40

Drive Table Match:

Type	17
Cylinders.....	977
Heads	5
Landing Zone:.....	977
Write Precomp	300
Sectors.....	17
Size	40

101-
Password Protection None
Boot Errors: Keyboard: On
Floppy:..... On
Video: On

ENTER (Accept) Pg Up (Next match) ESC (Exit)

Using the Setup Utility

FIGURE 14 - D

Texas Microsystems, Inc. Setup Utility
Model LS486-SX 33MHz BIOS Version 4.0.1.3

Basic Options

- Time and Date
- Floppy Disks
- Fixed Disks**
- Video Adapter
- Keyboard
- Shadow RAM
- Boot Options
- Password Options
- Password Edit
- Advanced Options
- Park Hard Drive

Time 10:18:28
Date Aug 30, 1993
Weekday Monday

Auto ID

Drive Reports: 1B

Drive	Cylinders.....	1053
Drive	Heads	2
Hard	Sectors.....	40
Hard	Optional user configurable:	
Video	Type	47
Base	Cylinders.....	1053
Exte	Heads	2
Floa	Landing Zone:.....	1053
Fast	Write Precomp.....	-1
Boot	Sectors.....	40
101-	Size.....	41

Password Protection None
Boot Errors: Keyboard: On
Floppy: On
Video: On

ENTER (Accept) ESC (Exit)

Basic Options Menu

FIGURE 14 - E

Texas Microsystems, Inc. Setup Utility
Model LS486-SX 33MHz BIOS Version 4.0.1.3

<p style="text-align: center;">Basic Options</p> <div style="border: 1px solid black; padding: 5px;"><p>Time and Date Floppy Disks Fixed Disks Video Adapter Keyboard Shadow RAM Boot Options Password Options Password Edit Advanced Options</p><p>Park Hard Drive Flash It!</p></div>	<p>Time10:18:28 DateAug 30, 1993 WeekdayMonday</p> <div style="border: 1px solid black; padding: 5px; margin: 10px 0;"><p style="text-align: center;">Onboard SCSI ROM</p><p style="text-align: center;">Off E0000H</p></div> <p>Base Memory.....640K Extended Memory.....3072K Floating Point Unit.....Not Present Fast Boot.....No Boot Drive SequenceDrive A: then C: 101-Keyboard NumLockOff Password ProtectionNone Boot Errors: Keyboard:On Floppy:.....On Video:On</p>
---	--

↑(Previous) ↓(Next) Enter (execute) Esc (quit/save)

Using the Setup Utility

FIGURE 14 - F

Texas Microsystems, Inc. Setup Utility
Model LS486-SX 33MHz BIOS Version 4.0.1.3

<p style="text-align: center;">Basic Options</p> <p>Time and Date Floppy Disks Fixed Disks Video Adapter Keyboard Shadow RAM Boot Options Password Options Password Edit Advanced Options</p> <p>Park Hard Drive Flash It!</p>	<p>Time10:18:28 DateAug 30, 1993 WeekdayMonday</p> <p style="text-align: center;">Select SCSI IRQ</p> <div style="border: 1px solid black; padding: 5px; margin: 5px 0;"><p>IRQ9 IRQ10 IRQ11 IRQ12 NONE</p></div> <p>Extended Memory3072K Floating Point UnitNot Present Fast BootNo Boot Drive SequenceDrive A: then C: 101-Keyboard NumLockOff Password ProtectionNone Boot Errors: Keyboard:On Floppy:On Video:On</p>
--	---

↑(Previous) ↓(Next) Enter (execute) Esc (quit/save)

Basic Options Menu

FIGURE 14 - G

Texas Microsystems, Inc. Setup Utility
Model LS486-SX 33MHz BIOS Version 4.0.1.3

Basic Options

- Time and Date
- Floppy Disks
- Fixed Disks
- Video Adapter
- Keyboard
- Shadow RAM
- Boot Options
- Password Options
- Password Edit
- Advanced Options

- Park Hard Drive
- Flash It!

Time 10:18:28
Date..... Aug 30, 1993
Weekday..... Monday

Select SCSI I/O PORT

140H
340H

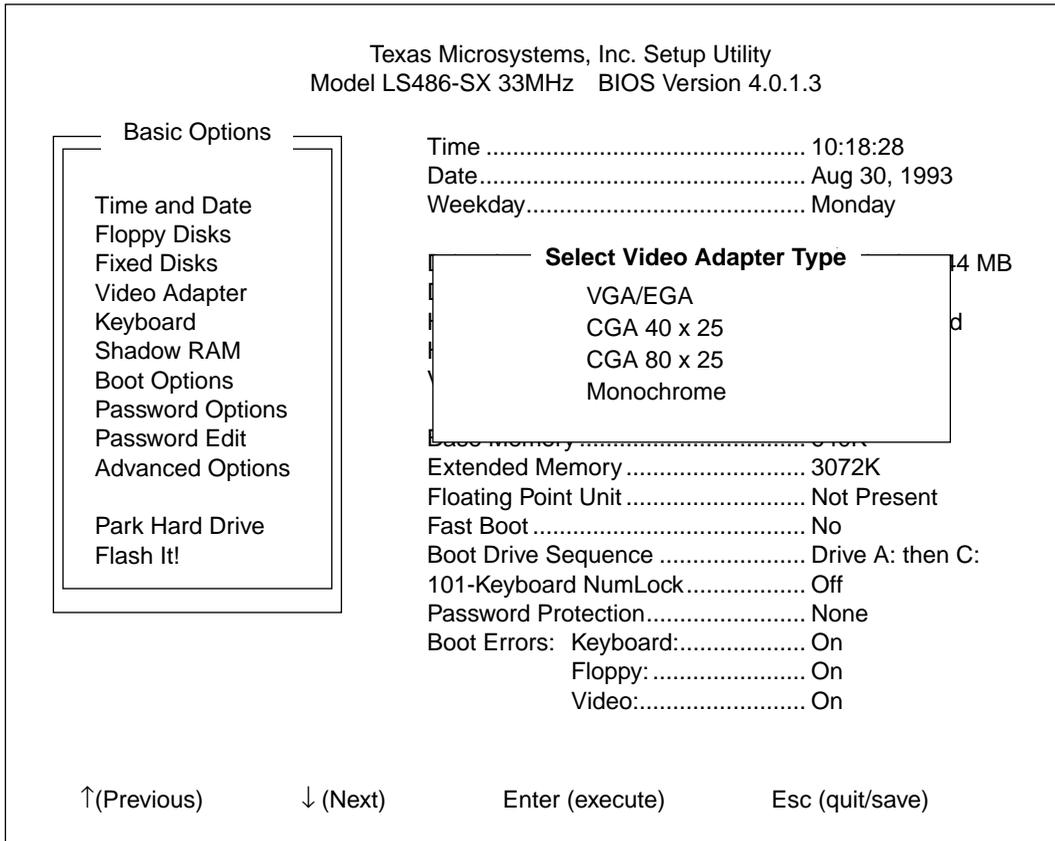
Base Memory 640K
Extended Memory 3072K
Floating Point Unit Not Present
Fast Boot No
Boot Drive Sequence Drive A: then C:
101-Keyboard NumLock..... Off
Password Protection..... None
Boot Errors: Keyboard:..... On
 Floppy:..... On
 Video:..... On

↑(Previous)↓ (Next)Enter (execute)Esc (quit/save)

5.1.4 Video Adapter

This feature allows you to specify the type of video adapter installed in your system. In addition, video configuration errors can be disabled, allowing you to run your system without a video adapter.

FIGURE 15 - A



Basic Options Menu

FIGURE 15 - B

Texas Microsystems, Inc. Setup Utility
Model LS486-SX 33MHz BIOS Version 4.0.1.3

Basic Options

- Time and Date
- Floppy Disks
- Fixed Disks
- Video Adapter
- Keyboard
- Shadow RAM
- Boot Options
- Password Options
- Password Edit
- Advanced Options

- Park Hard Drive
- Flash It!

Time 10:18:28
Date..... Aug 30, 1993
Weekday Monday

Video Configuration Errors

Off
On

Base
Ext
Flo
Fast Boot No
Boot Drive Sequence Drive A: then C:
101-Keyboard NumLock..... Off
Password Protection None
Boot Errors: Keyboard: On
 Floppy: On
 Video: On

↑(Previous)↓(Next)Enter (execute)Esc (quit/save)

5.1.5 Keyboard

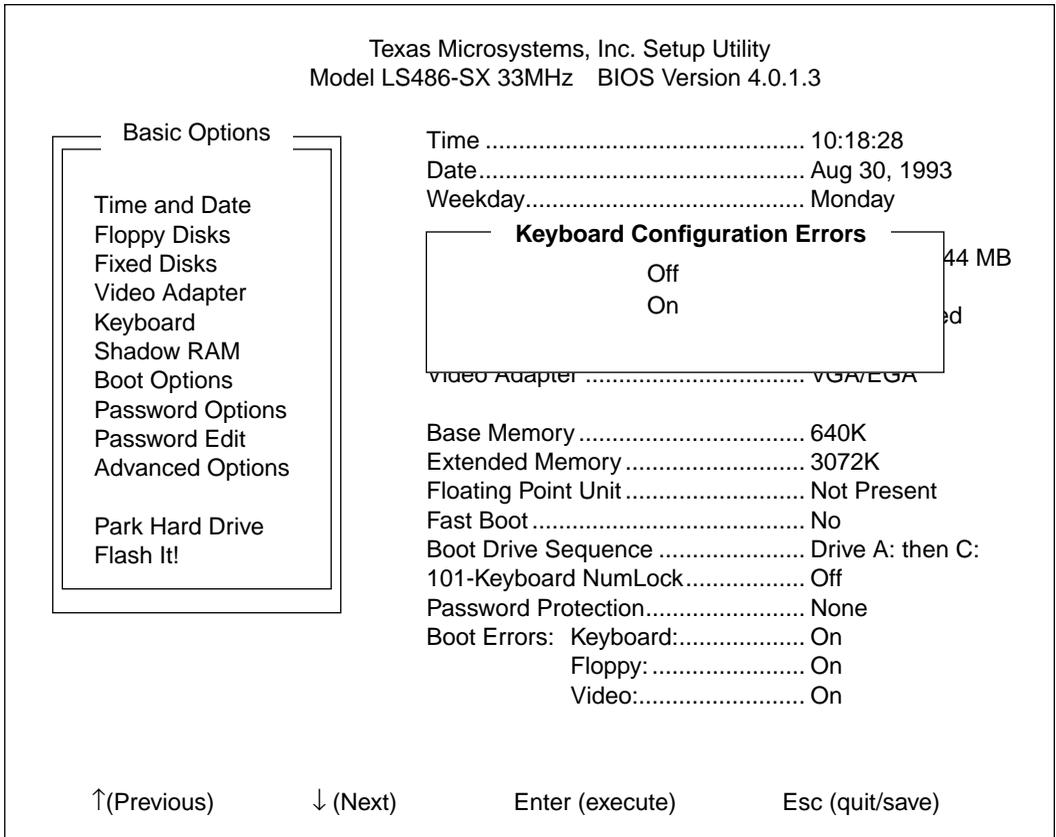
This option provides several functions. The first menu allows you to enable or disable keyboard configuration errors. If you choose to disable this option, you can run your system without a keyboard.

The next two menus offer you the ability to set the “Typematic” delay and rate. “Typematic delay” refers to the period that elapses between the time a key is held down until it begins to repeat. “Typematic rate” refers to the rate at which the character will repeat.

Note: Occasionally, .exe programs and TSR's that set the Typematic functions are run from the autoexec.bat file. If used, these programs have precedence over the Setup Utility's "Typematic" functions.

Basic Options Menu

FIGURE 16 - A



Texas Microsystems, Inc. Setup Utility
Model LS486-SX 33MHz BIOS Version 4.0.1.3

Basic Options

- Time and Date
- Floppy Disks
- Fixed Disks
- Video Adapter
- Keyboard
- Shadow RAM
- Boot Options
- Password Options
- Password Edit
- Advanced Options

- Park Hard Drive
- Flash It!

Time 10:18:28
Date..... Aug 30, 1993
Weekday..... Monday

Keyboard Configuration Errors

- Off
- On

44 MB
d

Video Adapter VGA/EGA

Base Memory 640K
Extended Memory 3072K
Floating Point Unit Not Present
Fast Boot No
Boot Drive Sequence Drive A: then C:
101-KeyBoard NumLock..... Off
Password Protection..... None
Boot Errors: Keyboard:..... On
 Floppy: On
 Video:..... On

↑(Previous) ↓(Next) Enter (execute) Esc (quit/save)

Using the Setup Utility

FIGURE 16 - B

Texas Microsystems, Inc. Setup Utility
Model LS486-SX 33MHz BIOS Version 4.0.1.3

Basic Options

- Time and Date
- Floppy Disks
- Fixed Disks
- Video Adapter
- Keyboard
- Shadow RAM
- Boot Options
- Password Options
- Password Edit
- Advanced Options
- Park Hard Drive
- Flash It!

Time 10:18:28
Date..... Aug 30, 1993
Weekday..... Monday

Keyboard Typematic Delay 44 MB
250 msec

Hard Disk 2..... Not installed
Video Adapter VGA/EGA

Base Memory 640K
Extended Memory 3072K
Floating Point Unit Not Present
Fast Boot No
Boot Drive Sequence Drive A: then C:
101-Keyboard NumLock..... Off
Password Protection..... None
Boot Errors: Keyboard:..... On
Floppy:..... On
Video:..... On

↑(Previous) ↓(Next) Enter (execute) Esc (quit/save)

Basic Options Menu

FIGURE 16 - C

Texas Microsystems, Inc. Setup Utility
Model LS486-SX 33MHz BIOS Version 4.0.1.3

Basic Options

- Time and Date
- Floppy Disks
- Fixed Disks
- Video Adapter
- Keyboard
- Shadow RAM
- Boot Options
- Password Options
- Password Edit
- Advanced Options
- Park Hard Drive
- Flash It!

Time 10:18:28
Date..... Aug 30, 1993
Weekday..... Monday

Keyboard Typematic Rate 4 MB

24 chars/sec

Hard Disk 2..... Not Installed
Video Adapter VGA/EGA

Base Memory 640K
Extended Memory 3072K
Floating Point Unit Not Present
Fast Boot No
Boot Drive Sequence Drive A: then C:
101-Keyboard NumLock..... Off
Password Protection..... None
Boot Errors: Keyboard:..... On
 Floppy: On
 Video:..... On

↑(Previous) ↓(Next) Enter (execute) Esc (quit/save)

5.1.6 Shadow RAM

This option requires you to specify where the optional ROM-BIOS code is to be located. When you select this option, a memory map that displays memory in 16 KByte blocks is displayed. If a ROM is found within that 16 KByte location, the Setup Utility will display the word “ROM” or “SHADOW,” where:

- **ROM** - the system will execute code directly from the EPROM on the option card, or
- **SHADOW** - the system will copy the code from the EPROM into RAM at the same address, allowing code to run from the RAM on the CPU card (dramatically improving the performance of the system).

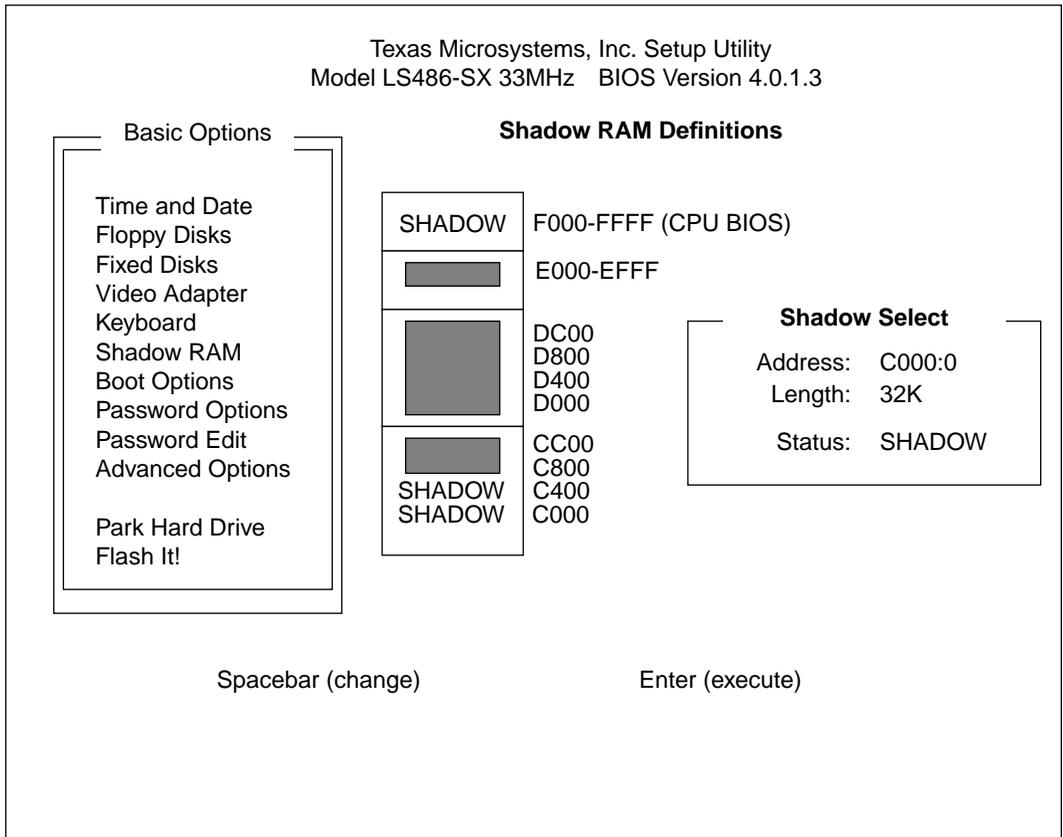
A window will also appear to the right of the map. This window displays the following for each option ROM found in the system:

- Starting address of the option ROM
- Length of the option ROM
- Current status (ROM or SHADOW)

This window allows you to toggle between running the option ROM from the EPROM in which it resides (by selecting ROM), or directing the system to copy it into shadow RAM at power-up (by selecting SHADOW).

Basic Options Menu

FIGURE 17



5.1.7 Boot Options

This function is a series of windows that allows you to set the following items:

- **Boot Drive Sequence** - you can specify the sequence in which drives are accessed (useful when attempting to load an operating system)
- **Set status of NumLock key at boot** - if a 101-key keyboard is installed, this option directs the BIOS to enable or disable the NumLock key before booting.
- **Fast Booting** - When the “Fastboot” feature is enabled, the BIOS does not perform comprehensive diagnostics at bootup. This feature enables the machine to boot as quickly as possible, as it skips the Power-On Self Test (POST).

Note: A successful normal boot sequence must be performed before the “Fastboot” option is enabled. Once the correct configuration is achieved and a normal boot is done, the user may then enter setup and enable Fastboot. No other changes should be made. If any changes are to be made, you must again perform a standard boot after the changes are enacted before you can enable Fastboot. You can press <CTRL-ALT-S> during the boot process to enter the Setup Utility from Fastboot. Note that when this is done, Fastboot is disabled.

Basic Options Menu

FIGURE 18 - A

Texas Microsystems, Inc. Setup Utility
Model LS486-SX 33MHz BIOS Version 4.0.1.3

Basic Options

- Time and Date
- Floppy Disks
- Fixed Disks
- Video Adapter
- Keyboard
- Shadow RAM
- Boot Options
- Password Options
- Password Edit
- Advanced Options
- Park Hard Drive
- Flash It!

Set Boot Drive Access

- Drive A: then C: (selected)
- Drive C: then A:
- Drive A: Only
- Drive C: Only

Time10:18:28
DateAug 30, 1993
WeekdayMonday

Base Memory.....640K
Extended Memory.....3072K
Floating Point Unit.....Not Present
Fast Boot.....No
Boot Drive SequenceDrive A: then C:
101-Keyboard NumLock.....Off
Password ProtectionNone
Boot Errors: Keyboard:On
Floppy:On
Video:On

↑(Previous) ↓(Next) Enter (execute) Esc (quit/save)

Using the Setup Utility

FIGURE 18 - B

Texas Microsystems, Inc. Setup Utility
Model LS486-SX 33MHz BIOS Version 4.0.1.3

Basic Options

- Time and Date
- Floppy Disks
- Fixed Disks
- Video Adapter
- Keyboard
- Shadow RAM
- Boot Options
- Password Options
- Password Edit
- Advanced Options

- Park Hard Drive
- Flash It!

Time 10:18:28
Date..... Aug 30, 1993
Weekday..... Monday

Set status of NumLock at Boot

Off
On

44 MB

Drive A: Only
Drive C: Only

Floating Point Unit Not Present
Fast Boot No
Boot Drive Sequence Drive A: then C:
101-Keyboard NumLock..... Off
Password Protection..... None
Boot Errors: Keyboard:..... On
 Floppy: On
 Video:..... On

↑(Previous) ↓(Next) Enter (execute) Esc (quit/save)

Basic Options Menu

FIGURE 18 - C

Texas Microsystems, Inc. Setup Utility
Model LS486-SX 33MHz BIOS Version 4.0.1.3

<p style="text-align: center; margin: 0;">Basic Options</p> <ul style="list-style-type: none">Time and DateFloppy DisksFixed DisksVideo AdapterKeyboardShadow RAMBoot OptionsPassword OptionsPassword EditAdvanced Options Park Hard DriveFlash It!	<p>Time10:18:28 DateAug 30, 1993 WeekdayMonday</p> <p style="text-align: center;">Do you want Fast Booting?</p> <div style="border: 1px solid black; padding: 5px; margin: 5px auto; width: 80%; text-align: center;"><p>No Yes</p></div> <p>Video AdapterVGA/EGA</p> <p>Base Memory640K Extended Memory3072K Floating Point UnitNot Present Fast BootNo Boot Drive SequenceDrive A: then C: 101-Keyboard NumLockOff Password ProtectionNone Boot Errors: Keyboard:On Floppy:On Video:On</p>
---	---

↑(Previous) ↓(Next) Enter (execute) Esc (quit/save)

5.1.8 Password Options

This feature allows you the option of having no password protection, requiring a password to enter the Setup Utility, or requiring a password to enter Setup and boot. The password is entered from this menu, and you are prompted to enter it again for verification. The password may consist of from one to 12 characters. Letters A to Z (case-sensitive) and numbers 0 to 9 are accepted. If a password is already entered, you must know the password in order to change it. *Note that Switch SW1-3 will delete all password protection.*

WARNING: In addition to deleting any password, SW1-3 will cause the CPU to load the "default" CMOS settings also. If you haven't used the "Flash It!" options to save your settings as the "default," the CPU will probably not boot the installed operating system. If this happens, you will need to reconfigure the CMOS setup to match the active hardware options (refer to Section 5.1.10 for information on the Flash-It! options).

Basic Options Menu

FIGURE 19 - A

Texas Microsystems, Inc. Setup Utility
Model LS486-SX 33MHz BIOS Version 4.0.1.3

<p style="text-align: center; margin: 0;">Basic Options</p> <ul style="list-style-type: none">Time and DateFloppy DisksFixed DisksVideo AdapterKeyboardShadow RAMBoot OptionsPassword OptionsPassword EditAdvanced Options Park Hard DriveFlash It!	<p>Time10:18:28 DateAug 30, 1993 WeekdayMonday</p> <div style="border: 1px solid black; padding: 5px; margin: 5px 0;"><p style="text-align: center; margin: 0;">Password Protect Options</p><ul style="list-style-type: none">NoneInch, 1.44 MBSetup OnlyInstalledSetup and System BootInstalled</div> <p>Base Memory640K Extended Memory3072K Floating Point UnitNot Present Fast BootNo Boot Drive SequenceDrive A: then C: 101-Keyboard NumLockOff Password ProtectionNone Boot Errors: Keyboard:On Floppy:On Video:On</p>
---	--

↑(Previous) ↓(Next) Enter (execute) Esc (quit/save)

Using the Setup Utility

FIGURE 19 - B

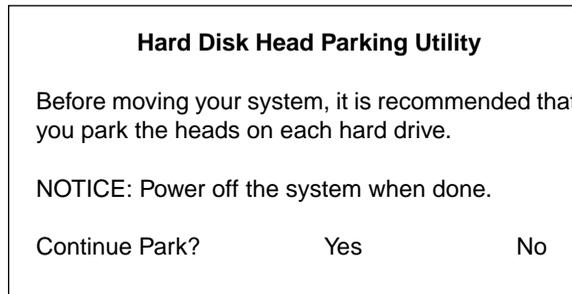
Texas Microsystems, Inc. Setup Utility
Model LS486-SX 33MHz BIOS Version 4.0.1.3

<p style="text-align: center;">Basic Options</p> <div style="border: 1px solid black; padding: 5px;"><p>Time and Date Floppy Disks Fixed Disks Video Adapter Keyboard Shadow RAM Boot Options Password Options Password Edit Advanced Options</p><p>Park Hard Drive Flash It!</p></div>	<p>Time10:18:28 DateAug 30, 1993 WeekdayMonday</p> <p style="text-align: center;">Password Edit</p> <div style="border: 1px solid black; padding: 5px;"><p>New Password *****</p></div> <p>Video AdapterVGA/EGA</p> <p>Base Memory640K Extended Memory3072K Floating Point UnitNot Present Fast BootNo Boot Drive SequenceDrive A: then C: 101-Keyboard NumLockOff Password ProtectionNone Boot Errors: Keyboard:On Floppy:On Video:On</p>
--	---

↑(Previous) ↓(Next) Enter (execute) Esc (quit/save)

5.1.9 Park Hard Drive

When enabled, this feature allows you to park the heads on each hard drive and protect the drives whenever it is necessary to move or transport the computer. The menu will display a “Continue Park?” prompt. Press “Yes” to park the hard drives, “No” to discontinue this feature.



5.1.10 Flash It!

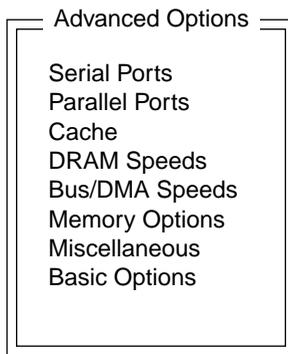
“Flash It!” permits all selections to be programmed permanently into BIOS memory. In the event of a CMOS power failure, or whenever SW1-3 is closed, the selections that were current when the “Flash It!” option was selected will be the new default values that the system will “load.”

In the event that a new default value prohibits system operation (including an active password that becomes an unknown), SW1-2 must be closed to invoke the auxiliary BIOS. SW1-3 must also be closed to load the true factory defaults. After operating the Setup Utility, you can restore control to the standard BIOS by opening SW1-2 and SW1-3.

IMPORTANT! While the system is “flashing” BIOS memory, it is imperative that the reset switch not be pressed and power is not turned off until the “Flash It” operation has completed. In the event that the flash operation is interrupted, SW1-2 must be closed to invoke the auxiliary BIOS and allow the system to be operated. It will then be necessary to perform another flash operation which, when successful, will enable SW1-2 to be opened and control returned to the flashed BIOS.

5.2 Advanced Options

Choosing the “Advanced Options” item from the “Basic Options” menu will cause a new menu of options to be displayed. We’ll discuss these options in the following sections. The Advanced Options menu is displayed below.



5.2.1 Serial Ports

You can select the port addresses for Serial Port 1 (UART1) and Serial Port 2 (UART2) using this option. The choices are as follows:

- 3F8
- 2F8
- 3E8
- 2E8
- Disabled

Note: Serial Port 1 must use IRQ4, and Serial Port 2 must use IRQ3. These items are not user-selectable.

If Serial Ports 1 and 2 are given the same base port address, a window will prompt you to enter a key that will solve the conflict. You cannot further configure the system until the serial ports no longer share the same address.

Using the Setup Utility

FIGURE 20 - A

Texas Microsystems, Inc. Setup Utility
Model LS486-SX 33MHz BIOS Version 4.0.1.3

Advanced Options

- Serial Ports
- Parallel Ports
- Cache
- DRAM Speeds
- Bus/DMA Speeds
- Memory Options
- Miscellaneous
- Basic Options

Onboard Floppy Controller..... On
Onboard IDE Interface On
Onboard SCSI ROM Off

Select Serial Port 1 Address

- 03F8h, IRQ4
- 02F8h, IRQ4
- 03E8h, IRQ4
- 02E8h, IRQ4
- Disabled

SPEED

15M -16M Memory..... Enable 15M-16M
Top 128K of 32M..... Enable Top 128K
DRAM Write Wait States..... 0 wait states
DRAM Read Wait States..... 1 wait state
DRAM RAS precharge 2 SYSCLKS
DRAM RAS to CAS timing 0 SYSCLKS

↑(Previous) ↓(Next) Enter (execute) Esc (quit/save)

Advanced Options

FIGURE 20 - B

Texas Microsystems, Inc. Setup Utility
Model LS486-SX 33MHz BIOS Version 4.0.1.3

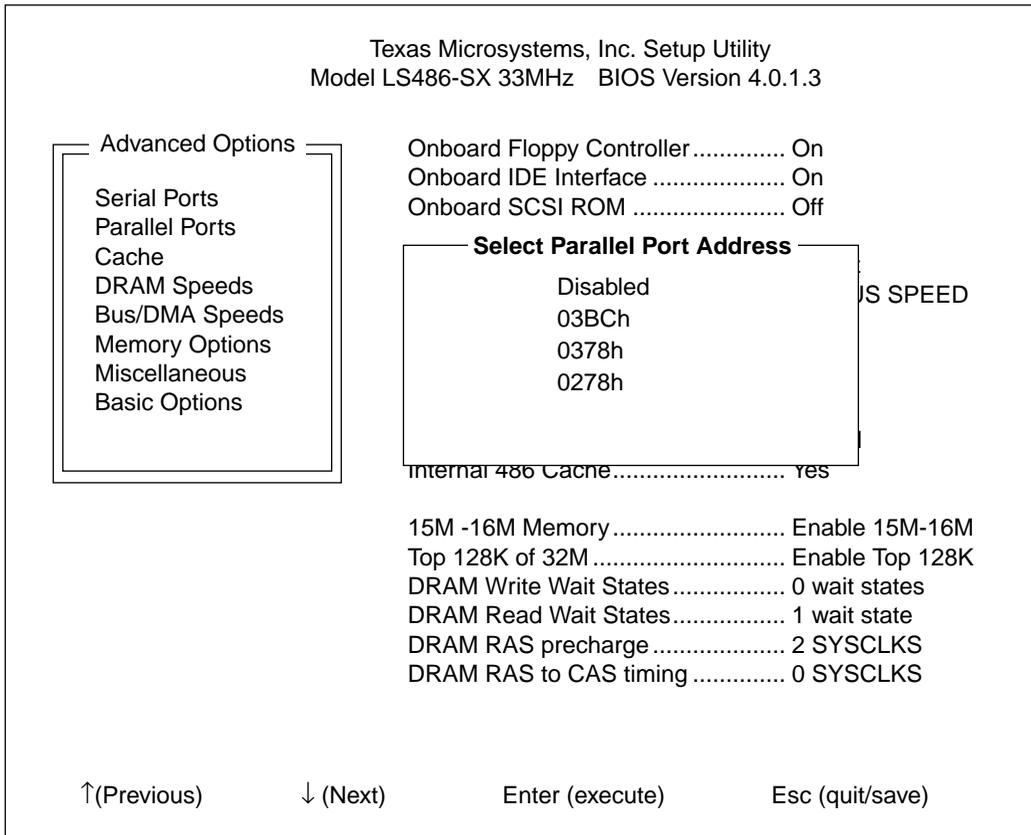
<div style="border: 1px solid black; padding: 5px;"><p style="text-align: center;">Advanced Options</p><p>Serial Ports Parallel Ports Cache DRAM Speeds Bus/DMA Speeds Memory Options Miscellaneous Basic Options</p></div>	<p>Onboard Floppy Controller On Onboard IDE Interface On Onboard SCSI ROM Off</p> <div style="border: 1px solid black; padding: 5px; margin: 10px 0;"><p style="text-align: center;">Select Serial Port 2 Address</p><p>03F8h, IRQ3 02F8h, IRQ3 03E8h, IRQ3 02E8h, IRQ3 Disabled</p></div> <p>15M -16M Memory Enable 15M-16M Top 128K of 32M Enable Top 128K DRAM Write Wait States 0 wait states DRAM Read Wait States 1 wait state DRAM RAS precharge 2 SYSCLKS DRAM RAS to CAS timing 0 SYSCLKS</p>
---	---

↑(Previous) ↓ (Next) Enter (execute) Esc (quit/save)

5.2.2 Parallel Ports

Use this feature to select an address for the on-board parallel port. Once you enable a port address, you may choose between IRQ5, IRQ7 and NO IRQ. The parallel port can also be configured as standard AT-compatible or bi-directional.

FIGURE 21 - A



Advanced Options

FIGURE 21 - B

Texas Microsystems, Inc. Setup Utility
Model LS486-SX 33MHz BIOS Version 4.0.1.3

Advanced Options

- Serial Ports
- Parallel Ports
- Cache
- DRAM Speeds
- Bus/DMA Speeds
- Memory Options
- Miscellaneous
- Basic Options

Onboard Floppy Controller..... On
Onboard IDE Interface On
Onboard SCSI ROM Off

Select Parallel Port IRQ

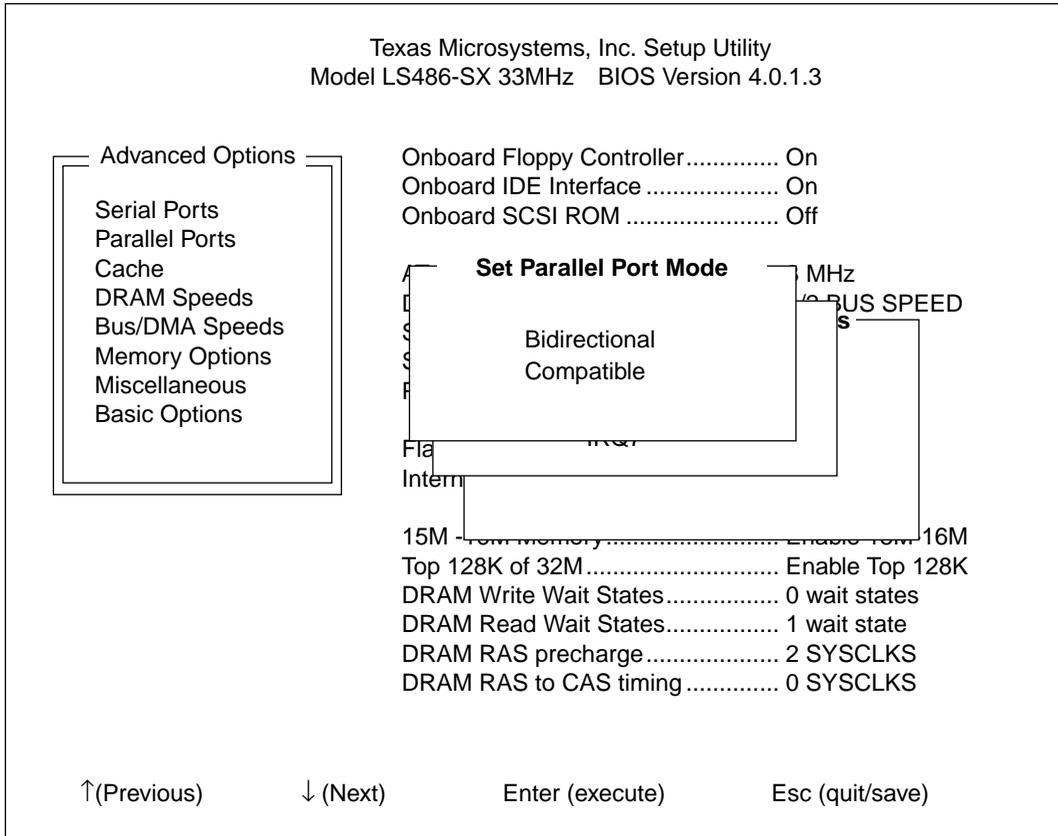
- No IRQ
- IRQ5
- IRQ7

15M -16M Memory..... Enable 15M-16M
Top 128K of 32M..... Enable Top 128K
DRAM Write Wait States..... 0 wait states
DRAM Read Wait States..... 1 wait state
DRAM RAS precharge 2 SYSCLKS
DRAM RAS to CAS timing 0 SYSCLKS

↑(Previous) ↓(Next) Enter (execute) Esc (quit/save)

Using the Setup Utility

FIGURE 21 - C



5.2.3 Cache

The LS486S contains no secondary cache, but the internal 8 KByte CPU cache can be turned on or off via this option. Also, if the cache is enabled, you can choose to make the shadow RAM area (C0000 to FFFFF) non-cacheable or cacheable and write-protected.

After responding to these menus, the “Non-Cacheable Memory Block” window appears, and the “Block Size” column is highlighted. To increment the block size, press the Page Up key; press the Page Down key to decrement. The block size options for the LS486 are 512K, 1M, 2M, 4M, 8M and DISABLED.

Once the block size is selected, press the right arrow key to highlight the “Start Addr” column. This column is used to select the start address for the non-cacheable memory block. As with the “Block Size” column, press the Page Up key to increment, Page Down to decrement. The increment unit is the block size selected earlier.

Using the Setup Utility

FIGURE 22 - A

Texas Microsystems, Inc. Setup Utility
Model LS486-SX 33MHz BIOS Version 4.0.1.3

Advanced Options

Serial Ports

Parallel Ports

Cache

DRAM Speeds

Bus/DMA Speeds

Memory Options

Miscellaneous

Basic Options

Onboard Floppy Controller On

Onboard IDE Interface On

Onboard SCSI ROM Off

Use the 486 Internal Cache? Hz

No

Yes

Flash I/O Port Address 0270H

Internal 486 Cache Yes

15M -16M Memory Enable 15M-16M

Top 128K of 32M Enable Top 128K

DRAM Write Wait States 0 wait states

DRAM Read Wait States 1 wait state

DRAM RAS precharge 2 SYSCLKS

DRAM RAS to CAS timing 0 SYSCLKS

↑(Previous)↓(Next)Enter (execute)Esc (quit/save)

Advanced Options

FIGURE 22 - B

Texas Microsystems, Inc. Setup Utility
Model LS486-SX 33MHz BIOS Version 4.0.1.3

Advanced Options

Serial Ports
Parallel Ports
Cache
DRAM Speeds
Bus/DMA Speeds
Memory Options
Miscellaneous
Basic Options

Onboard Floppy Controller.....On
Onboard IDE InterfaceOn
Onboard SCSI ROMOff

C000H to FFFFH CACHE

NON Cacheable
Cacheable Write Protected

Flash I/O Port Address0270H
Internal 486 Cache Yes

15M -16M Memory.....Enable 15M-16M
Top 128K of 32M.....Enable Top 128K
DRAM Write Wait States.....0 wait states
DRAM Read Wait States 1 wait state
DRAM RAS precharge.....2 SYSCLKS
DRAM RAS to CAS timing.....0 SYSCLKS

↑(Previous)↓ (Next)Enter (execute)Esc (quit/save)

FIGURE 22 - C

Texas Microsystems, Inc. Setup Utility
Model LS486-SX 33MHz BIOS Version 4.0.1.3

Advanced Options

- Serial Ports
- Parallel Ports
- Cache
- DRAM Speeds
- Bus/DMA Speeds
- Memory Options
- Miscellaneous
- Basic Options

Onboard Floppy Controller On
Onboard IDE Interface On
Onboard SCSI ROM..... Off

Non-Cacheable Memory Block

Block Size	Start Addr	End Addr	SPEED
512K	00100000	0017FFFF	

Flash I/O Port Address 0270H
Internal 486 Cache..... Yes

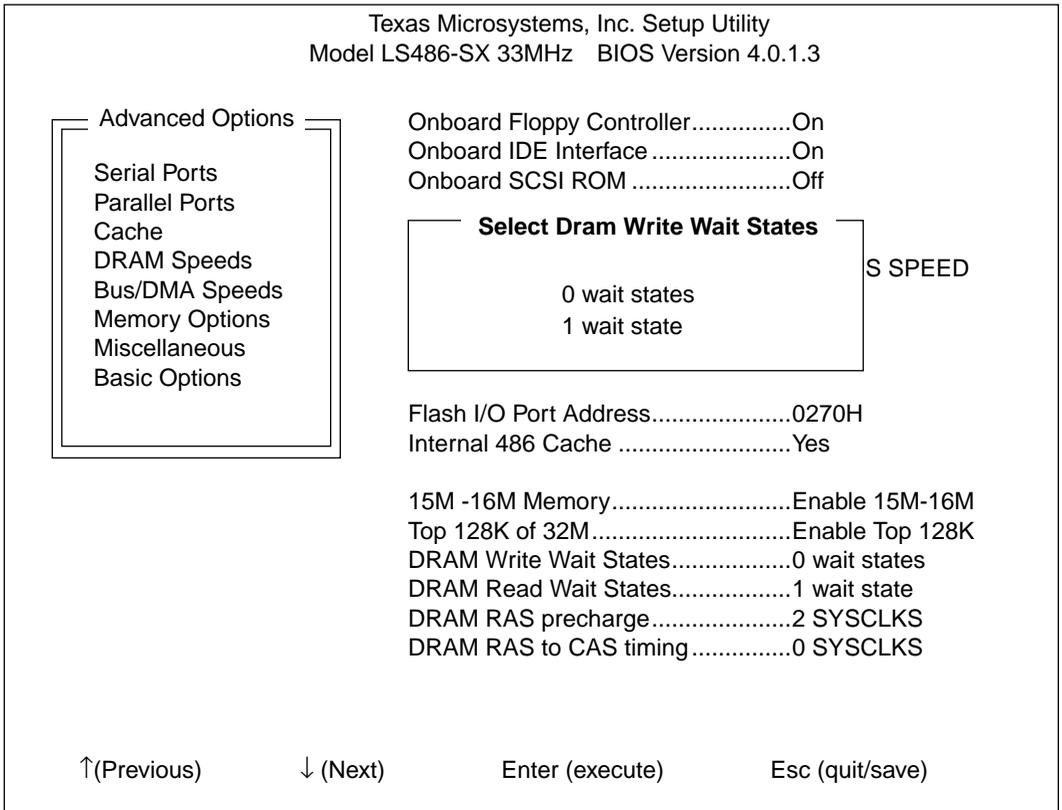
15M -16M Memory Enable 15M-16M
Top 128K of 32M Enable Top 128K
DRAM Write Wait States 0 wait states
DRAM Read Wait States 1 wait state
DRAM RAS precharge 2 SYSCCLKS
DRAM RAS to CAS timing 0 SYSCCLKS

Pg Up (incr) Pg Down (decr) ↑↓ (select) Enter (execute)

5.2.4 DRAM Speeds

The LS486 chipset allows adjustment of several DRAM (Dynamic Random Access Memory) timing parameters. DRAM write and read wait state timing, DRAM RAS precharge timing, and DRAM RAS to CAS time can all be adjusted separately. *Note: A wait state occurs when the CPU is idle (not processing information). RAS is Row Address Select, while CAS is Column Address Select. RAS Precharge is the period of time that RAS is not active. RAS to CAS Time refers to the period between the time RAS goes active and CAS goes active. Since RAS and CAS are related to accessing the system memory, only experienced users should alter the factory default settings.*

FIGURE 23 - A



Using the Setup Utility

FIGURE 23 - B

Texas Microsystems, Inc. Setup Utility
Model LS486-SX 33MHz BIOS Version 4.0.1.3

Advanced Options

Serial Ports

Parallel Ports

Cache

DRAM Speeds

Bus/DMA Speeds

Memory Options

Miscellaneous

Basic Options

Onboard Floppy Controller On

Onboard IDE Interface On

Onboard SCSI ROM..... Off

Select Dram Read Wait States

S SPEED

0 wait states

1 wait state

2 wait states

3 wait states

Internal 400 Cache..... 165

15M -16M Memory Enable 15M-16M

Top 128K of 32M Enable Top 128K

DRAM Write Wait States 0 wait states

DRAM Read Wait States 1 wait state

DRAM RAS precharge 2 SYSCLKS

DRAM RAS to CAS timing 0 SYSCLKS

↑(Previous)↓(Next)Enter (execute)Esc (quit/save)

Advanced Options

FIGURE 23 - C

Texas Microsystems, Inc. Setup Utility
Model LS486-SX 33MHz BIOS Version 4.0.1.3

Advanced Options

Serial Ports
Parallel Ports
Cache
DRAM Speeds
Bus/DMA Speeds
Memory Options
Miscellaneous
Basic Options

Onboard Floppy Controller.....On
Onboard IDE InterfaceOn
Onboard SCSI ROMOff

Select Dram RAS Precharge

2 SYSCCLKS
3 SYSCCLKS

S SPEED

Flash I/O Port Address.....0270H
Internal 486 CacheYes

15M -16M Memory.....Enable 15M-16M
Top 128K of 32M.....Enable Top 128K
DRAM Write Wait States.....0 wait states
DRAM Read Wait States.....1 wait state
DRAM RAS precharge.....2 SYSCCLKS
DRAM RAS to CAS timing.....0 SYSCCLKS

↑(Previous)↓(Next)Enter (execute)Esc (quit/save)

Using the Setup Utility

FIGURE 23 - D

Texas Microsystems, Inc. Setup Utility
Model LS486-SX 33MHz BIOS Version 4.0.1.3

Advanced Options

Serial Ports

Parallel Ports

Cache

DRAM Speeds

Bus/DMA Speeds

Memory Options

Miscellaneous

Basic Options

Onboard Floppy Controller..... On

Onboard IDE Interface On

Onboard SCSI ROM Off

Select Dram RAS to CAS time

0 SYSCLKS

1 SYSCLKS

Flash I/O Port Address..... 0270H

Internal 486 Cache..... Yes

15M -16M Memory..... Enable 15M-16M

Top 128K of 32M..... Enable Top 128K

DRAM Write Wait States..... 0 wait states

DRAM Read Wait States..... 1 wait state

DRAM RAS precharge 2 SYSCLKS

DRAM RAS to CAS timing 0 SYSCLKS

↑(Previous)↓(Next)Enter (execute)Esc (quit/save)

5.2.5 Bus/DMA Speed

These options allow you to select the proper bus and DMA (Direct Memory Access) speeds. Direct memory access allows data to be transferred between peripheral devices and internal memory without intervention from the CPU.

The bus speed can be selected as 8, 10 or 12 MHz. Although 8 MHz is the AT-compatible standard, many newer peripherals will run at faster speeds. However, when selecting the bus speed, be aware of peripheral equipment speed limitations.

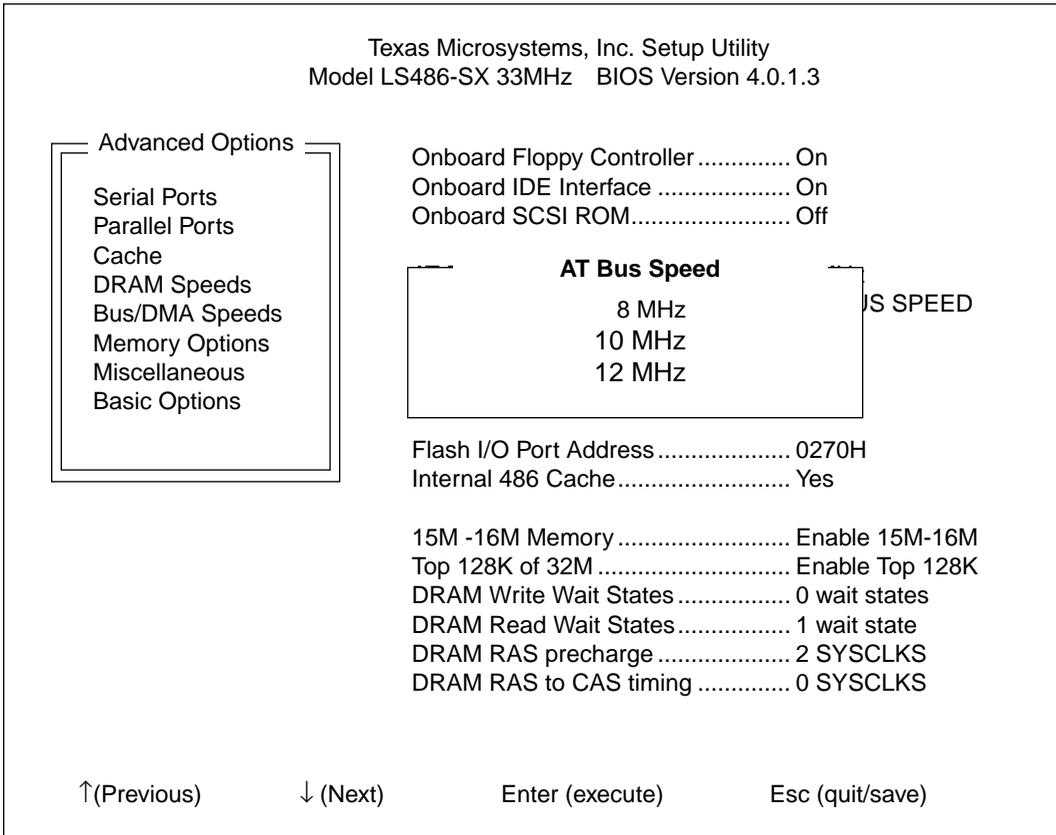
The DMA speed can be selected to be equal to, or half of, the system bus speed. The standard AT-compatible speed is one-half the standard 8 MHz bus speed, i.e. 4 MHz. However, many newer peripherals will run at faster speeds.

The Chips and Technologies 82C206 controller can be configured to fine-tune performance. Wait states are inserted by the 82C206 Integrated Peripherals Controller. The system will cause the 82C206 to assert a “not ready” condition on IOCHRDY (I/O Channel Ready) for the number of wait states selected in the 82C206 Read/Write Cycle field. The “CT206 Read/Write Wait State” setting allows the setting of wait states for I/O operations to the CT206 chip. Wait states for 8-bit and 16-bit DMA (Direct Memory Access) may be controlled independently to allow user-customizing.

Note: Texas Micro recommends setting the “Bus Speed” option to 8 MHz and the “DMA Speed” option to “1/2 Bus Speed.” From this starting point, you can increase Bus/DMA speeds to desired settings unless you experience system problems. Then, you can decrease the settings until the problem is resolved.

Using the Setup Utility

FIGURE 24 - A



Advanced Options

FIGURE 24 - B

Texas Microsystems, Inc. Setup Utility
Model LS486-SX 33MHz BIOS Version 4.0.1.3

Advanced Options

Serial Ports

Parallel Ports

Cache

DRAM Speeds

Bus/DMA Speeds

Memory Options

Miscellaneous

Basic Options

Onboard Floppy Controller On

Onboard IDE Interface On

Onboard SCSI ROM..... Off

DMA Speed

1/2 Bus Speed (4.00 MHz)

Bus Speed (8.00 MHz)

Flash I/O Port Address..... 0270H

Internal 486 Cache..... Yes

15M -16M Memory Enable 15M-16M

Top 128K of 32M Enable Top 128K

DRAM Write Wait States 0 wait states

DRAM Read Wait States 1 wait state

DRAM RAS precharge 2 SYSCLKS

DRAM RAS to CAS timing 0 SYSCLKS

↑(Previous)↓(Next)Enter (execute)Esc (quit/save)

FIGURE 24 - C

Texas Microsystems, Inc. Setup Utility
Model LS486-SX 33MHz BIOS Version 4.0.1.3

Advanced Options

- Serial Ports
- Parallel Ports
- Cache
- DRAM Speeds
- Bus/DMA Speeds
- Memory Options
- Miscellaneous
- Basic Options

Onboard Floppy Controller On
Onboard IDE Interface..... On
Onboard SCSI ROM..... Off

CT206 Read/Write Waitstates

1 WAIT STATE S SPEED
2 WAIT STATES
3 WAIT STATES
4 WAIT STATES

Flash I/O Port Address 0270H
Internal 486 Cache Yes

15M -16M Memory Enable 15M-16M
Top 128K of 32M Enable Top 128K
DRAM Write Wait States 0 wait states
DRAM Read Wait States 1 wait state
DRAM RAS precharge 2 SYSCLKS
DRAM RAS to CAS timing 0 SYSCLKS

↑(Previous) ↓(Next) Enter (execute) Esc (quit/save)

Advanced Options

FIGURE 24 - D

Texas Microsystems, Inc. Setup Utility
Model LS486-SX 33MHz BIOS Version 4.0.1.3

<p style="text-align: center; margin: 0;">Advanced Options</p> <p style="margin: 5px 0;">Serial Ports</p> <p style="margin: 5px 0;">Parallel Ports</p> <p style="margin: 5px 0;">Cache</p> <p style="margin: 5px 0;">DRAM Speeds</p> <p style="margin: 5px 0;">Bus/DMA Speeds</p> <p style="margin: 5px 0;">Memory Options</p> <p style="margin: 5px 0;">Miscellaneous</p> <p style="margin: 5px 0;">Basic Options</p>	<p>Onboard Floppy Controller On</p> <p>Onboard IDE Interface On</p> <p>Onboard SCSI ROM..... Off</p> <div style="border: 1px solid black; padding: 5px; margin: 10px auto; width: 80%; text-align: center;"><p>8 Bit DMA Waitstates</p><p>1 WAIT STATE</p><p>2 WAIT STATES</p><p>3 WAIT STATES</p><p>4 WAIT STATES</p></div> <p>Flash / Chipset Address 0270H</p> <p>Internal 486 Cache..... Yes</p> <p>15M -16M Memory Enable 15M-16M</p> <p>Top 128K of 32M Enable Top 128K</p> <p>DRAM Write Wait States 0 wait states</p> <p>DRAM Read Wait States 1 wait state</p> <p>DRAM RAS precharge 2 SYSCLKS</p> <p>DRAM RAS to CAS timing 0 SYSCLKS</p>
--	--

↑(Previous) ↓(Next) Enter (execute) Esc (quit/save)

FIGURE 24 - E

Texas Microsystems, Inc. Setup Utility
Model LS486-SX 33MHz BIOS Version 4.0.1.3

Advanced Options

- Serial Ports
- Parallel Ports
- Cache
- DRAM Speeds
- Bus/DMA Speeds
- Memory Options
- Miscellaneous
- Basic Options

Onboard Floppy Controller.....On
Onboard IDE Interface.....On
Onboard SCSI ROMOff

16 Bit DMA Waitstates

- 1 WAIT STATE
- 2 WAIT STATES
- 3 WAIT STATES
- 4 WAIT STATES

Flash ROM Port Address.....0270H
Internal 486 CacheYes

15M -16M Memory.....Enable 15M-16M
Top 128K of 32M.....Enable Top 128K
DRAM Write Wait States.....0 wait states
DRAM Read Wait States.....1 wait state
DRAM RAS precharge.....2 SYSCLKS
DRAM RAS to CAS timing.....0 SYSCLKS

S SPEED

↑(Previous) ↓ (Next) Enter (execute) Esc (quit/save)

5.2.6 Memory Options

Set Base Memory Size

The LS486 base memory can be set to either 640 KBytes (the usual amount of memory for an AT-compatible computer) or 512 KBytes. Since a few add-on cards are mapped to the 512 - 640 KByte region, this option allows you to configure the system to run these cards in the 512 - 640 KByte area.

15M to 16M Memory

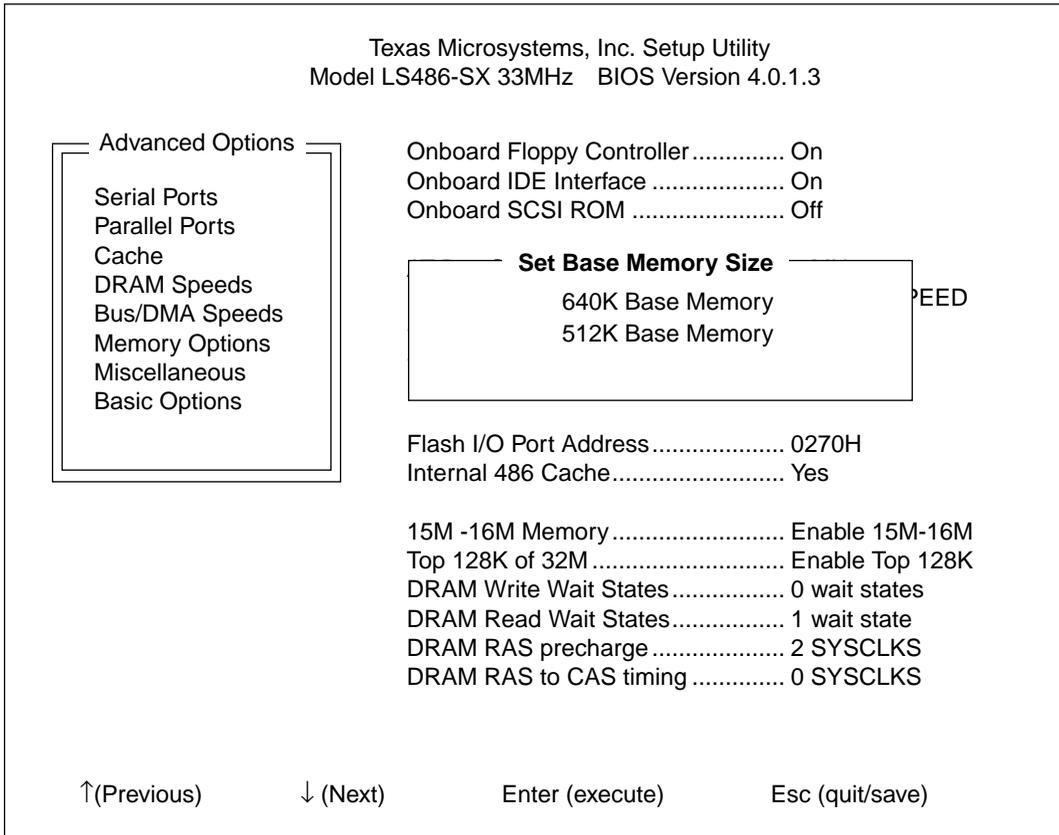
If the on-board memory is 16 MBytes or greater, this option also allows you to create a “hole” in the 15 MByte to 16 MByte region. This hole is sometimes used by UNIX add-in cards that expect to be mapped to this region. However, if a card on the AT bus must use this region, this option will allow this configuration without the removal of memory SIMM's.

Top 128K of 32M

Another option designed for UNIX users allows the enabling or disabling of the top 128 KBytes of memory. Most versions of UNIX will perform dynamic memory sizing, which can cause UNIX to “alias” memory up to the maximum 4 GByte end of memory. This can occur with the ETEQ ET6000 chip set when the LS486 is configured with 32 MBytes of on-board memory. By disabling the top 128 KBytes of the on-board RAM, you can prevent UNIX from “wrapping around” the memory map and sizing the memory incorrectly.

Using the Setup Utility

FIGURE 25 - A



Advanced Options

FIGURE 25 - B

Texas Microsystems, Inc. Setup Utility
Model LS486-SX 33MHz BIOS Version 4.0.1.3

Advanced Options

- Serial Ports
- Parallel Ports
- Cache
- DRAM Speeds
- Bus/DMA Speeds
- Memory Options
- Miscellaneous
- Basic Options

Onboard Floppy Controller..... On
Onboard IDE Interface On
Onboard SCSI ROM Off

15M to 16M Memory

Enable 15M-16M
Disable 15M-16M

Flash I/O Port Address..... 0270H
Internal 486 Cache..... Yes

15M -16M Memory..... Enable 15M-16M
Top 128K of 32M..... Enable Top 128K
DRAM Write Wait States..... 0 wait states
DRAM Read Wait States..... 1 wait state
DRAM RAS precharge..... 2 SYSCCLKS
DRAM RAS to CAS timing..... 0 SYSCCLKS

↑(Previous) ↓(Next) Enter (execute) Esc (quit/save)

FIGURE 25 - C

Texas Microsystems, Inc. Setup Utility
Model LS486-SX 33MHz BIOS Version 4.0.1.3

Advanced Options

- Serial Ports
- Parallel Ports
- Cache
- DRAM Speeds
- Bus/DMA Speeds
- Memory Options
- Miscellaneous
- Basic Options

Onboard Floppy Controller On
Onboard IDE Interface On
Onboard SCSI ROM..... Off

Top 128K of 32M

Enable Top 128K **PEED**
Disable Top 128K

Flash I/O Port Address 0270H
Internal 486 Cache Yes

15M -16M Memory Enable 15M-16M
Top 128K of 32M Enable Top 128K
DRAM Write Wait States 0 wait states
DRAM Read Wait States 1 wait state
DRAM RAS precharge 2 SYSCLKS
DRAM RAS to CAS timing 0 SYSCLKS

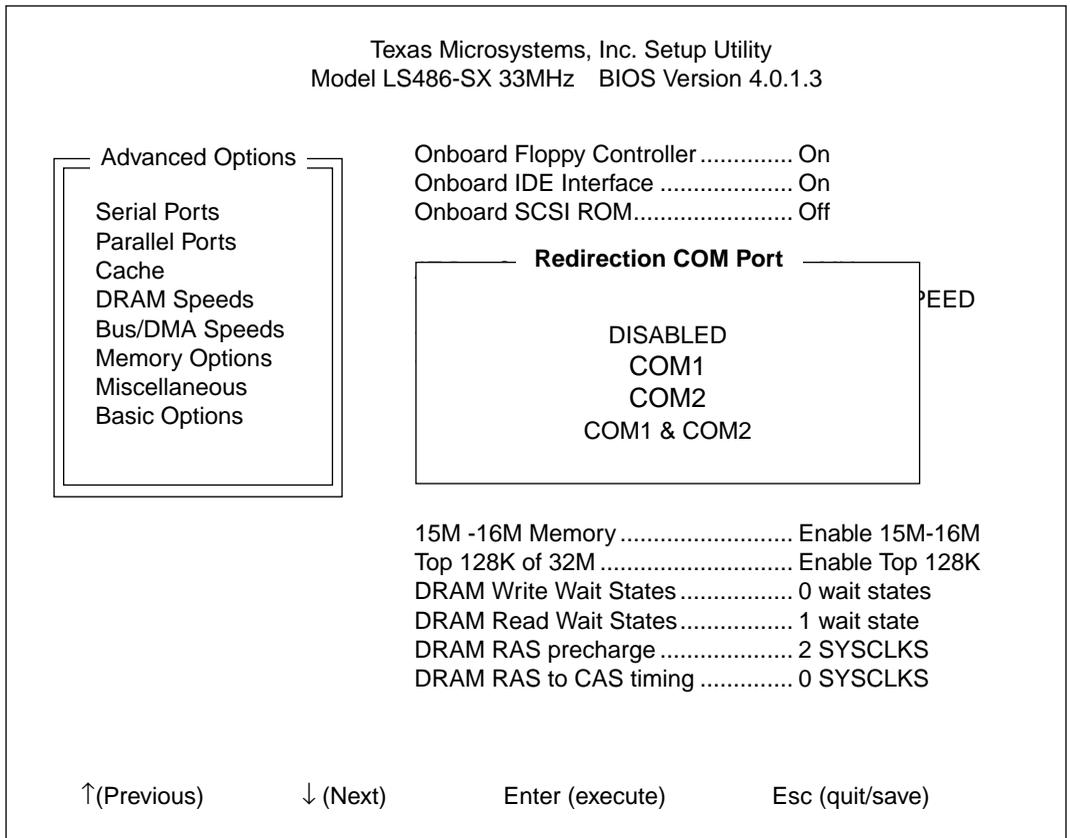
↑(Previous) ↓(Next) Enter (execute) Esc (quit/save)

5.2.7 Miscellaneous

This selection will offer additional option menus only if certain non-standard "BIOS extensions" have been installed in BIOS memory. One such extension is the Serial Redirection BIOS. When installed, the Miscellaneous selection will permit selection of a serial port, baud rate and other options pertaining to the BIOS extension.

Any installed BIOS extension will be accompanied with documentation covering options available in "Miscellaneous."

FIGURE 26 - A



Using the Setup Utility

FIGURE 26 - B

Texas Microsystems, Inc. Setup Utility
Model LS486-SX 33MHz BIOS Version 4.0.1.3

Advanced Options

- Serial Ports
- Parallel Ports
- Cache
- DRAM Speeds
- Bus/DMA Speeds
- Memory Options
- Miscellaneous
- Basic Options

Onboard Floppy Controller On
Onboard IDE Interface On
Onboard SCSI ROM..... Off

Redirection Baud Rate

SPEED

4800
9600
19200

Flash I/O Port Address 0270H
Internal 486 Cache Yes

15M -16M Memory Enable 15M-16M
Top 128K of 32M Enable Top 128K
DRAM Write Wait States 0 wait states
DRAM Read Wait States 1 wait state
DRAM RAS precharge 2 SYSCLKS
DRAM RAS to CAS timing 0 SYSCLKS

↑(Previous)↓ (Next)Enter (execute)Esc (quit/save)

5.3 Switch SW1-3 - Reload Default Setup Utility Values

Occasionally, you may encounter a situation when the CMOS RAM (Complementary Metallic Oxide Semiconductor Random Access Memory) becomes corrupted. This condition is usually accompanied by a “lock-up” of the system. The factory default Setup Utility values for LS486 operation must then be reloaded into CMOS RAM.

Under normal conditions, SW1-3 should remain in the OFF position. However, when factory default values must be reloaded, follow these procedures:

1. Remove power from the system and place SW1-3 in the “ON” position.
2. Restore power to the system. The message “System Switch 3 is ON - Default System Configuration Loaded” will appear on the screen.
3. After waiting a few seconds, remove power from the system, place SW1-3 in the OFF position and restore power.

Depending on the specifics of the system, the LS486 may boot. If it does, you can modify the setup after pressing <CTRL-ALT-S> during the memory tests. If the LS486 cannot boot, the messages “Invalid Configuration Information” and “Please Run Setup Program” and the prompts “Strike F1 to continue” and “Strike F2 for Setup” will appear on the screen. Strike <F2> to recall the Setup Utility and reset the parameters as needed. Press <ESC> to save the setup parameter values and reboot the system.

Memory Configuration

The LS486 supports up to 32 MBytes of on-board memory in various configurations. Memory can be added to the LS486 through the installation of SIMMs (Single Inline Memory Modules) into the two (2) SIMM slots at the bottom of the board (see Figure 1).

Three SIMM types (256 KByte, 1 MByte and 4 MByte) are supported by the LS486. These X36 SIMM's may be installed in Banks 0 and 1, with Bank 1 being the top SIMM slot; however, always populate Bank 0 before Bank 1 (i.e., do not leave Bank 0 empty). Table 4 summarizes the supported memory configurations.

CAUTION: Before installing SIMM's, remove power from the system by disconnecting the power cord from the power source. After power has been removed, remove the LS486 Card. Only qualified, experienced electronics personnel should access the interior of a chassis. The components of the LS486 Card are very sensitive to static discharge. Texas Microsystems recommends using a grounding wrist strap to remove all static electricity before touching the components. While out of the unit, LS486 components should be placed on a static-dissipative surface or into a static-shielding bag.

Memory Configuration

LS486 system memory decoding is handled automatically through the initialization software. For proper operation, it is necessary to configure the system memory correctly using the BIOS Setup Utility (see Chapter 5).

Table 4: DRAM Configuration

Bank 0	Bank 1	Total Memory
256K	0	1 MByte
256K	256K	2 MBytes
1M	0	4 MBytes
1M	256K	5 MBytes
1M	1M	8 MBytes
4M	0	16 MBytes
4M	256K	17 MBytes
4M	1M	20 MBytes
4M	4M	32 MBytes

Note: The memory sizes in the first two columns (Bank 0 and Bank 1) indicate which x36 (36-bit wide) SIMM is installed. The memory size in the "Total Memory" column represents the total memory in 9-bit wide bytes (i.e. 256K x 36 bits = 1M x 9 bits).

General Maintenance

As with any electronic hardware, an adequate maintenance program will enhance the LS486's ability to provide dependable performance. In general terms, maintenance includes periodic inspection of the LS486 to ensure that it is clean and free from signs of dirt, dust, wear and stress.

CAUTION: *Always remove power from the system prior to inspecting the LS486 Card. Disconnect the power cord from the power source. Only experienced electronics personnel should access the chassis' interior.*

CAUTION: *No moisture or condensation may come in contact with the LS486 electronic components or cables/connectors. Damage to sensitive components may occur.*

Inspect all cables and connectors to verify that they are securely fastened to their connecting component(s). Worn or stressed cables and connectors must be replaced. All peripheral equipment used with the LS486 should be properly maintained. Malfunctioning equipment should be immediately replaced to prevent damage to the LS486 CPU.

7.1 CPU Lithium Battery

The LS486 CPU Card contains a built-in, high-capacity lithium battery that retains the correct time, date and computer parameters in CMOS memory when the system is powered OFF. This retained information assists BIOS in performing initialization and configuration during power-up or reset operations. The battery is designed to provide years of service without replacement. However, if configuration or clock-related inconsistencies occur or the LS486 has been in service for more than four (4) years, the battery may require replacement.

Replacement of the LS486 battery requires that the old battery be unplugged and a new battery inserted in its place. A battery replacement kit may be purchased from Texas Microsystems, or the LS486 may be returned to the factory for this service. Contact the nearest Texas Micro Sales Representative for details.

CAUTION: *Always remove power from the system before replacing the LS486 battery. To ensure that no damage occurs, the power cord should be disconnected from the power source. Only experienced electronics personnel should replace the LS486 battery.*

CAUTION: *The components of the LS486 Card are very sensitive to static discharge. Therefore, Texas Microsystems recommends using a grounding wrist strap to remove all static electricity prior to touching the components. While out of the unit, LS486 components should be placed on a static-dissipative surface or into a static-shielding bag.*

WARNING: *Due to risk of fire or explosion, do not recharge, force open or heat the LS486 battery or dispose of the battery in fire.*

WARNING: *Improper replacement of the battery may cause damage to the LS486 and void the warranty acquired with the purchase of the LS486 Card.*

7.2 Return Procedure

In instances where Texas Microsystems products require service, the factory must be contacted and a Return Goods Authorization (RGA) must be obtained. When requesting an RGA number, please provide the product serial number. When authorization is given, a Return Goods Authorization number will be issued. This RGA number must appear on all packing materials and correspondence to ensure proper handling. In all instances, including return for warranty repair, an RGA must be obtained and noted, or the factory will be unable to accept delivery.

7.3 Technical Support

Texas Microsystems provides on-line technical support available during weekdays from 7:00 a.m. to 6:00 p.m. (Central Time USA) for your convenience. Our staff of trained professionals welcomes the opportunity to answer your questions and assist you with your technical requirements. Just call us toll-free at:

1-800-627-8700

You can also reach us at 1-713-541-8200. To expedite your request, please have the Texas Microsystems product model and serial number available.

If additional information is required pertaining to Adaptec's "Software Development Kit" or custom device drivers, contact the Adaptec Technical Support Department at 800-959-7274 or 408-945-2550.

This section provides application-specific information concerning the LS486/L486 CPU Card.

Memory Map - L486

Note: This notice does not apply to the LS486 (with SCSI), as E000 is not available for customer use (the SCSI BIOS resides at E000:0).

The memory address space E000:0 to E000:FFFF is reserved for on-board EPROM (BIOS). The 64 KByte block E000:0 to E000:FFFF is local to the CPU card and is not available to the ISA bus. If you have an adapter card and want to map the adapter BIOS at E000, the L486 will not detect the card on the AT bus.

If you need to use the 64 KBytes of memory between E000:0 and E000:FFFF, you can use the Flash Utility to flash your code into the 28F010 on the L486. To do this you must have:

- Flash Utility, version 4.0 or newer
- L486 BIOS binary file
- The binary file containing your custom code.

Note: The file must be a binary image file for the Flash Utility to work properly.

Setup Utility Default Settings

The following table represents the factory-default configuration settings for the LS486 CPU Card. For more information on these options, see Chapter 5, *Using the Setup Utility*.

Setup Item	Default Setting
Time	00:00:00
Date	Jan 01, 1993
Weekday	Friday
Drive A:	5 1/4 Inch, 1.2 MB
Drive B:	Not Installed
Hard Disk 1	Not Installed
Hard Disk 2	Not Installed
Video Adapter	VGA/EGA
Keyboard Typematic Settings	Keyboard Controller defaults

Technical Support

Setup Item	Default Setting
Base Memory	Dynamic
Extended Memory	Dynamic
Floating Point Unit	Dynamic
Fast Boot	Off
Boot Drive Sequence	Drive A: then C:
101-Keyboard NumLock	Off
Password Protection	None
Password	None
Boot Errors: Keyboard	On
Boot Errors: Floppy	On
Boot Errors: Video	On
Floppy Controller	Off
IDE Interface	Off
On-board SCSI ROM	Off
SCSI IRQ	None
SCSI I/O Port	140h
Serial Port 1	Disabled
Serial Port 2	Disabled
Parallel Port	Disabled
Flash I/O Port Address	Switch #2 Off = 270H On = 370H
Set Typematic Rates	Disabled
Shadow RAM	BIOS always shadowed

Setup Utility Default Settings

Setup Item	Default Setting
Internal 486 Cache	Enabled
C0000H to FFFFFH Cache	NON-cacheable
NON-cacheable Memory Block	Disabled
DRAM Write Wait States	1 Wait State
DRAM Read Wait States	2 Wait States
DRAM RAS Precharge	3 System Clocks
DRAM RAS to CAS time	1 System Clock
BUS Speed	8 MHz
DMA Speed	1/2 Bus Speed (4 MHz)
CT206 Read/Write Wait States	3 Wait States
8-Bit DMA Wait States	3 Wait States
16-Bit DMA Wait States	3 Wait States
Base Memory Size	640 KBytes
15M to 16M Memory	Enabled
Top 128K of 32M Memory	Enabled

Note: After the "Flash It!" option is used, your settings become the factory defaults.

The Adaptec EZ-SCSI Program

Note: This information is applicable to the LS486 Card only.

Included with your LS486 is a diskette containing the Adaptec EZ-SCSI program. EZ-SCSI enables you to quickly and easily install SCSI peripherals such as hard disk drives, CD-ROM drives and removable media drives on your computer. To install EZ-SCSI:

1. If you are running Windows, exit from Windows now.
2. Insert the EZ-SCSI Installation is diskette into your floppy drive.
3. At the DOS prompt, change to the drive containing the diskette. Do not use the “copy” command to copy the files to your hard disk; the files are compressed and will be automatically decompressed and copied to your hard drive.
4. Type **install** and press **Enter**.
5. Follow the instructions on the screen to complete the program.
6. When the Install program is complete, remove the Installation diskette and reboot your computer so that the new configuration can take effect.

If you have further questions, consult the Adaptec EZ-SCSI User's Manual provided with your LS486.

NOTES