CalComp
DrawingBoard

2300 SERIES

User's Guide

Part Number: 50305-5 Rev E
Order Number: M0500-040

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DrawingBoard models 23120, 23180 and 23240

Warning:
This equipment generates and uses radio frequency energy. If it is not installed and used properly, that is, in strict accordance with the manufacturer's instructions, it may cause interference to radio and television reception. It has been tested and found to comply with the limits for a Class B computing device in accordance with the specifications in Subpart J of Part 15, FCC Rules, which are designed to provide reasonable protection against such interference in a residential installation. Operation of this equipment in a residential area may cause interference, in which case the user, at his own expense, will be required to take whatever measures may be required to correct the interference. If this equipment does cause interference to radio and television reception, which can be determined by turning the equipment on and off, the user is encouraged to try to correct the interference by one or more of the following measures:

- ***Reorient the receiving antenna.***
- ***Relocate the computer/device with respect to the receiver.***
- ***Move the computer/device away from the receiver.***
- ***Plug the computer into a different outlet so that computer and receiver are on different circuits.***
- ***Reorient or coil cables.***
- ***Keep cursor or pen on the active area.***

If necessary, consult the dealer or an experienced radio/television technician for additional suggestions.

You may find the following booklet helpful:

"How to Identify and Resolve Radio TV Interference Problems". The booklet is available from the U. S. Government Accounting office, Washington, DC 20401. The stock number is 004-000-00345-4 (FCC, Part 15,838 b).

- Any cables the user adds to the device must be shielded to be in compliance with the FCC standards.

This digital apparatus does not exceed the Class B limits for radio noise emissions from digital apparatus as set out in the radio interference regulations of the Canadian Department of Communications.

LE PRÉSENT APPAREIL NUMÉRIQUE N'ÉMET PAS DE BRUITS RADIOÉLECTRIQUES DÉPASSANT LES LIMITES APPLICABLES AUX APPAREILS NUMÉRIQUES DE CLASSE B PRESCRITES DANS LE RÉGLEMENT SUR LE BROUILLAGE RADIOÉLECTRIQUE ÉDICTÉ PAR LE MINISTÉRE DES COMMUNICATIONS DU CANADA.

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DrawingBoard Models 23360, 23480 and 23600 only

Warning:
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- *Reorient the receiving antenna.*
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- *Plug the computer into a different outlet so that computer and receiver are on different circuits.*
- *Reorient or coil cables.*
- *Keep cursor or pen on the active area.*

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- Any cables the user adds to the device must be shielded to be in compliance with the FCC standards.

This digital apparatus does not exceed the Class A limits for radio noise emissions from digital apparatus as set out in the radio interference regulations of the Canadian Department of Communications.

LE PRÉSENT APPAREIL NUMÉRIQUE N'ÉMET PAS DE BRUITS RADIOÉLECTRIQUES DÉPASSANT LES LIMITES APPLICABLES AUX APPAREILS NUMÉRIQUES DE CLASSE A PRESCRITES DANS LE RÉGLEMENT SUR LE BROUILLAGE RADIOÉLECTRIQUE ÉDICTÉ PAR LE MINISTÉRE DES COMMUNICATIONS DU CANADA.

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No warranty is made with respect to custom equipment or products produced to buyer's specifications, except as specifically stated in the contract.

Seller makes no warranties except as set forth herein. Seller warrants that articles furnished hereunder are free from defects in material and workmanship, and perform to applicable published CalComp specifications. This warranty is in lieu of any other warranty expressed or implied. In no event will seller be liable for special or consequential damages as a result of any alleged breach of this warranty provision. (This does not apply in those states that do not allow exclusions or limitations of consequential damages.) The liability of Seller hereunder shall be limited to replacing or repairing, at its option, any defective units which are returned FOB Seller's plant during such applicable warranty period as is set forth below. Equipment or parts which have been subjected to abuse, misuse, accident, alteration, neglect or unauthorized repair or installation are not covered by warranty. Seller shall have the right of final determination as to the existence and cause of defect. As to items repaired or replaced, the warranty shall continue in effect for the remainder of the warranty period on the original equipment, or for thirty days following date of shipment by Seller of the repaired or replaced part, whichever period is longer. No liability is assumed for expendable items, such as pen ink cartridges and fuses.

The warranty periods for the various classes of equipment are described for desktop digitizers and free-standing digitizers.

Desktop digitizers (models 23120, 23180 & 23240)

Subassemblies and Accessories—Five years (United States) from date of shipment by the Manufacturer.

Standard and Modified Standard CalComp Equipment—Five years (United States) from date of shipment or date of installation by the Manufacturer (if installation is provided hereunder).

Free standing digitizers (models 23360, 23480 & 23600)

Subassemblies and accessories—Two years (United States) from date of shipment by the manufacturer.

Standard and modified standard CalComp equipment — Two years (United States) from date of shipment or date of installation by the manufacturer (if installation is provided hereunder).

Shipping damage

Inspect and test equipment as soon as it is received. If the equipment shows signs of damage, please notify the carrier immediately and request that their claims agent prepare a damage report.

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Preface

This User's Guide explains how to start using your DrawingBoard. To learn more about:

- Connecting cables, see page 3-2.
- Tablet features, see page 2-3.
- Using the menu, see page 4-4.
- Available commands, see pages 5-1 to 5-28.
- Output formats, see page A-13.
- Three set up procedures see page 4-7.

Package contents

In each DrawingBoard package the following items are standard:

- DrawingBoard digitizers
- Kit (user-defined accessories)
- User's Guide

About this manual

Use the following chapter descriptions to help you locate the information you need quickly and efficiently.

- Chapter 1 describes how a DrawingBoard works and explains the use of the active area and pointing devices.
- Chapter 2 covers the step-by-step process for connecting cables.
- Chapter 3 describes the menu; its different set up procedures and menu block definitions.
- Chapter 4 explains the commands that are available to you.
- Appendix A defines the output formats.
- Appendix B describes a BASIC program that causes an IBM or compatible system to accept and display data from the tablet.
- Appendix C explains how to write a batch file.
- Appendix D gives DrawingBoard specifications.
- Appendix E tells how to order options and accessories.
- Appendix F covers troubleshooting and product support.

- Appendix G lists the major changes to the 23240.
- Appendix H describes how to use AutoCAD 10 with the Macintosh.
- Appendix I is the ASCII chart.
- Appendix J contains the glossary

Special text elements

This User's Guide has been designed so that important elements are easily seen.

A note points out information of special interest.

◗ Caution statements describe the steps you should use to preserve your work and successfully operate your equipment.

Warning statements alert you to possible danger.

Any words printed in **computer type** contain commands that you need to type at your keyboard.

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Introduction

This chapter describes how a DrawingBoard™ works and explains the tablet's features.

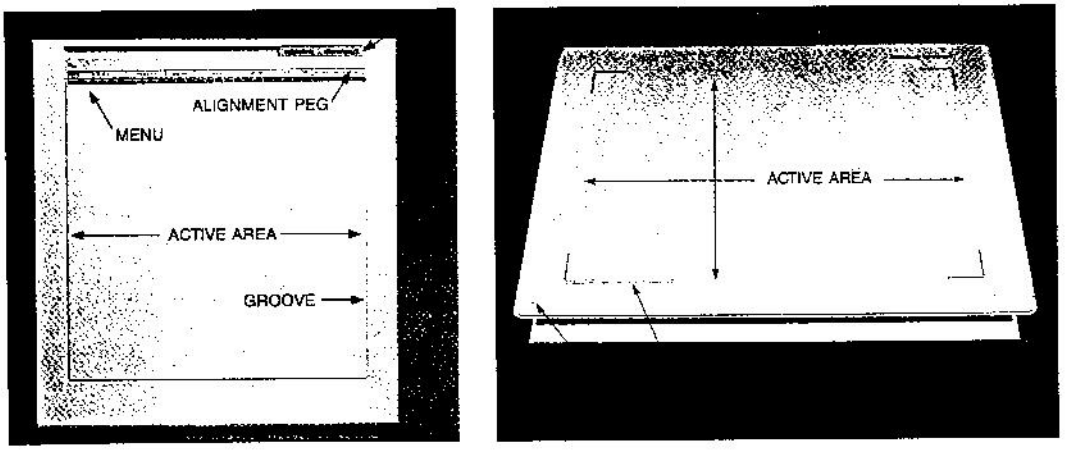
What is a DrawingBoard?

The DrawingBoard can be used for drawing, drafting, mapping, desktop publishing, animation, and presentation graphics. By placing a drawing or sketch on the tablet's surface and tracing over it, you can easily convert graphic information into accurate digital information for entry into the computer.

How the digitizer works

An ac current flowing in the cursor electromagnetically induces voltages into precisely positioned conductors beneath the tablet's surface. The tablet electronics finds the tablet grid conductors with the largest signals and converts the grid signals into digital position data. The tablet sends the information out the communication port to the host. The data generated indicates the distance vertically and horizontally from the origin on the digitizer's surface.

Tablet features



Models: 23120, 23180, 23240

Figure 2-1 Tablet surface defined

Models: 23360, 23480, 23600

Indicator light

The yellow light indicates power and proximity. The light is on when the pointing device is within 0.4 inches of the active areas surface. When the cursor is out of the active area, the light flashes.

Active area

The 23120 DrawingBoard's active area is slightly smaller, 11.7" x 11.7" or 297.18mm x 297.18mm when emulating Summagraphics MM1201.

The active area allows accurate digitizing. The tablet detects the cursor within 0.4 inches of the active area. You can digitize through non-conductive surface materials such as sketch pads. Digitizing through thin metallic materials is also possible although resolution and accuracy are reduced.

Adjusting the tablet legs

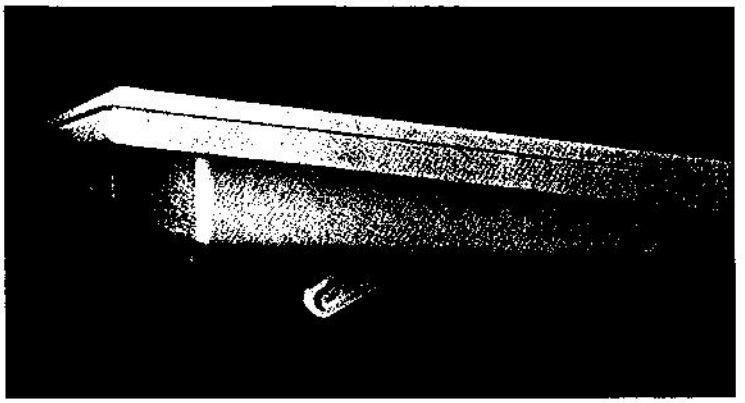


Figure 2-2: Adjusting the tablet legs

The DrawingBoard model 23120 has two tilt angles. The wedge shape of the base provides one. In addition, two legs are recessed into the underside of the tablet. To increase the tilt of the tablet, rotate these legs out until they touch the rear edge of the recess. You will notice some resistance when the legs are partially rotated. This is not a stable position, and should not be used. The legs should either be folded into their recess or fully rotated.

Pointing devices

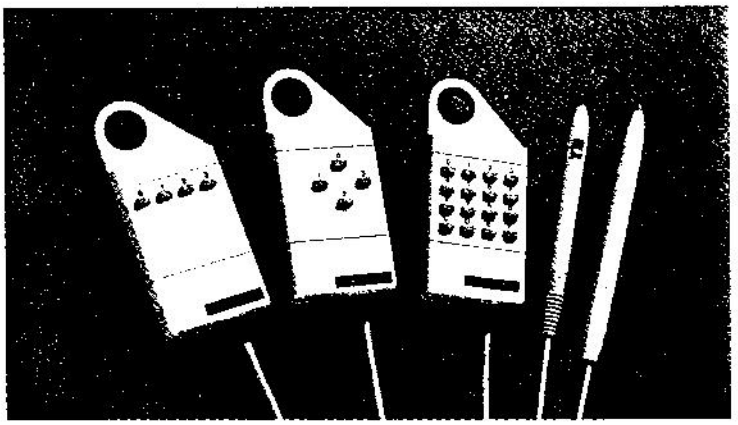


Figure 2-3: Pointing devices

Six pointing devices are available for use with the DrawingBoard: the 4 button cursor, the 16 button cursor, the tip-switch pen, the one button pen, the two button pen, and the pressure sensitive pen.

The pointing devices operate in absolute or relative mode. Which mode you use depends on your software or your project.

Using the pointing device

The cursor body can be turned in any direction, but it must be laid flat on the material to be digitized.

After you put the material you want digitized on the active area, place the cursor on the material. Move the cursor until the intersection of the crosshairs covers the point to be digitized. (Crosshairs on the bottom of the cursor lens minimize parallax error. For maximum precision look through the lens from directly over it).

A digitizer uses absolute positioning

The digitizer's surface represents the screen. When the pointing device is on the lower-left corner of the tablet, the cursor appears in the lower-left corner of the screen. The tablet copies the movements of your cursor to the on-screen cursor. This provides you with accurate digital information. Use absolute positioning and your pointing device with CAD programs, when tracing drawings, and creating computer graphics

4 or 16 button cursor

Some programs accept the input from the cursor buttons as if it were a small keyboard. Refer to your software manual to learn if it supports multi-button cursors. Table 4-2 on pages 4-10, 4-11, and 4-12 contains menu settings for selected graphic packages.

Tip-switch pen

The pen permits rapid sketching and menu picking. The pen tip is similar to a cursor button. Place the pen on the point you want digitized and press down gently. You will feel a click. Release by lifting up. To produce the most accurate data, hold the pen vertically.

One button pen

This pen can be used like a standard pen or the button on the side can be used for added command functions. The tip is the Ø button and the side-switch is button 1.

Two button pen

This pen can be used like a standard pen or the buttons on the side can be used for added command functions. The two button pen acts like the first three buttons of a four button cursor. The tip is the Ø button and the side switches are buttons 1 and 2 . One or both buttons can be pressed, or any combination of buttons and pen tip. Tables A5 and A6 on page A-12 contain possible output formats.

- If you need to open the pen, turn the body of the pen and not the nose/switch section.

Pressure sensitive pen

The pressure sensitive pen allows the user to communicate variable data to the system by changing the pressure applied to the pen tip. The software can then assign values to the pressure levels and use this data to vary such parameters as line width and color.

A mouse uses relative positioning

A mouse does not track its exact position. The movement of the on-screen cursor reflects the direction and distance that the mouse has moved while on the active area of the tablet. The tablet copies the movements of your pen or cursor to the on-screen cursor. Using the DrawingBoard allows you to make the on-screen cursor move across the full width of the screen while the mouse stays in a small area on your tablet.

You can use mice to point to menus and words or for moving objects on the screen. Page layout, word

processing, and spreadsheet programs work well with a tablet in mouse mode.

Emulating a mouse

The Mouse System Mouse can be emulated by selecting Mouse on the menu. However a mouse driver must be present.

Installing the Hardware

Before you can use your DrawingBoard, you need to connect all the cables. This chapter also explains the RS-232 interface and the dc power connector.

Cable connections for DrawingBoard models 23120, 23180, and 23240

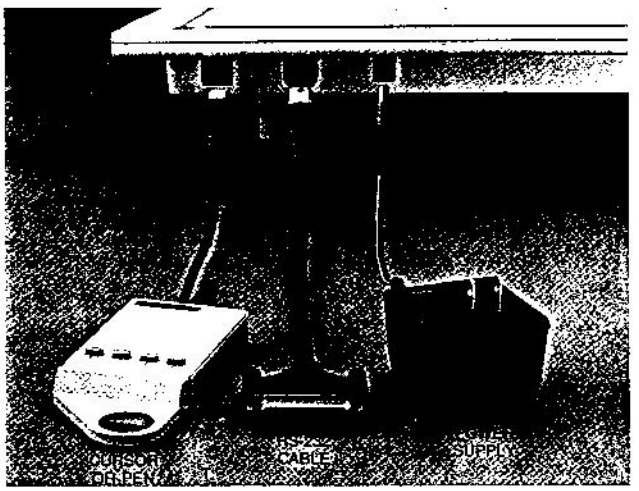


Figure 3-1: 23120, 23180, and 23240 cable connections

All cable connections are made facing the rear panel of the tablet.

1. Insert the plug of the cursor or pen cable into the far left socket by positioning the arrow on the plug toward the bottom of the tablet.

2. Connect the RS-232 (Asynchronous Communications Cable) to the center socket. Match the indentation in the plug with the notch in the socket. Connect the free end of the RS-232 cable to the computer's serial communication port using the 9-to-25 pin adaptor, if necessary.

3. Connect the power cable into the far right socket of the tablet. Connect the free end of the power cable to a power outlet. The yellow light-emitting

diode (LED) in the tablet's upper right corner glows if the cursor or the pen is in the active area. It flashes if the cursor or pen is outside the boundaries of the active area.

- The tablet is on any time the power supply is plugged into a live outlet. To turn the tablet off, unplug it.

If clamps are used on the extrusions they must be kept within one inch of the outer edge of the tablet.

Do not use another manufacturer's power supply for the tablet unless both the plug type and polarity of their power supply match the tablet's requirements. If you plug a power supply with the wrong polarity into the tablet, the tablet will not power up. Page D-2 lists power supply specifications.

Cable connections for DrawingBoard models 23360, 23480, and 23600

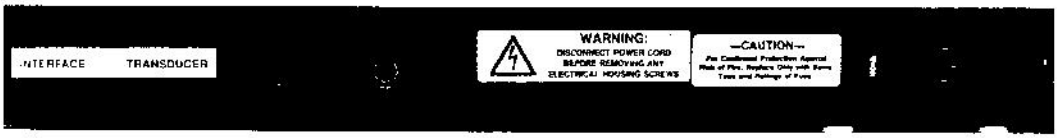


Figure 3-2: 23360, 23480, and 23600 cable connections

Before you plug in the digitizer, check that the voltage displayed in the fuse box matches your line voltage. See pages 3-12, 3-13, and 3-14 to learn how to change the voltage.

All cable connections are made facing the rear panel of the tablet.

1. Insert the plug of the cursor or pen cable into the middle socket by positioning the arrow on the plug toward the bottom of the tablet.

2. Connect the RS-232 cable to the left socket. Match the indentation in the plug with the notch in the socket. Connect the free end of the RS-232 cable to the computer's serial communication port using the 9-to-25 pin adaptor, if necessary.

3. Connect the power cable into the far right socket of the tablet. Connect the free end of the power

cable to a power outlet. The yellow LED in the tablet's lower-left corner glows if the cursor or the pen is in the active area. It flashes if the cursor or pen is outside the boundaries of the active area.

- Use the power switch on the far left side to turn the tablet on or off.

Do not use another manufacturer's power supply for the tablet unless both the plug type and polarity of their power supply match the tablet's requirements. If you plug a power supply with the wrong polarity into the tablet, the tablet will not power up. Page D-2 lists power supply specifications.

- If clamps are used on the extrusions, they must be kept within one inch of the outer edge of the tablet.

Communications

The tablet uses asynchronous serial RS-232C transmission with RS-232C/CCITT V.24 signals. The host end of the cable is standard. Figure 3-3 contains pin out diagrams of the connectors.

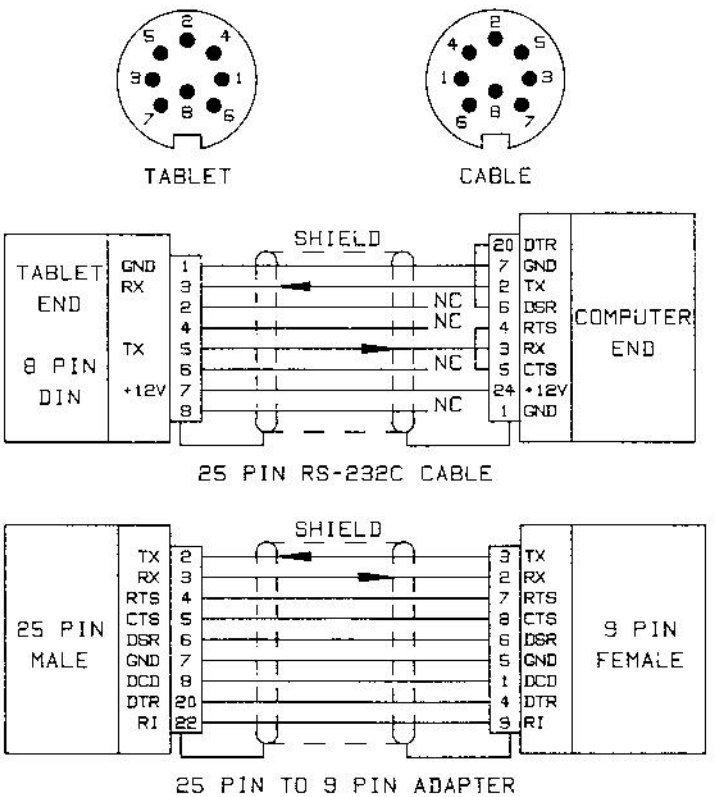


Figure 3-3: Pin identification

DC power connector

Do not use another manufacturer's power supply for the tablet unless both the plug type and polarity of their power supply match the tablet's specifications. If you plug a power supply with the wrong polarity into the tablet, the tablet will not work. The Drawing-Board requires a 2.1mm monoplug with an outside ring of +12 volts @ 500mA, and a negative inside diameter.

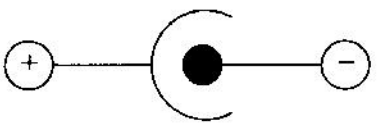


Figure 3-4: Schematic diagram of connector

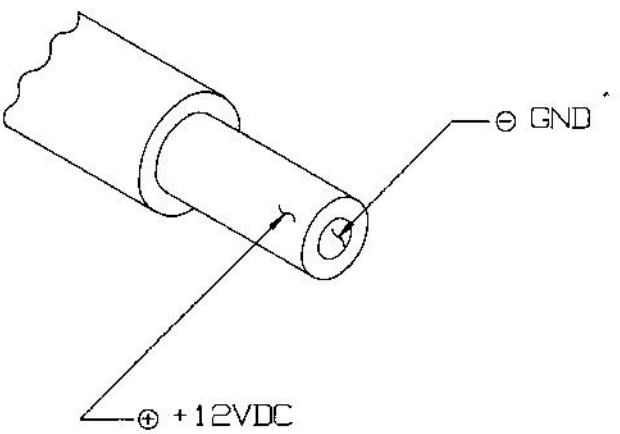


Figure 3-5: Physical diagram of connector

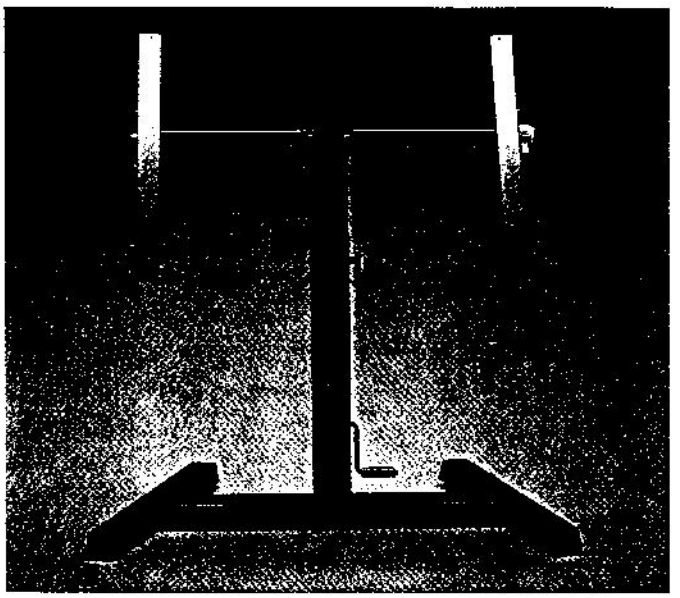


Figure 3-6: Manual lift base

Space requirements for the free standing DrawingBoard and base

A DrawingBoard requires enough room for its depth and width plus its accessories and working room for the operator. As an estimate, allow approximately one foot (300mm) extra for each side of the tablet and three feet (1M) in front of it for the minimum working room.

Environmental considerations

Follow these precautions at all times to avoid damage to the tablet:

- Avoid discharging static electricity to the tablet.
- Do not place heavy objects on the digitizing surface.
- Do not use sharp objects, like compasses or knives, on the tablet surface.
- Do not use the tablet surface for any purpose other than digitizing.
- If clamps are used on the extrusions they must be kept within one inch of the outer edge of the tablet.

Although the surface is waterproof, spilled liquids may leak between the frame and surface. This could cause damage inside the frame. Do not use excessive amounts of cleaning fluids.

Assembling the base

The following assembly procedures are for the CalComp manual lift base only. If you are mounting your DrawingBoard to a different pedestal, please refer to their assembly instructions.

Base package contents

The following items are standard in each box:

- 6 3/8-16 hex nuts
- 10 3/8 lock washers
- 4 3/8-16 x 3/4 long bolts
- 1 Clamp knob assembly
- 4 Glides with jam nut

- 4 1/4-20 hex nuts
- 4 1/4 lock washers
- 4 1/4-20 x 3/4 long bolts
- 1 1/4-3/4 wrench

Warning:
The tablet and base are heavy. The assembly and mounting procedure should be performed by at least two people.

Fitting the base parts

Follow these steps to assemble the base.

1. Lay the carton flat on the floor and remove the plastic banding from around the top and base of the carton.

2. Open the reinforcing flaps from around the base of the carton and lift the carton top straight up. This will expose the base.

3. Cut loose the following components as the carton is lying on the floor: the pedestal, the tilt bracket, and the plastic package containing the hardware.

   - Make sure all the components are removed from the package before going on to step 4.

4. Remove the plywood panel from the carton and place it face down on the floor.

   Handle the plywood carefully in order not to damage the base's painted surface.

5. Remove the bolts securing the legs.

6. Insert two leveling glides on the bottom of each leg.

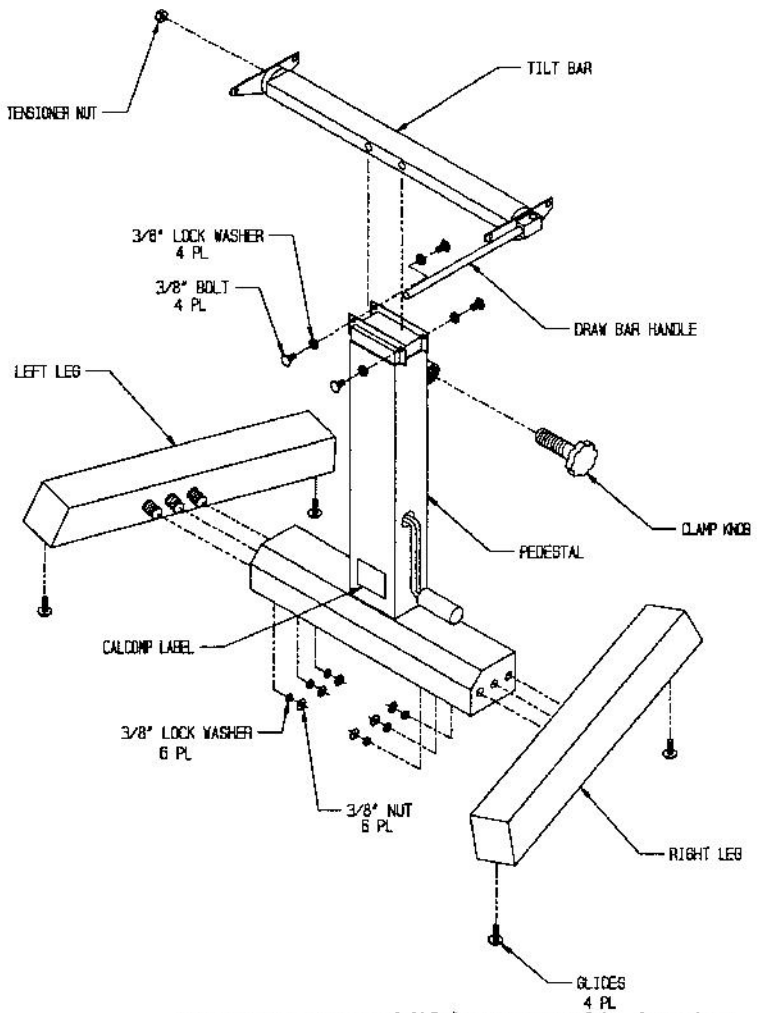


Figure 3-7: Manual lift base assembly drawing

7. With another person's help, carefully rotate the pedestal until it rests on its cap.

8. Fasten the legs to the pedestal with six 3/8" lock washers and six 3/8" nuts. The short leg angle goes to the rear. This spreads the legs wider in the front than in the back and gives stability to the base.

- Tighten the bolts with the wrench from the hardware package.

9. With another person's help, carefully rotate the pedestal until it rests on its legs.

10. Fasten the tilt bracket to the top of the pedestal with four 3/8" lock washers and four 3/8" bolts. Check that the draw bar handle is placed on the same side as the crank handle in the pedestal.

11. Place washer on clamp knob bolt.

12. Insert clamp knob bolt into the opening on the back of the pedestal; tighten in a clockwise direction until it meets the pedestal.

You are now ready to install the DrawingBoard.

Mounting the tablet

Follow these steps to attach the DrawingBoard:

1. Extend the draw bar handle to the right until it makes a 90° angle. This releases the tension on the tilt brackets so that you can move them to a horizontal position.

2. With another person's help, stand the tablet on its bottom edge with the mounting brackets facing the front of the pedestal.

3. Lift the tablet up. Align the tablet's mounting bracket holes with the holes in the tilt brackets.

4. With one person holding the tablet steady, insert two 1/4" bolts, nuts, and washers in each bracket; tighten hardware securely.

g the tablet's height and tilt

To raise or lower the tablet follow these steps:

1. Loosen the clamp knob until it moves freely.
2. Turn the hand crank clockwise to raise the tablet and counterclockwise to lower the tablet.
3. Tighten the clamp knob after the desired height is reached.

The height is adjustable from 34" to 49" from the floor.

- Do not lubricate any of the moving parts on the tilt bar.

To tilt the tablet follow these steps:

1. Hold the tablet in its present position with one hand. With the other hand, extend the draw bar handle to the right until it makes a 90° angle.
2. Continue to support the tablet and adjust the tablet's tilt.
3. Return the draw bar handle to its locked position.

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Power entry unit

Figure 3-8: Power entry unit

The power entry unit is located on the black flipdown tray beneath the tablet's surface.

Changing the operating voltage

The voltage housing is located on the right side of the black flipdown tray.

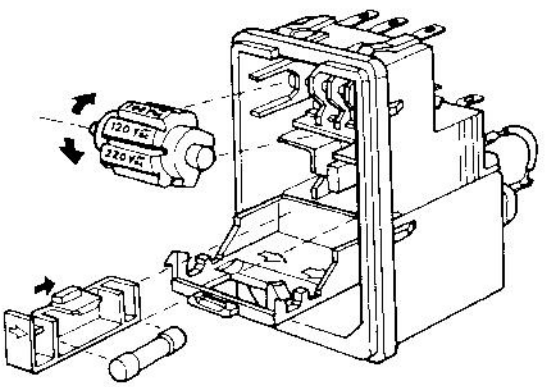

Figure 3-9: Voltage housing

The internal power supply may be operated at the following positions and ranges:

Positions	Ranges
100V	90-110VAC/50-60Hz
120V	110-125VAC/50-60Hz
220V	200-230VAC/50-60Hz
240V	230-260VAC/50-60Hz

Warning:
Disconnect the power supply from the tablet and the power outlet.

To change the power supply voltage:

1. Insert a small flat blade screwdriver into the notch at the right end of the fuse block cover. The cover will swing open to the left.

2. Pull the voltage selector wheel straight out of its housing.

3. Orient and insert the wheel so that the desired voltage position faces out.

4. Replace the cover and verify that the correct voltage appears.

Changing the fusing

Warning:
To prevent fires or electric shocks always replace fuses with the same type and rating of fuse.

The tablet requires two 20mm fuses rated at .125A for 250 VAC. To change the fusing:

1. Insert a small, flat-blade screwdriver into the notch at the right end of the fuse block cover. The cover will swing open to the left.

2. Insert a small, flat-blade screwdriver above the arrow on one of the fuse boxes and pull it out.

3. Replace the fuse.

4. Reinsert the fuse box. Replace other fuse if necessary.

5. Replace the cover and verify that the correct voltage appears.