
CalComp

9500 Digitizer Series

User's Guide

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Order Number: M0095-070

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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 A 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 commercial 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).

◆ **Caution:**

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

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 periods of warranty for the various classes of equipment are:

Subassemblies and Accessories — Two years from date of shipment by the Manufacturer.

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

Custom Equipment or Product Produced to buyer's specifications—no warranty is made with respect to this class of equipment, except as specifically stated in the contract.

Warranty work performed on site for the first 90 days. After the initial 90 days, the tablet must be returned for service.

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 report of damage.

User safety information

Warning:
Warning statements notify you of possible danger to life and safety.

Notes point out information of special importance or interest.

- ◆ Caution statements describe the steps required to preserve your work and successfully operate your equipment.

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9500 and SMART
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roduction

This chapter describes how a digitizer works.

The 9500 series digitizer

The CalComp 9500 Series digitizer represents the newest generation of high resolution, high performance graphic input devices. The 9500 digitizer is designed for OEM (original equipment manufacture), industrial, and business applications. The standard model includes two major components: an active surface tablet where digitizing occurs and a transducer for input of positional data. Processing electronics are completely self-contained within the tablet and are easily removed and replaced for ease of maintenance and upgrading. It combines high resolution, accuracy, and ruggedness with versatility and low maintenance to form a system which will reliably serve and grow with user applications.

By placing a drawing or sketch on the tablet's surface and tracing over it, you can easily convert graphics into accurate digital information and enter it into a computer or automated design station. The computer may then store, redraw or even manipulate the drawing's graphic composition.

The tablet

The 9500 features electromagnetic technology that gives precise, stable data. The standard opaque tablet is available in a variety of tablet sizes ranging from 24 by 36 inches (610mm x 914mm) to 44 by 60 inches (1219mm x 1524mm). Resolution up to 10,160 lines per inch (400 LPmm) and accuracy of ± 0.005 inch is standard with each unit. High accuracy of ± 0.002 is available. The tablet communicates output data in a choice of interface configurations: RS-232C and GPIB/HPIB/IEEE488.

Pointing devices

The pointing devices are rugged, lightweight, and accurate. The 9500's transducer can be either a pen or a multibutton cursor. The pen uses either an ink or non-ink type of ballpoint cartridge. The cursor is available in 4 or 16 button versions and has a lens with cross hairs that is used to select points to be digitized. The multibutton cursor contains a user definable keyboard. Application software packages enable you to assign a different software command to each button.

How the 9500 works

An ac current flowing in the transducer electromagnetically induces voltages into precisely positioned conductors beneath the tablet's surface. The tablet electronics find 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. Data indicates the distance vertically and horizontally from the origin on the digitizer's surface.

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Installation

This chapter describes the assembly procedures for the Mayline base and the CalComp manual lift base; tablet mounting; and tablet height and tilt adjustments.

To learn more about:

- Assembling the Mayline base, see page 2-5.
- Assembling the CalComp manual lift base see page 2-22.
- Mounting the tablet to the base, see page 2-3 and 2-26.
- Adjusting the tilt, see page 2-11 and 2-27.

Space requirements

A digitizer 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 requirements

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

1. Avoid discharging static electricity to the tablet.
 2. Do not place heavy objects on the digitizing surface.
 3. Do not use sharp objects, like compasses or knives, on the tablet surface.
 4. Do not use the tablet surface for any purpose other than digitizing.
 5. 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.
- ◆ If clamps are used on the extrusions, they must be kept within one inch of the outer edges of the tablet.

Using the 9500 on a table



Figure 2-1: Attaching the moulding

A moulding is provided that serves as a bumper foot when the tablet is mounted on a table top. To install the moulding follow these steps:

1. Remove the four pieces of flexible edge moulding from the accessory kit.
2. Install two pieces of moulding per bracket. Position the moulding at suitable places along the brackets. Repositioning can be done at any time.

Mounting a tablet to a Mayline base

The optional power lift base supports tablets with the following model numbers and active areas: 95360 (24" X 36"), 95480 (36" X 48"), 95600 (44" X 60"). The following assembly and adjustment procedures are for

the Mayline brand base only. If you are mounting your 9500 Digitizer tablet to a brand of pedestal other than Mayline®, please refer to their assembly instructions.

Hardware and tools

Inside the Mayline pedestal box are hardware and tools for assembling the pedestal.

Quantity	Item
3	Allen wrenches
1	7/16" hex wrench (for tightening leg bolts)
3	Cable clamps (discard)
5	#12 threadform screws (discard)
4	1/4" cap screws (on the pedestal tilt brackets)
8	1/4" X 1/2" bolts (on chrome or black legs)
2	Mounting brackets (discard)

An accessory box inside the 9500 tablet shipping carton contains the following hardware for attaching the tablet to the pedestal:

2	10-32 X 1/4" pan head screws (for lift switch)
4	8" flexible edge mouldings

A phillips screwdriver will be needed for mounting the power lift switch to the tablet.

Warning:

The tablet and pedestal are heavy. This assembly and mounting procedure is to be performed by a minimum of two persons.

- ▶ Do not push on or activate the pedestal tilt brake handle until reading the installation instructions in the User's Guide. A small brochure is wrapped with packing material around the lift switch box (at the end of the electrical cable). All warnings and cautionary recommendations are to be followed carefully, as Cal-Comp is not liable for any damages incurred from misuse of a manufacturer's pedestal equipment.

Assembling the Mayline base

1. Remove the nylon banding from around the top and base of the pedestal carton.
2. Open the reinforcing flaps from around the base of the carton and lift the carton top straight up and off of the bottom skid. This will expose the pedestal, accessories and packing material.
3. Remove all inside packing and parts from ends and top of pedestal. Do not remove the pad taped to the top of the central columns. Allow the power cord and lift switch box to rest on the ribbed rubber pad.
4. Remove the packing material, instruction brochures, and the small bag of tools and hardware that are taped to the lift switch box.
5. With another person's help, carefully rotate the pedestal until it rests on its cap.

It may be necessary to put some packing corrugate under the cap or tilt brackets to keep the pedestal from tipping.

6. Remove the legs from the shipping box and remove the four 1/4" bolts from each leg.

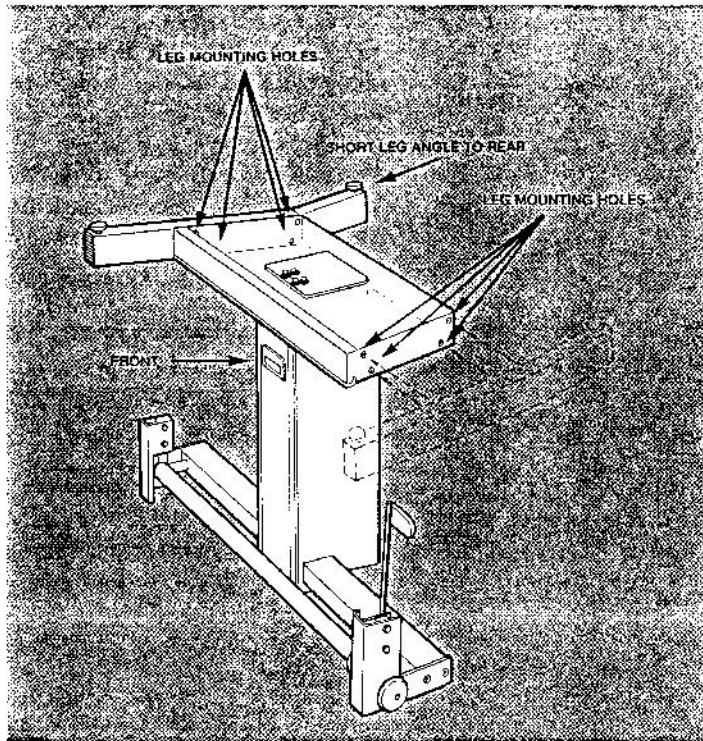


Figure 2-2: Attaching the legs

7. Fasten the legs to the pedestal with the 1/4" bolts. Legs and pedestal are marked to indicate the front. The short leg angle goes to the rear. See Figure 2-2. Tighten the bolts with the hex wrench from the pedestal hardware bag.
8. With another person's help, carefully rotate the pedestal until it rests on its legs.
9. Remove the two (or three) 1/4" diameter cap screws from each side of the tilt bracket.
 - Save these screws. They are used when installing the tablet.

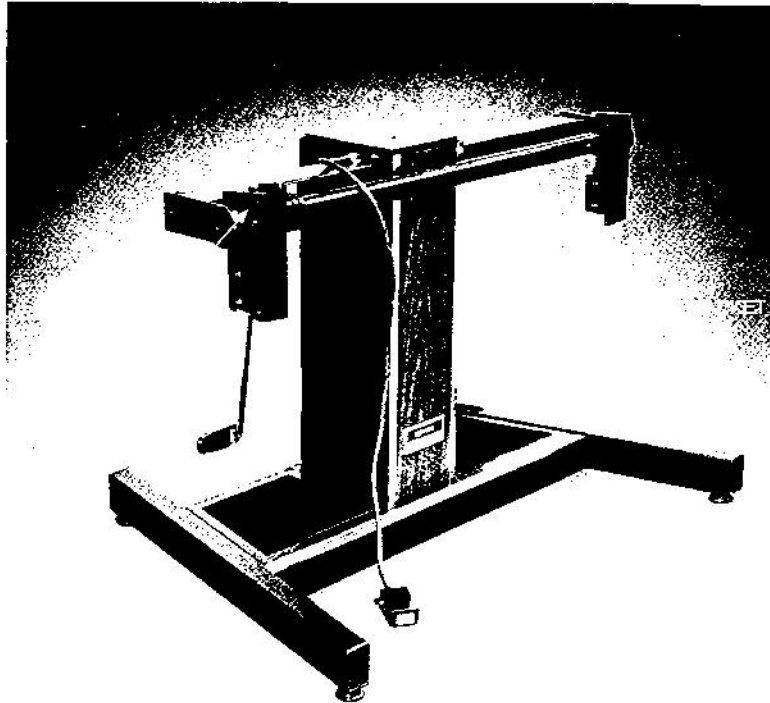


Figure 2-3: Mayline base

10. Remove all tape and pads from the pedestal.
11. Drape the switch box electric cord over the pedestal pivot tube. See Figure 2-3. This must be done before the tablet is mounted.

Opening the 9500 shipping carton

1. Place the crate containing the digitizer horizontally.
2. Cut the two nylon bands from the crate.

3. Remove the top cover.

The small cardboard box contains the standard tablet accessories.

4. Lift the digitizer out of the crate. Place your hands along the sides of the digitizer. Do not lift at the corners.

Mounting standard tablets

1. Stand at the left front side of the pedestal. Place your foot on the pedestal leg. Position another person on the right side of the pedestal, with the same foot position.

◆ Do not place your fingers between the tilt brackets and the pivot tube.

2. The person on the left front side of the pedestal should firmly lift the tilt lever up to a horizontal position. As the brackets rotate to a horizontal position, slowly release the tilt lever while holding the spring loaded side of the tilt bracket down with your palm.

◆ The spring loaded tilt lever can release quickly if accidentally raised.

3. Plug in the pedestal power cord.

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

5. Lift the tablet up. Set it on the pedestal tilt brackets, positioning the mounting bracket cutouts over the pivot tube covers. See Figure 2-4. The tablet mounting brackets fit over the tilt brackets and permit little or no side-to-side movement.

6. With one person holding the tablet steady, locate the power lift switch. Press the switch and raise the tablet up until the drive mechanism goes into neutral or the clutch chatters. Movement continues only while the switch is depressed.
7. Align the mounting bracket holes with the threaded holes in the tilt brackets. Attach the tablet to the tilt brackets using four 1/4" diameter capscrews which were previously removed. See Figure 2-4.
8. Tighten all the screws.
9. Unplug the pedestal power cord.
10. Fasten the lift switch box on the back left side of the tablet See Figure 2-5. Two threaded holes position the switch box approximately even with the bottom edge of the tablet. Use two #10 X 1/4" screws from the hardware bag.

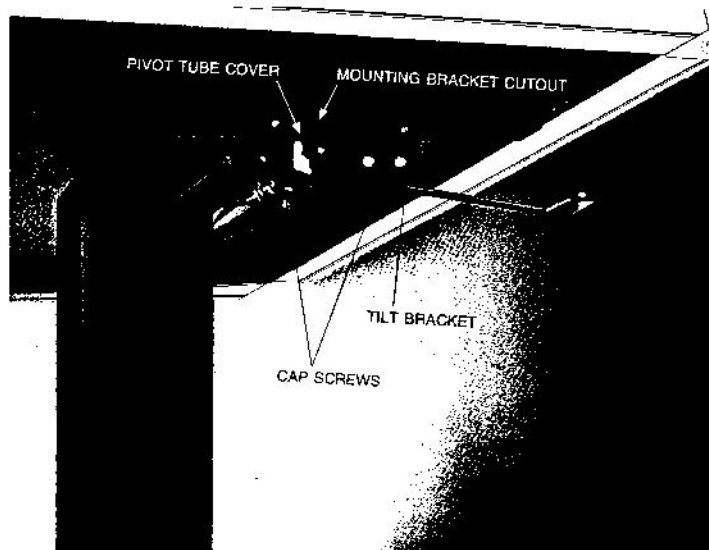


Figure 2-4: Fitting the tablet to the pedestal

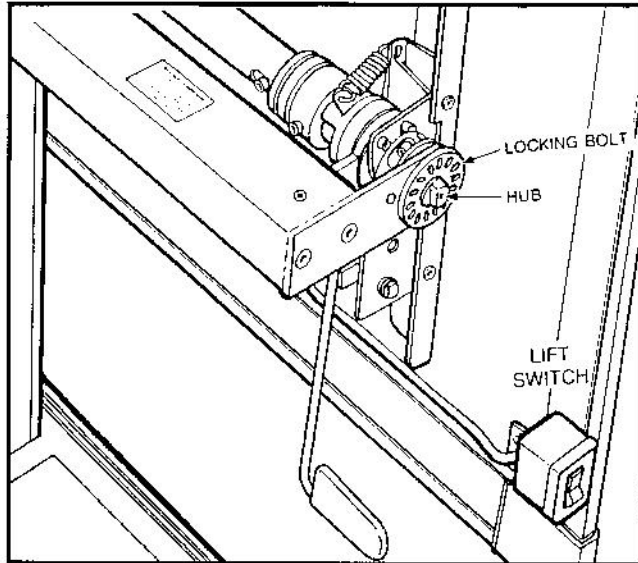


Figure 2-5A: Attaching the lift switch box (48" & 60")

11. Next level the pedestal base. The tablet's tilt is controlled by the hand lever. Adjusting the tension on the tilt lever can make it easier or harder to tilt the 9500.
12. Plug in the pedestal power cord.
13. Raise or lower the 9500 by pressing the rocker switch.

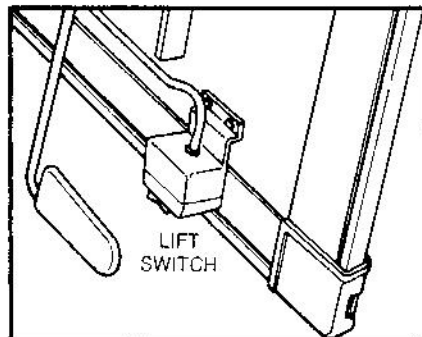


Figure 2-5B: Attaching the lift switch box (36")

Adjusting the tilt

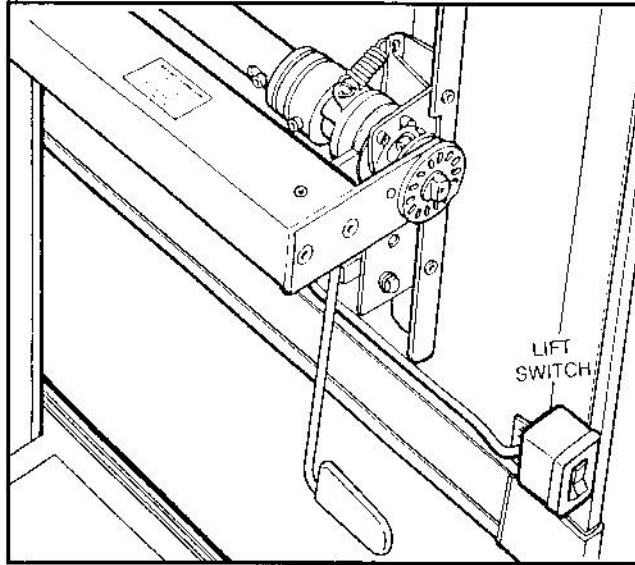


Figure 2-6: Adjusting the tilt mechanism

Adjust the tilt on the 95600 only if the Mayline brake is not holding the tablet.

Warning:

The tilt mechanism is under tension. Removing the locking bolt releases the tension. Holding the wrench firmly on the hub as you loosen the locking bolt, prevents the wrench from being dislodged. A 12 inch or larger adjustable crescent wrench with a long handle gives the best leverage for the adjustments. Always disconnect the pedestal power cord before making adjustments.

1. Before tilting the digitizer tablet, lower the tablet as far as possible (until you hear the clutch chatter). Tilt the digitizer tablet to vertical.
2. Remove the conical housings, from both ends of the tilt mechanism.
3. Fasten the wrench to the hub. With an allen

wrench, remove the locking bolt. Using the wrench, turn the perforated disc one hole and replace the locking bolt. (To increase tension always turn the top edge of the disc towards the underside of the tablet).

4. Check the operation of the tilt lever. If additional adjustments are required, repeat step three at the other end of the tablet. Continue adjusting the tension, one hole at a time, alternating ends, until proper balance is achieved. Replace the conical housings.

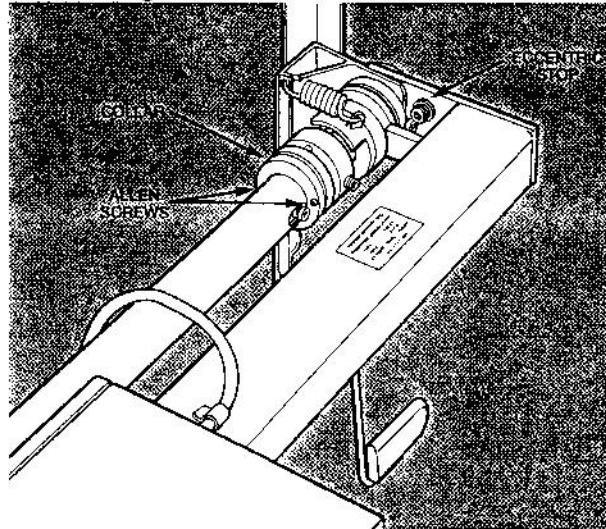


Figure 2-7: Adjusting the tilt (detail)

5. Prevent a full vertical position (recommended with the larger tablets) by adjusting the eccentric stop on the tablet base. See Figure 2-7. Adjust the eccentric stop by loosening the cap screw from the other side of the bracket support. Rotate the stop and retighten the cap screw. The widest part of the stop should be toward the protruding nut on the pivot.

Tilt lever clearance

The clearance between the tilt lever and the tablet frame may be adjusted. Decreasing the clearance so that the lever and frame may be grasped at the same time allows you to use both hands to tilt the tablet. As the clearance is decreased the braking effect of the tilt mechanism is also increased, giving better control over large tablets.

To change the clearance:

1. Adjust the allen screws in the collar.
2. Push the tilt lever against the underside of the tablet while you turn the set screws.
3. After adjusting the screws, rotate the collar back to the position shown in Figure 2- 7.

Cable connections

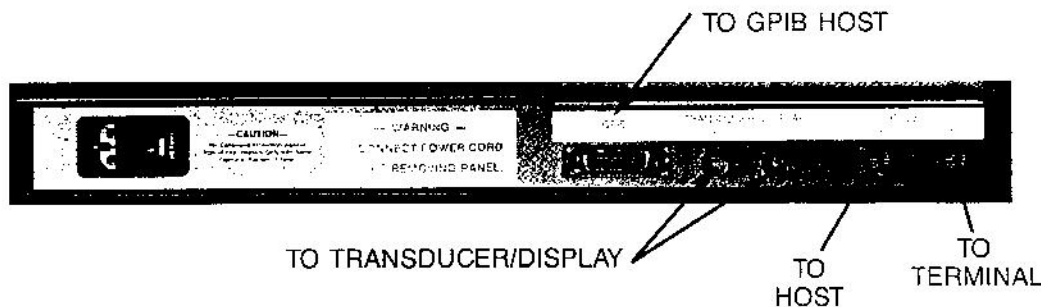


Figure 2-8: Cable connections

The accessory box contains one RS-232 male cable, one RS-232 female cable, and four cable clips. Connect all the cables under the top edge of the 9500 surface. All the sockets are labelled for easy identification.

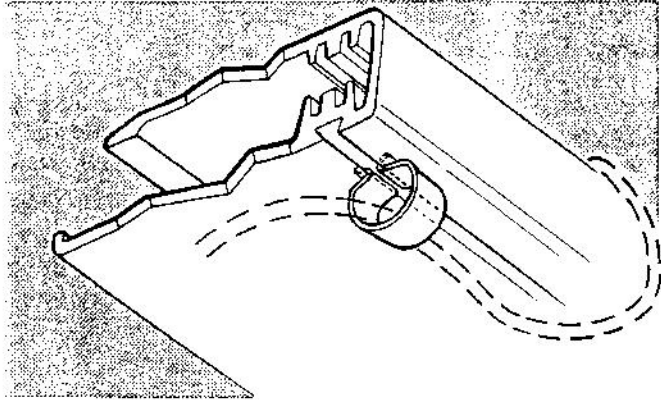


Figure 2-9: Inserting cable clips

Place the cable through the bottom loop of each cable clip. Use the clips (squeeze and release), to route the cable in the groove underneath digitizer.

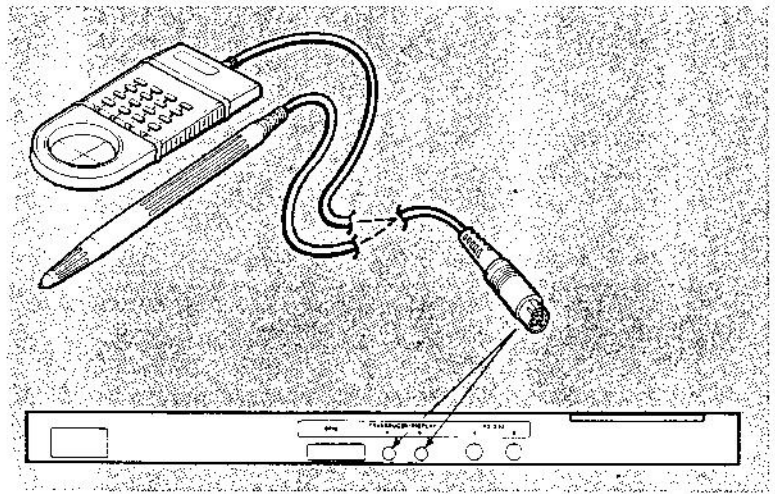


Figure 2-10: Connect cursor-to-tablet

1. Connect the cursor or pen plug into the female socket labelled Transducer/Display A or B. You will not be able to run two transducers and the display at the same time.

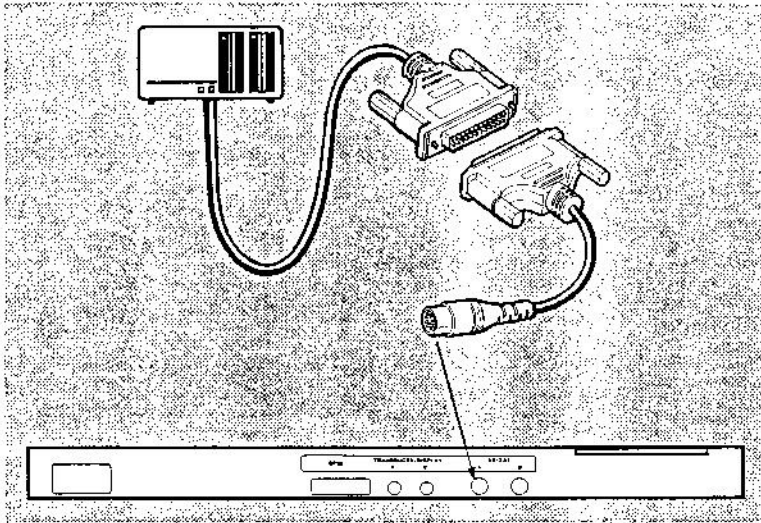


Figure 2-11: Connect host-to-port

2. Connect the host's cable to the appropriate port.

Host	Cable	Port
DCE* mainframe modem	Male	Port A
DTE* PC terminal	Female	Port B
GPIB HPIB IEEE488	GPIB	GPIB port
*Can be used with or without the 9-to-25 pin adaptor.		

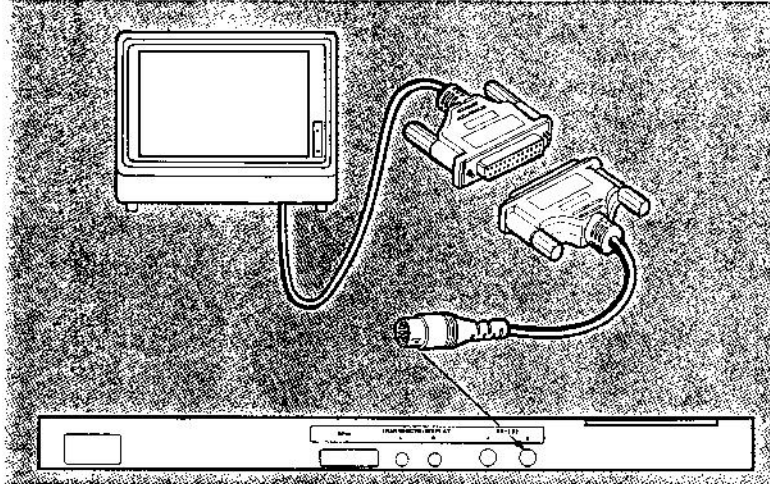


Figure 2-12: Connect terminal-to-tablet

3. Connect the terminal's cable to the tablet.

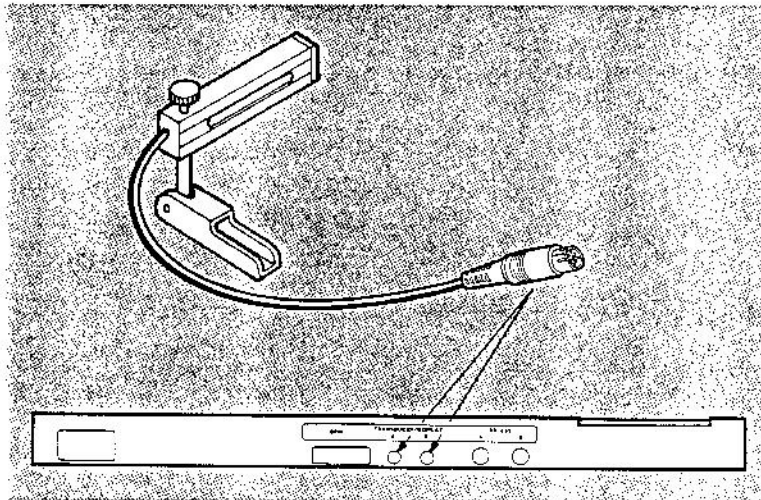


Figure 2-13: Connect optional display

4. Connect the optional display cable to the unused transducer/display port.

Attaching the accessories

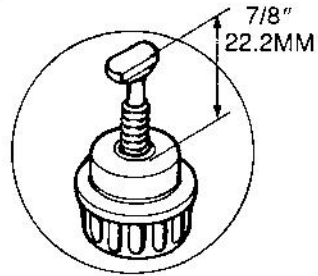


Figure 2-14A: Assembling the knob and lock stud

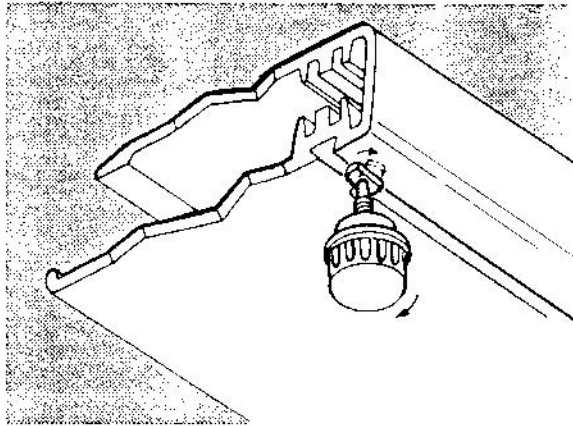


Figure 2-14B: Using the knob and lock stud

1. Preassemble a knob and lock stud to fasten accessories to the tablet frame.
2. Screw the stud into the knob to obtain a stud length of 7/8" (22.2mm). See Figure 14A.
3. Insert the assembled stud through the accessory and into the groove on the underside of the tablet. Screw the knob down securely. See Figure 14B.

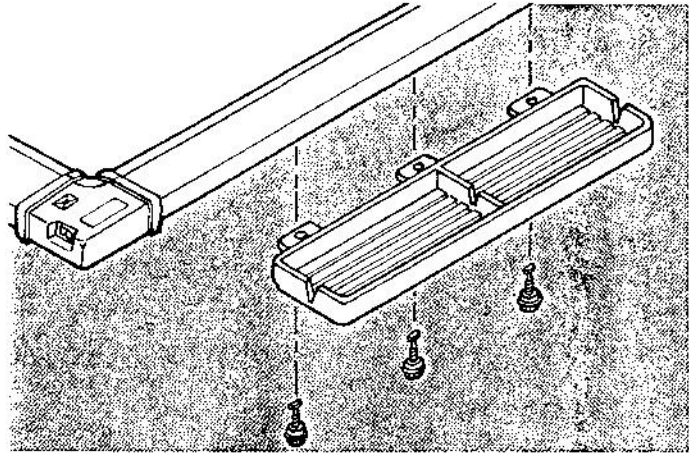


Figure 2-15A: Attaching the tray

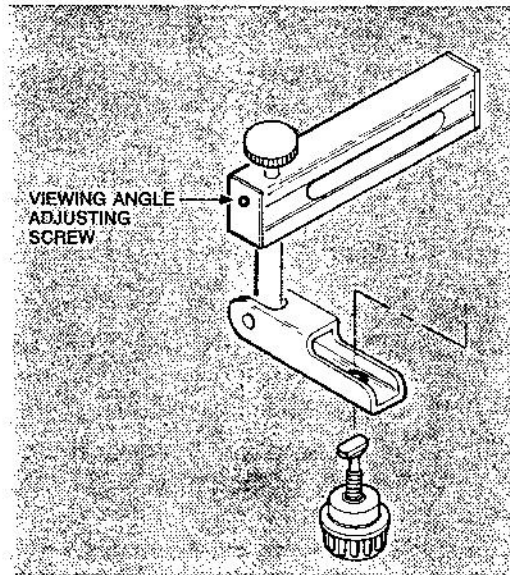


Figure 2-15B: Attaching the Liquid Crystal Display

Accessories can be located at any position around the tablet. Repositioning can be done at any time.

Power entry unit

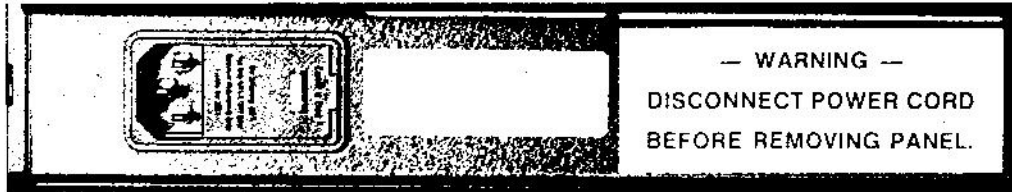


Figure 2-16: Power entry unit

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

Changing the operating voltage

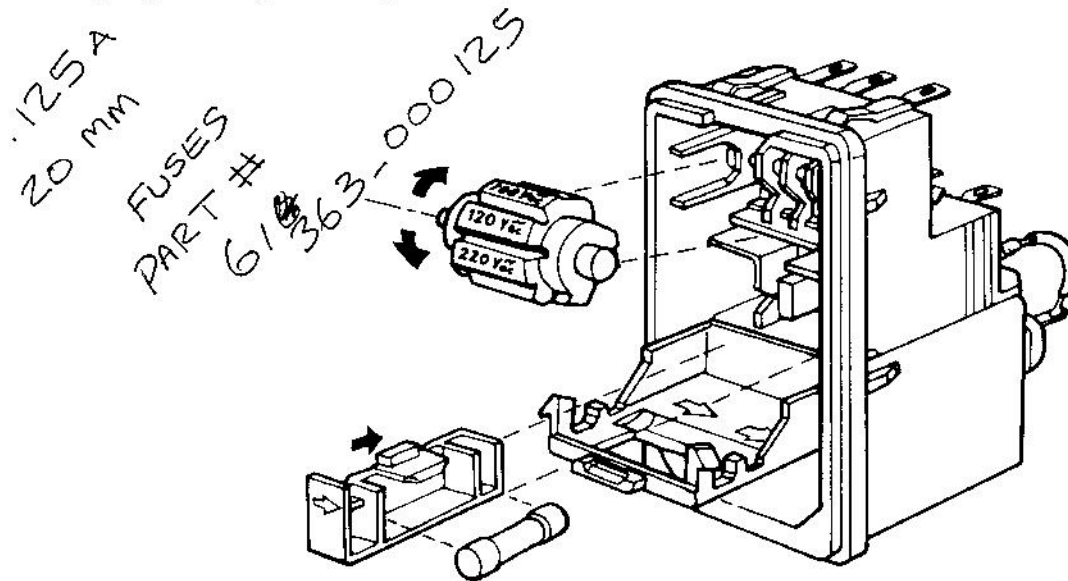


Figure 2-17: Voltage housing

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

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.

Warning:

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

CalComp's manual lift base

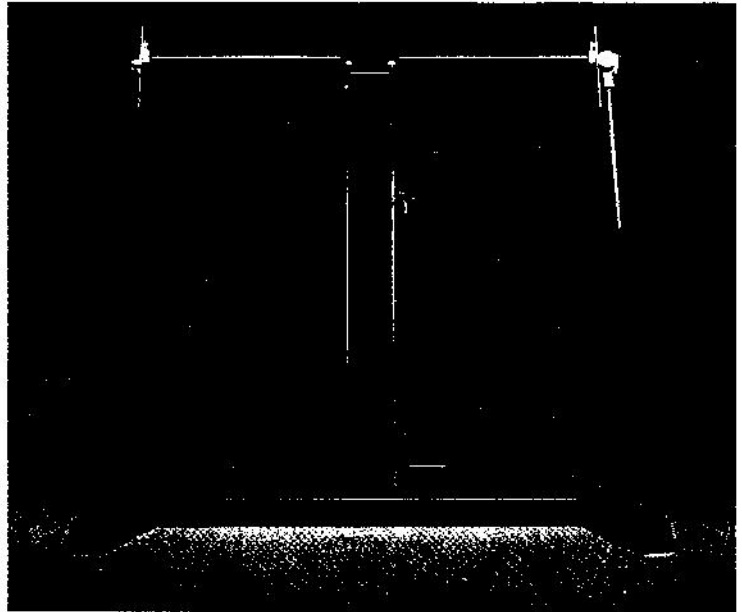


Figure 2-18: Manual lift base

The following instructions describe the base package contents, the assembly procedures, tablet mounting, and height and tilt adjustments.

Space requirements for the large format 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.
- 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.
- If clamps are used on the extrusions they must be kept within one inch of the outer edge of the tablet.

Assembling the base for the large format digitizers

The following assembly procedures are for the 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 exposes 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.

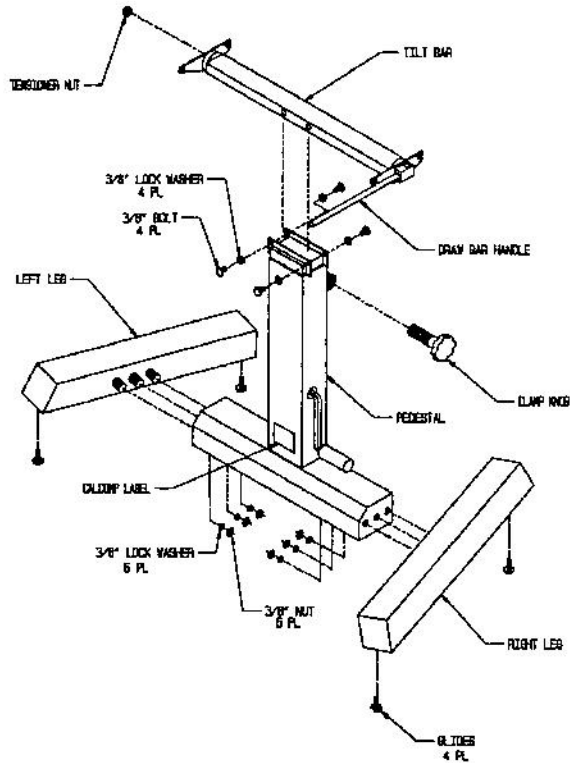


Figure 2-19: Manual lift base assembly drawing

5. Remove the bolts securing the legs.
6. Insert two leveling glides on the bottom of each leg.
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 your DrawingBoard.

Mounting the large format tablets

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.

Adjusting 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.

To adjust the locking tension tighten or loosen the nut on the left side of the tilt bracket.

Using the digitizer on a table

A moulding is provided that serves as a bumper foot when the tablet is mounted on a table top. To install the moulding follow these steps:

1. Remove the four pieces of flexible edge moulding from the accessory kit.
2. Install two pieces of moulding per bracket. Position the moulding at suitable places along the brackets. Repositioning can be done at any time.