Provel d1 Digitizer User's Guide

Introduction

Set-up

Calibration

Operation

Troubleshooting

Introduction

Provel Inc
www.provel.us
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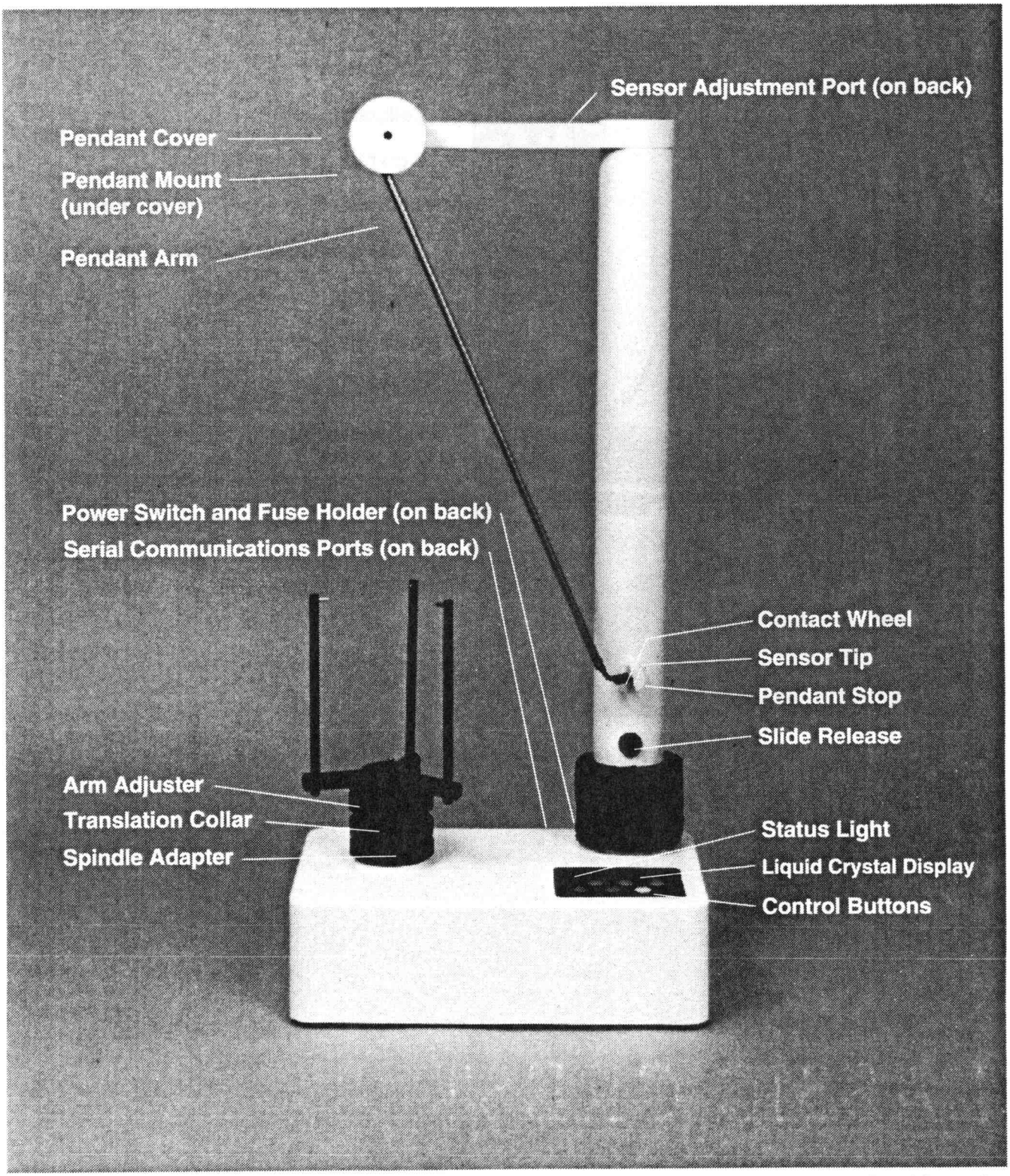
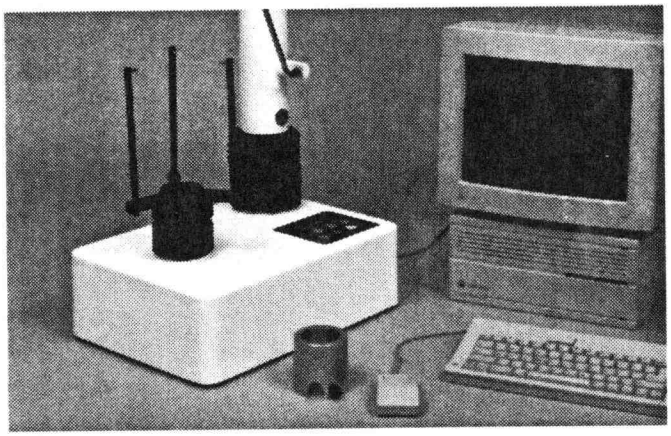
d1 User's Guide version 2.0

Key Components

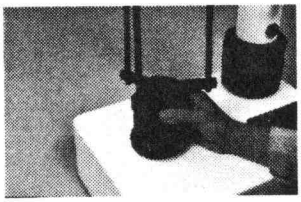


Digitizer Set-up

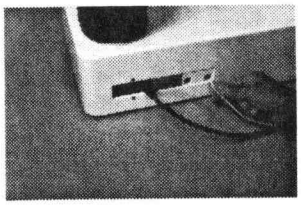


BASIC d1 SET-UP

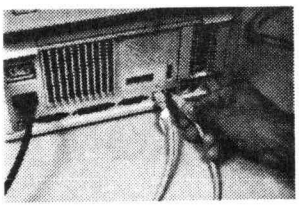
Install Workpiece Holder



Connect Power Cord, Surge Suppressor, and Serial Cable to d1



Connect Serial Cable to Computer



Basic d1 Set-up

1. **Carefully Unpack Digitizer and Confirm You Have All Components**

2. **Review User's Guide**

3. **Place d1 on a Stable, Steady, Flat Surface**

4. **Install Workpiece Holder**

   Attach the workpiece holder to the d1 by threading the translation collar onto the base adapter.

5. **Connect Power Cord to Surge Protector and Properly Grounded AC Outlet**

   Provel strongly recommends use of a common power surge protector between your d1 and the AC power outlet.

   The d1 automatically adjusts to most power standards throughout the world. (85-264 VAC, 47-440 Hz)

   CAUTION: Do not connect the d1 to any power outside of this range.

6. **Connect Serial Cable Between d1 and Computer**

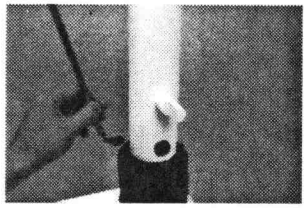
   The d1 and Macintosh computers. Connect the serial cable for digitizer data to Port #1 on the d1. Connect the other end of the cable to either the printer or modem port on your Macintosh.

   If you need a longer cable, you can use any Macintosh Mini DIN 8 printer cable. These are available at computer dealers in a variety of lengths.

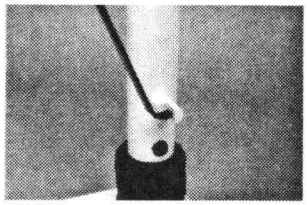
   The d1 and other computers. The d1 can communicate with other computers with (1) an appropriate serial port and (2) specifically adapted CAD/CAM software. Contact your CAD/CAM distributor or Provel for more information on connecting the d1 to other computers.

Switch Power ON
Display Reads

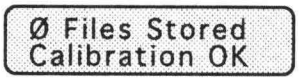
Swing Pendant



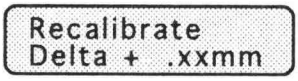
Return Pendant



Display Reads



or



7. Turn Power On and Index Arm

Turn power on using the switch on the back of the base. You should see a red control panel light and two message lines on the liquid crystal display. You will also see a red light at the tip of the pendant arm.

If the lights and display are not visible, the d1 is not receiving power. Check the power cord, surge protector, and wall outlet. For additional suggestions see **Troubleshooting**.

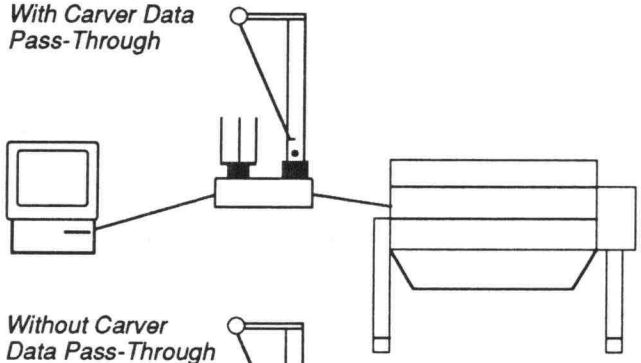
Once power is on, pull the pendant arm at least 20mm (8") away from the pendant stop, and then return it to the stop. This establishes the d1's internal reference point and compares it to a previously stored value. The liquid crystal display will then indicate the calibration status of the d1.

You are ready to learn basic operation of your digitizer. After setting-up your computer and software, the next step is to calibrate your d1.

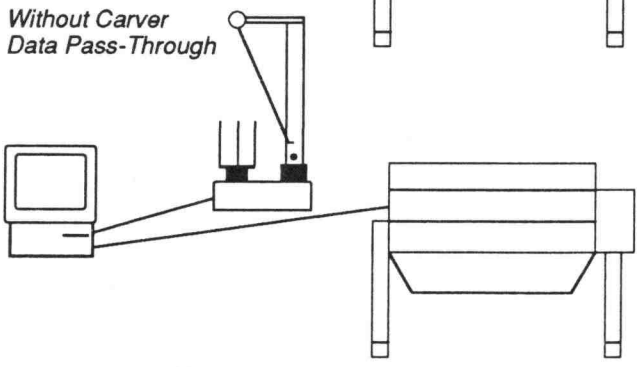
NOTE: You should always recalibrate your d1 after it has been shipped or otherwise subjected to extensive vibration and shock, even if the liquid crystal display indicates calibration is OK.

CARVER DATA PASS-THROUGH OPTION

With Carver Data Pass-Through



Without Carver Data Pass-Through



Optional Connection of Carver via the d1

With the appropriate computer, CAD/CAM software, and carver, you can pass data directly through the d1 to your carver.

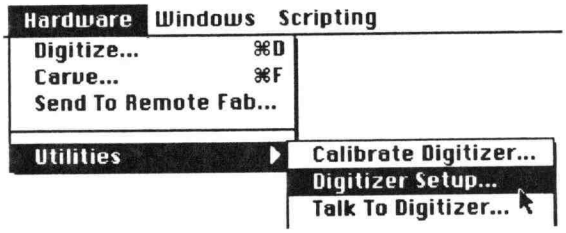
This allows you to minimize the cable running between the computer, digitizer, and carver and keep the second port on your computer free for other use.

Contact your CAD/CAM distributor or Provel for information on using the carver pass-through feature with your carver.

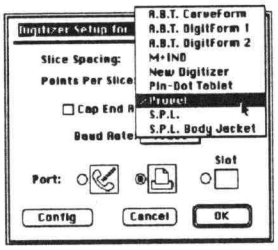
Computer/Software Set-up

SHAPEMAKER SET-UP FOR d1

Choose "Digitizer Set-up"



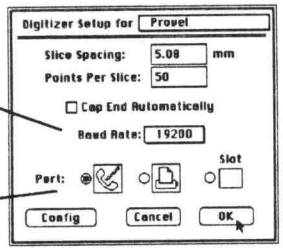
Choose "Provel"



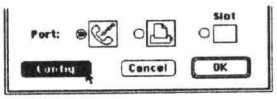
Confirm settings

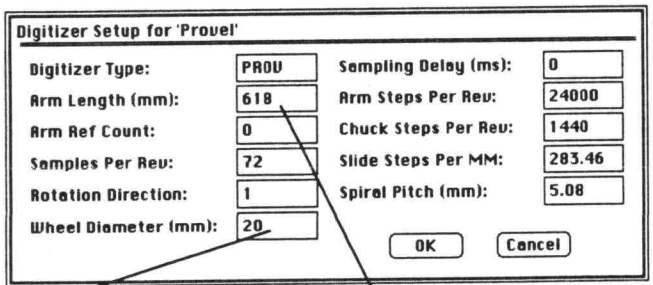
Baud Rate: *Must match baud rate set in d1. See Digitizer Control to set d1 baud rate.*

Port: *d1 can be attached to either port. Setting must match port where d1 cable is attached.*



Choose "Configuration" and confirm settings





Wheel Diameter: *Change when using larger or smaller contact wheel. Standard Provel wheels are 20mm and 25mm in diameter.*

Arm Length: *May change with different tips. Measure center of rotation to contact point on wheel.*

Shapemaker from Biologic, Inc.

You should be comfortable using a Macintosh and have a basic understanding of Shapemaker's Hardware Set-up menus before connecting the d1 via serial cable and configuring Shapemaker's set-up values. The d1 will work with any Macintosh compatible with Shapemaker.

Shapemaker versions 2.0 and above all support the d1 digitizer. If you have an earlier version of Shapemaker, contact your CAD/CAM distributor or Bio-logic.

Shapemaker Set-up for d1

1. **Choose "Digitizer Set-up" from "Hardware / Utilities/ menu**

2. **Choose "Provel" from list of digitizers**

3. **Confirm proper settings in first dialog box**

   The *Baud Rate* in Shapemaker must be the same as set in the d1. See **Digitizer Control** to set the d1's baud rate. To use the d1's carver data pass-through option, the baud rate setting in both Shapemaker and the d1 should be set at the same rate as the carver.

   Slice Spacing and *Points Per Slice* relate only to the Shapemaker screen display of a digitized shape--not the resolution of the data captured by the d1.

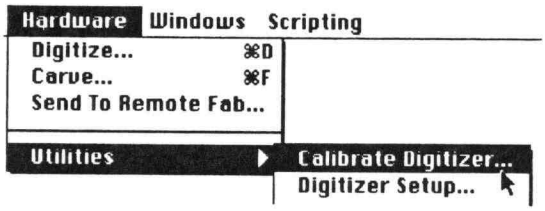
4. **Choose "Configuration" and confirm proper settings in second dialog box**

   Additional settings are accessible in the configuration dialog box. You may need to change the *Arm Length* and/or *Wheel Diameter* settings as you use the d1. The other settings should not normally vary. Make sure these settings have the following values:

   - **Arm Ref Count:** **0**
   - **Samples Per Rev:** **same as on d1**
   - **Rotation Direction:** **1**
   - **Sampling Delay (ms):** **0**
   - **Arm Steps Per Rev:** **24000**
   - **Chuck Steps Per Rev:** **1440**
   - **Slide Steps Per MM:** **283.46**
   - **Spiral Pitch:** **5.08**

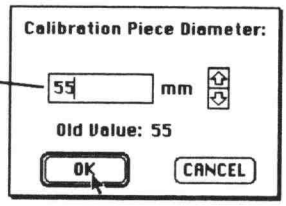
Shapemaker CALIBRATION SETTING FOR d1

1. Choose "Calibrate Digitizer"

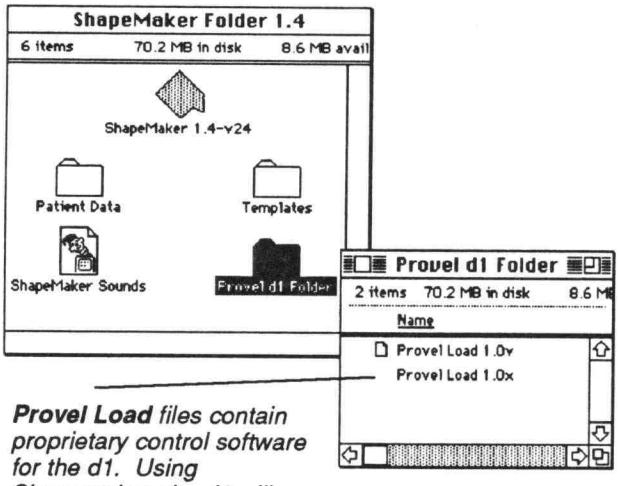


2. Confirm Setting

Provel standard calibration tool: Inside Diameter = 55mm



PROVEL LOAD FEATURE



Provel Load** files contain proprietary control software for the d1. Using Shapemaker, the d1 will automatically update its control software when a new Provel Load file is placed in the **Provel d1 Folder.

Calibration Set-up

Since the d1 internally stores and verifies calibration, you only need to verify that the proper *Calibration Piece Diameter* is stored in Shapemaker.

Understanding the Provel Load Feature

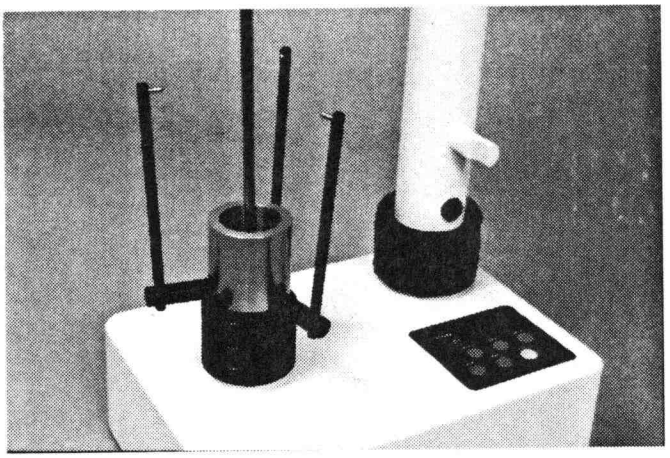
One of the d1's many unique features is its upgradeable control software. Shapemaker automatically loads a new version of the d1's control program into the d1's permanent memory.

To take advantage of this feature, you must have a folder named **Provel d1 Folder** inside the primary Shapemaker folder on your hard drive. You must then place any new versions of d1 control software (contained in files called *Provel Load version #*) within this Provel d1 Folder. The next time you digitize, Shapemaker will alert you that a newer d1 control software version exists and ask you if you want to update your d1. Provel will distribute new versions of the d1 control software on diskette or via modem.

Other Computers and Software

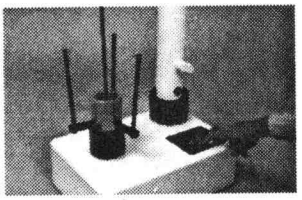
Contact Provel for more information on compatibility of the d1 digitizer with other CAD/CAM software for the O&P profession.

Calibration



BASIC d1 CALIBRATION

Place Calibration Tool and Position Pendant at least 1 inch below top edge



Press OPTION and START at same time

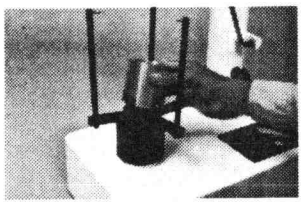
Display Reads

Calibrating
Ø Marks Sensed

then

Calibration
Entered

Return Pendant and Remove Calibration Tool



Display Reads

xx Files Stored
Calibration OK

Basic Calibration Procedures

1. Place Calibration Tool on Workpiece Holder

Once in position, tighten the thumb screw to secure.

2. Turn Power On and Establish Index Position

See Digitizer Set-up to review this step.

3. Position Pendant Arm in Calibration Tool

The pendant tip and contact wheel should be on the inside of the calibration tool at least 1 inch (25mm) below the top edge.

4. Start Calibration Sequence

Calibration is measured, computed, and entered into the d1's memory using a special digitizing sequence.

Confirm that the contact wheel is inside the calibration tool and at least 1 inch (25mm) below the top edge.

Begin the calibration sequence by holding the OPTION button down and pressing the START button at the same time.

After 4 rotations, the d1 will automatically stop. Calibration data has now been entered into the d1.

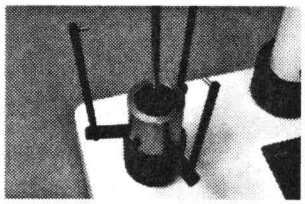
5. Return Pendant to Pendant Stop and Remove Calibration Tool

Return the pendant arm to home position on the pendant stop and remove the calibration tool from the workpiece holder. The d1 is ready for use.

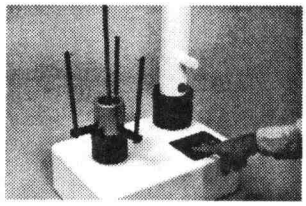
NOTE: If the display reads *Recalibrate,* go through the calibration procedure again. If the display still reads *Recalibrate* , refer to **Troubleshooting**.

OPTIONAL VERIFICATION

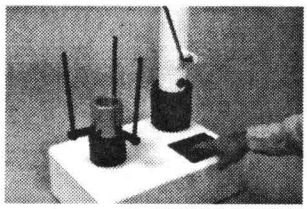
Digitize inside of fixture



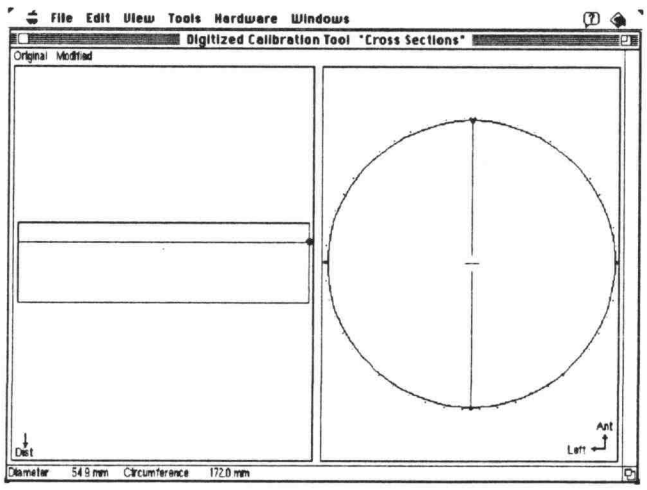
Press STOP before pendant swings out



Press ENTER to store the data as a file



Transfer file to CAD/CAM software



Optional Calibration Verification

Once the d1's internal calibration is established, you may use the calibration tool in conjunction with your CAD/CAM software package to verify that your entire digitizing system is operating properly.

NOTE: Become familiar with basic digitizing before using this procedure.

1. **Place Calibration Tool in Workpiece Holder.**

2. **Digitize Calibration Tool Using Procedures Described in Basic Digitizing.**

   CAUTION: Use the stop button to stop digitizing before the pendant arm jumps out of the calibration tool. Failure to do so could cause the pendant arm to get caught in the moving arms of the workpiece holder.

   After pressing STOP and then ENTER, Transfer the file of the digitized calibration tool into your CAD/CAM program, and use the appropriate view to display the measured diameter of the digitized calibration tool.

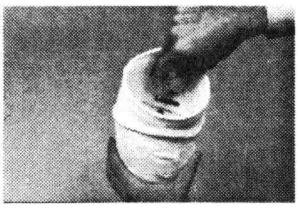
   The calibration tool supplied by Provel is 55mm in diameter. The digitized view of the calibration tool in your CAD/CAM program should also show a diameter of 55mm,+/- .5mm.

   Any major discrepancy should be investigated. Refer to **Troubleshooting** and your CAD/CAM software manual for more information.

Basic Digitizing

Mark Landmarks

The d1's sensor automatically captures properly marked landmarks. The sensor reads the contrast between the mark and the cast.

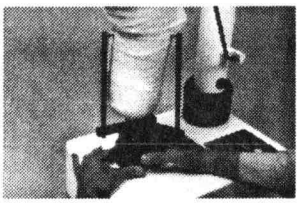


Extend Top *(Optional)*

If using tape to extend the cast, spread talcum powder on the adhesive surface.

Place Cast

Rotate and Translate Cast



This section briefly covers the normal operating steps of digitizing with the d1.

1. Prepare Cast

Mark Landmarks Use a black felt pen to create a dense, black mark. Large black marks will appear in Shapemaker as a cluster of multiple marks. You may also draw lines, which will appear as a series of marks. The smallest mark the d1 will routinely sense is about 1/4 inch (6mm) in diameter.

Extend Top To digitize the entire cast, you may need to extend the cast. Tape works well for this purpose. After applying the tape, spread talcum powder on any exposed adhesive on the inside surface to keep the contact wheel from sticking. You can also pull or wrap flexible material such as P-lite or neoprene around the top of the cast

Fill Transitions Fill any sharp edges or transitions which might snag the contact wheel. These are likely at the top lip of a cast that has been extended. Use any convenient form of filler--for example tape, clay, or plaster.

2. Fixture Cast

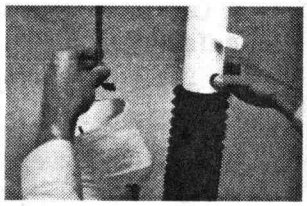
Place Cast Place the cast in the workpiece holder, and turn the adjuster ring (uppermost ring) to open and close the arms. Use the arm adjuster ring to clamp the cast tightly in the workpiece holder.

Rotate and Translate Cast After securing the cast in the arms, you can loosen the translation collar (middle ring) to rotate and/or translate the entire workpiece holder. Tighten the translation collar against the bottom ring to secure the workpiece holder before digitizing.

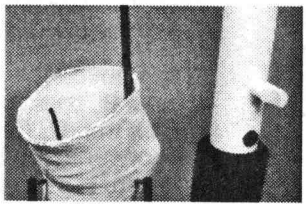
3. Turn Power On and Establish Index

See **Digitizer Set-up** to review this step.

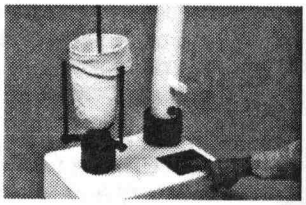
Position Pendant



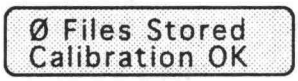
Check for Clearance



Begin Digitizing



Display Reads



START

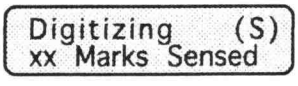
Press START

Display Reads

SLOW

Press SLOW (optional) at any time

Display Reads



Press SLOW again to return to normal speed

4. Check for Pendant Arm and Pendant Tip Clearance

Before beginning a digitizing cycle, check for complete clearance between the pendant arm, pendant tip, and the cast. Use the column release button to move the pendant arm to the bottom most position in the cast. Check for pendant arm clearance by loosening the translation collar and rotating the cast by hand.

If the pendant arm contacts the cast at any point, either use the d1's translation feature to find a center of rotation allowing clearance, or re-align the cast in the workpiece holder.

If the cast includes any significant undercut areas, check for clearance between the top of the pendant tip and the surface of those areas.

5. Begin Digitizing

After checking for clearance, confirm the pendant is in the bottom of the cast.

Press START to begin digitizing. As marks are sensed the number on the lower line display will change. The sensor emits a beep each time a mark is sensed or the pendant arm is moved away from a surface, although this may not always be audible in a noisy environment.

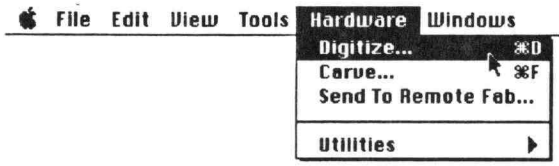
You can press SLOW at any time during digitizing to slow the rotation of the cast. The status light will change from red to yellow. Press SLOW again to return to normal speed. You can change the specific settings for the slow and high speeds through the d1's control software. See **Digitizer Control**.

The d1 also adjusts speed automatically to help the pendant stay in contact with difficult areas of the cast. This is a normal part of a digitizing cycle with the d1.

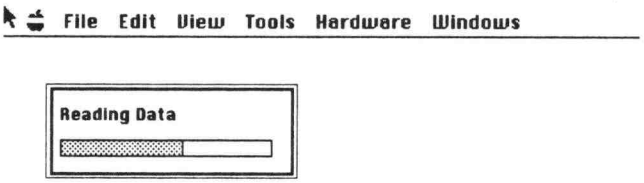
You can also press STOP at any time during digitizing. See the following page for an explanation of your options after pressing STOP.

FILE TRANSFER TO SHAPEMAKER

Choose Digitize...



Shapemaker will import stored shape and landmark data file from the d1



Transferring d1 files into Shapemaker

Biologic, Inc. has provided Shapemaker with an easy to use interface for the d1. Make sure the d1 is properly connected to the Macintosh and that all Digitizer Set-up parameters in Shapemaker have been properly set for the d1. Refer to **Digitizer Set-up** and **Software Set-up** for more information.

1. **Choose "Digitize" Command from the "Hardware" Menu**

   Shapemaker will import the entire d1 file including landmarks and the unique file number assigned by the d1.

   Please note that a file is cleared from the d1's memory as soon as it is successfully transferred to Shapemaker.

   The single red landmark on the Shapemaker image of the digitized shape represents the unique point at which the d1 started digitizing.

2. **Save Digitized Shape File**

   We recommend you always save a copy of the digitized shape file before beginning any modifications in Shapemaker.

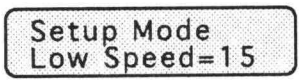
Digitizer Control

d1 Setup Mode			version1.1
Main Menu	**DEFAULT**	**MINIMUM**	**MAXIMUM**
Low Speed	15 rpm	5 rpm	25 rpm
High Speed	30 rpm	30 rpm	50 rpm
Load Limit	100%	80%	120%
Baud Rate	38,400	300	38,400
Points/rev	72 per rev	36 per rev	120 per rev
Marks: (sensor on/off)	On	Off	On
Reject Marks: (ignore misc.)	Off	(On) >360°	(On) >30°
Contrast	7	2	9

ENTER OR EXIT THE SET-UP MODE

Press OPTION and SLOW at same time

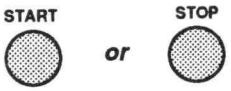
Display Reads



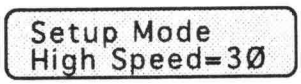
Exit Set-up Mode at any time by again pressing OPTION and SLOW

CHANGING OPERATING SETTINGS

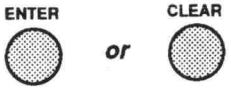
Press either START or STOP to move through the menu of operating settings



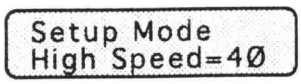
Display shows the setting and current value



Press either ENTER or CLEAR to select a new value for a particular setting



Display shows setting and new value



The d1's microprocessor control allows a simple user interface while still providing flexible control over all operating settings. By entering a special menu in the d1's software called Setup Mode, you can change any of the settings listed in the table.

In addition to the control settings accessible in the main level menu of the Setup Mode, additional control settings can be accessed through a special sub-menu.

Entering and Exiting the Set-up Mode

Enter the Setup Mode by pressing both the OPTION and SLOW buttons at the same time.

You can enter the Setup Mode any time the d1 is not actively digitizing, calibrating, or transferring data.

Exit the Setup Mode at any time by again holding the OPTION button down and pressing SLOW. The d1 will return to normal operating mode.

Changing the d1's Operating Settings

Once in the Setup Mode, you can view and change the operating settings by using the STOP, START, ENTER, and CLEAR buttons.

Press the START button to move forward through the list of settings shown on the lower line of the display.

Press the STOP button to move backward through the list. The display will show the current value for each setting. Viewing the settings using the START and STOP buttons will not change the values.

Once you have used START and STOP to move to the setting you wish to change, use ENTER and CLEAR to select the new value.

Press CLEAR to move to a higher value, press ENTER to move to a lower value.

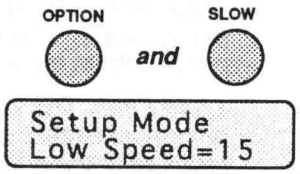
You may then use the Setup Mode to view or change additional settings, or hold down OPTION and press SLOW to return to the normal operating mode.

EXAMPLE SETTING CHANGE

Enter Set-up Mode

Press OPTION and SLOW at same time

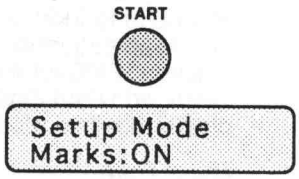
Display Reads



Move to Marks Setting

Press START 5 times

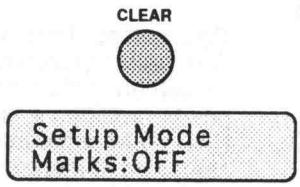
Display Reads



Select New Value

Press CLEAR Once

Display Reads



Exit Set-up Mode

Press OPTION and SLOW at same time

Display Reads

An Example: Switching the Mark Sensor Off

Follow this example to turn off the d1's automated mark sensor. This feature is useful when digitizing clear check sockets. Any other setting can be changed using the following basic procedures.

1. Press OPTION and SLOW to enter Set-up Mode

You will see the Setup Mode display. The display always starts with the low speed setting on the lower line.

2. Press START 5 times to move to Marks:ON/OFF Setting

If you press START more than 5 times, you will move forward through the list past the Marks:ON/OFF setting. Press STOP at any time to move backward through the list. Go on to step 3 when the lower line of the display reads: *Marks:ON.*

3. Press ENTER to change setting to OFF

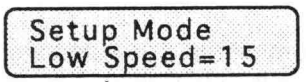
Press ENTER to switch the mark sensor OFF. As with all settings, press CLEAR if you want to change the setting in the opposite direction--in this case CLEAR will switch the mark sensor ON.

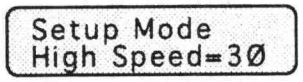
4. Press OPTION and SLOW to exit Set-up Mode

Once you have entered the Setup Mode, you may change as many settings as you like.

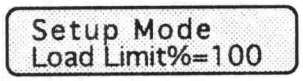
After you have experimented with the Marks:ON/OFF and other settings in the Setup Mode, return to normal operating mode by pressing the OPTION and SLOW buttons.

Details on Main Control Settings

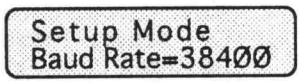




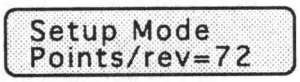
Slow and High Speed Both the high and low speed of the d1 can be changed through the set-up mode. The value displayed is revolutions per minute of the workpiece holder.



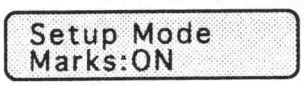
Load Limit The load limit setting controls the amount of excess load on the workpiece holder required to trip a Motor Overload shut-down sequence. This feature takes effect after the d1 accelerates to the selected speed. The default setting of 100% should be adequate for the majority of uses. Select a lower setting (80%, for example) to induce an easier tripping of the Motor Overload sequence. Temporarily select a higher setting (120% for example) if encountering Motor Overload when digitizing a heavy object such as a plaster positive model.



Baud Rate The d1 can communicate with other computers at a variety of data transmission speeds. Make sure the d1's baud rate setting is appropriate for your CAD/CAM software and hardware. See **Software Set-up** for more information.



Points/Rev This setting controls the number of data points stored by the d1 for each digitizing revolution. While selecting a higher number of points provides a higher digitizing resolution, most CAD/CAM software programs use their own algorithm to interpolate the shape. Refer to your CAD/CAM software manual. A higher number of points per revolution leads to larger files stored in the d1. To decrease the file size when digitizing multiple objects or a large object, select a lower number of points per revolution.



Marks This setting allows you to disable the automated mark sensing feature of the d1. This is useful when digitizing clear check sockets in which the mark sensor can not establish a reflective background signal or where mark information is simply not necessary. Use the START and SLOW buttons to toggle the sensor on or off.

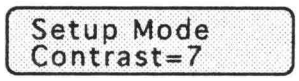
Reject Marks This setting controls a special feature of the d1's software which can help prevent inadvertent landmarks from appearing in the digitized shape. See **Advanced Topics** for a more detailed discussion of this setting.

Contrast This setting controls the contrast of the d1's liquid crystal display. If you find the display difficult to read in your lighting and viewing conditions, try a lower or higher contrast setting.

d1 Setup Mode			version 1.1
Level Two Sub-Menu	**DEFAULT**	**MINIMUM**	**MAXIMUM**
Max Accel Lmt (speed control)	3	1	5

ENTER OR EXIT LEVEL 2 CONTROL SETTINGS MENU

From this starting point in the Set-up Mode main menu



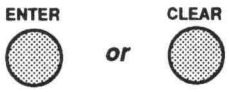
Press OPTION and START at same time

Display Reads

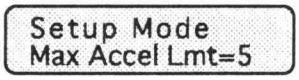
Return to the Setup Mode main menu at any time by pressing STOP

CHANGING LEVEL 2 SETTINGS

Press either ENTER or CLEAR to select a new value for a particular level 2 sub-menu setting



Display shows setting and new value



Level Two Control Settings

In addition to the control settings accessible through the Set-up Mode, a second level of settings exists in the d1. These are accessed through the Set-up Mode as a special sub-menu.

Entering and Exiting Level Two Control Settings

You must first be in the *Contrast* setting in the main menu of the Set-up Mode before you can access the level two control settings. If you are not in the *Contrast* setting, press OPTION and SLOW and then press START 7 times. Then enter level two control settings by pressing OPTION and START buttons at the same time.

NOTE: If you press OPTION and START from the normal operating menu, the d1 will begin the calibration sequence.

Exit the level two control settings by pressing STOP. You will return from the sub-menu to the Set-up Mode main menu. You can also press OPTION and SLOW to return directly to normal operating mode from the level two sub-menu.

Changing Level Two Control Settings

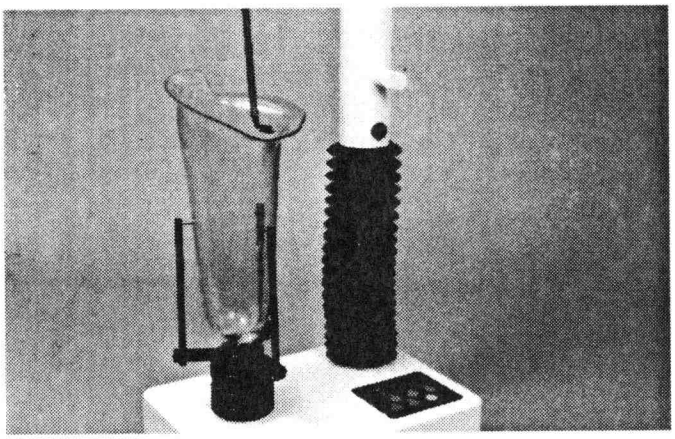
The level two settings can be changed using the same procedures as in the normal Set-up Mode. Once in the level two menus, use START and STOP to move to any of the level two settings. Use ENTER and CLEAR to select the values for each setting.

Additional Details on Level 2 Settings

Max Accell Lmt (Speed Control) This setting increases or decreases the amount of automated speed control that takes place during the digitizing process. The default factory setting is 3. To achieve a more intense automated speed control effect when working with odd shapes, choose a higher setting value. If you want the d1 to maintain a more steady speed (i.e. less automated speed control), choose a lower setting value.

Future Features Provel anticipates offering additional control features in the future. Access to these will be added to the Setup Mode menus in either the main menu or level two sub-menu.

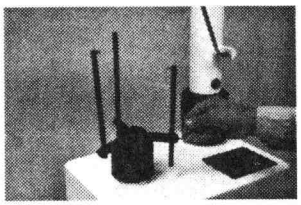
Advanced Topics



The d1 is capable of digitizing a wide variety of shapes, sizes, and materials. The following techniques are suggested for solving digitizing challenges and using additional features of the d1.

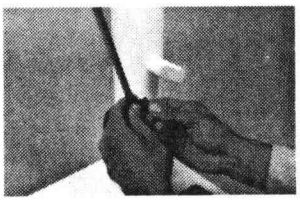
Clear Sockets

The d1's automated mark sensor will have difficulty establishing a base line signal in clear check sockets. This leads to digitized shapes with a high number of false marks. Use the d1's Setup Mode software controls to turn off the mark sensor when digitizing clear sockets. See **Digitizer Control**. Alternatively, pull a white stockinette over the outside of the clear check socket. This may provide sufficient reflection to stabilize the mark sensor.



Short Casts

It is possible to fixture a cast which is shorter than the standard length of the workpiece holder arms. To shorten the arms, loosen the set screw, lower the arm, and retighten the set screw. Alternatively, fixture the calibration tool in the workpiece holder and place the short cast on top of it.

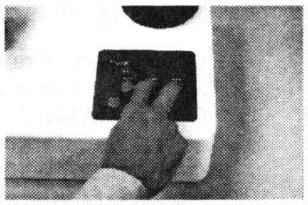


Changing the Digitizer Contact Wheel

Each d1 is shipped with 20mm and 25mm diameter contact wheels. The smaller wheel will more closely follow sharp radii, while the larger wheel will allow smoother digitizing of larger undercuts and rougher surfaces.

To change wheels, slip the wheel off of the bearing mounted on the pendant tip. Snap the new wheel onto the bearing, making sure the wheel and bearing rotate smoothly once in place.

CAUTION: Be sure to reset the Wheel Diameter setting in Shapemaker (or other CAD/CAM software) when you change the d1's wheel.



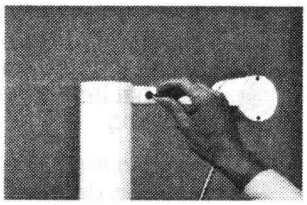
Complete d1 Reset Sequence

The d1's control software has a special reset sequence which will:

- Erase any data files stored in memory
- Reset the file number counter to 0
- Reset the Setup Mode control settings to the factory default values.

Only use the reset sequence if you will not lose any important data and will be comfortable resetting any control settings from default.

To execute a complete reset, turn off the d1's power, press and hold down both the OPTION and CONTROL buttons while you switch the power back on.



Mark Sensor Sensitivity Adjustment

The automated mark sensor is adjusted at the factory to read dense black marks. The sensitivity of the sensor can be increased or decreased thru the adjustment port on the back of the upper arm. Use a small jewelers screwdriver to turn the adjustment screw in the sensing unit visible through the port. Turn the screw counterclockwise to increase sensitivity, and clockwise to decrease sensitivity.

While increased sensitivity will allow the d1 to sense fainter marks, it will also increase the likelihood of sensing false marks. You may need to experiment to find a setting that best fits your needs.

Reject Marks Feature in d1 Control Settings

The d1's automated sensor reads the contrast between the white cast and any black marks. In certain portions of the cast (typically a relatively flat distal end) the sensor may not receive enough reflection to establish a reference signal. This will cause inadvertent landmarks to appear in the digitized shape. These will usually take the form of a horizontal line or spiral of closely spaced landmarks. The Mark Angle setting in the d1's control software allows the d1 to ignore a majority of these inadvertent spiral landmarks.

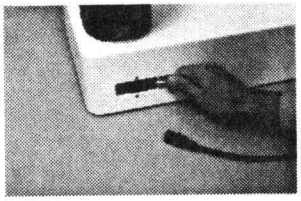
Once in the Set-up mode, use the START and STOP buttons to toggle through the *Reject Mks:* settings. A setting of *Reject Mks:>30°* will cause the d1 to ignore any continuous landmark lines of greater than 30°. Use this settings to ignore the maximum amount of inadvertent landmarks.

If you find the d1 is also ignoring horizontal lines you have drawn in the cast, set the *Reject Mks:>* to a higher number of degrees (90° or 360°).

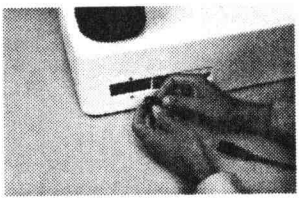
Troubleshooting

FUSE REPLACEMENT

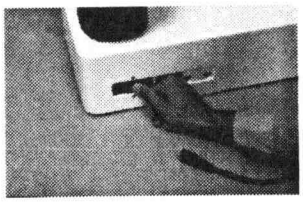
Remove Power Cord, Pry Fuse Holder From Power Entry Module



Inspect Both Fuses For Visible Damage, Replace If Necessary With 250v .5A Fuse (2 Spare Fuses Included In Fuse Holder)



Press Fuse Holder Into Power Entry Module



No Power At Digitizer

Check the d1's fuses, replace them if necessary.

Check the surge protector and power outlet.

No Data Connection Between Digitizer And Computer

Check the serial cable connections at the d1 and on the computer.

Check the communication settings in the d1 and the CAD/CAM software.

- Baud rate must match on d1 and in computer
- Communications port setting in computer must match actual port where cable is plugged in

If these do not solve the problem, try a different serial cable.

Also check the operation of the computer's communication port by connecting a printer or other device.

Refer to your CAD/CAM software manual as well as **Digitizer Set-up** and **Software Set-up.**

Shape Is Wrong Size In CAD/CAM Software

Check the CAD/CAM software settings for:

- Contact Wheel Diameter
- Pendant Arm Length
- Arm Steps Per Rev
- Chuck Steps Per Rev
- Slide Steps Per MM
- Spiral Pitch
- Calibration Fixture Diameter

An incorrect value in any of these settings could cause significant distortion of a shape digitized by the d1.

Always recalibrate after resetting any parameters in Shapemaker.

Refer to your CAD/CAM software manual as well as **Digitizer Set-up** and **Software Setup**.