Warranty and Service Policy

If any defects in material and workmanship appear during the first three months, the defective part will be repaired or replaced at Brunswick's option with no charge to the customer.

If any defects in material appear during the nine months following the initial three month warranty period, the defective part will be repaired of replaced at Brunswick's option without charge to the Customer for parts. The Customer must assume all other costs, including shipping, in making the repair or replacement.

Brunswick reserves the right to make design modifications within the technical specifications of the American Bowling Congress without incurring the obligation to incorporate such changes in products already sold.

The warranty applies only to the original purchaser. Repairs or replacements made by anyone not approved by Brunswick void the warranty. Under no circumstances shall the Seller or Manufacturer be liable for loss of profits or other direct or indirect costs, expenses, losses or damages arising out of defects in or failure of parts.

Please take time to fill out the attached Warranty Registration Card and mail it to us today. In addition to supplying us with the necessary information to register your purchase, it will assure you that you will be notified of any available software upgrades or associated information. Thank you in advance for your response.

Replacement Parts Under Warranty

RECORDER - Part No. 61-860155-000

During the ONE YEAR warranty period, parts of the Lane Monitor Recorder which are faulty due to material or workmanship will be replaced or repaired at no charge. The defective part(s) must be properly packaged, insured for full value, and shipped to:

Brunswick Bowling and Billiards Corp.
525 W. Laketon Avenue
Muskegon, Michigan 49441
Attn: Quality Department

The item must be identified and accompanied by a description of the problem.

OPTICAL READER - Part No. 61-860225-000, 61-860225-220

During the ONE YEAR warranty period, if the Lane Monitor Optical Reader will not operate due to material or workmanship, it will be replaced or repaired at no charge. However, the UV Source Tube is not included. The defective unit must be properly packaged, insured for full value, and shipped to:

Brunswick Bowling and Billiards Corp.
525 W. Laketon Avenue
Muskegon, Michigan 49441
Attn: Quality Department

The Optical Reader must be accompanied by a complete description of the problem.

To order service parts, refer to page 40 of this manual. USE GENUINE BRUNSWICK REPLACEMENT PARTS ONLY.

General Description

The Brunswick Lane Monitor System is designed to permanently record and read the amount of dressing present on a lane surface, provided the dressing contains an ultraviolet-sensitive additive in compliance with American Bowling Congress (A.B.C.) specifications. The system has two separate components; the Recorder and the Optical Reader.

RECORDER - Part No. 61-860155-000

The Lane Monitor Recorder consists of an aluminum track, two sliding tape carriages and a wooden push rod. See Figure 1. The device accepts one roll of special 1" wide transparent tape on each carriage. The applicator carriage is pushed from one side of the lane to the other, adhering a length of tape to the lane surface.

The dressing from the lane is absorbed by the adhesive in the tape. When the lifter carriage is then pushed across the lane, it lifts the first length of tape and laminates it to a second length of tape. The dressing, preserved between the two layers of tape, can then be measured by the Optical Reader.

The Recorder is supplied with two rolls of UV pick-up tape, one roll of white lane edge marking tape, assembly tools, etc. in a sturdy padded carrying case.
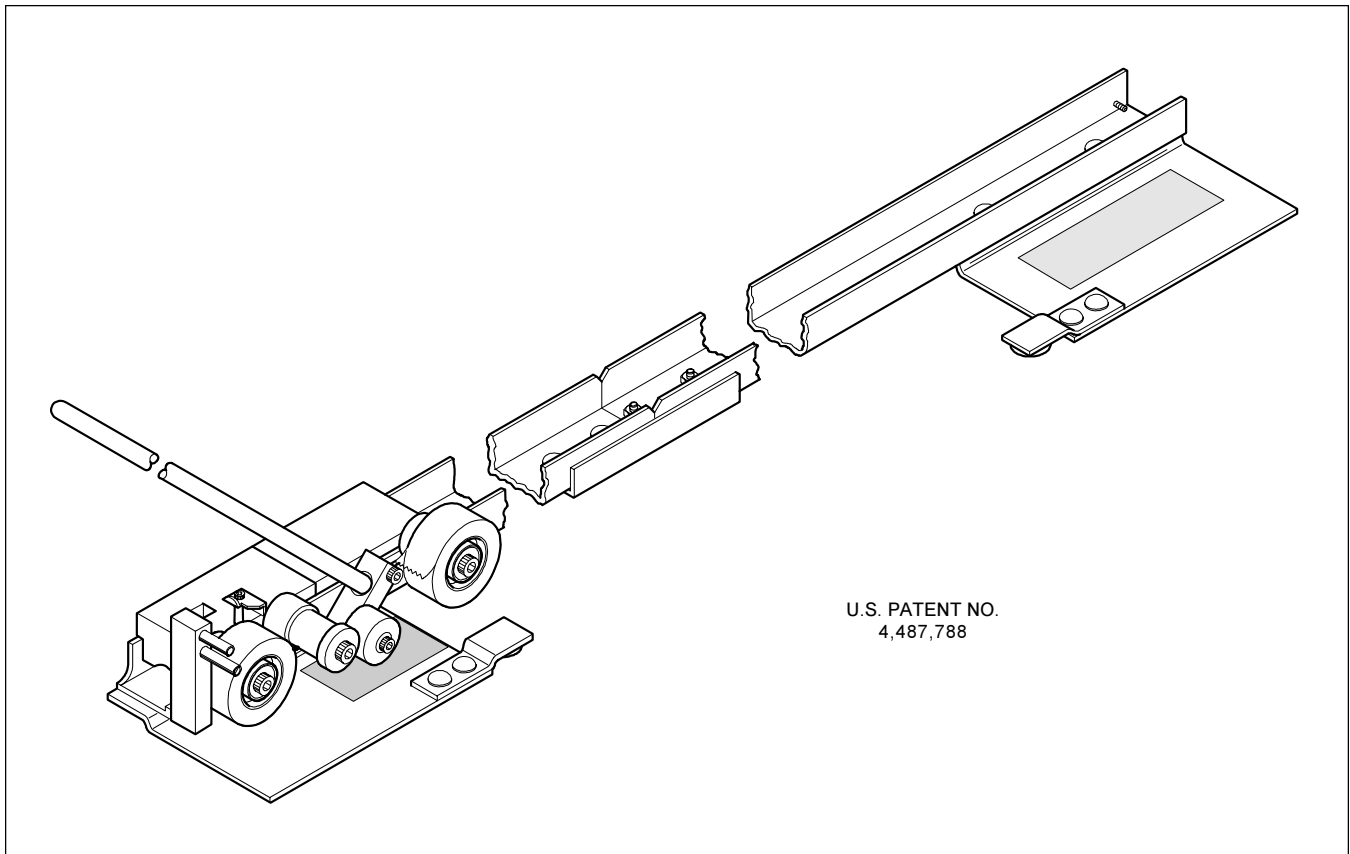

U.S. PATENT NO.
4,487,788

Figure 1 - Lane Monitor Recorder

OPTICAL READER - 61-860225-000, 61-860225-220

The Computer Lane Monitor Optical Reader and supplied software connects to your existing IBM compatible PC to automate your lane reading. This device exposes the dressing in the tape to ultraviolet light, causing it to fluoresce if the required additive is present. See Figure 2.

The Reader then electronically measures and displays the intensity of visible light emitted by the additive in the dressing. The laminated transparent tape, produced by the Recorder, is fed into the Optical Reader where it is automatically advanced as a sensor reads the values of the entire lane width. The electronic readings are sent to the connected computer where the relative distribution of dressing across the lane is displayed both graphically and digitally on the computer screen.

The Optical Reader package includes the software program to create a data base to restore and compare lane dressing information to manage optimum lane conditions. Calibration kit is included along with the power cord and computer data cable.
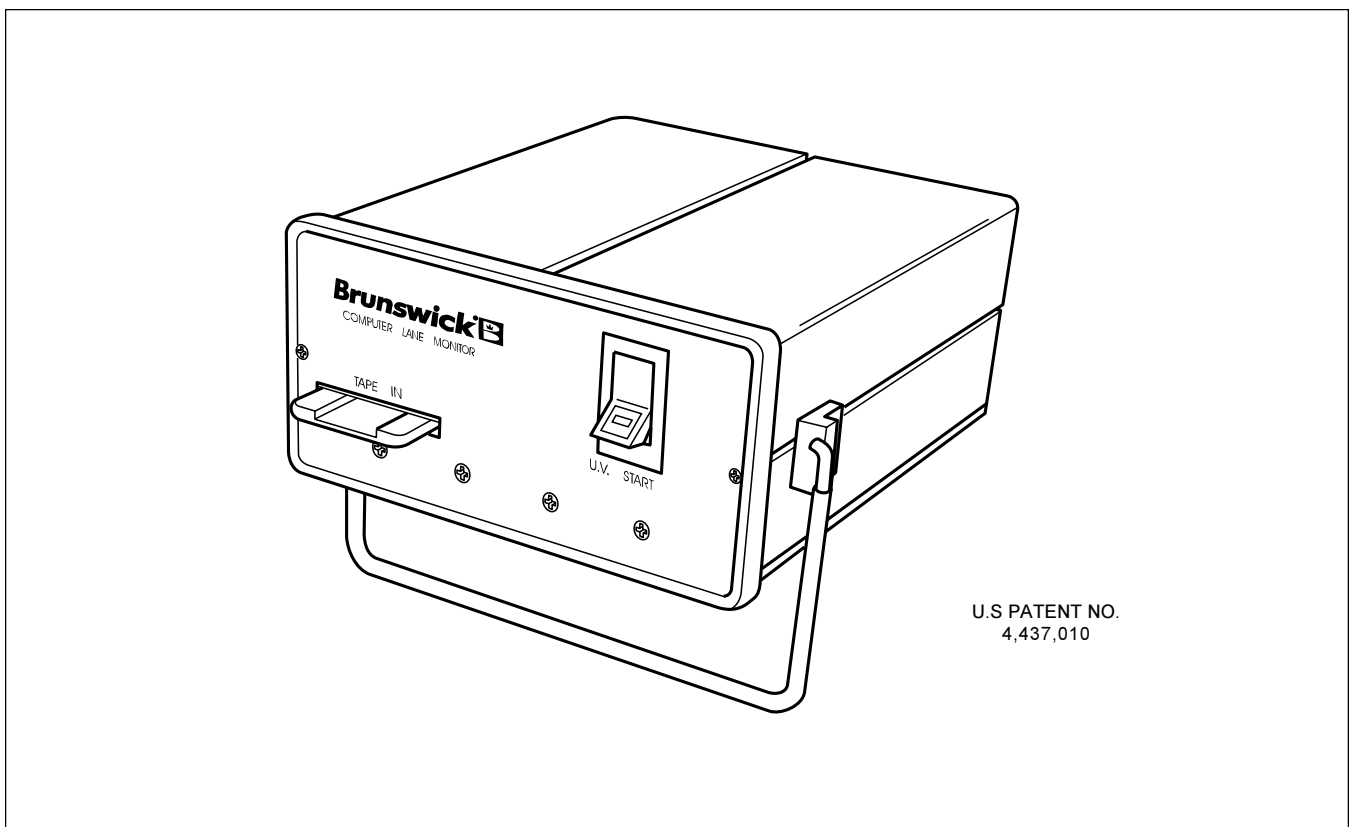

Figure 2 - Computer Lane Monitor Optical Reader

Lane Monitor Recorder

ASSEMBLY AND ADJUSTMENT

1. The Recorder is shipped with the track separated into two sections. Assemble the two sections using two 1/4" nuts on the studs shown in Figure 3.
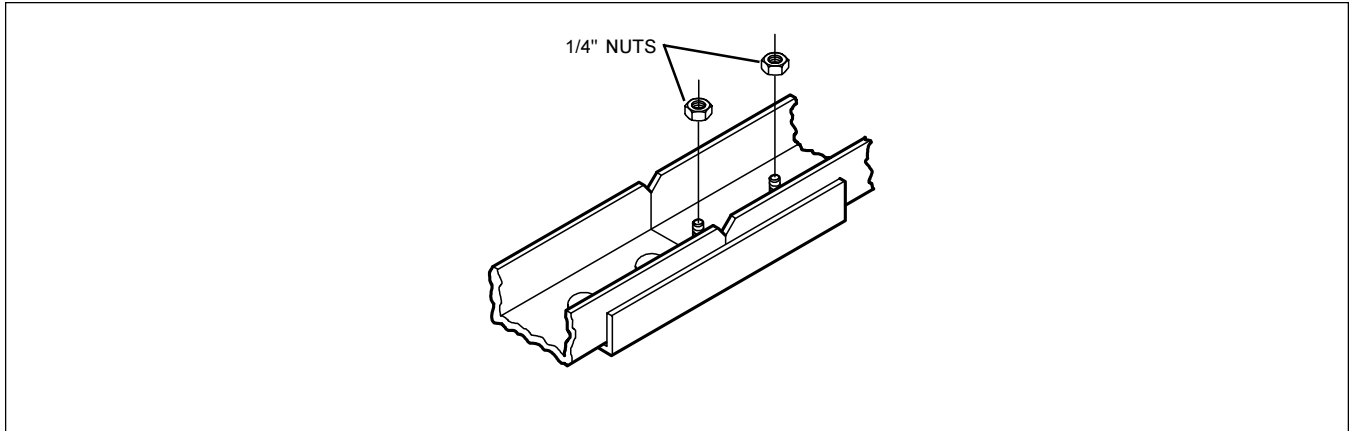

Figure 3 - Recorder Assembly

2. See Figure 4. Loosen the two Allen head bolts on the anchor post and pivot it up from the storage position to the vertical operating position. Retighten the screws.

3. Use the two bolts shown in Figure 4 to adjust the device for lane width. Both plates should be left off the lane and level with the lane edge. In general, it is not necessary to adjust the Recorder to each lane as long as the adjustment is wide enough to accommodate all the lanes, and the track is kept square to the edge of the lane.
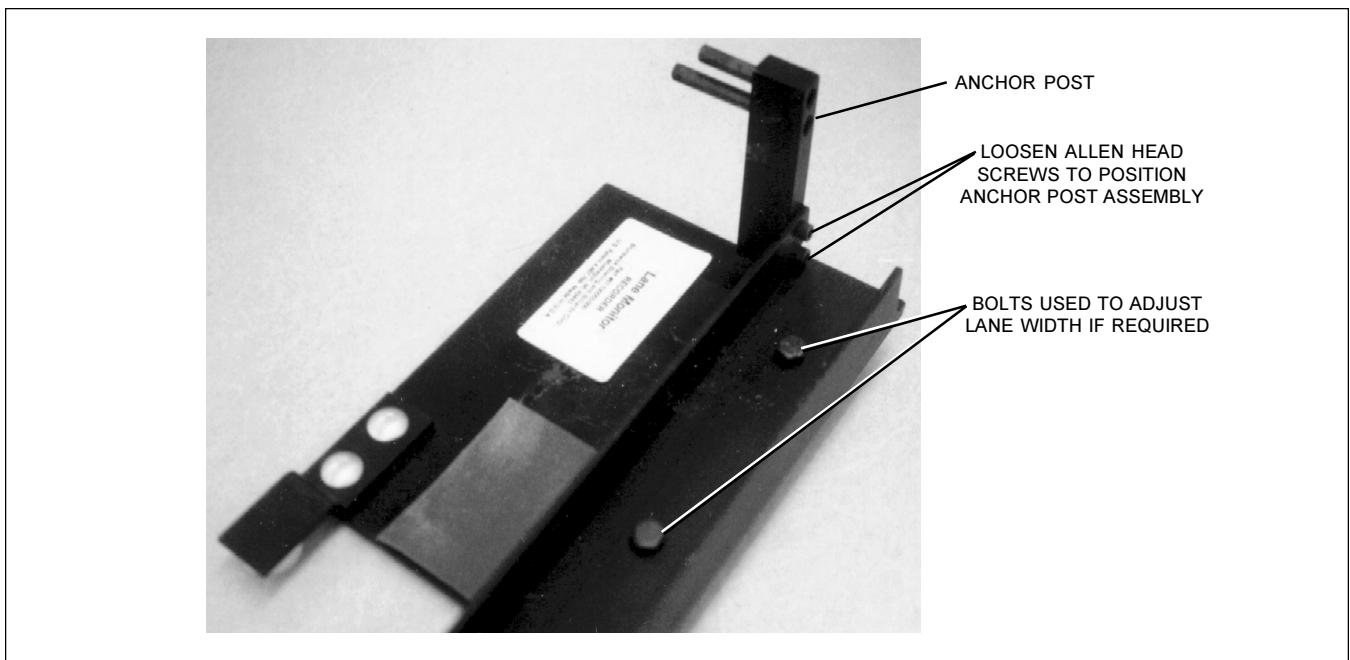

Figure 4 - Lane Width Adjustment

STORAGE AND HANDLING

1.   The tape applicator carriages should be kept in the carrying case when not in use.

2.   The track assembly may be left assembled between uses while inside the bowling center., provided it is kept where it cannot be dropped or bent.

3.   When transporting the entire Recorder outside the building, always disassemble and pack in the original foam-lined case.

THREADING

1.   Mate the carriages as shown in Figure 6 on the next page.

2.   Place a roll of the included, special 1" wide transparent tape that complies with A.B.C. specifications on each of the two outer rollers. Be sure the roll is not distorted and that is fully seated against the shoulder of the hub. If the tape core is loose, put enough tape on the hub to get a tight fit.

   a.   Lift the mated carriages from the track.

   b.   Referring to Figure 5, pull some tape from the REAR ROLL. Bring it under and around the TAPE GUIDE and lay it back over the REAR ROLL from which it came.

   c.   Next, pass tape from the FRONT ROLL underneath the RUBBER ROLLER and over the TAPE GUIDE so that the two tapes match up exactly and adhere together.

   d.   Pull the mated tapes over the TAPE GUIDE, cut off the excess and make a large loop. Reach over the TOP ANCHOR PIN, hook the loop on the LOWER ANCHOR PIN, and remove slack by pulling on the loose end. See Figure 5.
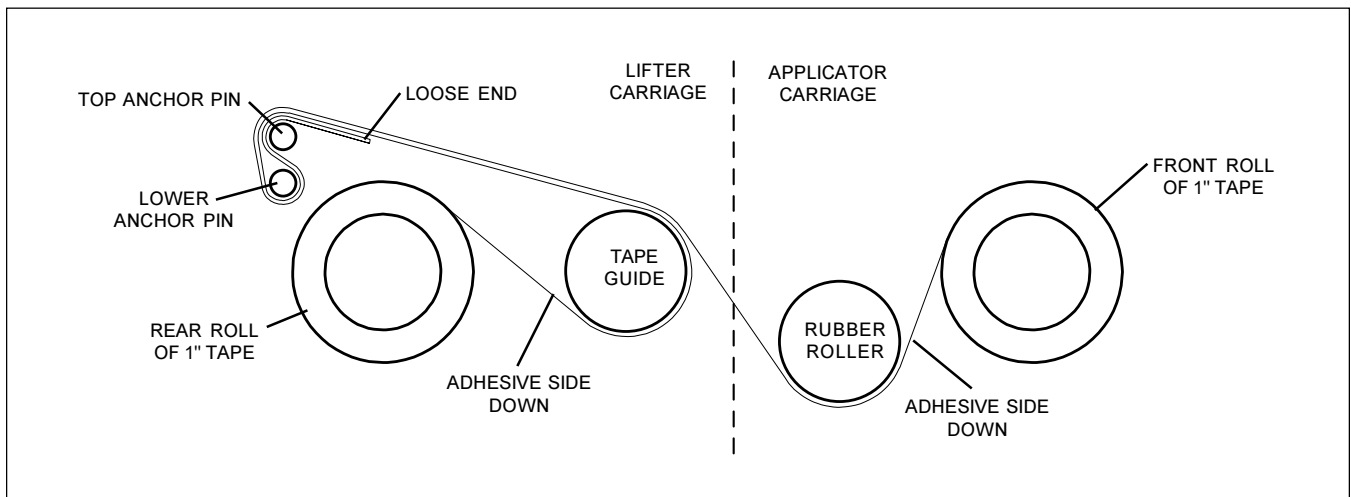

Figure 5 - Threading Diagram

OPERATION OF THE RECORDER

> *CAUTION: The Recorder is a precise machine and must be handled with care. Due to the slippery coating on the carriages, they are liable to slide out of the track without warning if they are not held securely while being transported. If dropped, check tape reels for alignment, and straighten or replace bent pivot bolts.*

1. Be sure the rubber roller is dry and free of dressing. If not, clean with rubbing alcohol.

2. Lay the Recorder across the lane in the first reading location with the anchor post assembly on the ten-pin side of the lane.

3. Place the mated carriage assembly in the track with the lifter carriage tight against the anchor post. The tape reels and the rubber roller will be on the starting plate. See Figure 6.

4. Place a one-inch square of thin paper tape on the outer edge of BOARD NO. 1 to mark the TEN-PIN EDGE of the lane as shown in Figure 6. The LANE NUMBER, SAMPLING LOCA-TION, and DATE may be marked on this paper in advance. Note: 3M brand #658 Post-It tape, sold as Brunswick part no. 61-100057-000 is include and recommended for use with the Computer Lane Monitor automatic positioning feature.

   CAUTION: Do not cover any part of BOARD NO. 2.

   If tape is not available, a one inch square of THIN white paper may be substituted.
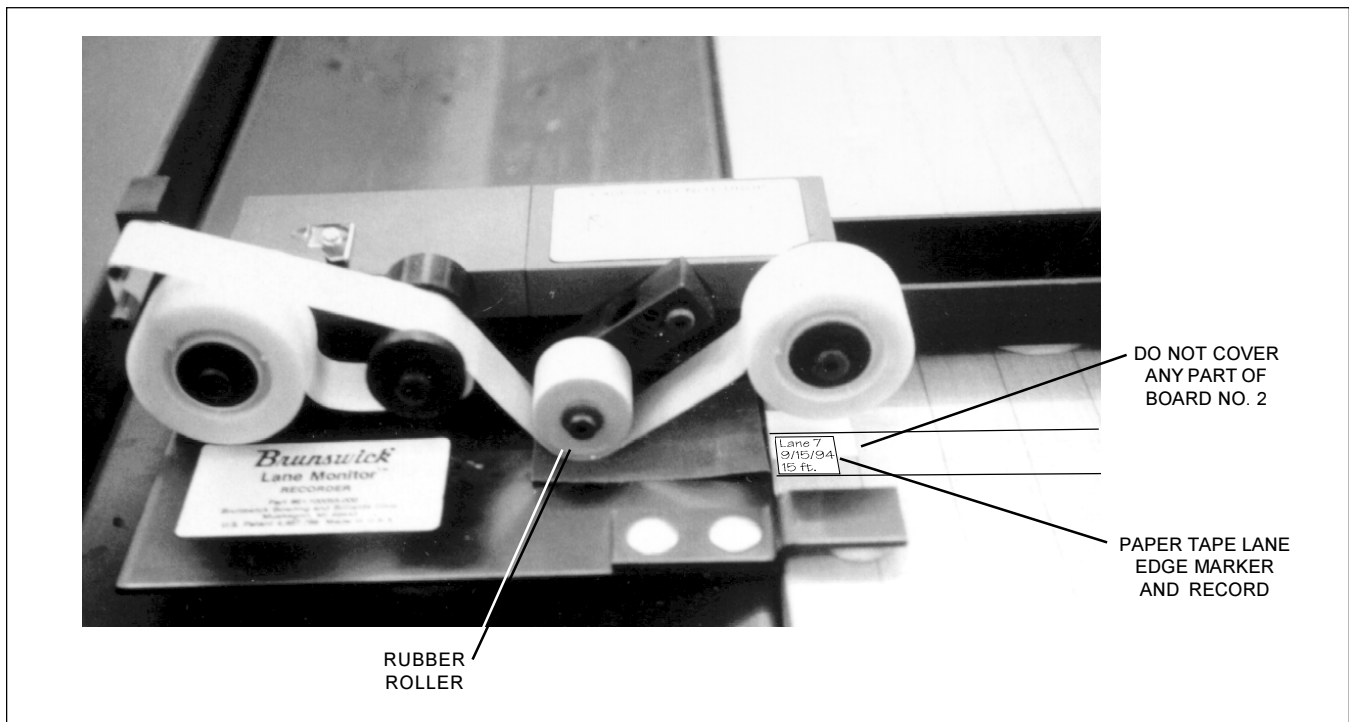

Figure 6 - Recording Sample Information

5.   Insert the wooden push-rod into the hole on the pivot arm of the applicator carriage and **slowly** push the carriage across the lane. This will cause a length of transparent tape to be adhered to the lane surface. See Figure 7.

   CAUTION: Hold the rod at the correct angle (approximately 45°). Too high or too low may cause problems. See Figure 7.
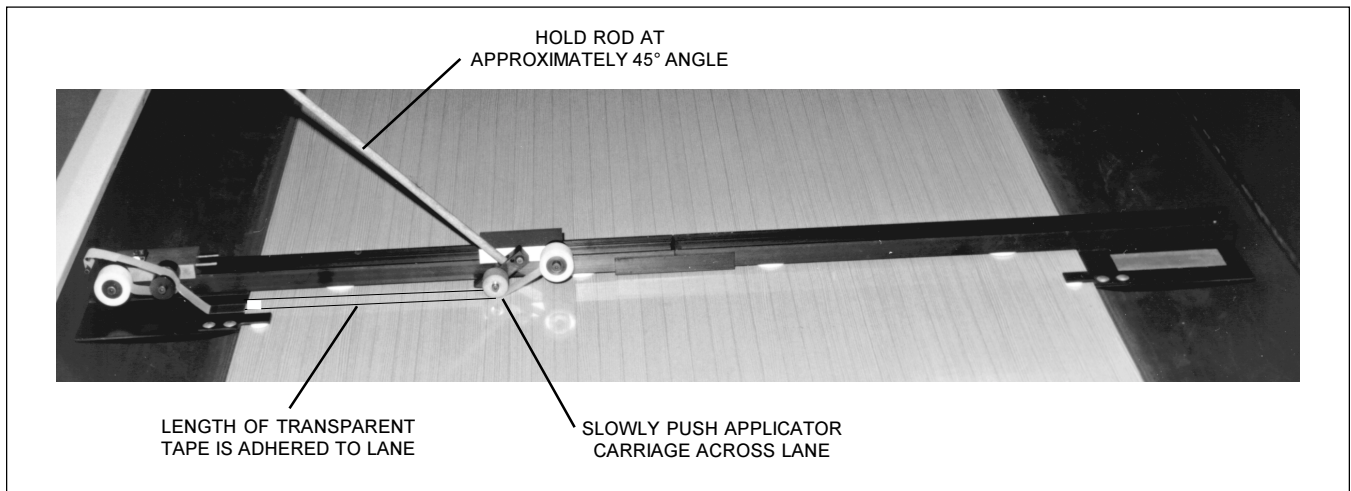

Figure 7 - Slowly Push Applicator Carriage, Adhering Tape to the Lane

6.   Insert the push-rod into the recess on top of the lifter carriage and **slowly** push the carriage across the lane (Figure 8) until it fully mates with the applicator carriage.
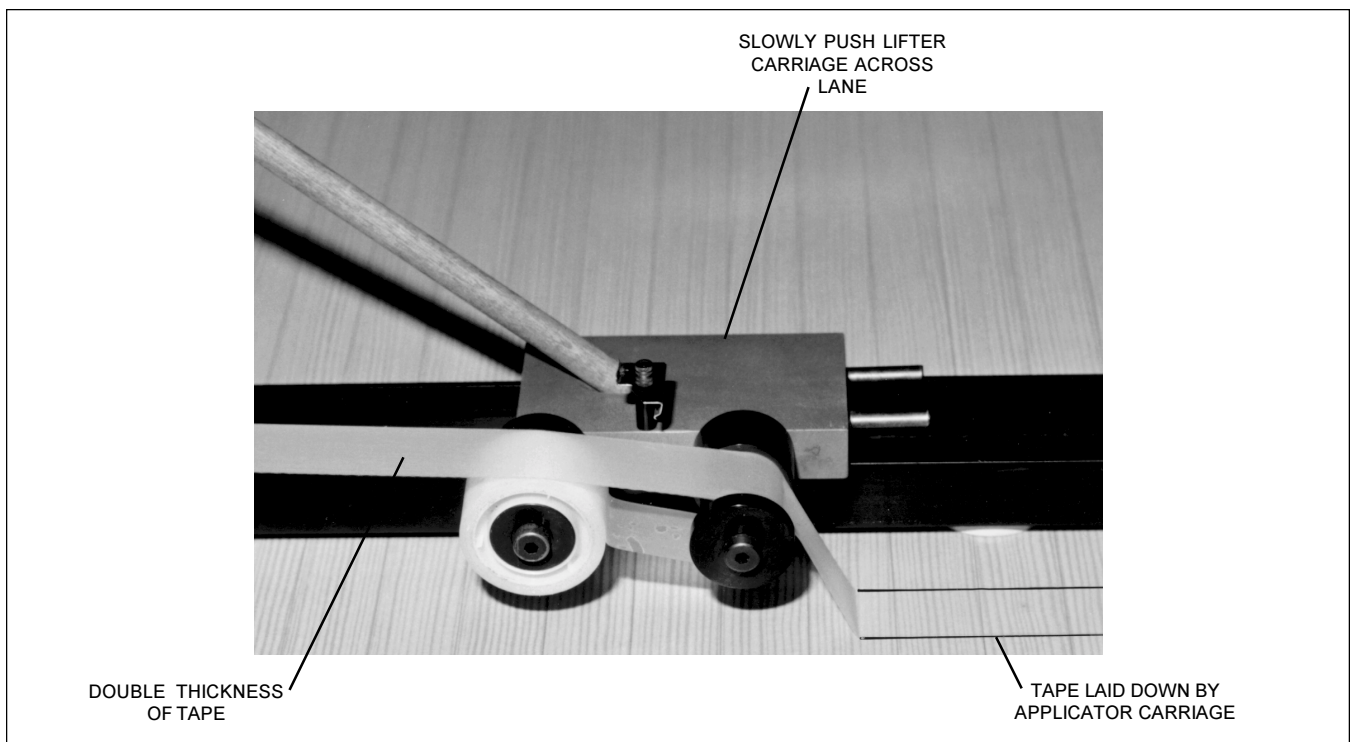

Figure 8 - Slowly Push Lifter Carriage Across Lane Until It Fully Mates with Applicator Carriage

The tape should now be a double thickness and suspended above the lane with the adhesive sides together. Figure 9.

DOUBLE THICKNESS OF
TAPE IS SUSPENDED
ABOVE LANE

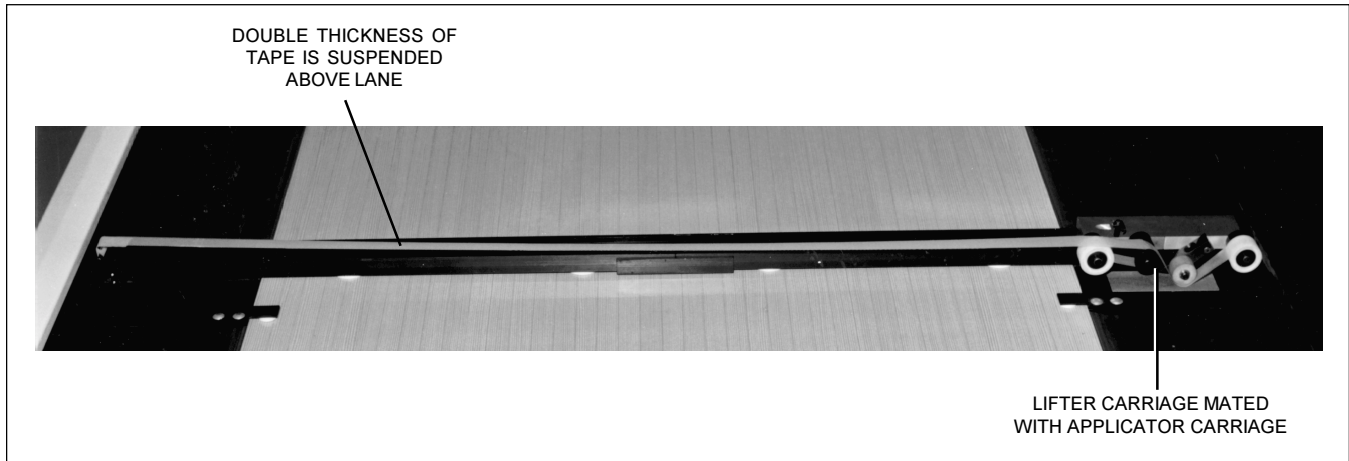LIFTER CARRIAGE MATED
WITH APPLICATOR CARRIAGE

Figure 9 - Double Thickness of Tape Suspended Above Lane

7.   Raise the doubled tape slightly, nick it with the taped cutter, and tear it across

8.   Raise the torn end upward at a 45° angle to free the tape from the anchor post, being careful to **keep the tape clear of the lane surface.**

9.   PICK UP the mated tape carriages and return them to the starting position.

      CAUTION: If the rubber wheel makes direct contact with the dressed lane, it will have to be cleaned before the next use.

10.   Repeat steps 1-9 at subsequent reading locations.

      CAUTION: Store sample tapes in a container to protect them from being folded or crushed. The ideal storage form for a tape is to roll it in a 2 to 3" diameter circle and use a paper clip to hold together. This will greatly improve the preparation for reading a tape.

      NOTE: DO NOT allow the Recorder frame to move along the lane as the tape carriages are pushed across the lane. This is the main cause of misalignment and mismatching of the tape strips. If the tape sample has more than 1/16" of adhesive exposed along the edges or has excessive wrinkles, it may not feed properly through the Optical Reader. Discard poor tape samples and reposition the Recorder frame a few inches from the original reading to make a new tape sample.

Computer Lane Monitor Optical Reader

NORMAL STORAGE AND OPERATING CONDITIONS

	MINIMUM	NOMINAL	MAXIMUM
Operating Voltage (110V)	90 VAC	110 VAC	125 VAC
Operating Voltage (220V)	200 VAC	220 VAC	240 VAC
Operating Current	—	210 MA	—
Operating Temperature	60°F	70° F	80° F
Storage Temperature	0°F	70° F	165° F
Relative Humidity	10%	—	90%

> NOTE: Use 1 Amp 250V fast blow fuse only (AGCI Part No. 11-685001-000 or 3AG Part No. 11-685053-000).

STORAGE AND HANDLING

1.   The Optical Reader is designed to operate within a wide range of conditions which should be observed. (See Normal Storage and Operating Conditions chart above.)

2.   To reduce the need for maintenance or repair, minimize exposure of the unit to water, dirt, metal filings, and salt-laden air.

3.   Protect unit from shock and vibration. Although the lane monitor has been designed to be as rugged as possible, it is still a delicate test instrument and can be damaged by severe shock. Excessive rough handling, exposure to water spray or extreme temperatures should be avoided.

PRECAUTIONS FOR USE

1.   If cold, allow the Optical Reader to acclimate to room temperature before operation.

2.   Operate within the recommended line voltage limits.

3.   Set the Reader on clean, hard, flat surface.

4.   Keep foreign material out of the lane monitor, especially the tape path. Make sure sample tapes are clean and free from excessive tape adhesive and/or lane dressing. Foreign material on the tapes will accumulate on the drive roller and more frequent cleaning will be required.

5.   Keep rollers clean. Periodic cleaning of the drive and idler rollers will ensure trouble free operation. Cleaning should be performed after approximately 100 tapes., depending on condition of the tapes and operating conditions. Storage in a clean dry place will help ensure proper operation.

6.   If the Optical Reader does not appear to operate properly, be sure instructions have been followed before concluding that service is required. Refer to Troubleshooting Section in this manual for problems, cause and solutions.

7.   Disconnect power before checking fuse or servicing the Computer Lane Monitor Reader.

8.   If electronic repairs are required beyond areas covered in the Troubleshooting Section, the Optical Reader should be returned to Brunswick Bowling for service or repair. Contact your sales person for proper return assistance.

USER FAMILIARIZATION

1. With the Computer Lane Monitor Optical Reader turned off, locate the switches, indicator light, cable connection, tape slots, and fuse location. See Figure 10.

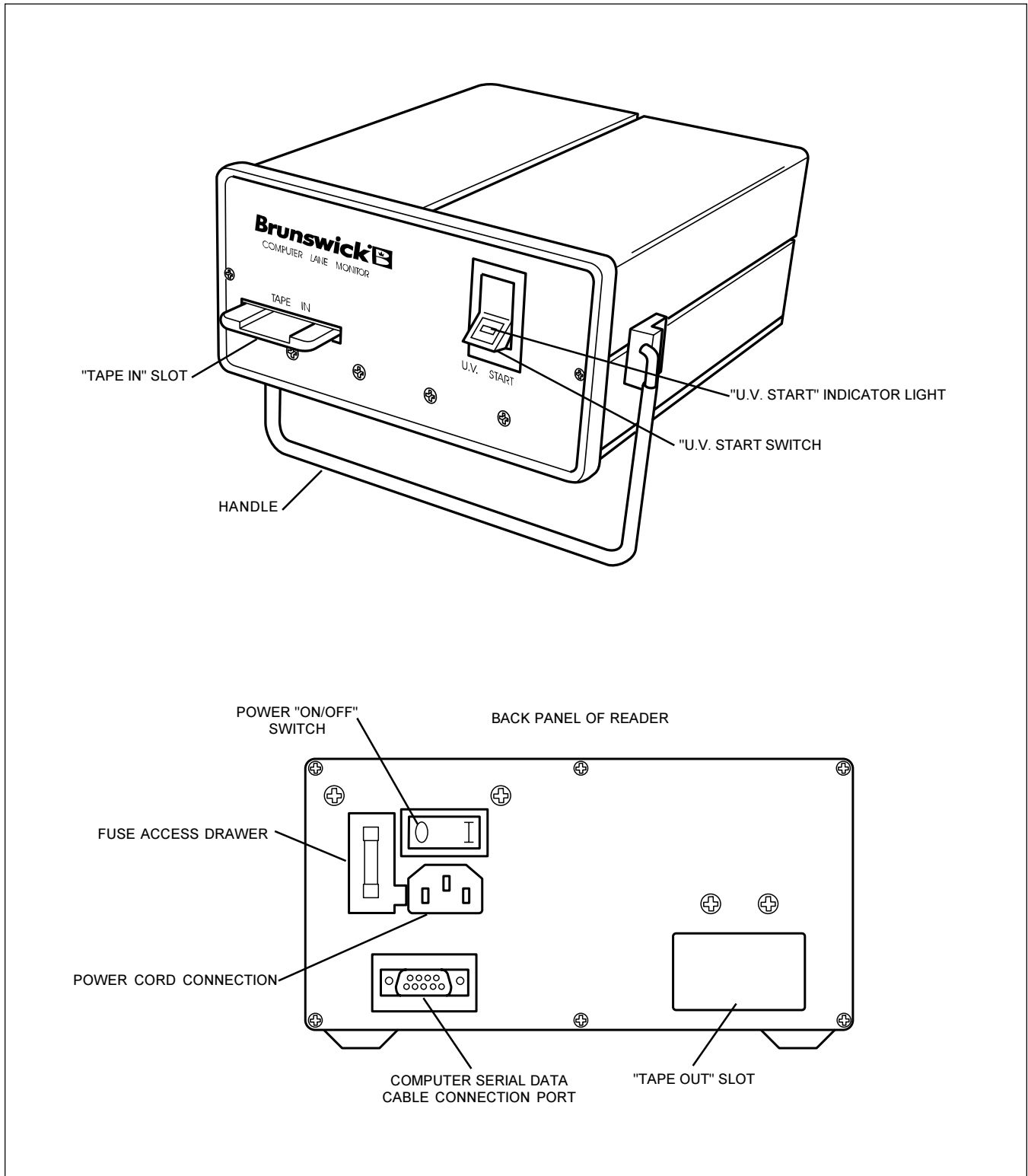   *NOTE: 220 V power cord is not supplied with a wall outlet connector.*

Figure 10 - Computer Lane Monitor Optical Reader Familiarization

SAMPLE TAPE PREPARATION FOR OPTICAL READER

1. Proper sample tape preparation is very important to assure trouble free operation of the Computer Lane Monitor. The initial end of the sample tape is most critical for proper feeding of the Optical Reader.

    a. Select a good smooth section of tape 6" to 10" ahead of the lane edge marker with no exposed adhesive.

    b. It is recommended that an extra layer of 1" wide transparent tape (Brunswick part no. 11-900070-000) be placed across the end of the tape sample as shown in Figure 11. The cross direction of this extra layer helps to stiffen the end of the tape from its natural curl.

    c. Cut the end of the tape sample as shown in Figure 11 to create a good tape leader.
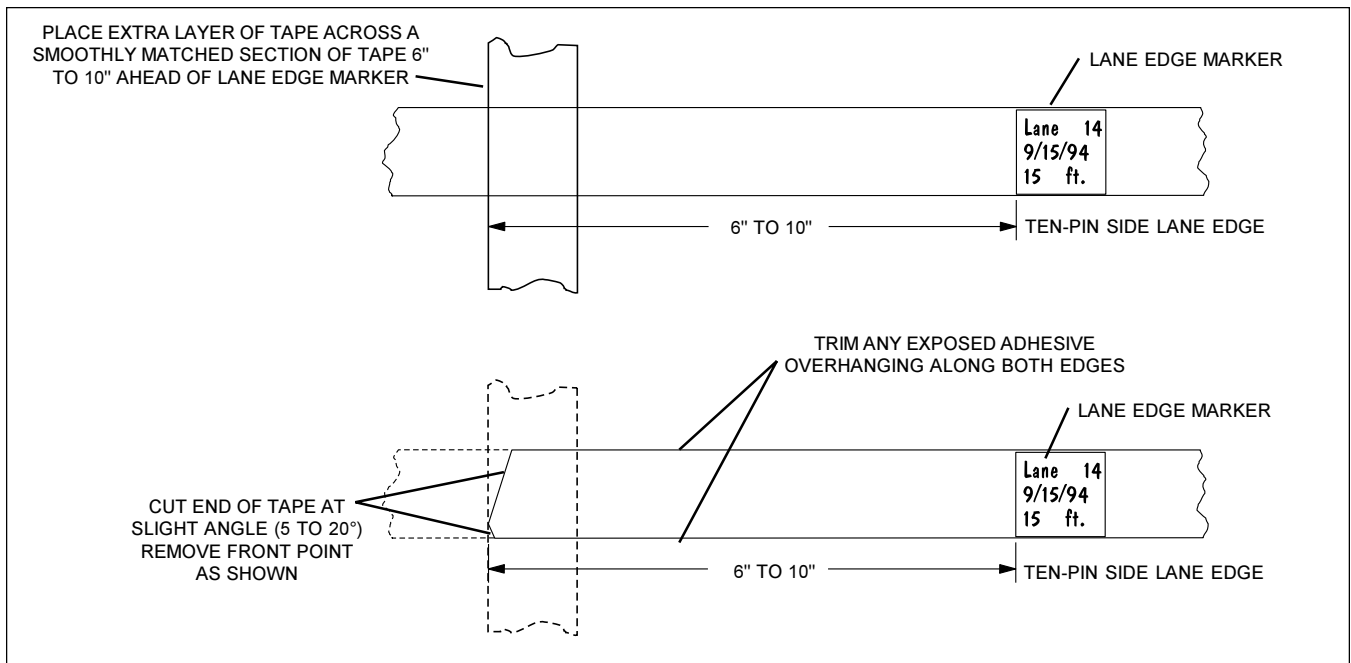
Figure 11 - Preparing Tape Leader Portion

CAUTION: *A. If the two tapes are mismatched, trim along both edges to remove the over-hang removing any exposed adhesive on the 6" leader. Do not trim narrower than 7/8" or tape may not follow inner slot.*

B. Severely curled tape should be straightened out before insertion into the Reader. Forming the tape into a "V" shape across the width of the tape may help it to remain straight. Leave no lumps, curls or wrinkles at the end of the leader.

C. If there is dressing on the outside surfaces of the tape, especially the leader, it must be completely removed before insertion into the reader.

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2.	If sample tape leader is shorter than 6" or if the very end is damaged, a new extension can be put on the front of the leader.

	*CAUTION:	At least 3" of the original tape must be left in front of the lane edge marker for a valid reading since the reader sets the zero value 1 to 2" in front of the lane edge marker.*

	a.	Press together two 6" lengths of transparent tape, leaving the last 1" separated.

	b.	Insert the sample tape, as shown in Figure 12, into the separated area of the new leader extension and carefully press the extension onto the original leader.

	c.	Knead the overlap firmly so the assembly will stay together during use. Trim the end off 6" from the lane edge marker as shown in Figure 11. Trim the overhanging edges of exposed adhesive.
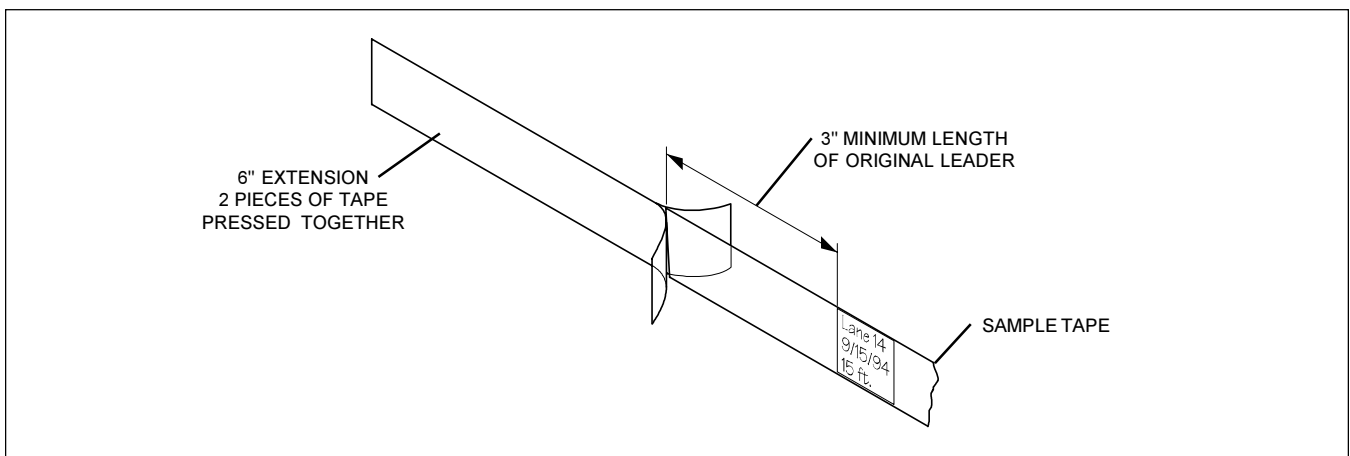
Figure 12 - Leader Extension

3.	If a sample tape does not have a lane edge marker between the layers of transparent tape, place a 1" square piece of the supplied white, lane edge marker material (Brunswick part no. 61-100057-000, 3M brand #658 Post-It tape) onto the outside of the tape sample over the board no. 1 position on the ten-pin side. Firmly press the edges of the marker to make sure it is firmly attached to the tape sample.

4.	If a sample tape has a lane edge marker between the layers of transparent tape that is not the recommended thin white, 1" square material, it will be necessary to use the Manual Option of the "Read Tape" command explained later in this manual.

	*NOTE:	A tape sample with only a 3-3/4" leader can be used without adding a leader extension by using the Manual Option of the "Read Tape" command.*

INSTALLATION OF COMPUTER LANE MONITOR SOFTWARE

The Computer Lane Monitor System requires an existing IBM-compatible, 386 or higher computer with a minimum of 3M RAM and a VGA or EGA color or monochrome monitor to control the Optical Reader and display the information. Since the software also stores the tape files in a data base for quick retrieval, a hard drive is required. The software control program must be installed onto the computer before the initial operation of the Computer Lane Monitor. The basic program runs on the DOS operating system as explained in the following pages of this manual. A Windows version software is also included in this package, which provides more advanced options for viewing 3-D lane graphs, printing with full availability of Windows drivers, etc. Refer to the separate supplemental manual for instructions on installing and operating the Computer Lane Monitor with the Windows version software.

> *NOTE: Make sure to make a copy of the original diskette and store it in a safe location.*

1.   Insert the DOS installation program diskette into the computer's floppy disk drive. (For this example, it is assumed to be drive A:)

2.   Type **A:** <Enter>

3.   Type **INSTALL** <Enter>

4.   If the installation program diskette is inserted into drive B, type **B:** <enter>, then type **INSTALLB** <enter>.

5.   The program will prompt you through the installation process.

6.   Make sure to store the original diskette in a safe place.

> *NOTE: If you do not have a 3 1/2" disk drive on your computer, have the original diskette copied onto a 5 1/4" floppy diskette. Contact your Brunswick salesperson if you do not have any available way to copy the original diskette onto the proper size diskette for your computer.*

OPERATION OF THE OPTICAL READER

CONNECTION OF POWER CORD AND COMPUTER SERIAL DATA CABLE

1. Plug the supplied power cord into the connection on the back panel of the Optical Reader. See Figure 10.

2. Connect the other end of the power cord into a grounded 110 or 220 VAC 50/60Hz outlet, depending on the voltage range of the Reader which you ordered.

    CAUTION: Never use a 2-prong adapter or a 2-conductor extension cord. Improper power supply for your model will damage the unit.

3. Plug the male end of the supplied RS232 serial computer data cable into the connection port on the back panel of the Optical Reader. See Figure 10.

4. Plug the female end of the serial cable into the serial port of an IBM-compatible PC computer.

OPTICAL READER POWER-UP AND U.V. LAMP START

1. Turn on the Optical Reader power switch located on the back panel. See Figure 10. The switch is marked with a "|" for ON and "0" for OFF.

2. Turn on the U.V. lamp by pressing the "U.V. START" switch on the front panel until the amber indicator light remains on, then release the switch. The light will stay on indicating the proper function of the U.V. lamp.

    NOTE: Do not be alarmed if the U.V. lamp "starts" by itself when the power switch is activated. This sometimes happens if the bulb is warm.

COMPUTER POWER-UP AND START OF SOFTWARE PROGRAM

1. Turn on computer power and enter the following commands from the DOS prompt (C:) to run the Computer Lane Monitor program.

    NOTE: If your computer automatically starts from Windows_{TM}, exit Windows_{TM} by selecting the exit command from the "File" option of the Program Manager screen.

    Windows_{TM} is a registered trademark of Microsoft.

2. Type **CD\LM** <enter> (to select the correct directory)

3. Type **CLM** <enter> (to start the Computer Lane Monitor program)

4. If the Computer Lane Monitor program is accidentally exited, the screen will display the "C:LM>" prompt. To restart the program, type **CLM** <enter>.

PROGRAM INTRODUCTION SCREEN

1. The Program Introduction Screen will appear with a message near the bottom indicating the version of the Computer Lane Monitor that was found and that the Optical Reader is communicating with the computer. See Figure 13.

Brunswick
COMPUTER LANE MONITOR™
Lane Dressing Analysis
System

Application Software: Version 1.20

Firmware: P.C. Lane Monitor Version 3.00

Press Any Key to Continue

Figure 13 - Program Introduction Screen

2. If the message indicates that the Monitor was "NOT FOUND", make sure that the serial computer data cable was properly connected and that the Optical Reader power was turned on. If your computer has more than one serial port, it may be necessary to switch to another available serial port on the back of the computer or change the serial port set-up. To change the set-up, first press any key to continue to the main menu. Then select the "Utilities" option and then choose the "Environment" option to change the set-up to search for another serial port. Refer to step 5 of the "Utilities" instructions on page 28.

3. Press any key on the computer keyboard to continue.

MAIN MENU SCREEN

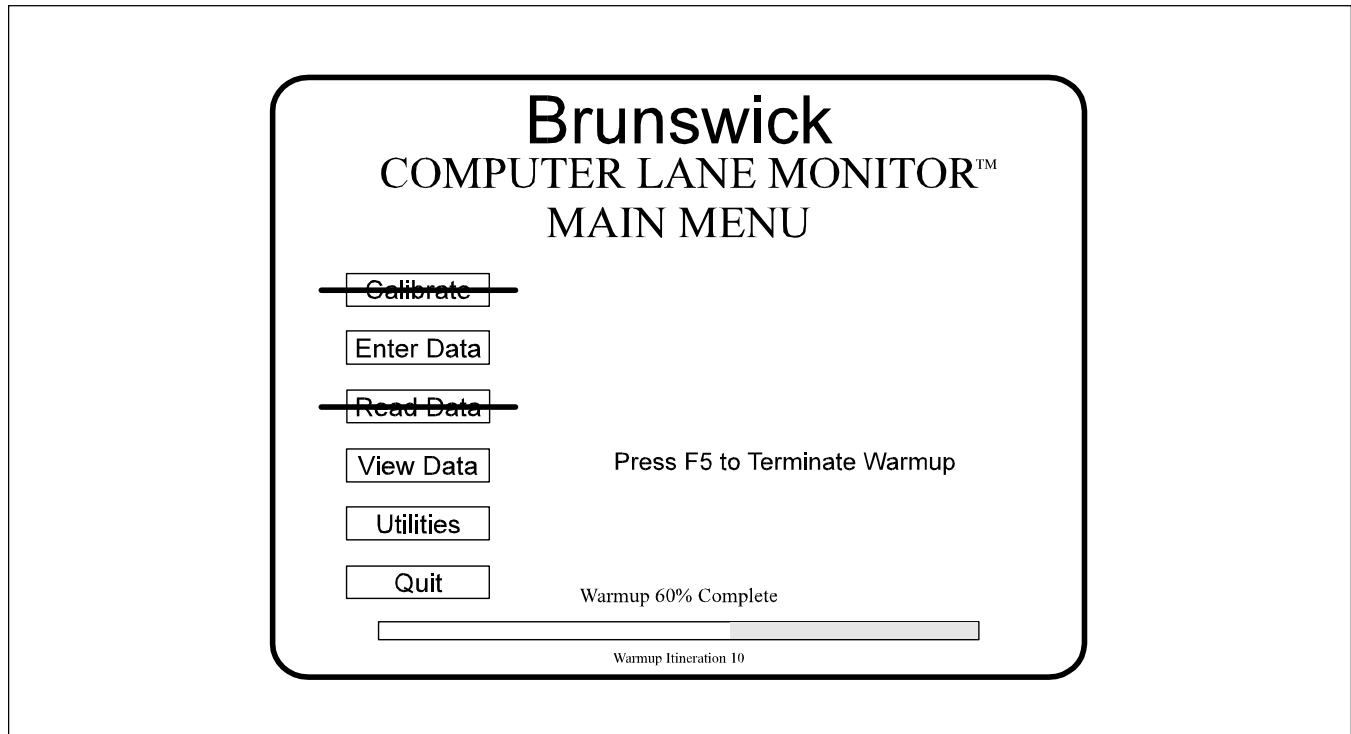1. The Main Menu appears next on the computer screen. See Figure 14.

Figure 14 - Main Menu

2.   This screen displays the Main Menu options. When the Main Menu screen appears for the first time, it automatically starts the Warm-Up Check with a bar graph displayed at the bottom of the screen. (The Warm-Up Check is explained in the next instruction step.) Normally one would wait until the Warm-Up Check is completed and then select the Main Menu options in sequence from top to bottom. For example, the Warm-Up Check must be completed before the "Calibrate" option can be selected. And the "Calibrate" option must be completed before the "Read Tape" option can be selected. It is also highly recommended that the "Enter Data" option be completed before selecting the "Read Tape" option.

      NOTE: *Two Main Menu options which can be selected out of sequence while the U.V. lamp is warming up are the "View Data" and "Utilities" options. The "Utilities" option will need to be selected the first time you run the program to set up the proper computer monitor and printer. Select the "Environment" option of the "Utilities" menu to change the computer monitor from the default color VGA set-up. Select the "Printer" option of the "Utilities" menu to select the proper printer set-up. Refer to the "Utilities" instructions on pages 28-30. Both these options are explained in later instruction steps.*

3.   To select a Main Menu option, use the arrows on the keyboard to move the highlighted cursor up or down. Then press the <enter> key to execute your selection.

WARM-UP CHECK

1.   The Warm-Up Check monitors the U.V. lamp at the start of the Computer Lane Monitor pro-
     gram to make sure it has stabilized enough to allow accurate calibration and reading of sample
     tapes. The Warm-Up Check is automatically started each time the Main Menu is displayed
     until the Warm-Up Check is completed. A bar graph on this display indicates the warm-up
     status of the U.V. lamp to avoid excess waiting. See Figure 15. The warm-up time varies
     depending on the ambient temperature, storage temperature, and age of the U.V. source tube.
     A normal warm-up takes 15 to 45 minutes from the time the UV lamp was started.

     TIP: *For minimum waiting, turn on the U.V. lamp an hour before use. The Warm-Up*
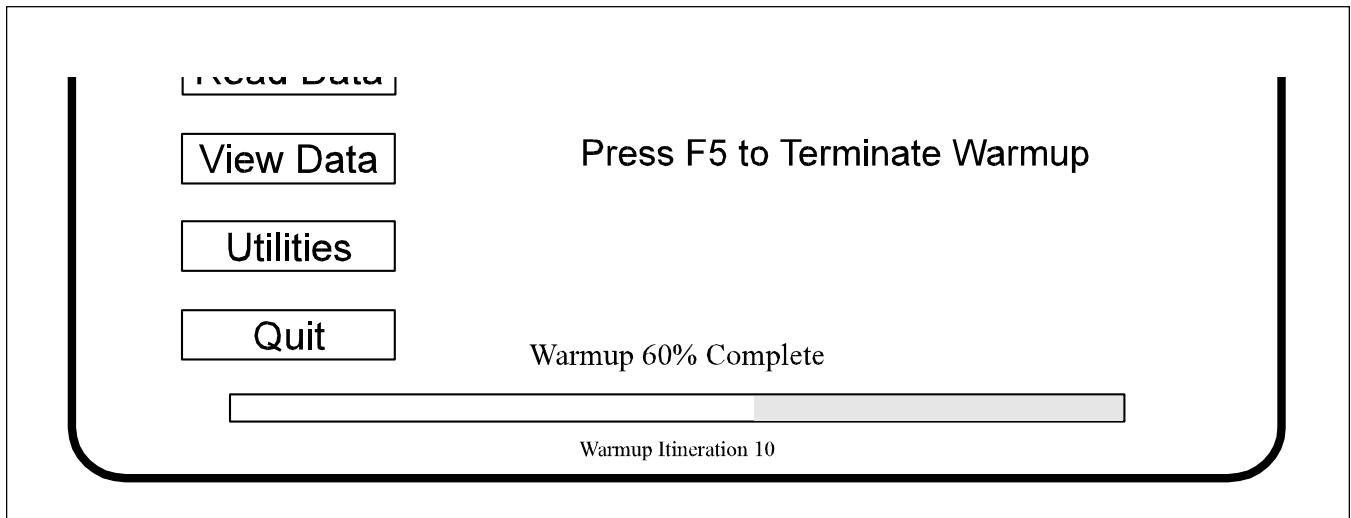   *Check can then be completed in only a few minutes.*

Figure 15 - Warm-up Status Bar

2.   You can exit the Warm-Up Check at any time to select the "View Data" or "Utilities" options by
     pressing the F5 key. The Warm-Up Check must be completed before the "Calibrate" or "Read
     Tape" options can be selected. Simply return to the Main Menu to restart the Warm-Up Check.

18

"CALIBRATE" OPTION

1.   Select the "Calibrate" option to set the Optical Reader calibration with the included calibration strips before reading a sample tape. There are two options in the calibration menu. See Figure 16.
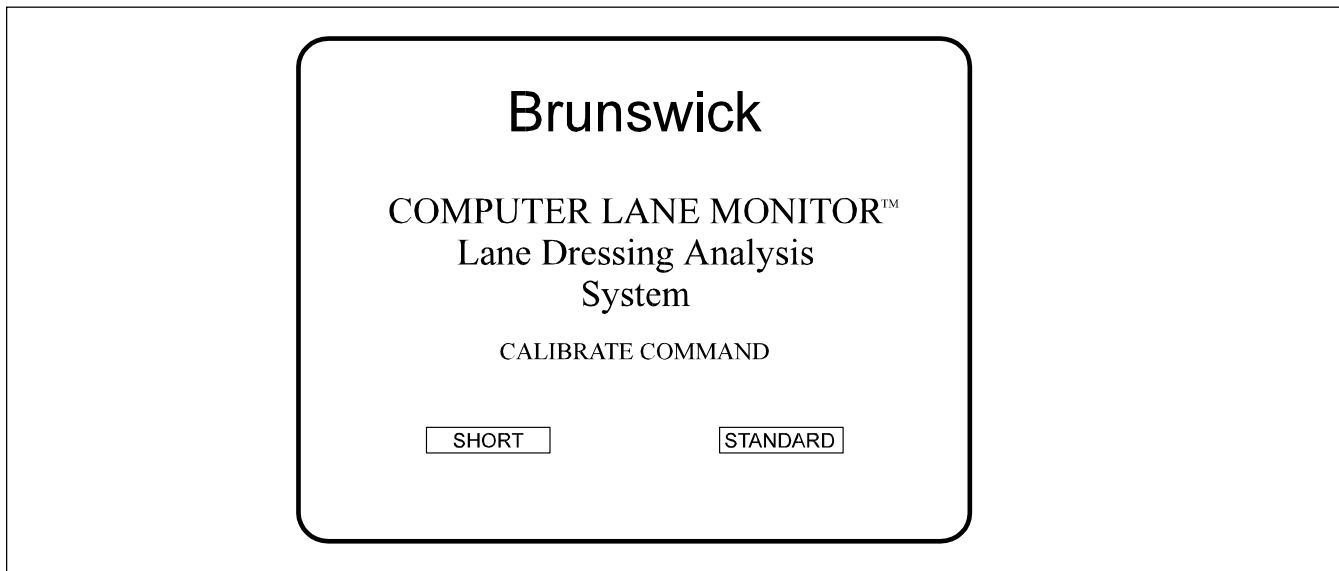

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COMPUTER LANE MONITOR™
Lane Dressing Analysis
System

CALIBRATE COMMAND

SHORT   STANDARD

Figure 16 - Calibration Menu

2.   The "SHORT" calibration requires only one calibration strip while the "STANDARD" option uses all three calibration strips. You will have to use the standard calibration the first time you run the program. After that, it is suggested that you use the short calibration since the program will automatically prompt you when it is necessary to run the standard calibration. Both options first prompt you to press any key with the Optical Reader tape slot empty. A calibration strip should then be inserted into the "Tape In" slot until the label end is flush with the front edge of the "Tape In" guide. See Figure 17.

FLUSH WITH
FRONT EDGE
OF GUIDE

Figure 17 - Insertion of the Calibration Strip

3. The Optical Reader then reads the calibration strip when you press any key. Leave the calibration strip in the Reader until the screen prompts you to **type in the value printed on the label of the calibration strip.** The calibration value must be entered from the computer keyboard followed by pressing the <enter> key. If you press the wrong number key while entering the calibration strip value, use the backspace key to erase the mistake before pressing the <enter> key.

4. If the computer calculated "SHORT" calibration setting from a single calibration strip is close to the previous "standard" clibration setting, the program will indicate that the calibration is complete and return you to the main menu for your next for your next selection. If not, it will prompt you to conduct the "STANDARD" calibration with three calibration strips.

    NOTE: *The standard calibration is more accurate than the short calibration. It also has diagnostics to indicate if one of the three strips is out of range so you can check if you entered the wrong value or if the strip is too old.*

                Also, do not be alarmed if the computer prompts you to re-calibrate periodically during extended periods of use. This is a feature that is built into the monitor to compensate for the gradual internal temperature change.

    NOTE: *The included calibration kit (Brunswick part number 61-860162-000) contains three calibration strips. When each strip is used for the first time, record the date in the space provided on the label. Each strip should be replaced with a new strip after four months from the date of first use, depending on your frequency of use. Always keep the strips in the provided envelopes when not in use. Exposure to direct sunlight is harmful to the strips and can result in false readings. Also, remove the strips from the Optical Reader as soon as the calibration is completed.*

"ENTER DATA" OPTION

1. Select the "Enter Data" option to input the lane number, distance of sample from the foul line, date, establishment, etc. The "Comments" section can be used to record the type of lane dressing used, the program or set-up of the lane machine or any other desired information. See Figure 18.

```
╔══════════════════════════════════════════════════════════╗
║  ┌──────────────────── LANE STATISTICS ─────────────────┐ ║
║  │    Establishment Name:      BRUNSWICK  LANES         │ ║
║  │           Lane Number:      4                        │ ║
║  │    Distance from Foul Line:    15  feet              │ ║
║  │  Approx. No. of games bowled since last conditioned:  0 │ ║
║  │  Comments:  Record the type of lane dressing used, the lane machine │ ║
║  │             set-up or other information here.        │ ║
║  │                                                      │ ║
║  │                              Tab to exit             │ ║
║  │   ┌──────────────────────────────────────────┐      │ ║
║  │   │  Readings Taken By:     ROY    BURKHOLDER │      │ ║
║  │   │           Date:         08/12/94          │      │ ║
║  │   │           Time:         9:52AM            │      │ ║
║  │   └──────────────────────────────────────────┘      │ ║
║  │         <Done>              <Clear>                  │ ║
║  └──────────────────── BRUNSWICK  BOWLING ─────────────┘ ║
╚══════════════════════════════════════════════════════════╝
```

Figure 18 - Enter Data Screen

2. It is important to enter this information before reading a tape and saving the data to create an accurate data base for future reference.

3. Use the "CLEAR" command to erase all the information, except the current date and time, for completely new input or use the arrow and tab keys to move to the spaces to change only selected information such as lane number, distance, date, etc. The delete key will erase the existing entry one space at a time to allow editing or new entry.

4. Select the "DONE" command to save this information and return to main menu.

"READ TAPE" OPTION - AUTOMATIC

1.   Select the "Read Tape" option to read and display the value of a new tape sample. There are two options with the "Read Tape" menu. Use the "Automatic" option if you have the proper lane edge marker explained on page 12. Otherwise, use the "Manual" option. The "AUTOMATIC" option will automatically control the tape drive roller motor to position the tape and advance it while it reads the entire tape length. The "MANUAL" option is explained in the next instruction section. Choose the desired option from the screen shown in Figure 19.

     CAUTION: *Make sure there is no tape sample already in the Optical Reader when you select a "Read Tape" option. The Reader takes an empty slot reading to check the calibration before each tape sample is read.*
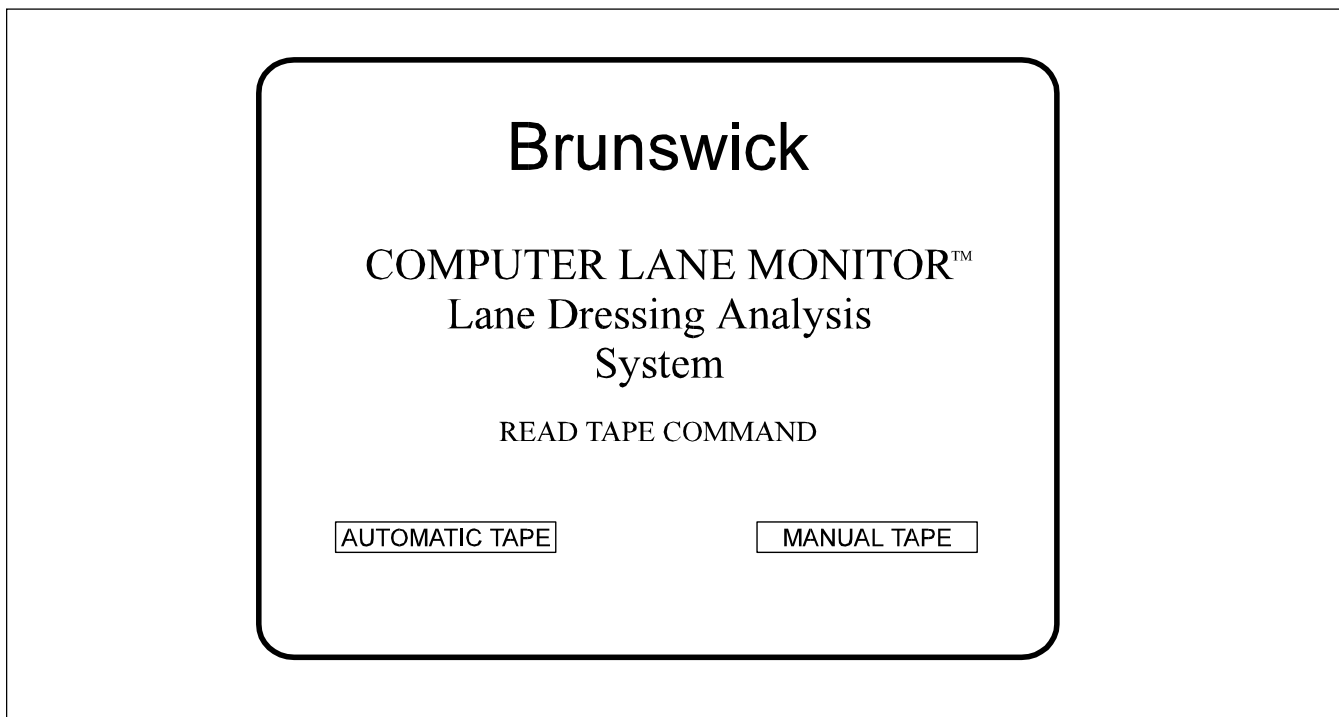

Brunswick

COMPUTER LANE MONITOR™
Lane Dressing Analysis
System

READ TAPE COMMAND

| AUTOMATIC TAPE | | MANUAL TAPE |

Figure 19 - "Read Tape" Options

     NOTE: *If you have not read and followed the instructions on Sample Tape Preparation for Optical Reader, return to page 12. Make sure that the tape sample has a straight 6" leader with the recommended white lane edge marker.*

     NOTE: *The program prompts you if the last tape was not saved. Type "N" to abort the "Read Tape" option. Then enter the "View Data" option explained later in the instruction steps to select the "current" tape to view and save. If you type "Y", the program will continue to read a new tape into the "current" file and erase the previously read tape file.*

2.   The screen will prompt you to insert a sample tape into the "Tape In" slot of the Optical Reader. The automatic tape drive motor will not start until you have inserted the tape sample leader into the "Tape In" slot of the Optical Reader.

3. **After the tape drive motor starts, continue to insert the sample tape further into the slot until it contacts the drive rollers and is pulled in by itself.** The tape will slowly advance until it finds the lane edge marker. Then it will reverse to take a zero reading from the leader before it advances to quickly read the entire tape length.

    TIP: *Place a pencil or pen through the center of the tape sample roll to allow it to unroll without twisting before it enters the "Tape In" slot. For best results, grasp the front end of the tape as it exits the rear opening of the Reader and watch for a steady flow of tape.*

    CAUTION: *If the sample tape becomes jammed in the Optical Reader while it is being read, IMMEDIATELY STOP THE TAPE READ OPERATION BY PRESSING THE "ESCAPE" KEY OR TURNING OFF THE POWER TO THE READER! Refer to the "Clearing a Tape Jam" section in the Service section of this manual.*

    NOTE: *If the Optical Reader can not find the lane edge marker to automatically position the sample tape, or if the lane edge marker is covering part of the second board, you will need to use the "Manual" tape positioning explained in the next step. You will need to clear the tape from the Reader by selecting the "Move Tape" option of the "Utilities" menu BEFORE selecting the "Manual" option of the "Read Tape".*

4. The lane dressing analysis graph will be automatically displayed as the end of the tape sample exits the Reader. The digital units of oil for each board position will be displayed in a column on the right of the screen. See Figure 20.
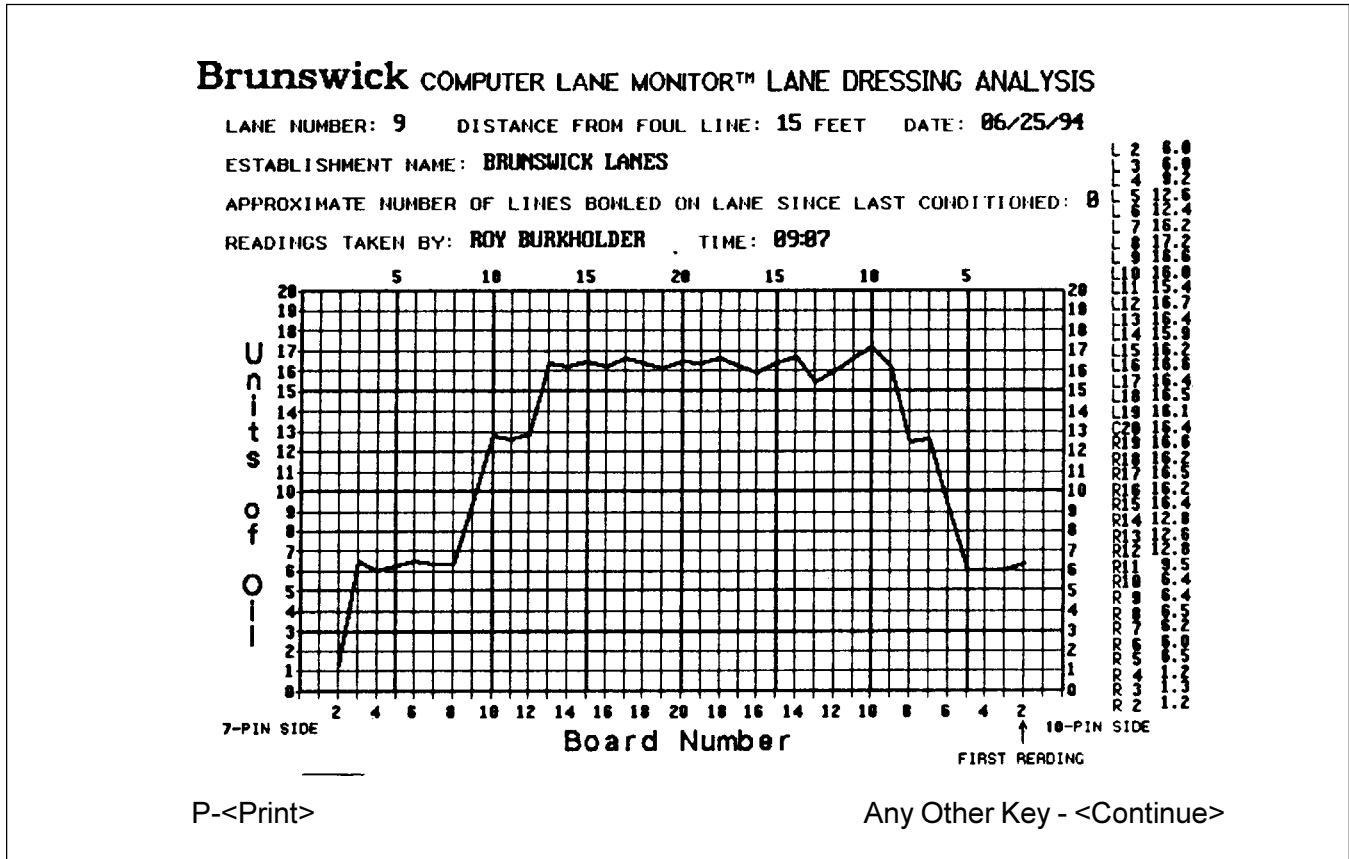

Figure 20 - Lane Dressing Analysis Graph

5. Select the "Save" command shown at the bottom of the screen by pressing the "S" key after checking that the lane no., distance, date, and other statistics are correct. This will assure that the tape file is stored on the data base for later reference. You will then return to the main menu.

   NOTE: *If the lane statistics are not correct, exit the graph and select the "Enter Data" option to correct the information before saving it. You will be able to return to the same "Current" tape graph to save it or print a copy on paper from the "View Data" option.*

"READ TAPE" OPTION - MANUAL

1. The "MANUAL" option of the "Read Tape" program requires the operator to manually position the tape on the leader to take the zero reading then manually position the tape at the start of the second board (10-pin side) and start the program to advance and read the entire tape length. This option should be used if the sample tape does not contain the recommended one-inch square, white lane edge marker. The "Manual" option is not as accurate or repeatable as the "Automatic" option of the "Read Tape" program because of variations in the tape positioning during the Zero Reading and slight shifting of lane edge and board readings.

2. Mark two lines on the sample tape as shown in Figure 21. The first line should be 3-1/2" after the 10-pin lane edge with the second line 5-1/2" after the 10-pin lane edge. Figure 21 is shown full scale and can be used as a guide for marking the tape.
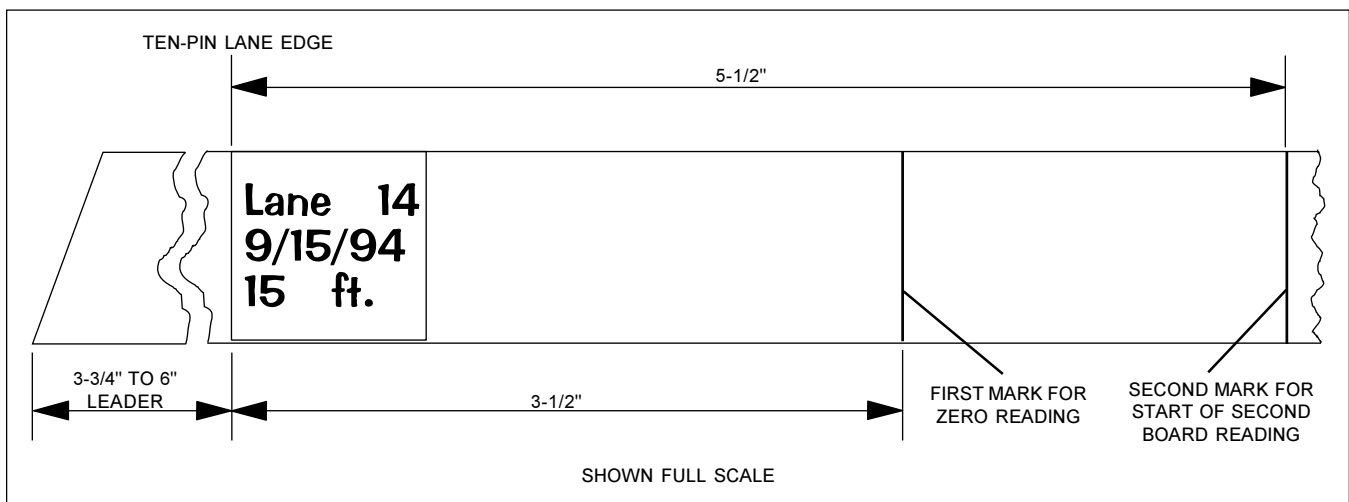

Figure 21 - Preparing a Tape for Manual Read

3. After the "Manual" option of the "Read Tape" program is selected, the screen will prompt you to insert the sample tape into the "Tape In" slot of the Optical Reader and position it for the ZERO READING. With a normal sample tape with a 6" leader, the tape positioning is done by inserting the tape until it contacts the rollers and then pressing the indicated arrow keys to cause the drive motor to position the tape so the first marked line (3-1/2" after the 10-pin lane edge) **is flush with the front edge of the "Tape In" guide.** If the sample tape leader is only 3-3/4" long, the leader may not contact the drive rollers and will have to be held on the 3-1/2" mark by hand.

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4.   Press the <enter> key to take the ZERO READING.

5.   The screen will then prompt you to position the tape sample at the start of the second board on the 10-pin side. This is done by pressing the indicated arrow keys to cause the drive motor to move the tape until the second marked line (5-1/2" after the 10-pin lane edge) is flush with the front edge of the "Tape In" guide.

> *NOTE:*   *If the 10-pin lane edge was not clearly marked or if the lane edge marker covered part of the second board, the tape can manually be positioned by noting the value of the tape reading on the screen as the tape is advanced. The lane edge should be the point where the reading starts to increase noticeably above zero. (Advance ~1" further to the start of the second board.) A white lane edge marker will cause a very high reading. Position the tape just beyond these high readings where the values are normal. Because this procedure involves some estimation as to where the second board starts, it may result in readings which are slightly shifted from the true board positions.*

6.   Press the <enter> key to start the program to advance and read the entire length of the sample tape. The program will now proceed as explained in the previous "Read Tape - Automatic Option" instruction section.

"VIEW DATA" OPTION

1.   Select the "View Data" option to view the graph of a single tape sample or an overlay of up to three previously saved tape graphs for comparison. This option allows you to print any of the graphs on paper and delete any tape files from the main data base. The "View Data" option will also let you return to the "Current" tape graph to view, save, or print a copy on paper.

2.   When the "View Data" option is selected, the screen displays the key lane statistics from both the "Current" tape graph and the list of tape files stored in the data base. See Figure 22.

```
╔═══════════════════ Type 'X' in View Column of up to 3 Selections ═══════════════╗
║         │ Lane #│ Distance │  Establishment   │   Date   │    Time    │ VIEW │   ║
║═════════╪═══════╪══════════╪══════════════════╪══════════╪════════════╪══════╪═══║
║ CURRENT │   4   │    25    │ BRUNSWICK LANES  │ 08/12/94 │  10:00AM   │      │   ║
║         │   4   │    10    │ BRUNSWICK LANES  │ 08/12/94 │   9:40AM   │  X   │   ║
║         │   4   │    15    │ BRUNSWICK LANES  │ 08/12/94 │   9:52AM   │  X   │   ║
║         │   4   │    25    │ BRUNSWICK LANES  │ 08/12/94 │  10:00AM   │  X   │   ║
║         │       │          │                  │          │            │      │   ║
║         │       │          │                  │          │            │      │   ║
╚══════════════════════════ Press ENTER to View Selections ═══════════════════════╝

            CURRENTLY SELECTED DATA BASE IS SAMPLES .DBF
```

Figure 22 - View Data

3.   To view a tape graph, first use the arrow keys to move the highlighted cursor up or down and type an "X" in the "View" column of the tape file selected to view. Place as many as three "X"s in the "View" column to display overlaid graphs for comparison. Then press the <enter> key to execute the view command.

4. The tape graph will then appear on the computer screen. See Figure 23. Select the "Print" command shown at the bottom of the screen by pressing the "P" key to print a copy of the graph on paper or press any other key to return to the Main Menu.
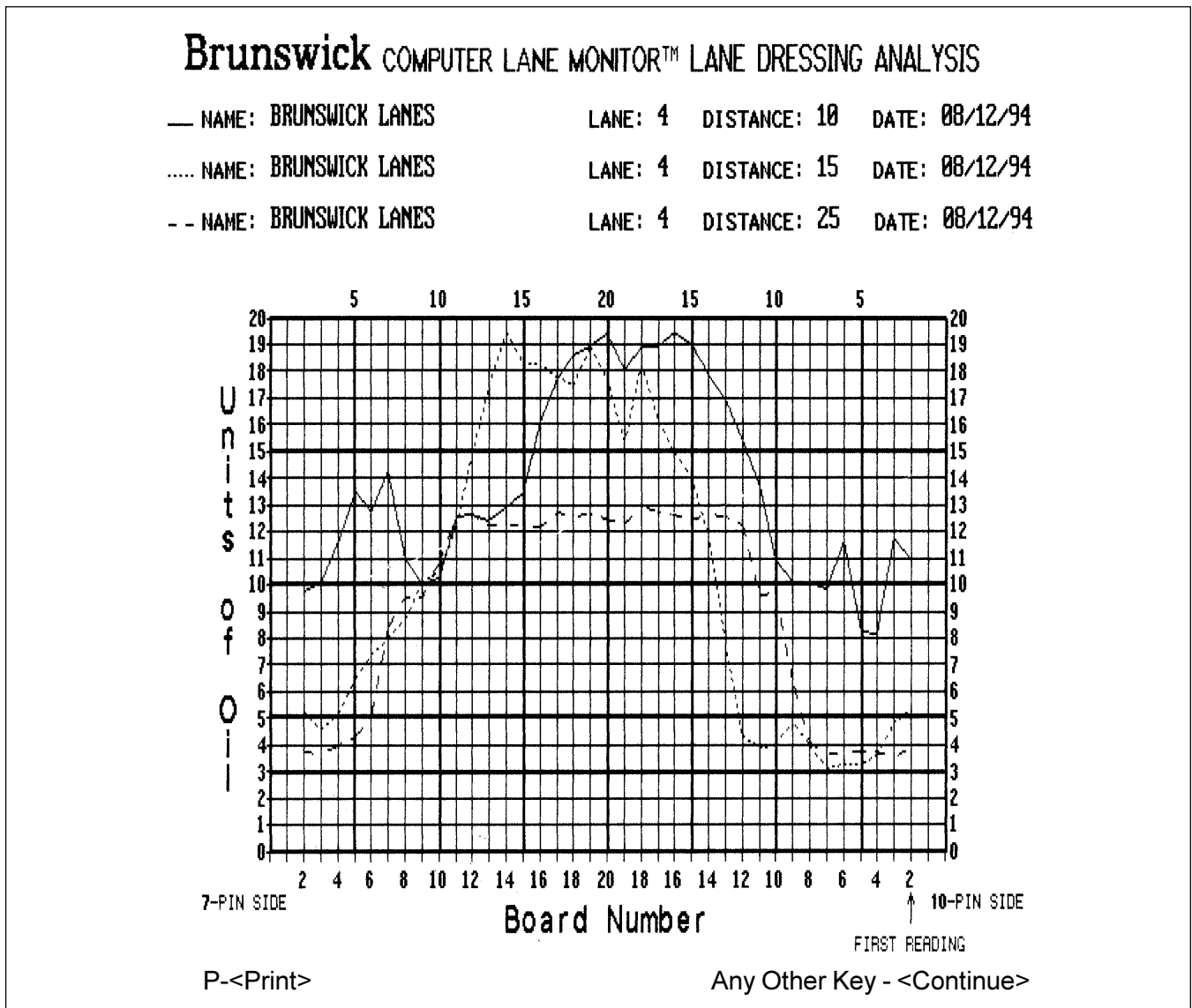

Figure 23 - Tape Graph

NOTE: *The complete lane statistics and the column of digital units of oil for each board position will only be displayed when a single tape graph is selected. Also note that only the most recently read tape will be stored in the "Current" view area and it will be erased when another tape sample is read. Make sure to "Save" the current tape by selecting only the current tape view and selecting the save command. The current tape file is then added to the data base. The Save command only appears on the current tape view since the other tape files are already saved in the data base.*

5. To delete a tape file from the data base, use the arrow keys to move the highlighted cursor up or down to the selected tape file. Press the "F7" key to mark the file to be deleted. A small dot will appear just to the left side of the Lane # on any file selected to delete. Use the "F8" key to unmark a tape file which was mistakenly marked. When the <enter> key is pressed, all tape files which were marked will be deleted and permanently erased from the data base.

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"UTILITIES" OPTION

1. Select The "Utilities" option to change the set-up of the computer monitor, serial port, or printer. Other functions which can be selected from the "Utilities" option are the ability to clear a sample tape from the Optical Reader and the ability to select, create, and append different file databases for the tape graph files. Each function of the "Utilities" option is explained in the following instruction steps.

2. When the "Utilities" option is selected, the screen displays the information shown in Figure 24. Use the arrow keys to move the highlighted cursor up or down and press the <enter> key to execute your selection.
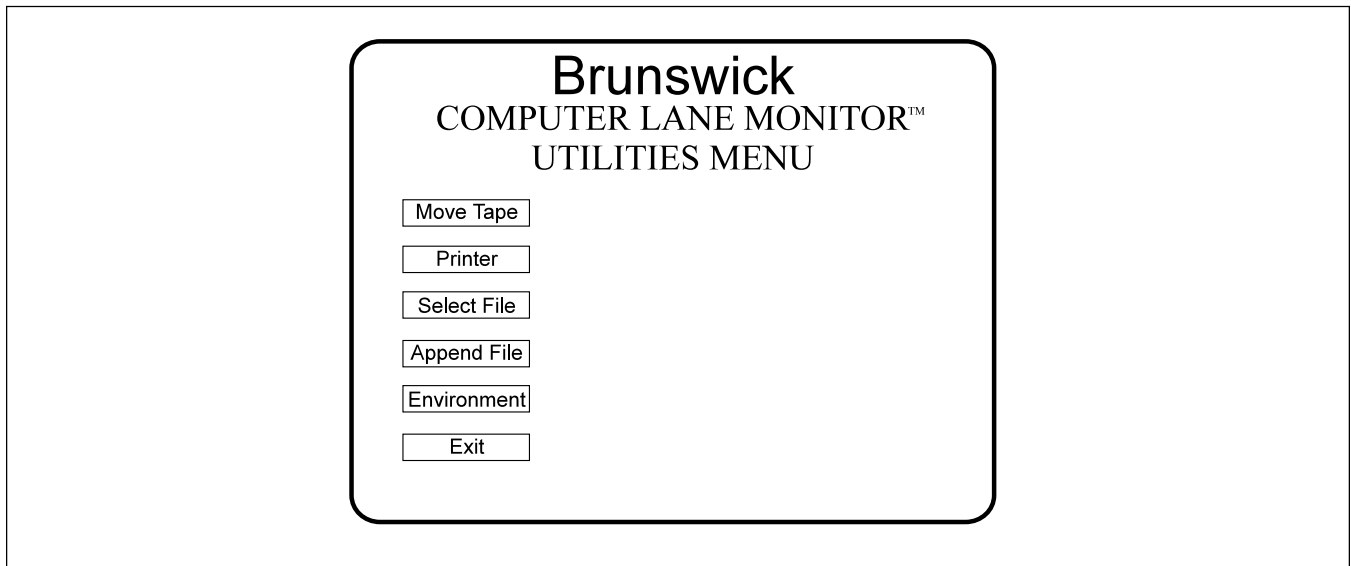

Figure 24 - Utilities Menu

3. The "MOVE TAPE" option allows you to control the Optical Reader tape drive motor from the computer keyboard to clear a tape sample from the tape slot. Use the arrow keys indicated on the screen to advance the tape sample out of the back of the tape slot. Refer to the "Clearing A Tape Jam" instructions in the Service section of this manual if necessary.

4. The "Printer" option allows you to select the proper printer set-up from a list of options. If your model of printer is not listed, refer to your printer manual to determine which selection your printer emulates - for example, most Panasonic printers emulate the Epson FX printer series.

5. The "Environment" option allows you to select the proper computer monitor and serial port set-up. Follow the instructions on the screen to change your selection from the defaul color VGA monitor and serial port #1. After you change the computer monitor or serial port set-up selection, it is necessary to exit and re-enter the Computer Lane Monitor program to reconfigure the hardware.

6. The "Select File" option allows you to select the database file from which the tape graph files are saved, deleted, or viewed from the "View Graph" option. Figure 25 shows the screen display for the "Select File" option. All tape graph files are stored in the SAMPLES.DBF database until another database file is created.

   To create a new database on the hard drive, use the arrow keys to move the highlighted cursor to the NEW.DBF selection. The program will then instruct you to type in the name you chose for the new database. You may want to create a different database for a different center or for a different time period such as at the start of a new season. DO NOT USE A SPACE OR "/" IN THE DATABASE NAME AND DO NOT USE MORE THAN 8 LETTERS OR NUMBERS.

   After you have created more than one database file, use the "Select File" option to select which database you want to save, delete, or view tape graphs from. Use the arrow keys to move the highlighted cursor to the desired database from the list. If the selected database is on a different disk drive, use the tab key to move to the drive selection box on the screen and press the <enter> key. Then use the arrow keys to select the desired drive. When all selections are made, press the <enter> key to execute the changes and return to the "Utilities" menu. If you want to exit this option at any time, press the escape key. If you accidentally select the "[. .]" file (all files), select the "[LM]" file to return to the correct database.

Select database:

[..]
NEW .DBF

Drive   C

Directory   LM

<< Use >>

< Cancel >
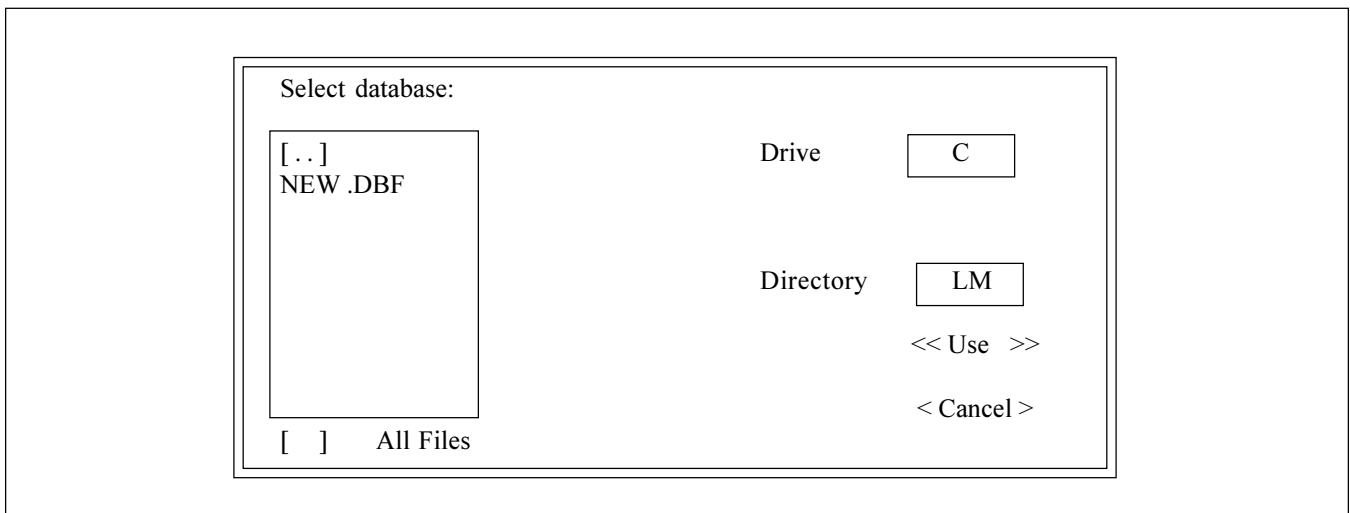
[   ]   All Files

Figure 25 - Select File

NOTE: *To create a new database file on a floppy diskette, you will need to first create the database on the hard drive and then copy that file onto the floppy diskette. Follow the above instructions to create the database with the desired name on the hard drive. Then exit the Computer Lane Monitor program to get the DOS prompt "C:". From the LM directory (C:LM>) type "**COPY** filename.* A:" with a formatted diskette in the A drive. Instead of actually typing in "filename.*", use the name of the file just created on the hard drive, for example "COPY BRUNSWIC.* A:" or "COPY 9-94BRUN.* A:". Then restart the Computer Lane Monitor program and choose the "Select File" option from the "Utilities" menu. First change to the A drive and then select the new database file just created. Now any tape samples read will be saved on the floppy diskette until the database is changed.*

         To copy from a floppy to the hard drive, make sure you are in the LM directory, then type "Copy A: filename."*

7. The "Append File" option allows you to copy tape graph files from the currently selected database file onto a different database file. First use the "Select File" option explained earlier to select the database which you want to copy tape files **from**. Then select the "Append File" option. Figure 26 shows the first screen display for the "Append File" option. Select the database that you want to copy tape graph files **to** by using the arrow keys to move the highlighted cursor to the desired database from the list and then press <enter>.

   Next the "Append File" option will display the list of tape graph files from the current database which you selected in the "Select File" option. See Figure 27. Any of these tape graph files can be selected to copy into the new Append database by using the arrow key to highlight the desired tape graph and typing an "X" in the PICK column. When your selections are complete, press the <enter> key. The program then returns to the "Utilities" menu screen.

   If you choose to append to a database file on a different disk drive, use the tab key to move to the drive selection box on the screen and press the <enter> key. Then use the arrow keys to select the desired drive. Before appending to a floppy diskette, it must first be prepared as explained in the previous "Select File" instructions.

```
          SELECT NEW DATABASE FILE FROM THE FOLLOWING LIST:
                 (USE ARROW TO SELECT AND THEN <ENTER>)
                CURRENTLY SELECTED DATABASE IS SAMPLES.DBF


        Select database:

        [ .. ]                          Drive              C
        NEW.DBF

                                        Directory          LM


                                                      << Use >>

                                                      < Cancel >

        [  ]         All Files


                PRESS ESC TO CANCEL SELECTION
```

Figure 26 - Append File

To create a new database on the hard drive to copy to, use the arrow keys to move the highlighted cursor to the NEW.DBF selection. The program will then instruct you to type in the name you chose for the new database.

```
              CURRENTLY SELECTED DATABASE IS SAMPLES.DBF
             = Type 'X' in Pick Column to Copy Data into New File =
    Lane # | Distance | Usage | Establishment | Last Name | Date    | Time    | PICK

      4        15        0    Brunswick Lanes  Brim       08/25/94  8:45AM    X
      4        25        0    Brunswick Lanes  Brim       08/25/94  8:54PM
      4        35        0    Brunswick Lanes  Brim       08/25/94  9:00AM

              = Press ENTER to exit =
```

Figure 27 - Select Files to Copy to Append Database

"QUIT" OPTION

1. Select the "Quit" option to exit the Computer Lane Monitor program and return to the DOS prompt.

Troubleshooting

PROBLEM NO. 1:   LANE RECORDER CARRIAGES DO NOT SLIDE FREELY.

CAUSE A: Dirty track or carriage.
SOLUTION A: Clean track or carriage.

CAUSE B: Bent parts.
SOLUTION B: Replace or have repaired by competent machine shop.

CAUTION: The hard coating on aluminum parts is essential to proper sliding.

PROBLEM NO. 2:   SAMPLE TAPES MADE WITH THE LANE RECORDER REPEATEDLY
                    COME OUT MISMATCHED, WRINKLED, OR DISTORTED.

CAUSE A: Tape rolls not seated against the shoulder of tape hub.
SOLUTION A: Reposition tape roll on tape hub.

CAUSE B: Tape roll distorted so that outer tape is out of line with core.
SOLUTION B: Use a new roll of tape.

CAUSE C: Tape core loose on hub.
SOLUTION C: Because tape cores vary in size, the hub may have to be built up with tape to get a
                    tight fit.

CAUSE D: Shoulder bolts on carriages loose or bent.
SOLUTION D: Use straight carriage bolts, properly tightened.

CAUSE E: Push rod held at wrong angle, causing carriages to lift or misguide.
SOLUTION E: Push rod at recommended 45° angle.

CAUSE F: Channel track aasembly was moved between the time that the first strip of tape was
                    applied by the applicator carriage and the time that the second lifter carriage was
                    pushed across to match the two tape strips.
SOLUTION F: Make sure that the channel track assembly is not moved on the lane while making
                    tape samples.

PROBLEM NO. 3:   TAPE STICKS TO LANE RECORDER END PLATES.

CAUSE A: Improper technique in handling carriages.
SOLUTION A: See "Operation of Lane Recorder" in manual.

CAUSE B: Emery cloth missing.
SOLUTION B: A 2" x 3" piece is required on the rear plate and a 2" x 5-1/2" piece is required on the
                    far plate. Replace as necessary.

PROBLEM NO. 4: U.V. START INDICATOR FAILS TO LIGHT WHEN "U.V. START" SWITCH IS DEPRESSED.

CAUSE A: Optical Reader power is not on.
SOLUTION A: Make sure Optical Reader is plugged into a live outlet and that the power switch is turned ON. The switch is marked with a "0" and a "1". The "1" is ON.

CAUSE B: Fuse is burned out.
SOLUTION B: Check the fuse and replace if necessary. See Optical Reader Fuse Replacement Procedure. The specified fuse is a 1 Amp 250 Volt fast blow fuse. DO NOT USE A LARGER FUSE.

CAUSE C: U.V. Source tube is burned out.
SOLUTION C: Replace U.V. source tube. See U.V. Source Tube Replacement Procedure.

PROBLEM NO. 5: U.V. START INDICATOR LIGHTS WHEN "U.V. START" SWITCH IS DEPRESSED, BUT GOES OUT WHEN SWITCH IS RELEASED.

CAUSE A: "U.V. START" switch not held long enough.
SOLUTION A: Hold "U.V. START" switch for at least one second before releasing.

CAUSE B: U.V. Source tube is burned out.
SOLUTION B: Replace U.V. source tube. See U.V. Source Tube Replacement Procedure.

PROBLEM NO. 6: COMPUTER SCREEN INDICATES THAT "LANE MONITOR NOT FOUND" WHEN PROGRAM SOFTWARE IS RUN OR "HARDWARE STATUS FAILURE" IS INDICATED.

CAUSE A: Optical Reader power or U.V. source tube are not on.
SOLUTION A: Make sure Optical Reader is plugged into a live outlet and that the power switch is turned ON, and U.V. source tube is turned on. The power switch is marked with a "0" and a "1". The "1" is ON.

CAUSE B: Serial data cable is not properly connected.
SOLUTION B: Make sure the female end of the serial data cable is plugged into the connection on the back panel of the Optical Reader and that the male end of the serial data cable is properly connected to the serial port of the computer.

CAUSE C: Incorrect serial port set-up or connection.
SOLUTION C: Move the computer serial data cable to another available serial port on the back of the computer or change the serial port set-up from the "Environment" option of the "Utilities" menu (page 29).

CAUSE D: Serial data cable is damaged.
SOLUTION D: Replace the serial data cable.

PROBLEM NO. 7: LANE READER TAPE DRIVE MOTOR DOES NOT AUTOMATICALLY START TO READ A SAMPLE TAPE.

CAUSE A: Optical Reader improperly calibrated.
SOLUTION A: Repeat the "Calibrate" option and make sure the calibration strip is not too old (should be less than four months since first used) and that the calibration value of the strip was properly input from the keyboard. Use the Manual Tape Read Option if necessary.

PROBLEM NO. 8: SAMPLE TAPE STARTS FEEDING INTO THE OPTICAL READER, BUT THE PROGRAM INDICATES THAT THE LANE EDGE MARKER CAN'T BE FOUND.

CAUSE A: Sample tape does not have the proper lane edge marker.
SOLUTION A: Refer to "Sample Tape Preparation for Optical Reader" or "Read Tape - Manual Option" section of this manual.

PROBLEM NO. 9: SAMPLE TAPE DOES NOT FEED INTO THE OPTICAL READER AFTER POSITIONED ON THE LANE EDGE MARKER.

CAUSE A: Sample tape leader is not long enough. Front of leader becomes disengaged from tape drive rollers as tape is reversed to take a zero reading ~1" in front of the lane edge marker.
SOLUTION A: Refer to "Sample Tape Preparation for Optical Reader" or "Read Tape - Manual Option" section of this manual.

PROBLEM NO. 10: SAMPLE TAPE STARTS FEEDING INTO THE OPTICAL READER, BUT DOES NOT EXIT THE SLOT IN THE REAR OF THE UNIT.

CAUSE A: Sample tape is jammed inside the Optical Reader.
SOLUTION A: STOP THE TAPE READ OPERATION IMMEDIATELY BY PRESSING THE "ESCAPE" KEY OR TURNING OFF THE POWER TO THE OPTICAL READER! Refer to "Clearing a Tape Jam" section of this manual.

PROBLEM NO. 11: THE TAPE DRIVE MOTOR STALLS OR MAKES A RATTLING NOISE AS THE SAMPLE TAPE IS BEING READ.

CAUSE A: Excessive wrinkling on sample tape.
SOLUTION A: Smooth tape sample if possible. If tape condition is too poor, it will not be able to be read by the Lane Monitor. Apply slight tension on the tape sample at the rear tape exit side of the Reader.

CAUSE B: Foreign material build up on rollers.
SOLUTION B: Clean rollers. Refer to "Optical Reader Roller Cleaning" section of this manual. The rollers should be cleaned after approximately every 100 tapes, depending on condition of the tapes and other operating conditions.

PROBLEM NO. 12: THE VALUES OF THE SAMPLE TAPE READINGS ARE NEGATIVE.

CAUSE A: The tape zero reading was taken over the lane edge marker.
SOLUTION A: Apply very slight tension on the tape sample near the "Tape In" side of the Reader to assist tape reverse during tape zero readings.

Computer Lane Monitor
Optical Reader Service

CLEARING A TAPE JAM

1.   If a sample tape becomes jammed in the Optical Reader during a tape read cycle, stop the tape read operation immediately by pressing the "escape" key or turning off the power to the Optical Reader.

2.   DO NOT PULL THE TAPE OUT OF THE OPTICAL READER TAPE SLOT!!

3.   Select the "Move Tape" option from the "Utilities" menu. Follow the screen instructions to reverse the tape while pulling gently on the tape. If tape fails to come free or motor stalls, use alternating forward and reverse commands to "work" the tape out. If the power was turned off to the Optical Reader, the program will have to be restarted to warm up and calibrate the Optical Reader after the tape is cleared.

     CAUTION: DO NOT FORCIBLY PULL THE TAPE OUT!!
     Severe damage to the motor control circuitry can result from pulling forcibly on the tape.

4.   If you can not work the tape out using the above method, or the tape has completely disappeared into the reader, refer to "Chassis Removal" procedure and physically remove the tape by rotating the rollers with your fingers.

     WARNING: Even with the power removed, any activity which spins the motor rapidly may cause damage to the motor control circuitry!

FUSE REPLACEMENT

1. Disconnect the power cord and serial data cable from the back panel of the unit.

2. The fuse is located in the small drawer on the left side of the power inlet module. Remove the fuse drawer by using a small flat blade screwdriver to pry under the tab that extends into the left side of the modular power connector. See Figure 28.
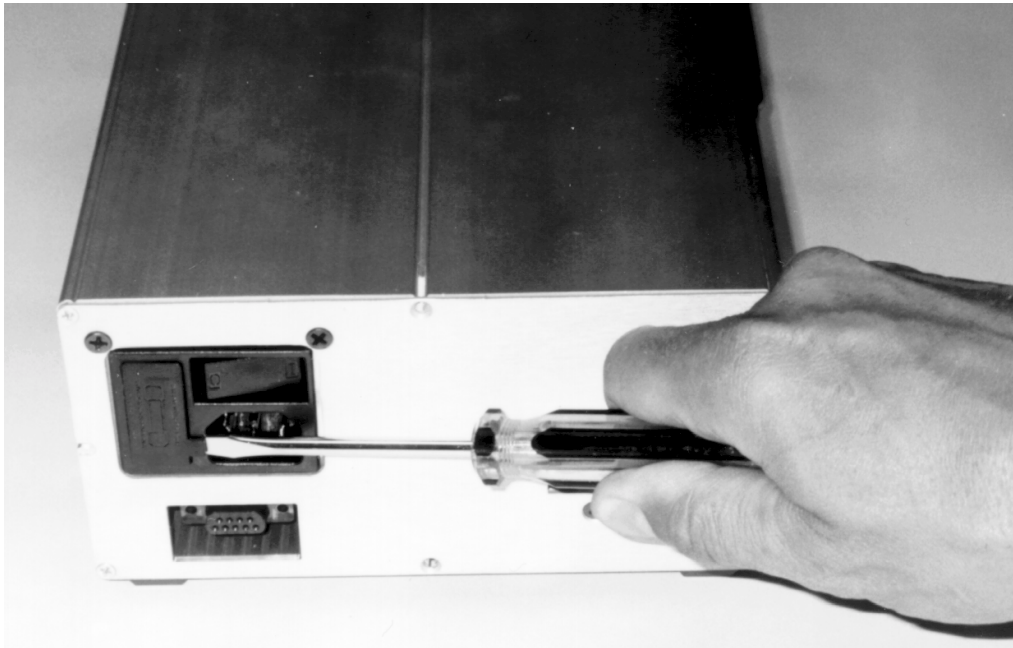

Figure 28 - Remove Fuse Drawer

3. Remove the fuse holder by lifting the small black plastic retaining catch on the side of the fuse drawer. Slide the fuse holder out of the drawer.

4. Remove the fuse and replace with a 1A 250V 3A6 (part no. 11-685053-000) or AGCI (part no. 11-685001-000) Fast Blow Type fuse. This fuse holder will accept a variety of glass fuses such as 5 x 20mm which are acceptable substitutes provided that they are <u>only</u> of the 1A 250V fast blow type.

5. Replace the fuse holder into the fuse drawer. Make sure the sides of the holder are positioned in the slots in the drawer and push in until it engages the catch fully.

6. Replace the fuse drawer by sliding it back into the power inlet module. Make sure it is fully seated.

OPTICAL READER CHASSIS REMOVAL

1. Disconnect the power cord and serial data cable from the back panel of the unit.

2. Remove the two back panel screws on the top corners of the power inlet module. See Figure 29.

3. Remove the two front panel screws.   See Figure 29. The chassis assembly and front panel will now slide freely from the case.
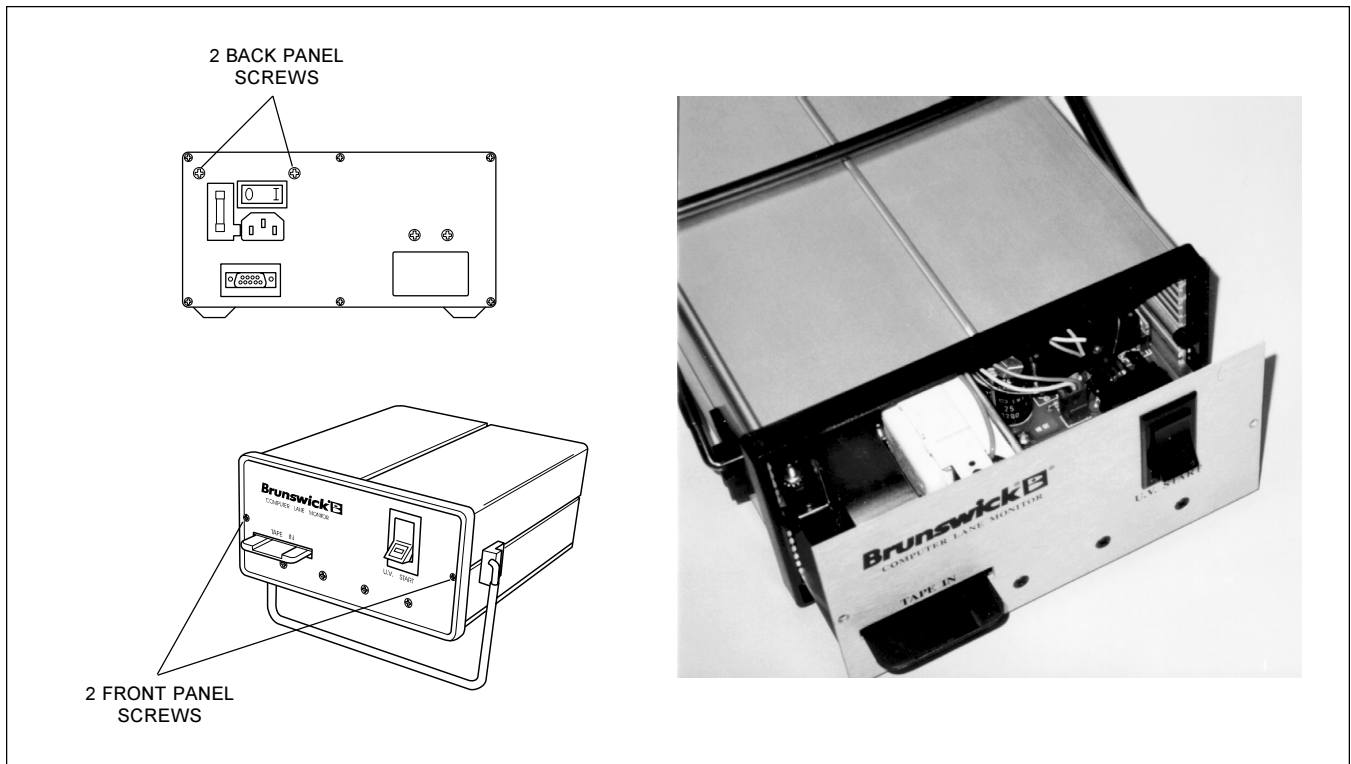

Figure 29 - Chassis Removal

4. Remove the chassis from the cabinet by gripping the tape slot to get it started, then holding the front panel itself to avoid banging the CPU circuit board on the benchtop as the chassis clears the case.

    NOTE: With the chassis removed from the case, care should be taken to avoid damaging delicate electronic components on the CPU circuit board.

TAPE ROLLER CLEANING

1. Remove the Optical Reader chassis as explained in the previous section of this manual.

2. Place the chassis on the bench with the front panel away and the roller assembly toward you.

3. Dampen a cotton swab or small patch of cloth with denatured alcohol.

4. Apply to the junction between the two rollers. See Figure 30. Wipe vigorously from side to side while <u>slowly</u> rotating the drive roller away from you. Continue this process until all tape residue and foreign material is removed from the rollers. Wipe with a dry cotton swab to remove any excess alcohol.
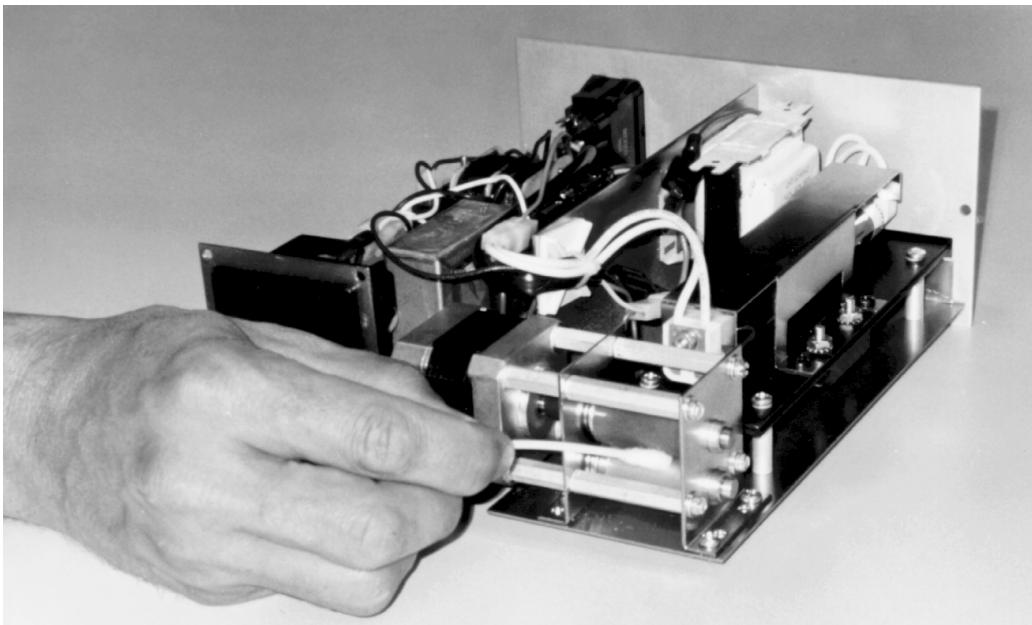
Figure 30 - Cleaning the Tape Rollers

5. Reassemble the Optical Reader chassis as explained in a later section of this manual.

    NOTE: Minor cleaning of the tape rollers can be accessed through the rear "tape out" opening without removing the Reader Chassis.

U.V. SOURCE TUBE REPLACEMENT

1. Remove the Optical Reader chassis as explained in a previous section of this manual.

2. Place the chassis on the bench with the front panel on the right and the Reader U.V. source tube assembly closest to you.

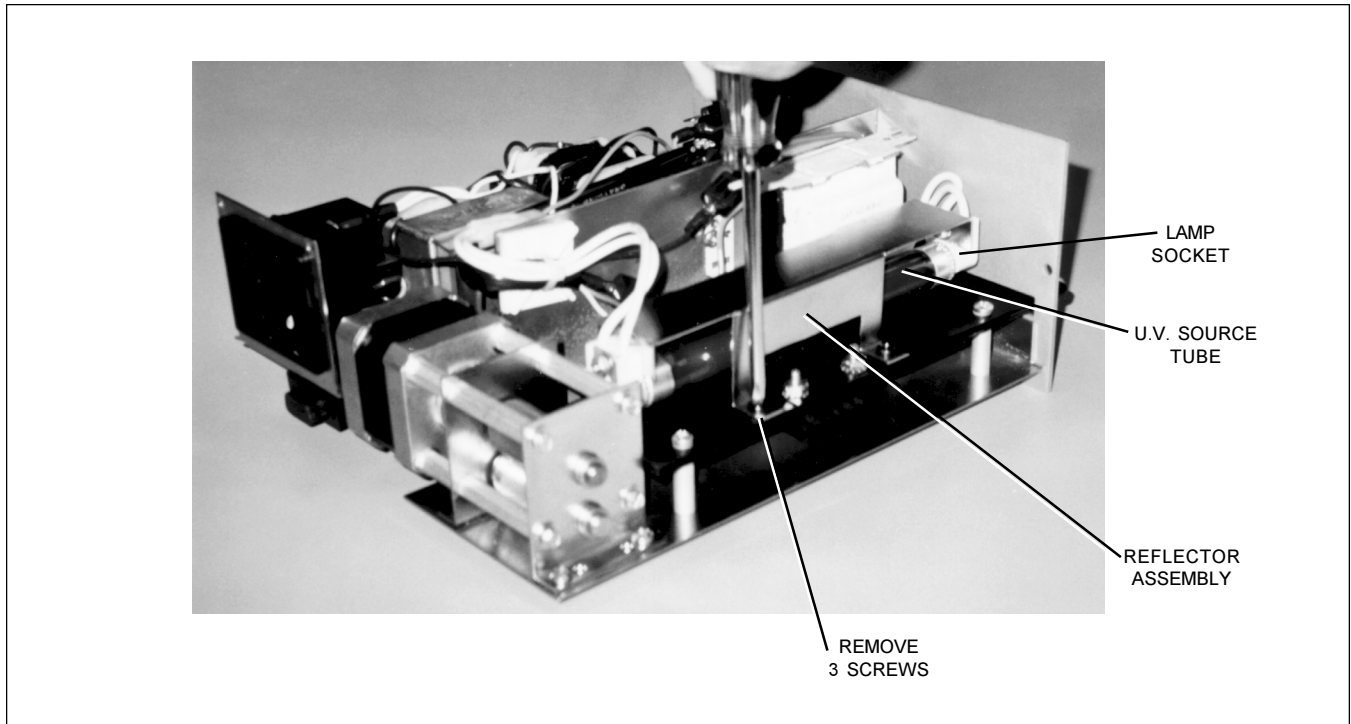3. Remove (3) #6-32 x 3/8" self taping screws from the reflector assembly. See Figure 31.

Figure 31 - Removal of Reflector Assembly

4. Turn the reflector assembly upside down and remove the U.V. source tube by rotating it 1/4 turn and sliding the end prongs out of the lamp sockets.

5. Install the new U.V. source tube into the lamp sockets, rotating it 1/4 turn to lock into place.

   CAUTION: Due to variations in comercially available source tubes, only use Genuine Brunswick part no. 61-100060-000. Substitutes may cause improper operation or damage to the reader.

6. Re-install the reflector assembly with the (3) screws removed in step #3.

7. Reassemble the Optical Reader chassis as explained in the next section of this manual.

8. Burn in the new U.V. source tube by leaving the U.V. lamp on for a minimum of 12 hours. The Computer Lane Monitor program may prompt you to recalibrate more frequently for a while with the new U.V. tube. It is preferable to leave the lamp burn in for 48 hours for best stability.

OPTICAL READER CHASSIS RE-ASSEMBLY PROCEDURE

1. Place the optical reader case on the bench with the front opening facing you. Start the Left side of the chassis in the bottom slot of the case. Next, start the Right side of the chassis in the 5th slot up from the bottom on the Right side of the case. See Figure 32.
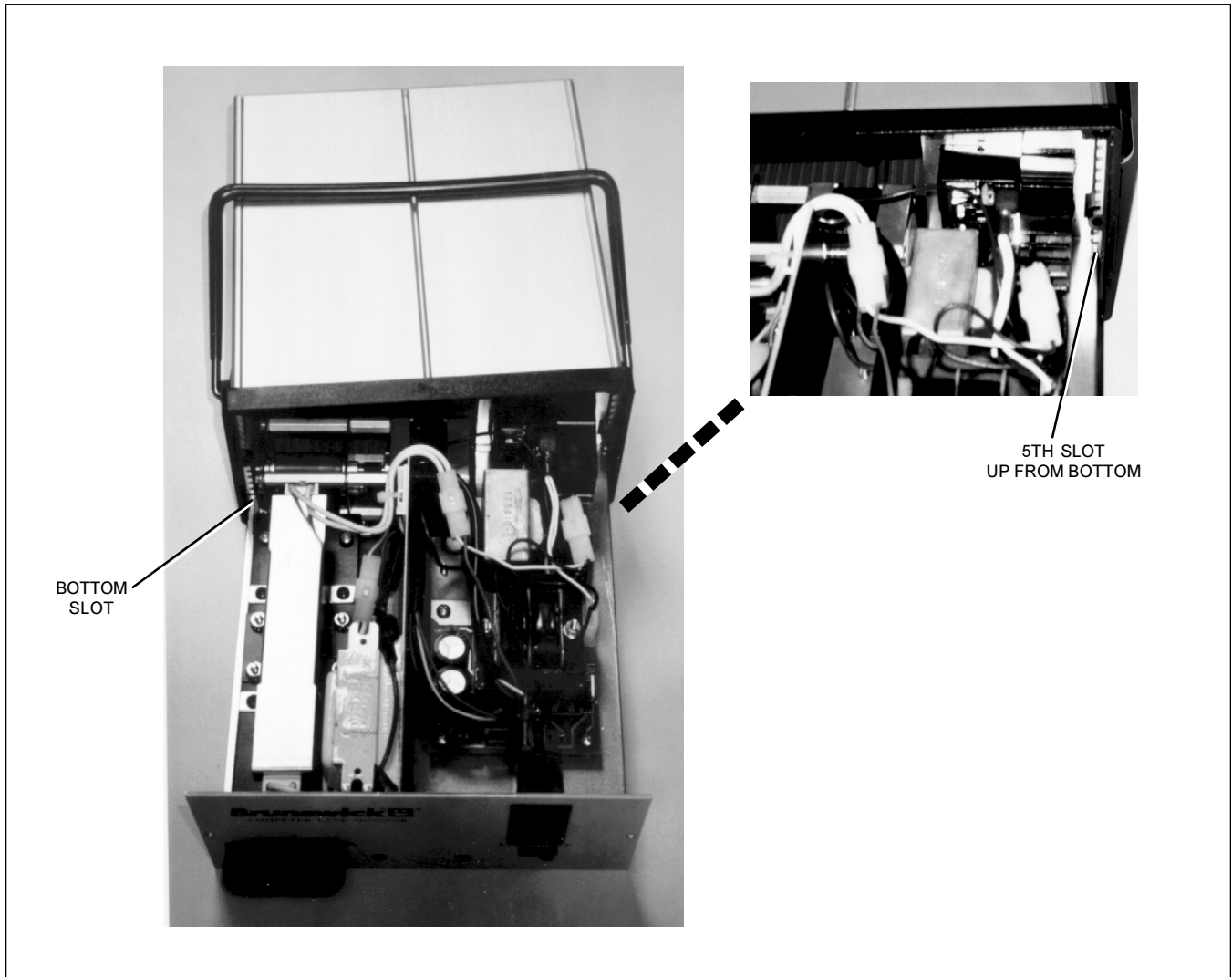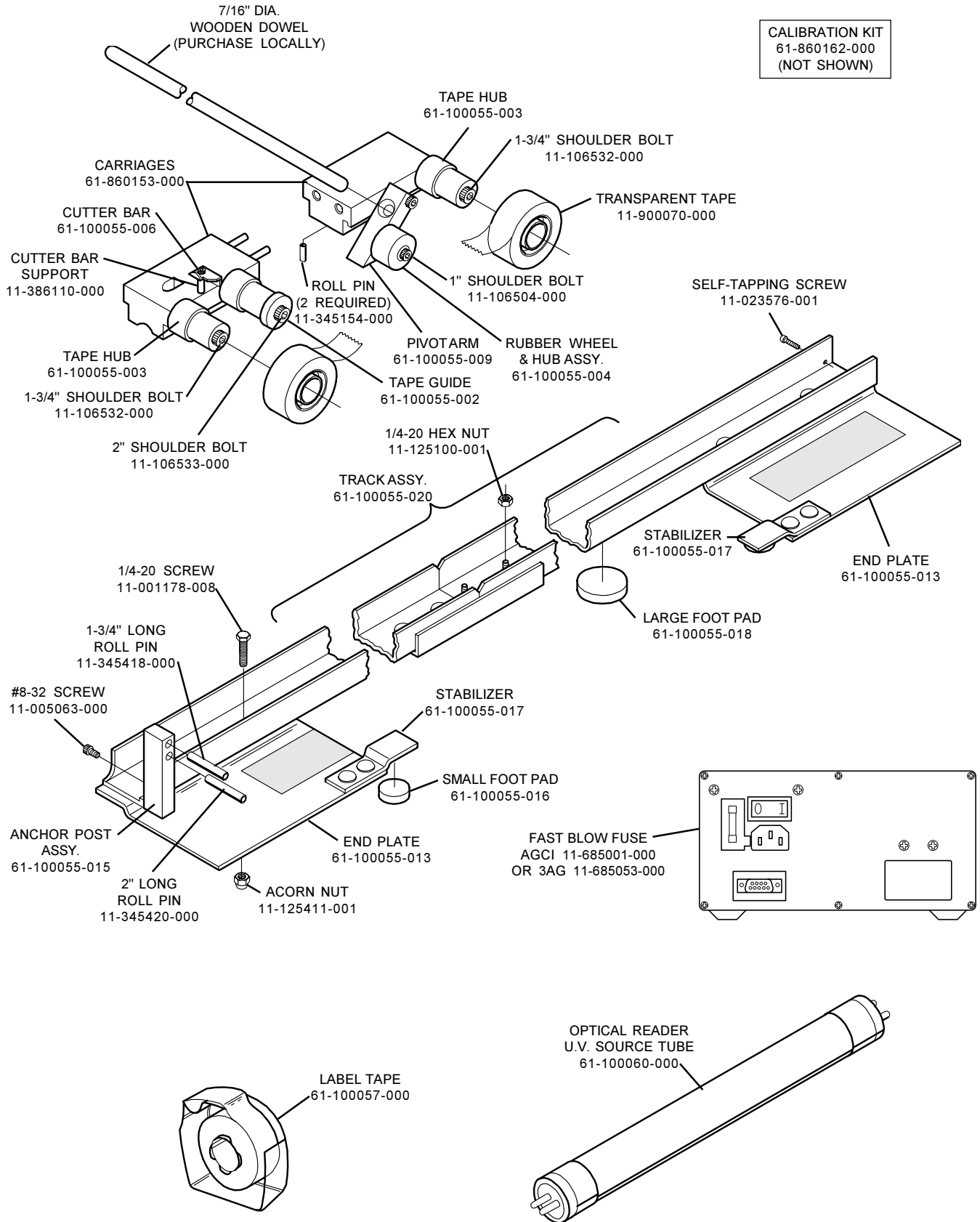

BOTTOM
SLOT

5TH SLOT
UP FROM BOTTOM

Figure 32 - Installing the Chassis

2. Carefully slide the chassis into the case until the front panel is fully seated into the plastic bezel of the case. Make sure that no wires are snagged or pinched as this is done.

3. Re-install the two front panel screws and tighten. See Figure 29.

4. Re-install the two back panel screws and tighten <u>only until snug</u>. DO NOT OVER TIGHTEN as the screws will strip out. See Figure 29.

Service Parts

7/16" DIA.
WOODEN DOWEL
(PURCHASE LOCALLY)

CALIBRATION KIT
61-860162-000
(NOT SHOWN)

TAPE HUB
61-100055-003

1-3/4" SHOULDER BOLT
11-106532-000

CARRIAGES
61-860153-000

TRANSPARENT TAPE
11-900070-000

CUTTER BAR
61-100055-006

CUTTER BAR
SUPPORT
11-386110-000

ROLL PIN
(2 REQUIRED)
11-345154-000

1" SHOULDER BOLT
11-106504-000

SELF-TAPPING SCREW
11-023576-001

TAPE HUB
61-100055-003

PIVOT ARM
61-100055-009

RUBBER WHEEL
& HUB ASSY.
61-100055-004

1-3/4" SHOULDER BOLT
11-106532-000

TAPE GUIDE
61-100055-002

2" SHOULDER BOLT
11-106533-000

1/4-20 HEX NUT
11-125100-001

TRACK ASSY.
61-100055-020

STABILIZER
61-100055-017

END PLATE
61-100055-013

1/4-20 SCREW
11-001178-008

LARGE FOOT PAD
61-100055-018

1-3/4" LONG
ROLL PIN
11-345418-000

#8-32 SCREW
11-005063-000

STABILIZER
61-100055-017

SMALL FOOT PAD
61-100055-016

FAST BLOW FUSE
AGCI 11-685001-000
OR 3AG 11-685053-000

ANCHOR POST
ASSY.
61-100055-015

END PLATE
61-100055-013

2" LONG
ROLL PIN
11-345420-000

ACORN NUT
11-125411-001

LABEL TAPE
61-100057-000

OPTICAL READER
U.V. SOURCE TUBE
61-100060-000

Quick Reference Checklist

RECORDER

1. All items accounted for in carrying case.

2. Track assembled - proper tools.

3. Anchor post locked upright - not too tight.

4. End plates have clearance on widest lanes.

5. Carriages and track in good condition - no bent parts.

6. Carriages move freely in track.

7. Tape guide and rubber rollers clean and free of dressing

8. Tape threaded per diagram - no slack, tape rolls tight and fully seated on hub.

9. Carriages mated and tight to anchor post on ten-pin side.

10. Tape edges matched exactly between tape guide and anchor pins.

11. Tape free of wrinkles.

12. Track assembly square to lane.

13. Vital information written on paper tape marker.

14. Paper tape marker applied to board no. 1 on ten-pin side.

15. First tape applied smoothly with applicator carriage.

16. Second tape laminated exactly to first with lifter carriage.

17. Tape cut and freed from anchor post without touching the lane.

18. Carriages mated and held tight during move to next reading location.

19. Recorder disassembled and returned to case for transportation.

20. All parts, tapes, papers, and tools accounted for in carrying case.

QUICK REFERENCE CHECKLIST

OPTICAL READER

1. Initial Computer Lane Monitor software installed.

2. Power cord & computer serial data cable connected.

3. Power on, U.V. Start pressed, U.V. indicator light on.

4. Computer on, Lane Monitor program started & "monitor found".

5. Warm-Up option completed.

6. Calibrate option completed with properly dated calibration strips.

7. Sample tapes properly prepared with 6" leader & supplied lane edge marker. Tape mismatch trimmed (no edges with exposed adhesive). End cut at slight angle & severe curl corrected.

8. Sample tape free of dressing on outer surface, handled by edges with clean hands.

9. Lane Statistics option used to enter lane no., distance from foul line, time date, etc.

10. Read Lane Tape option selected. Automatic or Manual tape positioning selected.

    a. Automatic - Tape leader inserted into "Tape In" slot ~6" to start motor. Then insertion continued until tape contacts drive rollers and is automatically positioned.

    b. Manual - Line marked 3-1/2" and 5-1/2" after 10-pin lane edge. Tape leader inserted into "Tape In" slot. Tape positioned to first mark and press <enter> to take zero reading. Tape positioned to second mark and press enter to start the automatic read.

11. Tape sample checked so it unrolls & enters the reader without twisting. Tape exit path cleared of obstructions. "Escape" key pressed if tape feed problems occur. Corrections made by referring to troubleshooting & service sections of the manual.

12. Computer Lane Monitor reads entire tape width & displays graph on computer screen. Lane no., distance, date & other statistics are checked before saving tape file.

13. View Tape Graph option is selected to return to the current graph read or view up to 3 overlaid tape files stored in the data base. Selected tape files can also be printed or deleted from the data base.

14. Utilities option is selected to change computer printer & monitor (color or monochrome) set-up. Manual tape feed option selected to clear tape from reader using keyboard to control tape drive roller motor.

15. Quit option is selected to exit from the Computer Lane Monitor program.
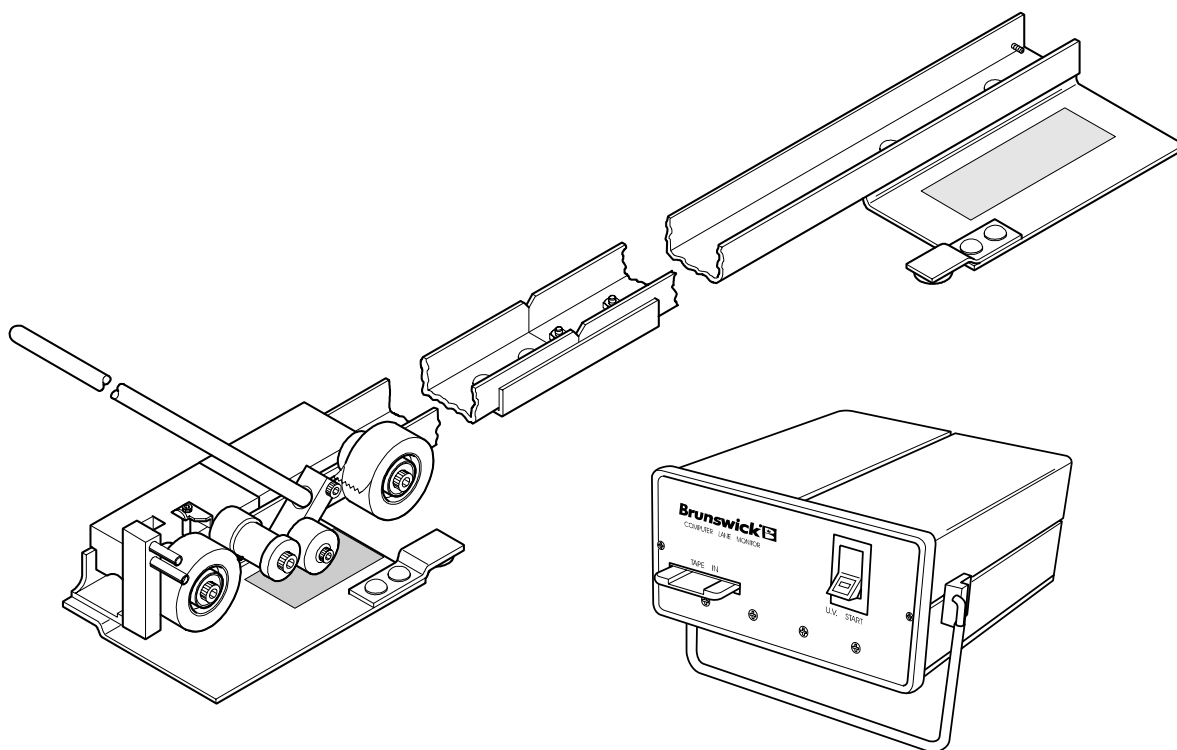
Brunswick®Ⓑ

Computer
Lane Monitor™

OPERATOR'S MANUAL

BRUNSWICK COMPUTER LANE MONITOR OPERATOR'S MANUAL

Reorder Part No. 61-900017-000

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