

SECTION I • Introduction

A. Overview

The DBA *EXCEL* represents unequalled technology in automated lane conditioning. Through the use of an on-board programmable computer, a "user-friendly" keypad for inputting data and information, and an advanced conditioner transfer system, the *EXCEL* allows the bowling center to maintain consistent bowling conditions.

With the expandability of the *EXCEL's* Programmable Computer, future upgrades are easily done, assuring that your *EXCEL* will not become obsolete.

**IT IS EXTREMELY IMPORTANT THAT THE OPERATOR
THOROUGHLY READ AND UNDERSTAND THIS OPERATING
MANUAL BEFORE USING THE *EXCEL*.**

Should you have any questions regarding any procedures pertaining to the proper operation of this machine, please contact your authorized DBA Distributor.

B. Machine Specifications

Power Supply 115 Volts, 50/60 Cycle, 8.5 Amps

Dimensions Width - 53"
 Height - 10"
 Length - 31 1/2"
 Weight - 250 pounds

C. Care and Safety Procedures

Although manufactured of the highest quality materials, it should be remembered that the DBA *EXCEL* is a sensitive piece of equipment. Care should be taken to see that the *EXCEL* is not dropped, banged or handled roughly. Doing so may damage the programmable computer, its components or the conditioner transfer system.

For care and safety reasons, see that the following precautions are exercised:

- continued -

- AVOID SPILLING ANY LIQUIDS OR CHEMICALS INSIDE OF THE MACHINE
- DO NOT OPERATE THE *EXCEL* WITH AN EXTENSION CORD OR POWER CORD OTHER THAN THE ONE PROVIDED
- MAKE SURE THAT THE POWER OUTLET USED PROVIDES THE CORRECT VOLTAGE AND AMPS
- DO NOT ATTEMPT TO MAKE ANY WIRING MODIFICATIONS
- DO NOT ATTEMPT TO RE-PROGRAM THE COMPUTER
- DO NOT OPERATE THE *EXCEL* IN AN UPRIGHT POSITION

Not following the above recommendations may cause damage to the *EXCEL*, its computer, those persons operating it, or void the warranty.

Persons assigned the responsibility of operating the DBA *EXCEL* should be trained in its use by an authorized factory-trained DBA Distributor. DBA conducts Training Schools on a regular basis for those individuals wishing to receive factory-training on DBA Maintenance Equipment. Interested individuals should contact their authorized DBA Distributor for more information.

D. Storage

Store the *EXCEL* in a warm, dry area. Conditioners can become more viscous (thicker) when exposed to cooler temperatures. This will reduce their ability to flow properly through the wicking pads.

SECTION II • Machine Description

A. Buffing End/Duster End/Right Side/Left Side

With the machine setting on the approach in a position ready to be operated on the first lane, the following descriptions will be used:

- **BUFFING END:** The BUFFING END shall be the end of the machine closest to the operator and nearest the approach, where the buffing brush is located.
- **DUSTER END:** The DUSTER END shall be the end opposite the buffing end and nearest to the pins, where the DMR duster assembly is located.
- **RIGHT SIDE:** The RIGHT SIDE of the *EXCEL* shall be to the right of the operator as he faces the pins.
- **LEFT SIDE:** The LEFT SIDE of the *EXCEL* is the side opposite the right, to the left of the operator as he faces the pins.
- **REAR:** Items in or towards the buffing end are in the REAR of the *EXCEL* (towards the approach).
- **FRONT:** Items in or towards the duster end are in the FRONT of the *EXCEL* (towards the pins).

B. Keypad

Located in the center of the duster end lid of the *EXCEL* is the computer keypad. This keypad is used to enter all programming information. The keypad may be accessed with the hood in either the up or down position.

The keypad consists of 10 input keys and a two-line Liquid Crystal Display (LCD) where the menu items and prompts appear.

The following keys are used on the keypad:

- **NEXT:** Use this key to advance within a main menu from one menu prompt to the next.
- **ENTER:** This key is used to complete an entry of data or information requested by a menu prompt.
- **MAN or MANUAL:** This key is used to exit Managers Menus, reset Lino Timer and remove Maintenance Messages.
- **LAST:** This key will return the user to the last menu prompt within a main menu.
- **START:** This key will activate the handle start switch.
- **MENU:** Pressing this key will display and advance the available main menus for the operator.
- **UP & DOWN ARROWS:** Use of these keys will increment or decrement numbers asked for in certain menu prompts, such as starting lane number, etc.
- **LEFT & RIGHT ARROWS:** These keys can be used when entering the starting and ending lane numbers from the OPERATORS MENU--the left arrow will display "Lane #1", while the right arrow will display the last lane in the center. In certain menu prompts these arrows will increment or decrement the value by 10.

C. Buffing End Components

Located on the buffing end of the *EXCEL* are the following components:

LANE DISTANCE WHEELS - Located on the outside rear wall of the buffing end and mounted on the ends of the handle are the distance wheels. These wheels measure the distance the *EXCEL* travels on the lane. This is done by means of an infra-red counting mechanism mounted next to the right side wheel. Mounted to the outside of the distance wheels are two white urethane wheels. These wheels lift the *EXCEL's* distance wheels off the lane surface at the foul line to discontinue the distance counting and to prevent conditioner from being transferred on to the approach.

CONDITIONER TANK - Under the hood located towards the rear of the buffing end is the conditioner tank and fill tube assembly. This tank, including wicks, holds slightly under 3/4 gallon of lane conditioner when full. This large capacity allows the level of conditioner to drop gradually when in use, thereby not greatly affecting conditioner output. The larger capacity is NOT intended to permit the *EXCEL* to operate for a longer period before refilling.

WICKING PADS - Located on the front edge of the conditioner tank are the eight wicking pad assemblies. Each individual wick sits inside the conditioner tank and draws conditioner through the wick to pass on to the transfer roller. The eight pads are 5" or 5 boards wide and are designated from left to right as LF 1-5, LF 5-10, LF 10-15, LF 15-20, RT 1-5, RT 5-10, RT 10-15, RT 15-20.

TRANSFER ROLLER - Resting against the wicking pads is the conditioner transfer roller. This stainless steel roller is driven by the transfer roller motor and pulls conditioner off the pads and transfers it onto the buffing brush. This is a single speed motor, yielding a constant flow of conditioner from the wicks to the buffing brush.

BUFFING BRUSH - Located near the front wall as you open up the buffing hood is the buffing brush assembly. The belt-driven buffing brush removes conditioner from the transfer roller and places it onto the lane surface.

D. Duster End Components

The following components are located under the hood on the duster end of the *EXCEL*:

DMR DUSTER ASSEMBLY - Located in the front of the duster end is the DMR (Dual Motor Ratcheting) duster cloth assembly. The DMR assembly operates by means of **two** duster motors. The first unwinds cloth and sets the duster down on the lane surface. The second winds up used cloth onto the used core. The wind up motor also lifts the duster off the lane at the end travel distance. This dual action simulates that of a ratcheting duster, helping to eliminate dirt lines during a conditioning run. This system also better controls cloth usage, and has no clutch mechanism to adjust. The *EXCEL* should ALWAYS be operated with duster cloth in the machine! This will prevent excess dirt and dust build up on the wicking pads and the lane.

The *EXCEL* uses DBA Red Edge Cloth #8443. Approximately 3/4" to 1 1/4" of cloth is used per lane depending on the distance of travel.

PROGRAMMABLE COMPUTER - Located near the center of the duster end is the *EXCEL* Programmable Computer (PC).

DRIVE MOTOR - On the right side of the duster end is the drive motor. This single speed motor drives the *EXCEL* on the lane.

BUFFING MOTOR - On the left side of the duster end is the buffing motor. This motor drives the buffing brush.

COMPUTER POWER SUPPLY - Located just to the right of the buffing motor is the Computer Power Supply. This power supply converts 110V AC into the 24V DC needed to operate the computer and lane distance sensor.

DRIVE MOTOR RELAYS - Between the computer and the buffer motor of the *EXCEL* there are four relays mounted with the Speed Control. They are designated from left to right as follows:

CR1 - FWD Relay (LY4)
CR2 - REV Relay (LY4)
CR3 - Speed Relay (LY2)
CR4 - Duster Relay (LY2 - Wind-Up only)

BUFFING MOTOR CONTACTOR - Between the speed control and the buffer motor is the Buffing Motor Contactor. When actuated under power, it will operate the buffing motor and the transfer roller motor (NOTE: The coil of the contactor is energized by CR1 or CR2).

POWER CORD OUTLET - Mounted on the left side of the *EXCEL* is the power cord outlet. This is the only outlet for the power cord to be attached to the *EXCEL*.

WICKING SOLENOIDS - Mounted on the center wall across from right to left are the eight wicking solenoids. Each solenoid controls one wicking pad.

E. Underside Components

Located on the underside of the *EXCEL* are the following components:

- **DRIVE SHAFT:** Located towards the center of the underside is the drive shaft. This shaft is driven by the drive motor.
- **DRIVE WHEELS:** Mounted on the drive shaft approximately 2" in from the side walls are the two drive wheels. These wheels are powered by the drive shaft and drive the *EXCEL* on the lane.
- **LANE-TO-LANE CASTERS:** Located on the exterior left and right sides of the frame, are the lane to lane casters. These casters support the *EXCEL* as it is moved from one lane to the next.
- **MOMENTARY WHEELS:** Located on the front wall are two urethane wheels. These wheels prevent the front panel from hitting the lane surface as the machine is moved in and out of the lane.

SECTION III • Pre-Installation Suggestions

Preparation of the Bowling Lanes

Prior to operating the *EXCEL* for the first time, it is highly recommended that a thorough inspection of the bowling lane and approach area take place. All loose foul lights, divisions, cappings and adapter blocks should be tightened, repaired or replaced. Continued operation of the *EXCEL* on improperly prepared lanes could cause damage or malfunction. Please contact your DBA Distributor should you need assistance with repair or replacement of these items.

SECTION IV • Operating Instructions

A. Filling the Conditioner Tank

Completely fill the *EXCEL's* conditioner tank prior to operating on the first lane. To fill the conditioner tank, the *EXCEL* should be in the upright position on a level surface. Connect the conditioner fill tube to the tank vent on the front panel of the *EXCEL*. Disconnect the overflow tube from the inside wall of the buffing end, remove end plug, and hang into an empty clean container. Through the fill tube funnel conditioner into the tank. The tank will be full when conditioner begins to flow through the overflow tube into the empty container.

NOTE: Failure to use the overflow tube or remove the end plug during filling may give incorrect level indications and may cause conditioner to flow from the sides of the tank. **FOR OPTIMUM CONSISTENCY, FILL THE CONDITIONER TANK BEFORE EVERY USE!**

Once the conditioner tank is full, set the *EXCEL* in its operating position on the approach for approximately ten minutes. This will allow the wicking pads to completely fill with conditioner.

To insure consistency from one end of the center to the next, larger establishments (40 lanes or more) should refill the conditioner tank after conditioning half of the lanes. *Gravity and the amount of conditioner in the tank can affect the output!* This will depend on the type of conditioner being used. Centers using higher viscosity conditioners may be prone to some conditioner drop off as the level in their tank decreases. Use of an ABC Approved Take-Up Device and Lane Reader is recommended to determine if and when conditions are changing.

B. Turning the Unit On

Carefully set the *EXCEL* in the programming position on the approach.

Connect the proper end of power cord to the *EXCEL*.

Connect the opposite end of power cord into a suitable outlet. **MAKE SURE THAT THE OUTLET IS SUPPLYING THE CORRECT VOLTAGE AND AMP (15 AMP MINIMUM) RATING.** Connecting the power cord into an outlet located towards the center lanes of the establishment will allow more lanes to be conditioned without changing outlets. The 125 foot power cord supplied with the *EXCEL* will allow approximately 32 lanes to be conditioned without changing outlets. (To accomplish conditioning 32 lanes, the *EXCEL* should be plugged into an outlet at approximately Lane 16. This will allow enough cord to be placed out of the *EXCEL's* path as it conditions lanes 1-16.)

When power is applied to the *EXCEL* the keypad will illuminate indicating power to the machine. Now the *EXCEL* is ready to program and run.

C. Menu Selections And Options

The operation of the DBA *EXCEL* is controlled by a series of selectable programs located within the memory of the programmable computer. These programs and settings may be changed or modified by following a simple sequence of prompts within the available menus displayed on the keypad. This section will lead the operator step-by-step through each menu and prompts.

The *EXCEL* PC is equipped with a 5 year rated battery for back-up and retention of information which is input into the memory.

To make this section easily understandable, the operator should be familiar with the keypad as detailed in SECTION II of this manual.

DBA EXCEL Operators Menu Selection

* START EXCEL * 0500 MENU XL5.1	* LINO #LNS RSET 0710 HIT MAN ENT	* RETURN FOULINE HIT START BUTTON	ODOMETER 0000 FT 0000 MI
STARTING LANE ? 00 00			
LAST LANE ? 00 00			
IS THIS CORRECT? 01 => 01 PRG 01			

DBA EXCEL Managers Menu Selections

<i>* Override 01 Auto Program 01</i>	<i>* Change Program Settings</i>	<i>* Change Auto Program Select</i>	<i>* System Control Lino Duster</i>	<i>* To Clear Maint Message Hit Man Key</i>
	Change Program # 00 00	Mon AM 1 PRGRM #00 Lanes 00 Thru 00	Present Duster 08 UNWND Time 08	
	Run Lino Duster? * 01 1-Yes,0-No 01	Mon AM 2 PRGRM #00 Lanes 00 Thru 00	Default Duster 08 UNWND Time 08	
	Travel Dist 00 In Feet 00	Mon AM 3 PRGRM #00 Lanes 00 Thru 00	Lino Empty #LNS 0710 Default 0710	
	Forward Shift To 00 High Speed 00	Mon PM 1 PRGRM #00 Lanes 00 Thru 00		
	RT 1-5 Oil Fwd 0000 inches 0000	Mon PM 2 PRGRM #00 Lanes 00 Thru 00		
	RT 5-10 Oil Fwd 0000 inches 0000	Mon PM 3 PRGRM #00 Lanes 00 Thru 00		
	RT 10-15 Oil Fwd 00 In Feet 00	Continues		
	RT 15-20 Oil Fwd 00 In Feet 00	for		
	LF 1-5 Oil Fwd 0000 inches 0000	each		
	LF 5-10 Oil Fwd 0000 inches 0000	day		
	LF 10-15 Oil Fwd 00 in feet 00	of		
	LF 15-20 Oil Fwd 00 in feet 00	week		
	Return Shift Dwn 02 low speed 02			
	RT 1-5 Oil Rev 0000 Inches 0000			
	RT 5-10 Oil Rev 0000 Inches 0000			
	RT 10-15 Oil Rev 00 In Feet 00			
	RT 15-20 Oil Rev 00 In Feet 00			
	LF 1-5 Oil Rev 0000 Inches 0000			
	LF 5-10 Oil Rev 0000 Inches 0000			
	LF 10-15 Oil Rev 00 In Feet 00			
	LF 15-20 Oil Rev 00 In Feet 00			
	Add Oil RT 1-5* 00 # of Hits 00			
	Add oil RT 5-10* 00 # of Hits 00			
	Add Oil LF 1-5* 00 # of Hits 00			
	Add Oil LF 5-10* 00 # of Hits 00			
	Distance Between 00 Hits/Feet 00			

D. Keypad Display

The keypad display is a two line LCD (Liquid Crystal Display). During operation and selection of programs, various prompts, which are simply questions or data requests, will appear in the display, along with possibly some numbers. The prompts will request the operator to input or change data or information within the selecting menu. The numbers will display conditioning program numbers, distances (feet) or "counts". What the prompts and numbers mean for each menu is explained under each menu heading in this section.

When the numbers appear, there will often be two numbers, both the same, displayed in the LCD. When this occurs, both numbers refer to the current setting for that particular prompt. When changing the setting with the use of the UP or DOWN ARROWS, only the number on the right side of the display will change. The number on the left will remain at the previous setting until the ENTER key is pressed, at which time both numbers will change to the new setting.

NOTE: If ENTER is not pressed before NEXT, the keypad will beep 6 times and the change will not be accepted. At this time the screen will change to the next screen.

THE FOLLOWING MENU SELECTIONS CAN BE ACCESSED BY THE OPERATOR

1. Start Menu

The Start *EXCEL* Menu will display the conditioning program being used, and allow the operator to select the starting and ending lane number. The operation of the *EXCEL* is also started from this menu.

Once the *EXCEL* is turned on, START screen will appear on the two-line LCD of the keypad. Also appearing will be a four digit number on the left hand side of the second line. This number designates the number of lanes of useable cloth remaining on the current lino-duster roll. It will appear similar to the following:

*** START EXCEL *
0045 MENU XL5.1**

The "0045" means that approximately 45 lanes are left on the current roll of cloth. The "XL5.1" refers to the version of programming upgrade currently installed in the *EXCEL* Computer.

To begin operation of the *EXCEL*, press ENTER then NEXT on the keypad. The following prompt will appear:

STARTING LANE?

00 00

The *EXCEL* is asking the operator to input the starting lane number. Also appearing in the LCD Display will be two numbers, one on the lower left side and one on the lower right side. These numbers indicate the starting lane number the last time the *EXCEL* was operated. If these numbers were not the starting lane numbers for this conditioning run, they must be changed.

To change the starting lane number, push either the UP ARROW or DOWN ARROW. The number on the lower right hand side of the LCD will change, while the number on the left side will remain the same. (The left number will always remain the same while the right number is being changed until the ENTER key is depressed.)

***NOTE:** When entering the starting lane number, depressing the Left Arrow key on the keypad will automatically input "Lane #1" as the starting lane. Depressing the Right Arrow key will input the number of the last lane in the center.*

Once you have reached the desired starting lane number, depress ENTER. Now both the right and left side numbers should be the same as the new starting lane number you selected. If this is correct, depress the NEXT key.

***NOTE:** If ENTER is not pressed before NEXT, the keypad will beep 6 times and the change will not be accepted. At this time the screen will change to the next screen.*

The following prompt will appear:

LAST LANE?

00 00

Now you must input the number of the last lane to be conditioned. Appearing with the above prompt will again be two numbers, this time displaying the number of the last lane conditioned during the previous run of the *EXCEL*. If these numbers are incorrect, you must enter the correct number. Using the UP or DOWN ARROWS again, change the number to the number desired. Once again, only the right side number will change.

NOTE: When entering the last lane number, depressing the Left Arrow key on the keypad will automatically input "Lane #1" as the starting lane. Depressing the Right Arrow key will input the number of the last lane in the center.

Once you reach the desired number, depress ENTER, and both numbers will change to the one you selected. If this is correct, depress the NEXT key.

At this point, this prompt will appear:

**IS THIS CORRECT?
01 => 02 PRG 01**

Along with this prompt, the starting lane number, last lane number and conditioning program number will appear in the LCD. (The example above shows the EXCEL starting on lane #1, ending on lane #2, and applying conditioning program #1.) If the starting and ending lane information is incorrect, depress the LAST key until you return to the starting and ending lane number prompts. If the conditioner program is incorrect, it will be necessary to access the Managers Menus to change the program selection. (IMPORTANT! The "Enter" key MUST be depressed to accept starting and ending lane information, even if new starting and ending lane numbers are not needed. If the "Enter" key is not depressed, the EXCEL will not start.) Once all information is acceptable, depress the START key.

At this point, this prompt will appear:

**LANE #01 IS NEXT
01 => 02 PRG 01**

Move the EXCEL o to the first lane and press the START BUTTON on the HANDLE. This will start the EXCEL down the first lane. As the EXCEL conditions the first lane the screen will read:

**LOW (OR HIGH) IPS 20
01 => 02 PRG 01**

(EXAMPLE: The screen above shows that lane 01 is the starting lane , lane 02 is the last lane , and the lanes are being conditioned with program 01. It also shows the present inches per second the machine is traveling while on the lane.)

When the *EXCEL* finishes the first lane the screen will change to:

**LANE #02 IS NEXT
01 => 02 PRG 01**

If the operator stops conditioning the lanes prior to finishing the last lane programmed, this screen will display the next lane to be conditioned. This eliminates the chances of a lane being conditioned twice or not at all.

When the last lane is completed the screen will display:

**02 LANES OILED
NOW CLEAN ME!!**

2. Lino Reset Menu

Depress the MENU key until the following appears on the screen:

***LINO #LNS RSET
0710 HIT MAN ENT**

To reset the lino-cloth counter, depress the MAN then ENTER keys while this screen is displayed. Be certain to perform this procedure each time a new roll of lino-duster cloth is installed in the *EXCEL*. When reset, the counter will read "0710". Located near each duster motor is a push button to manually operate the motor.

NOTE: If usable duster cloth still remains after counting down from "0710", reset the counter, then note how many additional lanes can be conditioned before cloth runs out. Add this number to the default setting in the SYSTEM CONTROL MENU. Resetting the Lino Reset counter prior to the roll of cloth being empty could prevent the cushion roller from dropping far enough to contact the lane.

When power is applied to the *EXCEL*, if the amount of cloth remaining is less than the # of lanes in the center the keypad will beep 6 times and the screen will flash the following:

**LINO ALMOST OUT
0000**

The remaining # of lanes of cloth will be displayed in the numbers below the message.

The *EXCEL* can be operated if this counter decreases to zero if there is still cloth left in the machine. Once the cloth runs out the screen will display the following:

**ERROR MESSAGE
LINO CLOTH EMPTY**

The cloth will need to be replaced for continued operation of the *EXCEL*.

3. Odometer Menu

Depress the MENU key until the following screen appears:

*** ODOMETER
0000 FT 0000 MI**

The Odometer will display the feet and miles the *EXCEL* has traveled up to that point.

**TO ACCESS THE FOLLOWING MENU SELECTIONS, IT WILL BE NECESSARY TO
INPUT THE MANAGERS PASSWORD!**

The Managers Password is a series of three key entries on the keypad which will allow access to the *EXCEL* Manager Menus. To enter the password, the keypad LCD must be displaying the LINO CTRL & RSET screen. The factory-set password information is recorded in the Quality Control Inspection envelope which is included with this manual. To have the Managers Password changed, please contact your Authorized DBA *EXCEL* Distributor.

4. Override Auto Program

This menu allows the Supervisor to override the Auto Program Selection and enter a manual program selection for the current conditioning run.

To reach this menu, depress the MENU key until the following appears:

***OVERRIDE AUTO
00 PROGRAM? 00**

Two numbers will be displayed with this prompt, one on the lower right side of the display and one on the lower left. These numbers refer to the last program entered. Use the UP or DOWN ARROWS to change the program number. When the desired program number is reached, press the ENTER key. If both numbers display the correct number, press the NEXT key. This concludes the OVERRIDE AUTO PROGRAM menu.

NOTE: If ENTER is not pressed before NEXT, the keypad will beep 6 times and the change will not be accepted. At this time the screen will change to the next screen.

NOTE: Programs selected in the Override Menu will only override the normal Auto Program selection for one conditioning run, whether it be the entire center or only a portion. Once all designated lanes have been conditioned, or if machine has been stopped and "starting" and "ending" lane numbers have been re-entered, the conditioning program used will revert back to the Auto Program Selections.

5. Change Program Settings

Depress the Menu Key and the following screen will appear:

***CHANGE PROGRAM SETTINGS**

This menu will allow the operator to do the following: change the distances of the conditioner application for each wicking pad within a selected conditioner program; choose a return oil distance and designate whether or not the duster assembly should be "on" or "off" during each program.

Eleven factory-preset conditioning patterns are stored in the EXCEL's computer memory at the time of manufacture. These preset programs may be altered in the CHANGE PROGRAM SETTINGS menu. To see a sample graph of the patterns applied by each of these programs, please see the appendix in the back of this manual.

To continue within this menu, press the ENTER key and then the NEXT key and the following prompt will appear:

**CHANGE PROGRAM #
00 00**

Along with this prompt will appear two numbers, one on the lower left side of the display, and one on the lower right. Both numbers will display the current program number.

To change the program number, use the UP or DOWN ARROWS. The number on the right side of the display will change. When the correct number is reached, depress the ENTER key. At this time, both numbers on the display will be the same as the program number you selected. If this is correct, depress NEXT.

The following prompt will appear:

**RUN LINO DUSTER?
01 1-YES,0-NO 01**

This screen controls the operation of the Duster assembly during use of this program #.

Use the UP or DOWN ARROW to change the number on the left to either "00" or "01", then depress ENTER when the desired number is reached. "00" will turn the Duster "off" during this conditioning run; "01" will leave it operational.

NOTE: It is recommended that the duster shut-off option be used ONLY when conditioning freshly cleaned lanes! Not operating the duster cloth on a previously conditioned lane has been known to cause wick contamination and poor conditioner flow!

To continue in this menu, depress the NEXT key and the following screen will appear:

**TRAVEL DIST
00 00**

This prompt will be displayed with two numbers showing the current travel distance (buff out) for the conditioning program selected. To change this distance, use the UP or DOWN ARROWS. Once again, the right side number will change. Once the correct distance is reached, depress ENTER and both numbers will display the new travel distance. If this is correct, depress the NEXT key.

The following prompt will appear:

**FORWARD SHIFT TO
03 HIGH SPEED 00**

This prompt will display the distance down the lane where the EXCEL will shift from low to high speed. To change this distance, use the UP or DOWN ARROWS. Once again, the right number will change. Once the correct distance is reached, depress ENTER and both numbers will display the new shift point.

If this is correct depress the NEXT key. The following prompt will appear:

**RT 1-5 OIL FWD
0000 INCHES 0000**

This prompt, along with the two numbers displayed, is referring to the distance *in inches* down the lane that the Right 1-5 board wicking pad should be activated. To change this number, use the UP or DOWN ARROWS. Again, only the right side number will change. Once the correct distance is reached, depress ENTER and both numbers will display the new distance for this pad.

If this number is correct, depress the NEXT key. The following prompt will appear:

**RT 5-10 OIL FWD
0000 INCHES 0000**

This prompt and the two numbers displayed refers to the distance that the Right 5-10 board wicking pad be activated. To change this distance, follow the instructions for changing the Right 1-5 board wicking pad.

If this number is correct, depress the NEXT key. The following prompt will appear:

**RT 10-15 OIL FWD
00 IN FEET 00**

Now the numbers displayed refer to the Right 10-15 board wicking pad. This distance is *in feet*. Continue through this menu repeating the previous procedures, and the operator will be allowed to change distance for the following:

Displayed Prompt

RT 15-20 OIL FWD (in feet)

LF 1-5 OIL FWD (in inches)

LF 5-10 OIL FWD (in inches)

LF 10-15 OIL FWD (in feet)

LF 15-20 OIL FWD (in feet)

After depressing the NEXT key, the operator will be given the option to change the speed of the EXCEL as it returns to the foul line.

The next prompt will read:

**RETURN SHIFT DWN
06 LOW SPEED 06**

This prompt, along with the two numbers displayed, is referring to the distance down the lane that the machine will change to low speed. The example above has the machine changing speed 6' from the foul line. To change this number, use the UP or DOWN ARROWS. Again only the right number will change. Once the correct distance is reached, depress ENTER and both numbers will display the new shift point.

After depressing the NEXT key, the operator will be given the option for a "return oil" run on each wicking pad. The double oil run will activate the specified pads on the return trip to the foul line. The first prompt will read:

**RT 1-5 OIL REV
0000 INCHES 0000**

Along with the prompt there will again be two alike numbers in the display. The procedure for changing these numbers is exactly the same as for the previous distances. After exiting this prompt, the operator will be allowed to set distances for the remaining pads:

Displayed Prompt

RT 5-10 OIL REV (in inches)

RT 10-15 OIL REV (in feet)

RT 15-20 OIL REV (in feet)

LF 1-5 OIL REV (in inches)

LF 5-10 OIL REV (in inches)

LF 10-15 OIL REV (in feet)

LF 15-20 OIL REV (in feet)

Once all return distances are determined the operator has the option of giving extra "HITS" with the outside 2 sets of wicking pads during forward travel. These "HITS" will add oil to the buffing brush keeping the level of conditioner more consistent. The first prompt displayed for this feature is:

**ADD OIL RT 1-5
00 # OF HITS 00**

Along with the prompt there will again be two matching numbers in the display. The procedure for changing these numbers is exactly the same as for previous distances. Additional "HITS" can be added for the following pads:

Displayed Prompt
ADD OIL RT 5-10
ADD OIL LF 1-5
ADD OIL LF 5-10

Once the number of hits are entered the following prompt is displayed:

**DISTANCE BETWEEN
06 HITS/FEET 06**

This menu is the distance interval between hits (in feet). The PC begins counting this distance after the pad has reached it's programmed travel distance.

To change this number, use the UP or DOWN ARROWS. (NOTE: If the programmed distance between "hits" is too large for all of them to occur within the overall travel distance, all additional "hits" will be ignored.)

This will conclude the selections within the CHANGE PROGRAM SETTINGS menu.

6. Change Auto Program Select

To reach this menu, depress the MENU key until the following screen appears:

***CHANGE AUTO PROGRAM SELECT**

This menu allows the supervisor to choose the specific conditioning programs to be used for each day of the week within each time period of the day, and the flexibility to change conditioning patterns up to a maximum of three times per operation across the center.

The "real time" clock in the EXCEL keeps track of the time of day and will run the program selected for that specific time period. The time periods are not broken down by the hour, but rather are separated into two time categories, AM and PM. For example, a conditioning program selected for Monday AM means that operation of the EXCEL anytime between 12:01 AM and 12 Noon will apply that selected conditioner program.

To continue within this menu, depress the NEXT key and the following prompt will appear:

MON AM 1 PRGRM #00 LANES 01 THRU 00

When this screen first appears, the current program # will flash on and off, designating that the selection being made will be for the program number. Use the UP or DOWN ARROWS to select the number, and depress ENTER once it has been reached.

At this point the last lane number will flash. Again use the UP or DOWN ARROW to select the number, depressing ENTER when it has been reached.

NOTE: At any time during this section, if the last lane # for the AM or PM setting is equal to the total # of lanes in the center, the 2nd or 3rd program screens will be skipped. The screen will go to the next 1st screen (AM or PM).

Press NEXT and the following screen will now appear:

MON AM 2 PRGRM #00 LANES 00 THRU 00

When this screen first appears, the current program # will flash on and off. Use the UP or DOWN ARROWS to change the program number, and depress ENTER once it has been reached.

At this point again, the last lane number will flash. (The first lane # will automatically be one more than the last lane selected in the previous menu screen.) Use the UP or DOWN ARROW to select the correct number, depressing ENTER when it has been reached.

Press NEXT and the following screen will now appear:

**MON AM 3 PRGRM #00
LANES 00 THRU 00**

Again the program number will flash. Select the correct number by using the UP or DOWN ARROW. (The last lane will automatically be displayed as the last lane in the bowling center.)

Depress ENTER and NEXT and the following screen will appear:

**MON PM 1 PRGRM #00
LANES 01 THRU 00**

Continue through these screens using the same procedure for entering numbers as explained previously for Monday AM. The manager will have the opportunity to select programming for the following days and times:

<u>Displayed Prompt</u>	<u>Day / Time</u>
MON AM (1, 2, 3)	Monday, 12:01 AM - 12 Noon
MON PM (1, 2, 3)	Monday, 12 Noon - Midnight
TUES AM (1, 2, 3)	Tuesday, 12:01 AM - 12 Noon
TUES PM (1, 2, 3)	Tuesday, 12 Noon - Midnight
WED AM (1, 2, 3)	Wednesday, 12:01 AM - 12 Noon
WED PM (1, 2, 3)	Wednesday, 12 Noon - Midnight
THURS AM (1, 2, 3)	Thursday, 12:01 AM - 12 Noon
THURS PM (1, 2, 3)	Thursday, 12 Noon - Midnight
FRI AM (1, 2, 3)	Friday, 12:01 AM - 12 Noon
FRI PM (1, 2, 3)	Friday, 12 Noon - Midnight
SAT AM (1, 2, 3)	Saturday, 12:01 AM - 12 Noon
SAT PM (1, 2, 3)	Saturday, 12 Noon - Midnight
SUN AM (1, 2, 3)	Sunday, 12:01 AM - 12 Noon
SUN PM (1, 2, 3)	Sunday, 12 Noon - Midnight

WARNING!! Do NOT turn off power or exit the Auto Select menus until all days and times have been properly set. A conditioning program number must be in place for every day/time period through the last lane in the center. Failure to do so will cause improper operation of the Auto Program Select feature.

This concludes the selections on the AUTO PROGRAM SELECT menu.

7. Systems Control Lino-Duster Menus

this series of screens will be used to adjust the lino-duster unwind time. It is also possible to change the number of lanes that a new roll of cloth will clean.

Depress the ENTER key to advance to the following screen:

*** SYSTEMS CONTROL LINO DUSTER**

Depress the ENTER and then the NEXT key, the following screen will appear:

PRESENT DUSTER 08 UNWIND TIME 08

This screen will display the current unwind time setting for each "ratchet" of cloth. This number will automatically increase as the size of the supply cloth roll decreases. This value will return to the default setting when a new roll of cloth is installed and the cloth counter is reset. **NO CHANGES SHOULD BE NEEDED IN THIS MENU.**

Depress the ENTER and then the NEXT key, the following screen will appear:

DEFAULT DUSTER 08 UNWIND TIME 08

This screen will display the default time for the unwinding of duster cloth. This is the unwind for the cloth when a new roll of cloth is installed and the lino-duster counter is reset. If the value is increased, more cloth will be unwound. If the value is decreased, less cloth will be unwound. Changes can be made to this number by using the UP or DOWN ARROWS.

Depress the ENTER and then the NEXT key, the following screen will appear:

LINO EMPTY #LNS 0710 DEFAULT 0710

This screen displays the default number of lanes that a new roll of cloth will complete. When the lino-duster counter is reset, after installing a new roll of cloth, this is the value that will be displayed. If changes have been made to the default unwind time, this value may need to be changed. Use the UP or DOWN ARROWS to change the value. When the correct value is displayed press ENTER.

This concludes the SYSTEM CONTROL LINO DUSTER MENU.

8. Clear Maintenance Messages

Depress the MENU key to advance to the following screen:

**TO CLEAR MAINT
MSG HIT MAN KEY**

This screen will allow the Supervisor to clear all maintenance messages that have been activated. Simply depress the MAN key when this screen appears and all messages will be cleared.

IMPORTANT: Supervisor should be certain that all items on the maintenance inspection have been completed prior to clearing maintenance messages!

**THIS CONCLUDES ALL MENUS AND FUNCTIONS ACCESSIBLE
BY THE MANAGERS PASSWORD!**

SECTION V • Adjustments

A. Buffing Brush Replacement and Adjustment

The buffing brush on the *EXCEL* is manufactured of a long-lasting synthetic bristle which, under normal circumstances, can be expected to last approximately 18 months.

To check the buffing brush adjustment, stand the *EXCEL* in an upright position and hold a level across the drive wheels and rear lane distance counting wheels. The buffing brush material should extend approximately 3/16" to 1/4" beyond the level for proper adjustment. The buffing brush is factory adjusted prior to being shipped.

If adjusting is needed, place the machine in an upright position on the approach. Loosen the jam nuts on the adjusting screws, along with all three adjusting blocks.

Turn adjusting screws until proper adjustment is reached. (Each full turn on an adjusting screws is equal to about 1/16" adjustment.) Tighten jam nuts and outside two adjusting blocks. Remove the clutch on the distance wheel shaft, and move the center adjusting block until the shaft spins as freely as possible. Tighten the center adjusting block and re-install clutch. Check that the lane distance shaft turns without any bind.

NOTE: When cleaning the EXCEL's Buffing Brush, NEVER use any type of cleaner on the brush. Use of cleaners will decrease the brushes ability to hold conditioner, and greatly affect the lengthwise taper of the conditioner pattern. All that is needed to clean the Buffing Brush is a clean soft, dry rag. Wipe the brush clean daily.

B. Duster Cloth Replacement and Adjustment

The *EXCEL* DMR (Dual Motor Ratcheting) duster cloth assembly is very similar to a hand-held lane duster, and in need of very little adjustment. Duster cloth should be loaded into the assembly as shown in the diagram below:

(Figure 8 - DUSTER CLOTH ROUTING)

C. Duster Cloth Counter

The *EXCEL* is equipped with a Lino-Duster Cloth Counter which indicates the number of lanes remaining on the current roll of duster cloth, and also warns the operator when no cloth is remaining.

When power is applied and there is not enough cloth left to do the entire center, the following screen will appear:

*** START EXCEL *
0000 MENU XL2.51**

The keypad will beep 6 times and the screen will then change to:

**LINO ALMOST OUT
00 LANE WARNING!**

When the Duster Cloth counter reaches zero, 00 lanes will be displayed for remaining cloth. Although the counter has reached zero, additional cloth may still be left on the core. The *EXCEL* can still be operated until the cloth runs out completely.

At that time the screen will display:

**ERROR MESSAGE
LINO CLOTH EMPTY**

When the *EXCEL* stops at the foul line, it will be necessary to replace the cloth and reset the lino counter. To do this, follow the instructions in this manual under LINO CTRL & RSET. After resetting the counter, reprogram the *EXCEL* to continue operation.

D. Filling of Conditioner Tank

To fill the conditioner tank, the *EXCEL* should be in the upright position on a level surface. Connect the conditioner fill tube to the tank vent on the front panel of the *EXCEL*. Disconnect the overflow tube from the inside wall of the buffing end, remove end plug, and hang into an empty clean container. Through the fill tube funnel conditioner into the tank. The tank will be full when conditioner begins to flow through the overflow tube into the empty container.

NOTE: Failure to use the overflow tube or remove the end plug during filling may give incorrect level indications and may cause conditioner to flow from the sides of the tank. FOR OPTIMUM CONSISTENCY, FILL THE CONDITIONER TANK BEFORE EVERY USE!

E. Wicking Adjustments

The wick pressure can be adjusted for balance of left and right side pressure across each wick by means of the wicking pad springs. It is suggested that the lanes be conditioned with the *EXCEL*, then graphed using an ABC Take-Up Device and Lane Reader. If conditioner patterns seem to vary in an area conditioned by one wicking pad, either increase or decrease the wick pressure by adjusting the springs on either end of the pad. Adjust springs and graph lanes again. (**NOTE:** Spring adjustments should be done **ONLY** to adjust pressure from one side of a pad to the next, **NOT** to increase overall conditioner output! Wicking pad springs should not be adjusted so tightly that it causes the wicking pad solenoids to pull too hard.) If several adjustments on the wicking pad springs do not balance the condition being applied, replace the wicking pad and readjust.

SECTION VI • Maintenance

Regular Maintenance: The following items should be done to the *EXCEL* on a regular basis:

A. Care of the Power Cord: Care should be taken to see that the *EXCEL* power cord be handled properly and stored correctly. Do NOT wrap the cord around the machine for storage. Some type of cord wrap or cord spool for suitable means of storage and add life to the use of the cord.

Should the power cord become damaged or frayed, it should be repaired or replaced IMMEDIATELY!

B. Wicking pads: Clean any accumulation of dirt and dust from wicking pads after every conditioning run. USE A SOFT RAG ONLY!! Metal or abrasives will tear at the wick material, causing wick deterioration and irregular conditioner flow.

WICKING PAD REMOVAL: Periodically it will become necessary to remove a wicking pad for cleaning or replacement. To do this, disconnect the solenoid cable from all wicking pads. Disconnect the springs from each pad which is to be removed, and pull the pad out of the tank. To replace the pads into the tank, simply reverse the procedure. (When re-installing wicking pads, it may be helpful to use a spatula or putty knife to assist in slipping the pad into the tank.)

WICKING PAD CLEANING: To clean the wicking pads, wipe the wick material with a clean, dry cloth until all loose dirt particles are removed.

WICKING PAD REPLACEMENT: When it becomes necessary to replace the wick material on the *EXCEL* wicking pads, use only genuine DBA replacement material and adhesive. These items may be ordered from your DBA Distributor. Follow the instructions included with the replacement items for proper installation.

CHANGING OF CONDITIONERS: It is not always necessary to replace the wicking pad material when the type of conditioner being used is changed. When changing conditioners, remove all eight wicking pads from the machine. Drain the conditioner tank completely. Using a clean, dry towel, squeeze the wicking pads, to remove as much of the conditioner as possible. Use several towels if necessary. Before replacing wicking pads into the conditioner tank, saturate each pad with the new lane conditioner to be used. This can be done by using a dispenser such as a clean, empty ketchup bottle, or by laying the pads into a small shallow pan filled with about 1/2" of lane conditioner. Once saturated, re-install all pads into the tank. Fill tank with the new lane conditioner and the *EXCEL* is ready for use.

C. Buffing Brush: Should be wiped with a clean cloth daily.

D. Sensor: Clean during Maintenance Checks by spraying each sensor lightly with electrical contact cleaner or by blowing them off with an air compressor. This will remove oil and dust build-up which could cause false sensing.

E. Drive Wheels: Clean after each operation.

F. Inside machine: Wipe up excess dust and dirt daily.

Automatic Maintenance Checks

The *EXCEL* features an Automatic Maintenance program which alerts the operator as to when to perform regularly scheduled maintenance. In addition to normal daily maintenance, the *EXCEL* requires inspections at 10, 50 and 100 miles of travel. Each time these distances are reached, a maintenance message will appear. These messages can only be cleared by the Supervisor once the lane man has completed the required maintenance inspection.

An odometer in the *EXCEL* records distance travelled through the LDS, then displays it on the keypad in the menu immediately following the Lino-Duster Cloth menu. When the pre-determined maintenance distances are reached, maintenance messages will toggle on the screen opposite the OPERATORS MENU screen:

**MAINTENANCE INSP
10 MI NOW DUE**

(or 50 MI NOW DUE or 100 MI NOW DUE)

To clear a maintenance message, access the Managers Menus by using the Managers Password and depress the MENU key until the following screen appears:

**TO CLEAR MAINT MSG
HIT MAN KEY**

Depress the MAN key and the maintenance message will now be cleared.

If the maintenance message is not cleared by the eighth start after it first appeared, the *EXCEL* will stop on the middle lane and next to last lane of the bowling center. The following message will be displayed:

**MAINTENANCE INSP
NOW OVERDUE**

When this message appears, the *EXCEL* can be restarted by pressing the start button. This will continue to occur until the maintenance message has been cleared by the Manager.

SECTION VII • DBA EXCEL Maintenance Inspections

The following pages contain the suggested maintenance to be performed at 10, 50 and 100 miles of operation. These inspections and adjustments are necessary so that the DBA EXCEL can operate in peak condition.

It is recommended that the operator check off the maintenance items as they are completed for each inspection. Upon completion, the bowling center supervisor should review the inspection with the operator, sign the form, then clear the maintenance message on the EXCEL keypad.

Estimated time to complete each maintenance inspection is as follows:

10 Mile:	30 to 45 minutes
50 Mile:	45 minutes to 1 hour
100 Mile:	90 minutes to 2 hours

10 Mile Maintenance Inspection

COMPLETE EVERY 10 MILES OF OPERATION

(Use Special 50 and 100 Mile Checklists at Appropriate Times)

NOTICE TO EXCEL OPERATORS: When the Excel 10 Mile Maintenance Inspection is due, please examine the entire machine thoroughly, paying close attention to the items listed below on the 10 Mile Maintenance Checklist. When your inspection and repairs are complete, review what has been done with your Supervisor, then have him/her clear the Maintenance Message on the Excel keypad.

	10 mile –	20 mile –	30 mile –	40 mile –	60 mile –	70 mile –	80 mile –	90 mile –
Clean entire machine thoroughly								
Inspect lane-to-lane casters								
Check all chain tensions								
Remove wicks: inspect and clean thoroughly with clean, dry cloth								
Inspect wick cables, loops and eye bolts for tightness and proper operation								
Operator's Initials								
Date								
Actual Mileage								
Supervisor's Initials								
Date								

50 Mile Maintenance Inspection

COMPLETE EVERY 50 MILES OF OPERATION

NOTICE TO EXCEL OPERATORS: When the Excel 50 Mile Maintenance Inspection is due, please examine the entire machine thoroughly, paying close attention to the items listed below. When your inspection and repairs are complete, review what has been done with your Supervisor, then have him/her clear the Maintenance Message on the Excel keypad.

—	
	Clean entire machine thoroughly
	Inspect lane-to-lane casters
	Check all chain tensions
	Remove wicks: inspect and clean thoroughly with clean, dry cloth
	Inspect wick cables, loops and eye bolts for rightness and proper operation
	Lubricate all drive chains with 2-3 drops of 30W or 50W oil
	Oil felt lube rings at bushings with 2-3 drops of 10W oil
	Lubricate LDS shaft bushings with 2-3 drops of 10W oil
	Lubricate pivot bolts and bushings on duster assembly with 2-3 drops 10W oil
	Lubricate buffer belt idler with 2-3 drops of 10W oil
	Check condition of tank vent hose and tank overflow hose

Operator's Signature

Date

Supervisor's Signature
Mileage

Date

Actual

100 Mile Maintenance Inspection

COMPLETE EVERY 100 MILES OF OPERATION

NOTICE TO EXCEL OPERATORS: When the Excel 100 Mile Maintenance Inspection is due, please examine the entire machine thoroughly, paying close attention to the items below. When your inspection and repairs are complete, review what has been done with your Supervisor, then have him/her clear the Maintenance Message on the Excel keypad.

-	
	Clean entire machine thoroughly
	Inspect lane-to-lane casters
	Check all chain tensions
	Remove wicks: inspect and clean thoroughly with clean, dry cloth
	Inspect wick cables, loops and eye bolts for rightness and proper operation
	Lubricate all drive chains with 2-3 drops of 30W or 50W oil
	Oil felt lube rings at bushings with 2-3 drops of 10W oil
	Lubricate LDS shaft with 2-3 drops of 10W oil
	Lubricate pivot bolts and bushings on duster assembly with 2-3 drops 10W oil
	Check condition of tank vent hose and tank overflow hose

MISCELLANEOUS:

	Check buffing brush adjustment
	Check and tighten guide rollers
	Check for loose or unsecured wiring
	Check tightness of screws on terminal strips and wiring blocks
	Check for excessive play in LDS shafts

CONDITIONER TRANSFER AREA: Inspect following for tightness

	Transfer roller drive sprocket - 1 set screw
--	--

DUSTER AREA: Inspect the following for tightness

	Main drive motor sprocket - 1 set screw
	Main drive motor support bushing collar - 2 bolts
	Buffer motor drive sprocket - 1 set screw

INSPECT THE FOLLOWING ASSEMBLIES FOR TIGHTNESS:

	Lane guide rollers (4)
	Lane guide roller brackets (4)
	Lane-to-lane caster support bolts
	Lane-to-lane caster wheel bolts
	Main drive shaft pillow blocks (6) and bolts (12)
	Conditioner tank mounting bolts (4)
	LDS pillow blocks (3) and bolts (6)
	LDS adjustment block bolts (2) and jam nuts (2)
	Solenoid mounting bolts (24)
	All frame assembly bolts

Operator's Signature

Date

Supervisor's Signature
Mileage

Date

Actual

SECTION VIII • Inputs and Outputs

The *EXCEL* PC has 16 inputs, 3 of which are used, and 12 outputs, all of which are used. Inputs accept data from various components in the *EXCEL*, then use that information to control functions of the machine through its outputs. As an example, the lane distance is input to the PC from the lane distance sensor, at which point data in ROM or RAM chips activate certain outputs as programmed. An output in this case might be one of the wicking pad solenoids.

Here is a list of the Inputs and Outputs of the *EXCEL* PC along with their designations:

<u>INPUT #</u>	<u>FROM:</u>
008	Start, Stop, Resume Button (on handle)
010	Duster Microswitch
014	LDS (Lane Distance Sensor)
<u>OUTPUT #</u>	<u>CONTROLS:</u>
200	Left Solenoid 1-5
201	Left Solenoid 5-10
202	Left Solenoid 10-15
203	Left Solenoid 15-20
204	Right Solenoid 1-5
205	Right Solenoid 5-10
206	Drive Motor Forward (CR1) & Duster Wind-Up Relay (CR4) (*Also energizes Buffer Motor Contactor)
207	Drive Motor Reverse (CR2) & Duster Wind-Up Motor during Forward Travel (*Also energizes Buffer Motor Contactor)
208	Right Solenoid 10-15
209	Duster Unwind Motor
210	High Speed Relay
211	Right Solenoid 15-20

NOTE: The Buffer Contactor is energized by CR1 (206) and CR2 (207).

As listed, all inputs have a prefix of "0", and all outputs a prefix of "2". These prefixes are used for programming purposes and are not shown on the PC Input/Output indicators.

Outputs have a relay assigned to them in the PC. This relay engages when the Output is activated. These relays are located inside the PC. To replace a relay, disconnect the two PC terminal strips, then loosen the four screws on the PC cover.

A relay removal tool is located in the cover of the PC. Use the tool to grasp the relay by the sides and carefully pull the relay off of the circuit board. To replace a relay, simply snap back into place on the circuit board. Replace the tool, the PC cover and reconnect the PC connector blocks.

Each input and output also has an LED indicator on the cover of the PC. If a particular input or output is engaged, a light will light. (The "0" and "2" prefixes are dropped from the Input and Output numbering on the PC cover.) For example, if the LDS is sensing, an LED will light at Input #14. If the LO Pad solenoid is activated, an LED will light at Output #05. These lights can be extremely helpful in troubleshooting various functions of the *EXCEL*.

- **Inputs**

- 1. Start Button**

The Start Button is located on the transport handle, and is used to start the *EXCEL* on each lane. If depressed during operation, the *EXCEL* will stop, resuming its operation once the start button is depressed again.

- 2. Duster Microswitches**

Located inside each side plate of the *EXCEL* are the Duster Microswitches. These switches are deactivated when the handle mounted start switch is pressed, dropping the duster down onto the lane. At the end of travel the wind up motor is turned on and winds up the cloth. When the cloth is taut and the duster is lifted off the lane, these switches are activated. The switch activation turns off the wind up motor.

- 3. LDS (Lane Distance Sensor)**

The LDS (Lane Distance Sensor) is mounted on the front handle which also acts as a drive shaft for the Lane Distance Wheels. This sensor is a "pass-thru" type sensor. A sprocket is mounted on the shaft which turns as the wheel rolls along the lane surface. The sensor shoots an infra-red beam through the teeth on the sprocket. Every time the beam passes through the teeth, the sensor senses one "count" and passes it along to the PC. Each count is equal to two inches, six counts to a foot.

When the *EXCEL* is on the approach, the LDS does not turn.

- **Outputs**

- 1. Wicking pad solenoids**

Outputs #200 thru #205, #208 and 211 control the wicking pad solenoids.

- 2. Drive Motor**

Output #206 operates the Drive Motor Relay. When this output is activated power is applied to the drive motor.

- 3. Reverse Relay/ Wind-Up**

Output #207 operates the Reverse Relay. When this relay is activated, it will reverse the direction of the drive motor or wind-up the cloth if the machine is on the lane. Output #207 operates the Reverse Relay and the Wind-Up Motor. During forward travel CR1 moves the signal from the Reverse Relay to the Wind-Up Motor. When CR1 is not energized, #206 can energize CR2 and the machine will travel in reverse.

- 4. Duster Unwind**

Output #209 operates the Duster Unwind Motor. When activated, it will reverse the direction of the drive motor or wind-up the cloth if the machine is traveling forward on the lane.

- 5. Duster Wind-Up**

Output #207 operates the Duster Wind-Up motor's motion. When activated during forward travel, the wind-up motor will wind-up a portion of cloth and lift the duster off the lane surface at the end of travel. By picking the duster up at the end of travel, dirt lines can be virtually eliminated.

- 6. Buffer Motor**

The Buffer Motor is operated by outputs #206 & #207, along with a contactor assembly. When the PC activates Outputs #206 & #207, it energizes the contactor assembly, which then applies power to the Buffer Motor and Transfer Roller Motor.

SECTION IX • Troubleshooting

<i>Problem</i>	<i>Cause</i>	<i>Remedy</i>
Excel will not start	1) Did not depress "Enter" after each prompt 2) Fuse blown	1) Re-start Excel and depress "Enter" 2) Replace fuse
Excel will not operate on lane; drive motor "sputters" while running	1) Drive motor brushes dirty, twisted or worn	1) Clean, straighten or replace drive motor brushes
No LCD screen	1) Keypad Unplugged 2) No power to machine	1) Plug in keypad 2) Restore power
Unable to access Managers Menu	1) Incorrect password used 2) Password entered at wrong screen	1) Enter correct password 2) Enter password at "Lino Reset Screen"
Inconsistent distances the down lane	1) LDS not functioning properly 2) LDS counting wheels not turning freely	1) Repair or replace LDS 2) Repair bind or cause of wheel slippage
Keypad "locked up"	1) Incorrect key hit on keypad	1) Turn off power to machine, then restore power.
Unusual error messages; unusual operation	1) PC connectors out of place or loose	1) Reconnect terminal strips
Buffing motor not operating	1) Contactor assmeby bad 2) Buffing motor bad 3) PC Output relay bad 4) PC connectors out of place or loose	1) Repair or replace contactor 2) Repair or replace motor 3) Replace #206/207 4) Reconnect
Wicking pad not operating	1) Solenoid inoperative 2) PC Output relay bad 3) Fuse blown 4) PC connectors out of place or loose	1) Repair or replace 2) Repair or replace 3) Replace 4) Reconnect
Duster Cloth will not unwind or wind-up	1) Armature on DMR motor is stuck 2) PC Output relay bad 3) Duster microswitch not signalling PC	1) Free up armature 2) Repair or Replace 3) Check that duster is contacting microswitch; check if PC input light #10 is lighting; repair or replace

SECTION X • Error Messages

NOTE: In most cases, restarting the EXCEL after an Error Message can be done by simply correcting the problem and pressing the start button on the handle. In some instances, reprogramming of the starting and ending lane numbers may be necessary.

EM #	LOCATION	POSSIBLE CAUSE
EM #2	Lane (Downward travel)	Excel caught on splinter; guide rollers need adjustment; Duster caught on lane.
EM #3	Lane (Return travel)	Excel caught on splinter: guide rollers need adjustment; Duster caught on lane.
EM #10	Lane (at the end travel distance)	Lino did not wind up used cloth; duster did not contact microswitch after lifting off the lane; bad duster microswitch.

SECTION XI • Worksheets

- A. Sample lane graph
- B. Factory-Set Conditioning Programs & Graphs