

# PIANOCORDER<sub>TM</sub> Reproducing System

## I N D E X FOR TROUBLESHOOTING GUIDE

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PIANOCORDER<sub>TM</sub> REPRODUCING SYSTEM  
TROUBLESHOOTING GUIDE INTRODUCTION

This guide is intended to assist the technician in servicing the PIANOCORDER<sub>TM</sub> Reproducing system. Every effort has been made to manufacture the PIANOCORDER systems with the highest quality materials and to insure that in every respect it is a high quality product. Before servicing the PIANOCORDER Reproducing system, study this troubleshooting guide and familiarize yourself with the methods suggested to analyze, diagnose, isolate, and replace the faulty assembly. Two points should be understood before any attempt at servicing is undertaken. First, carefully read and take note of the troubleshooting procedure you are following. Second, the sequence of servicing is important. The sequence of suggested procedures should be followed. For example, once it is understood that the power supply is operating, then and only then should you proceed to servicing the playback system. In a like manner, the recording system should only be serviced if the playback system is in perfect operating order. To help you to understand the operation of the PIANOCORDER<sub>TM</sub> Reproducing System, we have provided block diagrams and a brief functional description at the head of each section to assist you in understanding the operation and interaction of the PIANOCORDER<sub>TM</sub> Reproducing System. To further familiarize yourself with the system you should read the owners manuals supplied with the various PIANOCORDER systems. It is also of utmost importance that the GROUND FAULT INTERRUPTER unit supplied with your DP-100 maintenance kit be installed and that the PIANOCORDER system is connected to it, and not directly to the AC power source. Failure to heed this procedure can risk possible DESTRUCTION of the system

as well as exposing the technician to possible LETHAL SHOCK HASAZRDS.

Proper troubleshooting technique for the PIANOCORDER<sup>TM</sup> Reproducing System involves first, determining if the alignment of the system is correct (this may mean first determining if the operation and regulation of the piano is correct). There are detailed procedures indicated in your installation manual and they should be followed exactly when aligning the PIANOCORDER system. In all trouble shooting and maintenance procedures the most important part of the procedure is ALIGNMENT! Any time you replace a part or change a control setting or move and adjust a mechanical part you SHOULD ALWAYS RE-CHECK THE ALIGNMENT AND ADJUST AS NECESSARY. Following this procedure will result in the maximum benefit for you and for the consumer.

If during your troubleshooting you encounter difficulty you should call the PIANOCORDER system service information department and a technical representative will return your call to assist you in the maintenance of the PIANOCORDER Reproducing System. This number is 1-800-447-1970 in the continental United States (except California) and 1-213-998-9333 in California.

\* PIANOCORDER is a trademark owned by Superscope, Inc. for its reproducing systems and components.

PIANOCORDER<sub>tm</sub> REPRODUCING SYSTEM  
POWER SUPPLY FUNCTIONAL DESCRIPTION

Refer to figure "A" while reading this description.

The Power Supply uses 110 volts AC from the wall socket and directs it through it's line cord and through the inter-lock switch. When this switch is pushed in or pulled out IT IS ON and power is being supplied to the system. It provides power through cable 1, to the power supply and cable 2 to the the power switch located on the tape recorder bracket assembly. When this switch is turned on, power is allowed to flow into the power supply through cable 2. The power supply has four functions: First, to generate the +5 volts DC which is used to operate the playback logic card (through cable 3) and the key solenoid driver boards (through cables 7,8, and 9). Second, to generate +12 volts DC to operate the record logic board, the tape recorder and part of the playback logic board (the playback logic board is used to route this +12 volts which enters by cable 3 and is supplied through cables 10 and 11 to the the other boards). Third, to generate +180 volts DC to operate the key and pedal solenoids thru cables 4,5,6,15, and 16. Fourth, the power supply contains circuitry which operates in conjunction with the playback board to provide drive for the soft and sustain pedals through cables 3,15, and 16.

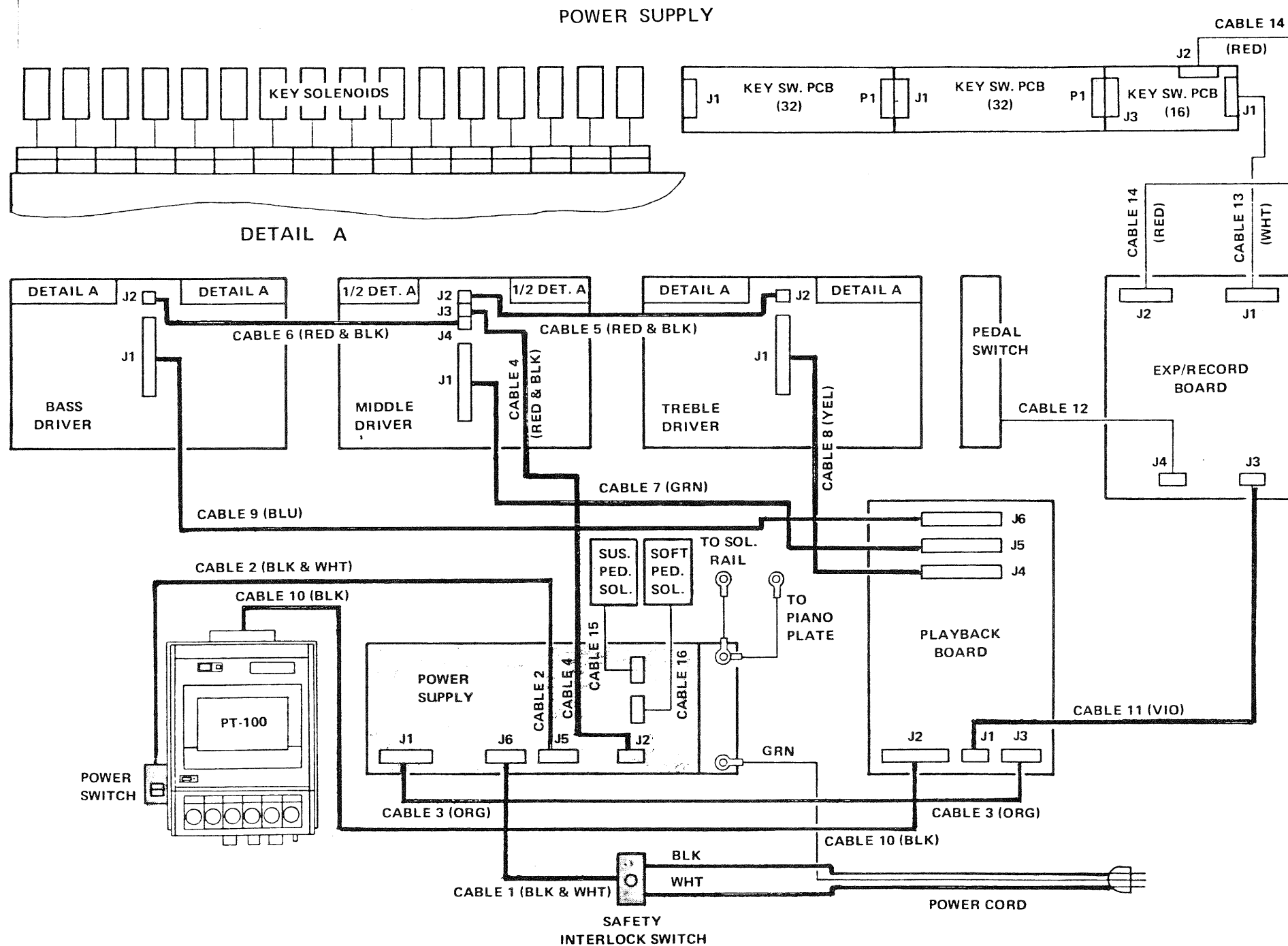


FIGURE A

PIANOCORDER<sub>tm</sub> Reproducing System  
TROUBLESHOOTING GUIDE PROBLEM ISOLATION BY SYMPTOM

Section One: AC MAINS POWER AND THE POWER SUPPLY

Symptom-

1. Neither the fine tuning nor the pilot lamp illuminates when the power switch is turned on. No fuses blow.
2. Neither the fine tuning lamp nor the pilot lamp illuminates when the power switch is turned on. The ground fault interrupter activates upon turn on.
3. The 12 Amp fuse in the power supply blows when the unit is turned on.
4. The 1.5 Amp fuse in the power supply blows when the unit is turned on.
5. The soft and sustain pedal fuses blow when power is applied.
6. The soft or sustain fuses blow when power is applied.
7. Short indicator cable assembly illuminates.
8. The pilot lamp is on. The fine tuning lamp will not illuminate.
9. The fine tuning lamp is on, the pilot lamp will not illuminate.
10. The soft pedal indicator lamp in the power supply does not illuminate when the pedal is operated.
11. The sustain pedal indicator lamp in the power supply does not illuminate when the pedal is operated.

# PIANOCORDER<sub>tm</sub> Reproducing System

## TROUBLESHOOTING GUIDE

### SECTION TWO: THE PLAYBACK SYSTEM

CONDITIONS: Both the pilot and fine tuning lamps are lit when power is applied to the unit.

#### A. Tape Recorder

1. The recorder will not run when play button is depressed.
2. Recorder will not play. Fine tuning lamp does not go out when test tape is inserted and the play button is depressed. (Tape is running)
3. Tempo control does not slow down or speed up performance.
4. Recorder does not shut itself off at end of tape in any mode.
5. Recorder will not fast forward or rewind tapes.
6. Take up tension on tape recorder is erratic.
7. Pushing stop button does not stop tape or eject cassette.

#### B. Individual Notes or Groups of Notes

1. Tape is running in play mode. ALL notes do not play. Fine tune goes out. Pilot lamp is on. Pedals may or may not function.
2. When unit is playing, one or more notes do not function. Pilot lamp on. Fine tuning lamp is out.
3. Unit skips notes or plays/with sour/notes. Fine tuning lamp flashes in playback mode. Pilot lamp is on.
4. Unit skips notes. Fine tuning lamp flashes in playback when tempo control is rotated to extreme fast or slow positions.
5. Unit plays two adjacent notes when only one should play.
6. Random notes play when unit is on. No tape is being played.
7. Random notes play when playing a pre-recorded tape.
8. Hammers are double-hitting (bouncing) when piano is playing.
9. Hammers are dampening the strings when the piano is playing.

## TROUBLESHOOTING GUIDE

### SECTION TWO: THE PLAYBACK SYSTEM (continued)

#### B. Individual Notes or Groups of Notes (continued)

10. All notes play when power is switched on or when play button is depressed.
11. Key(s) stay(s) down when unit is playing.

#### C. Pedals

1. Sustain and/or soft pedal do not function at all.
2. Soft pedal does not operate when switch on front of recorder is operated. Pedal works when playing prerecorded tapes.

#### D. Expression

1. No expression played on bass or treble section of piano.
2. No expression on treble section (notes 53 - 84), bass OK, middle OK.
3. No expression on upper half of the keyboard (notes 45 - 84), lower half is working properly.
4. No expression on lower half of the keyboard (notes 5 - 44), upper half is working properly.
5. No expression on bass section only (notes 5 - 36), middle and treble are working properly.
6. No expression on middle section only (notes 37 - 52), bass and treble are working properly.
7. Piano misses notes when playing at minimum or pianissimo level.
8. Unit plays too loudly. Will not play softly when fortissimo and pianissimo controls are set at minimum position.
9. Pianissimo and fortissimo controls on the tape recorder do not function properly for bass or treble sections of the piano.
10. Bass half of piano plays with expression but too loudly when playing pre-recorded tapes. Treble half is OK.
11. Bass half of the piano plays with expression but too softly when playing pre-recorded tapes. Treble half of piano is OK.
12. Treble half of the piano plays with expression but too loudly when playing pre-recorded tapes. Bass half of the piano is OK.



## TROUBLESHOOTING GUIDE

### SECTION TWO: THE PLAYBACK SYSTEM (continued)

#### D. Expression

13. Treble half of the piano plays with expression but too softly when playing pre-recorded tapes. Bass half of the piano is OK.

## PIANOCORDER TROUBLESHOOTING GUIDE

### SECTION THREE: THE RECORDING SYSTEM

CONDITIONS: THE PLAYBACK SECTION IS IN PERFECT OPERATING CONDITION, ALL NOTES AND PEDALS OPERATE WITH PROPER EXPRESSION.

#### PART A: Tape Recorder

1. The record button will not depress (power is on.)
2. The record button depresses normally, but the tape does not move (power is on.)

#### PART B: Individual notes or groups of notes

1. Unit plays normally but will not record any notes or pedaling.
2. Unit plays all notes but some keys will not record, pedals record ok.
3. Unit records notes when no keys are depressed.
4. All notes in bass section of piano record when no keys are depressed.
5. All notes in middle section of piano record when no keys are depressed.
6. All notes in treble section of piano record when no keys are depressed.
7. All notes record when no keys are depressed. Plays pre-recorded tapes ok.
8. Unit does not record fast performances but plays pre-recorded tapes OK - or misses notes.
9. Unit does not record trills. Plays pre-recorded trills ok.
10. Unit records 2 or more notes when one key is depressed. Test tape plays ok.
11. Unit records notes that did not sound.
12. Soft and/or sustain pedals do not record playback and record of notes is ok - playback of pedals is also ok.

#### PART C: Expression

1. All notes record with no expression
2. Bass or treble records with some expression.
3. Bass and/or treble expression is erratic, does not follow performance.

\*\*\*\*\* CAUTION \*\*\*\*\*

\*\*\*\*\* IMPORTANT \*\*\*\*\*

\*\*\*\*\* LETHAL HAZARD \*\*\*\*\*

WHEN SERVICING UNIT, MAKE SURE THAT POWER IS OFF AND WAIT 60 SECONDS BEFORE REMOVING PLUGS OR COMPONENTS. USE EXTREME CAUTION WHEN PERFORMING ALL TESTS OR ADJUSTING CONTROLS ON BOARDS WHEN POWER IS ON. THE GROUND FAULT INTERRUPTER UNIT SUPPLIED WITH EACH UNIT MUST BE INSTALLED BETWEEN THE PIANOCORDER SYSTEM AND THE AC MAINS POWER SOURCE. FAILURE TO HEED THIS PROCEDURE CAN RESULT IN DESTRUCTION OF THE UNIT AND WILL EXPOSE THE TECHNICIAN TO LETHAL SHOCK HAZARDS.

## SECTION ONE: THE POWER SUPPLY

SYMPTOM	POSSIBLE CAUSE	SOLUTION
1. Neither the fine tune nor pilot lamp lights when power is applied.	A. System is not plugged in.	Plug unit into AC outlet and re-test.
	B. Power at outlet not present.	Plug the leads of the test lamp (provided with the DP-100 parts kit) into outlet. If test lamp does not light, the outlet power is not present. Use an outlet with power. Test as above before plugging in system. MAKE SURE the outlet will supply 15 Amps to the unit. If after plugging system into a <u>second</u> outlet you find that outlet power is not present, check to see that proper fuses or circuit breaker are in use. If proper, then go to symptom no. 3, section one.
	C. Interlock not engaged by lower drop panel.	Remove lower drop panel. Push interlock button <u>in</u> . (It is spring loaded.) If unit functions when interlock is pushed in, the interlock switch is not properly positioned -- See your installation manual for proper installation technique.
	D. No 110 Volts to the Power Supply.	Remove AC plug from outlet. Temporarily remove 12 Amp AC fuse from power supply. Using a test lamp, place test pins on fuse holding bracket when bracket holds each end of fuse. (See Diagram) Plug power cord into outlet. Pull button in interlock out for locked on position. If test lamp lights, power to power supply is OK. Proceed to I. If test lamp does not light, proceed to E.
	E. Power Cord	Replace 12 Amp AC fuse removed in 1D. Visually check

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# SECTION ONE: THE POWER SUPPLY

SYMPTOM	POSSIBLE CAUSE	SOLUTION
1. Neither the fine tune nor pilot lamp lights when power is applied. (continued)	E. Power Cord (continued)	power cord for cuts in cable or bad plug. If no abnormalities are found, plug power cord into outlet. USING CAUTION, hold test lamp pins on black and white cable connectors attached to interlock from power cord. If lamp lights, power cord is ok. If lamp does not light, pull plug from outlet and replace power cord.
	F. Interlock Ass'y	If power cord tests OK, USING CAUTION, place pins of the test lamp on black and white connectors of cable 1 at the interlock. (See cable diagram) Push interlock button <u>in</u> . If test lamp lights, interlock is OK in <u>IN</u> position with test lamp pins in the same position, pull <u>OUT</u> button on interlock. If test lamp lights, with button out, interlock is OK in OUT position. Interlock must test OK in both positions. If not OK in both positions, pull AC plug from outlet and replace interlock.
	G. Interlock wiring	UNPLUG POWER CORD FROM OUTLET. Unplug cable 1 from power supply. Visually inspect cable 1 plugs and wires. If no abnormalities are found, plug power cord into outlet. Insert test lamp pins in plug of cable 1 (white and black wires.) Pull interlock button out. If test lamp lights, cable 1 is OK. If test lamp does not light, check the plugs of cable 1 at interlock. Try again, if test test lamp will not light, UNPLUG POWER CORD and replace cable 1.

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#### SECTION ONE: THE POWER SUPPLY

SYMPTOM	POSSIBLE CAUSE	SOLUTION
1. Neither the fine tune nor pilot lamp lights when power is applied. (continued)	H. Power switch or cable 2 bad.	TURN OFF POWER. Locate a new power switch and a cable 2 from your DP-100 maintenance kit. Plug a new cable 2 onto power supply and onto new power switch (outside of piano.) Turn on power. If cable 2 and power switch from your maintenance kit work, either the original switch or the original cable 2 are bad. Turn off power. Plug new cable 2 onto the power switch located in the tape recorder bracket. Turn on power. If the switch works, cable 2 in the piano is bad. UNPLUG THE PIANO. Replace cable 2. If cable 2 in the piano is not found to be bad, UNPLUG THE PIANO and replace the power switch in the tape recorder bracket with the power switch from the DP-100 maintenance kit.
	I. 12 Amp AC fuse bad.	UNPLUG THE PIANO AND TURN OFF POWER. Replace 12 Amp fuse in power supply. (Removed in step 1D) Place pins of test lamp on each end of fuse held by bracket in power supply. Turn on power, if lamp lights, fuse is bad. If lamp does not light, fuse is OK. If fuse blows after replacement, proceed to symptom 2. If fuse is OK, proceed to J below.
	J. 1.5 Amp fuse bad.	Turn off power. Remove 1.5 Amp fuse from power supply. Visually check to see if wire within glass section of fuse is broken. If wire is broken, fuse is bad. Replace with good fuse from your maintenance kit. Turn on power. If fuse is OK, or replacing bad fuse does not solve problem, proceed to K below. If replacement fuse blows when power is turned on, proceed to symptom 3.

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#### SECTION ONE: THE POWER SUPPLY

SYMPTOM	POSSIBLE CAUSE	SOLUTION
1. Neither the fine tune nor pilot lamp lights when power is applied. (continued)	K. Tape Recorder	Turn off power. Make sure plug on cable 10 is plugged onto playback logic board properly. Plug all the way on and do not skip pins. Visually inspect plug and wires for loose connections, etc. If plug is connected properly and no abnormalities are found, turn on power. If problem is not solved, turn off power. Remove plug of cable 10 from playback logic board. Locate the test box which is included in your maintenance kit. Plug it onto the playback logic board (with the test box play/standby switch in the standby position.) Turn on the power. If the lamps on the test box light, turn off power. Replace tape recorder. If lamps on test box do not light, proceed to step L.
	L. Power Supply	Turn off power. Remove all plugs from power supply. Locate a new power supply from your maintenance kit. Plug all cables onto the new power supply out of the piano. If problem is solved, replace power supply in piano. If problem is not solved, re-connect original power supply.
	M. Playback Logic Board	Turn off power. Remove cables 7, 8, 9, and 11 from playback logic board. Visually inspect PC board for bad components or burn marks. Also inspect plugs and cables of cable 3 and 10 to playback logic board. Make sure plugs are on properly.

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#### SECTION ONE: THE POWER SUPPLY

SYMPTOM	POSSIBLE CAUSE	SOLUTION
1. Neither the fine tune nor pilot lamp lights when power is applied. (continued)	M. Playback logic board (continued)	Turn on power. If fine tune or power lamps still do not light, turn off power and replace playback logic board.
2. Ground fault interrupter actuates upon turn on.	A. Ground wire from AC receptacle is shorted to AC line.	Proceed through solutions of section 1, symptom no. 3 as if 12 Amp fuse were blowing.
3. The 12 Amp AC fuse in power supply blows when unit is turned on.	A. Power Supply	UNPLUG PIANO AND TURN OFF POWER. To determine if fuses are bad, refer to test procedure under symptom no. 1, cause I. ** See Note. Remove all plugs from power supply. Visually inspect all PC boards for bad components or burn marks. Replace defective fuses. Plug cable 1 and 2 onto power supply. Install short indicator. Turn on power. If light on indicator lights, turn power off, replace power supply.

\*\* NOTE: BEFORE PROCEEDING, REMOVE CABLE AND INSERT SHORT INDICATOR CABLE ASSEMBLY BETWEEN POWER SUPPLY AND CABLE NO. 4. IF THIS LAMP IS ON WHEN YOU APPLY POWER, IT INDICATES THAT A SHORT IS PRESENT IN THE 180 VOLT LINE. THIS PREVENTS FUSE FROM FAILING. PROCEED WITH TROUBLESHOOTING USING THIS LIGHT AS YOUR FAULT INDICATION AS YOU WORK ON THE POSSIBLE CAUSE STEPS A THROUGH G. DO NOT REMOVE THIS TEST ASSEMBLY UNTIL YOU HAVE SOLVED THE PROBLEM. EXAMPLE: LAMP REMAINS "UNLIT" WITH POWER APPLIED AND NO TAPE PLAYING.

\*\*\*\*\* CAUTION \*\*\*\*\*

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# SECTION ONE: THE POWER SUPPLY

SYMPTOM	POSSIBLE CAUSE	SOLUTION
3. The 12 Amp AC fuse in power supply blows when unit is turned on. (continued)	B. Cable 4	UNPLUG UNIT AND TURN OFF POWER. Visually inspect plugs and wires on cable 4. Plug cable 4 back onto power supply (Short indicator between power supply and cable 4.) Make sure cable is plugged on properly. UNPLUG cable 4 from center driver board. Turn on power. If light on indicator lights, turn off power and replace cable 4 which is defective.
	C. Center driver board, playback logic board, cable 7, or solenoid shorted.	1) Turn off power. Remove cables 5, 6, and 7 from center driver board. 2) Visually inspect PC board for burn marks or bad components. Visually inspect solenoids for burn marks or bad wires or plugs. 3) Connect cable 4 to center driver board. Turn on power. If short indicator lights, TURN OFF POWER, replace center driver board, and re-test above. 4) If short indicator does NOT light, BEFORE PROCEEDING visually inspect solenoids for burned or discolored components. Replace these discolored solenoids and re-test then proceed. 5) Turn on power momentarily, if light still is lit, insure that no solenoid is on constantly. If one or more solenoids are on constantly, turn off power, replace these solenoids and re-test. If no solenoids appear to be on constantly, and indicator is still on---TURN OFF POWER and remove all solenoid connectors.



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## SECTION ONE: THE POWER SUPPLY

SYMPTOM	POSSIBLE CAUSE	SOLUTION
3. The 12 Amp AC fuse in power supply blows when unit is turned on. (continued)	C. Center driver board, playback logic board, cable 7, or solenoid shorted. (continued)	step 5 continued--Turn on power momentarily, if light goes out, reconnect solenoids one at a time until bad units are found (by light lighting.) CAUTION: TURN OFF POWER BEFORE EACH OPERATION. 6) UNPLUG UNIT AND TURN OFF POWER. Plug cable 7 onto center driver board. Turn on power. Visually inspect solenoids to insure that none are on constantly and that light is NOT on. If one or more solenoids are on constantly, or if light is ON, turn off power. Replace cable 7 with new cable 7 from maintenance kit. 7) Turn on power. Visually inspect solenoids to insure that none are on constantly and that light is NOT lit. If no solenoids are on constantly, leave replacement cable 7 in piano. If one or more solenoids are still on constantly, turn off power and replace playback logic board.
	D. Cable 5	Turn off power. Visually inspect plugs and wires on cable 5. Connect cable 5 to center driver board. Disconnect cable 5 from treble driver board. Turn on power. If light on short indicator lights, replace cable 5.
	E. Treble driver board, playback logic board, cable 8, or solenoid shorted.	1) Turn off power. Remove cables 5 and 8 from treble driver board. 2) Visually inspect PC board for burn marks or bad components. Visually inspect solenoids for burn marks or bad wires or plugs.

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# SECTION ONE: THE POWER SUPPLY

SYMPTOM	POSSIBLE CAUSE	SOLUTION
3. The 12 Amp AC fuse in power supply blows when unit is turned on. (continued)	E. Treble driver board, playback logic board, cable 8, or solenoid shorted. (continued)	3) Connect cable 5 to treble driver board. Turn on power. If short indicator lights, TURN OFF POWER, replace treble driver board, and re-test above. 4) If short indicator does NOT light, BEFORE PROCEEDING, visually inspect solenoids for burned or discolored components. Replace these discolored solenoids and re-test, then proceed. 5) Turn on power momentarily, if light still is lit, insure that no solenoid is on constantly. If one or more solenoids are on constantly, turn off power, replace these solenoids and re-test. If no solenoids appear to be on constantly, and indicator is still on--TURN OFF POWER and remove all solenoid connectors. Turn on power momentarily, if light goes out, reconnect solenoids one at a time until bad units are found, (by light lighting.) CAUTION: TURN OFF POWER BEFORE EACH OPERATION. 6) UNPLUG UNIT AND TURN OFF POWER. Plug cable 8 onto treble driver board. Turn on power. Visually inspect solenoids to insure that none are on constantly and that light is NOT on. If one or more solenoids are on constantly, or if light is ON, turn off power. Replace cable 8 with new cable 8 from maintenance kit.

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#### SECTION ONE: THE POWER SUPPLY

SYMPTOM	POSSIBLE CAUSE	SOLUTION
3. The 12 Amp AC fuse in power supply blows when unit is turned on. (continued)	E. Treble driver board, playback logic board, cable 8 or solenoid shorted. (continued)	7) Turn on power. Visually inspect solenoids to insure that none are on constantly and that light is NOT lit. If no solenoids are on constantly, leave replacement cable 7 in piano. If one or more solenoids are still on constantly, turn off power and replace playback logic board.
	F. Cable 6	Turn off power. Visually inspect plugs and wires on cable 6. Connect cable 6 to center driver board. Disconnect cable 6 from bass driver board. Turn on power. If light on short indicator lights, replace cable 6.
	G. Bass driver board, playback logic board, cable 9, or solenoid shorted.	1) Turn off power. Remove cables 6 and 9 from bass driver board. 2) Visually inspect PC board for burn marks or bad components. Visually inspect solenoids for burn marks or bad wires or plugs. 3) Connect cable 6 to bass driver board. Turn on power. If short indicator lights, TURN OFF POWER, replace bass driver board, and re-test above. 4) If short indicator does NOT light, BEFORE PROCEEDING, visually inspect solenoids for burned or discolored components. Replace these discolored solenoids and re-test then proceed.

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\*\*\*\*\* IMPORTANT \*\*\*\*\*

\*\*\*\*\* LETHAL HAZARD \*\*\*\*\*

WHEN SERVICING UNIT, MAKE SURE THAT POWER IS OFF AND WAIT 60 SECONDS BEFORE REMOVING PLUGS OR COMPONENTS. USE EXTREME CAUTION WHEN PERFORMING ALL TESTS OR ADJUSTING CONTROLS ON BOARDS WHEN POWER IS ON. THE GROUND FAULT INTERRUPTER UNIT SUPPLIED WITH EACH UNIT MUST BE INSTALLED BETWEEN THE PIANOCORDER SYSTEM AND THE AC MAINS POWER SOURCE. FAILURE TO HEED THIS PROCEDURE CAN RESULT IN DESTRUCTION OF THE UNIT AND WILL EXPOSE THE TECHNICIAN TO LETHAL SHOCK HAZARDS.

# SECTION ONE: THE POWER SUPPLY

SYMPTOM	POSSIBLE CAUSE	SOLUTION
3. The 12 Amp AC fuse in power supply blows when unit is turned on. (continued)	G. Bass driver board, playback logic board, cable 9, or solenoid shorted. (continued)	5) Turn on power momentarily, if light still is lit, insure that no solenoid is on constantly. If one or more solenoids are on constantly, turn off power, replace these solenoids and re-test. If no solenoids appear to be on constantly, and indicator is still on--TURN OFF POWER and remove all solenoid connectors. Turn on power momentarily, if light goes out, re-connect solenoids one at a time until bad units are found (by light lighting.) CAUTION: TURN OFF POWER BEFORE EACH OPERATION.
** See Note		6) UNPLUG UNIT AND TURN OFF POWER. Plug cable 9 onto bass driver board. Turn on power. Visually inspect solenoids to insure that none are on constantly and that light is NOT on. If one or more solenoids are on constantly, or if light is ON, turn off power. Replace cable 9 with new cable 9 from maintenance kit. 7) Turn on power. Visually inspect solenoids to insure that none are on constantly and that light is NOT lit. If no solenoids are on constantly, leave replacement cable 9 in piano. If one or more solenoids are still on constantly, turn off power and replace playback logic board.

\*\*Note: WHEN PROCEDURE HAS BEEN SUCCESSFULLY COMPLETED, REMOVE SHORT INDICATOR AND RE-TEST FOR SOLUTION TO PROBLEM.

\*\*\*\*\* CAUTION \*\*\*\*\*

\*\*\*\*\* IMPORTANT \*\*\*\*\*

\*\*\*\*\* LETHAL HAZARD \*\*\*\*\*

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#### SECTION ONE: THE POWER SUPPLY

SYMPTOM	POSSIBLE CAUSE	SOLUTION
4. 1.5 Amp fuse in power supply blows when unit is turned on.	A. Power Supply	TURN OFF POWER. Remove all connectors from power supply. Replace blown fuse. Visually inspect PC board for bad components, burn marks, etc. Plug cables 1 and 2 back into power supply and turn on power. If fuse blows, turn off power, replace power supply.
	B. Cable 3	TURN OFF POWER. Visually inspect cable 3 plugs and wires. Connect cable 3 plug onto power supply. Disconnect plug of cable 3 from playback logic board. Turn on power. If fuse blows, replace fuse and cable 3.
	C. Playback logic board	TURN POWER OFF. Disconnect cables 7, 8, 9, 10, and 11. Visually inspect PC board for bad components, burn marks, etc. Turn on power, if fuse blows, TURN OFF POWER. Replace playback logic board with fuse.
	D. Cable 11	TURN OFF POWER. Visually inspect plugs and wires of cable 11. Connect cable 11 to playback logic board only. Turn on power, if fuse blows, replace cable 11 and fuse.
	E. Record logic board	TURN OFF POWER. Visually inspect board for bad components, burn marks, etc. Connect cable 11 to record logic board and playback logic board. Turn on power. If fuse blows, replace record logic board and fuse.

\*\*\*\*\* CAUTION \*\*\*\*\*

\*\*\*\*\* IMPORTANT \*\*\*\*\*

\*\*\*\*\* LETHAL HAZARD \*\*\*\*\*

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#### SECTION ONE: THE POWER SUPPLY

SYMPTOM	POSSIBLE CAUSE	SOLUTION
4. 1.5 Amp fuse in power supply blows when unit is turned on. (continued)	F. Cable 7	TURN OFF POWER. Disconnect cables 8, 9, 10, and 11. Visually inspect cable 7 plugs and wires. Connect cable 7 to playback logic card. Disconnect cable 7 from center driver board. Turn on power. If fuse blows, replace cable 7 and fuse.
	G. Center driver board	TURN OFF POWER. Visually inspect PC board for bad components, burn marks, etc. Connect cable 7 to playback logic board and center driver board. Turn on power. If fuse blows, replace center driver board and fuse.
	H. Cable 8	TURN OFF POWER. Visually inspect plugs and wires on cable 8. Connect cable 8 to playback logic board. Disconnect cable 8 from treble driver board. Turn on power. If fuse blows, replace cable 8 and fuse.
	I. Treble driver board	TURN OFF POWER. Repeat procedures as in G above, but with treble driver board.
	J. Cable 9	TURN OFF POWER. Repeat procedure as in F above, but with cable 9.
5. Soft <u>and</u> Sustain pedal solenoid fuses blow	K. Bass driver board	TURN OFF POWER. Repeat procedures as in G above, but with bass driver board.
	A. Bad power supply or bad pedal solenoids	If both fuses blow, TURN OFF POWER. Disconnect all cables from power supply and reconnect all cables to known good power supply. If both fuses blow again, replace both pedal solenoids and fuses (original power supply is ok.)

\*\*\*\*\* CAUTION \*\*\*\*\*

\*\*\*\*\* IMPORTANT \*\*\*\*\*

\*\*\*\*\* LETHAL HAZARD \*\*\*\*\*

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#### SECTION ONE: THE POWER SUPPLY

SYMPTOM	POSSIBLE CAUSE	SOLUTION
6. Soft <u>or</u> Sustain pedal solenoid fuses blow	A. Bad Solenoid or power supply	TURN OFF POWER. Replace blown fuse. Disconnect solenoid which is suspect. Attached good solenoid to suspect solenoid connector. If fuse does NOT blow, replace solenoid. If fuse still blows, replace power supply.
7. Short indicator cable assembly illuminates	A. Short on high voltage line	Refer to section one, symptom one and proceed with all steps as indicated for <u>12 Amp fuse</u> failure.
8. Pilot lamp on, fine tuning lamp will not light.	A. Power Supply	TURN OFF POWER. Disconnect all cables from power supply. Examine power supply for bad components or burn marks. Connect all cables to known good power supply (outside of piano.) If light still does not illuminate, proceed to next step "B". If problem is solved, replace power supply in piano.
	B. Playback board	TURN OFF POWER. Disconnect all cables from playback board and examine for burn marks or faulty components. Reconnect cables to known good playback board and re-apply power. If still no light, proceed to following test. If problem is solved, replace playback logic board.
	C. Tape Recorder	TURN OFF POWER. Disconnect tape recorder. Reconnect known good tape recorder or test box (switch in standby), apply power. If light COMES ON, replace tape recorder; if not, proceed.
	D. Cable 3	TURN OFF POWER. Replace cable 3 with one from the parts kit. Turn on power. If light is still OFF, proceed. If it is ON, cable 3 is bad.

\*\*\*\*\* CAUTION \*\*\*\*\*

\*\*\*\*\* IMPORTANT \*\*\*\*\*

\*\*\*\*\* LETHAL HAZARD \*\*\*\*\*

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## SECTION ONE: THE POWER SUPPLY

SYMPTOM	POSSIBLE CAUSE	SOLUTION
8. Pilot lamp on, fine tuning lamp will not light. (continued)	E. Cable 7	TURN OFF POWER. Disconnect cable 7 and apply power. If light comes on, turn off power and substitute cable 7 from maintenance kit. Reapply power. If light does NOT come on, proceed to step E below.
	F. Middle driver	TURN OFF POWER. Disconnect cable 7 and apply power. If light comes ON, turn off power, disconnect ALL cables to middle driver board and reconnect to known good driver board. Reapply power. If still no light, proceed to step F below.
	G. Cable 8	TURN OFF POWER. Repeat procedure as in D above but with cable 8.
	H. Treble driver	TURN OFF POWER. Repeat procedure as in E above, but with treble driver.
	I. Cable 9	TURN OFF POWER. Repeat procedure as in D above, but with cable 9.
9. Fine tuning lamp is ON, pilot lamp will not illuminate.	J. Bass driver	TURN OFF POWER. Repeat procedure as in E above, but with bass driver.
	A. Tape Recorder	TURN OFF POWER. Disconnect tape recorder--replace temporarily with test box or known good tape recorder. (Test box control in standby.) Turn ON power, if light illuminates, replace tape recorder, if light DOES NOT, proceed with next step.



\*\*\*\*\* CAUTION \*\*\*\*\*

\*\*\*\*\* IMPORTANT \*\*\*\*\*

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#### SECTION ONE: THE POWER SUPPLY

SYMPTOM	POSSIBLE CAUSE	SOLUTION
9. Fine tuning lamp is ON, pilot lamp will not illuminate. (continued)	B. Power Supply	Go to symptom 8 and do step B only.
	C. Record board	TURN OFF POWER. Disconnect all cables from record board and examine record board for faulty components or burn marks. Reconnect all cables to known good record board. If light illuminates, replace record board. If not, continue procedure.
	D. Playback board	Go to symptom 8 and do step B only.
	E. Cable 3	TURN OFF POWER. Replace cable 3 with one from the parts kit. Turn on power. If light is still OFF, proceed. If it is ON, cable 3 is bad.
10. No soft pedal lamp on power supply, pedal operates normally. **	A. Power supply bad	TURN OFF POWER. Disconnect all cables to power supply. Reconnect all cables to known good power supply. Apply power.
11. No sustain pedal lamp on power supply, pedal operates normally. **	A. Power supply bad	TURN OFF POWER. Disconnect all cables to power supply. Reconnect all cables to known good power supply. Apply power.

\*\* Note: THESE PROBLEMS DO NOT HAMPER OPERATION OF THE SYSTEM. THESE LAMPS ARE USED IN TROUBLESHOOTING ONLY.

## PIANOCORDER<sub>tm</sub> REPRODUCING SYSTEM

### PLAYBACK SYSTEM FUNCTIONAL DESCRIPTION

NOTE: Refer to FIGURE B while reading this description.

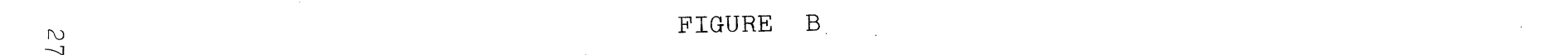
The playback system consists of five basic sections. The first is the tape recorder. It provides controls with which the user can control the operation of the system as well as playing digitally encoded magnetic cassettes which are used to store the actual musical performances. The functions of the tape recorder are to transport the tape in the play mode, rapidly move the tape in the fast-forward and rewind modes and to eject the cassette. The record button is used to put the digital cassette recorder as well as the entire system into the record mode. During playback the tape recorder amplifies the signal on tape to a suitable level so that the playback board can properly process the information. Thus, information is transferred from the tape recorder thru cable 10 to the playback logic board in the playback mode.

The second section is the Playback Logic Board. The primary function of the playback card is to decode the digital information provided by the cassette and to process the commands of the user as supplied by the recorder controls. Once this information has been decoded and processed it is transmitted through cables 7,8, and 9 to the bass, middle and treble key solenoid driver cards which are the third section of the system. In addition, the playback logic card distributes information to the fourth section, the pedals, through cable 3, the power supply, and cables 15 and 16. The playback board also distributes the +12 volts DC which is required for the operation of the record board and the tape recorder (through cables 10 and 11). The other function of the playback board is to

provide a drive signal to the fine tuning lamp which extinguishes when the tape recorder and logic board circuits are properly tuned. (This is also done thru cable 10).

The fifth section is the key solenoids which are used to play the individual notes. The expression which is controlled by the user and of course the original tape is split into bass and treble values so that at any one instant, notes in the bass and treble sections can play different intensities. This expression control happens so rapidly that individual notes in a chord can have different values of intensity.

## FIGURE B



\*\*\*\*\* CAUTION \*\*\*\*\*

\*\*\*\*\* IMPORTANT \*\*\*\*\*

\*\*\*\*\* LETHAL HAZARDS \*\*\*\*\*

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## SECTION TWO: THE PLAYBACK SYSTEM -- PART A: THE TAPE RECORDER

SYMPTOM	POSSIBLE CAUSE	SOLUTION
1. Recorder will not run when Play Button is depressed.	A. Pause Button is on	Check to make sure that the Pause Button is not depressed.
	B. Tape	Replace Tape cassette with a good prerecorded Tape or your test tape. If problem is solved the Tape is bad, if the unit is still not working proceed to step C.
	C. Tape Path	Visually inspect the tape path for obstructions. With the cassette removed, push the play button and inspect the cassette deck while operating. Inspect heads, pinch-roller, capstan, and tape guides for debris. Clean tape path thoroughly with a cotton swab which has been moistened with alchol. (see owners manual) If problem is not solved proceed with step D.
	D. Tape Recorder	TURN OFF POWER. Remove lower frame. Pull out interlock switch to it's "locked-on" position. Inspect the plug and wires of cable 10. Make sure that cable 10 is plugged on corectly and that no pins are skipped. If plug and cable are attached correctly to the Playback Logic Board, and unit still does not function replace the Tape Recorder with a new Recorder from your Parts.
2. Recorder will not playback tape. Tape RUNS, Fine Tune Lamp is on, Pilot Lamp is on.	A. Pause Control	Make sure that the Pause Button is not depressed.
	B. Tape	Replace the tape in use with a known good prerecorded tape or your test tape.
	C. Tape Path	Inspect tape path as in symptom 1, step C above. If the tape head is not clean the playback of tapes will not be correct. If problem is still not solved proceed.

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## SECTION TWO: THE PLAYBACK SYSTEM -- PART A: THE TAPE RECORDER

SYMPTOM	POSSIBLE CAUSE	SOLUTION
2. Recorder will not playback tape. Tape RUNS, Fine Tune Lamp is ON, Pilot Lamp is ON. (Continued)	D. Fine Tune Control	With the Tempo Control in center position, move the Fine Tune Control to the right, then to the left. If the piano begins to play and the Fine Tune Lamp begins to flash, continue to turn the control until the light stops flashing and stays OFF. Because tapes may differ it may be necessary to move the Fine Tuning control to the right or left to "tune-in" to a particular tape. Most tapes will play in the center position. If on a particular piano you notice that this is not so, refer to your installation procedure and align the unit.
	E. Tape Recorder or Playback Logic Board	TURN OFF THE POWER TO THE UNIT. Unplug Cable 10 from the Playback Logic Board. Plug in the 12 pin connector from your Test Box. Turn on power. Switch control on Test Box to the PLAY position from the STANDBY position. If the Fine Tune Lamp goes out when you switch the control to the PLAY position - CHANGE THE TAPE RECORDER. If the Fine Tuning Lamp on the Test Box stays lit, adjust the 3/4 Bit Control on the Logic Card SLIGHTLY clockwise OR counterclockwise until Fine Tune Lamp goes out. If adjusting the 3/4 Bit control does not cause the Fine Tune Lamp on the Test Box to go out, try also adjusting the Range Control. (see alignment procedure in your installation guide) If the adjustment of both controls does not cause the lamp to go out replace the PLAYBACK LOGIC BOARD. If the Logic Board does not solve the problem, you may have a problem which involves a combination of boards which are bad. Change Tape Recorder and Logic Card and Record Board then isolate problem by a process of elimination.

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## SECTION TWO: THE PLAYBACK SYSTEM -- PART A: THE TAPE RECORDER

SYMPTOM.	POSSIBLE CAUSE	SOLUTION
3. The tempo control does not slow down nor speed up performance.	A. Tape Recorder	TURN OFF POWER TO UNIT. Disconnect cable 10. Connect known good tape recorder to J2 and retest.
4. The tape recorder does not shut off at the end of the tape in any mode.	A. Tape Recorder	TURN OFF POWER TO UNIT. Disconnect cable 10. Connect known good tape recorder to J2 and retest.
5. Tape recorder will not fast forward or rewind tapes.	A. Tape	Replace Tape cassette with a good prerecorded Tape or your test tape. If problem is solved, the tape is bad.
	B. Tape Recorder	TURN OFF POWER TO UNIT. Disconnect cable 10. Connect known good tape recorder to J2 and retest.
6. Take-up tension is erratic. Tape loops around capstan and jams recorder.	A. Tape	Remove Tape from recorder. Clean tape path. Replace tape cassette with a good prerecorded Tape or your test tape. If problem is solved, the tape is bad.
	B. Tape Recorder	TURN OFF POWER TO UNIT. Disconnect cable 10. Connect known good tape recorder to J2 and retest.
7. Pushing Stop button does not stop tape.	A. Tape Recorder	TURN OFF POWER TO UNIT. Disconnect cable 10. Connect known good tape recorder to J2 and retest.
8. Pushing Stop button the second time does not eject tape from recorder.	A. Tape Recorder	TURN OFF POWER TO UNIT. Disconnect cable 10. Connect known good tape recorder to J2 and retest.

\*\*\*\*\* CAUTION \*\*\*\*\*

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## SECTION TWO: THE PLAYBACK SYSTEM -- PART B: INDIVIDUAL NOTES OR GROUPS OF NOTES

SYMPTOM	POSSIBLE CAUSE	SOLUTION
1. Tape is running in Play Mode. All notes do not play. Fine Tune lamp goes OUT. Pilot lamp is ON. Pedals may or may not function.	A. Tape	Tape may have no pedal or key information recorded. Replace with a known good prerecorded tape or your test tape. Retest.
	B. Power Supply	With good prerecorded Superscope tape inserted, and play button depressed, observe pedal solenoids. If pedal solenoids are functioning, go to step C. If pedal solenoids are not functioning, TURN OFF POWER. Remove cable 4 from its plug on the power supply. Place the pins of the AC Circuit Tester on the connector for cable 4 on the power supply. <u>USE CAUTION WHILE DOING THIS STEP TO PREVENT ELECTRICAL SHOCK.</u> Turn on power. If test lamp lights, power supply is OK. If test lamp does not light, TURN OFF POWER and replace power supply.
	C. Cable 4	Turn on power and play known good Superscope prerecorded tape. If LED's on power supply are flashing and pedal solenoids are functioning, TURN OFF POWER. Remove cable 4 from unit. Visually inspect cable 4 plugs and wires for loose wires or connectors. If visually OK, reinstall cable 4. Turn on power. If unit will not play, TURN OFF POWER. Replace cable 4 with new cable 4 from your maintenance kit. Turn on power. If piano will not play with new cable 4 installed, TURN OFF POWER and reinstall original cable 4. Proceed to next step.
	D. Playback Logic Board	TURN OFF POWER. Remove cables 7, 8, 9, 10, 11, and 3 from the playback logic board. Locate new playback logic board in your maintenance kit. Plug cables 7, 8, 9, 10, 11, and 3 onto new playback logic board out of



\*\*\*\*\* CAUTION \*\*\*\*\*

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SECTION TWO: THE PLAYBACK SYSTEM -- PART B: INDIVIDUAL NOTES OR GROUPS OF NOTES

SYMPTOM *	POSSIBLE CAUSE	SOLUTION
1. Tape is running in Play Mode. All notes do not play. Fine Tune lamp goes OUT. Pilot lamp is ON. Pedals may or may not function. (Continued)	D. Playback Logic Board (continued)	piano. DO NOT TURN ON POWER UNTIL YOU ARE SURE THE <u>PLAYBACK LOGIC BOARD IS NOT MAKING CONTACT WITH METAL WHICH MAY CAUSE DAMAGE TO THE BOARD.</u> Turn on power. If new playback logic board works, TURN OFF POWER and replace playback logic board in piano.
	E. Key Solenoid Driver Boards	TURN OFF POWER. Unplug Cables 4, 5, and 6 from Center Driver Board. Unplug Cables 5, and 6 from Treble and Bass Driver Boards. Plug Cable 4 onto Treble Driver Board. Turn on power. If treble notes play, TURN OFF POWER. Unplug cable 4 from treble Driver Board and plug onto Bass Driver Board. Turn on power. If treble works and bass does not, TURN OFF POWER, replace Center and Bass Driver Boards. If bass works and treble does not, replace Center and Treble Driver Boards. If no Driver Boards work, proceed to next step.
	F. Tape Recorder	TURN OFF POWER. Remove Cable 10 from the Playback Logic Board. Plug Test Box onto Playback Logic Board. Turn on power. Turn mode switch on Test Box to Record. Push keys and pedals on piano. If Solenoids are activated by key and pedal switches, TURN OFF POWER. Replace Tape Recorder.

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## SECTION TWO: THE PLAYBACK SYSTEM -- PART B: INDIVIDUAL NOTES OR GROUPS OF NOTES

SYMPTOM	POSSIBLE CAUSE	SOLUTION
2. When unit is playing, one or more notes do not function.	A. Tape	Replace Tape cassette with your test tape. Retest.
	B. Piano	Manually play all notes on piano to insure that all notes on piano itself function properly.
	C. Solenoid(s) Binding	TURN OFF POWER. Physically push-up solenoid slug of affected note or notes to insure that tip, rod, or slug is not binding. If slug is binding in sleeve, replace solenoid. If tip or rod is binding on tip or rod adjacent to it, move solenoid to the right or the left on the solenoid rail by loosening mounting screws. If tip or rod is binding on the keybed, the entire solenoid rail <u>may</u> be moved front to back or left to right to release the binding plunger(s). If moving the individual solenoid, or the entire solenoid rail does not free the solenoid(s) from binding on the keybed, the slot cut in the keybed must be enlarged in the area affected. Refer to installation section of this manual for proper procedure.
	D. Solenoid or Solenoid Driver Board	TURN OFF POWER. Replace Tape Recorder Plug 10 with Test Box Plug 10 from your maintenance kit. Turn ON power. Place Test Box in Record Mode. Push key of affected note(s) down on piano engaging key record switch. Push keys next to the affected note also. If Solenoid to the affected key does not respond by moving, and solenoids on either side respond to their switches being engaged, TURN OFF POWER. Unplug Solenoid of affected note from Driver Board. Replace it with next highest Solenoid Plug. Turn on power. Push key of

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SECTION TWO: THE PLAYBACK SYSTEM -- PART B: INDIVIDUAL NOTES OR GROUPS OF NOTES

SYMPTOM	POSSIBLE CAUSE	SOLUTION
2. When unit is playing, one or more notes do not function. (continued.)	D. Solenoid or solenoid driver board (continued)	Solenoid affected. If next highest note plays, replace affected key solenoid. If next highest key does not play, TURN OFF POWER. Try next lowest key, Turn on power. Push key of solenoid affected. If next key lowest does not play, TURN OFF POWER and replace solenoid driver board.
	E. Playback logic board	TURN OFF POWER. Remove cables 7, 8, 9, 10, 11, and 3 from the playback logic board. Locate new playback logic board in your maintenance kit. Plug cables 7, 8, 9, 10, 11, and 3 onto new playback logic board out of the piano. DO NOT TURN ON POWER UNTIL YOU ARE SURE THE PLAYBACK LOGIC BOARD IS NOT MAKING CONTACT WITH METAL WHICH MAY CAUSE DAMAGE TO THE BOARD. Turn on power. If new playback logic board works, TURN OFF POWER and replace playback logic board in piano.
	F. Cables 7, 8, or 9.	TURN OFF POWER. Get cables 7, 8, or 9 from your maintenance kit. Replace cable (to the affect board) with new cable. Turn on power.
3. Unit skips notes or plays wrong notes. Fine tune lamp FLASHES in play mode. Pilot lamp on.	A. Tape	Replace tape cassette with good pre-recorded Super-scope tape or your test tape.
	B. Tape path	Visually inspect path of tape through tape recorder. Push play button with cassette removed. Check heads, pinch roller, capstan and tape guides for debris which may prevent tape from traveling through recorder properly. Clean area thoroughly (clean tape head as described in the owners manual.)

\*\*\*\*\* CAUTION \*\*\*\*\*

\*\*\*\*\* IMPORTANT \*\*\*\*\*

\*\*\*\*\* LETHAL HAZARD \*\*\*\*\*

WHEN SERVICING UNIT, MAKE SURE THAT POWER IS OFF AND WAIT 60 SECONDS BEFORE REMOVING PLUGS OR COMPONENTS. USE EXTREME CAUTION WHEN PERFORMING ALL TESTS OR ADJUSTING CONTROLS ON BOARDS WHEN POWER IS ON. THE GROUND FAULT INTERRUPTER UNIT SUPPLIED WITH EACH UNIT MUST BE INSTALLED BETWEEN THE PIANOCORDER SYSTEM AND THE AC MAINS POWER SOURCE. FAILURE TO HEED THIS PROCEDURE CAN RESULT IN DESTRUCTION OF THE UNIT AND WILL EXPOSE THE TECHNICIAN TO LETHAL SHOCK HAZARDS.

## SECTION TWO: THE PLAYBACK SYSTEM — PART B: INDIVIDUAL NOTES OR GROUPS OF NOTES

SYMPTOM	POSSIBLE CAUSE	SOLUTION
3. Unit skips notes or plays wrong notes. Fine tune lamp FLASHES in play mode. Pilot lamp on. (continued)	C. Fine tune	Because pre-recorded Superscope tapes may differ slightly in azimuth, it may be necessary to move the fine tune control to the right or left to TUNE IN to a particular tape. Most tapes should play with fine turn control in center position. If fine tune control must be adjusted to extreme right or extreme left, in order to operate, proceed to D below.
	D. Azimuth adjust	Set fine turn control in center position. With tempo control in center position and good pre-recorded Superscope tape inserted, push play button. Insert small straight edge screwdriver in azimuth adjust hole directly behind record head in tape recorder. Adjust clockwise OR counterwise until fine turn lamp goes out and unit plays. When fine turn lamp goes out and unit plays, find optimum setting for azimuth adjust. (see procedure in alignment section.)
	E. 3/4 bit adjust or range adjust controls out of calibration.	Set fine turn control in center position. Set tempo control in center position. With good pre-recorded Superscope tape inserted and play button depressed, adjust 3/4 bit control or range control or both on playback logic board slightly clockwise OR counterwise until fine turn lamp goes out and unit plays properly. If rotating tempo causes fine tune lamp to flash, re-adjust 3/4 bit or range or both until unit plays throughout the entire range of the tempo control. (see alignment procedure for further instructions.)

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SECTION TWO: THE PLAYBACK SYSTEM -- PART B: INDIVIDUAL NOTES OR GROUPS OF NOTES

SYMPTOM	POSSIBLE CAUSE	SOLUTION
3. Unit skips notes or plays wrong notes. Fine tune lamp FLASHES in play mode. Pilot lamp on. (continued)	F. Tape recorder or playback logic board	TURN OFF POWER. Unplug cable 10 from playback logic board. Plug test box onto playback logic board. Turn on power. If fine tune lamp on test box goes out in record mode, replace tape recorder. If fine tune lamp on test box stays on in record mode, adjust 3/4 bit control on playback logic board slightly clockwise OR counterwise until fine tune lamp goes out. Set optimum position of 3/4 bit adjust control. If adjusting 3/4 bit adjust does not cause fine tune lamp on test box to go out, try adjusting range adjust along with 3/4 bit adjust. If adjusting both controls does not cause fine tune lamp on test box to go out, REPLACE PLAYBACK LOGIC BOARD.
4. Unit skips notes, fine tune lamp FLASHES in play mode when tempo control is rotated to extreme fast or slow position.	A. Tape	Replace tape cassette with a good pre-recorded Superscope tape or your test tape.
	B. Tape path	Visually inspect path of tape through tape recorder. Push play button with cassette removed. Check heads, pinch roller, capstan, and tape guides for debris which may prevent tape from traveling through recorder properly. (See owners manual.)
	C. Fine tune	Because pre-recorded Superscope tapes may differ slightly in azimuth, it may be necessary to move the fine tune control to the right or left to TUNE IN to a particular tape. Most tapes should play with fine tune control in center position. If fine tune control must be adjusted to extreme right or extreme left, proceed to symptom 3, step D or alignment procedure.

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## SECTION TWO: THE PLAYBACK SYSTEM -- PART B: INDIVIDUAL NOTES OR GROUPS OF NOTES

SYMPTOM	POSSIBLE CAUSE	SOLUTION
4. Unit skips notes, fine tune lamp FLASHES in play mode when tempo control is rotated to extreme fast or slow position. (continued)	D. Range or 3/4 bit control adjustment	With a good pre-recorded Superscope tape inserted, and play button depressed, rotate tempo control to extreme fast or slow which will cause fine tune lamp to flash. Adjust range control on playback logic board until unit plays properly and fine tune lamp goes out. Rotate tempo control to opposite extreme position. If unit skips and fine tune lamp flashes in this position, re-adjust range control for optimum setting until unit does not skip notes and fine tune lamp stays off throughout entire range of tempo control. If unit will not play properly when adjusting range control, set tempo control at extreme, where it causes unit to skip notes and fine tune lamp flashes. Adjust 3/4 bit adjust on playback logic board until unit plays properly and fine tune lamp stays off. Recheck opposite extreme setting of tempo control. If unit skips and fine tune lamp flashes in this setting, re-adjust range control on playback logic board until unit plays properly and fine tune lamp does not flash through complete range of tempo control. It may be necessary to alternately adjust range and 3/4 bit controls a few times until optimum setting is achieved. (See alignment procedure.)

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SECTION TWO: THE PLAYBACK SYSTEM -- PART B: INDIVIDUAL NOTES OR GROUPS OF NOTES

SYMPTOM	POSSIBLE CAUSE	SOLUTION
5. Unit plays two adjacent notes when only one note should play.	A. Tape	Replace cassette with your test tape.
	B. Solenoids	Remove lower drop panel. Pull interlock button out to locked on position. Turn on power. Play test tape (individual note test section,) while tape is playing, visually inspect solenoids. When a solenoid strikes two adjacent keys, stop the tape and mark the note (s) with masking tape. Continue to end of test section. TURN OFF POWER. Physically push-up slug of solenoid affecting notes. If one solenoid pushes two adjacent notes, visually inspect solenoid shaft and tip to see if shaft is bent or solenoid tip is not centered properly. If shaft is bent, straighten shaft. If shaft is NOT bent, and tip is not centered under note, loosen screws on solenoid bracket and move solenoid to center tip under note. Tighten screws.
	C. Key solenoid driver boards	If two adjacent solenoids on the same driver board play when one solenoid should, (as per test tape) TURN OFF POWER. Plug on new key driver board (bass, middle, or treble) from your maintenance kit.
	D. Cables 7, 8, or 9	TURN OFF POWER. If problem is not solved by replacing key solenoid driver board, replace original key solenoid driver board. Replace cable 7, 8, or 9 (the cable to the affected key solenoid driver board) with a new cable 7, 8, or 9 from your maintenance kit. TURN ON POWER.

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\*\*\*\*\* IMPORTANT \*\*\*\*\*

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## SECTION TWO: THE PLAYBACK SYSTEM -- PART B: INDIVIDUAL NOTES OR GROUPS OF NOTES

SYMPTOM	POSSIBLE CAUSE	SOLUTION
5. Unit plays two adjacent notes when only one note should play. (continued)	E. Playback logic board	TURN OFF POWER. Remove all cables from playback logic board in piano. Plug all cables on to known good playback logic board from your maintenance kit. (Out of piano.) MAKE SURE PLAYBACK LOGIC BOARD OUT OF PIANO IS NOT MAKING CONTACT WITH METAL WHICH MAY CAUSE DAMAGE TO THE PC BOARD. Turn on power. If new playback logic board solves problem, replace playback logic board in piano.
6. Random notes play when unit is turned on with no tape being played.	A. Ground lugs	Check tightness on all ground screws. Make sure ALL ground wires are not broken or damaged.
	B. Tape recorder	TURN OFF POWER. Locate new tape recorder from your maintenance kit. Unplug tape recorder from playback logic board. Plug new tape recorder (out of piano) onto playback logic board. Turn on power. If random notes disappear, turn off power, replace tape recorder. If random notes DO NOT disappear, TURN OFF POWER, reconnect original tape recorder.
	C. Playback logic board, cable 7 or center driver board	TURN OFF POWER. Locate new playback logic board from your maintenance kit. Unplug cables 7, 8, 9, 11, and 3 from your playback logic board. Plug cable 3 and 7 onto playback logic board (out of piano.) MAKE SURE PLAYBACK LOGIC BOARD OUT OF PIANO DOES NOT COME INTO CONTACT WITH METAL. Turn on power. If random notes disappear, turn off power and replace playback logic board. If random notes DO NOT disappear, (in center of keyboard because cable 7 is the only one being used) locate new cable 7 from maintenance kit.



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SECTION TWO: THE PLAYBACK SYSTEM -- PART B: INDIVIDUAL NOTES OR GROUPS OF NOTES

SYMPTOM	POSSIBLE CAUSE	SOLUTION
6. Random notes play when unit is turned on with no tape being played. (continued)	C. Playback logic board, cable 7 or center driver board (continued)	(continued) TURN OFF POWER. Replace cable 7. If random notes disappear, install new playback logic board in piano and new cable 7. If random notes DO NOT disappear, TURN OFF POWER. Replace center driver board. Re-test. If still bad, proceed with next step.
	D. Cable 8 or treble driver board	TURN OFF POWER. Locate new cable 9 from your maintenance kit. Replace cable 9 in piano. Turn on power. If random notes do not disappear, turn off power, replace treble driver board. Re-test. If still bad, proceed to next step.
	E. Cable 9 or bass driver board	TURN OFF POWER. Locate new cable 9 from your maintenance kit. Replace cable 9 in piano. Turn on power. If random notes do not disappear, TURN OFF POWER, replace bass driver board.
7. Random notes play when playing a pre-recorded tape.	A. Ground lugs	Check tightness on all ground screws. Make sure ALL ground wires are not broken or damaged.
	B. Tape recorder	TURN OFF POWER. Locate new tape recorder from your maintenance kit. Unplug tape recorder from playback logic board. Plug new tape recorder out of piano onto playback logic board. Turn on power. If random notes disappear, turn off power, replace tape recorder. If random notes DO NOT disappear, turn off power, reconnect original tape recorder.

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SECTION TWO: THE PLAYBACK SYSTEM -- PART B: INDIVIDUAL NOTES OR GROUPS OF NOTES

SYMPTOM	POSSIBLE CAUSE	SOLUTION
7. Random notes play when playing a pre-recorded tape. (continued)	C. Playback logic board, cable 7, center driver board	TURN OFF POWER. Locate new playback logic board from your maintenance kit. Unplug cables 7, 8, 9, 11, and 3 from playback logic board. Plug cable 3 and 7 onto playback logic board (out of piano.) Make sure playback logic board out of piano does not come into contact with metal. Turn on power. If random notes disappear, TURN OFF POWER and replace playback logic board. If random notes DO NOT disappear, (in center of keyboard because cable 7 is the only one being used) locate new cable 7 from maintenance kit. TURN OFF POWER. Replace cable 7. If random notes disappear, install new playback logic in piano and new cable 7. If random notes DO NOT disappear, turn off power. Replace center driver board. Re-test. If still bad, proceed with next step.
	D. Cable 8, treble driver board	TURN OFF POWER. Locate new cable 8 from your maintenance kit. Replace cable 8 in piano. Turn on power. If random notes do not disappear, TURN OFF POWER. Replace treble driver board. Re-test. If still bad, proceed with next step.
	E. Cable 9, bass driver board	TURN OFF POWER. Locate new cable 9 from your maintenance kit. Replace cable 9 in piano. Turn on power. If random notes DO NOT disappear, TURN OFF POWER. Replace bass driver board. Re-test.
8. Hammers double hitting (bouncing) when piano is playing.	A. Piano	Physically play all piano notes to insure that the piano itself is operating properly. The unit functions best on a well-regulated piano.

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SECTION TWO: THE PLAYBACK SYSTEM -- PART B: INDIVIDUAL NOTES OR GROUPS OF NOTES

SYMPTOM	POSSIBLE CAUSE	SOLUTION
8. Hammers double hitting (bouncing) when piano is playing. (continued)	B. Solenoid rail	Remove lower drop panel. Pull botton on interlock out to Locked On position. Play the section of your test tape that displays notes held down. When tape is playing a held down note (s), physically push down the key (s) being held also. If a key can be physically pushed down further than the unit pushes the key, the solenoid is too low. The solenoid rail must be raised. Visually inspect the piano action. When a key is played, the jack must move completely away from the hammer butt and the backcheck must function properly to prevent the hammers from bouncing. (Refer to your alignment procedure.)
9. Hammers dampening strings when piano is playing.	A. Piano	Physically play all piano notes to insure that the piano itself is operating properly. The unit functions best on a well-regulated piano.
	B. Solenoid rail	Remove lower drop panel. Play the section of your test tape that displays notes held down. When tape is playing a held down note (s), visually inspect the piano action to see if the solenoid is lifting the key off the balance rail, causing the hammer to dampen the string. If the back of the key is lifted higher than it would be lifted when the piano is played manually, lower the solenoid rail enough to allow proper function of the piano action. (See alignment section for further information.)

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## SECTION TWO: THE PLAYBACK SYSTEM -- PART B: INDIVIDUAL NOTES OR GROUPS OF NOTES

SYMPTOM	POSSIBLE CAUSE	SOLUTION
10. All notes play when play button is depressed (may blow 12 Amp AC fuse.)	A. Tape	Replace tape cassette with a good pre-recorded Superscope tape or your test tape.
	B. Playback logic board	TURN OFF POWER. Locate new playback logic board from your maintenance kit. Unplug all cables from playback logic board in piano. Plug all cables onto new playback logic board out of piano. MAKE SURE PLAYBACK LOGIC BOARD (OUT OF PIANO) DOES NOT COME INTO CONTACT WITH METAL WHICH MAY CAUSE A SHORT AND DAMAGE THE BOARD. Turn on power. If problem is not solved, go to the procedure outlined in section one, symptom 3.
11. Key (s) stay down when unit is playing.	A. Tape	Replace tape cassette with your test tape. Check again.
	B. Piano	Manually play all notes on piano to insure that all notes on piano itself function properly.
	C. Solenoid (s) binding	Remove lower frame. Physically push up solenoid slug of affected note or notes to insure that tip, rod, or slug is not binding. If slug is binding in sleeve, replace solenoid. If tip or rod is binding on tip or rod adjacent to it, move solenoid to the right or left on solenoid rail by loosening mounting screws. If tip or rod is binding on keybed, entire solenoid rail may be moved front to back or left to right to release binding plunger (s). If moving the individual solenoid or the entire solenoid rail does not free the solenoid from binding on the keybed, the slot cut in the keybed must be enlarged in the area affected. To do this, solenoid rail, keys, and hammer action must be removed. (See installation manual for proper procedure) With power removed, examine solenoids for burn marks or loose wires. Proceed to next step.

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## SECTION TWO: THE PLAYBACK SYSTEM -- PART B: INDIVIDUAL NOTE OR GROUPS OF NOTES

SYMPTOM	POSSIBLE CAUSE	SOLUTION
11. Key (s) stay down when unit is playing. (continued)	D. Solenoid driver board	TURN OFF POWER. Replace the driver board in piano, which is controlling notes in question, with a new driver board from your maintenance kit. Turn on power. If problem is not solved, replace original driver board. With power removed, examine solenoids for burn marks or loose wires. Then proceed to next step.
	E. Playback logic board	TURN OFF POWER. Unplug all cables from playback logic board in piano. Plug on new playback logic board (out of piano) MAKE SURE PLAYBACK LOGIC BOARD OUT OF PIANO DOES NOT COME INTO CONTACT WITH METAL WHICH WILL CAUSE A SHORT AND RUIN THE BOARD. Turn on power. If problem is solved, replace playback logic board in piano

## PART C: THE PEDALS

1. Sustain or soft pedal or both DO NOT FUNCTION at all.	A. Tape	Replace cassette with your test tape. Recheck problem.
	B. Power supply or logic card	Remove lower frame. Turn on power. Visually inspect power supply with tape playing to see if sustain or soft pilot lamps are blinking, indicating soft and sustain pedal circuit operation. (Both should be operating). If soft and sustain pilot lamps are not flashing, TURN OFF POWER. Unplug all cables from power supply. Plug all cables onto new power supply,

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SECTION TWO: THE PLAYBACK SYSTEM -- PART C: THE PEDALS

SYMPTOM	POSSIBLE CAUSE	SOLUTION
1. Sustain or soft pedal or both DO NOT FUNCTION at all. (continued)	B. Power supply or logic card (continued)	(continued) (out of piano) from your maintenance kit. Turn on power. If soft and sustain pilot lamps flash on new power supply, TURN OFF POWER and replace power supply in piano with new power supply from your maintenance kit. If soft and sustain lamps on new power supply do not flash when tape is playing, reconnect power supply in piano. Remove cables 7, 8, 9, 11, and 3 from playback logic board. Locate new playback logic board in your maintenance kit. Plug cables 7, 8, 9, and 8 onto new playback logic board out of piano. DO NOT TURN ON POWER UNTIL YOU ARE SURE THE PLAYBACK LOGIC BOARD IS NOT MAKING CONTACT WITH METAL WHICH MAY CAUSE DAMAGE TO THE PC BOARD. Turn on power. If new playback logic board solves problem, TURN OFF POWER and replace playback logic board in piano. If not, proceed to next steps.
	C. 1 Amp soft and sustain solenoid fuses	If soft and sustain pilot lamps ARE flashing on power supply, TURN OFF POWER. Remove plugs of cables 15 and 16 from power supply. Place pins of test lamp on pins of plug 15 (sustain) or plug 16.(soft) whichever is not operating. Turn on power. Test lamp should light when sustain or soft pilot lamp lights with tape playing If test lamp does not light, check soft or sustain solenoid 1 Amp fuse on power supply. To check fuse, TURN OFF POWER. Remove 1 Amp fuse from power

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## SECTION TWO: THE PLAYBACK SYSTEM -- PART C: THE PEDALS

SYMPTOM	POSSIBLE CAUSE	SOLUTION
1. Sustain or soft pedal or both DO NOT FUNCTION at all. (continued)	C. 1 Amp soft and sustain solenoid fuses (continued)	(continued) supply. Visually check to see if wire within glass section is broken. If wire is broken, fuse is bad. Replace with good fuse from your maintenance kit.
	D. Solenoids	Plug cable 15 and 16 onto power supply. Turn on power. With tape playing, if solenoids are bad, fuses will blow again. If fuses blow, replace solenoid (s) with new solenoid (s) from your maintenance kit.
	E. Solenoid adjustment in piano	With piano playing and sustain and soft controls on playback logic board at maximum settings, physically help solenoids to lift damper rail or hammer rail. If solenoids respond with physical help, see pedal solenoid installation and adjustment procedure in the installation manual.
2. Soft pedal does not operate when switch on front of recorder is operated. Pedal works on pre-recorded tapes.	A. Functional	Soft pedal will not function until tape is playing and fine tune lamp is off.
	B. Tape recorder	TURN OFF POWER. Replace cable 10 on playback logic board with cable 10 of your test box. With test box in play mode, turn on power and activate soft pedal with switch on test box. If soft pedal operates, TURN OFF POWER and replace tape recorder.
	C. Playback logic board	TURN OFF POWER. Locate new playback logic board from your maintenance kit. Unplug all cables from playback logic board in piano. Plug all cables onto new playback logic board out of piano. MAKE SURE PLAYBACK LOGIC BOARD OUT OF PIANO DOES NOT COME INTO CONTACT WITH METAL WHICH MAY CAUSE A SHORT AND DAMAGE THE BOARD. Turn on power. If problem is solved, replace playback logic board in piano.

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## SECTION TWO: THE PLAYBACK SYSTEM -- PART D: EXPRESSION

SYMPTOM	POSSIBLE CAUSE	SOLUTION
1. No dynamic expression on entire piano.	A. Minimum bass, minimum treble controls	TURN OFF POWER. Remove lower frame. Connect test box to playback board through test point connectors. Only test sockets are marked and should be connected to their proper test point pins. Turn on power and again play a known good tape with expression. The meter will deflect to the right then fall back to the left to indicate a changing expression level. The switch settings on the test box should be alternated between bass and treble to insure that both are generating dynamic expression. If the meter does not deflect to the left, go to next steps. If meter does deflect, align minimum bass and treble controls using procedures listed prior to going ahead with next steps. Pull out interlock button to locked on position. Adjust minimum bass and minimum treble controls on playback logic board. (See minimum bass and minimum treble settings in installation manual for proper procedure.) Re-test.
	B. Tape recorder	TURN OFF POWER. Make sure cable 10 is plugged on properly and no pins are skipped. If plug and cable are on playback logic board properly and unit will not function, TURN OFF POWER and replace tape recorder. Re-test. If still bad, proceed to next step.
	C. Cable 3	TURN OFF POWER. Replace cable 3 in piano with cable 3 from your maintenance kit. Turn on power. If problem is not solved, replace original cable 3. Proceed to next step.



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## SECTION TWO: THE PLAYBACK SYSTEM -- PART D: EXPRESSION

SYMPTOM	POSSIBLE CAUSE	SOLUTION
1. No dynamic expression on entire piano. (continued)	D. Playback logic board	TURN OFF POWER. Locate new playback logic board from your maintenance kit. Unplug all cables from playback logic board out of piano. MAKE SURE PLAYBACK LOGIC BOARD DOES NOT COME INTO CONTACT WITH METAL WHICH MAY CAUSE A SHORT AND DAMAGE THE BOARD. Turn on power. If problem is solved, replace playback logic board in piano.
2. No dynamic expression on treble section, notes 53 thru 84 bass OK.	A. Minimum bass, minimum treble controls	TURN OFF POWER. Repeat the solution for symptom no. 1, cause A.
	B. Playback logic board	TURN OFF POWER. Locate new playback logic board from your maintenance kit. Unplug all cables from playback logic board in piano. Plug all cables onto new playback logic board out of piano. MAKE SURE PLAYBACK LOGIC BOARD OUT OF PIANO DOES NOT COME INTO CONTACT WITH METAL WHICH MAY CAUSE A SHORT AND DAMAGE THE BOARD. Turn on power. If problem is solved, replace playback logic board in piano. Proceed to next step.
	C. Cable 8	TURN OFF POWER. Unplug cable 8. Plug on new cable 8 from your maintenance kit. Turn on power. If new cable 8 does not solve problem, TURN OFF POWER and reinstall original cable 8. Proceed to next step.
	D. Treble key solenoid driver board	TURN OFF POWER. Plug on new treble driver board from your maintenance kit. Turn on power.

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\*\*\*\*\* IMPORTANT \*\*\*\*\*

\*\*\*\*\* LETHAL HAZARD \*\*\*\*\*

WHEN SERVICING UNIT, MAKE SURE THAT POWER IS OFF AND WAIT 60 SECONDS BEFORE REMOVING PLUGS OR COMPONENTS. USE EXTREME CAUTION WHEN PERFORMING ALL TESTS OR ADJUSTING CONTROLS ON BOARDS WHEN POWER IS ON. THE GROUND FAULT INTERRUPTER UNIT SUPPLIED WITH EACH UNIT MUST BE INSTALLED BETWEEN THE PIANOCORDER SYSTEM AND THE AC MAINS POWER SOURCE. FAILURE TO HEED THIS PROCEDURE CAN RESULT IN DESTRUCTION OF THE UNIT AND WILL EXPOSE THE TECHNICIAN TO LETHAL SHOCK HAZARD.

SECTION TWO: THE PLAYBACK SYSTEM -- PART D: EXPRESSION

SYMPTOM	POSSIBLE CAUSE	SOLUTION
3. No expression on upper half of keyboard. Lower half of keyboard OK.	A. Minimum bass, minimum treble controls	TURN OFF POWER. Repeat the solution of symptom no. 1, cause A.
	B. Cable 3	TURN OFF POWER. Replace cable 3 in the piano with cable 3 from your maintenance kit. Turn on power. If problem is not solved, replace original cable 3. Proceed to next step.
	C. Playback logic board	TURN OFF POWER. Locate new playback logic board from your maintenance kit. Unplug all cables from playback logic board in piano. Plug all cables onto new playback logic board out of piano. MAKE SURE PLAYBACK LOGIC BOARD OUT OF PIANO DOES NOT COME IN CONTACT WITH METAL WHICH MAY CAUSE A SHORT AND DAMAGE THE BOARD. Turn on power. If problem is solved, replace playback logic board in piano. Proceed to next step.
	D. Cable 8	TURN OFF POWER. Unplug cable 8. Plug on new cable 8 from your maintenance kit. Turn on power. If new cable 8 does not solve problem, turn off power and reinstall original cable 8. Proceed to next step.
	E. Treble key solenoid driver board	TURN OFF POWER. Plug on new treble driver board from your maintenance kit. Turn on power. Proceed to next step.

\*\*\*\*\* CAUTION \*\*\*\*\*

\*\*\*\*\* IMPORTANT \*\*\*\*\*

\*\*\*\*\* LETHAL HAZARD \*\*\*\*\*

WHEN SERVICING UNIT, MAKE SURE THAT POWER IS OFF AND WAIT 60 SECONDS BEFORE REMOVING PLUGS OR COMPONENTS. USE EXTREME CAUTION WHEN PERFORMING ALL TESTS OR ADJUSTING CONTROLS ON BOARDS WHEN POWER IS ON. THE GROUND FAULT INTERRUPTER UNIT SUPPLIED WITH EACH UNIT MUST BE INSTALLED BETWEEN THE PIANOCORDER SYSTEM AND THE AC MAINS POWER SOURCE. FAILURE TO HEED THIS PROCEDURE CAN RESULT IN DESTRUCTION OF THE UNIT AND WILL EXPOSE THE TECHNICIAN TO LETHAL SHOCK HAZARD.

SECTION TWO: THE PLAYBACK SYSTEM -- PART D: EXPRESSION

SYMPTOM	POSSIBLE CAUSE	SOLUTION
3. No expression on upper half of keyboard. Lower half of keyboard OK. (continued)	F. Cable 7	TURN OFF POWER. Plug on new cable 7 from your maintenance kit. Turn on power. If problem is not solved, replace original cable 7. Proceed to next step.
	G. Middle key solenoid driver board	TURN OFF POWER. Replace middle driver board with new middle driver board from your maintenance kit. Turn on power.
4. No expression on middle section, notes 37 thru 52.	A. Minimum bass, minimum treble controls	TURN OFF POWER. Repeat the solution of symptom no. 1, cause A.
	B. Playback logic board	TURN OFF POWER. Locate new playback logic board from your maintenance kit. Unplug all cables from playback logic board in piano. Plug all cables onto new playback logic board out of the piano. MAKE SURE PLAYBACK LOGIC BOARD OUT OF PIANO DOES NOT COME INTO CONTACT WITH METAL WHICH MAY CAUSE A SHORT AND DAMAGE THE BOARD. Turn on power. If problem is solved, replace playback logic board in piano. Proceed to next step.
	C. Cable 7	TURN OFF POWER. Plug on new cable 7 from your maintenance kit. Turn on power. If problem is solved, replace original cable 7. Proceed to next step.
	D. Middle key solenoid driver board	TURN OFF POWER. Replace middle driver board with new middle driver board from your maintenance kit. Turn on power.

\*\*\*\*\* CAUTION \*\*\*\*\*                      \*\*\*\*\* IMPORTANT \*\*\*\*\*                      \*\*\*\*\* LETHAL HAZARD \*\*\*\*\*

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SECTION TWO: THE PLAYBACK SYSTEM -- PART D: EXPRESSION

SYMPTOM	POSSIBLE CAUSE	SOLUTION
5. No expression on lower half of keyboard, upper half of keyboard OK.	A. Minimum bass, minimum treble controls	TURN OFF POWER. Repeat the solution of symptom no. 1 cause A.
	B. Cable 3	TURN OFF POWER. Replace cable 3 in piano with cable 3 from your maintenance kit. Turn on power. If problem is not solved, replace original cable 3. Proceed to next step.
	C. Playback logic board	TURN OFF POWER. Locate new playback logic board from your maintenance kit. Unplug all cables from playback logic board in piano. Plug all cables onto new playback logic board out of piano. MAKE SURE PLAYBACK LOGIC BOARD OUT OF PIANO DOES NOT COME INTO CONTACT WITH METAL WHICH MAY CAUSE A SHORT AND DAMAGE THE BOARD. If problem is solved, replace playback logic board in piano. Proceed to next step.
	D. Cable 8	TURN OFF POWER. Unplug cable 8.. Plug on new cable 8 from your maintenance kit. Turn on power. If new cable 8 does not solve problem, turn off power, and reinstall original cable 8. Proceed to next step.
	E. Treble key solenoid driver board	TURN OFF POWER. Plug on new treble driver board from your maintenance kit. Turn on power. Proceed to next step.

\*\*\*\*\* CAUTION \*\*\*\*\*

\*\*\*\*\* IMPORTANT \*\*\*\*\*

\*\*\*\*\* LETHAL HAZARD \*\*\*\*\*

WHEN SERVICING UNIT, MAKE SURE THAT POWER IS OFF AND WAIT 60 SECONDS BEFORE REMOVING PLUGS OR COMPONENTS. USE EXTREME CAUTION WHEN PERFORMING ALL TESTS OR ADJUSTING CONTROLS ON BOARDS WHEN POWER IS ON. THE GROUND FAULT INTERRUPTER UNIT SUPPLIED WITH EACH UNIT MUST BE INSTALLED BETWEEN THE PIANOCORDER SYSTEM AND THE AC MAINS POWER SOURCE. FAILURE TO HEED THIS PROCEDURE CAN RESULT IN DESTRUCTION OF THE UNIT AND WILL EXPOSE THE TECHNICIAN TO LETHAL SHOCK HAZARD.

SECTION TWO: THE PLAYBACK SYSTEM -- PART D: EXPRESSION

SYMPTOM	POSSIBLE CAUSE	SOLUTION
5. No expression on lower half of keyboard, upper half of keyboard OK (continued)	F. Cable 9	TURN OFF POWER. Plug on new cable 9 from your maintenance kit. Turn on power. If problem is not solved, replace original cable 9.
	G. Bass key solenoid driver board	TURN OFF POWER. Replace bass driver board with new bass driver board from your maintenance kit. Turn on power.
6. No expression on bass section only, notes 5 thru 36.	A. Minimum bass, minimum treble control	TURN OFF POWER. Repeat the solution of symptom no. 1, cause A.
	B. Playback logic board	TURN OFF POWER. Locate new playback logic board from your maintenance kit. Unplug all cables from playback logic board in piano. Plug all cables onto new playback logic board out of piano. MAKE SURE PLAYBACK LOGIC BOARD OUT OF PIANO DOES NOT COME INTO CONTACT WITH METAL WHICH MAY CAUSE A SHORT AND DAMAGE THE BOARD. Turn on power. If problem is solved, replace playback logic board in piano. Proceed to next step.
	C. Cable 9	TURN OFF POWER. Plug on new cable 9 from your maintenance kit. Turn on power. If problem is not solved, replace original cable 9. Proceed to next step.
	D. Bass key solenoid driver board	TURN OFF POWER. Replace bass driver board with new bass driver board from your maintenance kit. Turn on power.

\*\*\*\*\* CAUTION \*\*\*\*\*                      \*\*\*\*\* IMPORTANT \*\*\*\*\*                      \*\*\*\*\* LETHAL HAZARD \*\*\*\*\*

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SECTION TWO: THE PLAYBACK SYSTEM -- PART D: EXPRESSION

SYMPTOM	POSSIBLE CAUSE	SOLUTION
7. Piano misses notes when playing at minimum or pianissimo control.	A. Minimum bass, minimum treble adjustments **Note	With piano playing, pianissimo and fortissimo tape recorder controls on minimum, adjust minimum bass and treble controls on playback logic board to minimum. Slowly adjust bass minimum control toward maximum until bass half of piano plays as soft as possible without skipping short notes and trills. After bass is adjusted properly, slowly adjust treble minimum control toward maximum until treble half of piano plays as soft as possible without skipping short notes and trills. Make sure that bass and treble sections of piano play with uniform intensity. If still faulty, proceed to next step.
	B. Piano	TURN OFF POWER. Physically play all notes on the piano to insure that the piano itself is operating properly. The unit functions best on a well regulated piano. If OK, proceed to next step.
	C. Solenoids	Make sure tips, rods, and slugs of solenoids are not binding. Push up slugs of affected notes to insure that solenoids are not binding. If solenoids are

\*\* Note: When playing very fast performances, the system will not play as soft as it will when playing long slow notes. This has been taken into consideration when the system was designed and the pianissimo control is intended to be increased to insure that all notes strike. When the fortissimo control is decreased, some tapes require that the pianissimo be increased to provide a proper performance. Read your INSTALLATION MANUAL and ALIGNMENT section as well as the OWNERS MANUAL.

\*\*\*\*\* CAUTION \*\*\*\*\*

\*\*\*\*\* IMPORTANT \*\*\*\*\*

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## SECTION TWO: THE PLAYBACK SYSTEM -- PART D: EXPRESSION

SYMPTOM	POSSIBLE CAUSE	SOLUTION
7. Piano misses notes when playing at minimum or pianissimo control. (continued)	C. Solenoids (continued)	(continued) binding, refer to Installation/Alignment section of your manual for proper adjustment procedure.
	D. Solenoid lost motion	TURN OFF POWER. Physically push up solenoid slugs. If solenoid plungers move before hammers, lost motion is present. Refer to system alignment section of manual.
8. Unit plays too loudly. Will not play softly when fortissimo and pianissimo controls are set at minimums.	A. Tape	Replace cassette with good pre-recorded Superscope tape or your test tape. If still bad, proceed to next step.
	B. Minimum bass, minimum treble adjustments **Note	TURN OFF POWER. Remove lower drop panel. Pull out interlock button for locked on position. Adjust minimum bass and minimum treble controls on playback logic board. (See minimum bass and minimum treble alignments in installation manual for proper procedures) If still bad, proceed to next step.
	C. Playback logic board	TURN OFF POWER. Remove cables from playback logic board. Plug cables onto new playback logic board from your maintenance kit. (out of piano) MAKE SURE THAT PLAYBACK LOGIC BOARD OUT OF PIANO IS NOT MAKING CONTACT WITH METAL WHICH MAY CAUSE DAMAGE TO THE PC BOARD. Realign minimum bass and minimum treble controls as in step B above. Turn on power. If new playback logic board solves problem, place new playback logic board in piano.

\*\* Note: (See previous page)

\*\*\*\*\* CAUTION \*\*\*\*\*

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## SECTION TWO: THE PLAYBACK SYSTEM -- PART D: EXPRESSION

SYMPTOM	POSSIBLE CAUSE	SOLUTION
9. Pianissimo and fortissimo controls on tape recorder do not function properly for bass section or treble section.	A. Tape	Replace tape cassette with known good pre-recorded Superscope tape or your test tape.
	B. Minimum bass and minimum treble controls.	TURN OFF POWER. Remove lower drop panel. Pull out interlock button for locked on position. Adjust minimum bass and minimum treble controls on playback logic board. USE EXTREME CAUTION TO PREVENT ACCIDENTAL SHOCK OR DAMAGE TO THE UNIT. SEE INSTALLATION MANUAL FOR PROPER PROCEDURE.
	C. Tape recorder	TURN OFF POWER. Unplug cable 10 of tape recorder and plug onto playback logic board cable 10 of a new tape recorder from your maintenance kit. Turn on power. If problem is solved, replace tape recorder in piano. Repeat step B above.
	D. Playback logic board	TURN OFF POWER. Locate new playback logic board from your maintenance kit. Unplug all cables from playback logic board in piano. Plug all cables onto new playback logic board out of piano. MAKE SURE PLAYBACK LOGIC BOARD OUT OF PIANO DOES NOT COME INTO CONTACT WITH METAL WHICH MAY CAUSE A SHORT AND DAMAGE THE BOARD. Turn on power. If problem is solved, replace playback logic board in piano. Repeat Step B above.



\*\*\*\*\* CAUTION \*\*\*\*\*

\*\*\*\*\* IMPORTANT \*\*\*\*\*

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SECTION TWO: THE PLAYBACK SYSTEM -- PART D: EXPRESSION

SYMPTOM	POSSIBLE CAUSE	SOLUTION
9. Pianissimo and fortissimo controls on tape recorder do not function properly for bass section or treble section. (continued)	E. Cables 7, 8, & 9	TURN OFF POWER. Plug on new cable 9, if problem is on bass section, plug on cable 7 if problem is on upper half of bass section or lower half of treble section, or Cable 8 if problem is on treble section. Turn on power and retest. If problem is not solved, Turn Off Power and replace original cables (s) and proceed to next step.
	F. Treble, middle or bass key driver boards	TURN OFF POWER. Replace key solenoid driver board of <u>affected notes</u> . Re-test.
10. Bass half of piano plays with expresssion but too loud when playing pre-recorded tapes, treble expression is OK.	A. Minimum bass, minimum treble	TURN OFF POWER. Remove lower frame. Pull out interlock button to "locked-on" position. Adjust minimum bass and minimum treble controls on playback logic board. (See minimum bass and minimum treble settings in installation manual for proper procedure). Retest. If still faulty, proceed to next step.
	B. Playback logic board	TURN OFF POWER. Remove cables from playback logic board. Plug cables onto new playback logic board from your maintenance kit. (Out of piano) MAKE SURE PLAYBACK LOGIC BOARD OUT OF PIANO IS NOT MAKING CONTACT WITH ANY METAL WHICH MAY CAUSE DAMAGE TO THE PC BOARD. Turn on power. Re-test and align as described in manual.

\*\*\*\*\* CAUTION \*\*\*\*\*

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WHEN SERVICING UNIT, MAKE SURE THAT POWER IS OFF AND WAIT 60 SECONDS BEFORE REMOVING PLUGS OR COMPONENTS. USE EXTREME CAUTION WHEN PERFORMING ALL TESTS OR ADJUSTING CONTROLS ON BOARDS WHEN POWER IS ON. THE GROUND FAULT INTERRUPTER UNIT SUPPLIED WITH EACH UNIT MUST BE INSTALLED BETWEEN THE PIANOCORDER SYSTEM AND THE AC MAINS POWER SOURCE. FAILURE TO HEED THIS PROCEDURE CAN RESULT IN DESTRUCTION OF THE UNIT AND WILL EXPOSE THE TECHNICIAN TO LETHAL SHOCK HAZARD.

## SECTION TWO: THE PLAYBACK SYSTEM -- PART D: EXPRESSION

SYMPTOM	POSSIBLE CAUSE	SOLUTION
10. Bass half of piano plays with expression but too loud when playing pre-recorded tapes, treble expression is OK. (continued)	C. Treble, middle or bass key driver solenoids.	TURN OFF POWER. Disconnect all cables, including key solenoids, to AFFECTED driver board. Connect cables to known good driver board. Re-test.
11. Bass half of piano plays with expression but too soft when playing pre-recorded tapes, treble expression OK.	A. Minimum bass minimum treble	TURN OFF POWER. Remove lower frame. Pull out inter-lock button to "locked-on" position. Adjust minimum bass and minimum treble controls on playback logic board. (See minimum bass and minimum treble settings in installation manual for proper procedure). Re-test. If still faulty, proceed to next step.
	B. Playback logic board	TURN OFF POWER. Remove cables from playback logic board. Plug cables onto new playback logic board from your maintenance kit. (Out of piano) MAKE SURE PLAYBACK LOGIC BOARD OUT OF PIANO IS NOT MAKING CONTACT WITH ANY METAL WHICH MAY CAUSE DAMAGE TO THE PC BOARD. Turn on power. Re-test and align as described in manual.
	C. Treble, middle, or bass key driver solenoids	TURN OFF POWER. Disconnect all cables, including key solenoids, to AFFECTED driver board. Connect cables to known good driver board. Re-test.

\*\*\*\*\* CAUTION \*\*\*\*\*

\*\*\*\*\* IMPORTANT \*\*\*\*\*

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WHEN SERVICING UNIT, MAKE SURE THAT POWER IS OFF AND WAIT 60 SECONDS BEFORE REMOVING PLUGS OR COMPONENTS. USE EXTREME CAUTION WHEN PERFORMING ALL TESTS OR ADJUSTING CONTROLS ON BOARDS WHEN POWER IS ON. THE GROUND FAULT INTERRUPTER UNIT SUPPLIED WITH EACH UNIT MUST BE INSTALLED BETWEEN THE PLANOCORDER SYSTEM AND THE AC MAINS POWER SOURCE. FAILURE TO HEED THIS PROCEDURE CAN RESULT IN DESTRUCTION OF THE UNIT AND WILL EXPOSE THE TECHNICIAN TO LETHAL SHOCK HAZARD.

SECTION TWO: THE PLAYBACK SYSTEM -- PART D: EXPRESSION

SYMPTOM	POSSIBLE CAUSE	SOLUTION
12. Treble half of piano plays with expression but too loud when playing pre-recorded tapes, bass OK.	A. Minimum bass minimum treble	TURN OFF POWER. Remove lower frame. Pull out interlock button to "locked-on" position. Adjust minimum bass and minimum treble controls on playback logic board. (See minimum bass and minimum treble settings in installation manual for proper procedure) Re-test. If still faulty, proceed to next step.
	B. Playback logic board	TURN OFF POWER. Remove cables from playback logic board. Plug cables onto new playback logic board from your maintenance kit. (Out of piano) MAKE SURE PLAYBACK LOGIC BOARD OUT OF PIANO IS NOT MAKING CONTACT WITH ANY METAL WHICH MAY CAUSE DAMAGE TO THE PC BOARD. Turn on power. Re-test and align as described in manual.
	C. Treble, middle or bass key driver solenoids	TURN OFF POWER. Disconnect all cables, including key solenoids, to AFFECTED driver board. Connect cables to known good driver board. Re-test.
13. Treble half of piano plays with expression but too soft when playing pre-recorded tapes. Bass OK.	A. Minimum bass minimum treble	TURN OFF POWER. Remove lower frame. Pull out interlock button to "locked-on" position. Adjust minimum bass and minimum treble controls on playback logic board. (See minimum bass and minimum treble settings in installation manual for proper procedure) Re-test. If still faulty, proceed to next step.

\*\*\*\*\* CAUTION \*\*\*\*\*                      \*\*\*\*\* IMPORTANT \*\*\*\*\*                      \*\*\*\*\* LETHAL HAZARD \*\*\*\*\*

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SECTION TWO: THE PLAYBACK SYSTEM -- PART D: EXPRESSION

SYMPTOM	POSSIBLE CAUSE	SOLUTION
13. Treble half of piano plays with expression but too soft when playing pre-recorded tapes. Bass OK. (continued)	B. Playback logic board	TURN OFF POWER. Remove cables from playback logic board. Plug cables onto new playback logic board from your maintenance kit. (Out of piano) MAKE SURE PLAYBACK LOGIC BOARD OUT OF PIANO IS NOT MAKING CONTACT WITH ANY METAL WHICH MAY CAUSE DAMAGE TO THE PC BOARD. Turn on power. Re-test and align as described in manual.
	C. Treble, middle or bass key driver solenoids	TURN OFF POWER. Disconnect all cables, including key solenoids, to AFFECTED driver board. Connect cables to known good driver board. Re-test.

PIANOCORDER<sub>tm</sub> REPRODUCING SYSTEM  
RECORDING SYSTEM FUNCTIONAL DESCRIPTION

NOTE: Refer to FIGURE C while reading this description.

The recording system consists of four sections: the bass, middle and treble record key switches; the pedal record switches; the record logic board and the tape recorder. The bass, middle and treble record key switches close when a key is depressed and provide this information through cables 13 and 14 to the record logic board which assembles this data into the proper format and stores it prior to output. In a like manner, the individual pedal record switches close when the respective pedal is depressed and provides this information through cable 12 to the record logic board. In addition, the record logic board computes the ~~exp~~ression of the notes being played and then stores this data. The final product of the record logic board is a data stream which contains information about which notes are played, which pedals are operated and how loudly the notes are played. This data is then directed through cable 11 to the playback logic board. The signal is not altered in any way in the playback board but is simply passed through to cable 10 where it is directed into the tape recorder. The tape recorder accepts this information and records it in digital form upon the tape. Once this is done the tape can be played back by utilizing the playback system which was described previously.

## RECORD SYSTEM

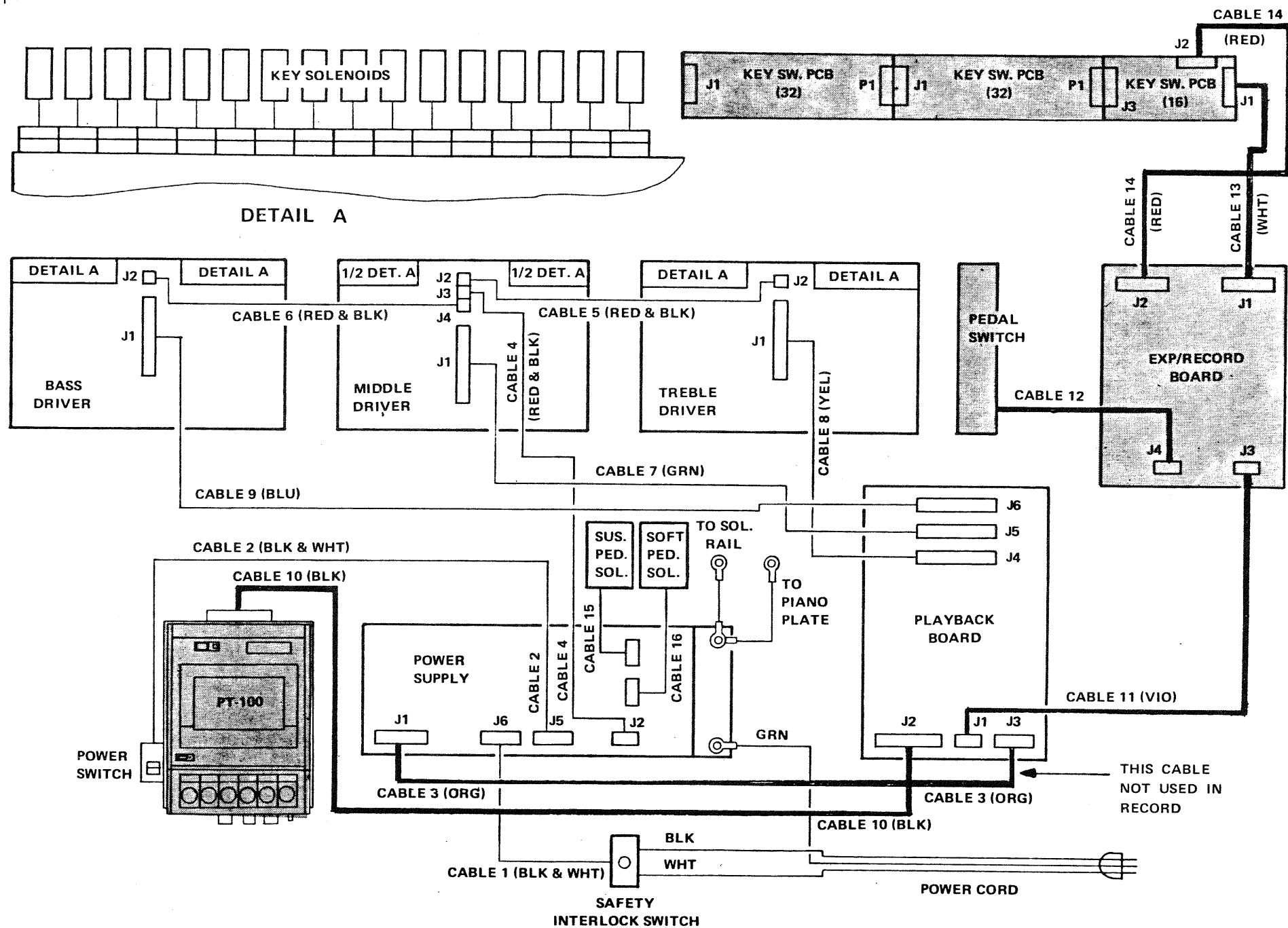


FIGURE C

\*\*\*\*\* CAUTION \*\*\*\*\*

\*\*\*\*\* IMPORTANT \*\*\*\*\*

\*\*\*\*\* LETHAL HAZARD \*\*\*\*\*

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SECTION THREE: THE RECORDING SYSTEM -- PART A: THE TAPE RECORDER

SYMPTOM	POSSIBLE CAUSE	SOLUTION
1. Record button will not depress. (Power on).	A. Tape	Remove cassette from recorder if knock-out tabs are removed from cassette, record button will not depress. Insert a blank cassette containing tabs. Try again. If problem is not solved, proceed with step "B".
	B. Tape Recorder	Locate new tape recorder from your maintenance kit. TURN OFF POWER. Remove lower drop panel. Pull out interlock button for locked-on position. Replace cable 10 on playback logic board with cable 10 of new recorder from your maintenance kit. Turn on power. If new tape recorder solves problem, turn off power and replace tape recorder in piano.
2. Record button depresses normally, tape does not move. (Power is on/pilot lamp is on).	A. Tape	Try using another "tabs-in" cassette. If unit works normally, tape is bad and should be replaced.
	B. Recorder	TURN OFF POWER. Replace tape recorder with new one from your DP-100 maintenance kit.

PART B: INDIVIDUAL NOTES OR GROUPS OF NOTES

1. Unit plays normally but will not record ANY NOTES or PEDALING.	A. Tape	Replace cassette with a good "tabs-in" blank cassette (that has been recorded on previously).
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\*\*\*\*\* CAUTION \*\*\*\*\*

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SECTION THREE: THE RECORDING SYSTEM -- PART B: INDIVIDUAL NOTES OR GROUPS OF NOTES

SYMPTOM	POSSIBLE CAUSE	SOLUTION
1. Unit plays normally but will not record ANY NOTES or PEDALING. (continued)	B. Recorder	TURN OFF POWER. Remove lower frame. Pull out inter-lock button to "locked-on" position. Replace cable 10 of tape recorder with cable 10 of test box. Turn on power. Switch test box to record mode. (switch on "play" position) Manually depress keys over bass, middle, and treble sections of record switches. If all key solenoids respond, turn off power and replace tape recorder with new recorder from your maintenance kit. If no solenoids respond, refer to D, E, F. If treble section responds and bass and middle sections do not respond refer to step G. If treble and middle sections respond and bass section does not respond, refer to step H.
	C. Cable 11	TURN OFF POWER. Replace cable 11 in piano with new cable 11 from your maintenance kit. Turn on power. With test box plugged onto playback logic board in record mode (switch in play position). Manually depress keys over bass, middle and treble sections of record switches. If key switches do not respond at all, re-install original cable 11, and go to next step.
	D. Record logic board	TURN OFF POWER. Unplug cables 11, 12, 13, and 14 from record logic board in piano. Plug cables 11, 12, 13, and 14 onto new record logic board from your maintenance kit. (Out of piano) CAUTION: MAKE SURE THAT RECORD LOGIC BOARD OUT OF



\*\*\*\*\* CAUTION \*\*\*\*\*

\*\*\*\*\* IMPORTANT \*\*\*\*\*

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SECTION THREE: THE RECORDING SYSTEM -- PART B: INDIVIDUAL NOTES OR GROUPS OF NOTES

SYMPTOM	POSSIBLE CAUSE	SOLUTION
1. Unit plays normally but will not record ANY NOTES or PEDALING. (continued)	D. Record logic board (continued)	PIANO DOES NOT COME INTO CONTACT WITH METAL WHICH MAY CAUSE A SHORT AND DAMAGE THE UNIT. Turn on power. With test box in record mode (control in play position) and plugged into playback logic board, manually depress keys over bass, middle, and treble sections of record switches. If key switches still do not respond, turn off power and plug cables 11, 12, 13, and 14 onto original record logic board, and continue.
	E. Cable 13 and Cable 14	TURN OFF POWER. Several piano case parts must be removed, check installation manual. Replace cables 13 and 14 with new cables 13 and 14 from your maintenance kit. Turn on power. With test box in record mode (switch in play) plugged onto playback logic board, manually depress keys over bass, middle and treble sections of record switches. If key switches do not respond, turn off power and plug original cables 13 and 14 onto record logic board only, and continue.
	F. Treble record switches	TURN OFF POWER. Locate new treble record switch section from your maintenance kit. (out of piano) Plug on original cables 13 and 14 out of piano. MAKE SURE THAT TREBLE RECORD SWITCH SECTION DOES NOT MAKE CONTACT WITH METAL WHICH MAY CAUSE A SHORT AND DAMAGE THE SYSTEM. Turn on power. With test box in record mode plugged onto playback logic board, manually depress treble record switches. If key solenoids respond,

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### SECTION THREE: THE RECORDING SYSTEM -- PART B: INDIVIDUAL NOTES OR GROUPS OF NOTES

SYMPTOM	POSSIBLE CAUSE	SOLUTION
1. Unit plays normally but will not record ANY NOTES or PEDALING. (continued)	F. Treble record switches (continued)	turn off power and replace treble record switch section in piano. Refer to installation manual for proper procedure.
	G. Middle record switches	Locate new middle record switch section from your maintenance kit. Remove middle and bass sections of record switches from piano. Plug on new middle record section from your maintenance kit. Turn on power, with test box in record mode plugged onto playback logic board, manually depress middle record switches. If key solenoids respond, turn off power and reinstate bass switches section. Refer to installation manual for proper procedure.
	H. Bass record switches	TURN OFF POWER. Locate new bass record switch section from your maintenance kit. Remove bass section of record switches from piano. Plug on new bass record section from your maintenance kit. Turn on power. With test box in record mode, (switch in play) and plugged onto playback logic board, manually depress bass record switches. If key solenoids respond, turn off power and refer to installation manual for proper installation procedure.
	I. Playback logic board	TURN OFF POWER. Locate new playback logic board from your maintenance kit. Unplug all cables from playback logic board in piano. Plug all cables onto new playback logic board out of piano. MAKE SURE PLAYBACK

\*\*\*\*\* CAUTION \*\*\*\*\*

\*\*\*\*\* IMPORTANT \*\*\*\*\*

\*\*\*\*\* LETHAL HAZARD \*\*\*\*\*

WHEN SERVICING UNIT, MAKE SURE THAT POWER IS OFF AND WAIT 60 SECONDS BEFORE REMOVING PLUGS OR COMPONENTS. USE EXTREME CAUTION WHEN PERFORMING ALL TESTS OR ADJUSTING CONTROLS ON BOARDS WHEN POWER IS ON. THE GROUND FAULT INTERRUPTER UNIT SUPPLIED WITH EACH UNIT MUST BE INSTALLED BETWEEN THE PIANOCORDER SYSTEM AND THE AC MAINS POWER SOURCE. FAILURE TO HEED THIS PROCEDURE CAN RESULT IN DESTRUCTION OF THE UNIT AND WILL EXPOSE THE TECHNICIAN TO LETHAL SHOCK HAZARDS.

### SECTION THREE: THE RECORDING SYSTEM -- PART B: INDIVIDUAL NOTES OR GROUPS OF NOTES

SYMPTOM	POSSIBLE CAUSE	SOLUTION
1. Unit plays normally but will not record ANY NOTES or PEDALING. (continued)	I. Playback logic board (continued)	LOGIC BOARD WHEN OUT OF PIANO DOES NOT COME INTO CONTACT WITH METAL WHICH MAY CAUSE A SHORT AND DAMAGE THE SYSTEM. Turn on power. With test box in record mode (switch in play) and plugged onto playback logic board, manually depress keys over bass, middle and treble sections of record switches. If key solenoid responds, turn off power and replace playback logic board in piano.
2. Unit plays all notes but SOME KEYS will not record, pedals record O.K.	A. Tape	Replace cassette with good blank cassette that has been recorded on. TURN OFF POWER. Remove lower frame. Remove cable 10 of tape recorder from playback logic board and plug on cable 10 of test box. Turn on power (test box switch on play). Physically push all keys individually on piano. (Solenoids should respond when key is depressed APPROXIMATELY half way). If a pattern of every 8th note or groups of 8 notes etc. Do not record, refer to symptom 1, solutions D, E, F, G, H, I.
Note * (if solenoids do not respond when keys are depressed approximately half way, see key switch alignment procedure in your installation manual)	B. Key board switches	If there is no pattern in notes that are not re-cording, mark the keys that do not record with masking tape. Remove (bad) key(s) and push top of switch with pencil eraser. Visually inspect switch through its path to insure that it is indeed making contact if switch(es)

\*\*\*\*\* CAUTION \*\*\*\*\*

\*\*\*\*\* IMPORTANT \*\*\*\*\*

\*\*\*\*\* LETHAL HAZARD \*\*\*\*\*

WHEN SERVICING UNIT, MAKE SURE THAT POWER IS OFF AND WAIT 60 SECONDS BEFORE REMOVING PLUGS OR COMPONENTS. USE EXTREME CAUTION WHEN PERFORMING ALL TESTS OR ADJUSTING CONTROLS ON BOARDS WHEN POWER IS ON. THE GROUND FAULT INTERRUPTER UNIT SUPPLIED WITH EACH UNIT MUST BE INSTALLED BETWEEN THE PIANOCORDER SYSTEM AND THE AC MAINS POWER SOURCE. FAILURE TO HEED THIS PROCEDURE CAN RESULT IN DESTRUCTION OF THE UNIT AND WILL EXPOSE THE TECHNICIAN TO LETHAL SHOCK HAZARDS.

### SECTION THREE: THE RECORDING SYSTEM — PART B: INDIVIDUAL NOTES OR GROUPS OF NOTES

SYMPTOM	POSSIBLE CAUSE	SOLUTION
2. Unit plays all notes but SOME KEYS will not record, pedals record O.K. (continued)	B. Key board switches (continued)	is not making contact and is bent, physically bend switch for proper alignment. (See key switch alignment procedures section of your installation manual if switch(s) is making contact, refer to section three, part B, symptom 1, cause F, G, and H.
3. Unit records notes when NO KEYS ARE DEPRESSED. *Note	A. Record card, logic card, key switches, cables	TURN OFF POWER. Remove lower drop panel. Remove cable 10 of tape recorder from playback logic board and plug on cable 10 of test box (test box to play). Turn on power. Physically push all keys individually on piano. (Solenoids should respond when key is depressed APPROXIMATELY half way). If a pattern of every 8th note or groups of 8 notes etc. are recording with NO KEYS depressed, follow procedure established in section three, part B, symptom 1, causes D, E, F, G, H and I. (same as WILL NOT RECORD).
*Note: Procedure for this symptom is similar to that used for symptom #1.	B. Key switch record boards	If there is no pattern in the notes which are being recorded with no keys down, mark the keys that are recording with masking tape. Remove (bad) key(s) and visually inspect key switch through its path to insure that it is not making contact. If switch is bent and making contact physically bend switch for proper alignment. (See key switch alignment procedures section of your installation manual). If switch(s) is not making contact, follow procedure established in section three part B, symptom #1, causes F, G, and H. (Same as WILL NOT RECORD)

\*\*\*\*\* CAUTION \*\*\*\*\*

\*\*\*\*\* IMPORTANT \*\*\*\*\*

\*\*\*\*\* LETHAL HAZARD \*\*\*\*\*

WHEN SERVICING UNIT, MAKE SURE THAT POWER IS OFF AND WAIT 60 SECONDS BEFORE REMOVING PLUGS OR COMPONENTS. USE EXTREME CAUTION WHEN PERFORMING ALL TESTS OR ADJUSTING CONTROLS ON BOARDS WHEN POWER IS ON. THE GROUND FAULT INTERRUPTER UNIT SUPPLIED WITH EACH UNIT MUST BE INSTALLED BETWEEN THE PIANOCORDER SYSTEM AND THE AC MAINS POWER SOURCE. FAILURE TO HEED THIS PROCEDURE CAN RESULT IN DESTRUCTION OF THE UNIT AND WILL EXPOSE THE TECHNICIAN TO LETHAL SHOCK HAZARDS.

### SECTION THREE: THE RECORDING SYSTEM -- PART B: INDIVIDUAL NOTES OR GROUPS OF NOTES

SYMPTOM	POSSIBLE CAUSE	SOLUTION
4. ALL notes in BASS SECTION of piano record when NO KEYS are depressed.	A. Record logic board	TURN OFF POWER. Remove lower frame. Pull out interlock button to "locked-on" position. Remove all plugs from record logic board. Plug all cables onto new record logic board (out of piano) from your DP-100 maintenance kit. Turn on power. If problem is solved, replace record logic board in piano, and proceed with step "B".
	B. Cables 13 and Cables 14	TURN OFF POWER. Remove cables 13 and 14. Plug on new cables 13 and 14 from your maintenance kit. Turn on power. If problem is not solved, turn off power and replace original cables 13 and 14, and proceed with next step.
	C. Record switches not properly aligned	Visually inspect BASS record switches to insure that they are not TOO HIGH. If record switches are too high and are making contact even though keys are not depressed, lower bass end of key switch rail. (See key switch alignment procedure in installation manual).
	D. Bass record switch board	TURN OFF POWER. Replace bass record switch board with new bass record switch board from your DP-100 maintenance kit. Turn on power.
5. ALL notes in MIDDLE SECTION of piano record when NO KEYS are depressed.	A. Record logic board	TURN OFF POWER. Remove lower drop panel. Pull out interlock button to "locked-on" position. Remove all plugs from record logic board. Plug all cables onto new record logic board (out of piano) from your maintenance kit. USE EXTREME CAUTION NOT TO SHORT BOARD TO ANY METAL PARTS. Turn on power. If problem is

\*\*\*\*\* CAUTION \*\*\*\*\*

\*\*\*\*\* IMPORTANT \*\*\*\*\*

\*\*\*\*\* LETHAL HAZARD \*\*\*\*\*

WHEN SERVICING UNIT, MAKE SURE THAT POWER IS OFF AND WAIT 60 SECONDS BEFORE REMOVING PLUGS OR COMPONENTS. USE EXTREME CAUTION WHEN PERFORMING ALL TESTS OR ADJUSTING CONTROLS ON BOARDS WHEN POWER IS ON. THE GROUND FAULT INTERRUPTER UNIT SUPPLIED WITH EACH UNIT MUST BE INSTALLED BETWEEN THE PIANOCORDER SYSTEM AND THE AC MAINS POWER SOURCE. FAILURE TO HEED THIS PROCEDURE CAN RESULT IN DESTRUCTION OF THE UNIT AND WILL EXPOSE THE TECHNICIAN TO LETHAL SHOCK HAZARDS.

### SECTION THREE: THE RECORDING SYSTEM -- PART B: INDIVIDUAL NOTES OR GROUPS OF NOTES

SYMPTOM	POSSIBLE CAUSE	SOLUTION
5. All notes in MIDDLE SECTION of piano record when NO KEYS are depressed. (continued)	A. Record logic board (continued)	solved, replace record logic board in piano, if not proceed to "B".
	B. Cables 13 and cables 14	TURN OFF POWER. Remove cables 13 and 14. Plug on new cables 13 and 14 from your maintenance kit. Turn on power. If problem is not solved, turn off power and replace original cables 13 and 14.
	C. Record switches	Visually inspect middle record switches to insure that they are not too high. If record switches are too high and are making contact even though no keys are being depressed, lower middle portion of key switch rail. (See key switch alignment procedure in installation manual).
	D. Middle record switch board	TURN OFF POWER. Replace middle record switch board with new middle record switch board from your maintenance kit. Turn on power.
6. ALL NOTES in TREBLE SECTION of piano record when NO KEYS are depressed.	A. Record logic board	TURN OFF POWER. Remove lower drop panel. Pull out interlock button to "locked-on" position. Remove all plugs from record logic board. Plug all cables onto new record logic board (out of piano) from your maintenance kit. USE EXTREME CAUTION NOT TO SHORT BOARD TO ANY METAL PARTS. Turn on power. If problem is solved, replace record logic board in piano, if not continue with procedure.

\*\*\*\*\* CAUTION \*\*\*\*\*

\*\*\*\*\* IMPORTANT \*\*\*\*\*

\*\*\*\*\* LETHAL HAZARD \*\*\*\*\*

WHEN SERVICING UNIT, MAKE SURE THAT POWER IS OFF AND WAIT 60 SECONDS BEFORE REMOVING PLUGS OR COMPONENTS. USE EXTREME CAUTION WHEN PERFORMING ALL TESTS OR ADJUSTING CONTROLS ON BOARDS WHEN POWER IS ON. THE GROUND FAULT INTERRUPTER UNIT SUPPLIED WITH EACH UNIT MUST BE INSTALLED BETWEEN THE PIANOCORDER SYSTEM AND THE AC MAINS POWER SOURCE. FAILURE TO HEED THIS PROCEDURE CAN RESULT IN DESTRUCTION OF THE UNIT AND WILL EXPOSE THE TECHNICIAN TO LETHAL SHOCK HAZARDS.

### SECTION THREE: THE RECORDING SYSTEM -- PART B: INDIVIDUAL NOTES OR GROUPS OF NOTES

SYMPTOM	POSSIBLE CAUSE	SOLUTION
6. ALL NOTES in TREBLE SECTION of piano record when NO KEYS are depressed. (continued)	B. Cables 13 and 14	TURN OFF POWER. Remove cables 13 and 14. Plug on new cables 13 and 14 from your maintenance kit. Turn on power. If problem IS NOT solved, replace original cables 13 and 14, and continue. If problem IS solved replace 13 and 14.
	C. Record switches	Visually inspect treble record switches to insure that they are not too high. If record switches are too high and are making contact when no keys are manually depressed, lower treble end of key switch rail. (See key switch alignment procedure in installation manual).
	D. Treble record switch board	TURN OFF POWER. Remove cables 13 and 14 from treble record switch board in piano and plug onto new treble record switch board from your maintenance kit out of piano. Make sure PC board does not come into contact with metal which may cause a short and damage the unit. Turn on power. If problem is solved, replace original treble record switch board in piano.
7. ALL notes record when NO KEYS ARE DEPRESSED. Plays pre-recorded tapes OK.	A. Record logic board	TURN OFF POWER. Remove lower frame. Pull out inter-lock button to locked-on position. Remove all plugs from record logic board. Plug all cables onto new record logic board (out of piano) from your maintenance kit. USE EXTREME CAUTION NOT TO SHORT BOARD TO ANY METAL PARTS. Turn on power. If problem is solved, replace record logic board in piano, if not, continue procedure.

\*\*\*\*\* CAUTION \*\*\*\*\*                      \*\*\*\*\* IMPORTANT \*\*\*\*\*                      \*\*\*\*\* LETHAL HAZARD \*\*\*\*\*

WHEN SERVICING UNIT, MAKE SURE THAT POWER IS OFF AND WAIT 60 SECONDS BEFORE REMOVING PLUGS OR COMPONENTS. USE EXTREME CAUTION WHEN PERFORMING ALL TESTS OR ADJUSTING CONTROLS ON BOARDS WHEN POWER IS ON. THE GROUND FAULT INTERRUPTER UNIT SUPPLIED WITH EACH UNIT MUST BE INSTALLED BETWEEN THE PIANOCORDER SYSTEM AND THE AC MAINS POWER SOURCE. FAILURE TO HEED THIS PROCEDURE CAN RESULT IN DESTRUCTION OF THE UNIT AND WILL EXPOSE THE TECHNICIAN TO LETHAL SHOCK HAZARDS.

SECTION THREE: THE RECORDING SYSTEM -- PART B: INDIVIDUAL NOTES OR GROUPS OF NOTES

SYMPTOM	POSSIBLE CAUSE	SOLUTION
7. ALL notes record when NO KEYS ARE DEPRESSED. Plays pre-recorded tapes OK. (continued)	B. Cables 13 and 14	TURN OFF POWER. Remove cables 13 and 14. Plug on new cables 13 and 14 from your maintenance kit. Turn on power. If problem is not solved, replace original cables 13 and 14, and continue.
	C. Record switches	Visually inspect record switches to insure that they are ALL NOT TOO HIGH. If record switches are too high and are making contact even though no keys are being depressed, lower entire key switch rail. (See key switch alignment procedure in installation manual).
	D. Record switch boards	TURN OFF POWER. Remove cables 13 and 14 from treble record switch board in piano and plug onto new treble record switch board from your maintenance kit out of piano. MAKE SURE PC BOARD DOES NOT COME INTO CONTACT WITH METAL WHICH MAY CAUSE A SHORT AND DAMAGE THE UNIT. Turn on power. If problem is solved, replace original treble record switch board in piano.
8. Unit does not record fast performances but plays pre-recorded tapes OK - or misses notes.	A. Key board switches	When a pianist plays fast passages, keys are sometimes not pushed down as far as when a pianist plays slow passages. If too many notes are skipped in a fast performance, key record switches may be raised to suit the individual performer. (See key record switch alignment section of installation manual for proper procedure).



\*\*\*\*\* CAUTION \*\*\*\*\*

\*\*\*\*\* IMPORTANT \*\*\*\*\*

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### SECTION THREE: THE RECORDING SYSTEM -- PART B: INDIVIDUAL NOTES OR GROUPS OF NOTES

SYMPTOM	POSSIBLE CAUSE	SOLUTION
9. Unit does not record trills. Plays pre-recorded trills OK.	A. Key record switches	When a pianist plays trills, keys are not pushed down very far. If both keys in a trill (locally recorded) move but the hammers of the keys recorded do not hit the strings, the key record switches must be raised. (See key record switch alignment section of installation manual for proper procedure). If both keys in a trill (locally recorded) stay down during the trill, the key record switches must be lowered. (See key record switch alignment section of installation manual for proper procedure).
10. Unit records 2 or more notes when one key is depressed. Test tape plays OK.	A. Key switch adjustment	TURN OFF POWER. Remove lower frame. Pull out interlock button to "locked-on" position. Replace cable 10 of test box. Turn on power. Switch test box to record mode (switch to play) manually depress KEYS ON PIANO. Mark the keys that do not record properly. Remove those keys and visually inspect key switches and key switch board to insure that depressing one key switch does not cause two switches to make contact or that individual switches are not adjusted properly. If adjustment of switches does not solve the problem proceed to step B, C, or D for problems on bass, middle or treble switches respectively.
	B. Bass record switch board	If no problem is found in step A, TURN OFF POWER and replace bass record switch section with new section from your maintenance kit. If problem is not solved, go to steps E and F.

\*\*\*\*\* CAUTION \*\*\*\*\*                      \*\*\*\*\* IMPORTANT \*\*\*\*\*                      \*\*\*\*\* LETHAL HAZARD \*\*\*\*\*

WHEN SERVICING UNIT, MAKE SURE THAT POWER IS OFF AND WAIT 60 SECONDS BEFORE REMOVING PLUGS OR COMPONENTS. USE EXTREME CAUTION WHEN PERFORMING ALL TESTS OR ADJUSTING CONTROLS ON BOARDS WHEN POWER IS ON. THE GROUND FAULT INTERRUPTER UNIT SUPPLIED WITH EACH UNIT MUST BE INSTALLED BETWEEN THE PIANOCORDER SYSTEM AND THE AC MAINS POWER SOURCE. FAILURE TO HEED THIS PROCEDURE CAN RESULT IN DESTRUCTION OF THE UNIT AND WILL EXPOSE THE TECHNICIAN TO LETHAL SHOCK HAZARDS.

SECTION THREE: THE RECORDING SYSTEM — PART B: INDIVIDUAL NOTES OR GROUPS OF NOTES

SYMPTOM	POSSIBLE CAUSE	SOLUTION
10. Unit records 2 or more notes when one key is depressed. Test tape plays OK. (continued)	C. Middle record switch board	If no problem is found in step A, turn off power and replace middle record switch section with new section from your maintenance kit. If problem is not solved go to steps E and F.
	D. Treble record switch board	If no problem is found in step A, turn off power and replace treble record switch section with new section from your maintenance kit. If problem is not solved, go to steps E and F.
	E. Cables 13 and 14	TURN OFF POWER. Remove cables 13 and 14. Plug on new cables 13 and 14 from your maintenance kit. Turn on power. If problem is not solved, replace original cables 13 and 14.
	F. Record logic board	Turn off power. Remove all cables from record logic board in piano. Plug all cables onto new record logic board (out of piano) from your maintenance kit. Make sure record logic board out of piano does not come into contact with metal which may cause a short and damage the unit. Turn on power. If problem is solved, replace record logic board in piano.
11. Unit records notes that did not sound.	A. Key switches	If key switch rail is adjusted too high and the pianist accidentally pushes keys, the accidental notes will record because the switches are actuated. (See installation manual for key switch alignment).

\*\*\*\*\* CAUTION \*\*\*\*\*

\*\*\*\*\* IMPORTANT \*\*\*\*\*

\*\*\*\*\* LETHAL HAZARD \*\*\*\*\*

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SECTION THREE: THE RECORDING SYSTEM -- PART B: INDIVIDUAL NOTES OR GROUPS OF NOTES

SYMPTOM	POSSIBLE CAUSE	SOLUTION
12. Soft and/or sustain pedals do not record playback and record of notes is OK - playback of pedals is also OK.	A. Pedal record switch adjustment	TURN OFF POWER. Remove lower drop panel. Pull out interlock button to "locked-on" position. Replace cable 10 on playback logic board with cable 10 of your test box. Turn on power. With test box in record mode (Switch in play) Physically push pedal switches so they make contact. See if pedal solenoids operate when switches contact. If solenoid(s) operate, adjust linkage between pedal and switch. (See pedal switch adjustments section of installation manual for proper procedure).
	B. Record logic board	TURN OFF POWER. Locate a new record logic board from your DP-100 maintenance kit. Unplug all cables from the record logic board in the piano. Plug all cables onto the new record logic board (outside of piano). MAKE SURE RECORD LOGIC BOARD OUT OF PIANO DOES NOT COME INTO CONTACT WITH METAL WHICH MAY CAUSE A SHORT AND DAMAGE THE BOARD. Turn on power. With test box in record mode (switch in play), and with test box plugged into playback logic board, manually depress pedal record switches. If solenoids operate, turn off power and replace record logic board in piano.

\*\*\*\*\* CAUTION \*\*\*\*\*

\*\*\*\*\* IMPORTANT \*\*\*\*\*

\*\*\*\*\* LETHAL HAZARD \*\*\*\*\*

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### SECTION THREE: THE RECORDING SYSTEM -- PART C: EXPRESSION

SYMPTOM	POSSIBLE CAUSE	SOLUTION
1. All notes record with NO EXPRESSION	A. Defective record board	TURN OFF POWER, wait one minute, disconnect all cables from suspect board and connect to known good record board. Apply power and retest.
2. Bass or treble records with some expression	A. Bass & treble record intensity controls require adjustment	Consult installation manual for proper alignment procedure. If alignment is not sufficient, proceed to step "B".
3. Bass and/or treble expression is erratic, does not follow performance	B. Record board A. Defective record board or alignment	Proceed as in step A, symptom no. 1, part C, section 3. Proceed as in symptom no. 2 above,

PIANOCORDER<sub>tm</sub> REPRODUCING SYSTEM  
SPECIAL TROUBLE SHOOTING APPARATUS

The DP 100 PIANOCORDER<sub>tm</sub> Reproducing System servicing kit includes three special trouble shooting devices. Use and operation of the three fixtures is described below.

While the test procedures are simple, the following safety precautions should be taken:

- A. Remove watch, rings and other metallic objects prior to working on the PIANOCORDER<sub>tm</sub> system.
- B. Use only one hand, if possible, while testing high voltage section of the unit. Keep the other hand outside the unit.
- C. Wear insulated shoes and be sure that the work surface (floor) is completely dry, and if possible the floor should have a rubber mat to further insulate the technician from this surface.

TEST KIT CONTENTS

- 1. AC TEST LAMP (Figure A-1) Lights when connected to a voltage source more than 90 volts DC. Use it to test the presence or absence of the high voltage (180 volts DC) and line voltage (110 volts AC).

PROCEDURE

Connect the test fixture to points noted in trouble-shooting guide when instructed by the procedure. USE CAUTION NOT TO SHORT test lamp connectors to each other while using, and use

PROCEDURE (continued)

CAUTION NOT TO SHORT PARTS OF THE PIANOCORDER and system together. Lamp will light when:

- A) More than 90 volts DC is present
- B) 110 volts AC is present

2. SHORT TEST INDICATOR CABLE ASSEMBLY (Figure A-2) used in high voltage line

INSTALLATION AND USE

1. Turn power off and wait one minute.
2. Remove drop panel and expose PIANOCORDER system.
3. Remove cable 4 from power supply (connector J2)
4. Install short test cable to power supply and the free end of cable 4. (Fits one way only)

TO TEST:

Turn power on. Lamp should not be lit.

NOTE: If even dimly lit, the indication is that a fault is present in the 180 volt DC line. This problem must be corrected prior to further testing or operation.

**\*\*** See Section 1 of trouble shooting guide for detailed explanation of this apparatus.

3. TEST BOX - (Figure A-3) Use to service unit in record and playback modes.

PLAYBACK MODE FUNCTION: To monitor the operation of expression circuits on the playback board.

PROCEDURE: Connect the 2 test point plugs to the playback board with the POWER OFF. (See installation procedure for diagram). Turn power on and play a pre-recorded tape.

### PLAYBACK MODE FUNCTION (continued)

The test box will display the expression level transmitted to the solenoid driver boards ONLY while actually playing. At other times, it will have a random display.

- A. The center switch (of the 3 upper switches) selects bass or treble readings for meter display.
- B. Meter adjust control is provided to set the meter to "0" when no expression is present. (The procedure for this set-up is covered in the installation procedure).

RECORD MODE FUNCTION: In this mode the test box assembly is used to replace the tape recorder for trouble shooting and for alignment of the record circuit and key switches. It also enables the technician to monitor expression values as it is being generated by the record card and associated circuitry.

PROCEDURE: WITH THE POWER OFF, connect the 12 pin connector plug to the logic card after removing cable 10 (cable to tape recorder from logic card). Place mode switch in STANDBY, meter switch in BASS, soft pedal off, fortissimo control in 3 o'clock position, and pianissimo control in 9 o'clock position. Turn on power and observe display on test box. You will observe both sync and + 12 volt pilot lamp are on. (if not see trouble shooting procedure for repair of system.) By placing the mode switch into the PLAY position you are feeding signals from the record circuit into the playback circuits. This allows you to exactly set the point at which notes record (by depressing key until you feel solenoid come "on"), and also

RECORD MODE FUNCTION: (continued)

to quickly check the function of these circuits. You will note that the sync light should GO OUT when the mode is switched to play. NOTES WILL HOLD "ON" during this test and they SHOULD NOT BE ALLOWED to remain depressed for any great length of time as DAMAGE TO THE KEY SOLENOID could result. To release held notes, put switch to standby or manually lift key to break switch contact. You can also test operation of pedal solenoids by moving the individual pedal switches to actuate the pedals. The soft pedal operation can also be tested from the test box by means of the SOFT PEDAL switch. Note: Use caution when actuating this switch on some pianos the hammers will be thrown forward enough so that the back checks will depress the keys and switch on notes which will be held on. If this occurs, go to STANDBY on the mode switch. Meter calibration is performed in playback system alignment and DOES NOT have to be performed EACH time the box is used. The record expression alignment and balance is checked by actuating the keys manually by playing a trill on both bass and treble sections and observing the meter deflection (switch to BOTH bass and treble), while increasing and decreasing the force with which you play. A pianissimo trill should JUST cause meter to start to deflect from its minimum value (.4 to .5) and then go to full deflection as the force is increased. Balance is set by using equal force in your test playing and adjusting meter for equal readings on both bass and treble.



RECORD MODE FUNCTION: (continued)

NOTE: For proper playback of recorded tapes, you must MATCH volume or expression with pianissimo and fortissimo controls.

NOTE: SEE YOUR INSTALLATION MANUAL ALIGNMENT SECTION FOR FURTHER INFORMATION AND INSTRUCTION.

# HIGH VOLTAGE INDICATOR

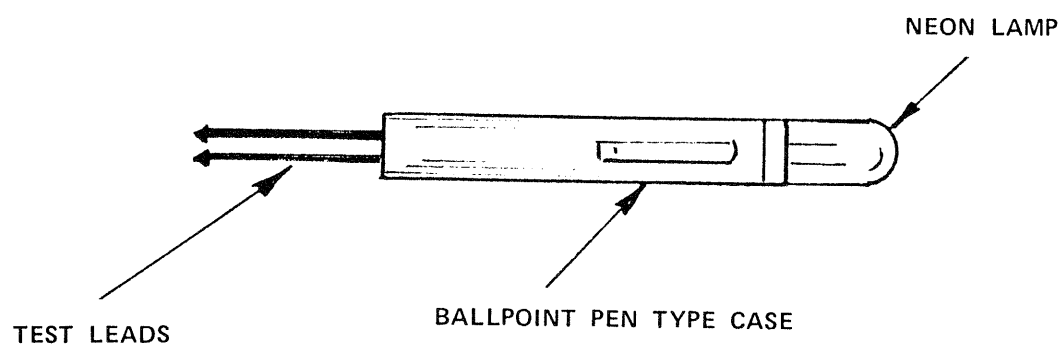


Figure A-1

# SHORT CABLE INDICATOR

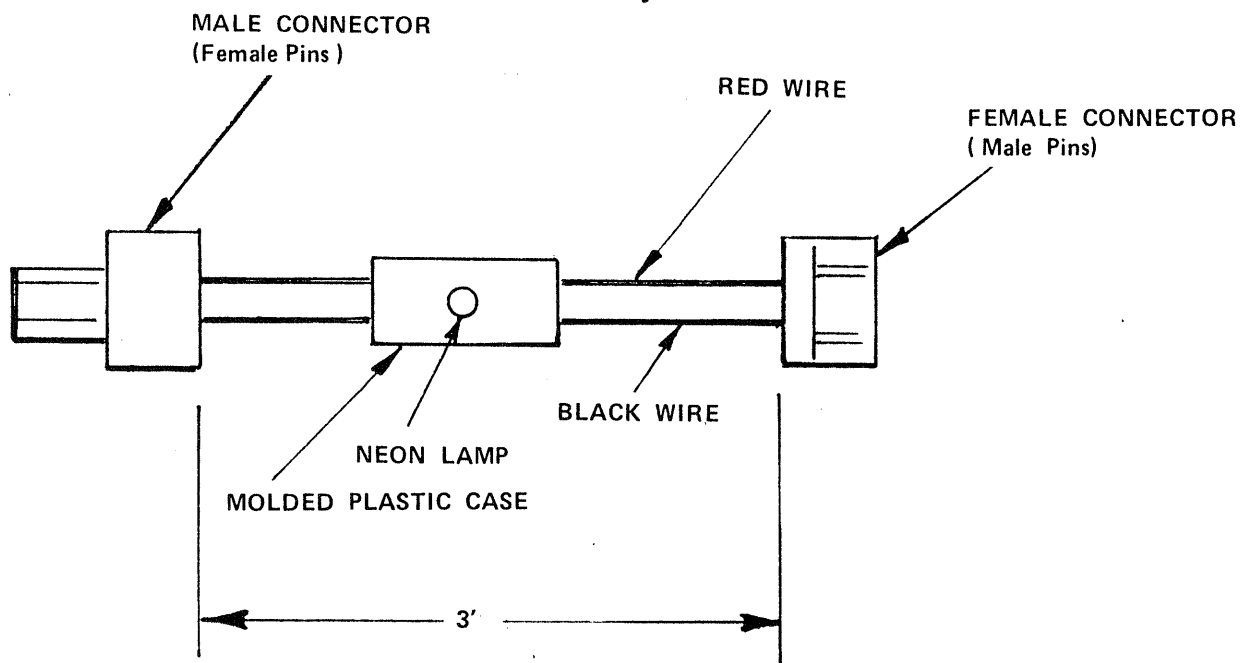


Figure A-2

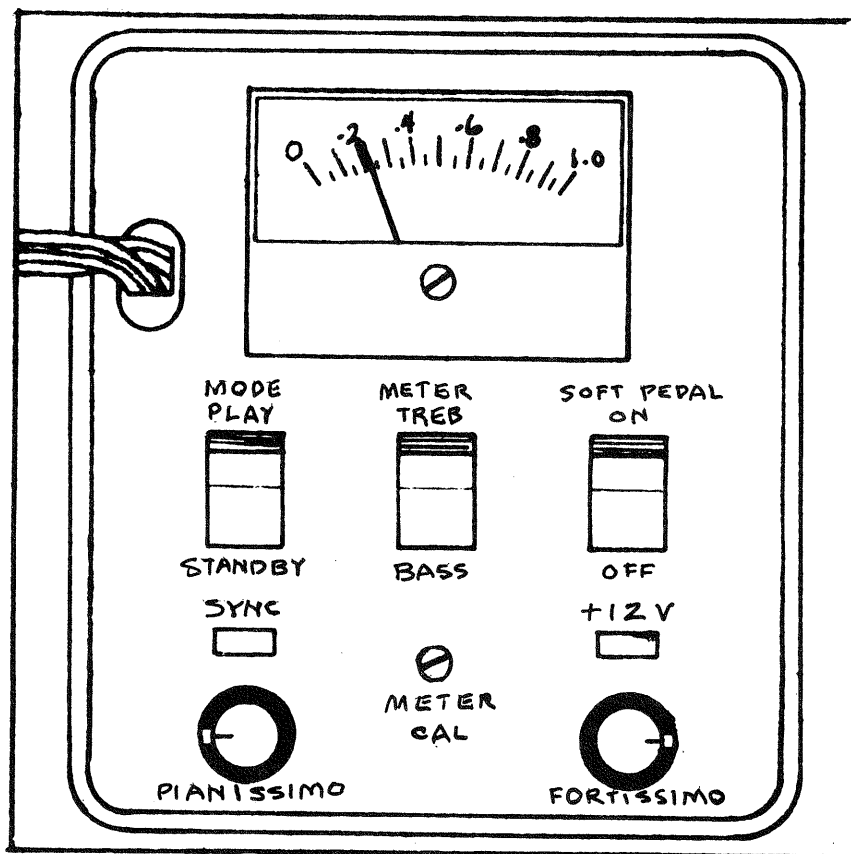


Figure A-3