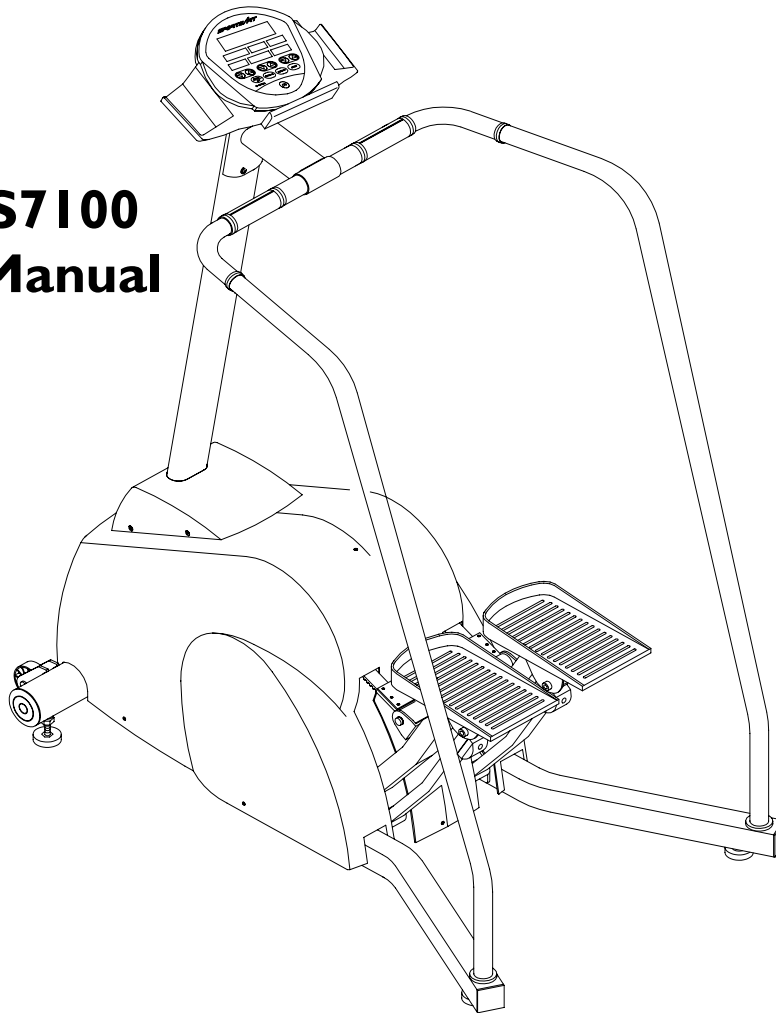


SportsArt 7100/S7100 Stepper Repair Manual



Version 1: 12-26-01
Version 2: 10-26-04

SportsArt 7100/S7100 Stepper Repair Manual - Introduction

The SportsArt 7100/S7100 Stepper Repair Manual was made to help technicians in the field. If you have suggestions or comments, please contact Bob Baumgartner by email at bob@sportsartamerica.com. Thank you!

Version 1: Dec. 26, 2001

Version 2: Oct. 26, 2004 – Updated to reflect changes in the S7100 stepper.

In the spring of 2004, the original 7100 stepper was updated. The display was changed and the product name became S7100. Even though some operational steps may differ due to the display change, product functions are basically the same, and troubleshooting techniques are the same. In this manual, notes were included to indicate places where the 7100 and S7100 differ. In general, for troubleshooting purposes, 7100 and S7100 are the same.

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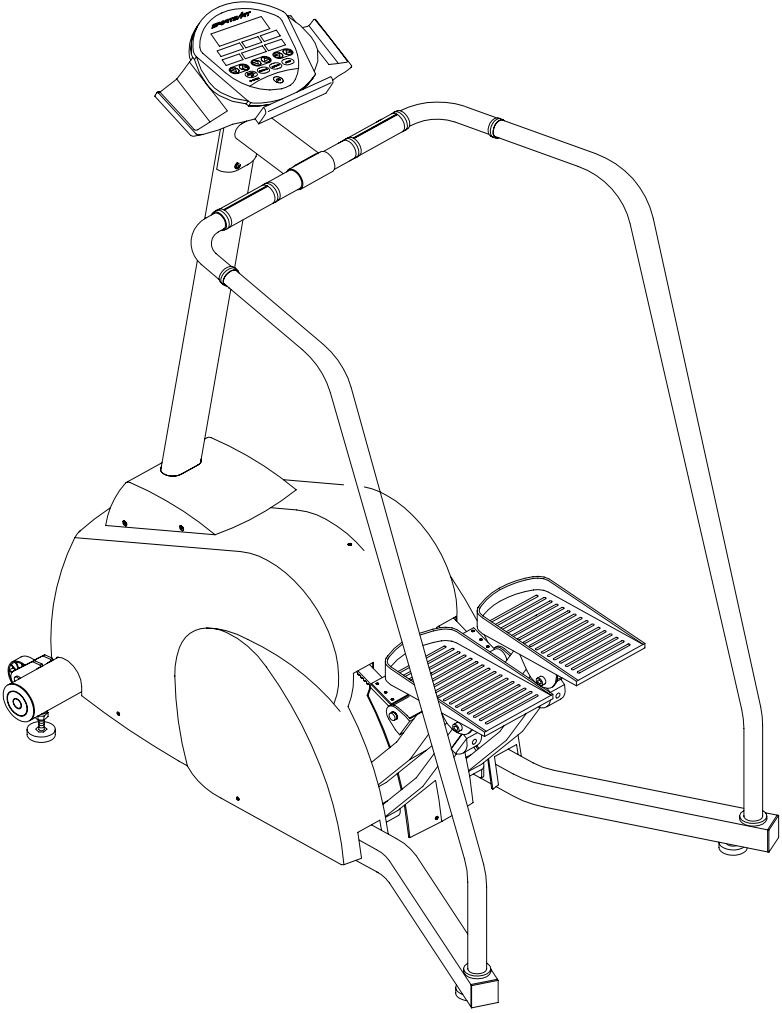
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Chapter I. 7100/S7100 Stepper Basic Illustrations

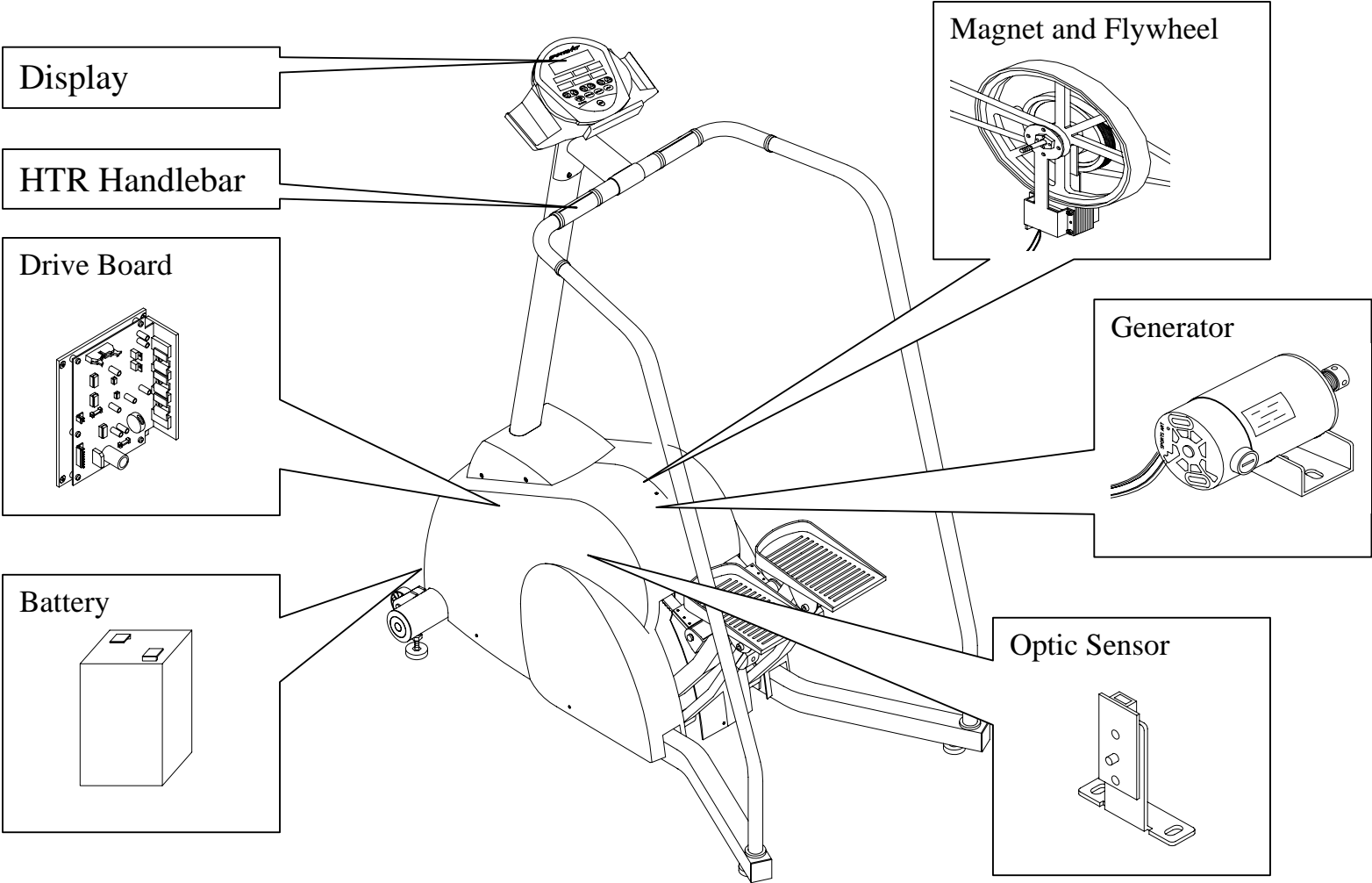
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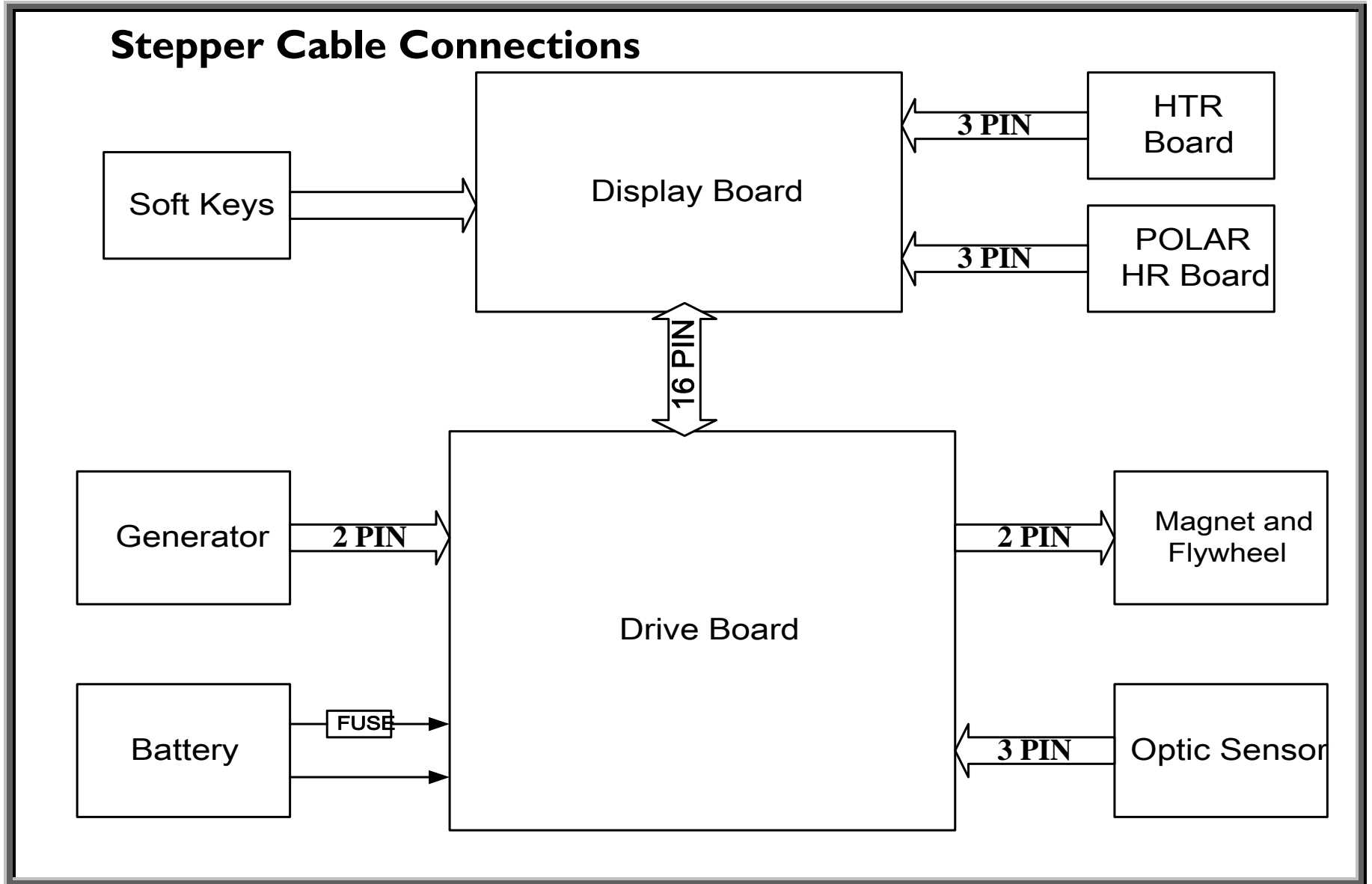
Stepper Illustration (Assembled Unit)



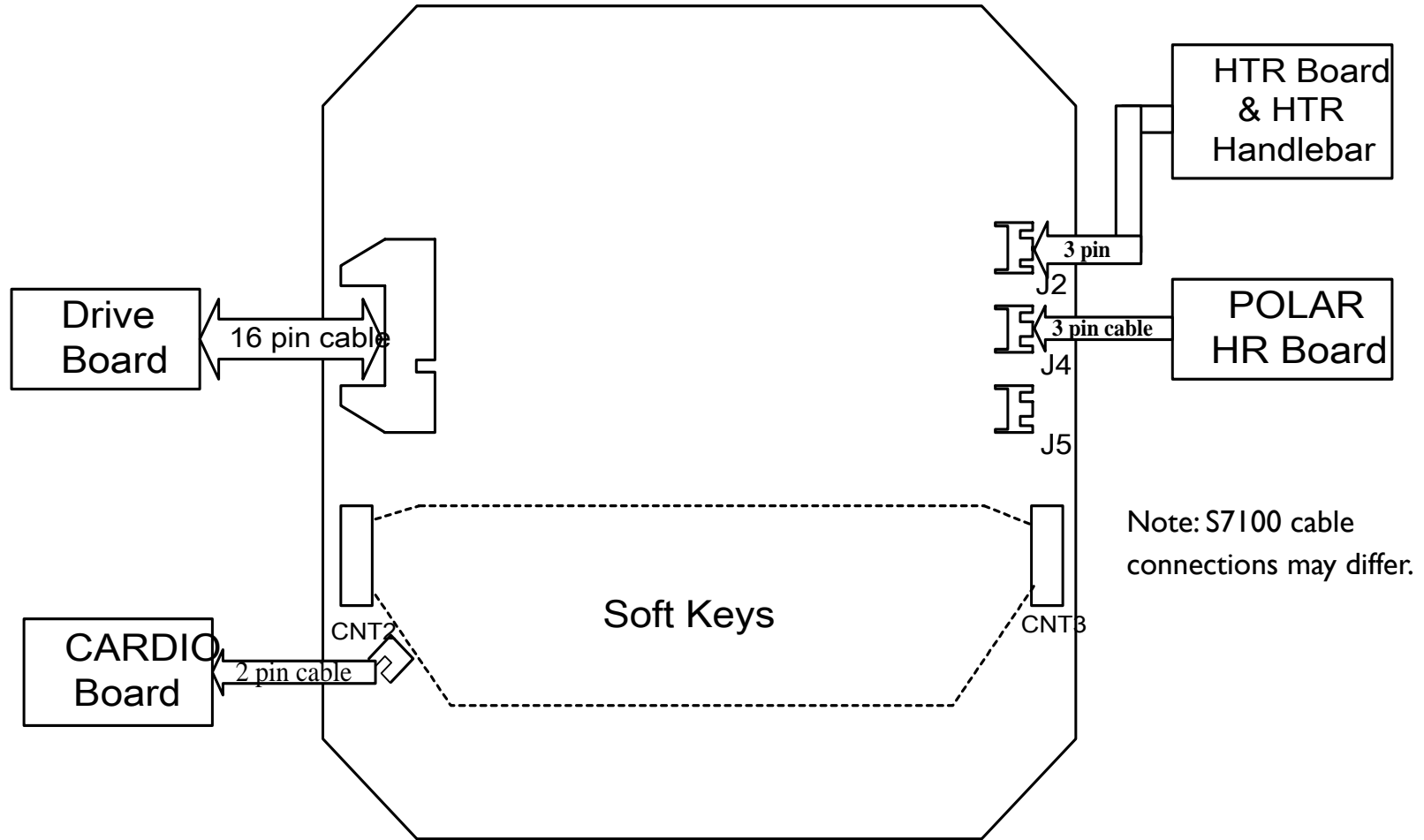
Note: The original 7100 stepper is shown. The display on S7100 is different.

Stepper Electronic Component Locations

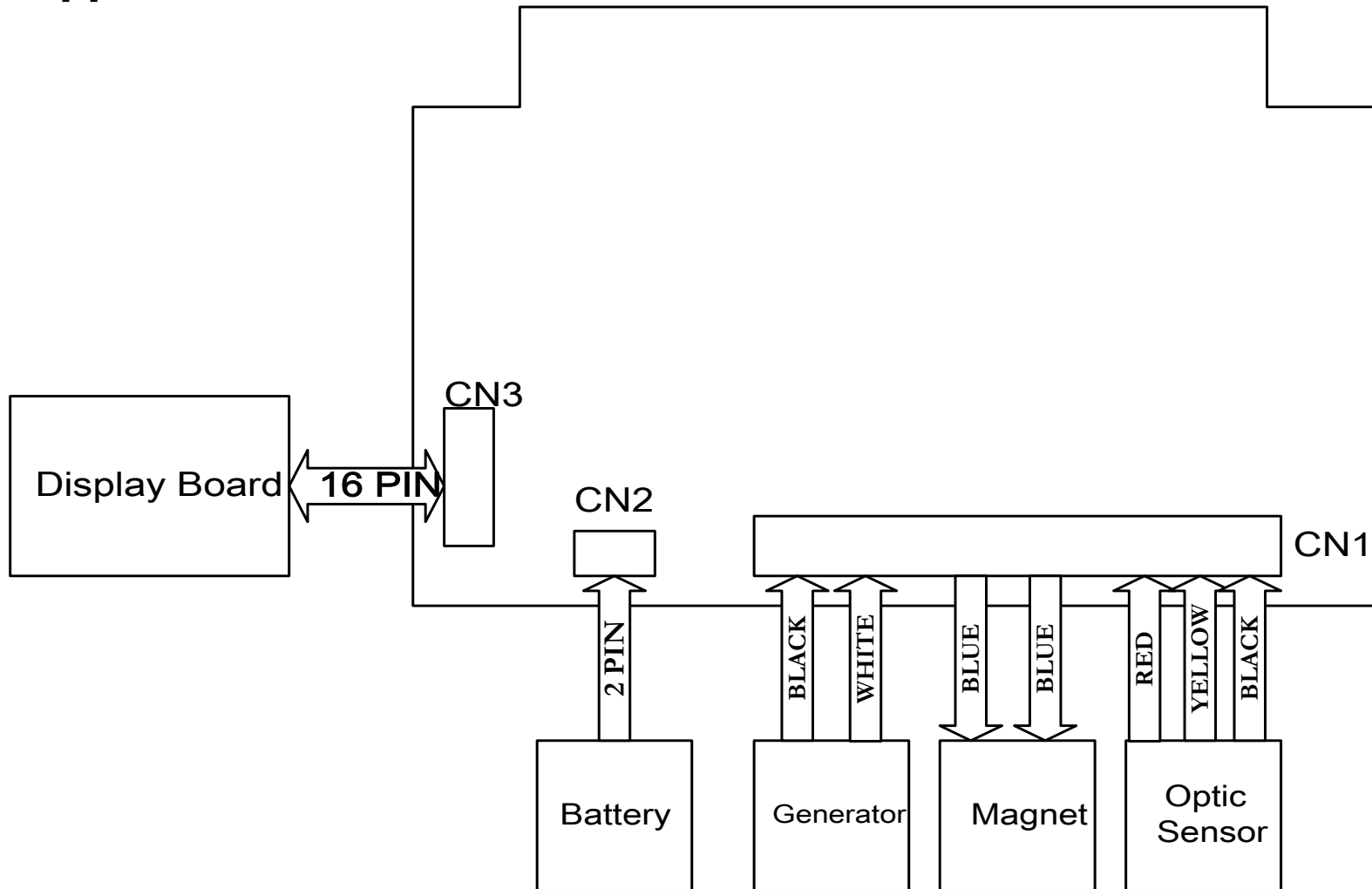




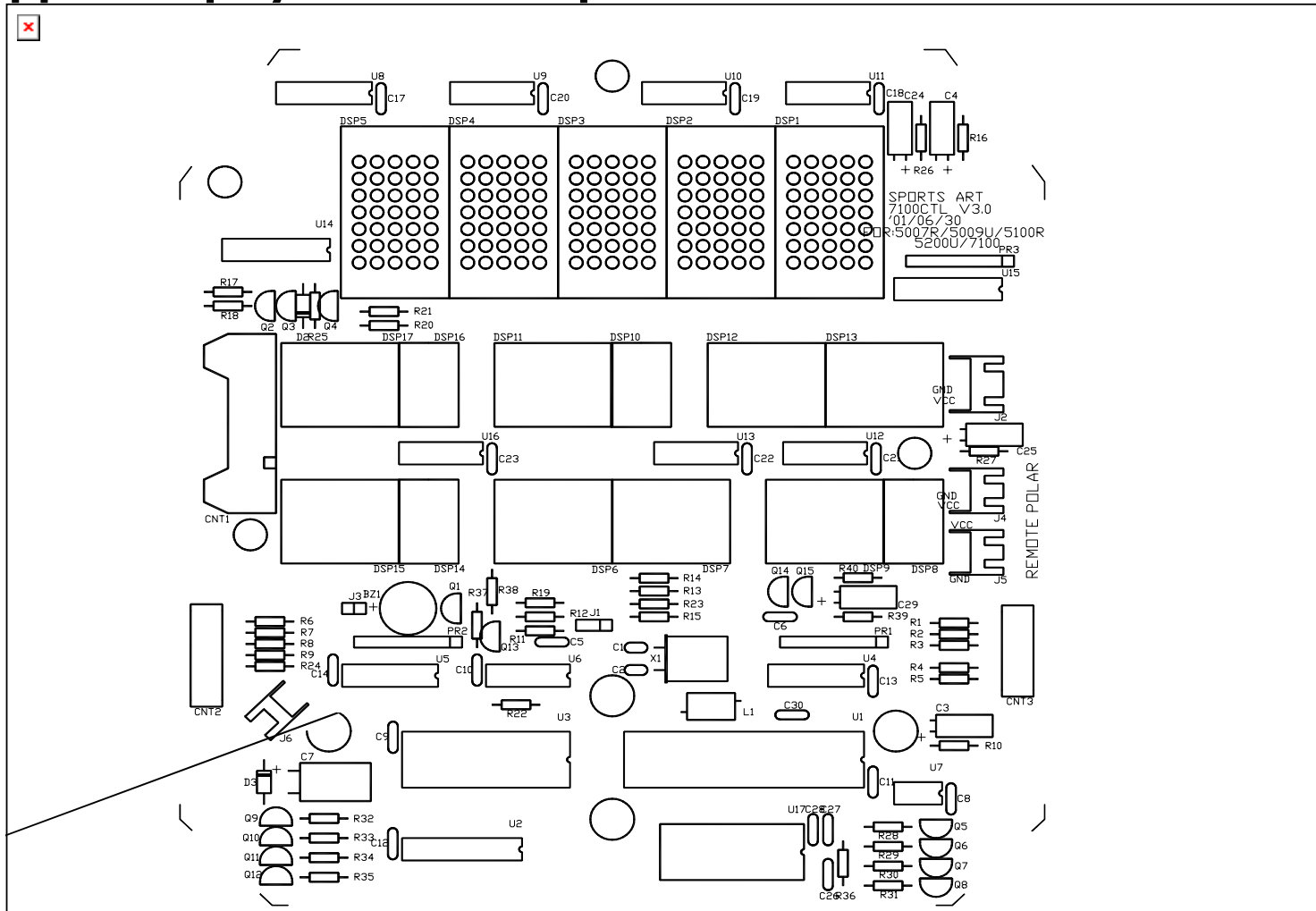
Stepper Display Board Cable Connections



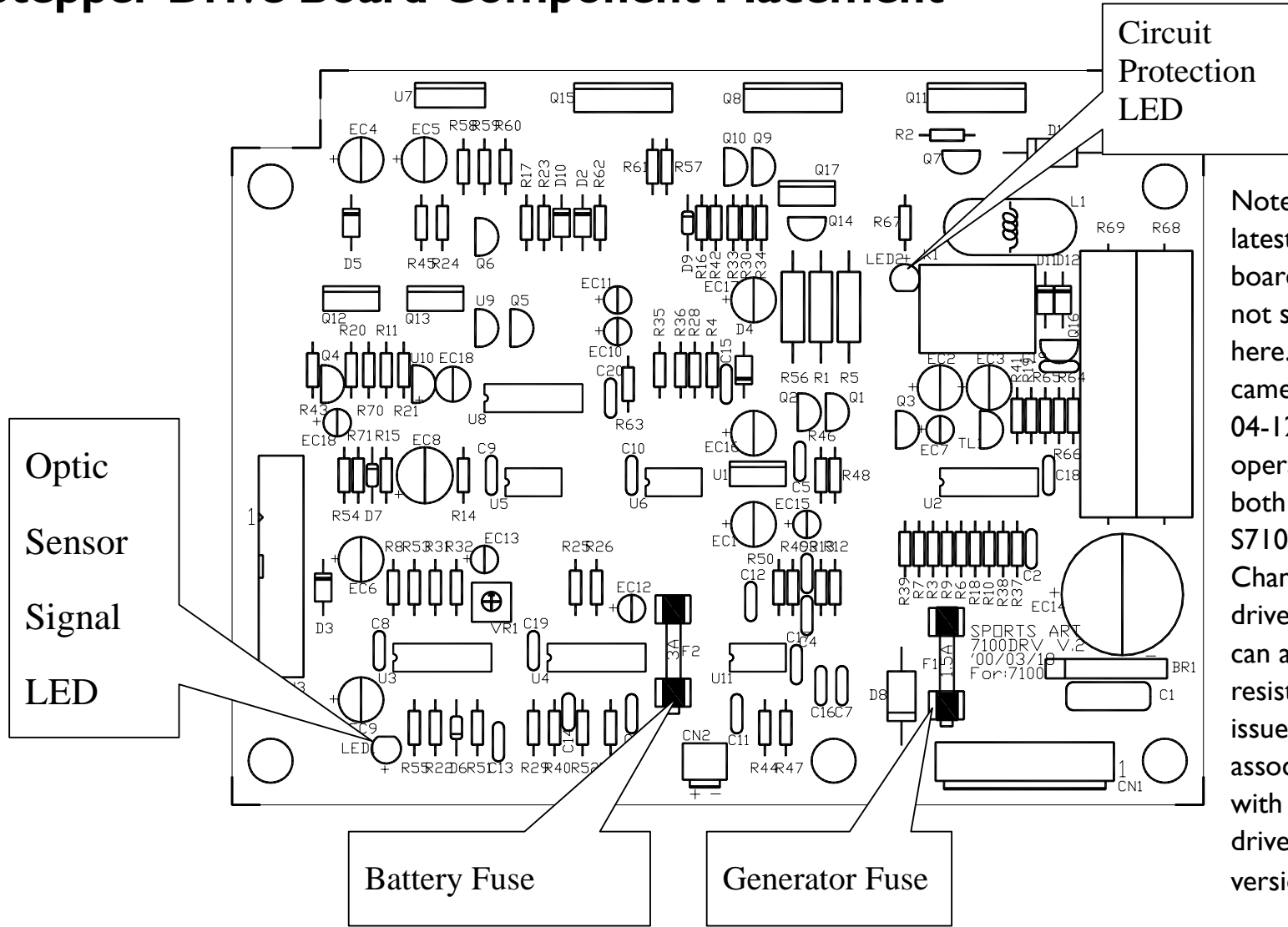
Stepper Drive Board Cable Connections



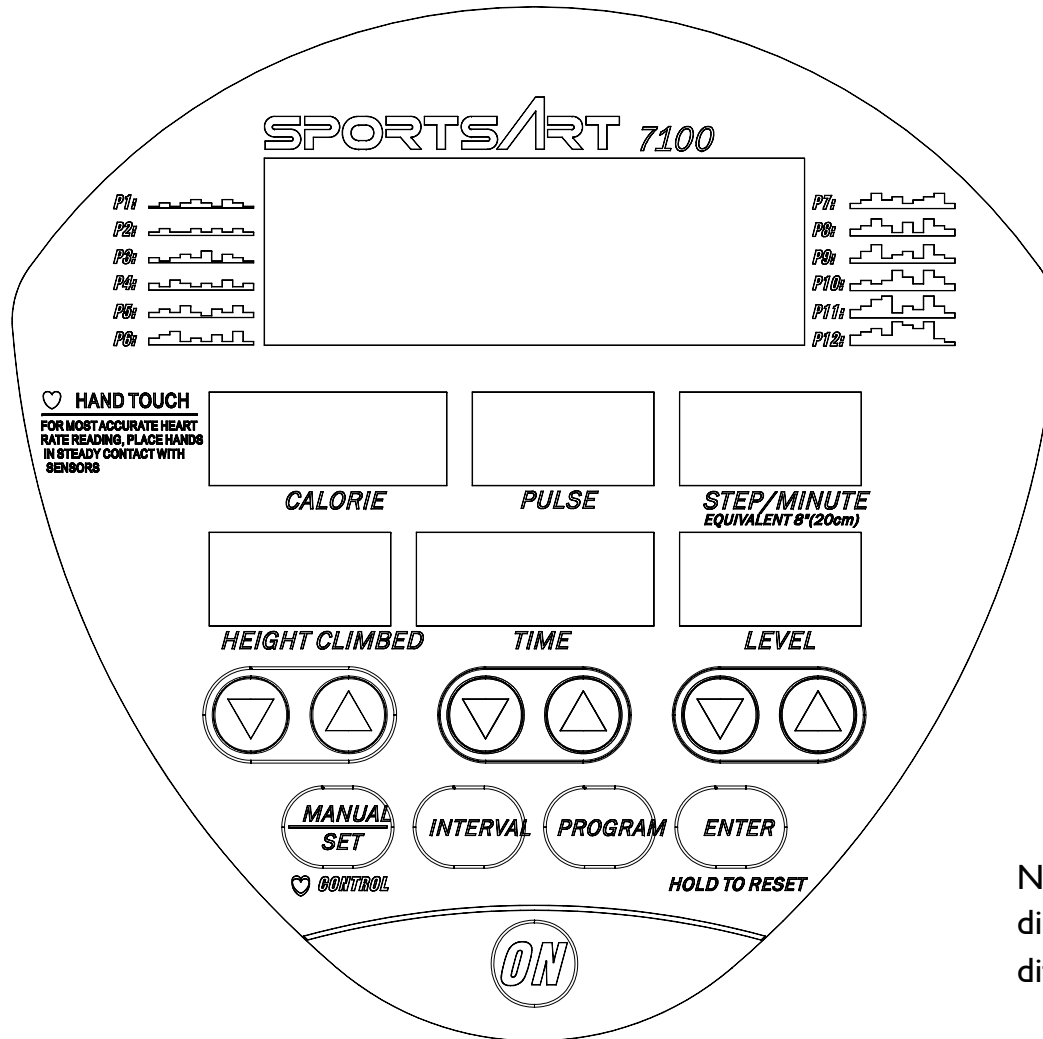
Stepper Display Board Component Placement



Stepper Drive Board Component Placement



7100 Stepper Display Overlay



Note: The S7100 display overlay is different.

Chapter 2. Stepper Operation

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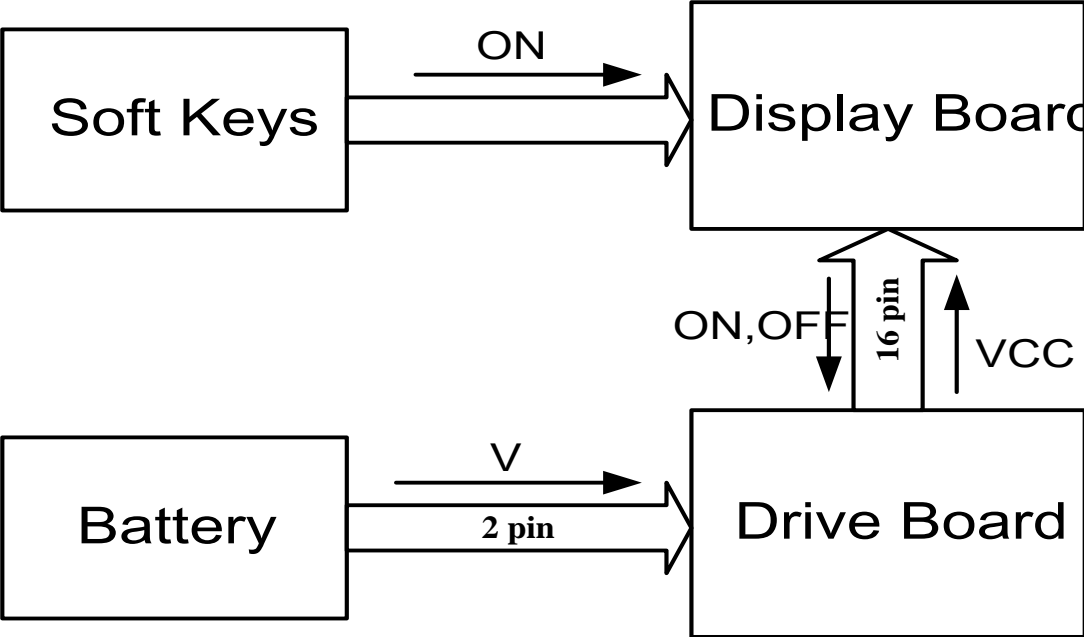
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Stepper Battery Operation

I. Configuration



SportsArt 7100/S7100 Stepper Repair Manual – Operation

2. Battery Operation

Order	Component	Operation
1	Battery	1. When no one is exercising on the stepper, the battery provides the drive board with power, allowing the display to light.
2	Soft Keys	1. If the unit has yet to be turned on, pressing the “ON” key results in a signal that prompts the drive board into action.
3	Display Board	1. When the “ON” key is pressed, the display board sends the “ON” signal to the drive board.
4	Drive Board	1. The “ON” signal prompts the battery to emit voltage to the drive board. 2. After stabilizing the voltage, the drive board provides voltage to the display board.
5	Display Board	1. After the display board receives voltage, 2. The display beeps once, and the main (LED) window lights and smaller windows show figures.

3. Procedure

Steps	Operation
1	The display doesn't light up.
2	Press <ON> key.
3	1. Display “beeps” once and the LED window shows “MAN'L”. 2. 8-segment LCD windows show “0000”.

SportsArt 7100/S7100 Stepper Repair Manual – Operation

Battery Switch Operation

I. Battery Switch Operation

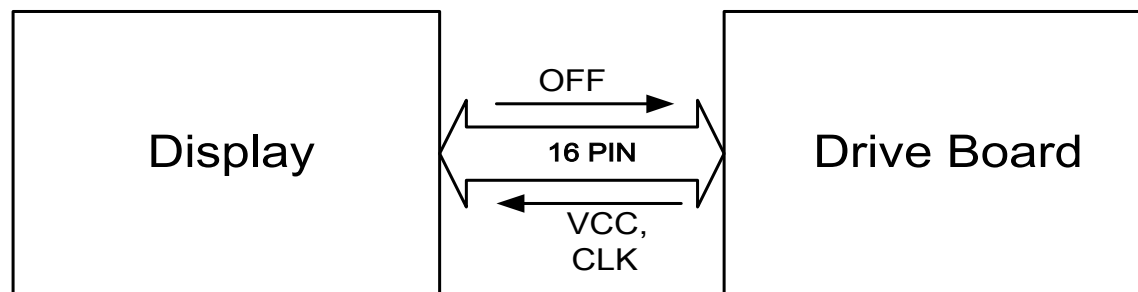
Order	Component	Operation
1	Soft key	1. Press TIME<▼>+LEVEL<▼> to turn off the battery.
2	Display board	1. Display CPU reads the soft key OFF signal. 2. The CPU sends an OFF signal to the drive board.
3	16-PIN cable	1. The display board OFF signal travels the drive board.
4	Drive board	1. After the drive board receives the OFF signal, the battery voltage turns off. 2. The drive board sends no voltage to the display board.
5	Display board	1. The display board doesn't receive any voltage from the drive board. 2. The display shuts off; nothing lights on the display.

2. Operational Procedure

Step	Operation
1	When the display turns on, it lights up.
2	When no one is exercising on the stepper,
3	Simultaneously pressing TIME<▼>+LEVEL<▼> keys,
4	The display shuts down; all windows become dark.

Battery Off Action – Automatic Shut Off

1. Configuration



2. Operation

Order	Part	Operation
1	Display	1. The display board reads the optic sensor signal to distinguish whether the unit is being used. 2. If there's no optic sensor signal, the CPU sends the OFF signal within two minutes.
2	16-pin Cable	1. The display board OFF signal travels the 16-pin cable to the drive board.
3	Drive Board	1. After receiving the display board OFF signal, the drive board stops sending voltage to the display. Display circuit voltage is named VCC. 2. No VCC voltage is sent to the display board.
4	Display	1. The display board doesn't receive the any voltage from the drive board. 2. The display board shuts off; Nothing lights up on the display.

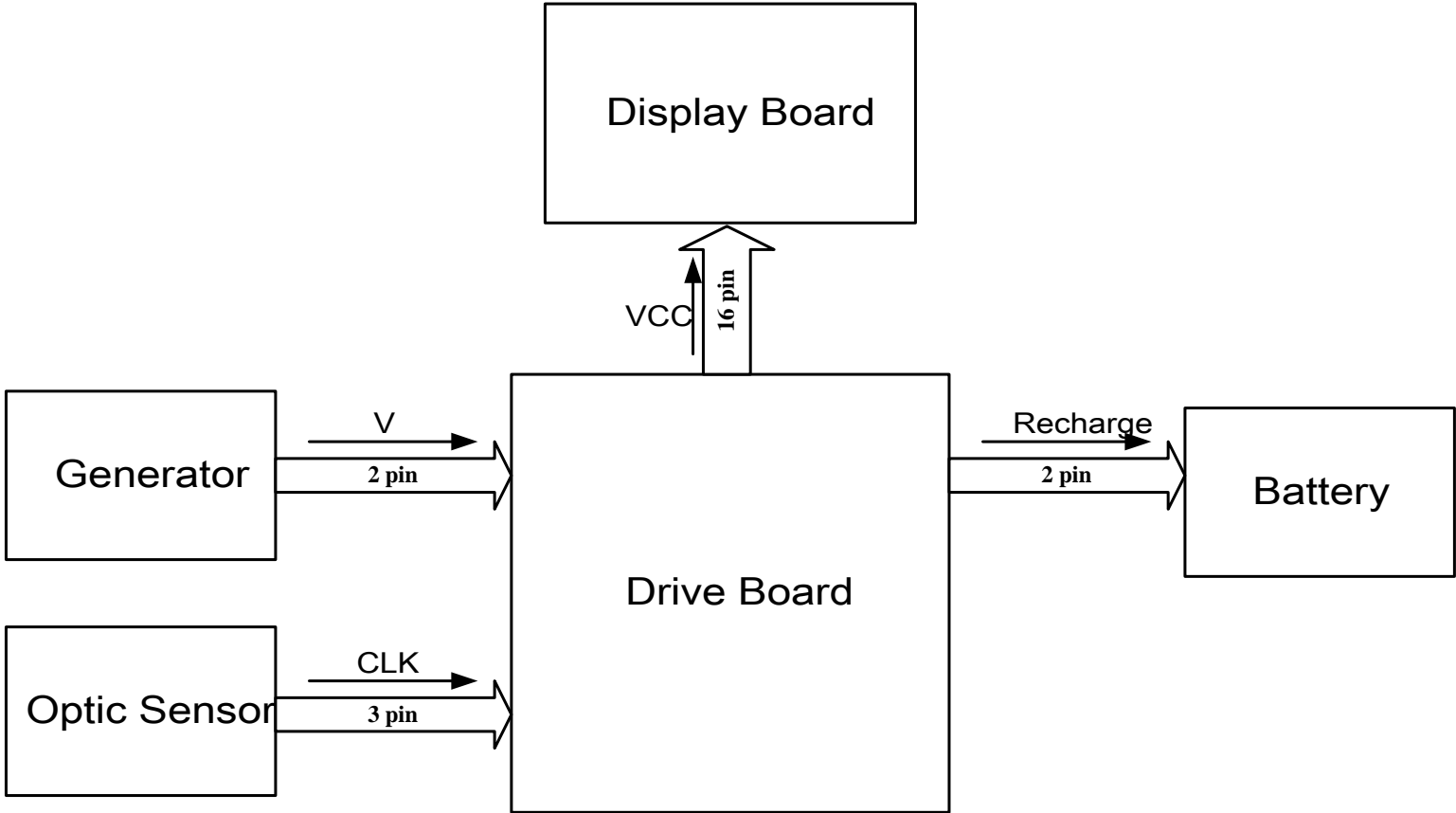
SportsArt 7100/S7100 Stepper Repair Manual – Operation

3. Procedure

Step	Operation
1	The display lights up normally.
2	When no one is exercising on the machine, the display TIME window value doesn't change.
3	After two minutes, the display turns off; display lights extinguish.

Stepper Generator Operation

I. Configuration



SportsArt 7100/S7100 Stepper Repair Manual – Operation

2. Operation

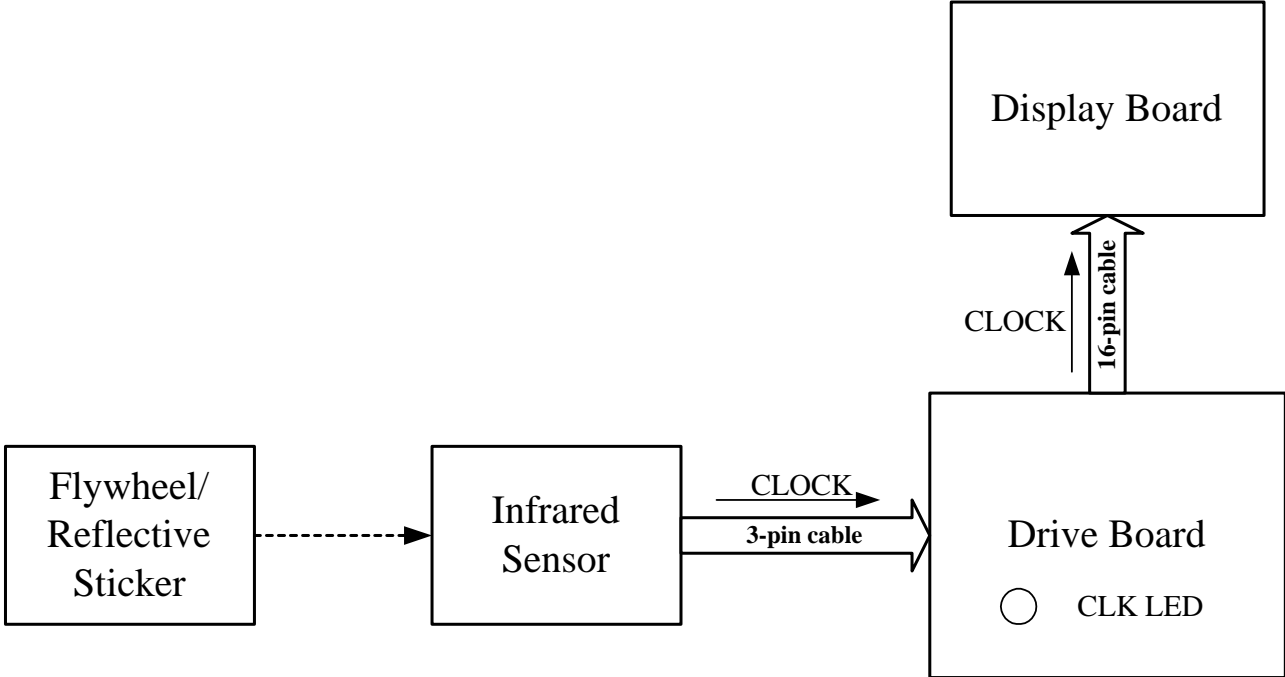
Order	Part	Operation
1	Generator	1. Exercise on the unit; Flywheel movement causes generator action. 2. The generator generates and sends voltage to the drive board.
2	Optic Sensor	1. When someone moves the footpads, the flywheel moves in turn. 2. The optic sensor detects the tachometer sticker speed signal.
3	Drive Board	1. The drive board processes generator voltage, making VCC voltage for the display. 2. The drive board detects the existence of the optic sensor signal. 3. If there is an optic sensor signal, the drive board VCC circuit voltage is sent to the display board.
4	Display Board	1. The drive board provides VCC voltage, making the display board operate. 2. Once the display board receives voltage, display windows and LCD window values appear.
5	Battery	1. Drive board provides voltage to recharge the battery.

3. Procedure

Steps	Operation
1	Display doesn't light.
2	Start exercising on the unit.
3	Display "beeps" once; the main (LED) window shows "MAN'L"; smaller LCD windows show "0".

Stepper Optic Sensor Signal Flow Chart

I. Configuration



SportsArt 7100/S7100 Stepper Repair Manual – Operation

2. Operation

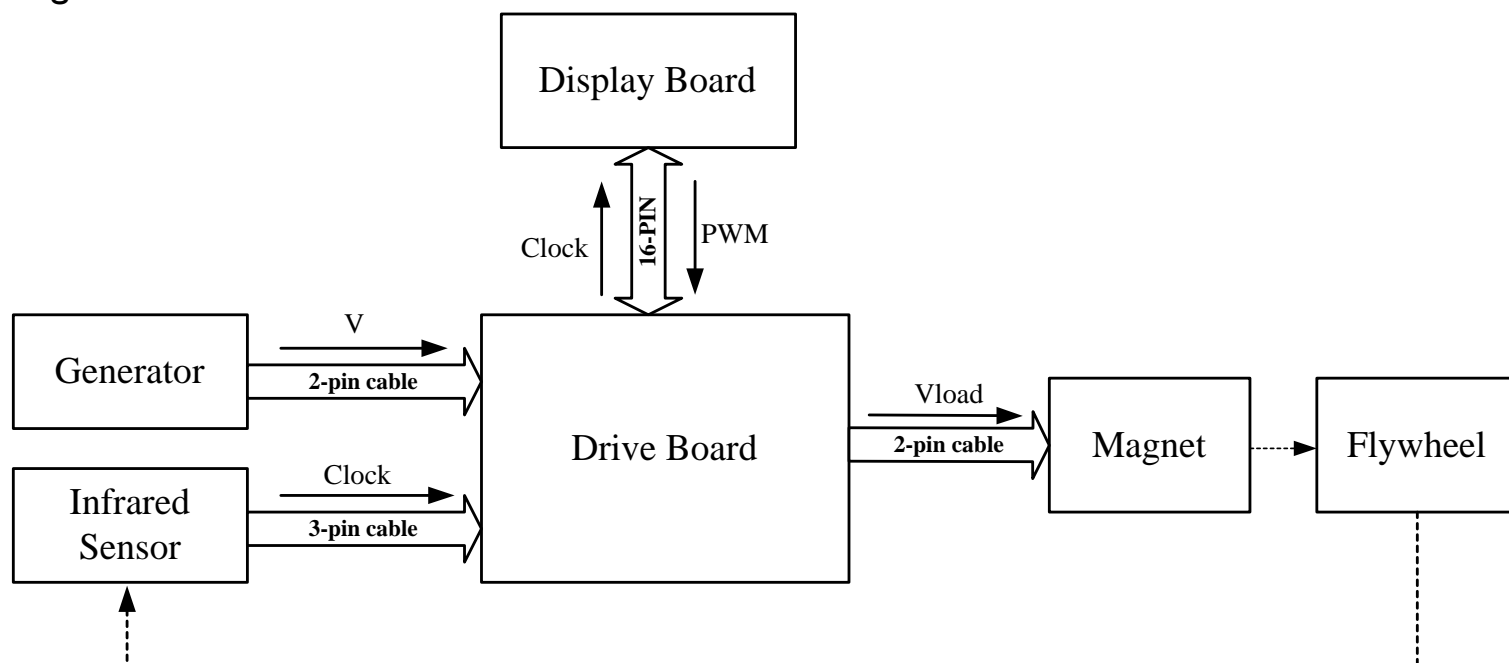
Step	Part	Operation
1	Flywheel	Exercise on the stepper. The optic sensor sticker moves as the flywheel moves.
2	Infrared Optic Sensor	1. The infrared sensor emits a signal to the reflective sticker, detecting the speed with which the flywheel moves.
3	Drive Board	1. After processing the infrared optic sensor signal, the CLK indicator on the drive board lights. 2. The drive board CLK indicator lights, extinguishes, lights, extinguishes, or seems to remain lit (at higher speeds).
4	Display Board	1. The CPU reads the optic sensor signal. 2. If there is a CLK value, the time window will show the count of time in use.

3. Procedure

Step	Operation
1	Exercise on the stepper. The display beeps and operates. The display shows "MAN'L".
	Don't exercise on the stepper. The display shows "STEP TO START".
2	Exercise on the stepper. The flywheel rotates (the sticker moves).
3	The display shows "MAN'L". The TIME window records time.
4	Don't exercise on the stepper. The TIME window stops recording time.

Stepper Resistance Operation Flow Chart

I. Configuration



2. Operation

Step	Part	Operation
1	Generator	1. When exercising on the stepper, flywheel rotation causes generator operation, producing voltage. 2. The generator produces voltage for the drive board and load resistance.
2	Infrared Optic Sensor	1. As the flywheel rotates, the optic sensor detects the rotation speed.

SportsArt 7100/S7100 Stepper Repair Manual – Operation

2. Operation (Cont.)

Step	Part	Operation
3	Drive Board	1. After processing the signal, the drive board sends the optic sensor signal to the display board.
4	Display Board	1. The CPU reads the optic sensor speed. 2. If there's no optic sensor signal, the display board sends the full open signal to the drive board, making for full resistance. 3. If there is an optic sensor signal, the display board emits the PWM signal to the drive board according to the set LEVEL value.
5	Drive Board	1. After processing the PWM signal, converting it into load voltage, the drive board sends the voltage to the magnet to produce resistance. 2. The more load voltage, the higher the resistance. Resistance is highest before unit operation. 3. Once someone starts exercising on the stepper, the load variance causes the speed to stabilize within the set STEP/MINUTE range.
6	Magnet	1. The drive board load voltage causes the magnet to produce resistance, controlling the stepper speed. 2. The higher the load voltage, the more resistance, the slower the unit operation.

3. Procedure

Step	Operation
1	When the unit is off, exercising on the stepper turns on the unit.
2	The display "TIME" window value increases or decreases counting time.

SportsArt 7100/S7100 Stepper Repair Manual – Operation

3. Procedure (Cont.)

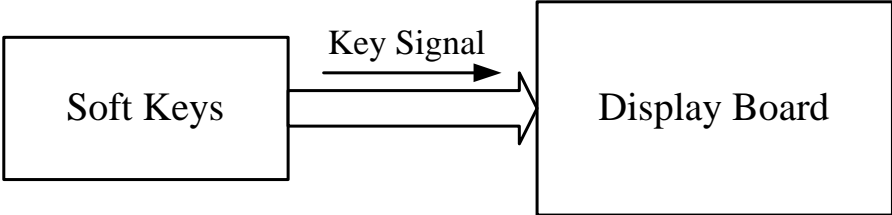
Step	Operation
3	Press LEVEL<▼> key until the window shows “1”; highest resistance occurs; STEP/MINUTE are 25.
4	Press LEVEL<▲> key until the LEVEL window shows “28”; the lowest resistance occurs; STEP/MINUTE are 160.

4. LEVEL Value and STEP/MINUTE Value Comparison Chart

LEVEL	STEP/MIN	LEVEL	STEP/MIN
1	25	15	95
2	30	16	100
3	35	17	105
4	40	18	110
5	45	19	115
6	50	20	120
7	55	21	125
8	60	22	130
9	65	23	135
10	70	24	140
11	75	25	145
12	80	26	150
13	85	27	155
14	90	28	160

Display Keypad Function Flow Chart

I. Configuration



2. Operation

Step	Part	Operation
1	Soft Key	1. Press the soft key. 2. The soft key signal is sent to the display board.
2	Display Board	1. The key signal is sent to the CPU (the main program IC) for implementation. 2. The CPU carries out the key command according to the display signal.

SportsArt 7100/S7100 Stepper Repair Manual – Operation

2. Operational Procedure

Key Name	Operation
HEIGHT CLIMBED<▲> Key	Press <▲> key without letting go. HEIGHT CLIMBED window value increases to 99.9.
HEIGHT CLIMBED<▼> Key	Press <▼> key without letting go. HEIGHT CLIMBED window value decreases to 0.
TIME<▲> Key	Press TIME<▲> key without letting go. TIME window value increases to 99.00.
TIME<▼> Key	Press TIME<▼> key. TIME window value decreases to 0.
LEVEL<▲> Key	Press LEVEL<▲> key. LEVEL window value increases to 28.
LEVEL<▼> Key	Press LEVEL<▼> key. LEVEL window value decreases to 1.
<MANUAL/SET> Key	Press <MAN'L> key several times. The main window shows the following, depending on whether the unit has HRC: (1) Units without HRC function: toggles between "MAN'L"/"SET" (2) Units with HRC function: toggles between "MAN'L"/"SET"/"HRC".
<INTERVAL> Key	Press the <INTERVAL> key several times. The main window toggles between "INTV1"/"INTV2".
<PROGRAM> Key	Press <PROG> key several times. The main window toggles between "PRO 1" - "PRO 12".

SportsArt 7100/S7100 Stepper Repair Manual – Operation

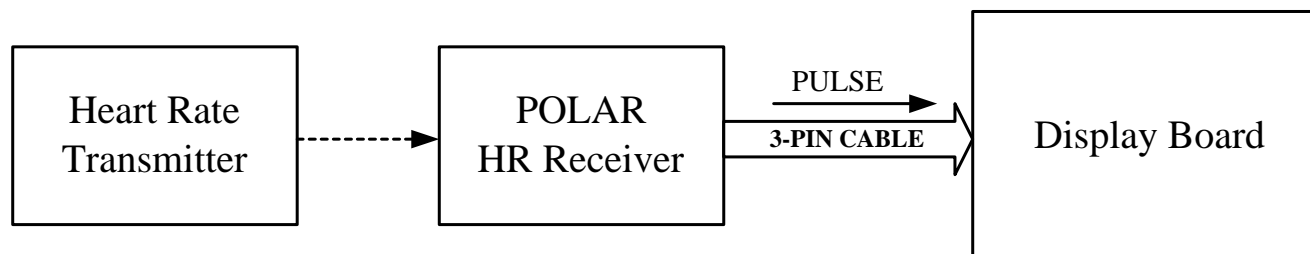
2. Operational Procedure (Cont.)

Key Name	Operation
<RESET> Key	When the display shows "MAN'L", press the <RESET> key. The display "beeps" once and the LEVEL window shows "1".
<ON> Key	When the display is not lit, press the <ON> key. The display "beeps" once and starts up (battery start up)
TIME<▼>+LEVEL<▼>	<ol style="list-style-type: none">1. When the display is lit but no one is exercising on the unit.2. Simultaneously press TIME<▼>+LEVEL<▼> for one second. The display lights extinguish (battery turn off)

Note: The S7100 display keys are slightly different.

POLAR Heart Rate Operation Chart

I. Configuration



2. Operation

Order	Part	Operation
1	Heart Rate Transmitter	1. POLAR transmitter detects the user's heart rate. 2. The heart rate signal is transmitted to the receiver.
2	POLAR Heart Rate Receiver	1. The receiver receives the POLAR transmitter signal. 2. Processing changes the transmitter signal into the heart rate signal, which is then sent to the display board.
3	3-pin Cable	1. The heart rate signal travels the three-pin cable to the display board.
4	Display Board	1. The CPU reads the heart rate signal. 2. After reading the signal, the heart rate appears in the PULSE window.

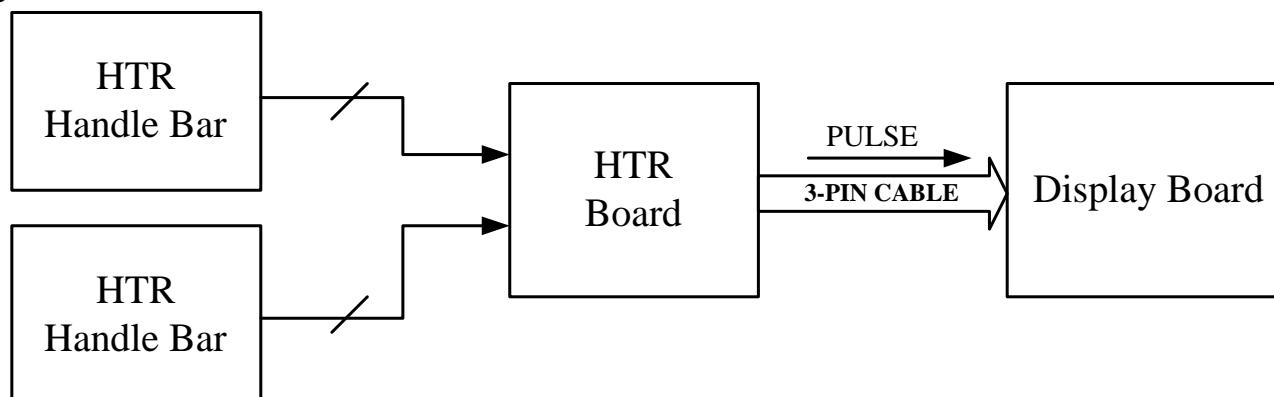
SportsArt 7100/S7100 Stepper Repair Manual – Operation

3. Procedure

Step	Operation
1	Put the POLAR transmitter in place. Stand on the unit.
2	Press the display “ON” key. The display beeps and lights up. Start exercising.
3	The display PULSE window shows the heart rate value within 1 minute.

Stepper HTR Operation Flow Chart

I. Configuration



2. Operation

Order	Part	Operation
1	HTR Handlebar	1. Put both hands on the HTR bar. The user's pulse transmits from the handlebar to the HTR board.
2	HTR Board	1. The HTR board transmits the pulse signal into the heart rate signal. 2. The HTR board indicator lights to show heart rate.
3	3-PIN Heart Rate Cable	1. The heart rate signal travels the 3-pin cable to the display board.
4	Display Board	1. The CPU reads the heart rate signal. 2. The display PULSE window shows the heart rate value.

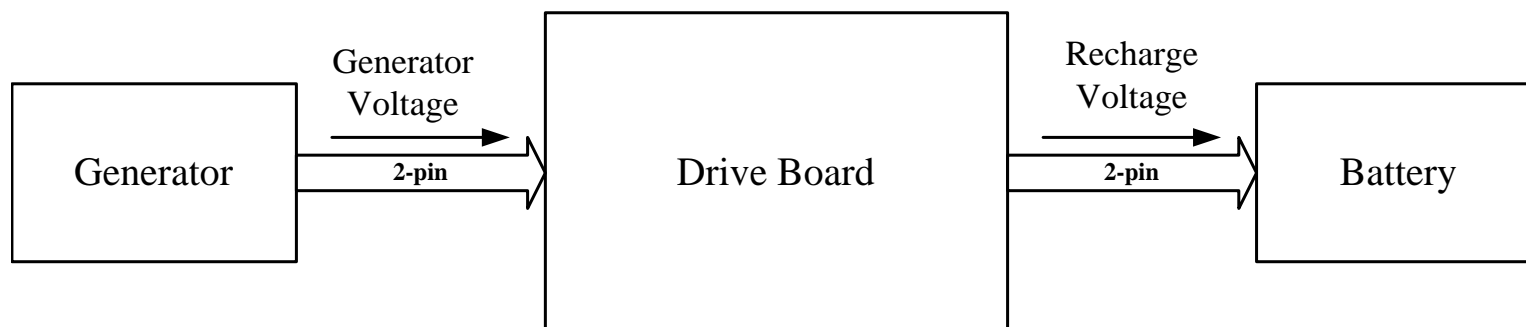
SportsArt 7100/S7100 Stepper Repair Manual - Operation

3. Procedure

Step	Operation
1	Hold onto the HTR handlebars.
2	The HTR board second indicator lights. Then the last indicator flashes.
3	Within a few seconds, the display PULSE window shows the heart rate value.
4	Let go of the HTR handlebar. The display PULSE window shows no pulse reading within a few seconds.

Battery Recharge Flow Chart

1. Configuration



2. Operation

Step	Part	Operation
1	Generator	1. Exercise on the treadmill. The flywheel rotation drives the generator. 2. The generator produces electricity for the battery.
2	Drive Board	1. After processing by the drive board, the generator voltage recharges the battery.
3	2-pin Cable to Battery	1. The voltage travels the 2-pin cable from the drive board to the display board.
4	Battery	1. After receiving the voltage, the battery starts recharging. 2. When the battery voltage equals incoming voltage, the battery stops recharging.

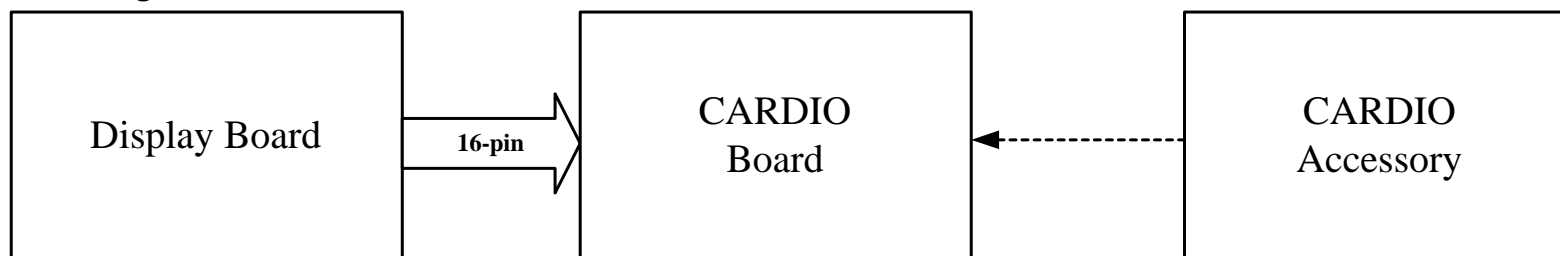
SportsArt 7100/S7100 Stepper Repair Manual – Operation

3. Procedure

Step	Operation
1	Put the multimeter to the DC 20V setting. Place probes on the drive board CN2 red and black wires.
2	Press LEVEL<▲> key until the LEVEL window shows “10” or more.
3	Exercise on the stepper. The multimeter shows 6.5V or more, indicating that the battery is recharging. Normal battery voltage is 6VDC.

Cardio Board Power Supply Flow Chart

1. Configuration



2. Operation

Order	Part	Operation
1	Display	1. Turn on power. The display lights up. 2. The display provides 5 VDC to the cardio board.
2	2-pin Cable	1. The voltage travels the 2-pin cable to the cardio board.
3	Cardio Board	1. The CARDIO board LED lights, indicating that 5 VDC is available to the cardio board. 2. The voltage travels the telephone cable connection to accessories such as Cardio Theater.

SportsArt 7100/S7100 Stepper Repair Manual – Operation

3. Procedure

Step	Operation
1	Turn on power. Main display shows “MAN’L”. Other windows show “0”.
2	Cardio board power indicator lights.
3	1. Place the cardio accessory product cord into the cardio board connector. 2. The display appears normal; it doesn’t freeze up.
4	Cardio accessory products can be used normally.

Chapter 3. Stepper Testing

3-1-1. Drive Board Power Component Test (Continued through 3-1-2)

3-2-1. Drive Board Power VCC Voltage Test (Continued through 3-2-4)

3-3-1. Generator Voltage Test at the Drive Board (Continued through 3-3-2)

3-4-1. Optic Sensor Signal Test at the Drive Board (Continued on 3-4-2)

3-5-1. Resistance Voltage Test at the Drive Board (Continued through 3-5-2)

3-6-1. Battery Tests at the Drive Board (Continued through 3-6-2)

3-7-1. VCC Voltage Test at the Display (Continued through 3-7-2)

3-8-1. POLAR Heart Rate Test (Continued through 3-8-2)

3-9-1. Testing the HTR Board (Continued through 3-9-2)

3-10-1. CARDIO Board Test (Continued through 3-10-2)

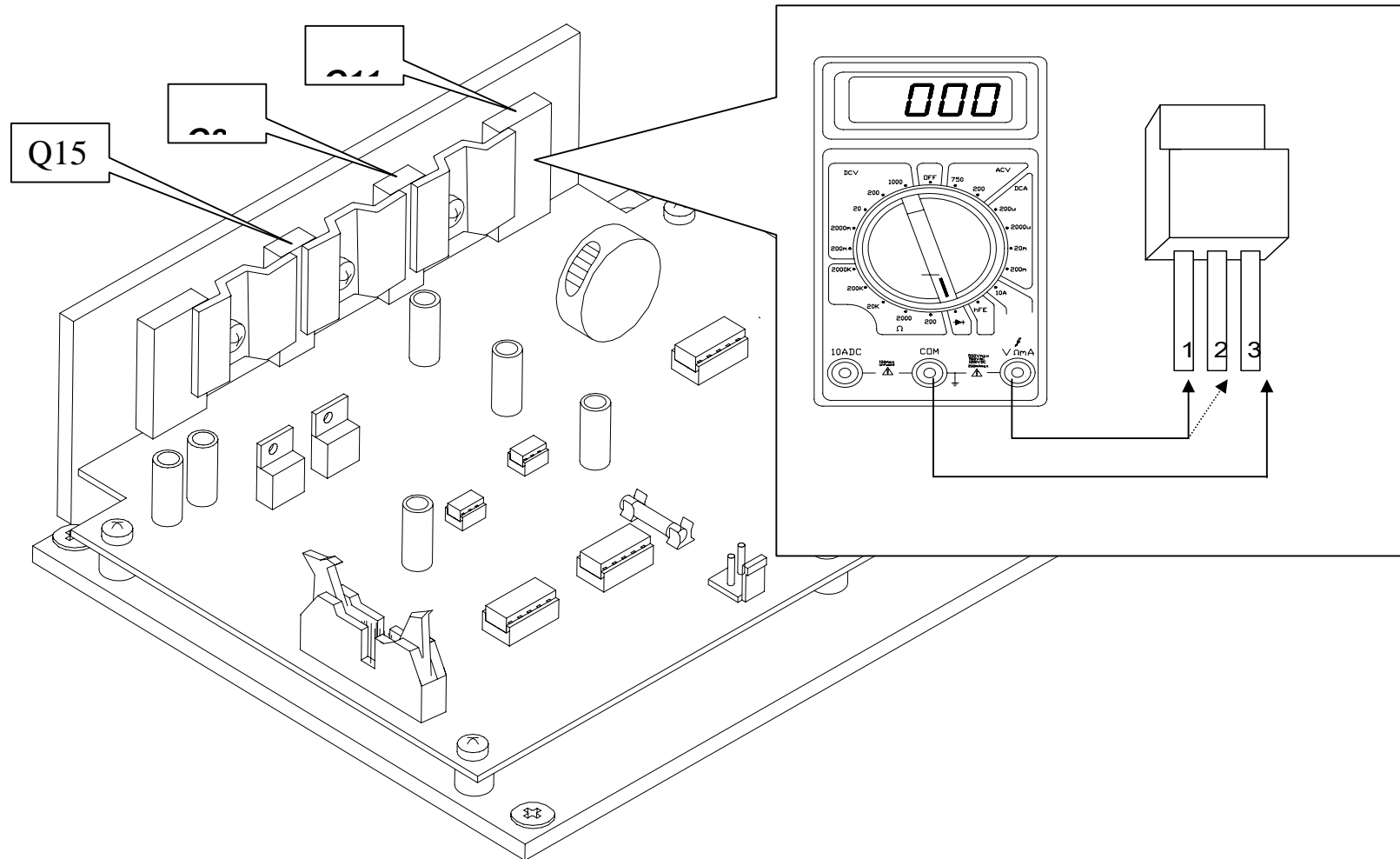
3-11-1. Generator Test

3-12-1. Electro-Magnet Test (Continued through 3-12-2)

3-13-1. Optic Sensor Test (Continued through 3-13-2)

Drive Board Power Component Test

I. Test Configuration



SportsArt 7100/S7100 Stepper Repair Manual – Testing

2. Q11, Q8, Q15 Test Procedure

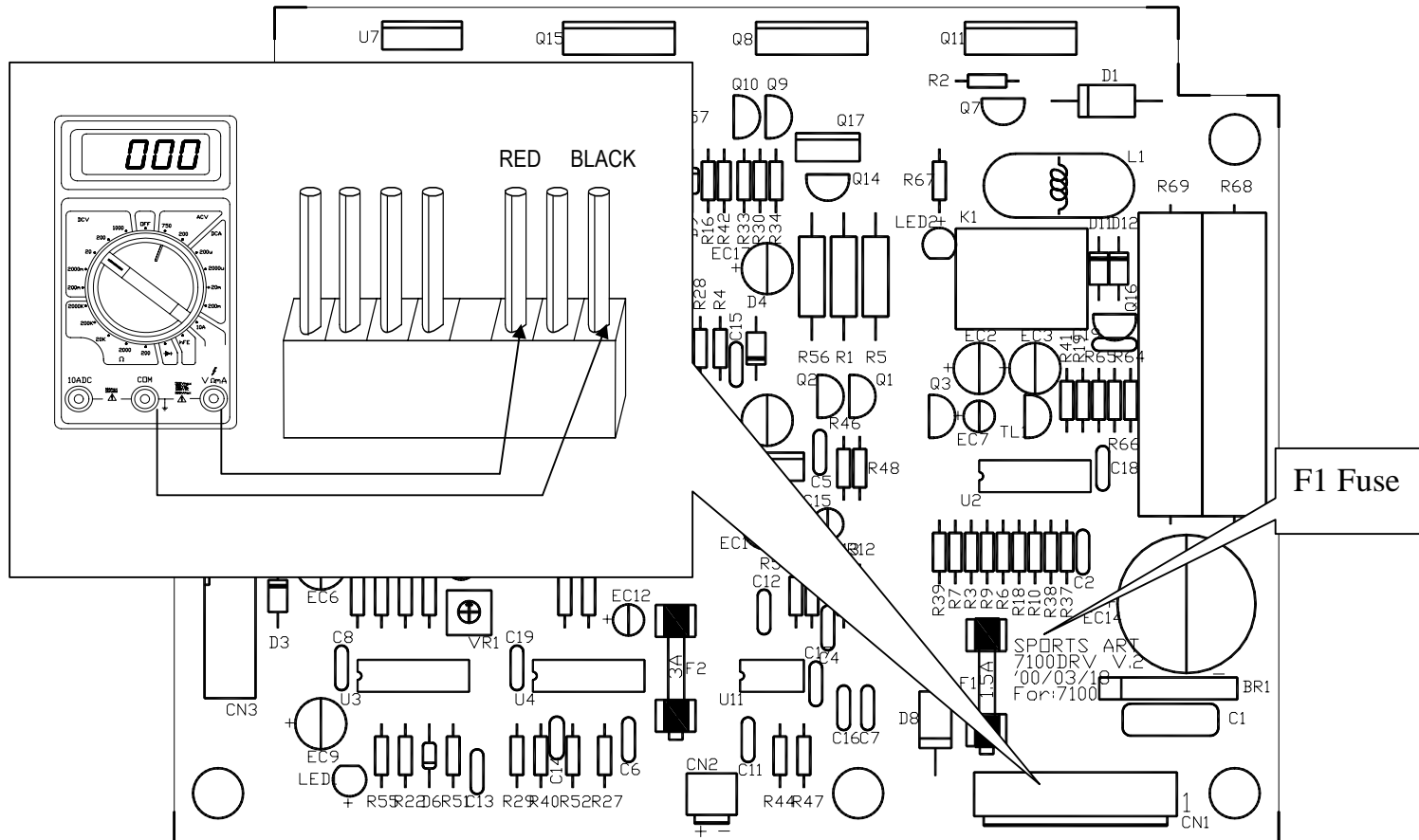
1. Remove all wire connections to the drive board.
2. Remove the IGBT insulating cover.
3. Put multimeter on the diode setting.
4. Place the multimeter red probe on the IGBT first pin; Place the black probe on the IGBT third pin. The multimeter should not show 0.
5. Place multimeter red probe on the IGBT second pin; Place the black probe on the IGBT third pin. The multimeter should not show 0.
6. If the multimeter shows 0, the IGBT has a short. Replace it.

3. Circumstance of Malfunction

1. Press the <ON> key; The display doesn't light up or the display freezes up.
2. When Q15 malfunctions, the battery will not recharge.
3. When Q8 malfunctions, the stepper resistance is unlimited or there is no resistance.
4. When Q11 malfunctions, the drive board components will burn or the display will not operate.

Drive Board Power VCC Voltage Test

I. Drive board power VCC test: CN1 pins



SportsArt 7100/S7100 Stepper Repair Manual – Testing

2. Test Procedure

1. Put multimeter to the 20 VDC setting. Place probes as shown in the previous page.
2. Don't remove any wire connections. Exercise rapidly on the stepper.
3. The meter shows 4.8-5.2 VDC.
4. If not as above, inspect:
 - (a) whether FI fuse is broken;
 - (b) whether the generator is putting out voltage.

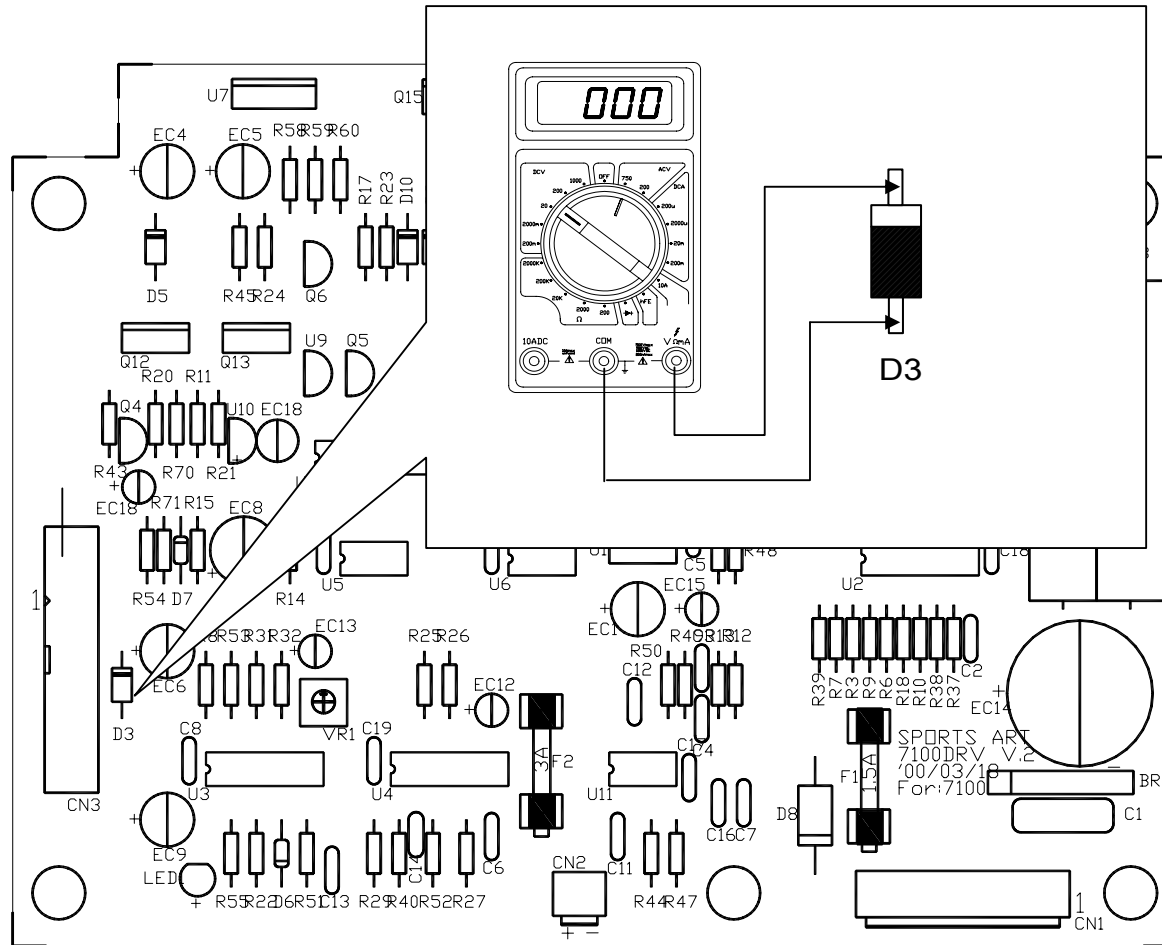
3. Circumstance of Malfunction

1. Display doesn't light even after the user exercises on the stepper.
2. Battery allows unit to turn on, but there's no resistance when the user exercises.

SportsArt 7100/S7100 Stepper Repair Manual – Testing

Drive Board Power VCC Test

I. Drive board power VCC test: diode 3



SportsArt 7100/S7100 Stepper Repair Manual - Testing

2. Test Procedure

2-1. Generator Test

2-1-1. Put multimeter to the 20VDC setting. Place probes as shown on the previous page.

2-1-2. Don't remove any wire connections. Exercise rapidly on the stepper.

2-1-3. Multimeter shows 4.8-5.2VDC.

2-1-4. If not as above, inspect:

(1) whether F1 fuse is broken;

(2) whether the generator is putting out voltage;

(3) the drive board.

2-2. Battery Test

2-2-1. Put multimeter to the 20VDC setting. Place probes as shown on the previous page.

2-2-2. Don't exercise or move the stepper.

2-2-3. Press the display "ON" key. Multimeter voltage shows 4.8-5.2VDC.

2-2-4. If not as above, inspect:

(1) the battery;

(2) the drive board.

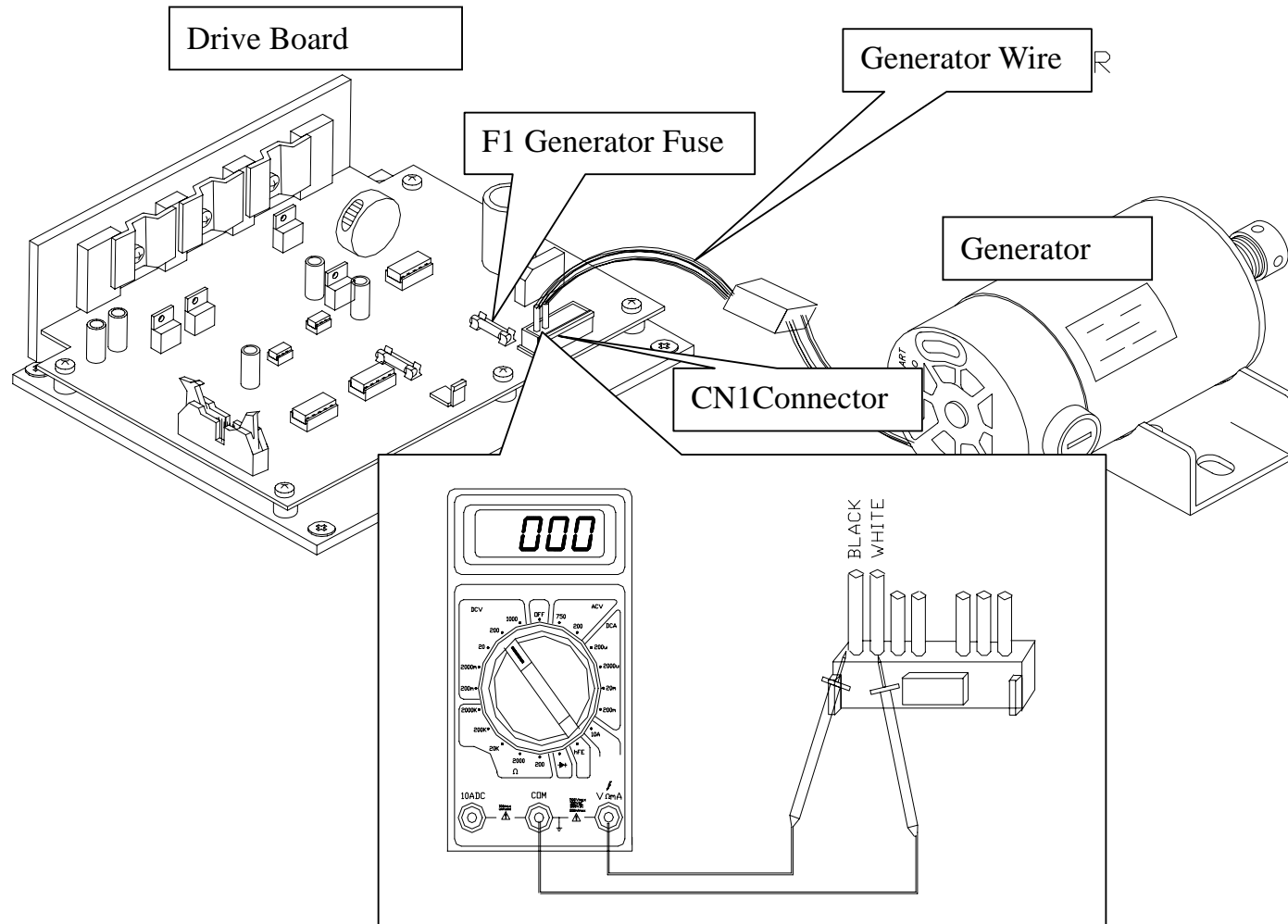
3. Circumstance of Malfunction

3-1. Display doesn't light even though someone exercises on the stepper.

3-2. Press display "ON" switch. The display doesn't light.

Generator Voltage Test at the Drive Board

I. Test Configuration



SportsArt 7100/S7100 Stepper Repair Manual – Testing

2. Test Procedure

2-1. Put multimeter to the 20VDC setting.

2-2. Place multimeter probes on the drive board CON1 black and white wire connections as shown.

2-3. Exercise on the stepper.

2-4. The display “beeps” once and lights up, indicating that the generator startup is successful. The multimeter shows 0-100VDC.

2-5. If the multimeter has no reading, the generator is not producing voltage or the wire is not conducting the voltage. Inspect the generator and wire.

2-6. If the voltage is 0-100VDC, but the display does not beep, inspect whether F1 (2A) fuse has broken.

3. Circumstance of Malfunction

3-1. Exercise on the stepper. The display doesn't light up or operate.

SportsArt 7100/S7100 Stepper Repair Manual – Testing

2. Test Procedure

1. Set multimeter to the 20VDC setting. Place probes on drive board CNI connector yellow and black wire connections.
2. Don't remove any wires. Exercise on the unit.
3. Drive board LED1 flashes or lights and remains lit. Display TIME window shows time count. This indicates that the optic sensor is operating.
4. The multimeter should show 1.5-3.5VDC. The faster the speed, the higher the voltage.
5. If the multimeter shows 5 or 0VDC, the optic sensor is malfunctioning.

Inspect the following:

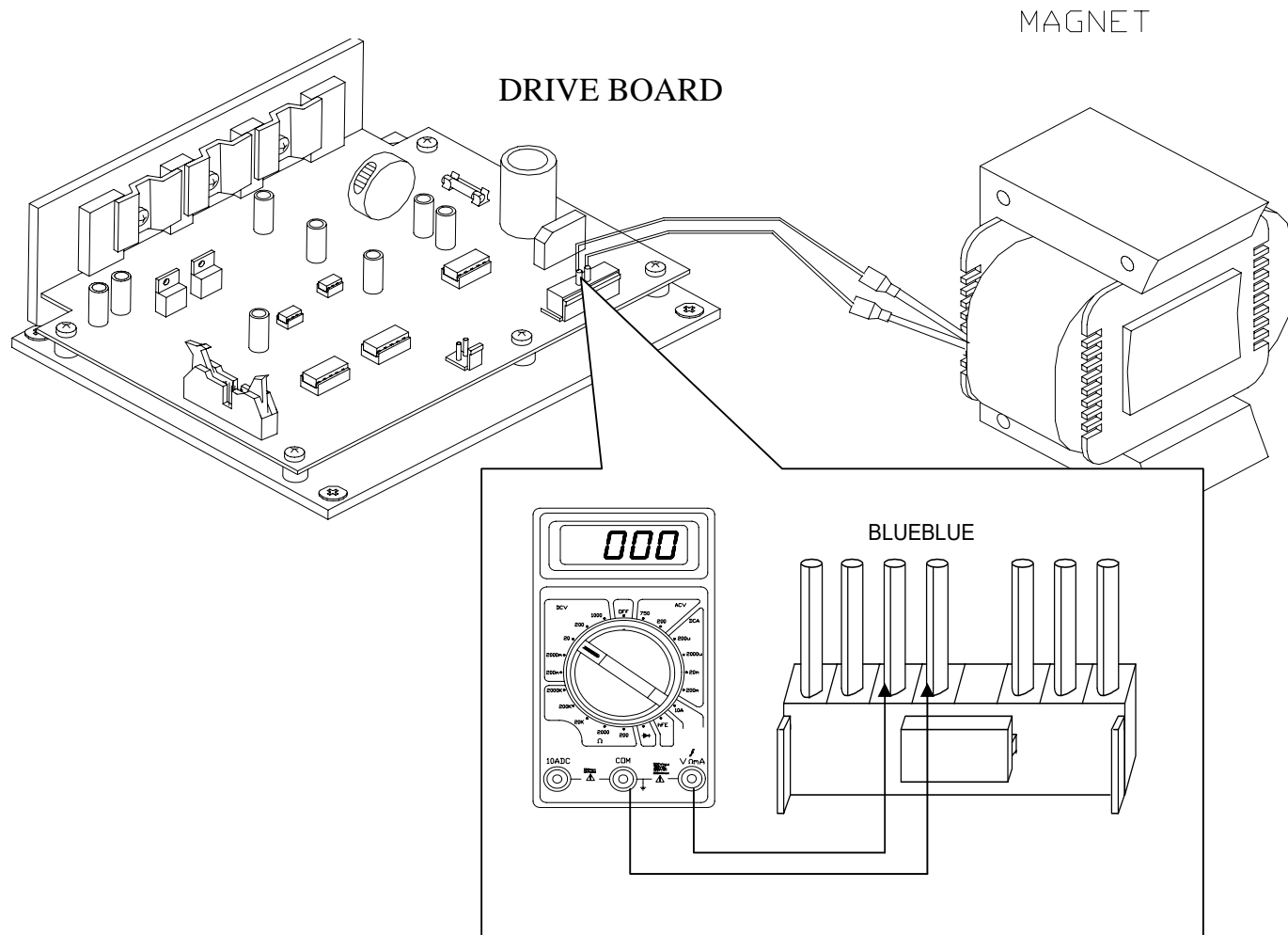
- (a) The distance between the optic sensor and the reflective sticker on the flywheel. Correct distance: 3/8 inch (5 mm). If too far, the sensor cannot pick up the reflected signal; If too close, the signal gets distorted.
- (b) Whether the reflective sticker is ripped or torn.
- (c) The optic sensor wire and connections.

3. Circumstance of Malfunction

- 3-1. Exercise on the unit. Unit doesn't start up.
- 3-2. In exercising on the stepper, the resistance is too strong and cannot be changed.

Resistance Voltage Test at the Drive Board

I. Test Configuration: Place probes as shown.



SportsArt 7100/S7100 Stepper Repair Manual – Testing

2. Test Procedure

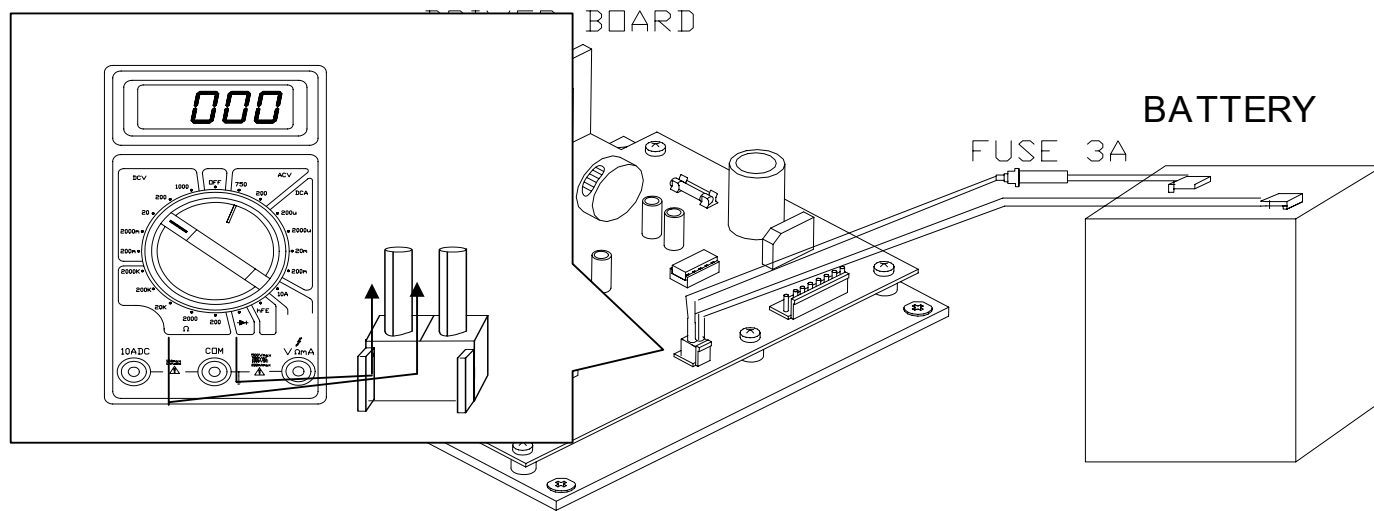
1. Put the multimeter to the 20VDC setting.
2. Place probes on the drive board CON1 blue wire connections, as shown.
3. Exercise on the stepper. The multimeter should show 0.5-15VDC. Resistance is generated.
4. If the multimeter shows 20VDC or more and no variation in voltage, there is full resistance.
5. If the multimeter shows 0VDC and no voltage variation, there is no resistance.

3. Circumstances of Malfunction

1. Exercise on the stepper. Resistance is too high.
2. Exercise on the stepper. There is no resistance.

Battery Tests at the Drive Board

I. Test Configuration



2. Test Procedure

1. Don't remove the drive board CN2 connection wires.
2. Inspect whether battery fuse F2 has broken. If broken, replace the fuse.
3. Put the multimeter to the 20VDV setting. Place probes on the battery terminals as shown.
4. Put the multimeter to the 5.0VDC+ setting.
5. If the battery voltage is below 5.0VDC, exercise on the stepper for thirty minutes or more.

SportsArt 7100/S7100 Stepper Repair Manual – Testing

3. Battery Recharge Test Procedure

1. Don't remove drive board CN2 connection wires.
2. Inspect whether the battery F2 fuse is broken. If broken, replace it.
3. Put multimeter to the 20 VDC setting. Put multimeter probes on the battery terminals as shown.
4. Press display LEVEL < ▲ > key until the LEVEL window shows 15.
Exercise on the stepper.
5. If the multimeter shows 6.5 VDC or more, the drive board is putting out power to recharge the battery.
6. If the multimeter shows less than 6 VDC, the drive board is not putting out voltage to recharge the battery.

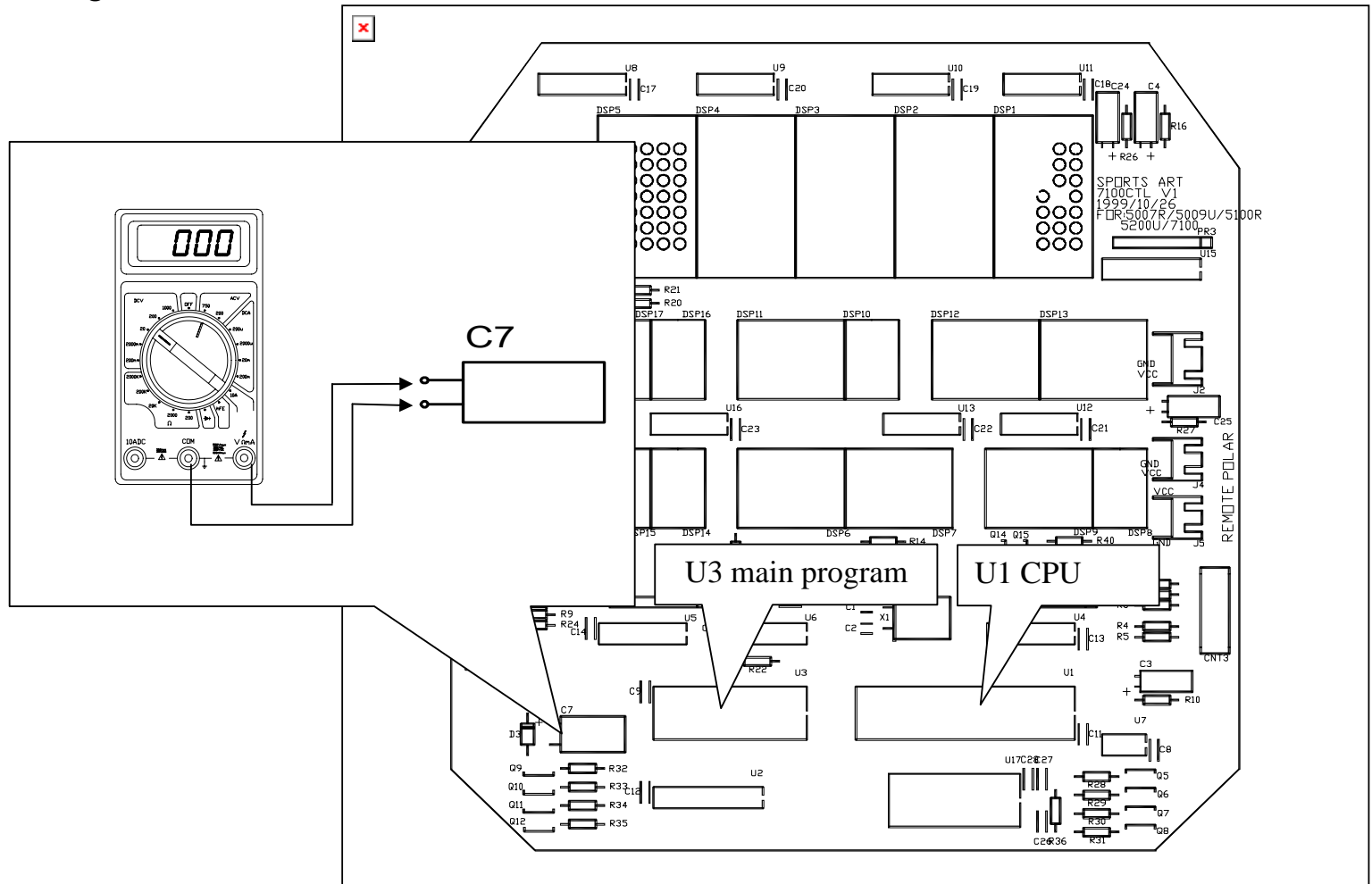
Inspect whether:

- (a) the display LEVEL value is at 15 or more;
- (b) the battery with no load is below 5.0 VDC;
- (c) or replace components U8 and Q15 on the drive board.

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VCC Voltage Test at the Display

I. Test Configuration



SportsArt 7100/S7100 Stepper Repair Manual – Testing

2. Test Procedure

1. Put multimeter to the 20VDC setting.
2. Put multimeter probes as shown above on capacitor C7 pins.
3. Exercise on the stepper; multimeter shows 4.8-5.2VDC; the display beeps once and lights up.
4. If the multimeter shows 5VDC, but the display doesn't light, re-insert the main program and CPU.
5. If the multimeter doesn't show 5VDC, inspect whether the drive board has 5VDC.

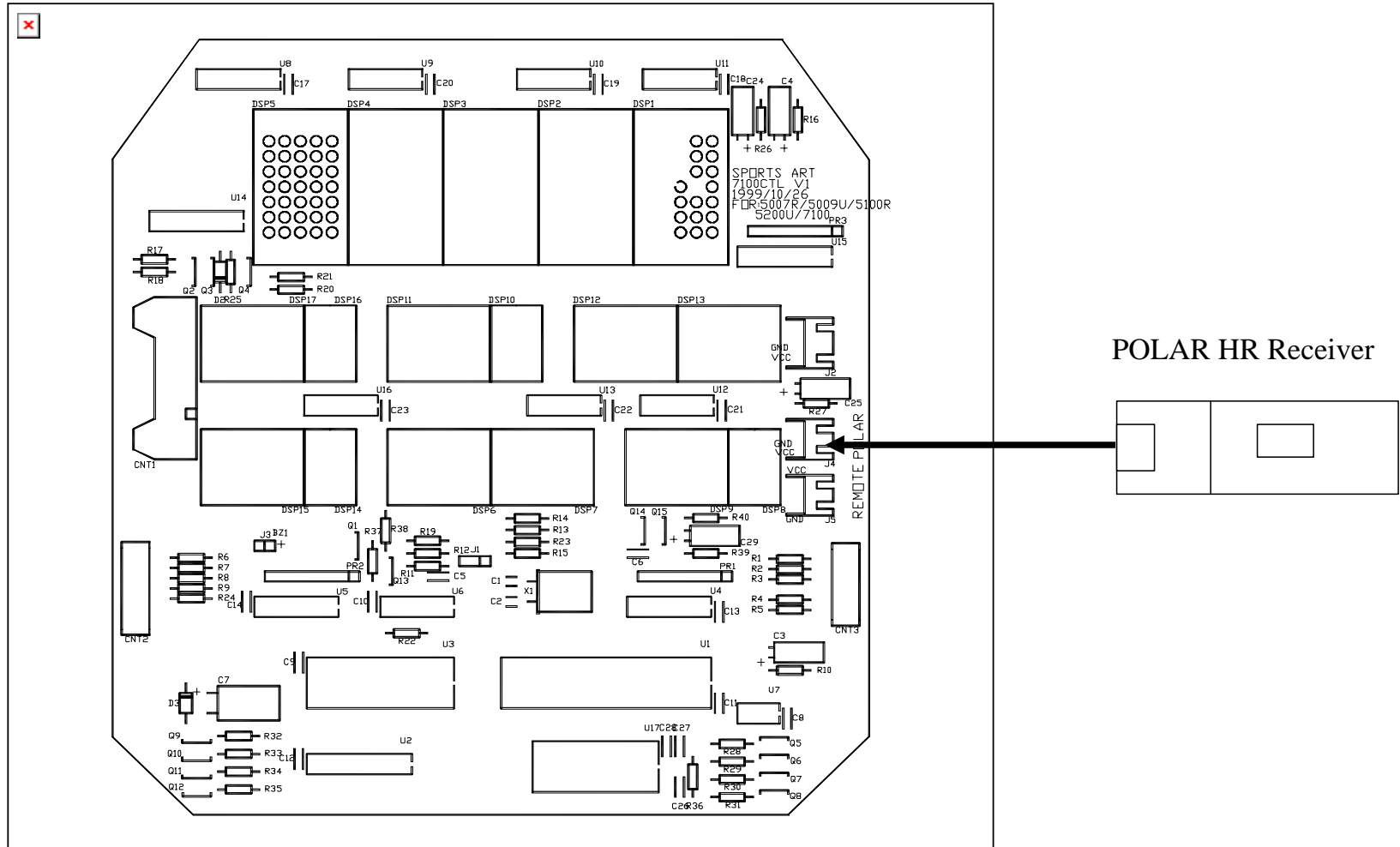
3. Circumstance of Malfunction

1. Press <ON> key or exercise on the unit. The display doesn't light up or operate.
2. Exercise on the unit. The display freezes up.

SportsArt 7100/S7100 Stepper Repair Manual – Testing

POLAR Heart Rate Test

I. Test Configuration



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2. Test Procedure

1. Inspect the POLAR heart rate receiver is connected as shown.
2. Strap on the POLAR heart rate transmitter.
3. Press the display <ON> key. The display lights.
4. The display PULSE window shows the heart rate value within 10 minutes.
5. If no heart rate value appears, inspect:
 - (a) wire and connector from the heart rate board to the display;
 - (c) POLAR receiver antenna soldering;
 - (d) Replace POLAR receiver;
 - (e) Replace the POLAR transmitter.

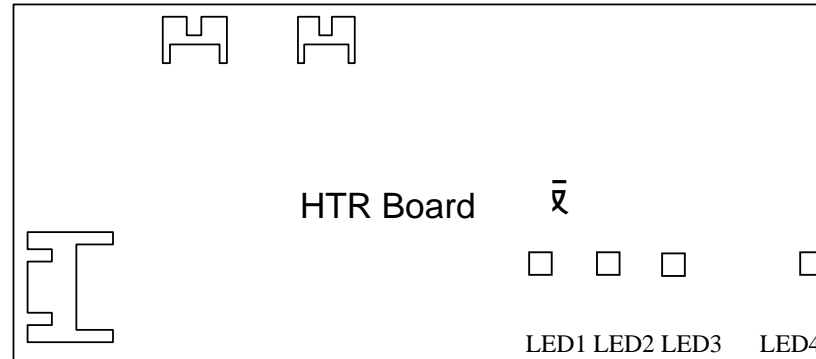
3. Circumstance of Malfunction

1. Strap on the POLAR HR belt. The display PULSE window doesn't show a heart rate value.

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Testing the HTR Board

I. Configuration



HTR Board	LED1	LED2	LED3	LED4
HTR	X - Not lit in HTR mode.	Lights when user holds onto HTR handlebars.	Flashes to indicate incoming HTR signal.	Lights when HTR handlebars are held; Flashes when HTR signal is sent to display.
Polar	Flashes to indicate incoming POLAR signal.	X - Doesn't light in POLAR mode.	X - Doesn't light in POLAR mode.	Flashes when POLAR signal is sent to display.

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2. Test Procedure

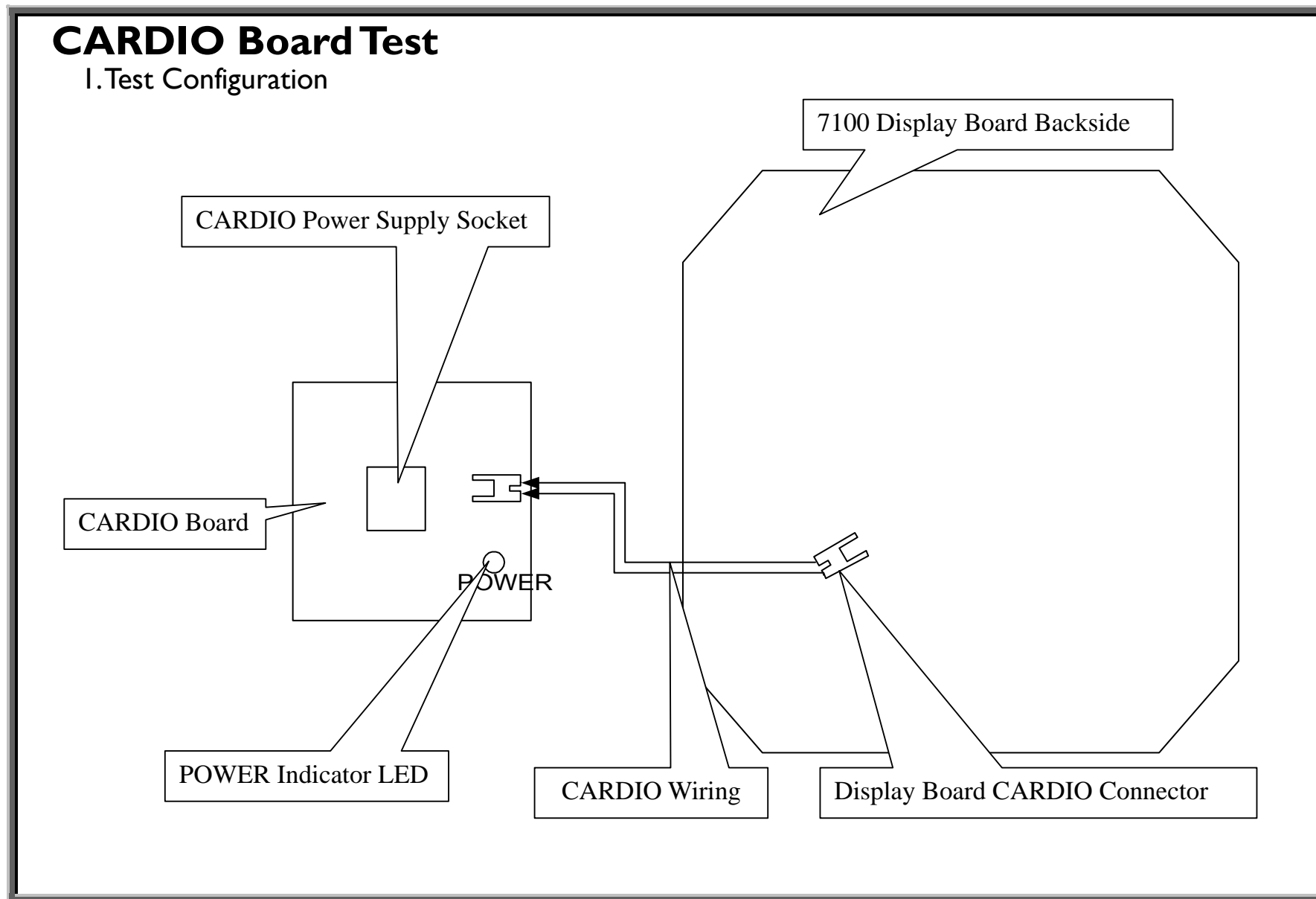
Malfunction	Cause	Part in Question
LED1 (POLAR) not flashing	POLAR receiver is not detecting a heart rate or the signal is not getting to the HR board.	POLAR transmitter, POLAR receiver board, wires
LED2 (HTR) not lighting	HTR handlebar is not being held or there is no detection of a signal at the HR board.	HTR handlebar, wire from HTR board to handlebar
LED3 (HTR) not flashing	Signal is not arriving from HTR handlebars.	HTR handlebar, cable, HR board
LED4 (HTR+POLAR) not flashing	POLAR receiver or HTR is not emitting a heart rate signal to the display.	If all other HR board LEDs are normal, replace the HR board.
Display Shows No HR Value	If HR board LEDs are normal, inspect the 3-pin cable, its connections, and the display board	3-pin cable, connections, display board

3. Circumstance of Malfunction

1. Place hands on the HTR handlebar; the display PULSE window doesn't show the heart rate value.
2. After turning on the unit or in mid use, the PULSE window shows a pulse value when none should appear.
3. When holding the HTR handlebar, the display PULSE window heart rate value and the user's actual heart rate vary too much.
4. When using the POLAR transmitter, the display PULSE window shows no heart rate value.
5. When using the POLAR transmitter, the display PULSE window and actual heart rate value differ.

CARDIO Board Test

I. Test Configuration



SportsArt 7100/S7100 Stepper Repair Manual – Testing

2. Test Procedure

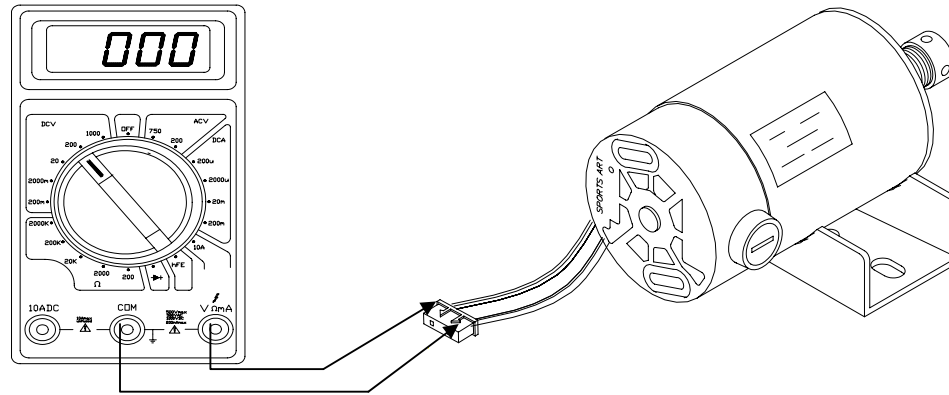
1. Connect CARDIO board wires as shown.
2. Press the display <ON> key; The display “beeps” once and lights up.
3. The CARDIO board power LED lights. If not, inspect the 2-pin wire that connects the CARDIO board to the display board.
4. Connect the CARDIO output socket on the display to the CARDIO board. The CARDIO LED should light and cardio accessories should operate normally.
5. If the CARDIO board LED does not light, replace the CARDIO board connector.

3. Circumstance of Malfunction

1. After pressing the <ON> key, the display board beeps once and then freezes.
2. After plugging the CARDIO product into the supply connector, the CARDIO product doesn't light up or operate.

Generator Test

I. Test Configuration



2. Test Procedure

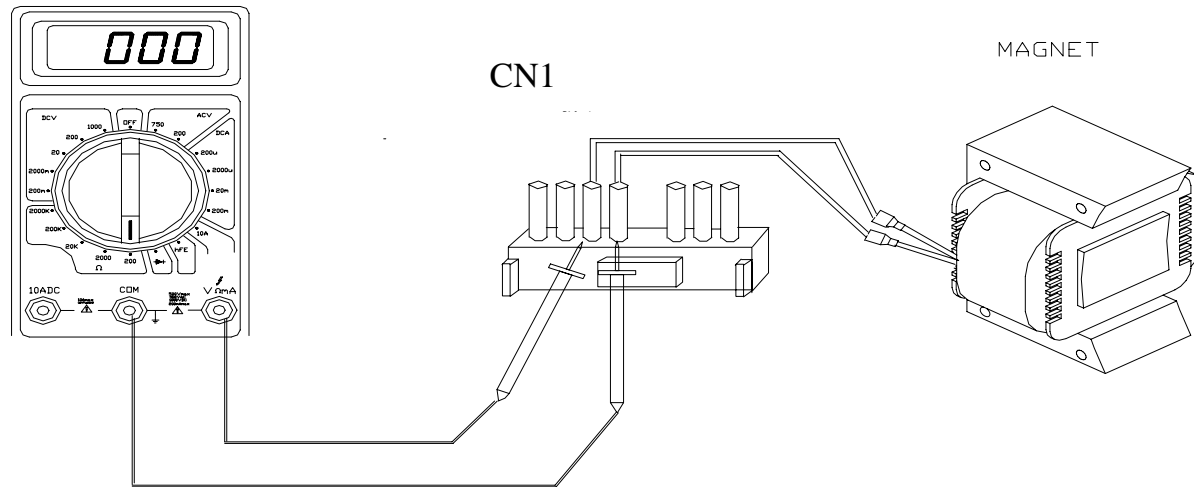
1. Put multimeter to the 200 VDC setting. Place probes as shown on the generator wire connections.
2. Exercise on the stepper.
3. The multimeter voltage reading will fluctuate.
4. If no voltage is produced, inspect the generator.

3. Circumstances of Malfunction

1. The display doesn't light when one exercises on the stepper.
2. There is no load resistance.
3. The display freezes as the user exercises.
4. The FI fuse on the drive board breaks.

Electro-Magnet Test

1. Test Configuration



2. Ohm Test Procedure

1. Put multimeter to the 200 ohm setting. Detach CON1 wire connections from the drive board.
2. Place probes on the blue wire connections. Normal resistance: 10 ohm \pm 20%.
3. If not as above, replace the magnet.

3. Current Leakage Test Procedure

1. Leave magnet wires detached from the drive board. Put multimeter to the 200 ohm setting. Place the red probe on the end of one CN1 magnet wire. Place the black probe on a screw or exposed metal on the unit frame.
2. Normal reading: no change (meter shows "OL"). If the meter shows "0" or "0.4" the magnet wire is touching the frame, causing a short. Inspect the thin wires in the side of the magnet.

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4. Circumstance of Malfunction
 1. There is no resistance.
 2. The FI fuse is broken.

Optic Sensor Test

I. Test Configuration

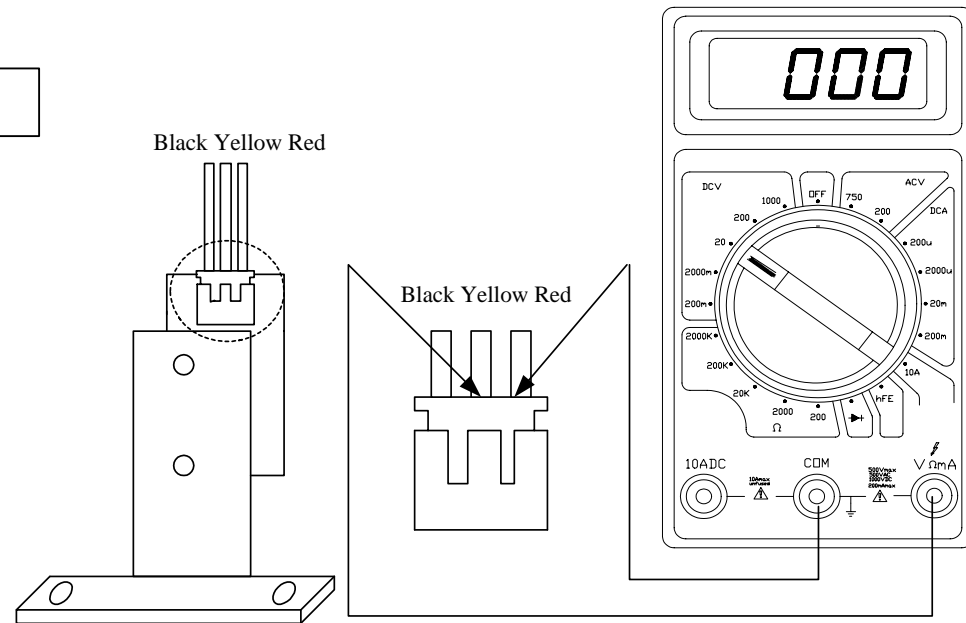
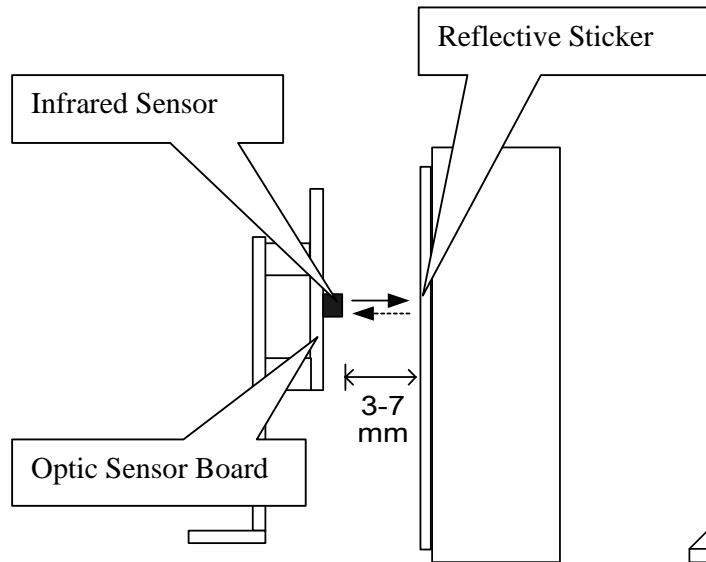


Fig. 1. Inspect for correct distance between optic sensor and reflective sticker: about 1/4 inch (3-7mm).

Fig. 2. Optic sensor voltage test: See 3-13-2.

SportsArt 7100/S7100 Stepper Repair Manual – Testing

2. Test Procedure

1. Distance Test: Make sure the optic sensor is within 1/4 inch (3-7 mm) from the reflective sticker.
2. Voltage Test: Put multimeter to the 20 VDC setting. Place multimeter probes as indicated below. Normal readings are shown on the graph.

Order	Place Probes on Wire Terminals:	Normal Voltage	Abnormal Voltage	Possible Malfunction
1	Red - Black	5 VDC (VCC)	Less than 4.5 VDC	Wires, drive board
2	Yellow - Black	2.0-3.0 VDC (CLK)	5 VDC or 0 VDC	Optic sensor.

Note: VCC is the name for the circuit that powers the optic sensor.

3. Circumstance of Malfunction

1. Exercise on stepper. Display has no reaction. It does not light but generator does have output.
2. Exercise on the stepper. Resistance is very high and does not change.
3. There is no step count.