8510 AC Spindle Drive Hardware/Firmware Replacement

Instructions

Introduction

The purpose of this publication is to describe the steps needed to replace the circuit boards and/or firmware in the 8510 AC Spindle Drive.

Replacement Procedure

Different procedures are provided in this publication to guide the user in the removal and replacement of the various boards and firmware in the 8510. Refer to the appropriate section(s) to remove/replace the supplied boards/firmware.

Important: When replacing the I/O and/or Main Control/CPU Boards, always remove the existing firmware chips (EPROM/EEPROM) for possible use in the new boards.

ATTENTION: To avoid an electrical shock hazard, assure that all power to the drive has been removed and that 30 seconds has elapsed (for bus discharge) prior to proceeding.

ATTENTION: The circuit boards included in this kit are ESD (Electrostatic Discharge) sensitive. In addition, the drive also contains ESD sensitive parts and assemblies. Static control precautions are required when installing, testing, servicing or repairing this assembly. Component damage may result if ESD control procedures are not followed. If you are not familiar with static control procedures, reference Allen-Bradley publication 8000-4.5.2, *Guarding Against Electrostatic Damage* or any other applicable ESD Protection Handbook.

A disposable grounding wrist strap is included with the replacement parts kit. This strap must be worn to guard against ESD damage to the drive or its components. Apply the strap around your wrist – affix the other end to the drive chassis (bare metal).

The following tools are recommended:

- IC Chip Puller
- #0 and #2 Phillips Screwdriver

o 1. Display & Keypad Module Replacement

   a) Assure that all power has been removed and 30 seconds has elapsed.

   b) Remove the drive front cover. See ESD precaution on page 1 and apply grounding wrist strap.

   c) Label and remove any cables from the I/O Board. Remove the I/O Board by taking out the four corner mounting screws and carefully separating the connectors.

   d) Remove the Display & Keypad Module (from the I/O Board) by taking the four screws (that secure the assembly) out from the back of I/O Board and carefully separate the connector.

   e) Install the new module by reversing the above steps.

   f) Replace drive cover, remove wrist strap and check for proper operation.

o 2. I/O Board Replacement

a) Assure that all power has been removed and 30 seconds has elapsed.

b) Remove the drive front cover. See ESD precaution on page 1 and apply grounding wrist strap.

c) Label and remove any cables from the I/O Board. The board can now be removed by taking the four corner screws out and carefully separating the connectors.

d) Remove the Display & Keypad Module (from the I/O Board) by taking the four screws (that secure the assembly) out from the back of I/O Board and carefully separate the connectors.

e) Using Figure 1, locate the H8 microprocessor and EEPROM IC packages on the I/O Board.

   Important: The larger IC package that is to be removed in the next step is the H8 microprocessor (with internal EPROM). This package can be very difficult to remove. In addition, damage to surrounding components can occur if care is not taken.

   Important: It is recommended that a chip (integrated circuit) puller be used. If a puller is not available, a less desirable alternative is to use a small, flat blade screwdriver. The screwdriver is first inserted under one end of the H8 microprocessor and then the other end. This method can be used to help lift the IC from its socket. If the screwdriver method is used, extreme caution must be taken so that surrounding components and board traces are not damaged.

f) Carefully remove the H8 microprocessor from its socket noting notch orientation. Insert the H8 into the new I/O Board (note orientation – notch on IC must align with notch on socket). **Extreme care must be used to assure that all pins are properly aligned and inserted.** When all pins are aligned and inserted, firmly press the package down until it is fully seated. Inspect all pins to assure that no damage has occurred.

g) Carefully remove the EEPROM from its socket on the old board, noting notch orientation. Insert the EEPROM (noting orientation) into the socket on the new board. **Care must be used to assure that all pins are properly aligned and inserted.** When all pins are aligned and inserted, firmly press the package down until it is fully seated. Inspect all pins to assure that no damage has occurred.

   Important: The EEPROM contains the programmed parameters and must be moved to the new board. If it is not moved, re-programming of the drive parameters will be required.

h) Replace the I/O Board and Display & Keypad Module, assuring that connector pins are aligned properly and any cables removed are re-connected.

i) Replace drive cover, remove wrist strap & check for proper operation.

o 3. Main Control/CPU Board Replacement

a) Assure that all power has been removed and 30 seconds has elapsed.

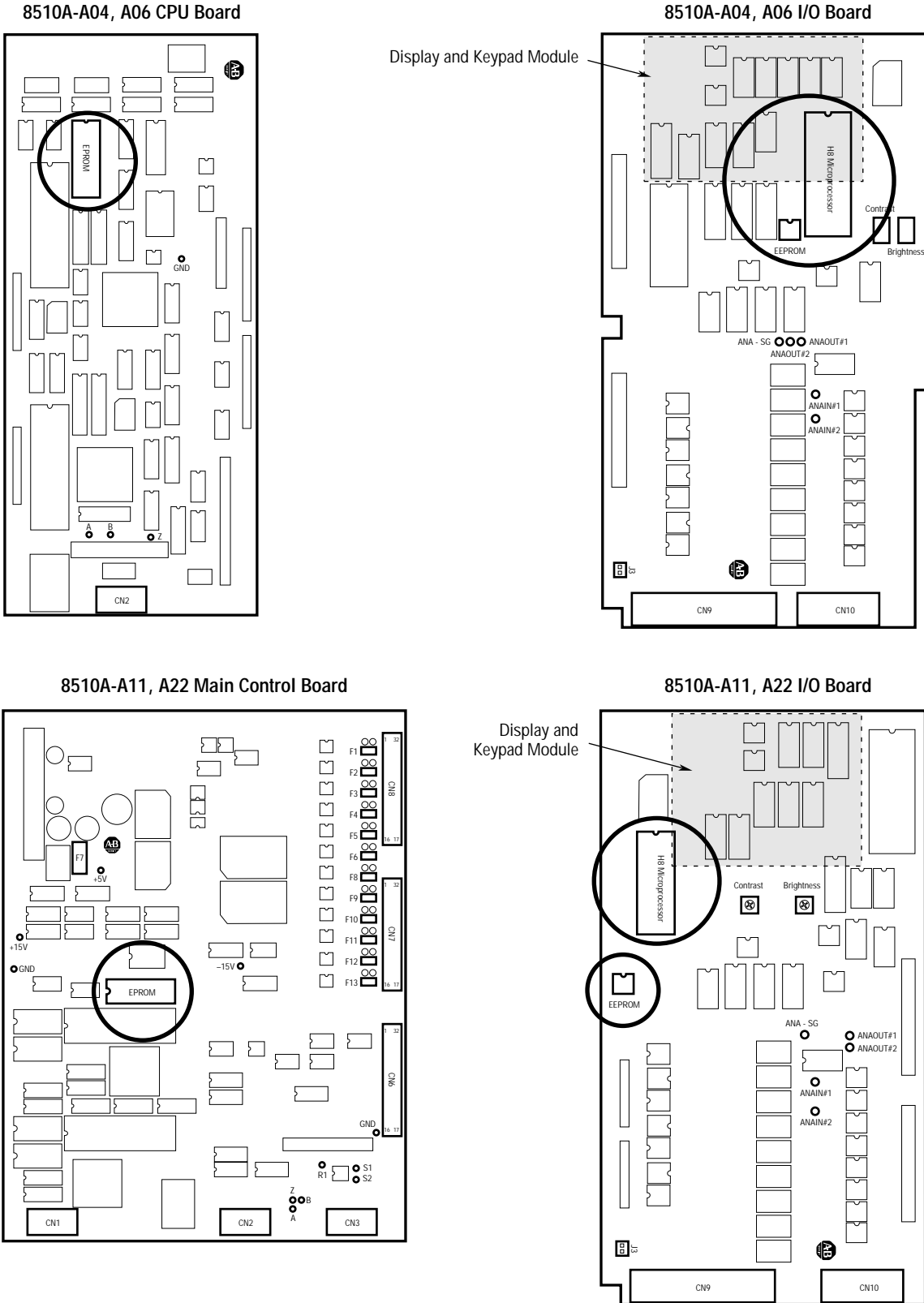b) Remove the front cover from the drive. Refer to the ESD precaution on page 1 and apply grounding wrist strap.

   Important: The supplied grounding wrist strap <u>must</u> be worn during this procedure to protect the IGBT gate leads against ESD damage.

c) Label and remove any cables from the I/O Board. Remove the I/O Board (with Display & Keypad Module) by taking the four screws out and carefully separating the connectors.

d) Label and remove any cables from the CPU/Main Control Board. Remove the board by taking out the six screws that secure it.

e) An EPROM is located on the Main Control/CPU Board which must be moved to the new board. Using Figure 1, find the location for this EPROM.

f) Carefully remove the existing EPROM from its socket (note notch orientation).

   Important: It is recommended that a chip (integrated circuit) puller be used. If a puller is not available, a less desirable alternative is to use a small, flat blade screwdriver. The screwdriver is first inserted under one end of the EPROM and then the other end. This method can be used to help lift the IC from its socket. If the screwdriver method is used, extreme caution must be taken so that surrounding components and board traces are not damaged.

g) Carefully insert the EPROM into position on the new board (note orientation). **Care must be used to assure that all pins are properly aligned and inserted.** After insertion, assure that all pins are properly seated in the socket.

h) Install the new Main Control/CPU Board. Re-connect any cables that were previously removed. On 8510A-A11/A22 drives, assure that the Main Control Board is properly seated with the Power Board via the three Interconnect Boards.

   Important: Do Not touch the gold edge connectors on the Interconnect Board – contamination could result, causing poor connections. In addition, ESD could damage the IGBT gate leads.

i) Replace the I/O Board (with Display & Keypad Module). Assure that the board connectors are fully seated. Re-connect any cables that were previously removed.

j) Replace drive cover and remove wrist strap. Check for proper operation.

Figure 1
Component Locations

8510A-A04, A06 CPU Board

8510A-A04, A06 I/O Board

Display and Keypad Module

EPROM

GND

A   B   Z

CN2

H8 Microprocessor

Contrast

EEPROM

Brightness

ANA - SG ANAOUT#1

ANAOUT#2

ANAIN#1

ANAIN#2

J3

CN9   CN10

8510A-A11, A22 Main Control Board

8510A-A11, A22 I/O Board

Display and
Keypad Module

F1
F2
F3
F4
F5
F6
F7
F8
F9
F10
F11
F12
F13

CN8

CN7

+5V

+15V

GND

−15V

EPROM

CN6

GND

R1   S1
        S2

Z   B
A

CN1   CN2   CN3

H8 Microprocessor

Contrast   Brightness

EEPROM

ANA - SG

ANAOUT#1
ANAOUT#2

ANAIN#1

ANAIN#2

J3

CN9   CN10

o 4. Gate Drive Board Replacement (8510A-A04/A06 Only)

a) Assure that all power has been removed and 30 seconds has elapsed.

b) Remove the front cover from the drive. Refer to the ESD precaution on page 1 and apply grounding wrist strap.

   Important: The supplied grounding wrist strap <u>must</u> be worn during this procedure to protect the IGBT gate leads against ESD damage.

c) Label and remove any cables from the I/O Board. Remove the I/O Board (with Display & Keypad Module) by taking the four screws out and carefully separating the connectors.

d) Label and remove any cables from the CPU Board. Remove the six screws securing the CPU Board. Remove board.

e) Label and remove any cables from the Gate Drive Board. Remove the board by taking out the six screws securing it.

   Tip: For easier board removal, lift the board off of the three interconnect boards. Move the lower right side of the board under the mounting lip and slide it out the bottom of the drive.

f) Install the new board and re-connect cables. Assure that the Gate Drive Board is properly seated with the Power Board via the Interconnect Boards.

   Important: Do Not touch the gold edge connectors on the Interconnect Board – contamination could result, causing poor connections. In addition, ESD could damage the IGBT gate leads.

g) Replace the CPU and I/O (with Display & Keypad Module) Boards. Assure that the board connectors are fully seated and any cables previously removed have been re-connected.

h) Replace drive cover and remove wrist strap. Check for proper operation.

o 5. Firmware Replacement

The control firmware for the 8510 is contained in two IC packages, on two printed circuit boards. The firmware must be replaced as a set to assure compatibility between the two boards. This kit contains the 2 packages required, plus an EEPROM (programmed with default parameters) if needed.

a) Assure that all power has been removed and 30 seconds has elapsed. Refer to the ESD precaution on page 1 and apply grounding wrist strap.

b) Remove the front cover from the drive.

c) Label and remove any cables from the I/O Board. Remove the I/O Board by taking out the four corner mounting screws and carefully separating the connectors.

d) Remove the Display & Keypad Module (from the I/O Board) by taking the four screws (that secure the assembly) out from the back of I/O Board and carefully separate the connector.

e) The smaller EPROM (IC package) is located on the Main Control/CPU Board. Using Figure 1, find the location for this EPROM.

f) Carefully remove the existing EPROM from its socket noting orientation of notch.

   Important: It is recommended that a chip (integrated circuit) puller be used. If a puller is not available, a less desirable alternative is to use a small, flat blade screwdriver. The screwdriver is first inserted under one end of the IC and then the other end. This method can be used to help lift the IC from its socket. If the screwdriver method is used, extreme caution must be taken so that surrounding components are not damaged.

g) Carefully insert the new EPROM into position, noting orientation. **Care must be used to assure that all pins are properly aligned and inserted.** After insertion, assure that all pins are properly seated in the socket.

h) The larger IC package is the H8 microprocessor (with internal EPROM). This package is located on the I/O Board and can be very difficult to remove. In addition, damage to surrounding components can occur if care is not taken. Refer to Figure 1 for location and the "Important" statement above before removing the IC package. Remove IC package noting notch orientation.

i) Noting notch orientation (notch on IC must align with notch on socket), insert the new package into the socket. **Care must be used to assure that all the pins are properly aligned and inserted.** When all pins are aligned and inserted, firmly press the package down until it is fully seated. Inspect all pins to assure that no damage has occurred.

j) Reassemble the Display & Keypad Module and the I/O Board. Assure that the board connectors are fully seated and cables previously removed are re-connected.

k) Replace drive cover and remove wrist strap. Check for proper operation. Reprogramming should not be required.

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