

Replacement Parts for EDGE® Pro CNC

Field Service Bulletin

806440 Revision 9 December 2022

Hypertherm, Inc.

21 Great Hollow Road, P.O. Box 5010 Hanover, NH 03755 USA 603-643-3441 Tel (Main Office) 603-643-5352 Fax (All Departments) info@hypertherm.com (Main Office)

800-643-9878 Tel (Technical Service) technical.service@hypertherm.com (Technical Service) 800-737-2978 Tel (Customer Service) customer.service@hypertherm.com (Customer Service)

Hypertherm México, S.A. de C.V.

52 55 5681 8109 Tel 52 55 5681 7978 Tel soporte.tecnico@hypertherm.com (Technical Service)

Hypertherm Plasmatechnik GmbH

Sophie-Scholl-Platz 5 63452 Hanau Germany 00 800 33 24 97 37 Tel 00 800 49 73 73 29 Fax

31 (0) 165 596900 Tel (Technical Service) 00 800 4973 7843 Tel (Technical Service)

technicalservice.emeia@hypertherm.com (Technical Service)

Hypertherm (Singapore) Pte Ltd.

Solaris @ Kallang 164 164 Kallang Way #03-13 Singapore 349248, Republic of Singapore 65 6841 2489 Tel 65 6841 2490 Fax marketing.asia@hypertherm.com (Marketing) techsupportapac@hypertherm.com (Technical Service)

Hypertherm Japan Ltd.

Level 9, Edobori Center Building 2-1-1 Edobori, Nishi-ku Osaka 550-0002 Japan 81 6 6225 1183 Tel 81 6 6225 1184 Fax htjapan.info@hypertherm.com (Main Office) techsupportapac@hypertherm.com (Technical Service)

Hypertherm Europe B.V.

Laan van Kopenhagen 100 3317 DM Dordrecht Nederland 31 165 596907 Tel 31 165 596901 Fax 31 165 596908 Tel (Marketing) **31 (0) 165 596900 Tel (Technical Service)**

00 800 4973 7843 Tel (Technical Service)

technicalservice.emeia@hypertherm.com (Technical Service)

© 2022 Hypertherm, Inc. All rights reserved. 100% Associate-owned.

EDGE, EDGE Connect, Phoenix, and Hypertherm are trademarks of Hypertherm, Inc. and may be registered in the United States and/or other countries. All other trademarks are the property of their respective holders.

Environmental stewardship is one of Hypertherm's core values. www.hypertherm.com/environment

Hypertherm (Shanghai) Trading Co., Ltd.

B301, 495 ShangZhong Road Shanghai, 200231 PR China 86-21-80231122 Tel 86-21-80231120 Fax

86-21-80231128 Tel (Technical Service)

techsupport.china@hypertherm.com (Technical Service)

South America & Central America: Hypertherm Brasil Ltda.

Rua Bras Cubas, 231 – Jardim Maia Guarulhos, SP – Brasil CEP 07115-030 55 11 2409 2636 Tel tecnico.sa@hypertherm.com (Technical Service)

Hypertherm Korea Branch

#3904. APEC-ro 17. Heaundae-gu. Busan. Korea 48060 82 (0)51 747 0358 Tel 82 (0)51 701 0358 Fax marketing.korea@hypertherm.com (Marketing) techsupportapac@hypertherm.com (Technical Service)

Hypertherm Pty Limited

GPO Box 4836 Sydney NSW 2001, Australia 61 7 3103 1695 Tel 61 7 3219 9010 Fax au.sales@hypertherm.com (Main Office) techsupportapac@hypertherm.com (Technical Service)

Hypertherm (India) Thermal Cutting Pvt. Ltd

A-18 / B-1 Extension, Mohan Co-Operative Industrial Estate, Mathura Road, New Delhi 110044, India 91-11-40521201/ 2/ 3 Tel 91-11 40521204 Fax htindia.info@hypertherm.com (Main Office) technicalservice.emeia@hypertherm.com (Technical Service)

Contents

Location of EDGE Pro parts	1
Common parts – inside the chassis	1
Common parts – front door	3
Common parts – rear view	4
HyPath parts	5
Picopath parts	6
SERCOS II and SERCOS III parts	7
EDGE Pro Ti parts	8
Micropath parts	9
Diagnostic test kits	11
Common test kits	11
HyPath test kits	11
Picopath test kits	12
EDGE Pro Ti test kit	12
Replacing EDGE Pro parts	13
Accessing parts	13
228445 – Ethernet connector	14
228446 – HASP hardware key	14
228447 – Hard disk drive	14
228448 – Power distribution board (141153)	15
228449 – Utility board (141055)	15
228450 – Operator panel board (141058)	16
228451 – Picopath or HyPath 4- or 6-axis MCC board (141061)	
228452 – HyPath 6-axis servo encoder board (141067)	
228453 – HyPath 24 I/O board (141070)	17
228454 – Motherboard (141110)	17
228455 – Micropath 2-axis servo encoder board (141113)	19
228456 – SERCOS II master board (141116)	20
228457 – Micropath 4-axis MCC board (141119)	20
228458 – Picopath 4-axis servo encoder board (141122)	20

Contents

228459 – Analog board (141125)	21
228460 – Surge board (141134)	21
228462 – 15-inch LCD touchscreen monitor	22
228464 – AC input module	26
228465 – Power switch	26
228467, 228468 - Switch assembly, green and red	27
228469 – Toggle switch	27
228470 - Potentiometer	27
228471 - Joystick	29
228472 – Shroud fan	30
228474 – sub-chassis fan	30
228473 – ATX power supply	31
228553 – Serial isolation board (141010)	32
428001 – Utility and serial isolation board (141307)	33
428002 – EDGE Pro Ti relay I/O board (141278)	34
428003 - EDGE Pro Ti DC servo encoder board (141281)	34
428004 – EDGE Pro Ti 6-axis MCC board (141191)	35
428005 - EDGE Pro Ti surge and safety board (141287)	35
428006 – EDGE Pro Ti power supply	36
428007 – EDGE Pro Ti external fan	37
428008 - EDGE Pro Ti DC servo amplifier module (228360)	37
428011 - Motherboard battery	38
428012 – Motherboard fan	38
428058 – EDGE Pro Ti power entry module	38
428059 - USB cable	39
428060 – EDGE Pro Ti rear fan	39
428063 – Wireless network board (141223)	40
428071 - SERCOS III master board (141310)	41
428105 – Picopath 2-axis servo encoder board (141254)	41
428106 - HyPath 2- and 4-axis servo encoder board (141292)	42
428107 - Wireless antennas	42

Location of EDGE Pro parts

Common parts – inside the chassis



ltem	Kit Number	Description	Qty
1	228446	HASP hardware key	1
2	428107	Wireless antennas (with no wireless board)	1
3	228474	Sub chassis fan, 12 V	1
4	228454	Motherboard (141110)	1
5	228447	Hard drive, 250 GB, SATA	2
6	428063	Wireless network board, cables, and antennas (141223)	1
7	228448	Power distribution board (141153)	1
8	428001	Utility and serial isolation board (141307)	1
9	228459	Analog board, for Sensor THC equipped configurations only (141125)	1
10	228460	Surge board, 230 V, for HyPath, Picopath, SERCOS II, SERCOS III, Micropath (141134)	1
11	228473	Power supply, ATX, 1 U, 400 W, for HyPath, Picopath, SERCOS II, SERCOS III Micropath	1



ltem	Kit Number	Description	Qty.
1	228553	Serial isolation (RS-232 and RS-422) board (HyPath, Picopath, SERCOS II, Micropath) (141010)	1
2	228449	Utility board (141055)	1
3	228472	Shroud fan, 24 V	1

Common parts – front door





ltem	Kit Number	Description	Qty.
1	228471	Joystick	1
2	228470	Potentiometer	1
3	228462	15-inch LCD touchscreen	1
4	228468	Switch assembly, red	1
5	228467	Switch assembly, green	1
6	428059	USB connector and cable, 0.5 m (1.6 ft)	1
7	228465	Power switch	1
8	228450	Operator panel board (141058)	1
9	228469	Toggle switch	1
10	228463	Switch assembly	1

Common parts – rear view



Item	Kit Number	Description	Qty.
1	228464	AC input module	1
2	228445	LAN or Hypernet connector	1
3	428059	USB connector and cable, 0.5 m (1.6 ft)	1

HyPath parts



Item	Kit Number	Description	Qty.
1	228453	HyPath 24 I/O board, for I/O 25 through 48 (141070)	1
2	228453	HyPath 24 I/O board, for I/O 1 through 24 (141070)	1
3	428106	HyPath 2- and 4-axis servo encoder board (141292)	1
4	228451	HyPath 6-axis MCC board (141061) EDGE. Note: For proper use of this replacement part, Phoenix [®] Version 9.76.4 or higher control software update is required.	1



Picopath parts



ltem	Kit Number	Description	Qty.
1	228458	Picopath 4-axis servo board (141122)	1
	428105	Picopath 2-axis servo board (141254)	1
2	228451	Picopath 4-axis MCC board (141061) Note: For proper use of this replacement part, Phoenix [®] Version 9.76.4 or higher control software update is required.	1



SERCOS II and SERCOS III parts



Item	Kit Number	Description	Qty.
1	228456	SERCOS II master board (141116)	1
	428071	SERCOS III master board (141310)	1

EDGE Pro Ti parts



Item	Kit Number	Description	Qty.
1	428002	EDGE Pro Ti relay I/O board (141278)	1
2	428003	EDGE Pro Ti 6-axis servo board (141281)	1
3	428008	EDGE Pro Ti servo amplifier board (228360)	1
4	428005	EDGE Pro Ti surge and safety board (141287)	1
5	428004	EDGE Pro Ti 6-axis MCC board (141191). For proper use of this replacement part, Phoenix [®] Version 9.76.4 or higher control software update is required.	1
6	428006	EDGE Pro Ti Power supply, 60 VDC, 1000 W	1



Micropath parts



Item	Kit Number	Description	Qty
1	228455	Micropath 2-axis servo, 5 V encoder board (141113)	1
2	228457	Micropath 4-axis MCC board (141119)	1

Diagnostic test kits

Follow the instructions in the EDGE Pro Instruction Manual that shipped with your CNC to use the test kits shown in this section.

Common test kits







Item	Part Number	Description	Qty.
	228512	EDGE Pro common test kit – Includes the following testers:	1
1	228503	Tester: LAN and Hypernet	1
2	228504	Tester: RS-422 serial ports	1
З	228505	Tester: USB	1

HyPath test kits







ltem	Part Number	Description	Qty.
	228511	EDGE Pro HyPath test kit – Includes the following testers:	1
1	228536	Tester: Integrated THC	1
2	228496	Tester: HyPath axes	1
3	228497	Tester: HyPath I/O (green stripe)	1
	228498	Tester: HyPath I/O (red stripe)	1

Picopath test kits



ltem	Part Number	Description	Qty
	228510	EDGE Pro Picopath test kit – Includes the following testers:	1
1	228537	Tester: Integrated THC	1
2	228499	Tester: Picopath axes	1
3	228500	Tester: Picopath I/O (white stripe)	1
	228501	Tester: Picopath I/O (orange stripe)	1

EDGE Pro Ti test kit



Item	Part Number	Description	Qty.
	428057	EDGE Pro Ti test kit – Includes the following testers:	1
1	428010	Tester: E-stop, for contacts in dry mode (blue)	1
2	428056	Tester: E-stop, for contacts in sourced mode (yellow)	1
3	428009	Tester: I/O, for contacts in dry mode (green)	1
4	428048	Tester: I/O, for contacts in dry mode (red)	1
5	428049	Tester: I/O, for contacts in sourced mode (orange)	1
6	428050	Tester: I/O, for contacts in sourced mode (white)	1
7	428016	Tester: Lifter and plasma interface	1

Replacing EDGE Pro parts

Use the instructions in the following sections to replace parts in the EDGE Pro CNC.



Replacement procedures are listed in order by the kit number for the part you are replacing. Before you begin a procedure, verify that you are using the procedure for the correct.



WARNING!

ELECTRIC SHOCK CAN KILL

Disconnect electrical power before replacing any part.

Only qualified personnel can work inside the CNC cabinet with AC power connected.

See Safety on page 1 for more safety precautions.

	WARNING! ELECTRIC SHOCK CAN KILL
Ń	Turn OFF electrical power to the CNC before opening panels on the enclosure.

	CAUTION!
100 A	Store PC boards in anti-static containers. Wear a grounded wrist strap when handling PC boards.

Accessing parts

The CNC has three panels in the enclosure that open to give you access to the parts inside. Depending on the part you are replacing, you may have to open one or more panels. Set aside all screws and other hardware for reuse.

- To open the front panel, remove the three screws at the top of the panel and the three screws at the bottom of the panel.
- To open the side or rear panel, remove the two screws at the top of the panel and the two screws at the bottom of the panel.

228445 - Ethernet connector

Follow the steps in *Accessing parts* to open the front panel of the CNC enclosure. Set aside all screws and other hardware for reuse.

To remove the connector:

- 1. Disconnect the external Ethernet cable.
- 2. Disconnect the internal Ethernet cable.
- 3. Unfasten the four nuts on the inside of the connector.
- 4. Pull the connector to the inside of the enclosure.

To replace the connector:

- 1. Position the connector in the opening in the rear panel of the enclosure.
- 2. Fasten the four nuts on the standoffs on the connector.
- 3. Reconnect the internal and external Ethernet cables.

228446 - HASP hardware key

Follow the steps in *Accessing parts* to open the front panel of the CNC enclosure. Set aside all screws and other hardware for reuse.



Anytime the HASP is changed, you may need a new password. Contact your table manufacturer or Hypertherm Technical Service to determine if you need a new password.

To remove the HASP key:

1. Remove the USB memory device from the top right USB port on the I/O panel on the motherboard.

To replace the HASP key:

1. Insert the USB memory device into the top right USB port on the I/O panel on the motherboard.

228447 - Hard disk drive

Follow the steps in *Accessing parts* to open the front panel of the CNC enclosure. Set aside all screws and other hardware for reuse.

To remove the hard disk drive:

- 1. Disconnect power and data cables from the hard drive.
- 2. Remove the four screws from the hard drive pocket.
- 3. Slide the hard drive assembly from the pocket and set it aside.

To replace the hard disk drive:

- 1. Slide the hard drive assembly back into the hard drive pocket on the board.
- 2. Refasten the four screws in the hard drive pocket.
- 3. Reconnect the power and data cables.

228448 – Power distribution board (141153)

Follow the steps in *Accessing parts* to open the front panel of the CNC enclosure. Set aside all screws and other hardware for reuse.

To remove the board:

- 1. Note the position and location of all cable connections on the board.
- 2. Remove all cables from the connectors on the board.
- 3. Remove the screw in the center of the board.
- 4. Pull the board toward the front of the enclosure and lift it off the standoffs.
- 5. Locate the part number on the board:

If the part number is 141153, replace the power distribution board, using the instructions in Steps 1 - 4. If the part number is 141049, use the additional instructions in Step 6 before replacing the board.

- 6. If the power distribution board has part number 141049, replace the cable 229246 with cable 229348 from the kit:
 - a. Cut the cable tie that secures the AC power connector to the power supply.
 - b. Carefully unplug the connector from the power supply. You may have to bend the metal tab on the power supply mounting bracket to unplug the connector. Do not over-bend the tab.
 - c. Plug cable 229348 into the power supply and secure it with the cable tie from the kit.

To replace the power distribution board:

- 1. Remove the board from the packaging.
- 2. Fit the large end of the keyhole-shaped holes in the board over the standoffs.
- 3. Slide the board toward the rear of the enclosure to move the small end of the key-shaped holes over the standoffs.
- 4. Fasten the screw in the center of the board.
- 5. Plug the cables into the appropriate connectors on the board.

228449 - Utility board (141055)

This utility board is always installed at the top of the PCI stack on the motherboard. If you are replacing the utility and serial isolation board (141307), see the instructions on page 33.

Follow the steps in *Accessing parts* to open the front and side panels of the CNC enclosure. Set aside all screws and other hardware for reuse.

To remove the utility board:

- 1. Note the connector for each cable that connects to this board.
- 2. Remove the cables to the operator panel board (J3).
- 3. Remove the cable to the power distribution board.
- 4. Remove the screws from the standoffs at the front of the board.
- 5. Pull the board from the PCI slot on the motherboard.

To replace the utility board:

- 1. Remove the board from the packaging.
- 2. Insert the board connector into the utility board PCI slot on the motherboard and position the holes at the front of the board over the standoffs.
- 3. Fasten the screws in the standoffs.
- 4. Plug in the cables from the power distribution and operator panel boards.

228450 - Operator panel board (141058)

Follow the steps in *Accessing parts* to open the front panel of the CNC enclosure. Set aside all screws and other hardware for reuse.

To remove the board:

- 1. Note the connector for each cable that connects to this board.
- 2. Disconnect the cable plugs from the connections.
- 3. Remove the screw in the center top of the operator panel board.
- 4. Gently pry the board from the spring-loaded standoffs.

To replace the board:

- 1. Remove the replacement board from the packaging.
- 2. Fit the new board over the spring-loaded standoffs. Verify that all cables and connectors are accessible for reconnection then press the board into place.
- 3. Insert and fasten the screw in the center top of the board.
- 4. Reattach plugs on the cables to connectors J1 through J16.

228451 - Picopath or HyPath 4- or 6-axis MCC board (141061)



For proper use of this replacement part, Phoenix[®] Version 9.76.4 or higher control software update is required.

Follow the steps in *Accessing parts* to open the front panel of the CNC enclosure. Set aside all screws and other hardware for reuse.

If your CNC has either the utility board, the analog board, or both installed, you must remove them before you can remove the 6-axis MCC board. Refer to the procedures for removing the utility board (on page 15) and the analog board (on page 21) for more information.

To remove the 6-axis MCC board:

- 1. Note the connector for each cable that connects to this board.
- 2. Remove the I/O and 6-axis servo cables.
- 3. Remove the nuts from the standoffs at the front of the board.
- 4. Pull the board from the PCI slot on the motherboard.

To replace the 6-axis MCC board:

- 1. Remove the board from the packaging.
- 2. Insert the board connector into PCI 5 slot on the motherboard and position the holes at the front of the board over the standoffs.
- 3. Fasten the screws in the standoffs.
- 4. Plug in one or both of the two I/O cables and the 6-axis servo cable.

228452 - HyPath 6-axis servo encoder board (141067)

Follow the steps in *Accessing parts* to open the rear panel of the CNC enclosure. Set aside all screws and other hardware for reuse.

To remove the 6-axis servo board:

- 1. On the outside of the rear panel, remove the screws around each circular plastic connector (CPC).
- 2. Note the connector for each cable that connects to this board.
- 3. On the inside of the rear panel, unplug the cable from the power connector and the 40-pin I/O connector.
- 4. Remove the two screws in the left side of the board and lift the board off the two spring-loaded standoffs on the right side of the board.

To replace the 6-axis servo board:

- 1. Remove the board from the packaging.
- 2. Line up the standoff holes on the right side of the board with the spring-loaded standoffs.
- 3. Line up the CPC connectors on the back of the board with the openings in the rear panel.
- 4. Press the board into place.
- 5. Fasten the two screws into the standoffs on the left side of the board.
- 6. Plug in the I/O ribbon cable and the power cable.
- 7. Fasten the CPC connectors to the outside of the rear panel with the screws.

228453 - HyPath 24 I/O board (141070)

Follow the steps in *Accessing parts* to open the rear panel of the CNC enclosure. Set aside all screws and other hardware for reuse.

To remove the 24 I/O board:

- 1. On the outside of the rear panel, remove the screws around each circular plastic connector (CPC).
- 2. Note the connector for each cable that connects to this board.
- 3. On the inside of the rear panel, unplug the cables from the power connectors (J1 and J2).
- 4. Unplug the 50-pin MCC I/O ribbon cable (J3).
- 5. Remove the screw in the center of the board.
- 6. Lift the board off the four spring-loaded standoffs.

To replace the 24 I/O board:

- 1. Remove the board from the packaging.
- 2. Line up the standoff holes in the board with the spring-loaded standoffs.
- 3. Line up the CPC connectors on the back of the board with the openings in the rear panel.
- 4. Press the board into place.
- 5. Fasten the screw in the center of the board.
- 6. Plug in the MCC I/O ribbon cable, the Field power cable, and the ATX power cable.
- 7. Fasten the CPC I/O connectors to the outside of the rear panel with screws.

228454 - Motherboard (141110)

Before you remove any parts from the CNC, copy the Phoenix.ini file to a memory stick. This procedure is easier if you can alternate between a USB keyboard and mouse connected to the USB port on the front of the EDGE Pro.

Set aside all screws and other hardware for reuse.

- 1. Insert the memory stick in the USB port on the rear of the EDGE Pro.
- 2. Press the Windows[®] key () on the keyboard or press Ctrl/Esc to open the Windows Start menu.
- 3. In Windows Explorer[®] on the CNC, navigate to the C:\Phoenix folder and copy the Phoenix.ini file to the memory stick.

Replacing EDGE Pro parts

4. Follow the steps in Accessing parts to open the front and side panels of the CNC enclosure.

To replace the motherboard, you must also remove the following boards in the CNC enclosure:

- Serial isolation board
- sub-chassis fan
- Any boards in the PCI slots
- Power distribution board

As you remove these boards, note the connector for each cable that connects to this board.

To remove the motherboard:

- 1. Remove the ATX power harness from the sub-chassis cavity through the cable port in the left side of the sub-chassis.
- 2. Disconnect all cables from the motherboard and remove them from the sub-chassis cavity.
- 3. Remove cables from the I/O panel on the motherboard.
- 4. Unplug the SATA, utility board, and fan cables.
- 5. Cut the cable tie for the SATA cable on the hard drive pocket and remove the cable from the sub-chassis.
- 6. Use the appropriate procedures in this FSB to remove the following parts:
 - sub-chassis fan (page 30)
 - Serial isolation board (page 32)
 - Boards in the PCI slots (note the PCI slot number for each board)
 - Power distribution board (page15)
- 7. Remove screws from the standoffs around the outside of the board and the single screw from below the DIMM1 slot.
- 8. Pull the motherboard from the spring-loaded standoffs.
- 9. Pull the motherboard to the right to detach it from the I/O mounting frame.
- 10. Tilt the top of the motherboard forward and to the right and lift it out of the sub-chassis.

To replace the motherboard:

- 1. Align the standoff holes and I/O connectors with the standoffs and I/O panel in the sub-chassis.
- 2. Snap the motherboard onto the spring-loaded standoffs.
- 3. Refasten the 8 screws on the board.
- 4. Replace the following parts, using the appropriate procedures in this FSB:
 - sub-chassis fan (page 30)
 - Serial isolation board (page 32)
 - Boards in the PCI slots (verify that each board is returned to the correct slot)
- 5. Reconnect the cables to the connectors in the I/O panel.
- 6. Reconnect the SATA and power distribution board cables.
- 7. Secure the SATA cable to the hard drive pocket with a cable tie.
- 8. Reconnect the internal fan cable to connector J6.
- 9. Thread the ATX wire harness through the cable port in the sub-chassis and reconnect cables to the motherboard, power distribution board, and serial isolation board.

Calibrate the touch screen:

- 1. Plug in the power cord and power ON the CNC.
- 2. Verify that all drives and motors are disabled.
- 3. If the Looking for "Hardware Key..." message displays, wait for it to disappear.
- 4. Plug in a USB keyboard.

- 5. Click Enter to accept the copyright notice.
- 6. Enter 7MOREDAYS at the Hardware Key prompt and press Enter twice.
- 7. Press or click Enter to accept the "Unable to load some..." message, if it appears.
- 8. If the Hardware Key prompt displays again, press or click Enter.
- 9. When the Preview Window displays, select Setup > Diagnostics > System (or press F4, F6, then F8) to start calibrating the touch screen.
- 10. Follow the instructions on the screen to complete the calibration.

Request a new HASP password:

The 7MOREDAYS HASP password that you entered in the previous procedure is only effective for 7 days. Before that HASP password expires, you must email the Phoenix.ini file to Hypertherm and request a new HASP password.

- 1. Email the Phoenix.ini file that you saved on the memory stick to htasales@Hypertherm.com and request a new HASP password.
- 2. After you receive this new HASP password, power ON the CNC.
- 3. Enter the new HASP password and click OK. If you are not able to enter text, press on the message window to focus the screen.
- 4. Enable the drives and motors in your system.
- 5. Verify the operation of your system or use the procedure that you receive with the HASP password.

228455 – Micropath 2-axis servo encoder board (141113)

Follow the steps in *Accessing parts* to open the rear panel of the CNC enclosure. Set aside all screws and other hardware for reuse.

To remove the Micropath 2-axis servo board:

- 1. Note the connector for each cable that connects to this board.
- 2. On the inside of the rear panel, unplug the three power cables, the 40-pin encoder cable and the 50-pin I/O cable.
- 3. On the outside of the rear panel, remove the screws on the rear panel.
- 4. On the inside of the rear panel, remove the screw from the right side of the board.
- 5. Remove the board, metal mounting panel, and connectors.
- 6. Remove the screws that attach the metal flange for each circular plastic connector (CPC) to the split mounting panel.
- 7. Remove both sides of the mounting panel.

To replace the Micropath 2-axis servo board:

- 1. Reassemble the mounting panel behind the CPC connectors.
- 2. Fasten the metal flanges on each CPC to the mounting panel with four screws.
- 3. From the inside of the rear panel, pass the connectors, with the I/O connector on the bottom, through the opening in the rear panel.
- 4. Fasten the screw to the standoff on the right side of the board.
- 5. On the outside of the rear panel, align the mounting panel with the rear panel at the six holes then fasten the screws.
- 6. Plug in the 50-pin I/O cable and the 40-pin encoder cable.
- 7. Plug in the power cables.

228456 - SERCOS II master board (141116)

Follow the steps in *Accessing parts* to open the front panel of the CNC enclosure. Set aside all screws and other hardware for reuse.

To remove the SERCOS II master board:

- 1. Note the connector for each cable that connects to this board.
- 2. Remove the cables from the side of the board.
- 3. Remove the screw in the mounting frame.
- 4. Pull the board from the PCI slot on the motherboard.

To replace the SERCOS II board:

- 1. Insert the SERCOS II board into PCI slot 4 on the motherboard.
- 2. Fasten the screw in the mounting board.
- 3. Reconnect the RX and TX cables to the correct connector on the side of the board.

228457 – Micropath 4-axis MCC board (141119)

Follow the steps in *Accessing parts* to open the front panel of the CNC enclosure. Set aside all screws and other hardware for reuse.

If your CNC has either the utility board, the analog board, or both installed, you must remove them before you can remove the 4-axis MCC board. Refer to the procedures for removing the utility board (on page 15) and the analog board (on page 21) for more information.

To remove the 4-axis MCC board:

- 1. Note the connector for each cable that connects to this board.
- 2. Remove the I/O and 4-axis servo cables.
- 3. Remove the nuts from the standoffs at the front of the board.
- 4. Pull the board from the PCI slot on the motherboard.

To replace the 4-axis MCC board:

- 1. Remove the board from the packaging.
- 2. Insert the board connector into PCI 5 slot on the motherboard and position the holes at the front of the board over the standoffs.
- 3. Fasten the screws in the standoffs.
- 4. Plug in one or both of the two I/O cables and the 4-axis servo cable.

228458 - Picopath 4-axis servo encoder board (141122)

Follow the steps in *Accessing parts* to open the rear panel of the CNC enclosure. Set aside all screws and other hardware for reuse.

To remove the Picopath 4-axis servo encoder board:

- 1. Note the connector for each cable that connects to this board.
- 2. On the inside of the rear panel, unplug the power cable, the 40-pin encoder cable, and the 50-pin I/O cable.
- 3. On the outside of the rear panel, remove the screws on the rear panel.
- 4. On the inside of the rear panel, remove the screw from the right side of the board.
- 5. Remove the board, metal mounting panel, and connectors.

- 6. Remove the four screws that attach the metal flange for each circular plastic connector (CPC) to the split mounting panel.
- 7. Remove both sides of the mounting panel.

To replace the Picopath 4-axis servo encoder board:

- 1. Reassemble the mounting panel behind the CPC connectors.
- 2. Fasten the metal flanges on each CPC to the mounting panel with four screws.
- 3. From the inside of the rear panel, pass the connectors, with the I/O connector on the bottom, through the opening in the rear panel.
- 4. Fasten the screw to the standoff on the right side of the board.
- 5. On the outside of the rear panel, align the mounting panel with the rear panel at the six holes then fasten the screws.
- 6. Plug in the 50-pin I/O cable and the 40-pin encoder cable.
- 7. Plug in the power cables.

228459 - Analog board (141125)

Follow the steps in *Accessing parts* to open the front panel of the CNC enclosure. Set aside all screws and other hardware for reuse. You must remove the utility board before you can remove the analog board. Refer to the procedures on page 15 for more information.

To remove the analog board:

- 1. Label the cables that are plugged into J1 and J2.
- 2. Unplug the cables for THC1 and THC2 from J1 and J2.
- 3. Remove the nuts from the standoffs at the front of the board.
- 4. Pull the board from the PCI slot on the motherboard.

To replace the analog board:

- 1. Remove the board from the packaging.
- 2. Insert the board connector into PCI 4 slot on the motherboard and position the holes at the front of the board over the standoffs.
- 3. Fasten the nuts in the standoffs.
- 4. Reconnect the cables from the THC1 and THC2 connectors on the rear of the encloser. Verify that you connect the correct cable to the J1 and J2 connectors on the board.

228460 - Surge board (141134)

Follow the steps in *Accessing parts* to open the front panel of the CNC enclosure. Set aside all screws and other hardware for reuse.

To remove the surge board:

- 1. Note the connector for each cable that connects to this board.
- 2. Disconnect the cables that come from the power entry module power distribution board.
- 3. Remove the screws from the standoffs.
- 4. Lift the board off the spring-loaded standoffs.

To replace the surge board:

- 1. Remove the board from the packaging.
- 2. Snap the board onto the spring-loaded standoffs.
- 3. Replace and fasten the two screws in the standoffs.
- 4. Plug the cables for the power entry module and the power distribution board into their respective connectors.

228462 – 15-inch LCD touchscreen monitor

Follow the steps in *Accessing parts* to open the front panel of the CNC enclosure. Set aside all screws and other hardware for reuse.

To remove the LCD touchscreen monitor:

- 1. Cut the wraps that attach the VGA, USB, and AC power cables.
- 2. Remove the VGA, USB, and AC power plugs.
- 3. Remove the 9 nuts and save them. You will need these nuts to install the new LCD touchscreen monitor.
- 4. Gently pull the LCD touchscreen monitor from the frame and set it aside. You may have to push on the screen on the outside of the door.



Make sure to leave the soft gasket in place for use with the new LCD touchscreen monitor.



To replace the LCD touchscreen monitor:

- 1. Remove the replacement LCD touchscreen monitor from the package.
- 2. Collect the nuts that were removed from the old LCD touchscreen monitor.
- 3. Set the display into the door as shown below. Make sure that the sill lip from the LCD touchscreen monitor is installed in its correct position in the door opening.





The sill lip (shown below) centers the LCD touchscreen monitor into the front door.



4. Place the mounting brackets on the top-right and bottom-left corners of the new LCD touchscreen monitor. Refer to the next page.





- 5. Reinstall the nuts from the old LCD touchscreen monitor.
- 6. Install the 8 screws loosely on all four sides of the LCD touchscreen monitor.
- 7. After installing the 8 screws, press down gently on the LCD touchscreen monitor and tighten each of the 8 screws against the gasket.



To get to the bottom-right screw on the mounting bracket, remove the Stop button by moving the cam lock toward the right as shown below.



- 8. Re-attach the Stop button and move the cam to the left.
- 9. Disconnect the old display power plug from J8 on the power distribution board.

10. Connect the 12 VDC power cable to the J12 HDD connector.



11. Put the 12 VDC power cable between J9 and J10 as shown below. (This step is recommended, but not necessary.)



12. Use cable ties to attach the power cable to the bottom surface of the CNC as shown below.



- 13. To close the front panel of the CNC enclosure, reverse the steps in Accessing parts.
- 14. To calibrate the touchscreen, select **Setup > Diagnostics > System** (or press **F4**, **F6**, then **F8** on a keyboard) and follow the instructions on the screen.

228463 - Switch assembly

Follow the steps in *Accessing parts* to open the front panel of the CNC enclosure. Set aside all screws and other hardware for reuse.

To remove the switch assembly:

- 1. Disconnect the cable from the front panel board.
- 2. Remove the nut on the button assembly next to the sheet metal.
- 3. Pull the button assembly through the front of the panel.

To replace the switch assembly:

- 1. Verify that the black washer is in place in back of the button.
- 2. Align the flat spaces of the button and the opening and push the button assembly through the panel.
- 3. Fasten the nut on the rear of the panel and tighten with a wrench.
- 4. Connect the cable to the front panel board.

228464 - AC input module

Follow the steps in *Accessing parts* to open the front panel of the CNC enclosure. Set aside all screws and other hardware for reuse.

To remove the AC input module:

- 1. Disconnect the cable from the module from connector J1 on the surge board.
- 2. Loosen the ground nut on the inside rear of the enclosure and remove the ground wire.
- 3. On the rear panel of the enclosure, remove the screws on both sides of the module.
- 4. Pull the module and wires from the enclosure.

To replace the AC input module:

- 1. Pass the wires and power module through the opening in the rear of the enclosure.
- 2. Fasten the screws that attach the module to the enclosure.
- 3. Connect the ground wire to the ground nut and tighten the nut.
- 4. Plug the power input cable from the module into connector J1 on the surge board.

228465 - Power switch

Follow the steps in *Accessing parts* to open the front panel of the CNC enclosure. Set aside all screws and other hardware for reuse.

To remove the power switch:

- 1. Unplug the cable from connector J16 on the front panel board.
- 2. Depress the four tabs on the edges of the assembly.
- 3. Pull the assembly through the front of the panel.

To replace the power switch:

- 1. Snap the switch into the opening through the front panel. Make sure that the green light with the ON symbol is on top.
- 2. Connect the cable to connector J16 on the front panel board.

228467, 228468 - Switch assembly, green and red

Follow the steps in *Accessing parts* to open the front panel of the CNC enclosure. Set aside all screws and other hardware for reuse.

To remove the pushbutton:

- 1. Unplug the pushbutton cable from the front panel board.
- 2. Move the red tab at the bottom of the black plastic frame to the right and remove the frame.
- 3. Remove the collar on the pushbutton and lift off the square metal washer.
- 4. Pull the pushbutton assembly through the front panel.

To replace the pushbutton:

- 1. Insert the pushbutton through the front panel, verifying that the black plastic washer remains in place.
- 2. Replace the square metal washer over the pushbutton on the inside of the front panel, with bent corners toward the panel.
- 3. Fit the black plastic frame over the assembly and move the red switch to the left.
- 4. Plug the cable into the front panel board.

228469 - Toggle switch

Follow the steps in *Accessing parts* to open the front panel of the CNC enclosure. Set aside all screws and other hardware for reuse.

To remove the toggle switch:

- 1. Unplug the cable from the front panel board.
- 2. Remove the rubber boot on the outside with a wrench. Newer units use sealed switches and the rubber boot has been replaced by a retaining nut. Use pliers to remove this retaining nut.
- 3. Pull the switch to the inside of the panel.

To replace the toggle switch:

- 1. On the inside of the panel, align the notch in the top of the toggle switch with the tab in the opening in the sheet metal and push the switch through.
- 2. Replace the rubber boot. If the kit includes retaining nuts, replace both switches with the retaining nuts and discard the rubber boots.
- 3. Plug the cable into the front panel board.

228470 - Potentiometer

Follow the steps in *Accessing parts* to open the front panel of the CNC enclosure. Set aside all screws and other hardware for reuse.

To remove the potentiometer:

- 1. Unplug the cable from the front panel board.
- 2. Use an Allen wrench to remove the screws in the side of the knob and remove the knob.
- 3. Use a wrench to remove the nut and washer on the outside of the panel.
- 4. Remove the assembly through the rear of the panel.

To replace the potentiometer:

1. Remove the nut and washer from the replacement.

- 2. Pass the replacement through the rear of the panel with the wires on the bottom and align the tab with the slot on the right.
- 3. Replace the nut and washer on the front side.
- 4. Replace the knob screws in the sides of the knob so that the white indicator on the knob has the full range of motion.

228471 - Joystick

Follow the steps in *Accessing parts* to open the front panel of the CNC enclosure. Set aside all screws and other hardware for reuse.

To remove the joystick:

1. Remove the nuts from the top and bottom of the aluminum cover (1) and remove the cover (if present).

Note: Save the top nut. Discard the bottom nut (2) and the aluminum cover.

- 2. Unplug the cable from the front panel board.
- 3. For the white EAO brand joystick, move the tab on the bottom of the assembly to the right to remove the joystick wire harness.
- 4. Remove the plastic nut from the joystick.
- 5. Pull the joystick through the panel.



To replace the joystick:

- 1. Remove the plastic nut (1) from the new joystick.
- 2. Place the metal index plate (2) on the door (3) if an index plate is not already present on the door.
- Install the joystick through the index plate and door. Position the white wire towards the top.
- 4. Install the front black plastic nut (1) to secure the joystick.
- 5. Install one 6-32 hex nut (4) to fasten the index plate.
- 6. Plug the joystick connector (5) to the PCB at J8.



228472 – Shroud fan

Set aside all screws and other hardware for reuse.

To remove the shroud fan:

- 1. Remove the screws that attach the shroud to the enclosure of the CNC.
- 2. Remove the shroud from the enclosure.
- 3. Cut the cable tie on the fan cables.
- 4. Disconnect the fan cable CPC from the enclosure.
- 5. Remove the screws from the fan frame.
- 6. Remove the fan.

To replace the shroud fan:

- 1. Insert the screws you removed into the fan frame.
- 2. Place the fan in the frame with the label on the inside and the cables on the left of the frame.
- 3. Fasten the screws into the standoffs.
- 4. Plug in the fan cables and replace the cable tie around the cables.
- 5. Replace the shroud on the enclosure and fasten the screws.

228474 - sub-chassis fan

Follow the steps in *Accessing parts* to open the front panel of the CNC enclosure. Set aside all screws and other hardware for reuse.

To remove the sub-chassis fan:

- 1. Cut the cable tie and unplug the cable from the MB FAN connector on the motherboard.
- 2. Remove the screws from the two holes in the bottom corners of the fan housing.

To replace the sub-chassis fan:

- 1. Fit the hole in the upper left corner of the fan housing over the standoff.
- 2. Fasten screws through the bottom corners of the fan housing.
- 3. Plug the cable into the MB FAN connector on the motherboard.

228473 - ATX power supply

Follow the steps in *Accessing parts* to open the front panel of the CNC enclosure. Set aside all screws and other hardware for reuse.

To remove the power supply:

- 1. Verify that power has been disconnected from the CNC.
- 2. Note the connector for each cable that connects to this power supply.
- 3. Cut the three cable ties that secure the wire harness.
- 4. Disconnect power cables in the wire harness from the motherboard, power distribution board, CPU, and serial isolation board.
- 5. Remove the wire harness through the cable port in the left side of the sub-chassis.
- 6. Disconnect the ATX power cable from connector J9 on the power distribution board.
- 7. Remove the two screws at the front edge of the sub-chassis and slide the power supply frame out.
- 8. On the right side of the power supply, cut the cable tie from the plug for the cable to the power distribution board.
- 9. Pull the plug out and up to release it from the plug bracket. Keep for reuse.
- 10. Discard the old power supply and wire harness.

To replace the power supply:

- 1. Fit the new power supply in the metal frame with the label facing down and the power plug facing the screw hole.
- 2. Secure the power supply to the bracket using the screw in this kit.
- 3. Align the tabs on the top rear of the frame with the slots in the sub-chassis and slide the frame into the sub-chassis.
- 4. Fasten the 2 screws at the front edge of the sub-chassis to secure the power supply.
- 5. Plug the ATX power cable into the power distribution board. Plug the other end of the cable into the new power supply.
- 6. Route the new wire harness through the cable port in the left side of the sub-chassis and connect the wire harness connectors to the motherboard, power distribution, CPU, and serial isolation boards.
- 7. Connect the other end of the wire harness to the connectors on the power supply.
- 8. Use cable ties to secure the cables to the cable tie bases.

228553 - Serial isolation board (141010)

Follow the steps in *Accessing parts* to open the front and side panels of the CNC enclosure. Set aside all screws and other hardware for reuse.

To remove the board:

- 1. Note the connector for each cable that connects to this board.
- 2. Remove the four screws in the D-sub connectors on the back side of the board and unplug the serial cables.
- 3. Unplug the dual serial isolation cable on the component side.
- 4. Unplug the power cable from connector J1.
- 5. Remove the four jack screws on the D-sub connectors.
- 6. Remove the screw at the top of the component side of the board.
- 7. Remove the serial board from the mounting frame.

To replace the board:

- 1. Position the board in the mounting frame.
- 2. Fasten the screw at the top of the component side of the board.
- 3. Replace the screws through the mounting frame, into the D-sub connectors.
- 4. Plug in the power cable.
- 5. Plug in the dual serial isolation cable.

428001 - Utility and serial isolation board (141307)

Follow the steps in *Accessing parts* to open the front and side panel of the CNC enclosure. Set aside all screws and other hardware for reuse.

To remove the utility and serial isolation board:

- 1. Note the connector for each cable that connects to this board.
- 2. Remove serial cables from the left side of the board:
 - a. Remove the screws from either side of the serial cable connectors.
 - b. Remove the grey and multicolored ribbon cable connectors from the serial connectors on the left side of the board.
 - c. Remove the screw that holds the silver board bracket to the side of the sub-chassis.
- 3. On the front of the board, remove the multicolored round cable with the black sleeve from J1.
- 4. On the right side of the board, remove the:
 - Cable bundle from J6.
 - Multicolored ribbon cable from J3.
 - Twisted blue and white cable from J11.
- 5. Remove the multicolored ribbon cable from the cable clamp on the sub-chassis.
- 6. Remove the screw from the standoff at the right front of the board.
- 7. Pull the board from the PCI slot on the motherboard.

To replace the utility and serial isolation board:

- 1. Remove the board from its packaging.
- 2. Insert the board connector into PCI slot 4 on the motherboard and position the hole at the front of the board over the standoff.
- 3. Fasten the screw through the board to the standoff.
- 4. Fasten the screw through the board bracket to the sub-chassis.
- 5. Plug the multicolored cable with the black sleeve from the operator panel into J1.
- 6. Plug cables into the right side of the board:
 - a. Plug in the cable bundle from the power distribution board and motherboard into J6.
 - b. Plug in the multicolored ribbon cable from COM3 and COM4 into J3
 - c. Plug in the blue and white cable from the I/O board into J11.
- 7. Replace the multicolored ribbon cable into the cable clamp and fasten the clamp.
- 8. Plug the serial cables into the left side of the board:
 - a. Plug the grey ribbon cable into the Serial 2 connector.
 - b. Plug the multicolored ribbon cable into the Serial 1 connector.
- 9. Fasten the screws on either side of both serial cable connectors.

428002 - EDGE Pro Ti relay I/O board (141278)

Follow the steps in *Accessing parts* to open the rear panel of the CNC enclosure. Set aside all screws and other hardware for reuse.

To remove the relay I/O board:

- 1. On the outside of the rear panel, remove the screws around the 4 I/O connectors.
- 2. On the inside of the rear panel, unplug the cables from J1, J2, J3, J5, J6, J7, and J8.
- 3. Remove the screws from the lower left and right center of the board.
- 4. Lift the board off the spring-loaded standoffs.

To replace the relay I/O board:

- 1. Remove the board from its packaging.
- 2. Line up the standoff holes in the board with the spring-loaded standoffs.
- 3. Line up the CPC connectors on the back of the board with the openings in the rear panel.
- 4. Press the board into place.
- 5. Fasten the screws in the lower left and the right center of the board.
- 6. Replace the screws in the I/O connectors on the outside of the rear panel.
- 7. Plug the cables into connectors J1, J2, J3, J5, J6, J7, and J8.

428003 - EDGE Pro Ti DC servo encoder board (141281)

Follow the steps in *Accessing parts* to open the rear panel of the CNC enclosure. Set aside all screws and other hardware for reuse.

Before you remove the servo board, remove the servo amplifier modules, using the instructions on page 37.

To remove the servo board:

- 1. On the outside of the rear panel, remove the screws around the 8 encoder and motor connectors.
- 2. On the inside of the rear panel, unplug the cables in J2, J3, J4, J5, J6, J7, and J8 on the servo board.
- 3. Unplug the cables in J5, J6, and J8 in the I/O board.
- 4. Remove the cables from the plastic cable holder on the servo board and remove the cable holder.
- 5. Cut the cable ties that hold the cables to the metal cable bracket at the upper right side of the board.
- 6. Remove the 3 screws from the upper and lower left and lower right of the board.
- 7. Remove the 2 screws and the top plate from the standoffs of the cable bracket
- 8. Unscrew the standoffs.
- 9. Lift the servo board off the spring-loaded standoffs.

To replace the servo board:

- 1. Remove the board from its packaging.
- 2. Replace the board on the rear door:
 - a. Line up the CPC connectors on the back of the board with the openings in the rear panel and fasten the screws on either side of each connector.
 - b. Line up the holes in the board with the spring-loaded standoffs and refasten the screws.
- 3. Fasten the standoffs for the metal cable bracket
- 4. Replace the cable holder plate on the standoffs and fasten the screws.
- 5. Replace the plastic cable holder on the servo board,

- 6. Plug in the cables to J2, J3, J4, J5, J6, J7, and J8 on the servo board.
- 7. Plug in the cables to J5, J6, and J8 on the I/O board.
- 8. Refasten cables to the metal cable bracket with cable ties.
- 9. Replace cables in the plastic cable holder on the servo board.

After you have replaced the servo board, replace the servo amplifier modules, using the instructions on page 37.

428004 – EDGE Pro Ti 6-axis MCC board (141191)



For proper use of this replacement part, Phoenix[®] Version 9.76.4 or higher control software update is required.

Follow the steps in *Accessing parts* to open the front panel of the CNC enclosure. Set aside all screws and other hardware for reuse.

You must remove the utility and serial isolation board before you can remove the 6-axis MCC board. Refer to the procedures on page 33.

To remove the MCC board:

- 1. Note the connector for each cable that connects to this board.
- 2. Remove the I/O and 6-axis servo cables.
- 3. Remove the standoff and screw at the front of the board.
- 4. Lift the board off the standoffs and pull the board from the PCI slot on the motherboard.

To replace the MCC board:

- 1. Remove the board from its packaging.
- 2. Insert the board connector into the PCI 5 slot on the motherboard and position the holes at the front of the board over the standoffs.
- 3. Refasten the screw and standoff.
- 4. Plug in the I/O cable and the 6-axis servo cable.

Replace the utility and serial isolation board using the instructions on page 33.

428005 – EDGE Pro Ti surge and safety board (141287)

Follow the steps in *Accessing parts* to open the rear panel of the CNC enclosure. Set aside all screws and other hardware for reuse.

To remove the surge and safety board:

- 1. Note the connector for each cable that connects to this board.
- 2. Remove the screws from the standoffs in the front of the board.
- 3. Lift the board off the spring-loaded standoffs in the back of the board.

To replace the surge board:

- 1. Remove the board from its packaging.
- 2. Fit the board over the spring-loaded standoffs at the back of the board and snap the board into place.
- 3. Lower the board over the standoffs in front and fasten the 2 screws into the standoffs.
- 4. Plug all cables into their connectors on the board.

428006 - EDGE Pro Ti power supply

Follow the steps in *Accessing parts* to open the front and rear panels of the CNC enclosure. Set aside all screws and other hardware for reuse.

To remove the power supply, start at the rear of the enclosure:

- 1. Remove the connector from J3 on the surge and safety board.
- 2. Cut the cable tie on top of the power supply bracket, to the left of the surge and safety board.

Turn the CNC and complete the removal procedure at the front of the enclosure:

- 1. Unfasten the 2 nuts from the bolts that extend from the floor of the enclosure through the flange in the front of the power supply bracket.
- 2. Unfasten the 2 screws in the front face of the bracket.
- 3. Remove the bracket and set it aside.
- 4. Remove the 3 wires from the terminal block on the right side of the power supply.
- 5. Remove the 2 white connectors behind the terminal block.
- 6. Slide the power supply out of the enclosure as far as possible and remove the heat shrink from the red and black wires that are connected to the tabs behind the terminal block and disconnect these wires.
- 7. Remove the power supply from the enclosure.

To replace the power supply continue at the front of the enclosure:

- 1. Remove the jumper with red and black wires from the side of the new power supply.
- 2. Slide new heat shrink over the ring terminals and down the red and black wires.
- 3. Connect the ring terminals on the red and black wires to the corresponding colored (red and black) tabs on the right side of the power supply.
- 4. Slide new heat shrink over the tabs and ring terminals of the red and black wires then apply heat to secure it in place.
- 5. Fasten the 2 screws through the bracket into the front of the power supply.
- 6. Tip the rear of the assembly and slide it partway into the enclosure.
- 7. Reconnect the wires with the white connectors behind the terminal block (black jumper in the middle, bundle of brown, green, blue, and black wires in the bottom.)
- 8. Refasten the wires into the terminal block on the right side of the power supply:
 - a. Black in front
 - b. White in the middle
 - c. Green/yellow in back (ground)
- 9. Slide the assembly through the enclosure into the rear bracket.
- 10. Lower the notches in the front flange of the bracket over the bolts in the floor of the enclosure and refasten the nuts.

Turn the CNC and complete the replacement procedure at the rear of the enclosure:

- 1. Reconnect the red and black wires to the terminal block on the servo board according to the labels on the board and tighten the screws.
- 2. Reconnect the connector for the multicolored wires in the black sleeve to the I/O board.
- 3. Refasten the red and black cables and the wires in the black sleeve to the cable bracket on the servo board with cable ties.
- 4. Loosely fasten the green/yellow, black, white, and grey wires to the top of the rear power supply bracket with a cable tie.

428007 - EDGE Pro Ti external fan

Set aside all screws and other hardware for reuse.

To remove the external fan:

- 1. Loosen the screws that attach the shroud to the enclosure of the CNC.
- 2. Remove the shroud from the enclosure. Cut the cable tie on the fan cables.
- 3. Cut the cable ties from the cables to the resistors.
- 4. Disconnect the cables from the resistors.
- 5. Disconnect the fan cable CPC from the enclosure.
- 6. Remove the screws from the fan frame.
- 7. Remove the fan.

To replace the external fan:

- 1. Insert the screws you removed into the fan frame.
- 2. Place the fan in the frame with the label on the inside and the cables on the left of the frame.
- 3. Fasten the screws into the standoffs.
- 4. Plug in the fan cables.
- 5. Plug cables into the resistors.
- 6. Replace the shroud on the enclosure and tighten the screws.

428008 - EDGE Pro Ti DC servo amplifier module (228360)

Follow the steps in *Accessing parts* to open the rear panel of the CNC enclosure. Set aside all screws and other hardware for reuse.

To remove the servo amplifier module:

- 1. Follow the instructions on page 39 to remove the rear fan.
- 2. The heatsink under the rear fan shroud is divided into 4 sections and the 4 servo amplifier modules are attached to the inside of these sections.
- 3. For each servo amplifier that you need to replace, remove the screws on the outer edges of the corresponding section of the heatsink that hold the heatsink to the enclosure.
- 4. Gently pull the section of the heatsink away from the enclosure.
- 5. Remove the screws toward the middle of the section of heatsink that fasten it to the servo amplifier module.

To replace the servo amplifier module:

- 1. Gently insert new amplifier module into the sockets on the servo board.
- 2. Fit the section of heatsink over the servo amplifier module and fasten it to the enclosure with screws through the holes on the outer edges.
- 3. Fasten the section of heatsink to the back of the servo amplifier module with screws through the inner holes.

428011 - Motherboard battery

Set aside all screws and other hardware for reuse.

To remove the motherboard battery:

1. Carefully remove the old battery from the socket on the motherboard.

To replace the motherboard battery:

- 1. Insert the new battery into the battery socket on the motherboard and press it gently into place.
- 2. Verify that the "+" sign is visible.

428012 – Motherboard fan

Set aside all screws and other hardware for reuse.

To remove the CPU fan:

- 1. Unplug the fan wire from the connector on the motherboard.
- 2. Remove the four corner clips on the fan from the bracket.
- 3. Remove the fan guard from the fan.

To replace the CPU fan:

- 1. Install the fan guard onto the new fan, so that the fan "label" faces down.
- 2. Snap the fan onto the bracket. Make sure all four corners snap into place.
- 3. Connect the fan wires to the motherboard.

428058 - EDGE Pro Ti power entry module

Follow the steps in *Accessing parts* to open the rear panel of the CNC enclosure. Set aside all screws and other hardware for reuse.

To remove the power entry module:

- 1. Disconnect the cable from the module from connector J4 on the surge board.
- 2. Loosen the ground nut on the attached ground wire and remove the wire.
- 3. On the rear panel of the enclosure, remove the screws on both sides of the module.
- 4. Pull the module and wires from the enclosure.

To replace the power entry module:

- 1. Pass the wires and power module through the opening in the rear of the enclosure.
- 2. Fasten the screws that attach the module to the enclosure.
- 3. Connect the ground wire to the ground nut and tighten the nut.
- 4. Plug the power input cable from the module into connector J4 on the surge board.

428059 - USB cable

Follow the steps in *Accessing parts* to open the front or side panel of the CNC enclosure. Set aside all screws and other hardware for reuse.

To remove the USB cable:

- 1. Remove the steel nut, black washer, rubber lanyard for the USB cover, and lock washer around the USB port on the front or rear panel.
- 2. Pull the port to the inside.
- 3. Cut the cable ties on the cable.
- 4. Disconnect the cable from the I/O panel on the motherboard and remove the cable.

To replace the USB cable:

- 1. Connect the cable to the USB connector in the I/O panel on the motherboard.
- 2. Align the flat side of the USB connector with the flat side of the opening and pass it through to the outside of the enclosure.
- 3. Replace the lock washer, rubber lanyard for the USB cover, black washer, and nut over the USB connector and tighten it manually.
- 4. Secure the cable with cable ties.

428060 – EDGE Pro Ti rear fan

Set aside all screws and other hardware for reuse.

To remove the rear fan:

- 1. Remove the 6 screws that hold the fan shroud to the rear panel.
- 2. Remove the fan shroud.
- 3. Remove the 2 screws from the standoffs at the lower corners of the fan and remove the fan.
- 4. Unplug the fan wire with the green connector.
- 5. Remove the fan.

To replace the rear fan:

- 1. Connect the green connector of the fan wire to the connector on the enclosure.
- 2. Align fan on the standoffs with airflow directed downwards towards the heatsinks.
- 3. Fasten the 2 screws through the fan into the standoffs.
- 4. Pass the fan wire over the left standoff.
- 5. Align the fan cover so that the bottom holes align with the screws on the fan and fasten the screws.
- 6. Replace the rear shroud and refasten the screws to the enclosure.

428063 – Wireless network board (141223)

Follow the steps in *Accessing parts* to open the front and side panels of the CNC enclosure. Set aside all screws and other hardware for reuse.

The kit for the wireless network board includes the board, the antennas, and the cables that connect the antenna to the board. Use the instructions in this section for the part or parts that you need to replace.



The coaxial cables that connect the antennas to the wireless network board can be damaged by excessive bending. Take special care when connecting or disconnecting these cables.

Replace the wireless board

To remove the wireless network board:

- 1. Note the connector for each cable that connects to this board.
- 2. Disconnect the antenna cables from the from the left side of the board.
- 3. From the front, remove the screw that fastens the board bracket to the sub-chassis.
- 4. Pull the board from the PCI slot on the motherboard.

To replace the wireless network board:

- 1. Remove the board from its packaging.
- 2. Insert the board connector into PCI slot 2 on the motherboard.
- 3. Fasten the screws holding the board bracket to the sub-chassis.
- 4. Reconnect the antenna cables to the left side of the board.

Replace the antennas

To remove the antennas for the wireless board:

1. Straighten the antennas and unscrew them from the rear of the enclosure.

To replace the antennas:

1. Screw the antennas onto the gold screw mounts on the top right of the rear side of the enclosure.

Replace the cables

To remove the cables between the antenna and the board:

- 1. Remove the antennas.
- 2. Remove the gold nuts and washers from the antenna connectors at the top right side of the rear of the enclosure.
- 3. Pull the antenna connectors into the interior of the enclosure.
- 4. Disconnect the cables from the left side of the wireless board.

To replace the cables:

- 1. Reconnect the antenna cables to the left side of the wireless board.
- 2. Align the flat side of each antenna connector with the flat side of the holes in the enclosure and pass the connectors through the holes.
- 3. Fasten the gold washer and nut over each antenna connector on the outside of the enclosure.
- 4. Replace the antennas on the connectors.

428071 - SERCOS III master board (141310)

Follow the steps in *Accessing parts* to open the front panel of the CNC enclosure. Set aside all screws and other hardware for reuse.

To remove the SERCOS III master board:

- 1. Note the connector for each cable that connects to this board.
- 2. Remove the Port 1 and Port 2 cables from the side of the board.
- 3. Remove the screw in the mounting frame.
- 4. Pull the board from the PCI slot on the motherboard.

To replace the SERCOS III board:

- 1. Insert the SERCOS III board into PCI slot 4 on the motherboard.
- 2. Fasten the screw in the mounting board.
- 3. Reconnect the Port 1 and Port 2 cables to the appropriate connectors on the side of the board.

428105 – Picopath 2-axis servo encoder board (141254)

Follow the steps in *Accessing parts* to open the rear panel of the CNC enclosure. Set aside all screws and other hardware for reuse.

To remove the Picopath 2-axis servo encoder board:

- 1. Note the connector for each cable that connects to this board.
- 2. On the inside of the rear panel, unplug the power cable, the 40-pin encoder cable, and the 50-pin I/O cable.
- 3. On the outside of the rear panel, remove the screws on the rear panel.
- 4. On the inside of the rear panel, remove the screw from the right side of the board.
- 5. Remove the board, metal mounting panel, and connectors.
- 6. Remove the four screws that attach the metal flange for each circular plastic connector (CPC) to the split mounting panel.
- 7. Remove both sides of the mounting panel.

To replace the Picopath 2-axis servo encoder board:

- 1. Reassemble the mounting panel behind the CPC connectors.
- 2. Fasten the metal flanges on each CPC to the mounting panel with four screws.
- 3. From the inside of the rear panel, pass the connectors, with the I/O connector on the bottom, through the opening in the rear panel.
- 4. Fasten the screw to the standoff on the right side of the board.
- 5. On the outside of the rear panel, align the mounting panel with the rear panel at the six holes then fasten the screws.
- 6. Plug in the 50-pin I/O cable and the 40-pin encoder cable.
- 7. Plug in the power cables.

428106 - HyPath 2- and 4-axis servo encoder board (141292)

Follow the steps in *Accessing parts* to open the rear panel of the CNC enclosure. Set aside all screws and other hardware for reuse.

To remove the servo board:

- 1. On the outside of the rear panel, remove the screws around each circular plastic connector (CPC).
- 2. On the inside of the rear panel, unplug the cable from the power connector and the 40-pin I/O connector.
- 3. Remove the two screws in the left side of the board and lift the board off the two spring-loaded standoffs on the right side of the board.

To replace the servo board:

- 1. Remove the board from the packaging.
- 2. Line up the standoff holes on the right side of the board with the spring-loaded standoffs.
- 3. Line up the CPC connectors on the back of the board with the openings in the rear panel.
- 4. Press the board into place.
- 5. Fasten the two screws into the standoffs on the left side of the board.
- 6. Plug in the I/O ribbon cable and the power cable.
- 7. Fasten the CPC connectors to the outside of the rear panel with the screws.

428107 - Wireless antennas

To remove the antennas for the wireless board:

1. Straighten the antennas and unscrew them from the rear of the enclosure.

To replace the antennas:

- 1. Screw the antennas onto the gold screw mounts on the top right of the rear side of the enclosure.
- 2. Align the antennas vertically.