# ProLINE-RoadRunner™ XLF Service Manual

for Siemens 80F4; 80F5, F, S, HF, and (limited) HS Series, D Series, X3

**Data I/O**

PN 096-0261-001

Data I/O has made a conscientious effort to ensure that the information in this document is accurate and complete. Data I/O assumes no liability for errors, or for any incidental, consequential, indirect, or special damages, including, without limitation, loss of use, loss or alteration of data, delays, or lost profits or savings, arising from the use of this document or the product which it accompanies.

No part of this document may be reproduced or transmitted in any form or by any means, electronic or mechanical, for any purpose, without written permission from Data I/O Corporation. Data I/O order forms may be reproduced for internal use only.

Data I/O is a registered trademark of Data I/O Corporation.
TaskLink and ProLINE-RoadRunner are trademarks of Data I/O Corporation.

Data I/O Corporation acknowledges the trademarks of other organizations for their respective products or services mentioned in this document.

Technical Documentation Dept. also acknowledges the RoadRunner team members for supporting the flow of information into this manual.

We are interested in your comments— e-mail: userdocs@dataio.com

# Contents

*096-0261-001*

For non-service information see the Owner's Manual, 096-0240.

# Precautions for Safe Operation

The RoadRunner System has been designed for safe and efficient operation. **The system can be dangerous if the RoadRunner safety features and precautions in this manual are ignored.**

To avoid possible personal injury or damage to the equipment, please observe the following practices:

- Only **trained personnel** should install, maintain, repair, or troubleshoot this system.

- Do not operate the ProLINE-RoadRunner unless you have been thoroughly trained, and have **read and understand the instructions** in this manual, particularly those that describe the system's safety features.

- Do not use ProLINE-RoadRunner for any application other than its **intended use**.

- Do not operate the system if the **guards or safety devices** are not in their normal operating positions.

- Do not operate RoadRunner with any of the **outer sheet metal panels** removed.

- Do not operate RoadRunner while servicing, replacing, or adjusting any component unless directed to do so in this manual. Make sure that the RoadRunner is **properly shut down** before performing any of these operations.

- Do not place any part of your body near or in the direct path of **moving parts**.

- **Do not disable** or attempt to defeat any of the protective safety features of this system. Personal injury or equipment damage can occur if any safety systems on RoadRunner are disabled. If you suspect that a safety feature of the RoadRunner is damaged or malfunctioning, stop using the RoadRunner immediately and contact Data I/O Customer Service or a local Data I/O approved service representative.

- Use extra caution when working around the RoadRunner's Output Belt. RoadRunner's safety shields do not cover or fully enclose the **output conveyor**. It is possible that an operator's hands, other body parts, or loose clothing can get caught or pinched in it.

- Wearing **hearing protection** is recommended while operating the RoadRunner. Sound pressure levels may exceed 85 decibels.

- Shut off the **pressurized air** or disconnect the air hose before servicing pneumatic parts.

## Electrostatic Discharge

The circuit boards inside RoadRunner are susceptible to electrostatic discharge (ESD), which can damage the circuitry. Also, devices processed through the RoadRunner are very sensitive to static and can be damaged by accidental electrostatic discharge while being handled.

The easiest way to prevent damage from ESD is to make sure a common static potential (**ground**) exists between static-sensitive devices or components, their environment, and the operator.

Perform all repairs at an ESD-safe workstation.

Blank page.

# Service—Siemens XLF

Data I/O's ProLINE-RoadRunner XLF supports many Siemens Placement machines as noted in Chapter 1 of the Owner's Manual.

## RoadRunner Models Covered in this Manual

This manual supports the Siemens XLF model of RoadRunner. (For service procedures for the Standard RoadRunner, see the *ProLINE-RoadRunner Service Manual for Siemens.)*

Many modules and components on the RoadRunner XLF are designed to be serviced or replaced by qualified technicians. You may wish to keep backup modules or components for replacements. The replaced module or component may be sent to Data I/O for repair or adjustment.

*NOTE: Send RoadRunners under warranty back to Data I/O.*

*If your RoadRunner is NOT under warranty, you have the option of repairing it with instructions in this manual or sending it back to Data I/O. See the inside, back cover for contact information.*

# Replaceable Modules

Replaceable modules include:

- Tape-In Module
- Conveyor Module
- Control Panel Module
- Linear Stage Module (with PNP Head)

- Pneumatic Module
- Cover Tape Module
- PNP Head (subassembly)
- Programmer Module

Some components can be replaced or adjusted at the customer location. Replacement and adjustment procedures for those components are included in this chapter. Some modules can be removed and sent to Data I/O or a local representative for servicing or exchanging.

**Within each main section of this chapter is an order form with relevant Inventory Part Numbers. These numbers represent the RoadRunner XLF configuration at the time of printing this manual only, and may not be the same as your unit.** However, with your RoadRunner Model Number and Serial Number, Data I/O can find the latest interchangeable replacement.

**SX**

*CAUTION: Electrostatic discharge may damage parts. Before servicing, place the RoadRunner on an ESD-safe workstation.*

## Tools Required

Some of the tools required for replacing components of the RoadRunner are:

- Metric hex key set (also known as Allen wrench, Inbus key, Unbrako key) preferably with a ball-end on one end. Sizes 1.5 mm through 5 mm.

- Vacuum Tweezer

- Cable tie clippers

- Programmer alignment tool (6950019001)

- ESD-safe workstation (may include an ESD grounding strap, a table mat, and special antistatic clothing)

- Slotted screwdrivers

- Cable tie gun

# SX

SX

Blank page

SX

# Components Overview
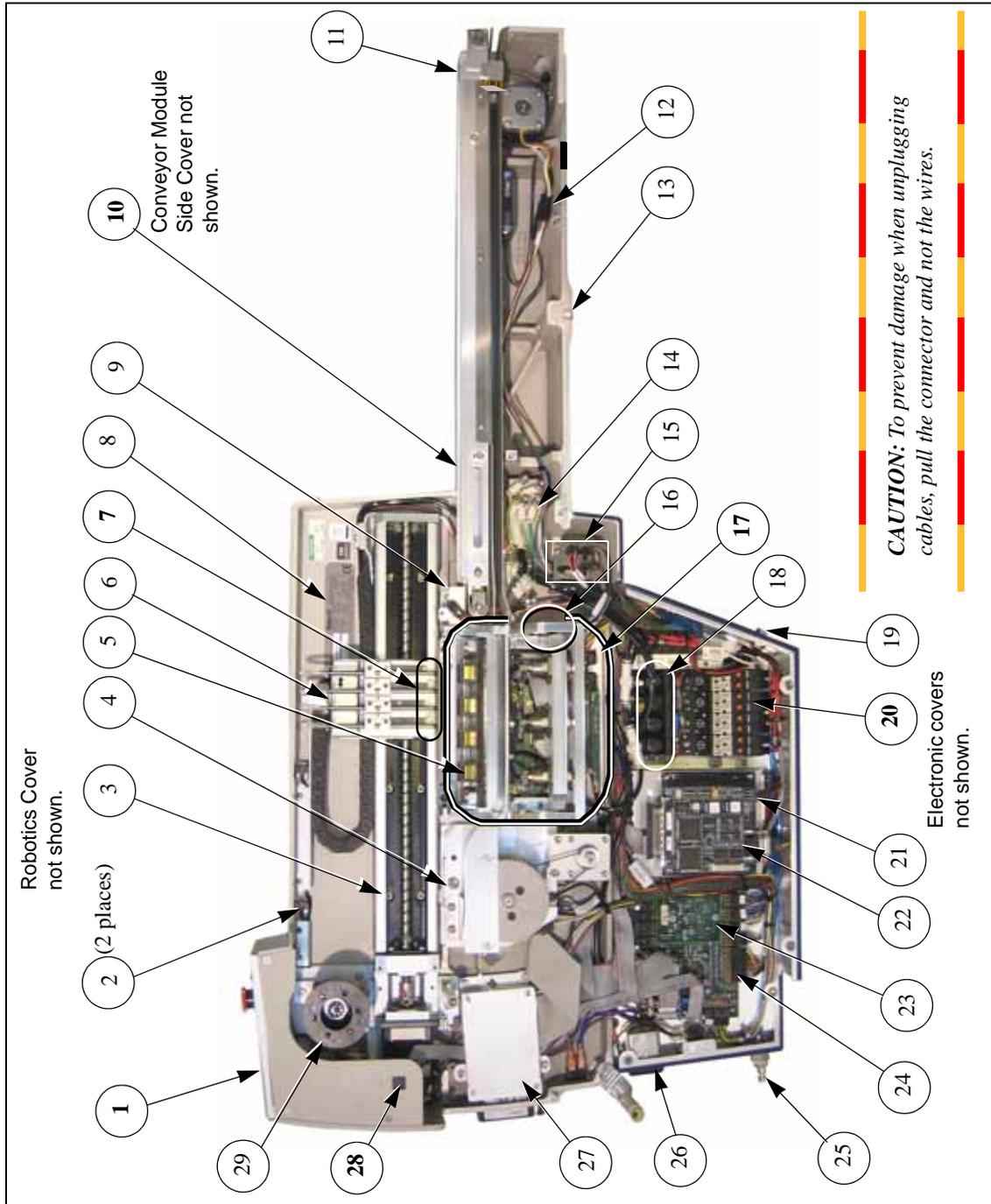


*Figure SX-1—Component Overview, XLF for Siemens (Model Name ROADRUNNR-XLF-S.)*

**CAUTION:** *To prevent damage when unplugging cables, pull the connector and not the wires.*

Conveyor Module Side Cover not shown.

Robotics Cover not shown.

Electronic covers not shown.

**CAUTION:** *Electrostatic discharge may damage parts. Before repair work begins, place the RoadRunner XLF on an ESD-safe workstation.*

## Component List

*Modules are listed in bold type. (Modules are assemblies installed and replaced as a unit.)*

1.  **Control Panel Module**, page SX-36
2.  Head Limit sensors
3.  **Linear Stage Module**, page SX-64
4.  **Tape-In Module**, page SX-10
5.  Socket Adapter (purchased separately)
6.  Pick and Place (PNP) Head
7.  Rubber Probe Tips
8.  Serial Number Label
9.  Reject Bin
10. **Conveyor Module**, page SX-26
11. End-Of-Belt Sensor Optic
12. End-Of-Belt Optical fiber Amplifier
13. Mounting Guide-Pin hole
14. Probe Control Manifold
15. Interconnect Panel
16. Socket Actuator Sensor (hidden)
17. **Programmer Module**, page SX-52
18. Vacuum Filters
19. SMT Communications Connection
20. **Pneumatic Module**, page SX-14
21. Power Supply (hidden)
22. Motion Controller PCB
23. Communications PCB
24. Robot I/O PCB
25. Air inlet connection
26. Power Switch
27. PC Card Reader/Writer
28. Robotics-Cover-Open Sensor
29. **Cover Tape Module**, page SX-22

**SX**

*CAUTION: Electrostatic discharge may damage parts. Before repair work begins, place the RoadRunner XLF on an ESD-safe workstation.*
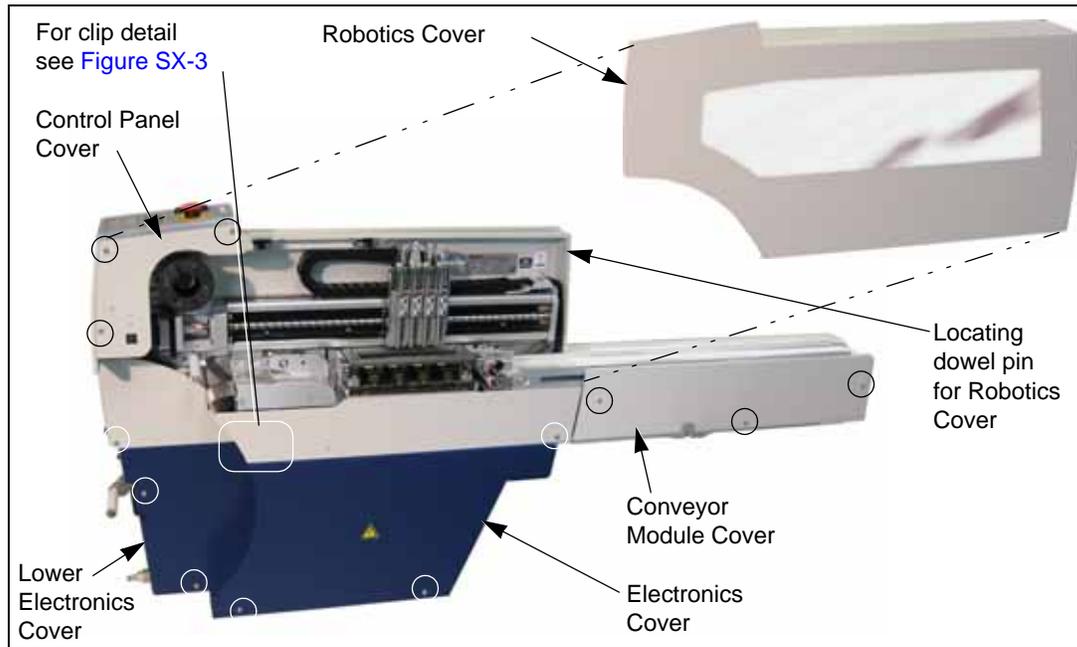
**SX**

# Covers



*Figure SX-2—Covers (with Screw Locations Indicated by Circles)*

The RoadRunner XLF has five removable covers:

- Robotics Cover
- Electronics Cover
- Lower (Electronics) Cover
- Conveyor Module Cover
- Control Panel Cover

The Robotics Cover shields the tape path and the programmer as well the Linear Stage and the movements of the PNP Head.

## Data I/O Parts Ordering Information

**Instructions:** **1**. Copy this page. **2**. Fill in your RoadRunner model and serial numbers (see the label on the chassis under the Robotics Cover). **3**. Fill in the quantity for the item(s) desired. **4**. Call your local Data I/O sale representative for part prices (optional). **5**. Mail or FAX it with your purchase order to Data I/O. See the last page of this manual for contact information.

ProLINE-RoadRunner XLF Model No._____ Serial No._____

| Inventory Part Number | Part Description | Qty | Price Ea. | Totals |
|---|---|---|---|---|
| 6161787001 | Robotics Cover, XLF | | $ | $ |
| 6152158001 | Electronics Cover Assy, XLF | | $ | $ |
| 6161788001 | Lower Electronics Cover, XLF | | $ | $ |
| 6161786001 | Conveyor Module Cover, XLF | | $ | $ |
| 6160375001 | Control Panel Cover, XLF | | $ | $ |
| | | | $ | $ |

Signature:_____Date:_____Company:_____

## Removing the Robotics Cover

Grasp the outer edges of the Robotics Cover and gently pull away from the Control Panel and out.

There is a locating dowel pin on the end opposite the Control Panel Module.

---

*NOTE: The Robotics Cover can be removed while the RoadRunner XLF is running. However, the robot speed reduces by 50%.*

---

> ### ⚠ WARNING
>
> *Shock Warning. Do not remove the Lower Cover, Electronics Cover, or the Conveyor Module Cover while the RoadRunner is plugged in.*

## Removing the Electronic Covers

1. Turn the power off.

2. Disconnect the RoadRunner XLF power cord and air supply.

---

*NOTE: The RoadRunner XLF pressurized air supply tube has a quick disconnect fitting with an automatic shut off. The line may be disconnected without shutting off the supply line air pressure.*

---

3. Lift off the Robotics Cover.

4. Remove the three screws that hold the Electronics Cover to the chassis. *For screw locations see Figure SX-2.*

5. Slide the cover to the right to unhook a clip on the left side, then lift off. For  *a detail of the cover clip see Figure SX-3*
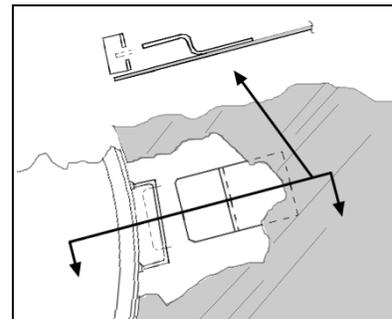


*Figure SX-3—Detail of Clip on the Inside of the Electronics Cover (cut-away and cross-section)*

**SX**

**SX**

---

6. Remove the three screws that hold the Lower Electronics Cover to the chassis. For screw locations see Figure SX-2.

## Removing the Conveyor Module Cover

1. Turn the power off.

2. Disconnect the RoadRunner XLF power cord and air supply.

3. Remove the three screws that hold the Conveyor Module Cover to the chassis. *For screw locations see Figure SX-2.*

## Removing the Control Panel Cover

The Control Panel Cover is a small rectangular cover just below the Control Panel Module.

1. Turn the power off.

2. Disconnect the RoadRunner XLF power cord and air supply.

3. Remove the three screws that hold the Control Panel Cover to the chassis. *For screw locations see Figure SX-2.*

4. Disconnect the Cover Open Sensor cable by pinching the clasp on the connector to release it and then pulling apart.

SX

SX

Blank page

SX

SX

# Tape-In Module

Remove the Position Locking Screw to remove the Tape-In Module body, after which the two Base Mounting Screws are accessible.
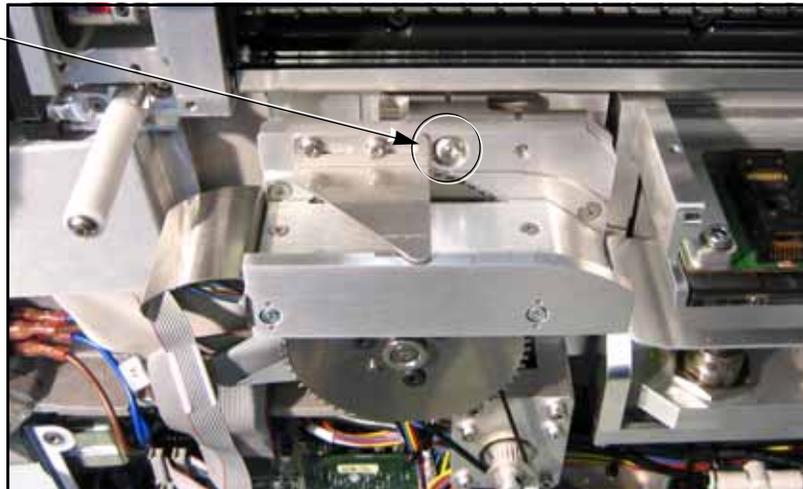


*Figure SX-4—Location of Tape-In Module Position Locking Screw (circled). (Base Mounting Screws are Hidden.)*

The Tape-In Module advances the device tape. The Tape-Advance Sensor sends sprocket motion feedback to the system controller.

If the device tape is not advancing correctly, there could be a problem with the Tape-In Module. Refer to the Troubleshooting chapter in the RoadRunner Owner's manual to identify the problem. If the problem is the Tape-In Module, remove it and return it to Data I/O for repair or replacement. If your RoadRunner XLF is past warranty period, you may elect to repair it on-site if you have a certified technician.

The sensor on the far side of this module can be replaced independently.

## Data I/O Parts Ordering Information

**Instructions:** **1**. Copy this page. **2**. Fill in your RoadRunner model and serial numbers (see the label on the chassis under the Robotics Cover). **3**. Fill in the quantity for the item(s) desired. **4**. Call your local Data I/O sale representative for part prices (optional). **5**. Mail or FAX it with your purchase order to Data I/O. See the last page of this manual for contact information.

ProLINE-RoadRunner XLF Model No._____ Serial No._____

| Inventory Part Number | Part Description | Qty | Price Ea. | Totals |
|---|---|---|---|---|
| 7502406001 | Adjustable Tape-In Module, 16-32 mm | | $ | $ |
| 6050084001 | Adjustable Tape-In Base | | $ | $ |
| | | | $ | $ |
| | | | $ | $ |
| | | | $ | $ |

Signature:_____Date:_____Company:_____

# Removing the 32/44 mm Tape-In Module

To remove the 32/44 mm Adjustable Tape-In Module:

1.  Turn the power off.

2.  Disconnect the RoadRunner XLF power cord and air supply.

3.  Remove the Robotics Cover and the two Electronics Covers.

4.  Remove the Position Locking Screw and pull the main body of the Tape-In Module straight out from the base as far as wires allow.

*For screw location, see Figure SX-4.*

5.  Check that wire labels are clearly marked and unplug the wires for the Tape Advance Sensor and the Tape-In Motor by pinching the clasp and pulling the connector apart.

    The sensor may be replaced independently of the module.
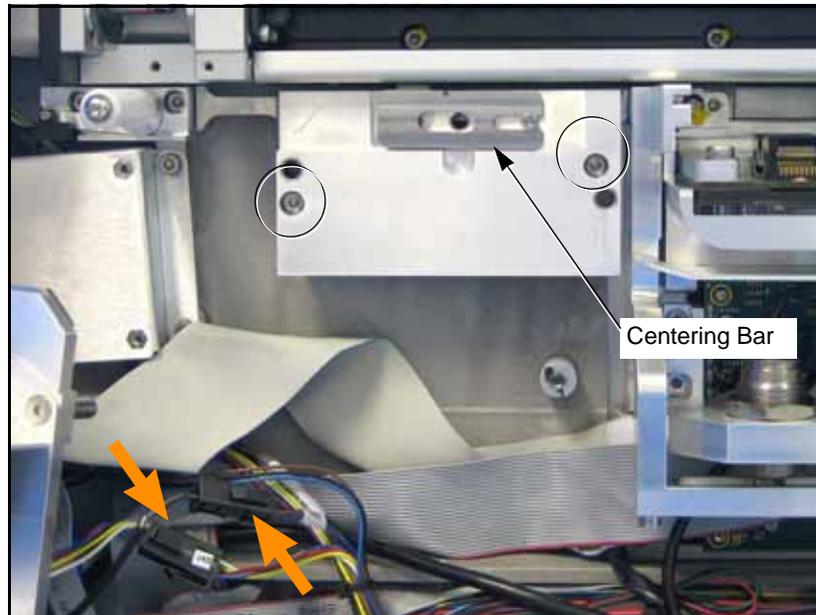


Centering Bar

*Figure SX-5—The Tape-In Module Base (after the main body has been removed). Screw locations are circled. Arrows point to the two Tape-In Module connectors.*

5a. To replace the Tape Advance Sensor remove the screw attaching the sensor to the module.
(The cable has been unplugged from the connector in a previous step.)

6.  Remove the two screws attaching the Tape-In Module Base to the RoadRunner Chassis with a 4 mm hex key.

7.  Pull the Base straight out from the chassis.

Replacement is in the reverse order of removal with these four precautions:
•   Ensure that cable connectors are mated correctly.

**SX**

- Ensure that no wires or hoses get pinched.
- Ensure that the Module body pins engage the locating holes in the base.
- Align to the PNP Head by performing the Tape-In Module alignment procedure. (See following heading.)

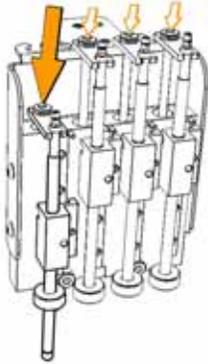### Aligning the 32/44 mm Adjustable Tape-In Module

The Tape-In Module must be in-line with the PNP Head probes (as well as the programmer) along the axis of tape travel; that is, regarding their distance from the RoadRunner casting. The PNP Head is the control and is not adjustable in that direction.

To center the tape path under the PNP probes:

1. Load a piece of empty 32 or 44 mm device tape into the Adjustable Tape-In Module. Set the module to the appropriate size.

2. Move the PNP Head so that Probe 1 is directly over the pick point.

3. Remove the rubber Probe Tip from Probe 1.

4. To visually verify centered tape, extend Probe 1 fully by pushing down on the nut on the top plate. Compare the position of the hole in the center of the tape pocket to the probe.

   If the probe is centered over the hole, then the tape path is centered. Replace the Probe tip; you are done centering the tape path.
   If the probe is not centered, continue.

5. Loosen the Centering Bar Screw with a 2.5 mm hex key. See figure below.

6. Loosen the Position Locking Screw.

7. Slide the Centering Bar left or right as necessary to align the pocket with the probe— use a slotted screw driver in the slot provided and pry the bar. See the figure below.

8. Tighten the Position Locking Screw. Then recheck the pocket alignment.
   If the pocket and probe are aligned, continue to the next step.
   It not aligned, repeat from step 6.

9. Tighten the Centering Bar Screw.

*NOTE: Once set, centering is good for both tape size settings.*

*For loading device tape, see Chapter 3 of the RoadRunner Owner's Manual.*

*Push probe here with finger.*



SX

SX

Slot in the
Centering Bar
for adjusting

*Figure SX-6—Adjusting the 32/44 mm Tape-In Module: loosening the Centering Bar screw. The Position Locking screw (circled) is already loosened.*
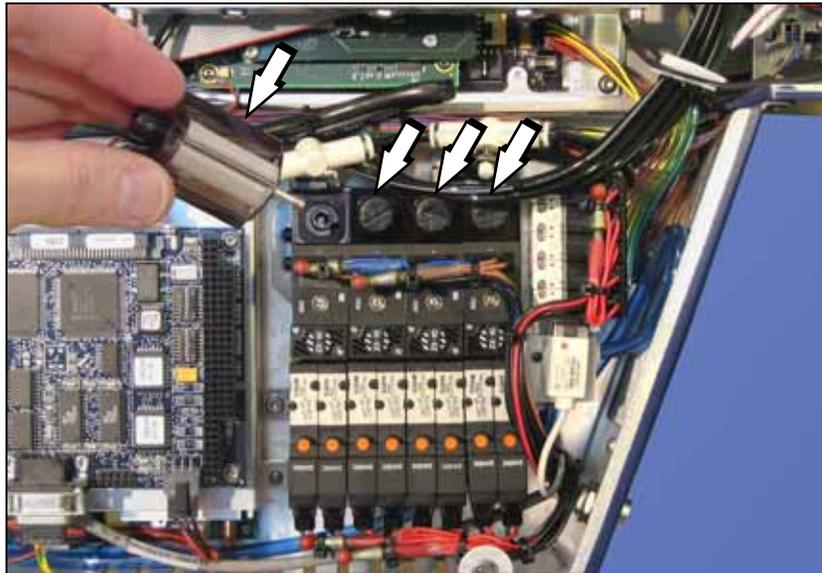
SX

SX

# Pneumatic Module



*Figure SX-7—Pneumatic Module and Vacuum Filter Locations*

The Pneumatic Module controls vacuum and blowoff air to the probes, as well as pressurized air to the probes cylinders and programmer socket cylinders.

Pneumatic Module suction is affected by clogged or dirty filters or hoses and by improper connections. If the vacuum filters are clogged or dirty, vacuum sensors have difficulty detecting whether a device is on the probe or not. This can result in error messages such as "Device pick failure at input with probe 1."

## Data I/O Parts Ordering Information

**Instructions:** **1**. Copy this page. **2**. Fill in your RoadRunner model and serial numbers (see the label on the chassis under the Robotics Cover). **3**. Fill in the quantity for the item(s) desired. **4**. Call your local Data I/O sale representative for part prices (optional). **5**. Mail or FAX it with your purchase order to Data I/O. See the last page of this manual for contact information.

ProLINE-RoadRunner XLF Model No._____ Serial No._____

| Inventory Part Number | Part Description | Qty | Price Ea. | Totals |
|---|---|---|---|---|
| 2860001001 | Vacuum filter | | $ | $ |
| 4800020001 | Pneumatic Module | | $ | $ |
| | | | $ | $ |
| | | | $ | $ |
| | | | $ | $ |

Signature:_____Date:_____Company:_____

If you experience problems such as dropped devices or pick failures, replace the vacuum filters (below), adjust the vacuum sensor (page SX-47), or see *Troubleshooting* in the RoadRunner Owner's Manual.

*NOTE: In normal low-dust conditions, Vacuum Filters must be replaced every 6 months. Replacement may need to be done more frequently in dustier environments.*

## Replacing the Vacuum Filters

*For more information, see "Covers" on page SX-6.*

1. Turn the power off.

2. Disconnect the RoadRunner power cord and air supply.

3. Remove the Robotics and Lower Covers.

4. Remove the square plastic housings with the Vacuum Filters by unscrewing the thumbscrews from the valve block.

*NOTE: Ensure that the gasket between the housing and the valve block does not fall out during removal or installation of the housing. If it does, install the gasket into the groove on the valve block.*

**SX**

*CAUTION: The housing has two locating pins. To prevent damage, orient the housing correctly when reinstalling.*
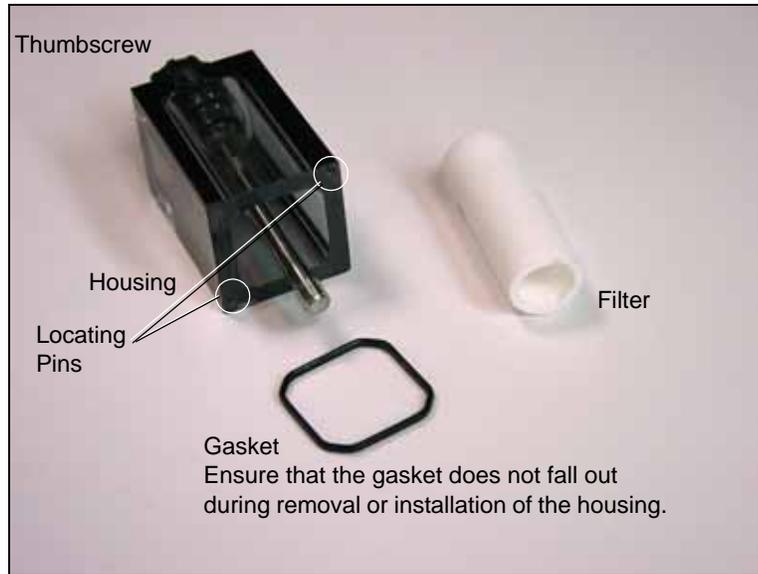
**SX**

*Figure SX-8—Vacuum Filter Components*

5.   Remove the filter from the plastic housing.

6.   When installing a new filter, make sure the rubber gasket is in place between the housing and the valve block.

## Removing the Pneumatic Module

*The RoadRunner XLF pressurized air supply tube has a quick disconnect fitting with an automatic shut off. The line may be disconnected without shutting off the supply line air pressure.*

*For more information, see "Removing the Electronic Covers" on page SX-7.*

*For the location of Probe vacuum lines, see Figure SX-10.*

1.   Turn the power off.

2.   Disconnect the RoadRunner power cord and air supply.

3.   Pull off the Robotics Cover.

4.   Remove the Lower Cover(s).

---

*NOTE: The vacuum lines and air pressure lines must be reinstalled to their same locations. Do not reverse them. Ensure that each line has a label before disconnecting.*

---

5.   Disconnect the four vacuum lines on the manifold adjacent to the filters. To release the "One-touch" connector, push the connector sleeve and pull the tube simultaneously. See figure below. (To reconnect, simply insert the tube into the housing sleeve, pushing it all the way in.)
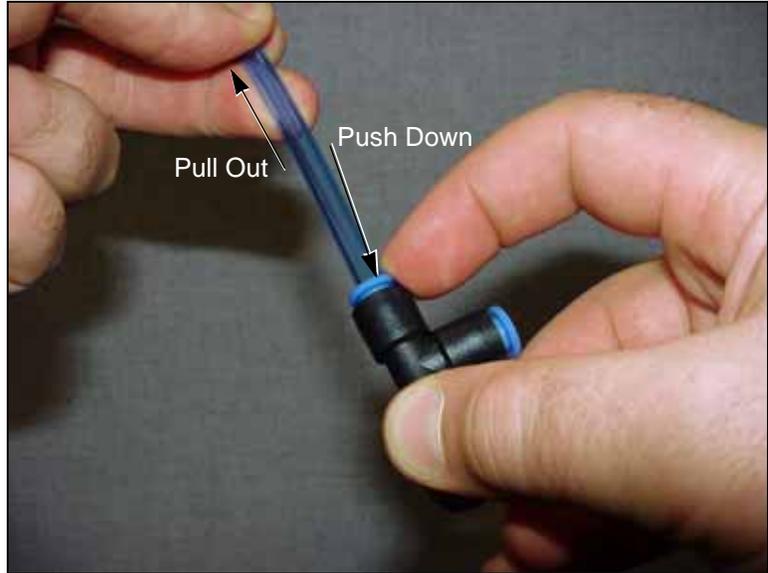
*Figure SX-9—Disconnecting a Pneumatic Tube from the One-touch Connector*

SX



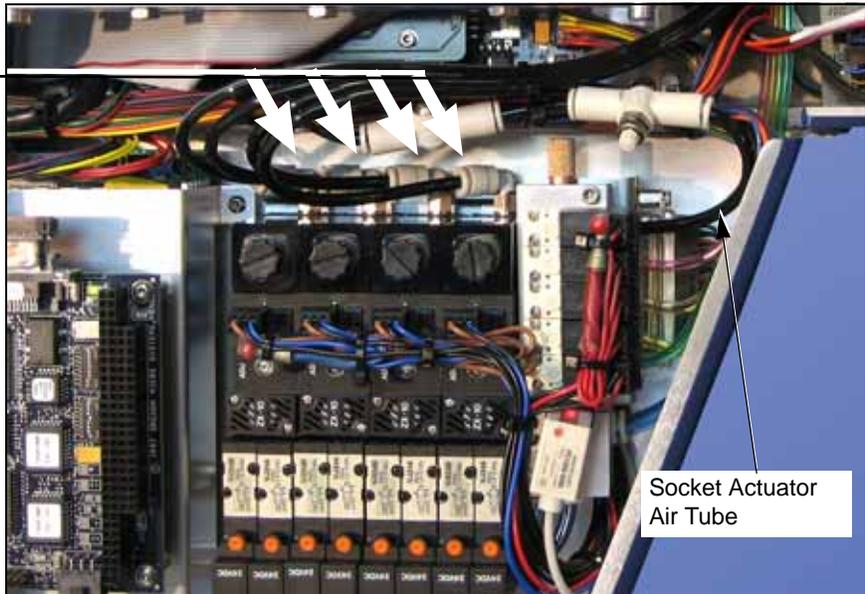*Figure SX-10—Location of Vacuum and Air Lines*

*The pneumatic access cover, secured with two screws, is on the back housing flange. See Figure SX-11.*

6. Remove the Pneumatic Access Cover.

7. Disconnect the Pneumatic Manifold Supply Line at the One-touch connector on the manifold.

8. Unscrew the two screws from the 25-pin cable connector and unplug the connector from the manifold bracket.

SX

Probe Air
Tubes

Pneumatic Manifold
Supply Line;
One-touch
Connector

25-Pin Connector;
two 1.5 mm Allen
fasteners

Access hole to the
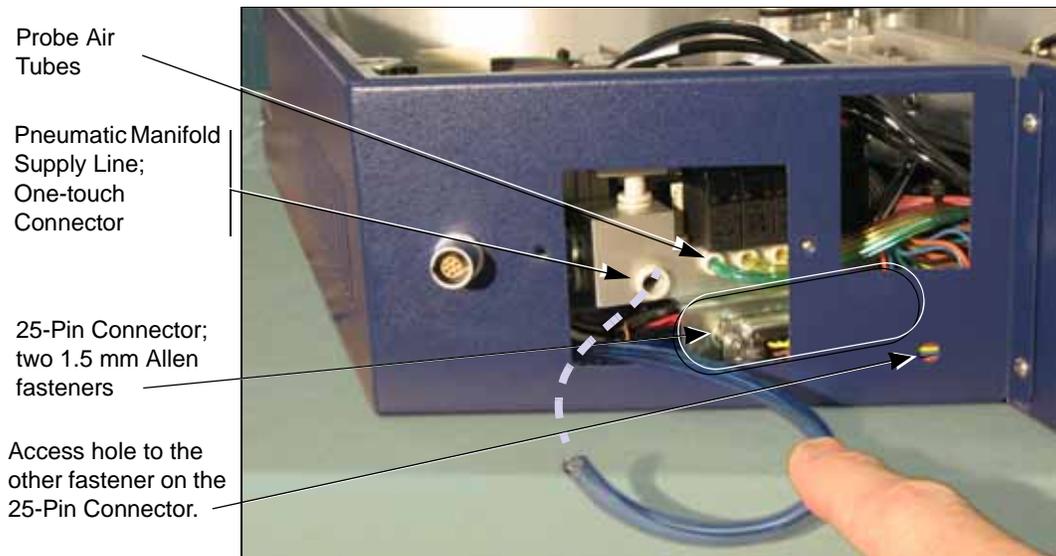other fastener on the
25-Pin Connector.

*Figure SX-11—Location of the Pneumatic Manifold Supply Line and Wiring Connector. (The Pneumatic Access Cover has been removed and the Supply Line disconnected.)*

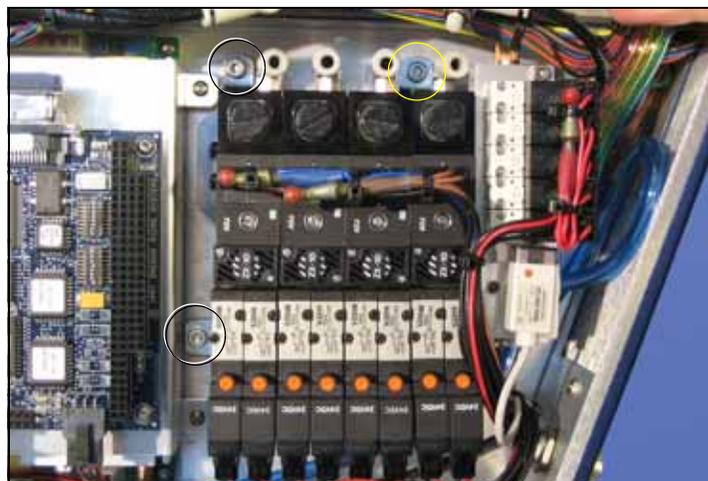9.   Remove the three screws securing the Pneumatic Module to the RoadRunner chassis. See figure below.

*Figure SX-12—Pneumatic Module fastener locations. The Probe Vacuum Tubes have been Disconnected.*

*To identify tubing lines see Figure SX-10 and Figure SX-11.*

10.  Lift the Pneumatic Module enough to remove the four Probe Air Tubes and the Socket Actuator Air Tube (one-touch fittings).

11.  Lift the Pneumatic Module free from the RoadRunner chassis.

## Reinstalling the Pneumatic Module

Installation is done in the reverse order of removal; then the following post-installation adjustments are required:

1. Reconnect the power and pressurized air.

2. Switch the power on.

3. At the Control Panel, verify proper electrical and pneumatic connections as follows:

   3a. Extend and retract each probe to verify correct plumbing. *Robot Diagnostics » Probe X » Position » Arrow Up/Down.*

   3b. Enable vacuum to each probe to verify correct plumbing. *Robot Diagnostics » Probe X » Vac Sense » Arrow Up/Down.*

   3c. Enable probe "Puff" and verify correct switching of positive air pressure at the probe tips. *Robot Diagnostics » Probe 1 » Puff » Up/Down Arrow.*

   3d. Check the operation of the Socket Actuator. *Robot Diagnostics » Socket » State » Up/Down Arrow.*

4. Adjust the probe vacuum sensors.

5. Adjust probe speed.

*For step 4 see "Adjusting Probe Vacuum Sensors" on page SX-47.*

*For step 5 see "Adjusting and Balancing Probe Speed" on page SX-42.*

## Adjusting the Low Air Pressure Sensor

The Low Air Pressure Sensor is part of the Pneumatic Module and is set at the factory to shut off the incoming air if the pressure drops below 65 psi. If you are experiencing air pressure problems, this sensor can be adjusted as follows.

To adjust the Low Air Pressure Sensor:

1. Push the E-Stop.

*For more information about removing the covers see page SX-7.*

> ### ⚠ WARNING
>
> *Electric shock hazard. The following procedures require the Electronics Cover(s) to be removed while power is on. Only touch items described in the procedures.Use caution.*

2. Remove the Electronics Covers.

SX

SX

3. With the power and the air on, check that the Low Air Pressure Sensor LED is lit.

4. Reduce the inlet air pressure to 0.448 MPa (65 psi).

5. With a small screwdriver rotate the sensor adjustment screw counter-clockwise until the LED goes out. Then turn it clockwise just until the LED lights.
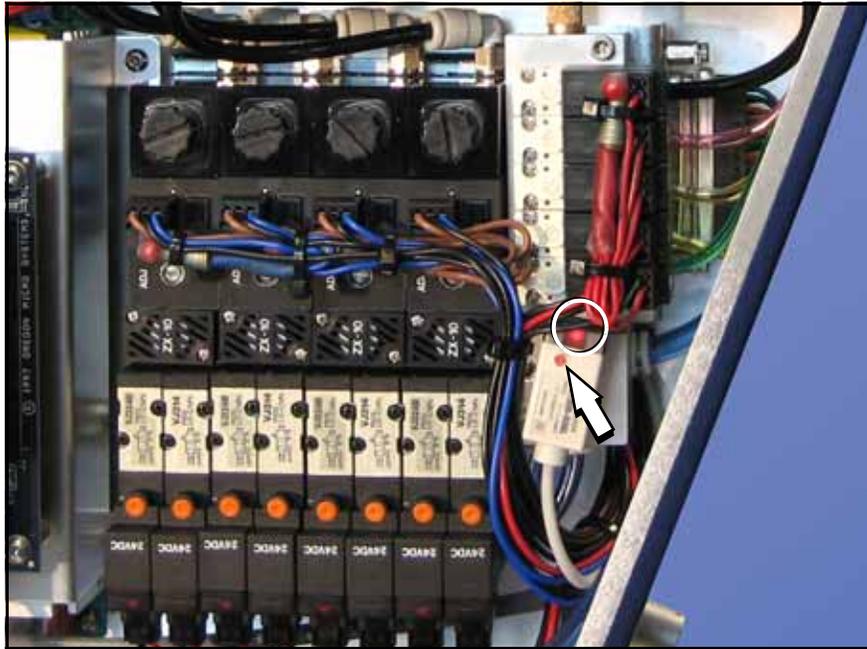
SX



*Figure SX-13—Adjusting the Low Pressure Sensor on the Pneumatic Module. The arrow points to the adjustment screw. The LED is circled.*

6. Replace the Electronics Covers.

7. Release the E-Stop.

SX

SX

Blank page
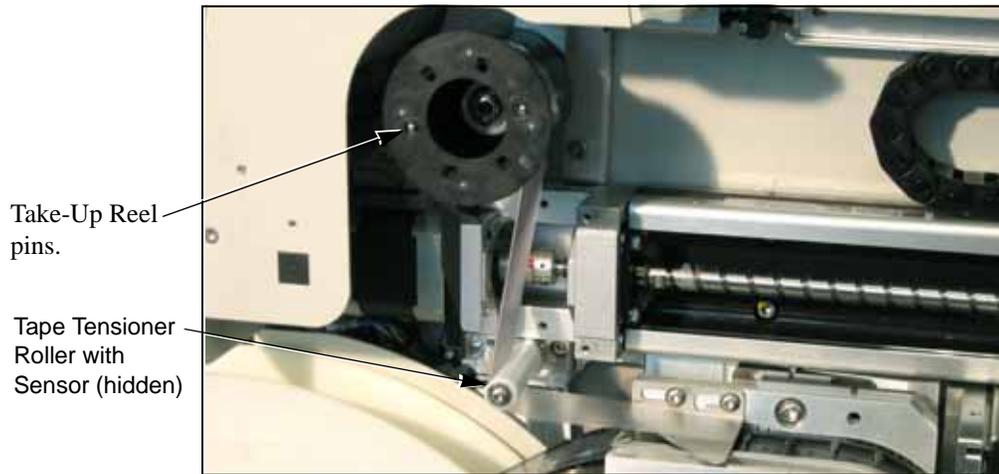
SX

# Cover Tape Module and Tensioner



Take-Up Reel pins.

Tape Tensioner Roller with Sensor (hidden)

*Figure SX-14—Cover Tape Module and the Tape Tensioner*

SX

If the Cover Tape Module fails to wind tape onto the reel, first check to see if the reel is full. Also, check that there is tension against the Tape Tension Roller.

If the Take-Up Reel is not full but the module is not winding tape, then the Cover Tape Module is suspect. Check for these:
• loose reel not seated on the pins    • loose or broken drive belt
• malfunctioning motor,                • malfunctioning clutch assembly or
• a motor connector that is loose or disconnected
• Tape Tension roller does not roll freely.
You may need to remove the Control Panel Cover.

*For more on the Control Panel Cover, see Figure SX-2.*

If the problem is the motor or drive belt, then the Cover Tape Module needs to be returned to Data I/O for repair. If your RoadRunner XLF is past warranty period, you may elect to repair it on-site if you have a certified technician.

## Data I/O Parts Ordering Information

**Instructions:** **1**. Copy this page. **2**. Fill in your RoadRunner model and serial numbers (see the label on the chassis under the Robotics Cover). **3**. Fill in the quantity for the item(s) desired. **4**. Call your local Data I/O sale representative for part prices (optional). **5**. Mail or FAX it with your purchase order to Data I/O. See the last page of this manual for contact information.

ProLINE-RoadRunner XLF Model No._____ Serial No._____

| Inventory Part Number | Part Description | Qty | Price Ea. | Totals |
|---|---|---|---|---|
| 7502402001 | Cover Tape Module, XLF | | $ | $ |
| 7502403001 | Cover Tape Sensor Assy, XLF | | $ | $ |
| | | | $ | $ |
| | | | $ | $ |
| | | | $ | $ |

SX

Signature:_____Date:_____Company:_____

## Removing the Cover Tape Module

1. Turn the power off.

2. Unplug the RoadRunner power cord.

3. Remove the Robotics Cover.

4. Remove the Take-Up reel from the Cover Tape Module.

5. Remove the three screws that mount the Cover Tape Module to the RoadRunner chassis.
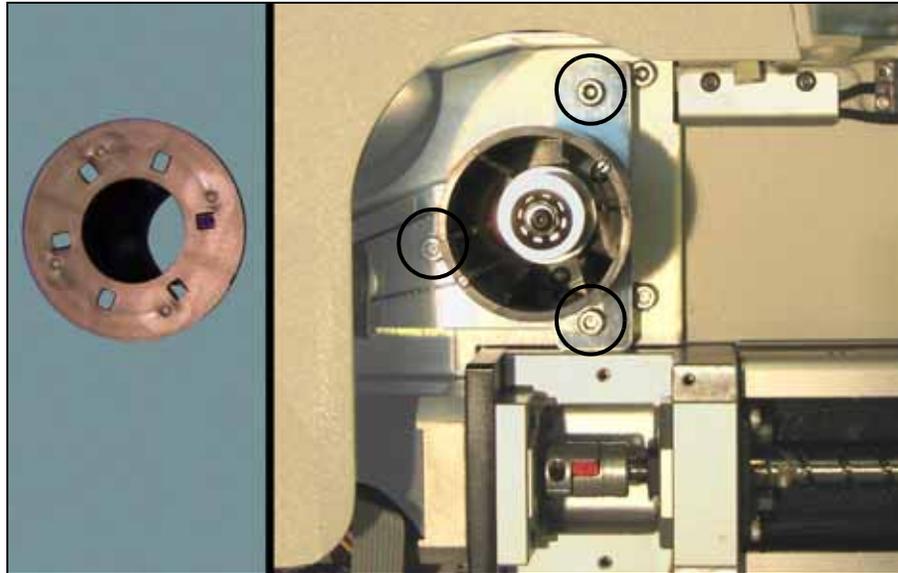


*Figure SX-15—Location of the Cover Tape Module Mounting Screws (circled). The Take-Up Reel has been removed.*

6. Disconnect the cable from the Cover Tape Module motor by pinching the clasp and pulling the connector apart.

Replacement of the Cover Tape Module is done in reverse order of removal.

## Removing the Tape Tension Sensor

The Tape Tension Sensor can be replaced without removing the Tape Tension Assembly. To remove the Sensor:

1. Unscrew the sensor from the assembly with a 1.5 mm hex key.

2. Remove the four screws attaching the PC Card Drive to the chassis, and slide the reader to the right and out as the cable allows.

3. Unplug the Sensor connector.

Replacement is in the reverse order.

*For location of the Card Drive screws, see "PC Card Drive" on page SX-40*
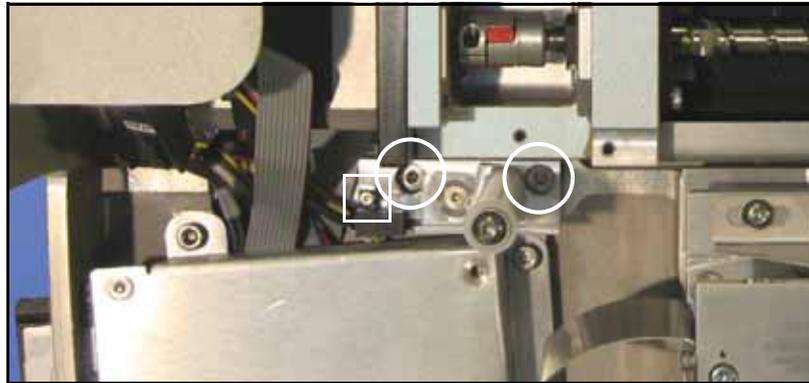
SX

SX

*Figure SX-16—The Cover Tape Tensioner with mounting screws (circled) and Sensor screw (boxed).*

## Removing the Tape Tension Assembly

The Tape Tension Assembly incorporates a roller and sensor to detect if the cover tape breaks (or is not routed properly).

To remove the Tape Tension Assembly (with sensor):

1.  Remove the two screws securing the assembly to the chassis with a 3 mm hex key.

2.  Remove the four screws attaching the Card Drive to the chassis, and slide the reader to the right and out as the cable allows.

3.  Unplug the Tape Tension Sensor connector.

Replacement is in the reverse order.

SX

SX

blank page

SX

SX

# Conveyor Module



Mounting Screws are circled.

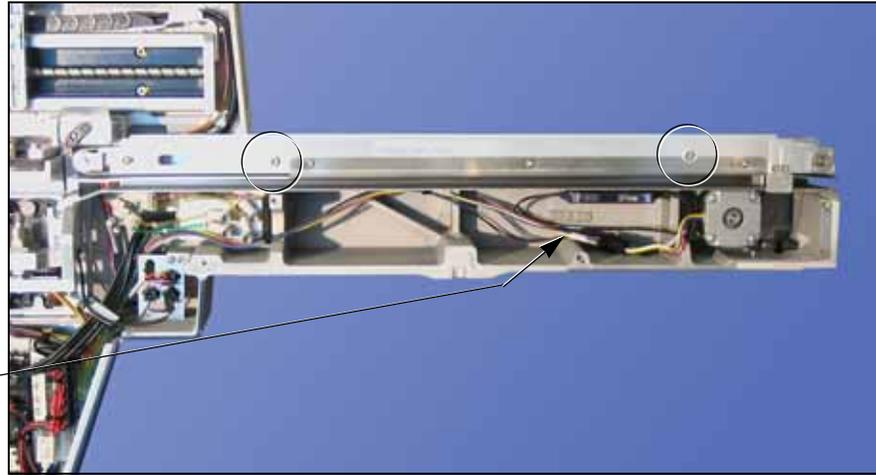Sensor Optic Cables and Motor Wires.

*Figure SX-17—Location of Wires and Screws on the Conveyor Module*

The conveyor belt, the belt motor, and the End-of-Belt Sensor make up the main parts of the Conveyor Module.

If the conveyor belt becomes creased, it will cause devices placed on the crease to be mispositioned. For this reason, a Conveyor Module with a creased or damaged belt should be immediately replaced. However, a belt can become somewhat creased from several days of inactivity. This can be easily remedied by running the RoadRunner in Dry Run mode for two minutes (Robot Diagnostics > Run Mode > Dry Run).

The entire Conveyor Module can be removed and replaced or sent to Data I/O for repair. The End-of-Belt sensor optic can be adjusted and the Optical fiber Amplifier retaught.

## Data I/O Parts Ordering Information

**Instructions:** **1**. Copy this page. **2**. Fill in your RoadRunner model and serial numbers (see the label on the chassis under the Robotics Cover). **3**. Fill in the quantity for the item(s) desired. **4**. Call your local Data I/O sale representative for part prices (optional). **5**. Mail or FAX it with your purchase order to Data I/O. See the last page of this manual for contact information.

ProLINE-RoadRunner XLF Model No._____ Serial No._____

| Inventory Part Number | Part Description | Qty | Price Ea. | Totals |
|---|---|---|---|---|
| 7502396001 | Conveyor Module, S-XLF | | $ | $ |
| | | | $ | $ |
| | | | $ | $ |
| | | | $ | $ |

Signature:_____Date:_____Company:_____

# Removing the Conveyor Module

1. Turn the power off.

2. Disconnect the RoadRunner XLF power cord and air supply.

3. Lift off the Robotics Cover.

4. Remove the Conveyor Module Cover.

5. Cut the cable ties securing the wires for the belt motor and sensors.

*For more information, see "Removing the Conveyor Module Cover" on page SX-8.*

---

*CAUTION: Optic cables are fragile and may break. Use care not to bend much.*

---

6. Disconnect two connectors: belt motor wires and optical fiber amplifier wires by pinching the clasp open and pulling the connector apart.



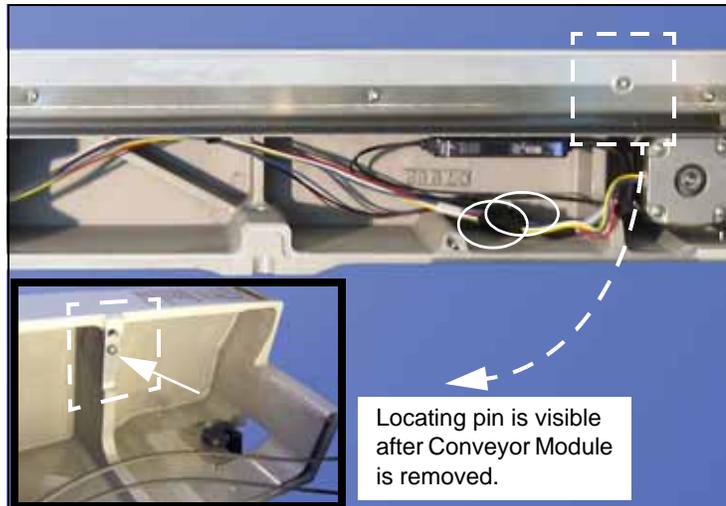Locating pin is visible after Conveyor Module is removed.

*Figure SX-18—Conveyor Wire Connector Locations (Circled)*

*For Conveyor screw locations see Figure SX-17.*

7. Remove the two screws attaching the Conveyor Module to the chassis.

8. Lift the Conveyor Module free of the RoadRunner chassis.

### Reinstalling the Conveyor Module

To reinstall the conveyor, reverse the removal steps, plus perform the following (Refer to Figure SX-18):
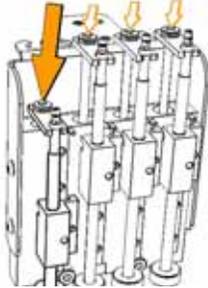
1. Notice the conveyor locating pin on the chassis. You may need to lift the Conveyor Module slightly to engage the pin.

2. Check that no wires are pinched between the Conveyor and the chassis.

**SX**

*Push probe here with finger.*

3.  Set the conveyor height as follows:

   3a. With the RoadRunner in its normal upright position and the conveyor fasteners snug but not tightened, move the PNP Head over the conveyor belt.

   3b. Place your thinnest device on the belt below Probe 1.

   3c. Lower Probe 1 fully (pushing on the nut directly above the probe stem). With the probe fully extended, adjust the conveyor height so there is approximately a 1 mm gap between the probe tip and the device on the belt. Then tighten the conveyor fasteners.

   3d. Recheck the height after tightening the fasteners.

## Adjusting the End-of-Belt Sensor

The End-of-Belt Sensor Optic stops the conveyor belt when parts reach the pick point. The optic sends a beam across the pick point between two fiber optic sensors. When a device breaks the beam, the End-of-Belt Optic stops the belt. The most likely indication that the End-of-Belt Optic is out of adjustment or broken, is that parts fall off the end of the conveyor.

If parts are falling off the end of the conveyor, first test to make sure the Optical fiber Amplifier is functioning (see "Testing . . ." below). If the sensor is functioning, but parts are still passing the pick point, reteach the Optical fiber Amplifier.

### Testing the End-of-Belt Sensor

1.  From the top level menu select *Robot Diagnostics*.

2.  Select *Belt*.

3.  Select *Pick Sensor*.

4.  Put your finger at the SMT pick point to block the sensor optic.

5.  The Control Panel display will show *Pick Sensor: 1* whenever your finger is blocking the beam, and *Pick Sensor: 0* when not blocked.
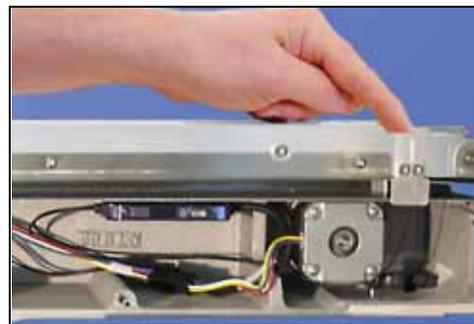


*Figure SX-19—Testing the End-of-Belt Sensor (The Conveyor Cover need not be removed.)*

6. If *Pick Sensor: 1* is not displayed when the beam is blocked, check to make sure that all the sensor wires and fiber optics are connected properly.

   6a. If *Pick Sensor:1* still does not display, then the Conveyor Module needs to be replaced.

   6b. If *Pick Sensor:1* does display, see "Reteaching the End-of-Belt optical fiber amplifier," below.

### Reteaching the End-of-Belt Optical Fiber Amplifier

1. Remove the Conveyor Module Cover.

2. Clean the conveyor belt: with isopropyl alcohol on a lint-free cloth, clean the exposed portion of the belt and then dry it.

3. Press the Emergency Stop button—the conveyor belt can now be rotated by hand.

4. Rotate the belt (toward SMT machine) and clean and dry this section.

5. Manually rotate the belt so that the optical fiber amplifier displays its highest value.

6. Place a device on the SMT pick point so it blocks the optic beam.

7. Push *Set* on the optical fiber amplifier.

*The Optical fiber Amplifier is mounted in the Conveyor Module. See Figure SX-20.*

End-of-Belt
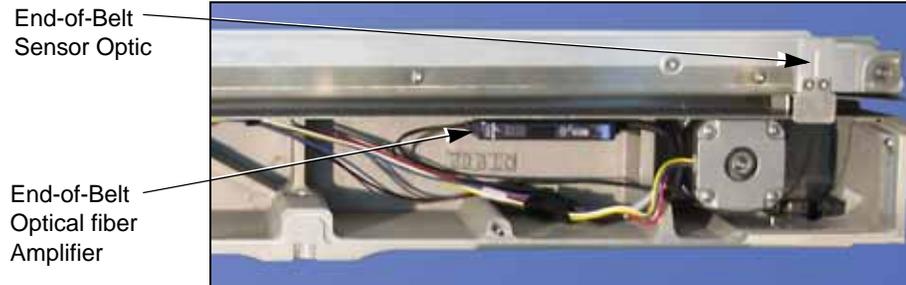Sensor Optic

End-of-Belt
Optical fiber
Amplifier



*Figure SX-20—Reteaching the End-of-Belt Sensor*

8. Remove the device from the belt and then rotate the belt (toward SMT machine) until the optical fiber amplifier displays its lowest value.

9. Push *Set* on the optical fiber amplifier again.

*For details on setting the Optical fiber Amplifier see the label on the inside of the Conveyor Cover shown in Figure SX-21.*

> *NOTE: In general, the End-of-Belt Optical fiber Amplifier should display a number less than 21 when a device is present at the SMT pick point and greater than 90 when no device is present. If it is not possible to achieve numbers less than 21 and greater than 90 by adjusting the optic beam, the conveyor module must be replaced. (The optical fiber amplifier must always operate in "Turbo" mode.)*
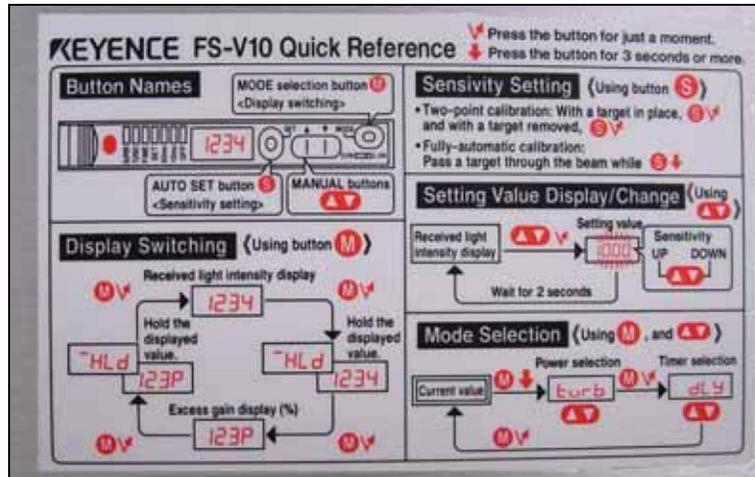
SX

SX

*Figure SX-21—End-of-Belt Optical fiber Amplifier Label on the Conveyor Cover*
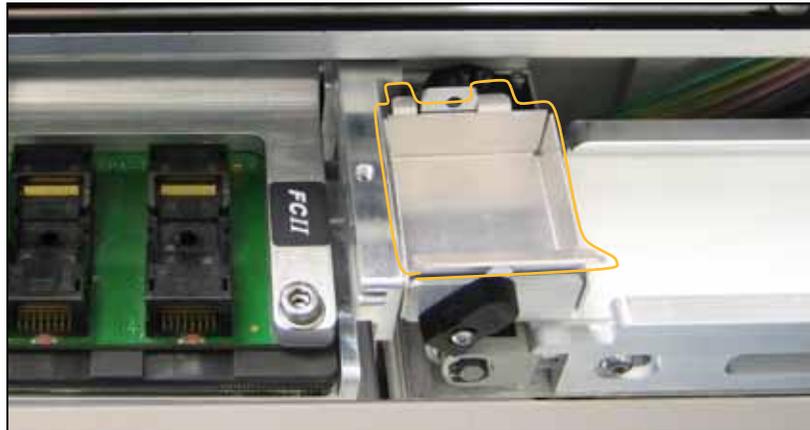
SX

SX

Blank page

SX

SX

# Reject Bin



*Figure SX-22—The Reject Bin  (outlined)*

The Reject Bin is not fastened in, and lifts out of the RoadRunner XLF. Lift up and then out.

The Reject Bin-*Full* Sensor senses when the bin is full and requires empty-ing. The Reject Bin-*Present* sensor senses the bin's presence. The sensors are attached to the Reject Bin Bracket.

**SX**

## Data I/O Parts Ordering Information

**Instructions:  1**. Copy this page.  **2**. Fill in your RoadRunner model and serial numbers (see the label on the chassis under the Robotics Cover).  **3**. Fill in the quantity for the item(s) desired.  **4**. Call your local Data I/O sale representative for part prices (optional).  **5**. Mail or FAX it with your purchase order to Data I/O. See the last page of this manual for contact information.

ProLINE-RoadRunner XLF Model No._____ Serial No._____

| Inventory Part Number | Part Description | Qty | Price Ea. | Totals |
|---|---|---|---|---|
| 6074132001 | Reject Bin, XLF | | $ | $ |
| 7090551003 | Reject Bin-Full Sensor, XLF | | $ | $ |
| 7090667001 | Reject Bin-Present Sensor, XLF | | $ | $ |
| | | | $ | $ |
| | | | $ | $ |

# SX

Signature:_____ Date:_____ Company:_____

# Removing the Reject Bin Sensors

1. Turn the power off.

2. Disconnect the power cord and air supply.

3. Lift off the Robotics Cover.

4. Push the head away from the Reject Bin area if necessary.

5. Lift out the Reject Bin.

6. Remove the Electronics Cover.

*For more information, see "Removing the Electronic Covers" on page SX-7.*

7. Unscrew the two screws securing the Reject Bin Bracket to the chassis with a 3 mm hex key.



Reject Bin-Present Sensor

Reject Bin-Full Sensors (here and directly opposite, mostly hidden).
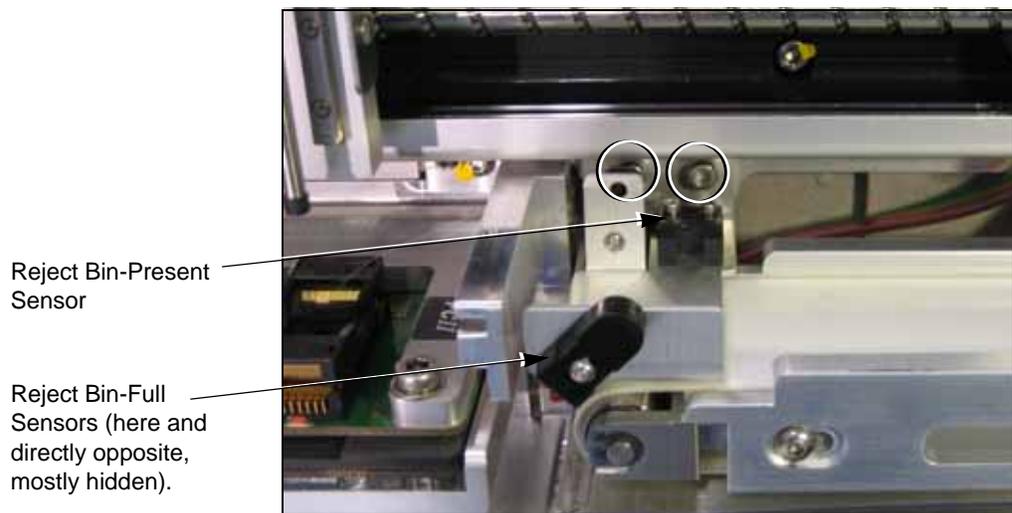
*Figure SX-23—Reject Bin Sensors with Reject Bin Bracket Screw Locations circled. The left screw requires a ball-end hex key. The Reject Bin has been removed.*

8. Unplug the Reject Bin Full optic sensor wires from the Interconnect Panel at J1C.

9. Unplug the Reject Bin Present Sensor wires from the Interconnect Panel at J1C2 and cut the Nylon cable tie (as necessary).

10. Carefully lift out the Reject Bin Bracket with sensors.

To remove the sensors:

11. Unscrew one screw through each optic sensor with a 1.5 mm hex key.

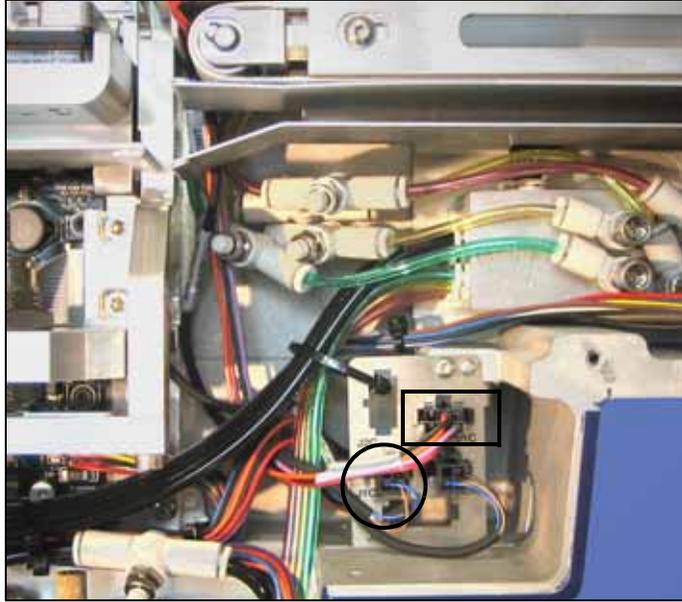12. Unscrew two screws through the Bin Present Sensor with a 1.5 mm hex key.

**SX**

*Figure SX-24—Connectors J1C (boxed) and J1C2 (circled).*

To install the Reject Bin Sensors and bracket, reverse the removal procedures:

• Reinstall the Sensors and the Reject Bin Bracket
• Reinstall the Electronics Cover.

*CAUTION: Ensure that the neither the Reject Bin nor the sensor wires contact the Conveyor Belt. Verify this when finished by rotating the Conveyor Belt by hand and watching closely.*

**SX**

blank page

SX

SX

# Control Panel Module



*Figure SX-25—Control Panel Module, front and back*

The Control Panel Module consists of the Emergency Stop button, the Indicator Lamps, Control Panel buttons and LCD screen. If any of the components in the Control Panel Module are not functioning correctly, check the wiring connections.

If components are still not functioning after connections are tested, return the Control Panel Module to Data I/O for repair.

*NOTE: Do not disassemble the Control Panel Module. If a component is not functioning, send the entire Control Panel Module back to Data I/O.*

## Data I/O Parts Ordering Information

**Instructions:** **1**. Copy this page. **2**. Fill in your RoadRunner model and serial numbers (see the label on the chassis under the Robotics Cover). **3**. Fill in the quantity for the item(s) desired. **4**. Call your local Data I/O sale representative for part prices (optional). **5**. Mail or FAX it with your purchase order to Data I/O. See the last page of this manual for contact information.

ProLINE-RoadRunner XLF Model No._____ Serial No._____

| Inventory Part Number | Part Description | Qty | Price Ea. | Totals |
|---|---|---|---|---|
| 7502397001 | Control Panel Module, XLF | | $ | $ |
| | | | $ | $ |
| | | | $ | $ |
| | | | $ | $ |

Signature:_____Date:_____Company:_____

# Removing the Control Panel Module

1.  Turn the power off.

2.  Disconnect the RoadRunner power cord and air supply.

3.  Remove the Robotics Cover.

4.  Remove the small corner panel by removing three screws with a 2 mm hex key. See figure below.

*Figure SX-26—Corner Panel Cover with screw locations circled.*

5.  Remove the four screws on the face of the Control Panel with a 2 mm hex key.

6.  Lift the Control Panel Module up enough to see the underside.

7.  Unplug the Control Panel Ribbon Cable from the connector.

8.  Follow the wires for the Emergency Stop button to their end connector (near the linear Stage motor) and disconnect it. You may need to cut some Nylon cable ties.

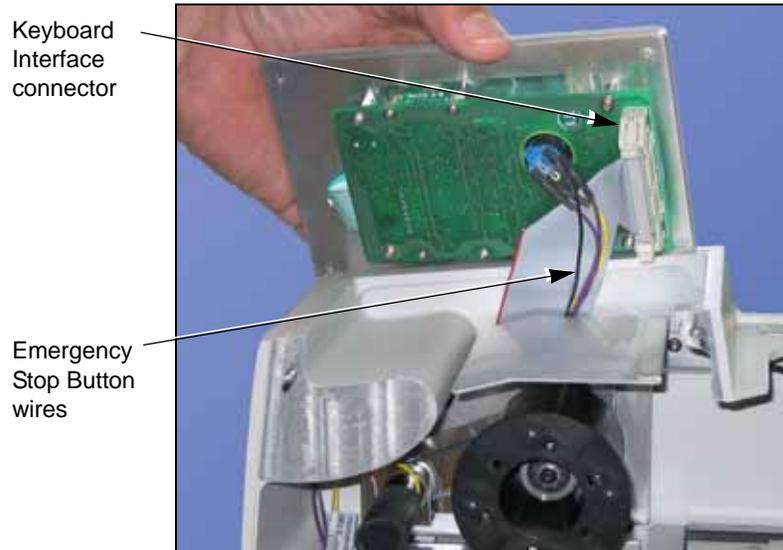9.  Carefully pull the cable up and free with the Control Panel.

Keyboard Interface connector

Emergency Stop Button wires



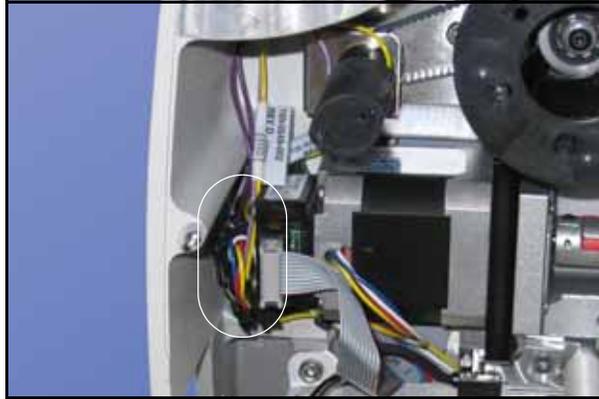*Figure SX-27—Location of Connector on the Control Panel.*

SX

*Figure SX-28—Bundle of wires includes the E-Stop Cable connector.*

Replacement is the in the reverse order of removal.

When reassembled, verify the proper operation of the following:
- Display
- Keypad
- Emergency Stop

SX

SX

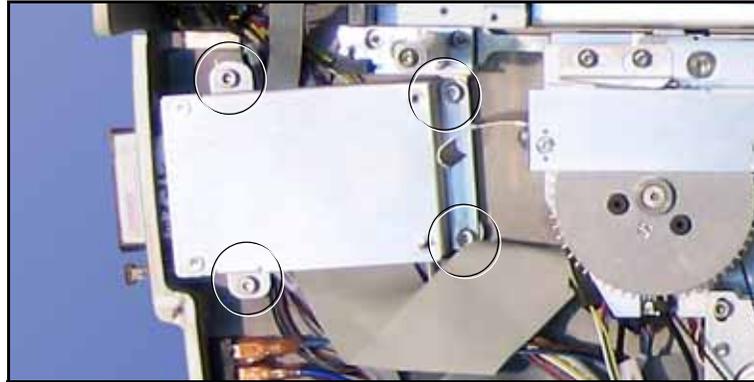SX

blank page

SX

# PC Card Drive



*Figure SX-29—PC Card Drive (with card inserted). Screw locations are circled. The Electronics Covers have been removed.*

The PC Card drive (also called a Card Reader/Writer) accepts Type II PCMCIA cards. If you experience problems, first confirm that the PC card you are using is good. Test the Card Drive with a card that is known to function correctly. Test all connections. If the PC Drive is still not functioning, remove it and return it to Data I/O for repair.

Trouble with PC Cards is often that the card has become corrupt or that it was incorrectly formatted (must be FAT 16, not FAT 32).

## Data I/O Parts Ordering Information

**Instructions:** **1**. Copy this page. **2**. Fill in your RoadRunner model and serial numbers (see the label on the chassis under the Robotics Cover). **3**. Fill in the quantity for the item(s) desired. **4**. Call your local Data I/O sale representative for part prices (optional). **5**. Mail or FAX it with your purchase order to Data I/O. See the last page of this manual for contact information.

ProLINE-RoadRunner XLF Model No._____ Serial No._____

| Inventory Part Number | Part Description | Qty | Price Ea. | Totals |
|---|---|---|---|---|
| 7502401001 | PC Card Drive (reader/writer), XLF | | $ | $ |
| | | | $ | $ |
| | | | $ | $ |
| | | | $ | $ |

Signature:_____Date:_____Company:_____

## Removing the PC Card Drive

To remove the Card Drive:

1.  Turn the power off.

2.  Disconnect the RoadRunner power cord and air supply.

3.  Lift off the Robotics Cover.

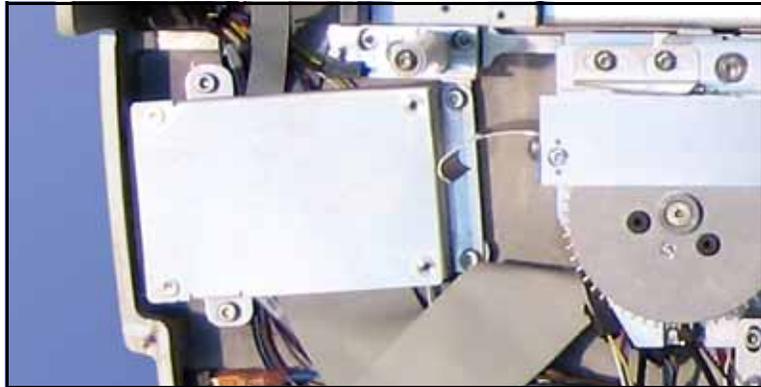4.  Remove the Lower Electronics Cover(s).



*Figure SX-30—The PC Drive. Both Lower Covers have been removed. Fastener locations are circled.*

5.  Eject the PC Card if there is one.

6.  Remove the four screws securing the drive to the chassis.

7.  Slide the drive inboard (right) to clear the slot in the chassis and lift out as the cable allows.

8.  Unplug the ribbon cable from the PC Drive connector.



*Figure SX-31—PC Drive Ribbon Cable is attached to the back of the drive.*

Installation of the PC Card Drive is in the reverse order of removal with these additions:

• Ensure that no cables get pinched when placing the PC Drive over them.

• Before tightening the fasteners, press the eject button and check for clearance with the chassis. The button should not rub the chassis.

**SX**
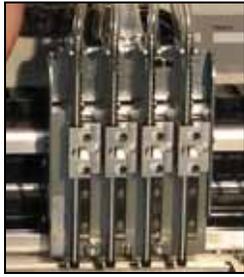
# Pick and Place Head

The head assembly contains four probes, each with Vacuum Tips. Some parts can be replaced and some probe functions can be adjusted.

## Aligning Pick and Place Points

Since device placement tolerance is small, the system may need aligning when a module is replaced or repaired. The system may also need aligning if any of the following error messages are displayed:

- Device pick failure at input, with probe *n.*
- Device pick failure on probe *n.*
- Device dropped from head *n.*

For system alignment procedures see "Setting the 'Tape' Parameter" and "Setting the 'Skt 1' Parameter" under heading "Setting Operational Parameters."

**SX**

## Adjusting and Balancing Probe Speed

If the probe speed is too fast, devices in the carrier tape become unsettled as a probe strikes a device during the pick routine. If the probe speed is too slow, throughput will suffer and device placement problems may occur.

Adjust the probe speed with power and pressurized air on. Ensure that vacuum to all probes is disabled before starting this procedure. The easiest way to ensure this is to cycle the power.

*See "Loading Device Tape" and "Aligning the Device Tape" in Chapter 3 of the Owner's Manual.*

1. Load and align the device tape without peeling off the cover tape. (The Cover Tape Peel Bar and Spool will not be used.)

> ⚠ **WARNING**
>
> **Pinch point**: *Moving mechanical parts. Keep hands away from moving parts. The following procedures require the Robotics Cover to be removed while mechanical parts are in motion. Use caution.*

2. Scroll to and select *Robot Diagnostics.*

3. Scroll to and select *Probe 1.*

4. Scroll to and select *Speed.* The probe will move to the device pick point and cycle continuously.

5. Read the speed that is now displayed in the screen.
   The speed should be 140±4.

If it needs adjustment skip to step 8.
If it does not need adjustment:

   5a. Press *Menu.*

**SX**

5b.  Scroll to and select the next probe.

5c.  Repeat from step 4 for each probe.

> ⚠ **WARNING**
>
> *Electric shock hazard. Do not touch any electronics that become exposed when the cover(s) is removed. Use caution and heed the following instructions closely.*

*For more information on removing the covers, see "Removing the Electronic Covers" on page SX-7.*

6.  Remove the Electronics Cover and the Conveyor Module Cover.

7.  Locate the Probe Control Manifold: it is mounted on the chassis below and to the right of the Reject Bin.
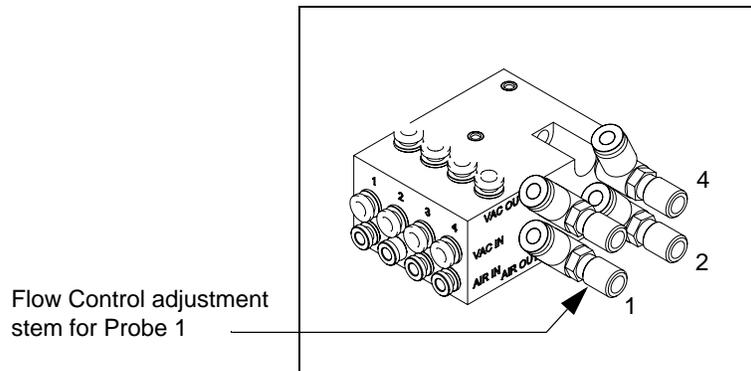


Flow Control adjustment stem for Probe 1

*Figure SX-32—Probe Control Manifold*
*(Adjustment stems may have thumbscrews or slots for screwdriver.)*

8.   Adjust the Probe Speed flow control for Probe 1 (or current probe) while watching the speed displayed at the keypad screen.

9.  When the speed is within the proper range, press *Menu*—probe motion will stop.

10. Tighten the locknut ring on the Flow Control if applicable to your model.

11. Recheck the speed. If it is outside the proper range then readjust.

12. Scroll to and select the next probe.

13. Repeat steps 4 and on for the next probe.

14. When finished, see Adjusting Probe-Raising Speed (next heading).

## Adjusting Probe-Raising Speed

*NOTE: Probe lowering speed should be set first. See "Adjusting and Balancing Probe Speed" on page SX-42.*

If the probe-raising speed is too fast, devices may rotate excessively after a pick operation and cause alignment problems; devices may even fall off the probes. It could also bend the motion limit pin on the PNP Head.

To adjust the probe-raising speed:

*For more information . . .
See "Loading Device
Tape" and "Aligning the
Device Tape" in Chapter 3
of the Owner's Manual.*

**SX**

1.  Load and align the device tape without peeling off the cover tape. (The Cover Tape Peel Bar and Spool will not be used.)

> ⚠ **WARNING**
>
> **Pinch point**: *Moving mechanical parts. Keep hands away from moving parts. The following procedures require the Robotics Cover to be removed while mechanical parts are in motion. Use caution.*

2.  Scroll to and select *Robot Diagnostics.*

3.  Scroll to and select *Probe 1.*

4.  Scroll to and select *Speed.* The probe will move to the device pick point and cycle continuously.

Probe-Raising
Speed flow controls
are in-line.

Probe-Lowering
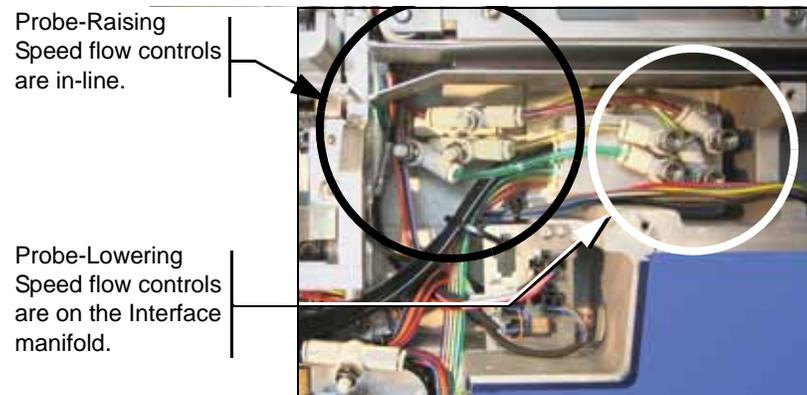Speed flow controls
are on the Interface
manifold.



*Figure SX-33—The in-line flow controls for adjusting the Probe Speed. Probe numbers are stamped on the manifold.*

5.  Watch the probe to observe the probe-raising speed. The probe should be fully up the very instant that the head jogs back and forth a couple millimeters.

# SX

*For more information see "Covers" on page SX-6.*

If the probe is fully up too soon (before the head jogs) or too late (after the head jogs), remove the Electronic Cover and the Conveyor Module Cover.

6. Loosen the locknut ring on the in-line Flow Control for Probe 1 (or current probe).

7. Manually adjust the speed by hand using the knob on the in-line flow control for Probe 1 raising speed (see figure above). Adjust the probe-raising speed until it synchronizes with the head jog.

8. Tighten the locknut ring.

9. Press Menu to deselect the current probe.

10. Scroll to and select the next probe.

11. Repeat these steps (from step 4 and on) for each probe.

12. When finished, replace both covers and remove the device tape.

SX

SX

# Resetting the *Pick* Delay and *Travel* Delay Times

The delay times do not change and do not usually require adjustment. The factory-set values are indicated in the following flow charts.
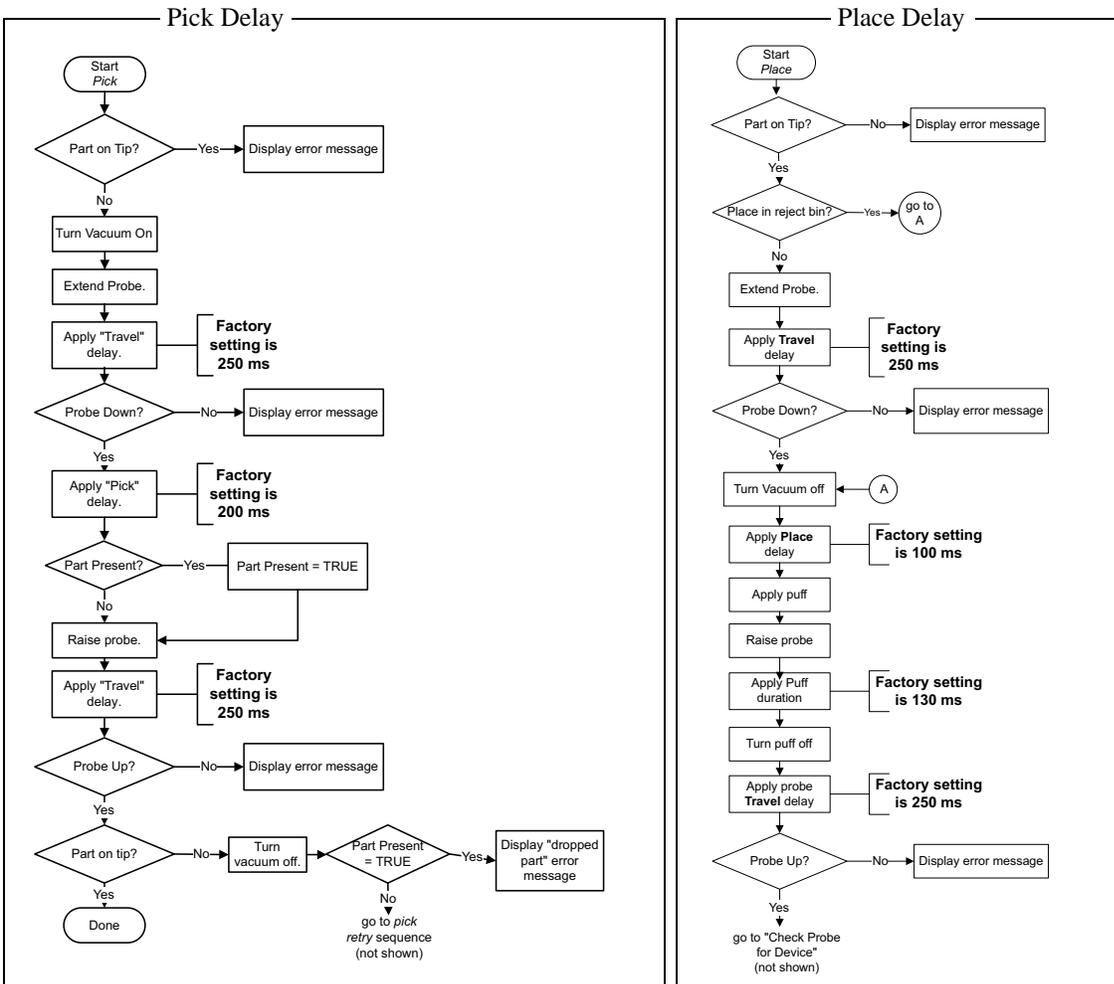


*Figure SX-34—Pick and Place Delay Flow Charts*

> NOTE: Changes to these values are not recommended.

These values only affect the internal verification delay time, as indicated in the flow charts. To reset delay times:

1. From the top level menu on the display, select *Operation.*

2. Scroll to and select *Probes.*

3. Scroll to and select the setting you wish to adjust.

4. Use the *Arrow Up* and *Arrow Down* buttons to change the setting.

5. When finished, select *Menu.*

# Adjusting Probe Vacuum Sensors

1. Select *Menu* until you reach the top menu level and select *Robot Diagnostics*.

   1a. Scroll to and select *Probe 1*.

   1b. Scroll to and select *Vacuum*.

   1c. Press the *Up Arrow* to enable the probe.

> ⚠ **WARNING**
>
> ⚡ ***Electric shock hazard****. The following procedures require the Electronics Cover(s) to be removed while power is on. Only touch items described in the procedures.Use caution.*

2. Remove the Electronics Cover.

   2a. Turn the vacuum sensor adjust screw for Probe 1 (the first adjustment block) counter-clockwise until the red LED adjacent to the adjustment screw illuminates.

Adjustment LED for Probe 1 (typical)

Vacuum Sensor Adjustment Screw for Probe 1 (typical)

Solenoid switches for Probe 1 (typical)



*Figure SX-35—Pneumatic Valve Block. When the vacuum for Probe 1 is enabled, the two small LEDs on the solenoids (white arrows) for Probe 1 will be unlit.*

   2b. Turn the vacuum sensor adjust screw for Probe 1 clockwise until the red LED goes out. Continue turning the screw one more revo-

> lution clockwise. Release the probe allowing it to resume the up position.

3. Select *Menu* until you reach the top menu level again and select *Robot Diagnostics*.

   3a. Scroll to and select *Probe 1*.

   3b. Scroll to and select *Vacuum*.

   3c. Press the *Down Arrow* to disable the probe.

4. Repeat steps 1 through 3 for each probe.

5. Re-install the Cover when finished.
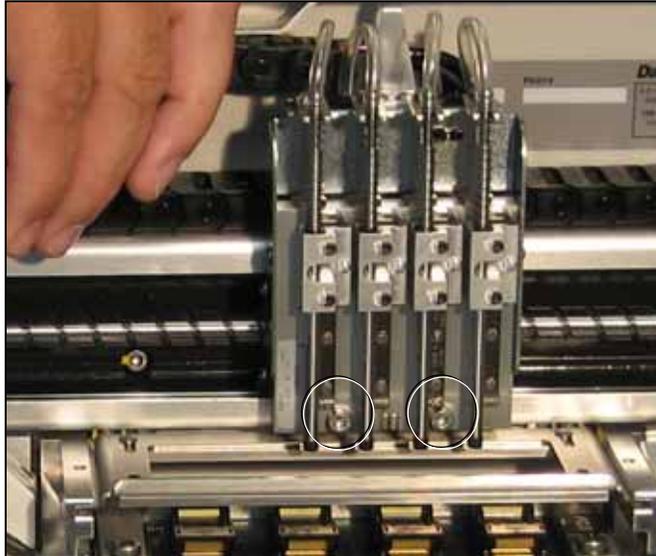
SX

SX

blank page

SX

SX

## Removing the PNP Head



*Figure SX-36—The PNP Head Mounting Screws (circled).*

SX

If you receive error messages relating to the Pick and Place (PNP) function, refer to the troubleshooting chart in the Owner's Manual.

If you experience trouble with the Pick and Place Head that is not covered in this manual, remove the head and send it to Data I/O Customer Service for repair or replacement. For example, a bent probe would require the PNP Head to be replaced.

Removal procedures are on the following page.

## Data I/O Parts Ordering Information

**Instructions:** **1**. Copy this page. **2**. Fill in your RoadRunner model and serial numbers (see the label on the chassis under the Robotics Cover). **3**. Fill in the quantity for the item(s) desired. **4**. Call your local Data I/O sale representative for part prices (optional). **5**. Mail or FAX it with your purchase order to Data I/O. See the last page of this manual for contact information.

ProLINE-RoadRunner XLF Model No._____ Serial No._____

| Inventory Part Number | Part Description | Qty | Price Ea. | Totals |
|---|---|---|---|---|
| 2890014005 | Pick and Place Head | | $ | $ |
| 2880019001 | Probe Tip | | $ | $ |
| | | | $ | $ |
| | | | $ | $ |

**SX**

Signature:_____Date:_____Company:_____

To remove the Pick and Place Head:

1.  Turn the power off.

2.  Disconnect the RoadRunner power cord and air supply.

3.  Remove the Robotics Cover.

4.  Label and disconnect the tube from the top of each probe.

*For PNP Head screw locations see Figure SX-36.*

5.  Remove two socket head cap screws attaching the head to the ball screw carriage [3 mm hex key].

6.  Lightly pull the head a couple of centimeters away from the carriage.

7.  Label and remove four pneumatic tubes with fittings from the back of the head with a slotted screwdriver. Note that each has a washer.
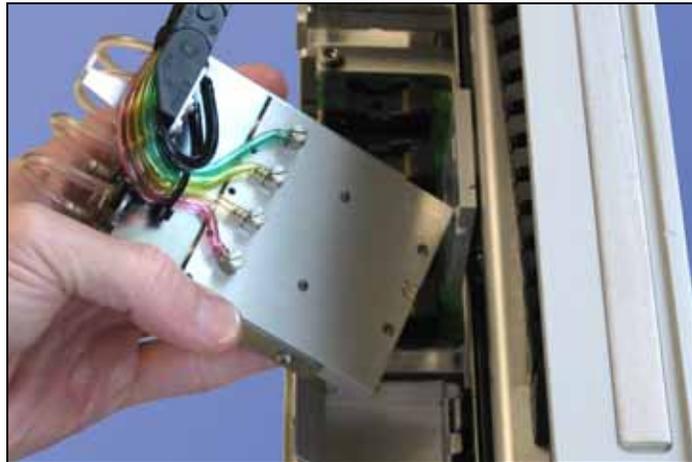


*Figure SX-37—The four fittings on the back of the PNP Head. (The Head has been unbolted from the Linear Stage).*

*Tube Fitting and Gasket.*

8.  Remove two Head Bracket screws from each side of the head [2 mm hex key].

To reinstall a PNP Head, reverse the steps for removal *and* perform the following:

1.  Install the four fittings onto the new head—the tubes are still attached. Ensure that each has a gasket.

2.  Install the head Bracket onto the head.

3.  Attach the tubes to the probes.
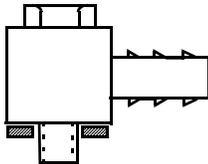
*For more information, see the "Linear Stage Installation Verification" on page SX-66.*

4.  Install the head to the Linear stage with the two socket screws. Use Loctite.

5.  Perform the "Linear Stage Reinstallation Verification" procedure.

SX

# Programmer Module

**1**-PCMCIA Cable Board

**2**- Ribbon Cable Connector J4

**3**- Cable Connector J3

**4**- Actuation air tube
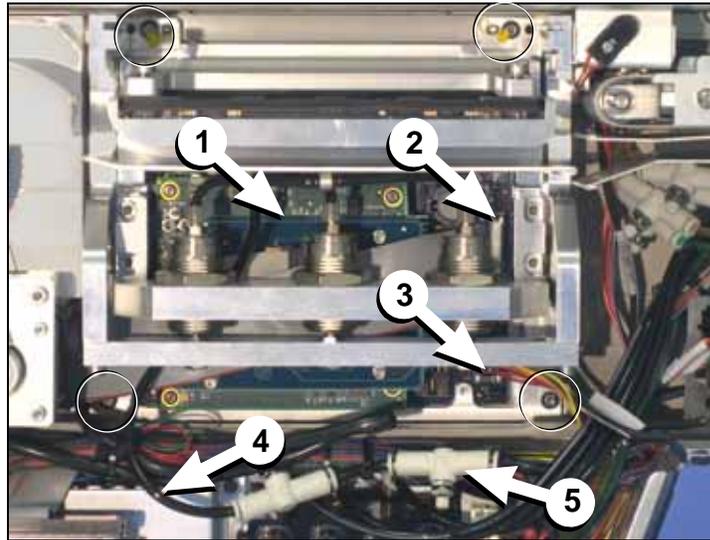
**5-** Actuation Flow Control Valve



*Figure SX-38—Programmer Module with mounting screws circled.*

The Programmer Module consists of the WaveForm Board, Main Controller Board, BackPlane Board, the Socket Adapter, and the Socket Actuator that opens and closes the programmer sockets.

*For more information, see "Changing the Socket Adapter" in Chapter 3 of the Owner's Manual.*

If Programmer Module sockets become worn, the Socket Adapter needs attention. The Socket Adapter needs cleaning when yield drops, and needs replacing when cleaning fails to boost yield. If replacing the Socket Adapter does not solve problems in the Programmer Module, see "Diagnosing with the Adapter Board" in the Maintenance Chapter of the Owner's Manual, or contact Data I/O for Programmer Module replacement or repair.

## Data I/O Parts Ordering Information

**Instructions:** **1**. Copy this page. **2**. Fill in your RoadRunner model and serial numbers (see the label on the chassis under the Robotics Cover). **3**. Fill in the quantity for the item(s) desired. **4**. Call your local Data I/O sale representative for part prices (optional). **5**. Mail or FAX it with your purchase order to Data I/O. See the last page of this manual for contact information.

ProLINE-RoadRunner XLF Model No._____ Serial No._____

| Inventory Part Number | Part Description | Qty | Price Ea. | Totals |
|---|---|---|---|---|
| 7502398001 | FC II Programmer, XLF | | $ | $ |
| 6950019001 | Programmer Alignment Tool | | $ | $ |
| | | | $ | $ |
| | | | $ | $ |
| | | | $ | $ |

Signature:_____Date:_____Company:_____

# Removing the Programmer Module

NOTE: *Only technicians who have taken the ProLINE-RoadRunner Service training course should attempt to remove the Programmer Module.*

NOTE: ***A Programmer Alignment Tool is recommended*** *from Data I/O to reinstall the Programmer Module. See the order form on the previous page. (This tool is a part of the Spares Kit on* *page SX-72.)*

1. Turn the power off.

2. Disconnect the RoadRunner power cord and air supply.

3. Lift off the Robotics Cover.

4. Remove the Lower Electronics Cover(s).

5. Move the PNP Head away from the programmer.

6. Remove the Actuator Plate by sliding it out of the bracket.

7. Optional: Remove the Socket Adapter.

8. Lift out the Reject Bin.

9. Disconnect Cable J3 by pulling the connector straight out.

*See "Changing the Socket Adapter" in Chapter 3 of the Owner's Manual.*

**SX**

**A**-PCMCIA Cable Board

**B**- Actuation air tube

[1] Cable
[2] Connector
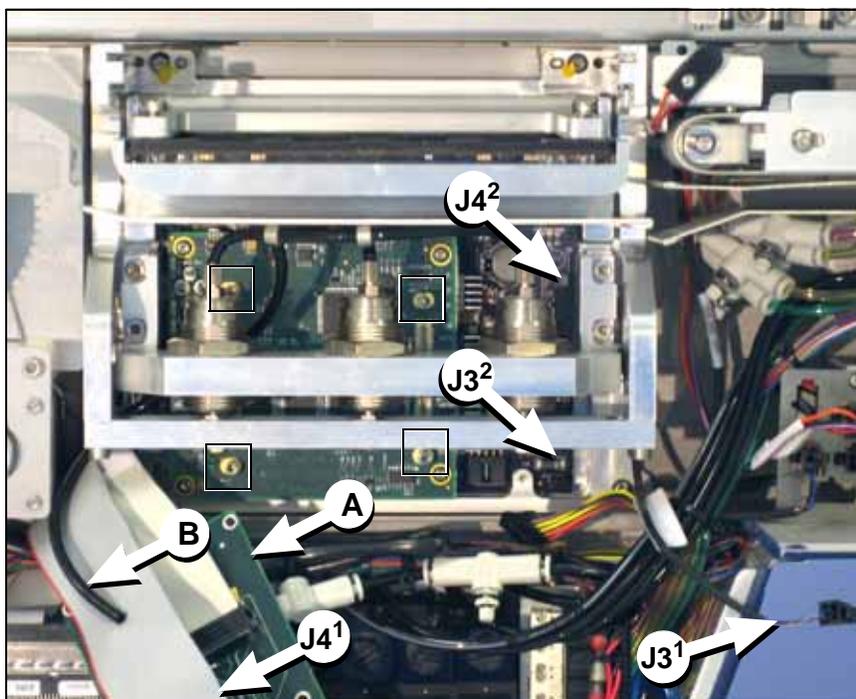


*Figure SX-39—PCMCIA Cable Board [A] has been removed from the Programmer Module (squares), the air tube [B] disconnected, and J3 and J4 cables unplugged.*

**SX**

**CAUTION:** *Ribbon Cables might get damaged if pulled or pinched. Cable damage is often not visible. Try to pull cables by the connector only.*

*Cables are identified in Figure SX-39 above.*

*For air fitting information see Figure SX-9 on page SX-17.*

*Programmer Module screw locations are indicated in Figure SX-38.*

SX

10. Disconnect Ribbon Cable J4 by pulling the connector straight out and move the cable out of the way.

11. Disconnect the Actuation Air Tube from the exhaust fitting. It is a One-Touch fitting.

12. Remove the PCMCIA Cable Board from the Programmer Module by removing the four screws with a 2 mm hex key and then unplugging it (pulling up) from the board below. THE RIBBON CABLE IS NOT REMOVABLE FROM THIS PCB. Slide the board out of the way.

13. Remove four screws securing the Programmer Module to the chassis using a 2.5 mm hex key.

14. Unplug the Ethernet Cable (701-3215) connector and the Serial RJ45 (Motion Controller) connector from the left side ot the Programmer Module. It may be helpful to pull the Module part way out to access them.

15. Unplug the Actuation Sensor cable JC5 from the Interconnect Panel by pinching the clasp on top so it opens like a clothespin and pulling the connector.
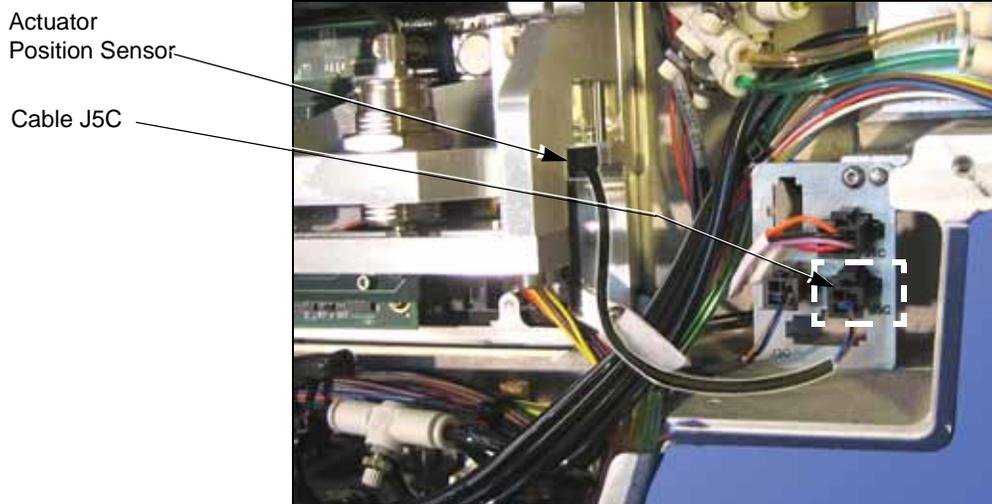
Actuator Position Sensor

Cable J5C



*Figure SX-40—Cable Interconnect Panel with the Cable JC5 and Sensor highlighted.*

16. Lift the Programmer Module out from the chassis.

### Reinstalling the Programmer Module

To reinstall a Programmer Module, perform the following steps:

SX

1. Plug the Ethernet Cable and RJ45 Motion Control Cable into the left side of the Module.

2. Reinstall a Programmer Module ensuring that no wires or hoses are pinched, and tighten the four screws.

3. Reconnect the air tube.

4. Reinstall all cable connectors.

5. Plug in the PCMCIA Cable PCB and install the four screws.

6. Reinstall the Reject Bin.

Align the Programmer Module as described below before completing reinstallation.
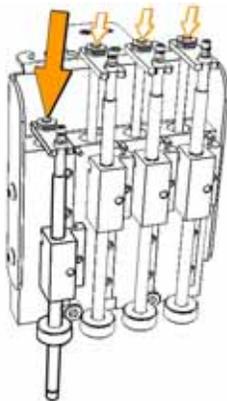
### Aligning the Programmer Module

Align the Programmer Module as follows:



*Figure SX-41—The Programmer Module Alignment Tool Installed on the Programmer in place of a Socket Adapter. (PROBE TIPS MUST BE REMOVED PRIOR TO ALIGNMENT PROCEDURE.)*



*Push probe here with finger.*



*CAUTION: Chassis might get damaged. For this procedure, loosen the Programmer Module mounting screws (two upper screws) before each attempt to adjust the Programmer Alignment Screws.*

1. Install the Programmer Alignment Tool (sales part number is PROGRAMMER ALIGNMENT TOOL) onto the Programmer Module in place of a socket adapter.

2. Remove the rubber tip from Probe 1 and extend Probe 1 into the alignment tool hole #1. If the probe **passes** through the hole easily, then the left side of the programmer is properly aligned—skip to step 3.

   2a. If Probe 1 **does not pass** through easily, loosen the upper left Programmer Module mounting screw two revolutions.

**SX**

**SX**

2b. Adjust the left Position Adjustment set screw (adjacent to the mounting screw) with a 2 mm hex key so that the probe does pass through easily. Turn the screw clockwise to move the module away from the chassis.

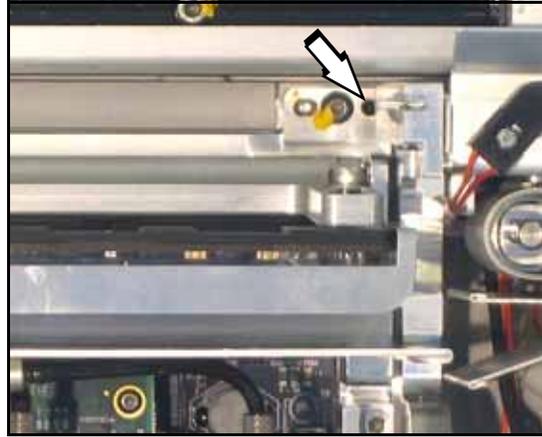2c. When done, tighten the upper left Programmer Module screw.



*Figure SX-42—Programmer Module Alignment Screw. (the Left Hand Screw is not shown)*

3. Remove the rubber tip from Probe 4 and extend it into the alignment tool hole #4. If the probe **passes** through the hole easily, then the right side of the programmer is properly aligned—skip to step 4.

3a. If probe 4 **does not pass** through easily, loosen the upper right Programmer Module mounting screw two revolutions.

3b. Adjust the right Position Adjustment set-screw accordingly.

3c. When done, tighten the upper right programmer mounting screw.

4. **Retest**.
If the module requires further adjustment, be sure to loosen the left or right mounting screw first.

5. Remove the Alignment Tool.

### Adjusting the Actuation Speed

The programmer actuation speed needs to be adjusted so that the sockets open without being slammed by the Actuator Plate. If it is too fast, causing a hard landing, it could damage sockets or cause devices to bounce.

1. Install a Socket Adapter and Actuator Plate.

2. Plug in the AC Power cable.

3. Connect external air source ensuring that it is set to approximately 5.17 Bars (75 PSI).

4. Press the Emergency Stop button to prevent the PNP Head from moving.

*CAUTION: Pinch hazard. Keep hands and fingers away from the PNP Head, Gantry lead screw, and programmer actuator.*

*The E-Stop does not stop the programmer from actuating—opening and closing the sockets.*

*CAUTION: Shock hazard. The E-Stop does not stop electrical flow to internal electronics.*

5. Insert a job card with Supervisor authority and switch the power on.

6. Locate the Actuation Flow Control and adjust it counter-clockwise to full open, then turn it clockwise 2-1/2 revolutions.

*To locate the Actuation Flow Control, see Figure SX-38 on page SX-52.*

7. At the Control Panel, press *Menu*. Then scroll to and select **Robot Diagnostics > Socket > State**. After selecting the **State** command a dot, or bullet, appears next to it. Then the *Down Arrow* and *Up Arrow* buttons will actuate the programmer. KEEP FINGERS AWAY FROM THE PROGRAMMER AND ACTUATOR PLATE.

8. Actuate the programmer and watch the speed. If the actuator appears to hit the sockets too hard, loosen the locking ring and adjust the flow control and then retry. Use the flow control to soften the impact. However, too slow and it may cause timing problems as well as reduced throughput.

9. Retighten the locking ring on the flow control.

Reinstall all RoadRunner covers.

**SX**

**SX**

# NVRAM Battery
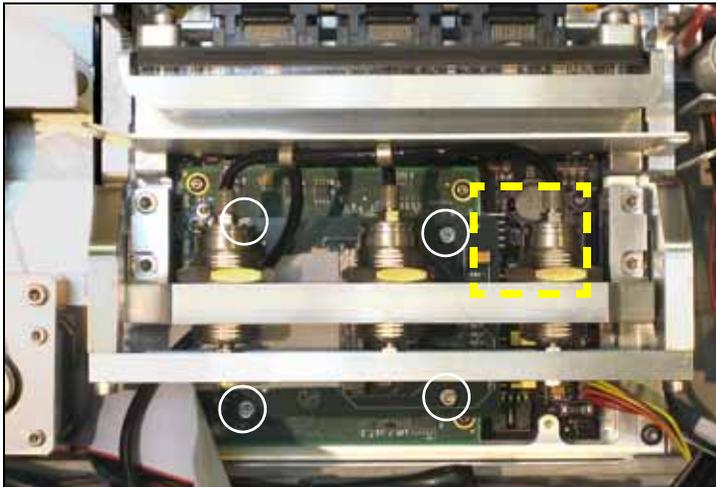


*Figure SX-43—The Programmer with Ribbon Cable J4 disconnected. The NVRAM Battery is on the far side of the next board down (dashed square). Screws for the PCMCIA Board are circled.*

RoadRunner uses a lithium battery to power the non-volatile read-only memory (NVRAM). If information stored in NVRAM is lost, RoadRunner will not function correctly. If RoadRunner displays this error message: **NVRAM Battery Failed**, NVRAM data will be lost when RoadRunner is switched off and the battery needs to be replaced.

After a new battery has been installed in RoadRunner, perform the simple procedure that follows the battery replacement instructions to reteach the PNP Head positions, the Socket Status, Network Settings, and the time and date.

It takes approximately 40 minutes to replace the battery and an additional 20 minutes to reteach the system.

## Data I/O Parts Ordering Information

**Instructions: 1**. Copy this page. **2**. Fill in your RoadRunner model and serial numbers (see the label on the chassis under the Robotics Cover). **3**. Fill in the quantity for the item(s) desired. **4**. Call your local Data I/O sale representative for part prices (optional). **5**. Mail or FAX it with your purchase order to Data I/O. See the last page of this manual for contact information.

ProLINE-RoadRunner XLF Model No._____ Serial No._____

| Inventory Name | Part Description | Qty | Price Ea. | Totals |
|---|---|---|---|---|
| 4210001001 | NVRAM Battery | | $ | $ |
| | | | $ | $ |
| | | | $ | $ |

Signature:_____Date:_____Company:_____

## Removing the NVRAM Battery

The battery is an integral part of the PowerCap Module. The entire PowerCap cap must be replaced. The PowerCap Module is located on the back side of the RPX_LITE circuit board.

1. Turn the power off.

2. Disconnect the RoadRunner power cord and air supply.

3. Lift off the Robotics Cover.

4. Remove the Lower Electronics Cover(s).

*For PCMCIA PCB screw locations, see Figure SX-42.*

5. Unplug Ribbon cable J4 from the Programmer Module and move it out of the way. See figure below.

6. Remove the PCMCIA PCB by removing four socket-head cap screws and lifting the PCB up. Then pull it down and aside—the ribbon cable is not removable from the PCB. For best access, disconnect the air tube from the in-line exhaust valve. See the next two figures below.

Ribbon Cable J4 has been unplugged from the connector (boxed).
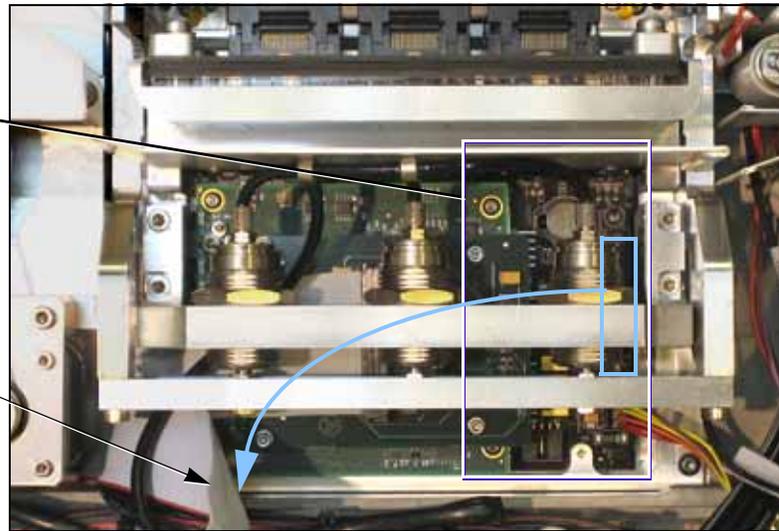


*Figure SX-44—The Programmer with Ribbon Cable J4 disconnected. (In the previous figure on page SX-58, the PCMCIA Board screws are circled.)*

7. Remove four socket-head screws securing the RPX_LITE board to the Waveform PCB and lift the board up. Then pull it down and aside—cables are still attached. See figures below.

8. Turn the board over and locate the PowerCap Module.

SX

**SX**
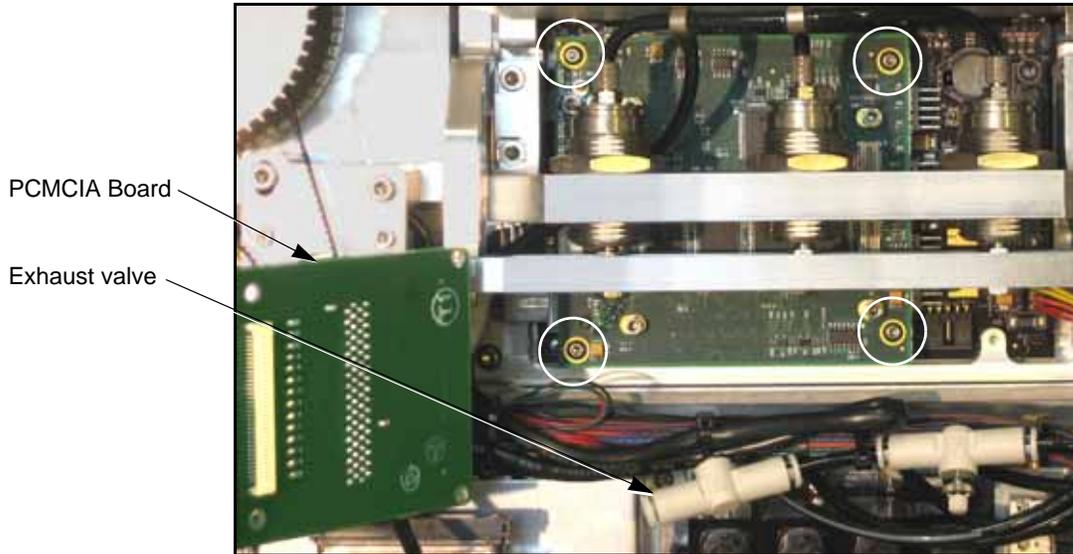
*Figure SX-45—The RPX-Lite PCB screws are circled. The PCMCIA PCB has been moved aside. The air tube has been disconnected from the exhaust valve for access.*
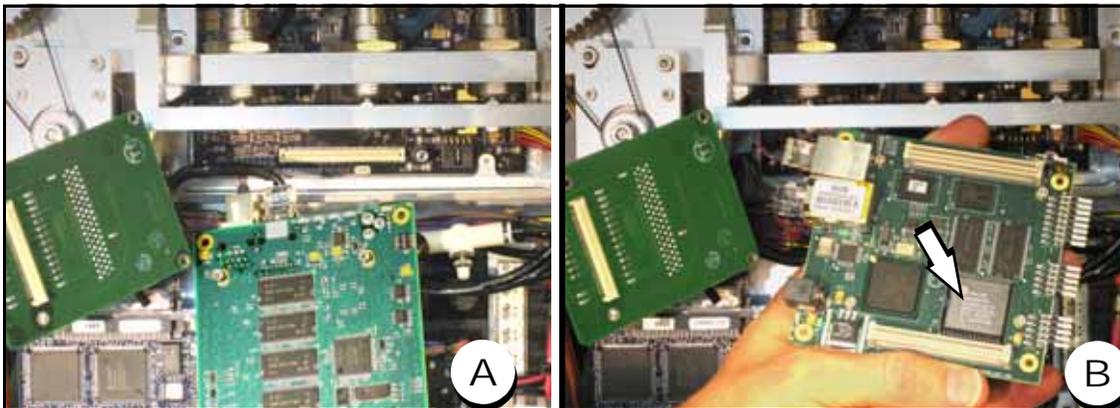
PCMCIA Board

Exhaust valve

SX



*Figure SX-46—The RPX-Lite PCB is removed with cables still attached (A) and the back side (B) showing the NVRAM Battery PowerCap (arrow).*

9.  Insert a small slotted screwdriver into the PowerCap cap slot.

10. Gently pull back the screwdriver handle until the side of the cap releases from the module base. See figure below. Remove the cap.

*NOTE: The battery is soldered into the cap. Replace the entire cap.*

# SX

Service—Siemens XLF • NVRAM Battery
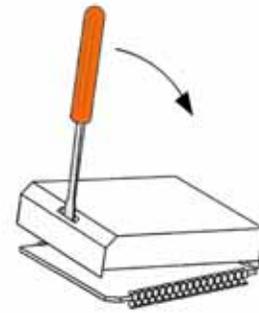
*Figure SX-47—Removing the cap from the base.*

## Installing a new NVRAM Battery

1. Align a new PowerCap cap contact springs (tabs) with the base contact lands.

2. Hook the PowerCap cap flange under the module base board. Center the cap on the base. See figure below.

3. Push down on the cap until the side with the slot snaps onto the base.

**SX**
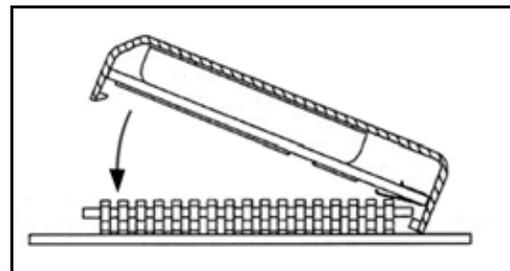


*Figure SX-48—Attaching a new PowerCap cap (NVRAM battery) to the PowerCap Module base.*

## Reinstalling Components

Reinstallation of components is in reverse order of removal. Briefly: install the RPX-Lite board, install the PCMCIA Cable board, plug in ribbon cable J4, install the lower cover.

## Reteaching the NVRAM

After a new battery has been installed in RoadRunner, you need to teach it the PNP Head positions, the Socket Status, Network Settings, and the time and date so that they can be stored again in NVRAM. The following proce-

**SX**

dures are covered in more detail in the RoadRunner Owner's Manual as noted in many of the steps below.

To reteach the NVRAM,

1. Connect the air supply and power cord to RoadRunner.

2. Switch the power on.

3. Insert a PC card with Supervisor Authority into RoadRunner.
   For help on setting Supervisor Authority, open TaskLink and click
   **Help > Help Topics > Menus > Tools Menu > Set Administrator Privileges > How to Set Administrative Privileges**.

4. Press the Menu button on the RoadRunner Control Panel.

### Head Positions

1. Teach the Tape pocket position—see *Setting the Tape Parameter* in Chapter 3 of the Owner's Manual.

2. Teach the Socket 1 position—see *Setting the Skt 1 Parameter* in Chapter 3 of the Owner's Manual.

3. Teach the Reject Bin position—see *Setting the Reject Parameter* in Chapter 3 of the Owner's Manual.

4. Teach the Belt position—see *Setting the Belt Parameter* in Chapter 3 of the Owner's Manual.

### Network Values

*The RoadRunner IP, Programmer Port (**Prog Port**), Subnet Mask (**Sub**), and Gateway (**GTW**) are listed in the RoadRunner menu under **System** > **Network**.*

If your RoadRunner is networked to a computer with TaskLink, you need to configure the network settings again.

1. Use the Network Wizard in TaskLink (**Tools > Create Network Configuration Card**) to create a Network Configuration card. (Generally, the previous network values are automatically inserted except a zero or a dummy number will be placed into the IP address field.) Enter data for the IP address, Programmer Port, Subnet Mask and Gateway. When done click **Finish**.

2. Remove the PC card and insert the card into the target RoadRunner.

3. Scroll to and select **System > Network > Network Parm**.

4. Press the *Down Arrow* to change **Network Parm** to **Card**.

5. Cycle the power on the RoadRunner.

SX

### *Reteaching the Time settings*

To set the time:

1.  Press the *Menu* button.

2.  In the top level menu, scroll to and select **System > Time**.

3.  Scroll to Hour.
    Set to the correct hour as follows:
    • Press *Select*
    • Adjust number with the *Up Arrow* or *Down Arrow*
    • Press *Menu* to save.

4.  Scroll to each remaining parameter (**Minutes**, **Month**, **Day**, **Year**)
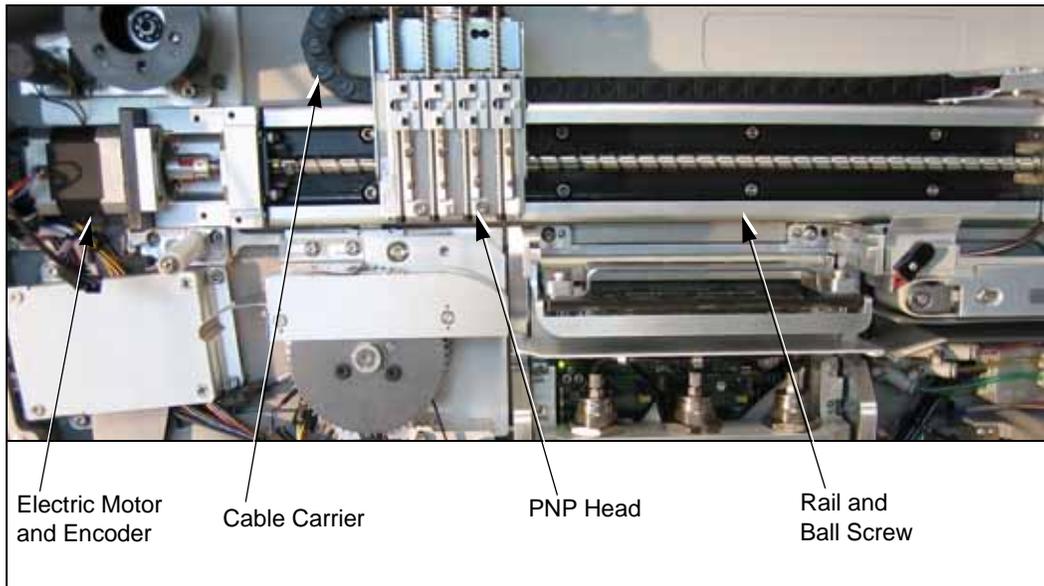    and set in the same manner.

**SX**

**SX**

# Linear Stage Module



*Figure SX-49—The Linear Stage Module. The Electronics Covers have been removed.*

*To remove the PNP Head only, see "Removing the PNP Head" on page SX-50.*

The Linear Stage module, part of the Robotic System, consists of a rail and ball screw, a stepper motor with encoder, and a cable carrier. The Linear Stage is removed as an assembly with the PNP Head.

## Data I/O Parts Ordering Information

**Instructions: 1**. Copy this page. **2**. Fill in your RoadRunner model and serial numbers (see the label on the chassis under the Robotics Cover). **3**. Fill in the quantity for the item(s) desired. **4**. Call your local Data I/O sale representative for part prices (optional). **5**. Mail or FAX it with your purchase order to Data I/O. See the last page of this manual for contact information.

ProLINE-RoadRunner XLF Model No._____ Serial No._____

| Inventory Part Number | Part Description | Qty | Price Ea. | Totals |
|---|---|---|---|---|
| 7502190005 | Linear Stage Module | | $ | $ |
| | | | $ | $ |
| | | | $ | $ |

Signature:_____Date:_____Company:_____

# Removing the Linear Stage Module

1. Turn the power off.

2. Disconnect the RoadRunner power cord and air supply.

3. Lift off the Robotics Cover.

4. Remove the Lower Electronics Cover(s).

5. Remove the Conveyor Module Cover.

6. Remove the Conveyor Module screws (the wires do not need to be unplugged) and lift it out of the way.

7. (Label if necessary and) disconnect four *black* Linear Stage air hoses from the Probe Control Manifold's upper surface. The Probe Control Manifold is located below the Reject Bin Bracket. The connections are one touch fittings.

8. (Label if necessary and) disconnect four *colored* air hoses from the Probe Control Manifold. The connections are one touch fittings.
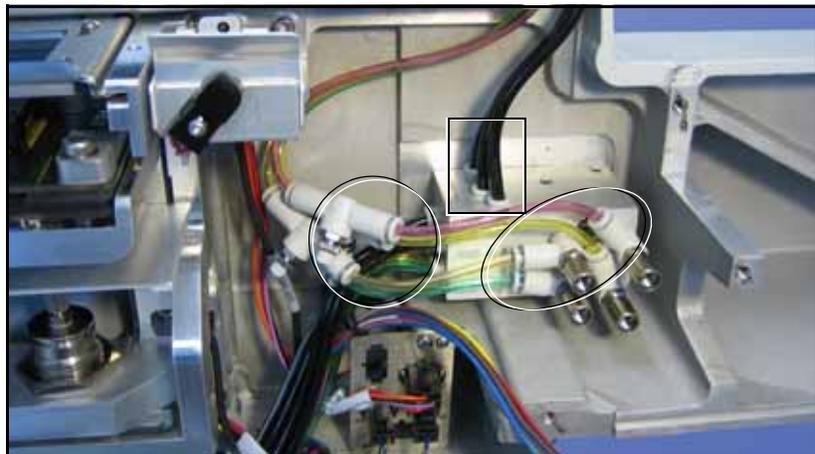


*Figure SX-50—Air tubes from the Linear Stage must be disconnected: four black tubes (boxed) and four colored tubes at the circle OR at the oval.*

*The Conveyor Module has been removed, but wires are not disconnected—the wires can be seen descending from the chassis.*

9. Remove the Control Panel Cover.

10. Unplug the ribbon cable at the Linear Stage Encoder.

11. Cut the cable tie securing connector J8B; it is adjacent to the Linear Stage motor. See figure below.

12. Unplug the connector J8B from the extension cable connector by pinching the clasp and pulling apart.

**SX**

Encoder
Ribbon
Cable

Connector
J8B

Cable Tie

*Figure SX-51—Two wire connectors must be unplugged from the Linear Stage Module.*

**SX**

13. Remove eight screws securing the Linear Stage Module to the chassis. (Slide the head out of the way as necessary.) See the figure below.



*Figure SX-52—Linear Stage Module screw locations (circled). (The Conveyor Module would not be in place at this time.)*

**Linear Stage Installation Verification**

To replace the Linear Stage Module, reverse the steps for removal *and* perform the following:

1. For Conveyor Module reinstallation, see heading *Reinstalling the Conveyor Module* earlier in this manual.

2. With the power off, slide the PNP Head along the entire length of the Linear Stage. Check that the Head Flag clears the position sensors.

3. Verify electrical and pneumatic connections as follows:

 3a. Connect the air hose and turn the power on.

 3b. Verify that the head homes.

**SX**

3c. Verify that the *Position* field at the keypad display toggles when each probe is lowered by hand. *Robot Diagnostics » Probe X » Position.*

3d. Extend and retract each probe to verify correct plumbing. *Robot Diagnostics » Probe X » Position » Arrow Up/Down.*

3e. Enable vacuum to each probe to verify correct plumbing. *Robot Diagnostics » Probe X » Vac Sense » Arrow Up/Down.*

4. Adjust the Probe Vacuum Sensors.

5. Verify correct Probe Speed.

6. Perform the "Aligning the Programmer Module" procedure.

7. Reteach the robot the four operation parameters: Tape, Socket1, Reject and Belt.

*For probe vacuum settings see "Adjusting Probe Vacuum Sensors" on page SX-47.*

*For probe speed information see "Adjusting and Balancing Probe Speed" on page SX-42.*

*For Programmer alignment see "Aligning the Programmer Module" on page SX-55.*

*For reteaching the robot see "Setting Operational Parameters" Chapter 3 of the Owner's Manual.*

SX

SX

# Spare Parts Kits

Kits of spares parts prevent long delays if you experience down time due to part wear or failure. There are two types of spares kits: a Basic Spares Kit and a Self-Service Spares Kit. The Self-Service contains more parts and requires technicians who have attended an Advanced RoadRunner Service course to replace the components. Use the Inventory Number below to order your spares kit.

### Spares Kits for Specific XLF Models

| Model | Basic Spares Kit Inventory Number | Self-Service Spares Inventory Number |
|---|---|---|
| RoadRunner XLF with FC II[1] | 9520503001 | 9520504001 |

[1]First shipped in June 2008.

Contents of the some of the kits are listed on the following pages.

FlashCORE II (FC II) is the latest version programmer for the standard RoadRunner.

Device size parameters compared to the Standard Siemens RoadRunner:

| Model / Maximum device size | Length (mm) | Width (mm) | Height (mm) |
|---|---|---|---|
| Standard | 15 | 21.65 | 3 |
| XLF | 32 | 32 | 6 |

On RoadRunner, the width is perpendicular to the direction of device travel.

SX

# SX

SX

blank page

SX

# Basic Spares Kit, RoadRunner XLF
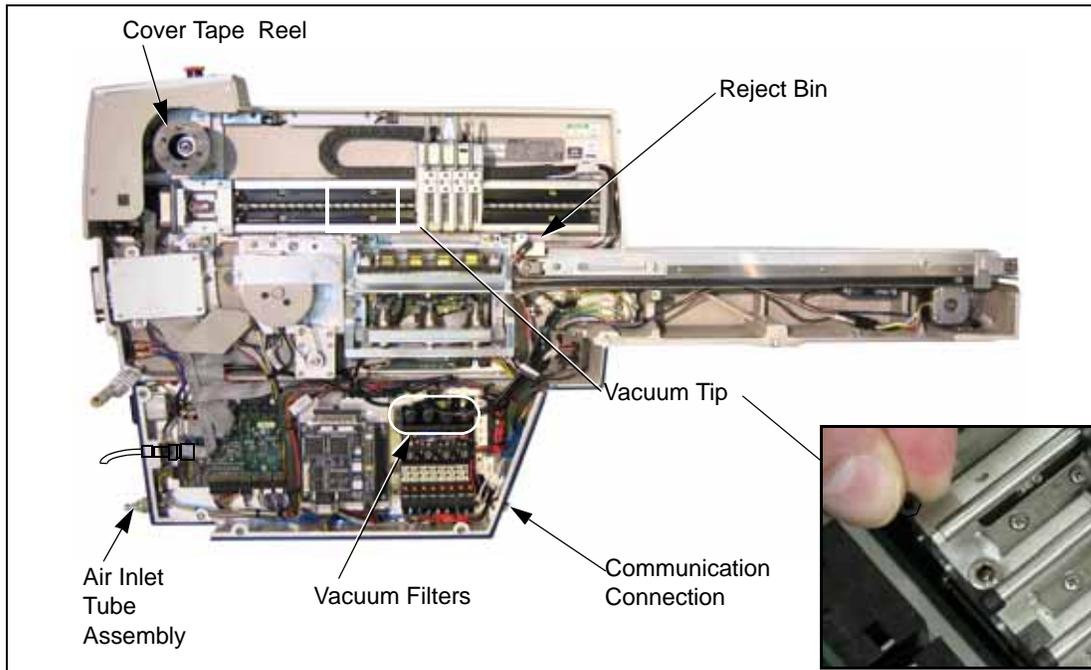


*Figure SX-53—Parts in the Basic Spares Kit; RoadRunner XLF*

Two spare parts kits are available for the RoadRunner XLF. Parts in the Basic Spares Kit are listed below. For the larger kit, "Self-Service Spares Kit," see page SX-72.

## Data I/O Parts Ordering Information

**Instructions:** **1**. Copy this page. **2**. Fill in your RoadRunner model and serial numbers (see the label on the chassis under the Robotics Cover). **3**. Fill in the quantity for the item(s) desired. **4**. Call your local Data I/O sale representative for part prices (optional). **5**. Mail or FAX it with your purchase order to Data I/O. See the last page of this manual for contact information.

ProLINE-RoadRunner XLF Model No._____ Serial No._____

| Inventory Part Number | Part Description | Qty | Price Ea. | Totals |
|---|---|---|---|---|
| 2880019001 | Probe Tip, 4.57MM OD | | $ | $ |
| 2860001001 | Vacuum Filter, 70PSI | | $ | $ |
| 6152132001 | Siemens Clamping Hook | | $ | $ |
| 6151978003 | Air Inlet Tube Assembly | | $ | $ |
| 6074132001 | Reject Bin | | $ | $ |
| 5250018001 | Cover Tape Take-Up Reel, 6 Holes | | $ | $ |
| 4510015001 | Shipping Box,13 x 8.63 x 2.5 | | $ | $ |
| 5658000001 | Vacuum Tool | | $ | $ |
| 7097030003 | Communications Cable Assy | | $ | $ |
| 7013215004 | PCMCIA PCB | | $ | $ |
| | | | $ | $ |
| 9520503001 | This Spares Kit (all above) | | $ | $ |

Signature:_____Date:_____Company:_____

## Replacing the Probe Tips

The rubber tip pulls straight off. To install a rubber tip, hold it with the square hole oriented to the square end of the probe and work it onto the probe.

## Replacing the Air Inlet Tube Assembly

To remove the Air Inlet Tube Assembly at the RoadRunner XLF air connector:

1. Stop or pause the job if one is running.

2. If there are any devices currently on the probes, remove them; they will fall off when air is removed.

3. Pull the collar on the quick release fitting back as you pull the tube assembly off the connector. (The quick release fitting has a safety shut off feature—the compressed air need not be turned off.)

To connect an Air Inlet Tube Assembly, push it onto the RoadRunner connector.

SX

**SX**

# Self-Service Spares Kit, RoadRunner XLF
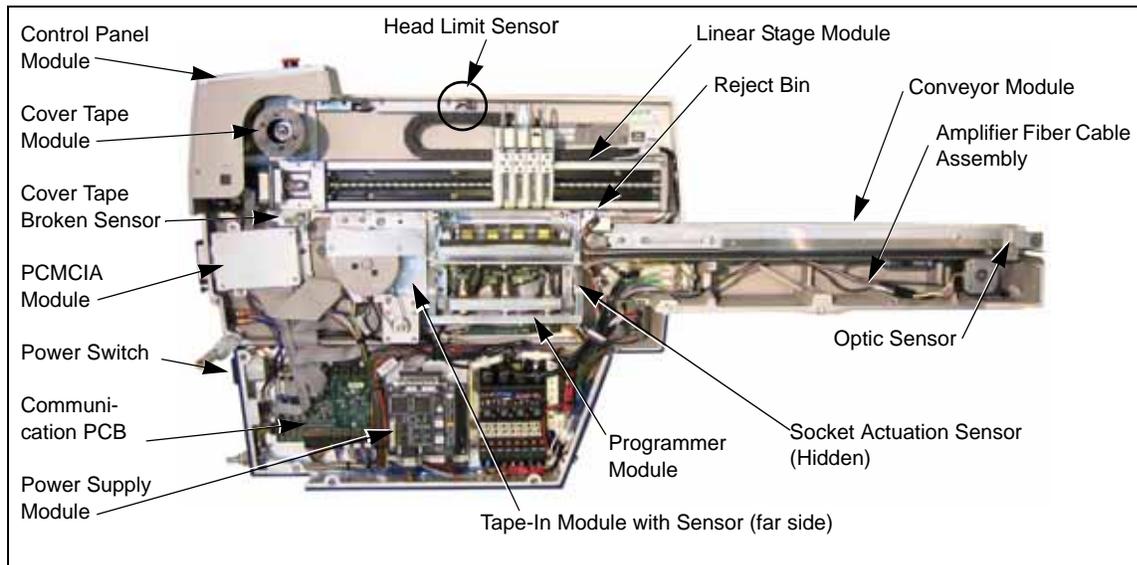


*Figure SX-54—Parts in the Self-Service Spares Kit; RoadRunner XLF*

## Data I/O Parts Ordering Information

**Instructions: 1**. Copy this page. **2**. Fill in your RoadRunner model and serial numbers (see the label on the chassis under the Robotics Cover). **3**. Fill in the quantity for the item(s) desired. **4**. Call your local Data I/O sale representative for part prices (optional). **5**. Mail or FAX it with your purchase order to Data I/O. See the last page of this manual for contact information.

ProLINE-RoadRunner XLF Model No._____ Serial No._____

| Inventory Part Number | Part Description | Qty | Price Ea. | Totals |
|---|---|---|---|---|
| 7502400001 | Linear Stage Module, XLF | | $ | $ |
| 7502398001 | Programmer Module, XLF, FC II | | $ | $ |
| 7502399001 | Adjustable Tape-In Module, 32-44 mm | | $ | $ |
| 7502396001 | Conveyor  Module, Siemens, XLF | | $ | $ |
| 7502402001 | Cover Tape Module, XLF | | $ | $ |
| 7502397001 | Control Panel Module, XLF | | $ | $ |
| 7502401001 | PCMCIA PCB, XLF | | $ | $ |
| 6157050001 | Reject Bin, XLF | | $ | $ |
| 4800020001 | Pneumatic Module | | $ | $ |
| 6154887001 | Robot I/O Board | | $ | $ |
| 8060010001 | Power Supply Board | | $ | $ |
| 3710035001 | Power  Switch, Rocker | | $ | $ |
| 7090550004 | Head Limit Sensors | | $ | $ |
| 9102200003 | Diagnostics Adapter Board (DAB) | | $ | $ |
| 6950019001 | Programmer Alignment Tool | | $ | $ |
| | | | $ | $ |
| | | | $ | $ |
| 9520504001 | This Self-Serve Spares kit  [all above] | | $ | $ |

Signature:_____Date:_____Company:_____

The Self-Service Spares Kit for RoadRunner XLF contains parts listed on . It is available to those who have attended an Advanced RoadRunner Service course.

### Customer Training

For information about advanced training, contact the Data I/O Customer Service Center. A training course may be ordered when purchasing a RoadRunner or at a later time.

*NOTE: This manual does not describe replacement instructions for all the parts in the Self-Service Spares Kit. For additional information, contact Data I/O or your nearest authorized representative. To find your nearest representative, see the instructions on the last page of this manual.*

SX

SX

# Socket Adapter and Actuator



*Figure SX-55—Actuator Plate Assembly and Socket Adapter*

The Actuator Plate opens the sockets on the Socket Adapter (assisted by air cylinders).

The Socket Adapter is the interface between the specific device and the programmer. Socket manufacturers' specifications are used for expected socket life.

Since the Actuator Plate is determined by the device package, it may need to be replaced for each new device type you wish to program. Call Data I/O Customer Service, or contact your nearest authorized Data I/O representative, for parts or device programming kits. Contact information is on the last page of this manual.

There are also two types of Adjustable Actuator Plates. One is for High Insertion Count (HIC) Actuators. The other is for all other plates.

See the *ProLINE-RoadRunner Owner's Manual* for the following:

*   To remove or install the **Actuator Plate** Assembly see "Changing the Actuator Plate" in Chapter 3.

*   To Adjust the **Adjustable Actuator Plate Assembly** see "Adjusting an Adjustable Actuator Plate" in Chapter 3 (manual PN 096-0240-005**G** or later).

*   To remove or install the **Socket Adapter** see "Changing the Socket Adapter" in Chapter 3.

# SX

# Index

*NOTE: For items not found here, check the RoadRunner Owner's Manual.*

---

*"I don't see <u>Salmon</u> in here. It should be here."*

Let us know about the items you can't find by e-mailing:
userdocs@dataio.com.

---

I

I

# Sales and Technical Support

**World Wide**

Data I/O Corporation

6464 185th Avenue N.E., Suite 101
Redmond, WA  USA 98052

Telephone: 425-881-6444
            inside US 1-800-332-8246
Fax:        425-867-6972
E-mail:     support@dataio.com

Contact Data I/O World Wide Support or your local representative. To find your local representative on our Web site, go to http://www.dataio.com and click  Contact Us  (upper right), then click  Representative Search  (left side). Then follow the instructions.

| www.dataio.com | www.dataio.cn | www.dataio.de |
|---|---|---|
| Data I/O | Data I/O | Data I/O |
| United States | China | Germany |

## When calling or writing, please provide the following information:

- RoadRunner Serial number
- Software Version displayed on the keyboard screen at start-up (turn the power off and then on again)
- Detailed description of the problem you are experiencing (if any)
- Error messages (if any)
- Device manufacturer, part number, package style and number of pins (if device-related)
- Name, telephone number and address