Sixnet® Series

# VT-MODEM-5
# Advanced 56K Modem

Hardware Guide | December 2018

LP1088-A

Red Lion Controls, Inc.

20 Willow Springs Circle

York, PA 17406 USA

## CONTACT INFORMATION:

Inside US: +1 (877) 432-9908
Outside US: +1 (717) 767-6511

Website: www.redlion.net

Email: support@redlion.net

# Table of Contents

**Preface** ... iii

Disclaimer ... iii
Purpose ... iii
Audience ... iii
Compliance Statements, Certifications & User Information ... iii
FCC Compliance Statement ... iii
User Compliance Information ... iv
Canadian Compliance Statement ... iv
Trademark Acknowledgments ... v
Regulatory Information ... v
Release Notes and Document Updates ... v
Publication History ... v
Related Documents ... v
Document Comments ... vi
Additional Product Information ... vi
Safety Information ... vi
Warnings/Cautions/Notes ... vi
Hazardous Location and Installation Requirements ... vii
AVERTISSEMENTS POUR INSTALLATION ET ENDROITS DANGEREUX ... vii

**Chapter 1 Overview, Highlights and Specifications** ... 1

Product Overview ... 1
Remote Configuration ... 1
Callback Security ... 1
Product Highlights ... 2
VT-MODEM-5 ... 2
Features and Benefits ... 2
Product Specifications ... 3

**Chapter 2 Hardware Installation** ... 4

Mounting the VT-MODEM-5 ... 4
Electrical Connections ... 5
RS232 Connections ... 5
IPm and ST-GT-1210 RS232 Connections ... 6
3rd Party PLC/Device Connections ... 7
VT-MODEM-5 Power, Phone Line Connections ... 8
DC POWER ... 8

Telephone Cable . . . . . 8
Modem Configuration . . . . . 9
Configuring a VT-MODEM-5 . . . . . 9
AT Command String At Power-up . . . . . 9
Configuring a VT-MODEM-5 as an External Modem on a PC . . . . . 9
Modem Installation in Windows® 10 . . . . . 9
Modem Installation in Windows® 7 . . . . . 9
To Remove a Modem . . . . . 10
Using a Terminal Program to Configure the VT-MODEM-5 . . . . . 10
Configuring the Port Parameters . . . . . 10
Remote Configuration . . . . . 13
Remotely Configuring the VT-MODEM-5 . . . . . 13
Basic Procedure . . . . . 13
Setup . . . . . 13
Changing the Setup Password . . . . . 13
Changing the Remote Escape Character . . . . . 14
Callback Security Procedure . . . . . 15
Maintenance Information . . . . . 17
Troubleshooting Tips . . . . . 17
VT-MODEM-5 Default LED Indications . . . . . 17
Reconnecting Serial Cables . . . . . 17
Resetting the VT-MODEM-5 . . . . . 17
**Service and Support Information** . . . . . 18
Service Information . . . . . 18
Product Support . . . . . 18
**Statement of Limited Warranty** . . . . . 19

# Preface

## Disclaimer

Portions of this document are intended solely as an outline of methodologies to be followed during the maintenance and operation of the VT-MODEM-5 equipment/software. It is not intended as a step-by-step guide or a complete set of all procedures necessary and sufficient to complete all operations.

While every effort has been made to ensure that this document is complete and accurate at the time of release, the information that it contains is subject to change. Red Lion Controls is not responsible for any additions to or alterations of the original document. Industrial networks vary widely in their configurations, topologies, and traffic conditions. This document is intended as a general guide only. It has not been tested for all possible applications, and it may not be complete or accurate for some situations.

Users of this document are urged to heed warnings and cautions summarized at the front of the document, such as electrical hazard warnings.

# Purpose

This manual gives specific information on how to install and connect the VT-MODEM-5 to a PC.

# Audience

The manual is intended for use by qualified personnel who are responsible for installing and maintaining network equipment in an industrial environment.

# Compliance Statements, Certifications & User Information

## FCC Compliance Statement

The Federal Communications Commission (FCC) has established rules which permit this device to be directly connected to the telephone network. Standardized jacks are used for these connections. This equipment should not be used on party lines or coin lines.

If this device is malfunctioning, it may also be causing harm to the telephone network; this device should be disconnected until the source of the problem can be determined and until repair has been made. If this is not done, the telephone company may temporarily disconnect service.

The telephone company may make changes in its technical operations and procedures; if such changes affect the compatibility or use of this device, the telephone company is required to give adequate notice of the changes.

If the telephone company requests information on what equipment is connected to their lines, inform them of:

- The telephone number that it is connected to,
- The Ringer Equivalence Number 0.3,
- The USOC jack required RJ11, and
- The FCC Registration Number 34579-MD-E

Items (b) and (d) are indicated on the label. The ringer equivalence number (REN) is used to determine how many devices can be connected to your telephone line, In most areas, the sum of the RENs of all devices on any one line should not exceed five (5.0). If too many devices are attached, they may not ring properly.

In the event of equipment malfunction, all repairs should be performed by our Company or authorized agent. It is the responsibility of users requiring service to report the need for service to our company or one of our authorized agents.

## User Compliance Information

If this equipment causes interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

In order to meet FCC emissions limits, this equipment must be used only with cables that comply with IEEE 802.3.

If necessary, the user should consult the dealer or an experienced radio/television technician for additional suggestions.

The user may find the following booklet prepared by the Federal Communications Commission helpful:

"How to Identify and Resolve Radio-TV Interference Problems".

This booklet is available from: U.S. Government Printing Office, Washington DC, 20402 Stock No. 004-000-00345-4.

## Canadian Compliance Statement

The VT-MODEM meets the procedural and specification requirements for certification under the Terminal Attachment Program.

Certification No.: 2991 8926 A

Issued To: Sixnet

Type Of Equipment: Multi-media Device

Trade Name And Model: VT-MODEM-5

Method of Connection: CA11A

Ringer Equivalence No.: 0.3

Certified To: Specification Cs03 Issue 8

Network Interface: LS

## Trademark Acknowledgments

Red Lion Controls acknowledges and recognizes ownership of the following trademarked terms used in this document.

- Microsoft®, Windows® 10, Windows® 7, and Windows® are registered trademarks of the Microsoft Corporation.
- All other company and product names are trademarks of their respective owners.

## Regulatory Information

FCC Part 15 and FCC Part 68; UL 508; CSA C22.2/142;

ACA TS 001- 1997; ACA TS 002-1997; AS/NZS3260-1993;

AS/NZS3548-1995; CTR21 (98/482/EC); EN55022; IEC 950:1991;

Hazardous Locations: ANSI/ISA 12.12.01, CSA C22.2/213 (Class 1, Division 2 Groups A, B, C, and D)

## Release Notes and Document Updates

The hard copy and online versions of this document are revised only at major releases and, therefore, may not always contain the latest product information. As needed, Tech Notes and or Product Bulletins will be provided between major releases to describe any new information or document changes.

The latest online version of this document and all product updates can be accessed through the Red Lion web site at www.redlion.net/support/documentation

### Publication History

The following information lists the release history of this document.

| Issue/Revision | Release Date | Content Description |
|---|---|---|
| Revision A | December 2018 | Updated document to Red Lion format. |
| Initial Release | June 2005 | Creation of initial hardware guide. |

### Related Documents

The following information lists available documents related to this product.

| Issue/Revision | Release Date | Document Title |
|---|---|---|
| LP1089 Revision A | December 2018 | VT-MODEM Industrial Modems Hardware Guide |
| LP1087 Revision A | December 2018 | VT-MODEM-4 Leased Line Industrial Modem Hardware Guide |

**Document Comments**

Red Lion appreciates all comments that will help us to improve our documentation quality. The user can submit comments through the Red Lion Customer Service. Simply email us at customer.service@redlion.net.

## Additional Product Information

Additional product information can be obtained by contacting the local sales representative or Red Lion through the contact numbers and/or e-mail addresses listed on the back of the cover.

## Safety Information

**WARNING –** Must consult the guide in all cases where this symbol is marked.
**AVERTISSEMENT –** Doivent consulter le guide dans tous les cas où ce symbole est marqué.

## Warnings/Cautions/Notes

Warnings apply to situations where personal injury or death may result.

Mises en garde s'appliquent aux situations où les risques de blessures graves ou mortelles peuvent en résulter

Cautions apply where damage to equipment may result.

Les mises en garde s'appliquent dans le cas où les dommages matériels peuvent en résulter

Notes apply where additional noteworthy information, not in the general text flow but applicable, is made available to the user.

Notes s'appliquent lorsque des informations dignes de mention, non pas dans l'enchaînement du texte mais il y a lieu, est mis à la disposition de l'utilisateur

**General Safety Cautions and Warnings / Précautions et Avertissements de Sécurité Générale**

| | |
|---|---|
|  | **CAUTION:** If the equipment is used in the manner not specified by Red Lion, the protection provided by the equipment may be impaired.<br>**ATTENTION:** Si l' équipement est utilisé d'une manière non spécifiée par Red Lion, la protection fournie par l'équipement peut être compromise. |

| | |
|---|---|
|  | **CAUTION:** Do not operate the equipment in a manner not specified by this manual.<br>**ATTENTION:** Ne pas faire fonctionner l'équipement d'une manière non spécifiée par ce manuel. |

| | |
|---|---|
|  | **WARNING:** Install only in accordance with Local and National Codes of authorities having jurisdiction.<br>**AVERTISSEMENT:** Installer uniquement, conformément aux codes locaux et nationaux des autorités ayant compétence. |

### Hazardous Location and Installation Requirements

These products should not be used to replace proper safety interlocking. No software-based device (or any other solid-state device) should ever be designed to be responsible for the maintenance of consequential equipment or personnel safety. In particular, Red Lion disclaims any responsibility for damages, either direct or consequential, that result from the use of this equipment in any application.

All power, input and output (I/O) wiring must be in accordance with Class I, Division 2 wiring methods and in accordance with the authority having jurisdiction. Suitable for use in Class I, Division 2, Groups A, B, C and D hazardous locations, or non-hazardous locations only.

#### AVERTISSEMENTS POUR INSTALLATION ET ENDROITS DANGEREUX

Ces produits ne doivent pas être utilisés pour remplacer le verrouillage de sécurité approprié. Aucun dispositif basé sur un logiciel (ou tout autre dispositif à l'état solide) devraient jamais être conçus pour être responsable de l'entretien de l'équipement consécutifs ou la sécurité du personnel. En particulier, Red Lion décline toute responsabilité pour les dommages, directs ou indirects, résultant de l'utilisation de cet équipement dans n'importe quelle application.

Tout pouvoir, le câblage d'entrée et de sortie (I/O) doivent être conformes aux méthodes de câblage de Classe I, Division 2 et conformément à l'autorité compétente. Cet équipement est adapté pour une utilisation en Classe1, Division 2, Groupes A, B, C et D ou endroits non-dangereux seulement.

| | |
|---|---|
|  | **WARNING: Explosion Hazard** – Substitution of components may impair suitability for Class I, Division 2.<br>**AVERTISSEMENT** - **Risque d'explosion** - La substitution de tout composant peut nuire à la conformité de Classe 1, Division 2. |

| | |
|---|---|
|  | **Warning** – Do not remove or replace port connections while circuit is live unless the area is known to be free of ignitible concentrations of flammable substances. For the required marking for the port connections, instruction shall be included indicating that the marking shall be displayed on a prominent place on the end-enclosure..<br>**Avertissement –** Ne pas retirer ou remplacer les connexions de port alors que le circuit est vivre à moins que la région est connue pour être libre d'ignitible les concentrations de substances inflammables. pour le marquage obligatoire pour les connexions de port, l'enseignement doit être inclus en indiquant que le marquage doit être affichée sur une place de premier plan dans l'enceinte. |

| | |
|---|---|
|  | **WARNING – Explosion Hazard** – Do not disconnect equipment unless power has been switched off or the area is known to be non-hazardous.<br>**AVERTISSEMENT - Risque d'explosion** - Ne débranchez pas l'équipement à moins que l'alimentation ait été coupée ou que l'environnement est connu pour être non dangereux. |

| | |
|---|---|
|  | **WARNING -** Never install or work on electrical equipment or cabling during periods of lightning activity.<br>**AVERTISSEMENT -** Ne jamais installer ou travailler sur équipement électrique ou de câblage pendant les périodes d'activité de la foudre. |

| | |
|---|---|
|  | **CAUTION:** Do not perform any services on the unit unless qualified to do so. Do not substitute unauthorized parts or make unauthorized modifications to the unit.<br>**ATTENTION:** Ne pas effectuer de services sur l'appareil s'il n'est pas qualifié pour le faire. Ne pas substituer pièces non autorisées ou de modifications non autorisées de l'appareil. |

| | |
|---|---|
|  | **WARNING:** Properly ground the unit before connecting anything else to the unit. Units not properly grounded may result in a safety risk and could be hazardous and may void the warranty. See the grounding technique section of this manual for proper ways to ground the unit.<br>**AVERTISSEMENT:** L'unité doit être correctement mise à la terre avant tout raccordement à l'unité. Unités pas correctement mise à la terre peuvent causer un risque de sécurité et pourraient être dangereuses et peuvent annuler la garantie. Voir la section technique de mise à la terre dans ce mode d'emploi pour des moyens appropriés à la masse de l'appareil. |

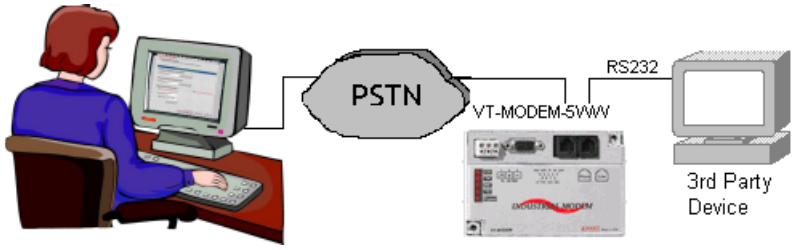
# Chapter 1 Overview, Highlights and Specifications

## 1.1 Product Overview

The VT-MODEM-5 is a rugged industrial telephone modem that is designed to operate in an electrical enclosure for harsh environments. The VT-MODEM-5 can be set-up as an external modem on any PC because it flexibly supports all standard Hayes AT commands, Fax Class 1 and Class 2 commands, and S-registers. The VT-MODEM-5 is compatible with most telecommunications or dial-up networking software. The modem may be DIN rail or panel mounted for convenient and easy installation adjacent to other DIN rail components inside new or existing enclosures. Most Windows® software can communicate through a VT-MODEM to remote devices to perform file transfers, diagnostics, program debugging and many other operations.

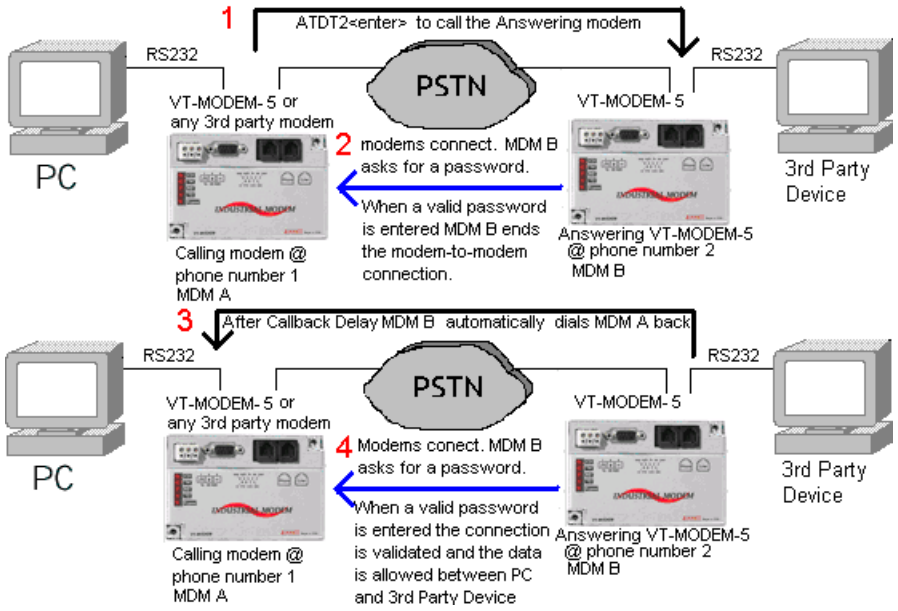
### 1.1.1 Remote Configuration

The VT-MODEM-5 allows the user to configure the remote modem over the Public Switched Telephone Network (PSTN). You can easily maintain and perform configuration changes from the comfort of your home or office.




### 1.1.2 Callback Security

Security is a major concern today. The VT-MODEM-5 addresses this concern with the Callback Security feature. This feature allows only users who know the passwords at predefined locations access the device connected to the VT-MODEM-5's RS232 port. The password is held only in the answering modem and is completely seamless to the device connected to its serial port. The figure below illustrates the complete Callback Security procedure. The big red numbers indicate the order of events in the Callback Security procedure.




# 1.2 Product Highlights

### 1.2.1 VT-MODEM-5

- Rated for -30° to +70°C operation
- Proven in the toughest settings from pipelines in Alberta to remote locations in Sweden
- DIN Rail or flat panel mounting
- DC powered- No more bulky AC adapters
- Supports all PLCs, RTUs and other devices
- Compliant with telephone systems world-wide

### 1.2.2 Features and Benefits

**FEATURES AND BENEFITS**

Rugged design for the toughest settings

- -30° to 70°C operating temperature range
- DIN Rail or flat panel mounting

Remote access to the modem from any location

- PSTN

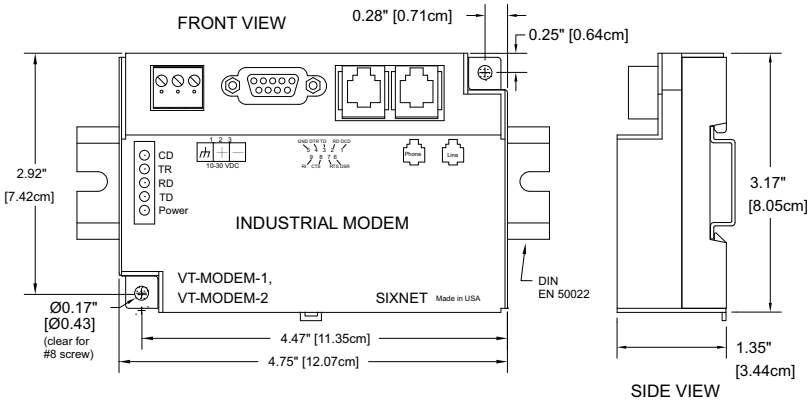
# 1.3 Product Specifications

| | |
|---|---|
| **TELEPHONE LINE** | |
| Max. Data Range | 56K bps (V.90 and V.92) |
| Compatibility | V.92, V.90, V.34 enhanced, V.34, V.32bis, V.32, V.22bis, V.22A/B, V.23, V.21, Bell212A & 103 |
| Data Compression | V.42 bis (4:1) and MNP 5 (2:1) |
| Error Correction | V.42/MNP 3-4 |
| Max. Fax Modem Rate | 33.6 kbps |
| Fax Modem Compatibility | ITU-T “Super” Group 3; Class 1.0, 2.0, 2.1; Group 3, Class 1 and 2, T.4, T.30, V.21, V.27ter, V.29, V.34, V.17, and TIA/EIA TR29.2 |
| Callback Security | Yes |
| Remote Configuration | Yes |
| Ringer Equivalent | 0.3 |
| Line Jack | RJ11 |
| Phone Jack | RJ11 |
| **RS232 PORT** | |
| Max. RS232 Rate | 115.2 kbps (Kilobaud) |
| RS232 Signal Support | TXD, RXD, CTS, RTS, DCD, DTR, DSR, RI, GND<br>(Non- Flow Control Not Supported) |
| RS232 Connector | DB9 female, RS232 |
| Command Set | All standard AT and S register commands including Class 1 and Class 2 Fax commands |
| **STATUS LEDS** | |
| CD (Carrier detect) | The modem has detected a carrier on the phone line (a remote modem has been detected). |
| TR (Data Terminal Ready) | The PC (or Sixnet® Station) has established a connection to the modem and is ready. |
| RD (Receive Data) | Flashes as data is received from the phone line. |
| TD (Transmit Data) | Flashes as data is sent out the phone line. |
| Power | On when power is present. |
| **GENERAL CHARACTERISTICS** | |
| Input Power | 10 - 30 VDC |
| Input Current | 75mA @ 24VDC (typical)<br>52mA @ 24VDC (Sleep Inactivity Mode) |
| Certification | FCC Part 15 and FCC Part 68; UL 508; CSA C22.2/142;<br>ACA TS 001- 1997; ACA TS 002-1997; AS/NZS3260-1993;<br>AS/NZS3548-1995; CTR21 (98/482/EC); EN55022; EIEC 950:1991;<br>Hazardous Locations: ANSI/ISA 12.12.01, CSA C22.2/213 (Class 1, Division 2 Groups A, B, C, and D) |
| Operating Temperature | -30° to 70° C |
| Storage Temperature | -40° to 85° C |
| Humidity | 5 to 95% RH (non-condensing) |
| Mounting | DIN rail or panel mount |
| Dimensions | W x 4.75L x 1.35H inches (8.2 W x 12.1 L x 3.4H cm) |

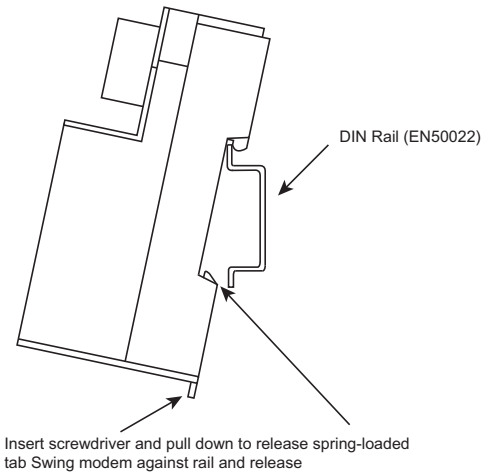
# Chapter 2 Hardware Installation

## 2.1 Mounting the VT-MODEM-5

The VT-MODEM-5 snaps onto standard DIN rail (DIN EN 50022) or is mounted to a flat panel using #6 or #8 screws. See the image below. The modem can be installed in any orientation, directly adjacent to other DIN rail components or in any convenient location within the enclosure. The modem should be installed within 6 feet of the device it will be connected to. For SixTRAK® gateways and VersaTRAK® RTUs, use the Sixnet® RS232 cable (VT-CABLE-MDM), which is 6 feet in length.




For DIN rail mounting, hook the top, rear of the modem onto the top edge of the DIN rail. Using a small flathead screwdriver, pull down on the spring-loaded tab on the bottom of the modem and push the modem back against the rail. Reverse these steps to remove the modem. See the image below.




DIN Rail Mounting

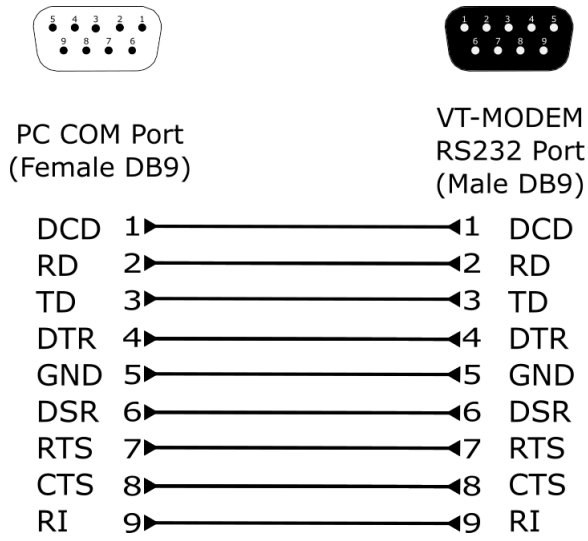
# 2.2 Electrical Connections

### 2.2.1 RS232 Connections

Use the Sixnet RS232 cable (VT-CABLE-MDM, which is 6 feet in length) or an equivalent cable to connect the modem's RS232 port (DB9 Male cable end) to the RS232 port on the SixTRAK Gateway, VersaTRAK RTU, or PC (DB9 Female cable end). As shown in the image below, the VT-CABLE-MDM is a straight through serial communications cable suitable for connecting a DTE device (PC, Gateway or VersaTRAK) to a DCE device (VT-MODEM). For IPm® and ST-GT-1210 stations, use a straight-through Ethernet cable (not supplied) and the RJ45 to DB9 male adapter that comes with the station.

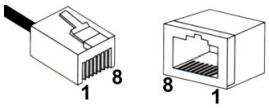
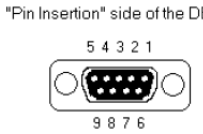
Cable requirements for PLCs and other devices may be different. Refer to the PLC or other device's documentation for cable pin-outs. Some PLC cables are documented in the Technical notes provided by Red Lion technical support.

**Note**: The technical notes are not listed here.



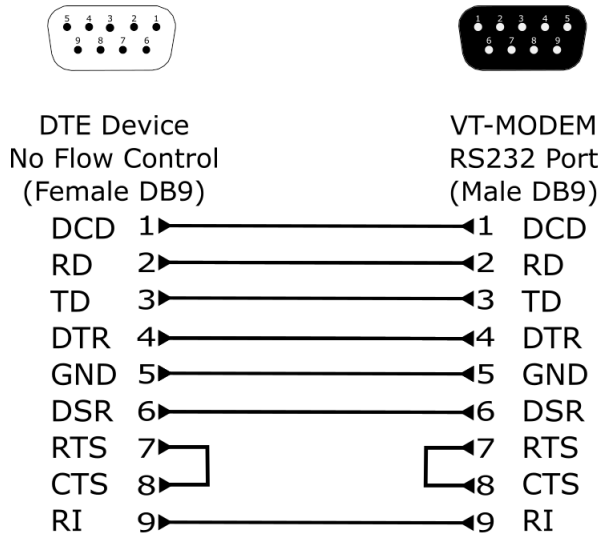
### 2.2.2 IPm and ST-GT-1210 RS232 Connections

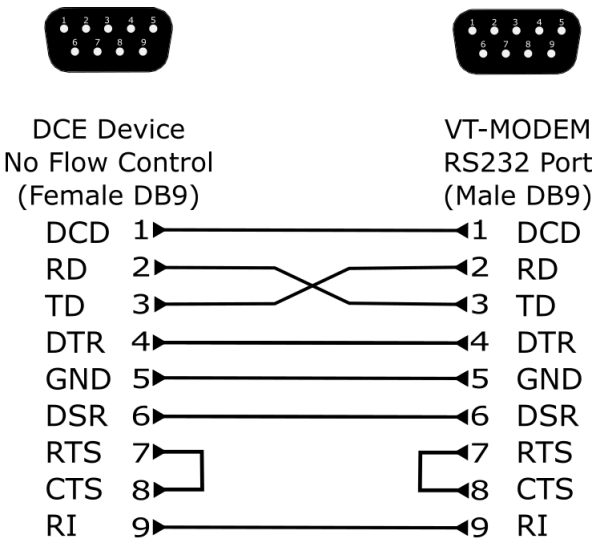
An un-wired DB9M to RJ45F adapter is provided for the RS232 port on the controller. The pin-outs follow the EIA/TIA-561 standard (see the table below). Use this adapter along with a RJ45 male to RJ45 male straight-thru wired patch cable (not included) to make a connection between the VT-MODEM-5's COM port (DB9 Female) and the controllers RJ45 Female RS232 port. Enable hardware flow control in the IPm's COM port configuration. Refer to the Sixnet Electronic catalog for more information on connecting to other equipment.

| TYPICAL MODEM ADAPTING WIRING | | | | | |
|---|---|---|---|---|---|
| CABLE AND DB9M | SIXNET RJ45F PIN #, SIGNAL NAME | | RJ45F TO DB9M ADAPTER WIRE COLOR | DB9 MALE CONNECTOR PIN #,SIGNAL NAME | |
|  | 1 | N/A | Blue | 9 | RI out |
| | 2 | N/A | Orange | 1 | DCD out |
| | 3 | N/A | Black | 4 | DTR in |
| | 4 | GND | Red | 5 | GND |
|  | 5 | RXD in | Green | 2 | RXD out |
| | 6 | TXD out | Yellow | 3 | TXD in |
| | 7 | CTS in | Brown | 8 | CTS out |
| | 8 | RTS out | White | 7 | RTS in |

### 2.2.3 3rd Party PLC/Device Connections

Determine if the device you are connecting to is a DTE or a DCE device. Use a straight-through cable to connect the VT-MODEM to a DTE 3rd party device. A cross-wired cable must be used to connect the VT-MODEM to a DCE 3rd party device. If the 3rd party device does not support flow control pins 7 and 8 must be tied together.



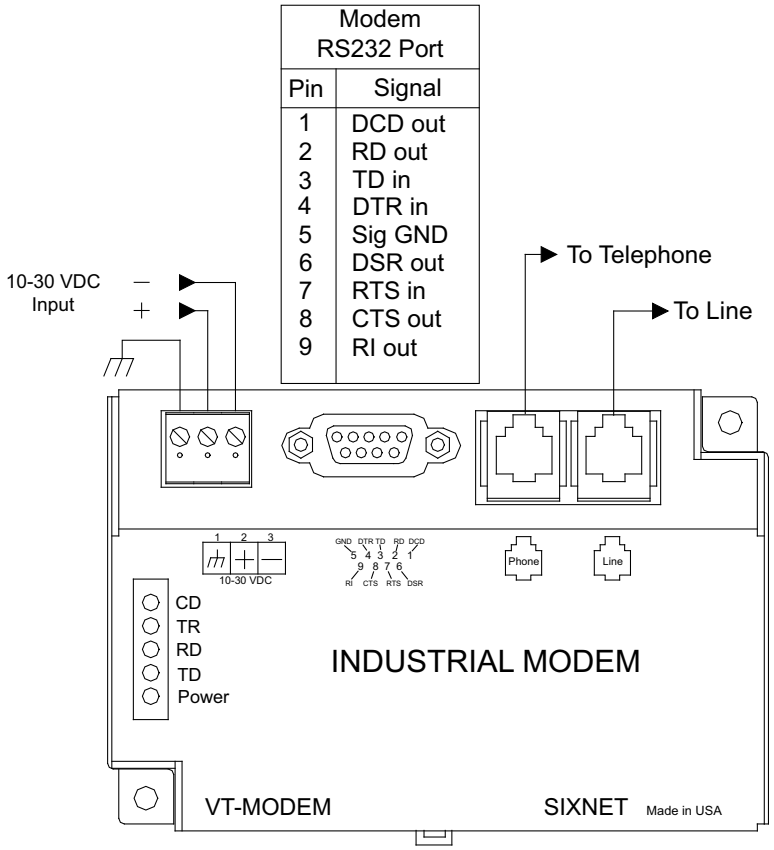
## 2.2.4 VT-MODEM-5 Power, Phone Line Connections

### 2.2.4.1 DC POWER

Connect 10 - 30 VDC to the VT-MODEM-5 as shown in the image below. The modem can usually be powered from the same DC source as other devices in the enclosure. All the screw terminals should be tightened to a maximum of 3.48 in-lbs.

### 2.2.4.2 Telephone Cable

Connect analog phone lines to the RJ-11 jacks as appropriate. One RJ-11 jack is provided to connect directly to a telephone (optional) and the second RJ-11 jack functions as the connection to the telephone network.



# 2.3 Modem Configuration

### 2.3.1 Configuring a VT-MODEM-5

All VT-MODEM models are factory configured to use the default communication settings for Sixnet Stations. If a VT-MODEM is connected to a PLC, PC or other non-Sixnet device, then it may be necessary to reconfigure the modem. To modify these parameters use the VT-MODEM Setup Wizard (v2.00 or later) located at www.redlion.net/resources/software/sixnet-software/automation-devices-software-firmware. The parameters can also be modified using a Windows® terminal program.

#### 2.3.1.1 AT Command String At Power-up

Upon power-up, a Sixnet station can send a command string to a VT-MODEM-5. This capability can be used to assure that the modem is set to a particular mode of operation, such as auto answer mode. Refer to the “Setting Modem String” topic in the Sixnet I/O Tool Kit program’s online help for information on this capability. The Sixnet Station can send any standard AT command.

### 2.3.2 Configuring a VT-MODEM-5 as an External Modem on a PC

The VT-MODEM-5 can be connected directly to a PC. The modem will need to be “installed” in Windows prior to use. Here are instructions to install the modem in most Windows Operating Systems.

#### 2.3.2.1 Modem Installation in Windows® 10

1. Connect the DC power, communications cable (VT-CABLE-MDM or equivalent) and telephone line as described above.
2. In the search box next to the Windows button type “Phone and Modem” and select the Phone and Modem in Control Panel.
3. In the Modems tab, click the “Add” button. Do not select the “Don’t detect my modem, I will select it from a list”. Instead, click Next and allow Windows to search the com ports and detect the modem.
4. Windows should find a modem called Standard Modem. Click Next and Windows will complete installation of the Standard Modem. (Alternatively, click Change and select “Standard Modem Types” from the Manufacturers list, and “Standard 28800 bps Modem” from the Models list.)
5. To verify that the modem has been installed, go to the “Phone and Modems” in Control Panel, then go to the “modems” tab. The modem should be listed as either a “Standard Modem” or a “Standard 28800 bps Modem” depending on the steps followed above.
6. Upon re-booting the machine, Windows may still find the VT-MODEM-5 as new hardware. If this happens, select “Do not install a driver (Windows will not prompt again)”.

#### 2.3.2.2 Modem Installation in Windows® 7

1. Select Start→Control Panel, and then double click the Phone and Modems icon.
2. In the Modems tab, click the “Add” button. Do not select the “Don’t detect my modem, I will select it from a list”. Instead, click Next and allow Windows to search the com ports and detect the modem.
3. Windows should find a modem called Standard Modem. Click Next and Windows will complete installation of the Standard Modem. (Alternatively, click Change and select “Standard Modem Types” from the Manufacturers list, and “Standard 28800 bps Modem” from the Models list.)

4. To verify that the modem has been installed, go to the “Phone and Modems” in Control Panel, then go to the “modems” tab. The modem should be listed as either a “Standard Modem” or a “Standard 28,800 bps Modem” depending on the steps followed above.
5. Upon re-booting the machine, Windows may still find the VT-MODEM-5 as new hardware. If this happens, select “Do not install a driver (Windows will not prompt again)”.

Once the VT-MODEM-5 has been added to your Windows system, it is ready for use.

If you are using a PLC or other device, refer to the documentation for that device as necessary.

### 2.3.3 To Remove a Modem

If it ever becomes necessary to re-install the modem for any reason, go to the “Phone and Modems” window in the Control Panel in the “modems” tab, highlight the modem to be removed and click the Remove button. To reinstall the modem, follow the installation steps as previously described.

### 2.3.4 Using a Terminal Program to Configure the VT-MODEM-5

1. Connect your Industrial Modem to your computer using the VT-CABLE-MDM (or an equivalent cable). Open the terminal program.
2. Choose the baud rate that matches the PLC or other device that will be connected to the modem. Anytime a setting is saved using &W0 or &W1, the RS232 baud rate is memorized by the VT-Modem. The saved baud rate will be used for future communications with any attached device that does not initiate communications with the modem (such as most PLCs).
3. You should be at a blank screen. Test that you are connected by typing **AT** `<enter>`. The modem should respond with an **OK** if you are connected. Now enter these commands. (Press `<enter>` after each.)
    - To check whether your Industrial Modem is communicating, look at the “TD” and “RD” LED's on the modem. They will light up when communicating.
    - Use the AT commands listed in “2.4 Remote Configuration” to enter in the appropriate parameters. For example, to ignore DTR type `AT&D0<enter>` the modem should respond with an **OK**. To save the parameters to the modems NVRAM type `AT&W0<enter>` to store parameters in stored profile 0 and `AT&W1<enter>` to store parameters in Stored Profile 1.
    - To dial a number, you can use the command: `ATDT<number>`. When you have successfully connected to another modem, it will show the baud rate at which you are connected.

**Example: ATDT15188778346**

- To Hang-up the connection, open a terminal session as previously indicated. Type **+++**, you should get an **OK** back, then type `ATH <enter>`. The resulting **OK** indicates that the modem-to-modem connection is terminated.

### 2.3.5 Configuring the Port Parameters

Serial data communication is defined by its 5 major components:

1. Baud Rate allowing the user to select the serial speed
2. Start bit to indicate the start of the data and is always present
3. Data bits that holds the data to be transferred

4. Parity bit used for error checking and
5. 1 or 2 Stop bits that indicates the end of the data message.

An example of 10-bit communication format is 9600 Baud, 8 Data bits, None Parity and 1 Stop bit. For instance, 1 Start bit + 8 Data bits + 0 Parity bit + 1 Stop bit = 10 bits. Ex. 1

An 11-bit format example is 9600 Baud, 8 Data bits, Even Parity and 1 Stop bit. For instance, 1 Start bit + 8 Data bits + 1 Parity bit + 1 Stop bit = 11 bits. Ex. 2

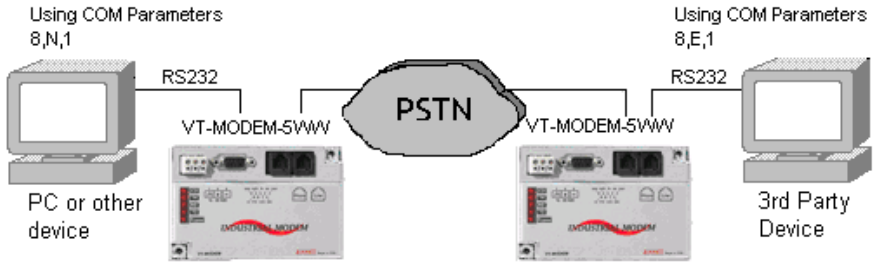
Modem error correction protocols do not use the parity method for error detection/correction so transmitting a parity bit with every byte just adds 10% to the data that gets transmitted over the line. Electing to not use the Parity bit does allows for greater bit transmission over the phone lines. This means faster Modem-to-Modem and Modem-to-Service Provider connection rates. The VT-MODEM-5 does not use the parity bit over the phone line. This means the Parity bit is stripped out when 11-bits are used and added back in at the receiving modem.

Along with the decide advantage of faster connection speeds there are a few limitations. The VT-MODEM-5 cannot respond to AT commands at the port parameters list in Table 1, although either modem will transfer data correctly with most port parameters.

| PORT PARAMETERS | RESPOND TO AT COMMANDS | TRANSFER DATA |
|---|---|---|
| 8,E,1 | - | YES |
| 8,E,2 | - | YES |
| 8,O,1 | - | YES |
| 8,O,2 | - | YES |
| 7,N,1 | - | - |

**Table 1.**

Since there is a limitation with 11-bit port parameters, Sixnet asks that the following suggestion be taken when connecting the VT-MODEM-5 to a device that requires one of the port parameters in Table 1. When dialing with a computer at the host end of the connection, configure the host end for 8 Data bits, None parity, 1 Stop bits. In addition, for connecting with a 3rd party device on the remote end, configure the remote device and the modem connected to the remote device's required parameters (8 Data bits, even parity, 1 stop bit in the example below).




The VT-MODEM-5 must be configured correctly to handle the port parameters correctly as well. The Set Modem Wizard included free with your modem will configure these AT commands, but if you wish to enter them manually use the following table to send the correct AT commands to the modem.

| FOR THESE COM PARAMETERS | | | | | | SEND THESE COMMANDS |
|---|---|---|---|---|---|---|
| **8** | Data bits | **N** | Parity | **1** | Stop bits | AT$EB0#P0 |
| **8** | Data bits | **N** | Parity | **2** | Stop bits | AT$EB0#P0 |
| **8** | Data bits | **E** | Parity | **1** | Stop bits | AT$EB1#P2 |
| **8** | Data bits | **E** | Parity | **2** | Stop bits | AT$EB1#P2 |
| **8** | Data bits | **O** | Parity | **1** | Stop bits | AT$EB1#P1 |
| **8** | Data bits | **O** | Parity | **2** | Stop bits | AT$EB1#P1 |
| **7** | Data bits | **N** | Parity | **1** | Stop bits | Not Supported |
| **7** | Data bits | **N** | Parity | **2** | Stop bits | AT$EB0#P0 |
| **7** | Data bits | **E** | Parity | **1** | Stop bits | AT$EB0#P2 |
| **7** | Data bits | **E** | Parity | **2** | Stop bits | AT$EB0#P2 |
| **7** | Data bits | **O** | Parity | **1** | Stop bits | AT$EB0#P1 |
| **7** | Data bits | **O** | Parity | **2** | Stop bits | AT$EB0#P1 |
| **7** | Data bits | **S** | Parity | **1** | Stop bits | AT$EB0#P0 |
| **7** | Data bits | **S** | Parity | **2** | Stop bits | AT$EB0#P0 |
| **7** | Data bits | **M** | Parity | **1** | Stop bits | AT$EB0#P0 |
| **7** | Data bits | **M** | Parity | **2** | Stop bits | AT$EB0#P0 |

Using the information provided in this section, send the AT command string defined in the table above to configure the modem for transferring data at the defined port parameters.

# 2.4 Remote Configuration

### 2.4.1 Remotely Configuring the VT-MODEM-5

Remote configuration is a network management tool that allows you to configure modems anywhere on the Public Switched Telephone Network from one location. With password-protected remote configuration, you can issue AT commands to a remote VT-MODEM-5 for maintenance or troubleshooting as if you were on-site.

#### 2.4.1.1 Basic Procedure

The following steps are valid regardless of whether the connection is established by the local or the remote VT-MODEM-5.

1. Establish a data connection with a remote VT-MODEM-5.
2. Send three remote configuration escape characters followed by **AT** and the setup password, and press **Enter**. Example. **%%%ATMTSMODEM**. You have four tries to enter the password before being disconnected. If the password is correct, the remote modem responds with **OK**.
3. You can now send AT commands to configure the remote modem.
4. When you have finished configuring the remote modem, save the new configuration by typing **AT&W0** and pressing **Enter.**
5. Type **ATO** and press **Enter** to exit remote configuration modem and enter on-line mode. You can now break the connection in the normal way.

#### 2.4.1.2 Setup

Sixnet modems are shipped with a default setup password (MTSMODEM). Because anyone who has the User Manual knows the default setup password, you should change the password and possibly also the remote configuration escape character. Be sure to note what the changes are if you decide to change them.

#### 2.4.1.3 Changing the Setup Password

1. Open a terminal program.
2. In the terminal window, type **AT#SMTSMODEM** (or **AT#Syyyyyy** if you have replaced the MTSMODEM password with yyyyyy) and press **Enter**. The modem responds with **OK** if the setup password is correct and **ERROR** if it is wrong.
3. To change the password, type **AT#S=yyyyyy**, where yyyyyy stands for the password, and press **Enter**. The modem should respond with **OK**. The password can include any keyboard character, can be up to eight characters long, and is case sensitive.
4. The new password is saved automatically. You can now either enter more AT commands or exit the data communications program. The next time you remotely configure the modem you must use the new setup password.

> **Caution:** You can only change the setup password locally; you cannot do it remotely. Also, passwords are case sensitive.

#### 2.4.1.4 Changing the Remote Escape Character

To further improve security, you can change a remote modem's remote configuration escape character. The remote configuration escape character is stored in register **S9**. The factory default is 37, which is the ASCII code for the percent character (%). Setting **S9** to 0 (zero) disables remote configuration entirely.

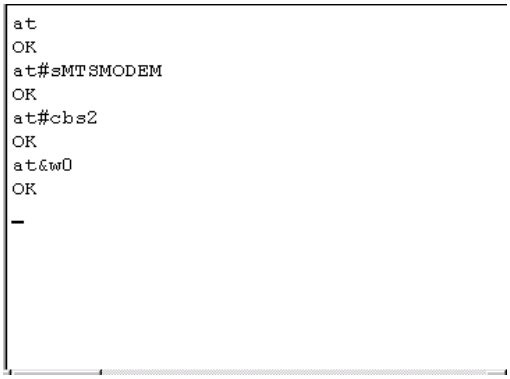
**Caution:** If you modify **S9** remotely, you won't be able to change it back remotely!

1. Establish a remote configuration link with the remote modem as described in **Basic Procedure.**
   **Note:** This command can be executed locally as well as remotely.
2. Type **ATS9=n**, where n is the ASCII code for the new remote configuration escape character, then press **Enter**.
3. Save the new value by typing **AT&W** and pressing **Enter**.
4. Type **ATO** and press **Enter** to exit remote configuration.

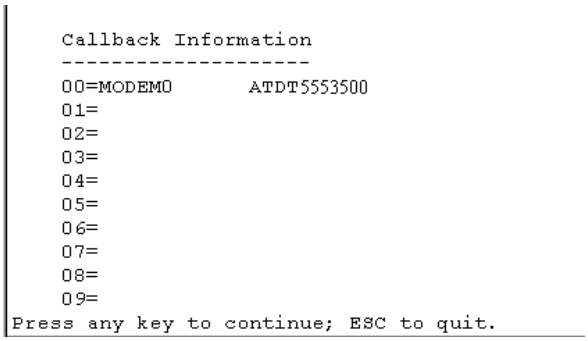
# 2.5 Callback Security Procedure

The following steps define what must be done to use the Callback Security feature in the VT-MODEM-5.

1. Enable Callback Security - Before any modification of the Callback Security features can be used the VT-MODEM-5s Setup Password must be entered. Type `AT#SMTSMODEM<enter>` (see “Changing the Setup Password” for more information on how to change the password). Next, enable the Remote Callback Security feature by typing `AT#CBS2<enter>`. Type `AT&W0<enter>` to save the settings to NVRAM.




2. Set the password and Callback number(s) - Now the Callback Security passwords and call back numbers must be configured and saved to the modem. The modem has twenty locations to save passwords and a corresponding dial string. To enter the location password ‘MODEM0’ into memory location 0 type `AT#CBN0=MODEM0<enter>`. The password must have 6 to 10 characters, is case sensitive, and cannot include the + or - characters. Enter the Callback phone number 555-3500 to correspond with memory location 0 by typing `AT&Z0=ATDT5553500<enter>`.




3. Procedure to connect the modems - Dial the phone number `ATDT#<enter>` of the remote modem. When the modem connects the connect message will appear, then the remote modem will prompt the dialing side for a password. Enter the correct password, press Enter and the remote modem will disconnect the modem. The remote modem will call back in a specified Callback delay. When the modem calls back and connects, it will prompt the calling modem for a password. Enter the valid password, press enter and the modems will connect allowing data to pass between the modems.

```
atdt23
CONNECT 9600 V42bis

Password>######
OK Disconnecting
NO CARRIER

RING

CONNECT 9600 V42bis

Password>######
OK Connecting
```

# 2.6 Maintenance Information

## 2.6.1 Troubleshooting Tips

### 2.6.1.1 VT-MODEM-5 Default LED Indications

All VT-MODEM-5 models have the following LEDs.

| LED | DEFAULT INDICATION |
|---|---|
| Carrier Detect | This LED will come ON once a phone line connection has been established, and will remain on for as long as the connection is maintained. |
| Data Terminal Ready | This LED will come ON when the DTR signal is present regardless the state of the &D command. |
| Receive Data | This LED will come ON whenever characters is received through the phone line. |
| Transmit Data | This LED will come ON whenever the modem sends characters out the phone line. |
| Power LED | **Normal Indication**: This LED will be ON when power is applied to the modem. |

### 2.6.1.2 Reconnecting Serial Cables

It is important to cycle (remove and then reapply) DC power to a VT-MODEM-5 each time the RS232 cable is disconnected and then reconnected. The serial port of the modem may not function properly if power is not cycled.

### 2.6.1.3 Resetting the VT-MODEM-5

The modem can be reset to the settings saved by the last &W command, issue the following:

```
ATX [CR]
```

If it ever becomes necessary to completely reset the modem including both user profiles to the basic factory default settings, the following command can be issued:

```
AT&F&W&W&W1 [CR]
```

This command string will load the factory defaults into the active configuration (&F) and then save those settings into both user profile 0 (&W) and user profile 1 (&W1).

Note that after the modem is reset completely to the factory defaults, it will no longer be set to auto-answer, which is often necessary for the modem to work when connected to a remote device. Use the VT-MODEM Setup Wizard to adjust these settings appropriately.

# Service and Support Information

## 3.1 Service Information

We sincerely hope that you never experience a problem with any Red Lion product. If you do need service, call Red Lion at 1-877-432-9908 for Technical Support. A trained specialist will help you quickly determine the source of the problem. Many problems are easily resolved with a single phone call. If it is necessary to return a unit to us, an RO (Repair Order) can be obtained on the Red Lion website.

Red Lion tracks the flow of returned material with our RO system to ensure speedy service. You must include this RO number on the outside of the box so that your return can be processed immediately.

Be sure to have your original purchase order number and date purchased available.

We suggest that you give us a repair purchase order number in case the repair is not covered under our warranty. You will not be billed if the repair is covered under warranty.

Please supply us with as many details about the problem as you can. The information you supply will be written on the RO form and supplied to the repair department before your unit arrives. This helps us to provide you with the best service, in the fastest manner. Repairs are completed as soon as possible. If you need a quicker turnaround, ship the unit to us by air freight. We give priority service to equipment that arrives by overnight delivery.

We apologize for any inconvenience that the need for repair may cause you. We hope that our rapid service meets your needs. If you have any suggestions to help us improve our service, please give us a call. We appreciate your ideas and will respond to them.

**For Your Convenience:**

Please fill in the following and keep this manual with your Red Lion system for future reference:

P.O. #:_____ Date Purchased: _____

Purchased From:_____

## 3.2 Product Support

**Technical Support:**
Inside US: +1 877 432-9908
Outside US: +1 717 767-6511
E-mail: support@redlion.net

**Customer Service:**
Inside US: +1 877 432-9908
Outside US: +1 717 767-6511
E-mail: customer.service@redlion.net

# Statement of Limited Warranty

(a) Red Lion Controls Inc.(the “Company”) warrants that all Products shall be free from defects in material and workmanship under normal use for the period of time provided in “Statement of Warranty Periods” (available at www.redlion.net) current at the time of shipment of the Products (the “Warranty Period”). **EXCEPT FOR THE ABOVE-STATED WARRANTY, COMPANY MAKES NO WARRANTY WHATSOEVER WITH RESPECT TO THE PRODUCTS, INCLUDING ANY (A) WARRANTY OF MERCHANTABILITY; (B) WARRANTY OF FITNESS FOR A PARTICULAR PURPOSE; OR (C) WARRANTY AGAINST INFRINGEMENT OF INTELLECTUAL PROPERTY RIGHTS OF A THIRD PARTY; WHETHER EXPRESS OR IMPLIED BY LAW, COURSE OF DEALING, COURSE OF PERFORMANCE, USAGE OF TRADE OR OTHERWISE.** Customer shall be responsible for determining that a Product is suitable for Customer’s use and that such use complies with any applicable local, state or federal law.

(b) The Company shall not be liable for a breach of the warranty set forth in paragraph (a) if (i) the defect is a result of Customer’s failure to store, install, commission or maintain the Product according to specifications; (ii) Customer alters or repairs such Product without the prior written consent of Company.

(c) Subject to paragraph (b), with respect to any such Product during the Warranty Period, Company shall, in its sole discretion, either (i) repair or replace the Product; or (ii) credit or refund the price of Product provided that, if Company so requests, Customer shall, at Company's expense, return such Product to Company.

(d) **THE REMEDIES SET FORTH IN PARAGRAPH (c) SHALL BE THE CUSTOMER'S SOLE AND EXCLUSIVE REMEDY AND COMPANY'S ENTIRE LIABILITY FOR ANY BREACH OF THE LIMITED WARRANTY SET FORTH IN PARAGRAPH (a)**.