# FIPS 140-2 Security Policy

MRV LX-8000 Series

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# FIPS 140-2 Security Policy

## LX-8000 Series

## 1. Introduction

The following describes the security policy for the LX 8000 Series Console Servers. The LX Series is a key component of MRV's Out-of-Band Network solution. Out-of-Band Networks provide secure remote service port access and remote power control to devices in an organization's networks and infrastructures. This nearly eliminates the need for physical presence at a device to correct problems or manage its everyday operation. MRV's Out-of-Band Network solution includes console servers, terminal servers, device servers, remote power control and management system. These capabilities combined with FIPS 140-2 security make the LX Series an ideal choice for providing secure remote access in a variety of environments.

### *1.1. Purpose*

This document covers the secure operation of the LX-8000 Series including initialization, roles, and responsibilities of operating the product in a secure, FIPS-compliant manner.

### *1.2. Versions*

The module consists of two firmware images, linuxito and ppciboot, that have following firmware versions.

linuxito version : 3.7.2
ppciboot version: 3.7.2

There are sixteen hardware configurations as described in Section 2. Therefore, there are sixteen hardware versions as listed below.

B/L 350-6003 Rev: D, P/N 500-8722 Rev: A
B/L 350-6003 Rev: D, P/N 500-8724 Rev: A
B/L 350-6005 Rev: G, P/N 500-8732 Rev: A
B/L 350-6004 Rev: C, P/N 500-8730 Rev: A
B/L 350-6003 Rev: D, P/N 500-8723 Rev: B
B/L 350-6003 Rev: D, P/N 500-8725 Rev: B
B/L 350-6005 Rev: G, P/N 500-8733 Rev: A
B/L 350-6004 Rev: C, P/N 500-8731 Rev: A
B/L 350-6003 Rev: D, P/N 500-8726 Rev: A

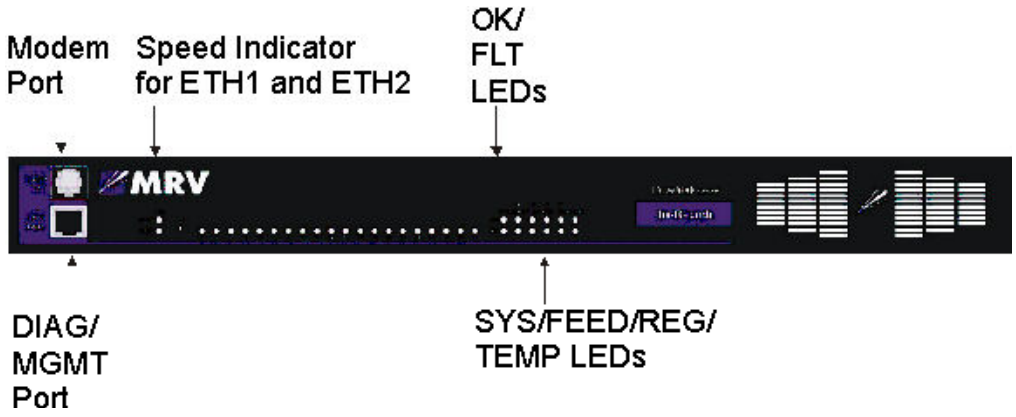
B/L 350-6003 Rev: D, P/N 500-8728 Rev: A
B/L 350-6005 Rev: G, P/N 500-8736 Rev: A
B/L 350-6004 Rev: C, P/N 500-8734 Rev: A
B/L 350-6003 Rev: D, P/N 500-8727 Rev: B
B/L 350-6003 Rev: D, P/N 500-8729 Rev: B
B/L 350-6005 Rev: G, P/N 500-8737 Rev: A
B/L 350-6004 Rev: C, P/N 500-8735 Rev: A

# 2. Interfaces

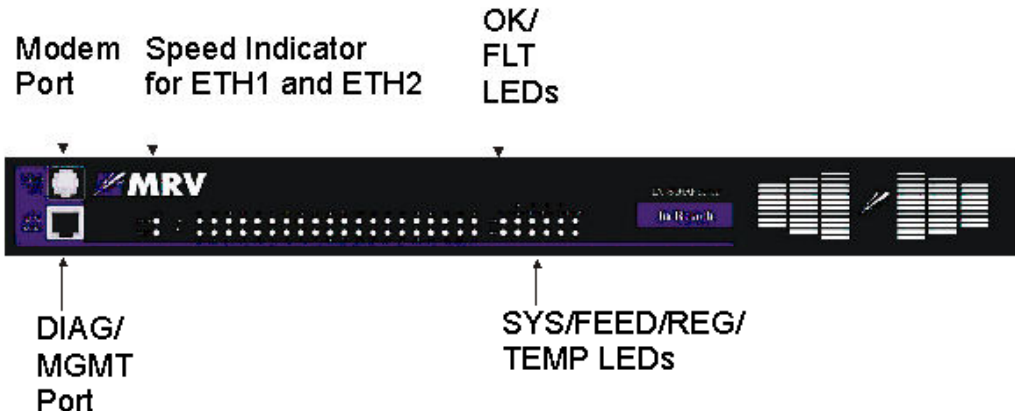
The LX-8000 Series are considered a multi-chip standalone module, and the cryptographic boundary of the module is defined by the outer case of module.

## *2.1. AC Power -Single Supply*

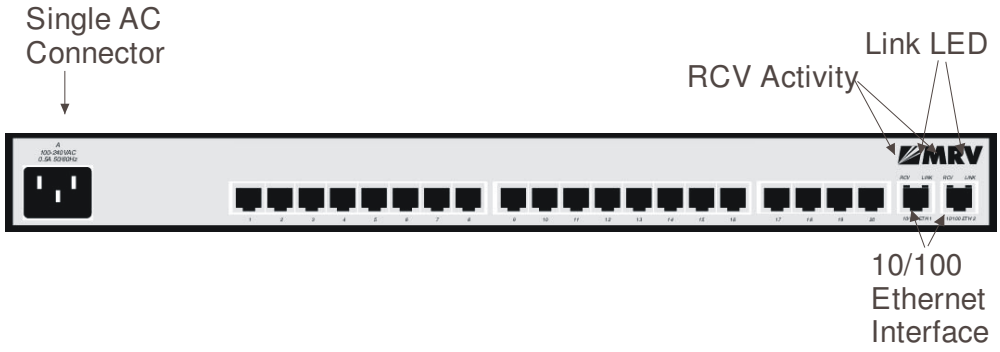
- **LX-8020S-001AC LX-8000S** with (20) RS232 RJ45 ports, & AC power
- **LX-8020S-101AC LX-8000S** with (20) RS232 RJ45 ports, AC power & internal V.90 modem
- **LX-8040S-001AC LX-8000S** with (40) RS232 RJ45 ports, & AC power
- **LX-8040S-101AC LX-8000S** with (40) RS232 RJ45 ports, AC power & internal V.90 modem




**LX-Series 8020 Front Panel**




**LX-Series 8040 Front Panel**

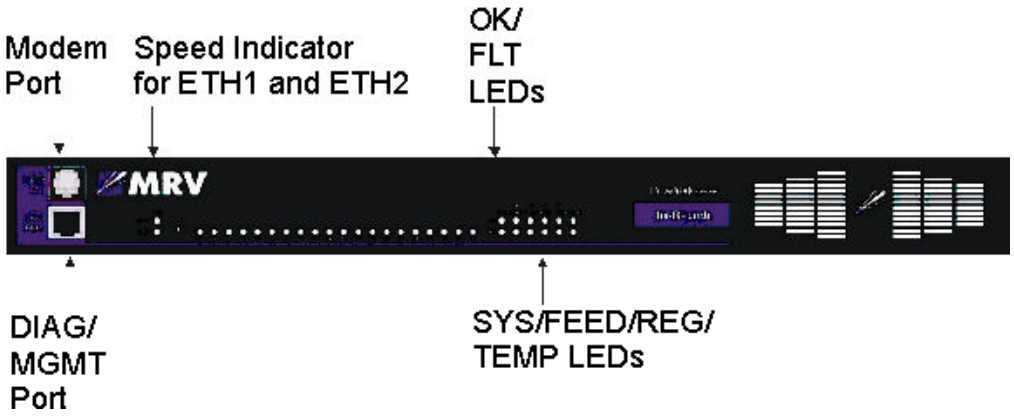



**LX-Series Single AC 8020 Rear Panel**

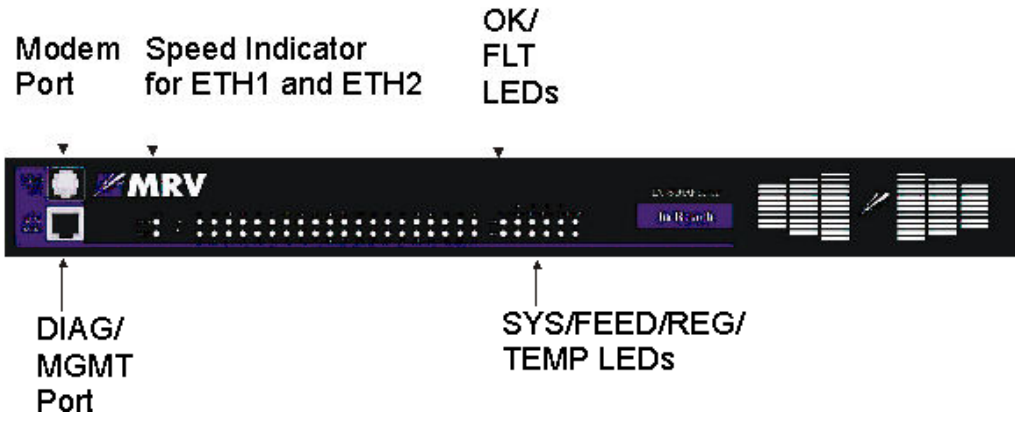

**LX-Series Single AC 8040 Rear Panel**

## *2.2. AC Power -Dual Supply*

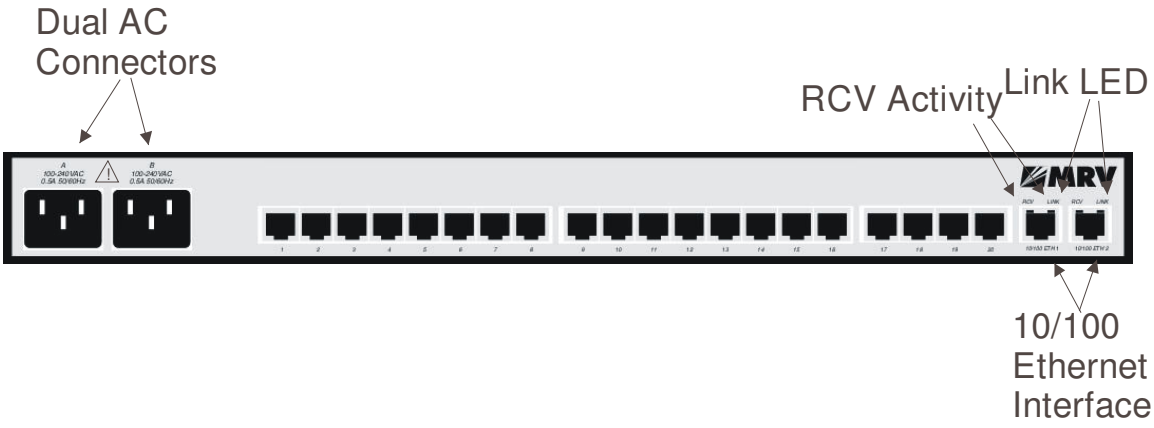
- **LX-8020S-002AC LX-8000S** with (20 )RS232 RJ45 ports, & dual AC power
- **LX-8020S-102AC LX-8000S** with (20) RS232 RJ45 ports, dual AC power & internal V.90 modem
- **LX-8040S-002AC LX-8000S** with (40) RS232 RJ45 ports, & dual AC power
- **LX-8040S-102AC LX-8000S** with (40) RS232 RJ45 ports, dual AC power & internal V.90 modem



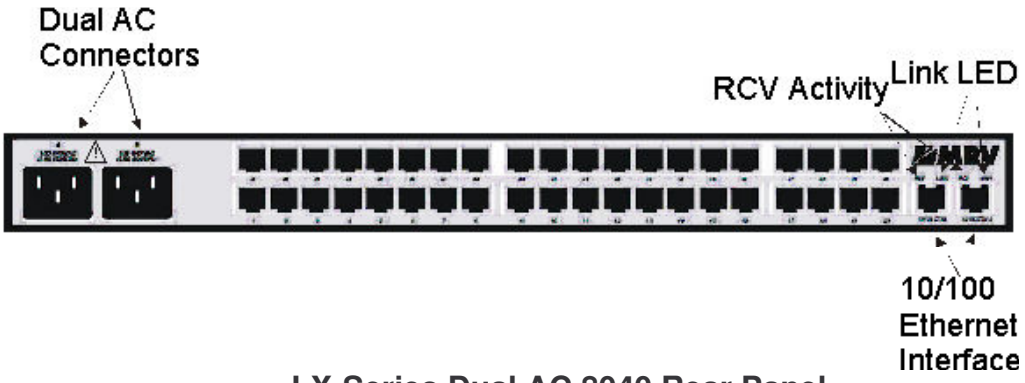

**LX-Series 8020 Front Panel**




**LX-Series 8040 Front Panel**



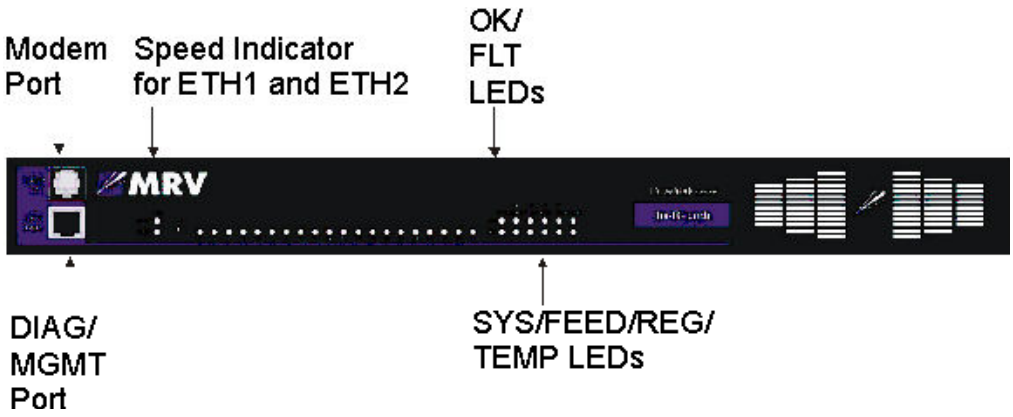

**LX-Series Dual AC 8020 Rear Panel**



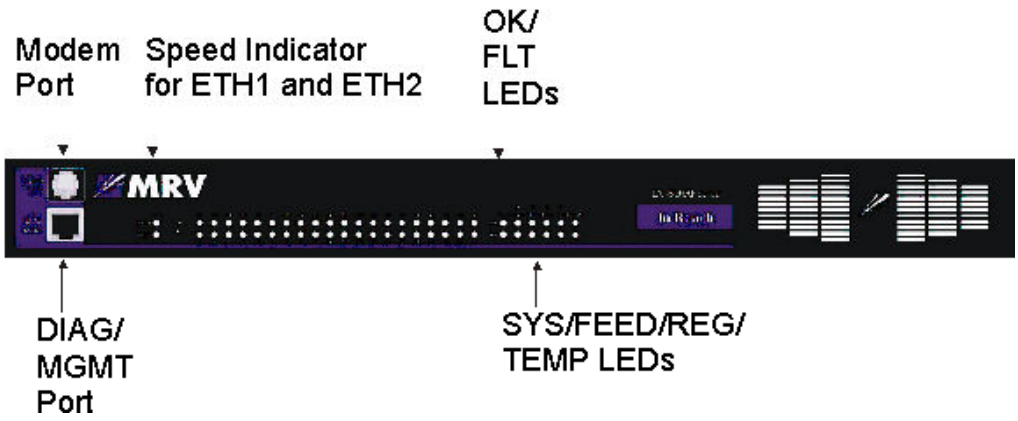

**LX-Series Dual AC 8040 Rear Panel**

## *2.3. DC Power (18-36V)-Dual Supply*

- **LX-8020S-002DC LX-8000S** with (20) RS232 RJ45 ports, & dual DC (18-36V) power
- **LX-8020S-102DC LX-8000S** with (20) RS232 RJ45 ports, dual DC (18-36V) power & internal V.90 modem
- **LX-8040S-002DC LX-8000S** with (40) RS232 RJ45 ports, & dual DC (18-36V) power
- **LX-8040S-102DC LX-8000S** with (40) RS232 RJ45 ports, dual DC (18-36V) power & internal V.90 modem




**LX-Series 8020 Front Panel**




**LX-Series 8040 Front Panel**


**LX-Series DC 8040 Rear Panel**

## *2.4. DC Power (36-72V)-Dual Supply*

- **LX-8020S-012DC LX-8000S** with (20) RS232 RJ45 ports, & dual DC (36-72V) power
- **LX-8020S-112DC LX-8000S** with (20) RS232 RJ45 ports, dual DC (36-72V) power & internal V.90 modem
- **LX-8040S-012DC LX-8000S** with (40) RS232 RJ45 ports, & dual DC (36-72V) power
- **LX-8040S-112DC LX-8000S** with (40) RS232 RJ45 ports, dual DC (36-72V) power & internal V.90 modem

The logical interfaces and their module mapping are described in the following table:

| Logical Interface | Physical Interface Mapping |
|---|---|
| Data Input Interface | 2 10/100 BASE-TX Ports<br>20 RS232 RJ45 Ports / 40 RS232 RJ45 Ports<br>Console Port<br>(RS232 Modem Port) |
| Data Output Interface | 2 10/100 BASE-TX Ports<br>20 RS232 RJ45 Ports / 40 RS232 RJ45 Ports<br>Console Port<br>(RS232 Modem Port) |
| Control Input Interface | Reset Button<br>2 10/100 BASE-TX Ports<br>20 RS232 RJ45 Ports / 40 RS232 RJ45 Ports<br>Console Port<br>(RS232 Modem Port) |
| Status Output Interface | LEDs,<br>2 10/100 BASE-TX Ports<br>2 10/100 BASE-TX Ports<br>20 RS232 RJ45 Ports / 40 RS232 RJ45 Ports<br>Console Port<br>(RS232 Modem Port) |
| Power Interface | (Dual) AC Power Input / Dual DC Power Input |

# 3. Roles, Services, and Authentication

The LX-8000 Series provides three different roles and a set of services specific to each of the roles. The LX-8000 Series will authenticate an operator by verifying his password and will then explicitly assign him either the Crypto-Officer or User role, depending on his security level. The module provides role-based authentication for all operators.

## *3.1. Roles*

The roles of the module include a PPCIBOOT User, Crypto-Officer and a User Role.

### *PPCIBOOT User*

The PPCIBOOT User is responsible for configuring the boot loader.

The following services are provided:

- Configure boot parameters
- Unconfigure boot parameters
- Enable FIPS 140-2 mode
- Disable FIPS 140-2 mode

### *Crypto-Officer Role*

The Crypto-Officer is the administrator of the LX and does the configuration.

The following services are provided:

- Configure system parameters
- Unconfigure system parameters
- Get system status
- Save configuration
- Exec system commands
- Exit from system

### *User Role*

The User Role performs a limited set of services to retrieve information or status. This role cannot perform services to configure the box.

The module allows concurrent users.

All roles can use role-based authentication locally or remotely via RADIUS, TACACS+, or RSA SecurID.

## 3.2. Algorithms

The LX supports the following cryptographic algorithms.

### *Approved cryptographic algorithms*

**Symmetric Key Algorithms**

| Algorithm | Modes | Key Size |
|---|---|---|
| AES | ECB, CBC, CFB, CTR | 128, 192, 256 |
| Triple-DES | ECB, CBC | 56, 112, 168 |

**Hashing Algorithms**

| |
|---|
| SHA-1 |

**Message Authentication Algorithms**

| |
|---|
| HMAC SHA-1 |

**Public Key Algorithms**

| Algorithm | Key Size |
|---|---|
| RSA (PKCS 1.5) | 1024 |
| DSA | 1024 |

### *Non-FIPS Approved Algorithm*

**Symmetric Key Algorithms**

| Algorithm | Modes | Key Size |
|---|---|---|
| DES | CBC | 64 |

**Public Key Algorithms**

| Algorithm | Key Size |
|---|---|
| RSA encrypt / decrypt (key wrapping) | 1024 (min), 8192 (max) |

**Hashing Algorithms**

| |
|---|
| MD5 |

**Key Exchange Algorithm**

| Algorithm | Key Size |
|---|---|
| Diffie-Hellman | 1024 (min), 8192 (max) |

### Key Generation

The module implements the ANSI X9.31 A.2.4 based PRNG. All key generation functions use the approved PRNG implementation.

# 4. Setting FIPS 140-2 Mode

The module images are pre-installed in the flash and new versions of software are shipped on CDs. All shipping occurs via a reputable courier service. The administrator should also inspect to make sure the boxes have not been tampered with or damaged upon receiving the modules, which could indicate a security compromise.

## *4.1. Prerequisites*

The following requirements{xe "FIPS:prerequisites"} must be met to use the product in a FIPS 140-2 compliant configuration:

- You must use the FIPS 140-2 validated versions of the LX linuxito and ppciboot software. *Only specific versions of the LX software are tested by an accredited cryptographic module test lab*.
- You must be running the software on the FIPS 140-2 tested LX-Series platform.
- FIPS 140-2 mode must be enabled on the LX-Series FIPS 140-2 validated unit(s).
- If you intend to use SNMP with FIPS 140-2, you must use the SNMP V3 version.
- You must place the provided tamper-evident labels in the proper locations.

## *4.2. Notes and Restrictions*

- The default subscriber InReach password must be changed.
- The default ppciboot password must be changed.
- The default system password must be changed.
- All configured passwords must be greater than or equal to 6 characters in length.
- If using an SNMP NMS or SNMP MIB browser, the application must support SNMPV3 and must support AES encryption. By default SNMP is disabled for security reasons. SNMP V3 must be enabled and configured fully on the LX in order to function with the NMS.
- SSH Clients must support sshV2, AES or 3DES ciphers, and HMAC-SHA1 or HMAC-SHA1-96 message authentication codes.

## 4.3. Applying Tamper Evident Labels

NOTE: To be FIPS 140-2 compliant, you must apply the tamper-evident labels before you power on and configure the LX unit.

Once the LX has been {xe "FIPS:tamper-evident labels"}configured in FIPS 140-2 mode, the cover cannot be removed without signs of tampering. Applying tamper-evident labels to the LX unit will prevent anyone from opening the unit without your knowledge.

To seal the cover of the LX, apply a tamper-evident label as follows:

1. Clean the LX surface of any grease or dirt before you apply the tamper-evident labels.
2. Apply two labels each to the bottom left and right sides of the unit, as shown in Figure 1.

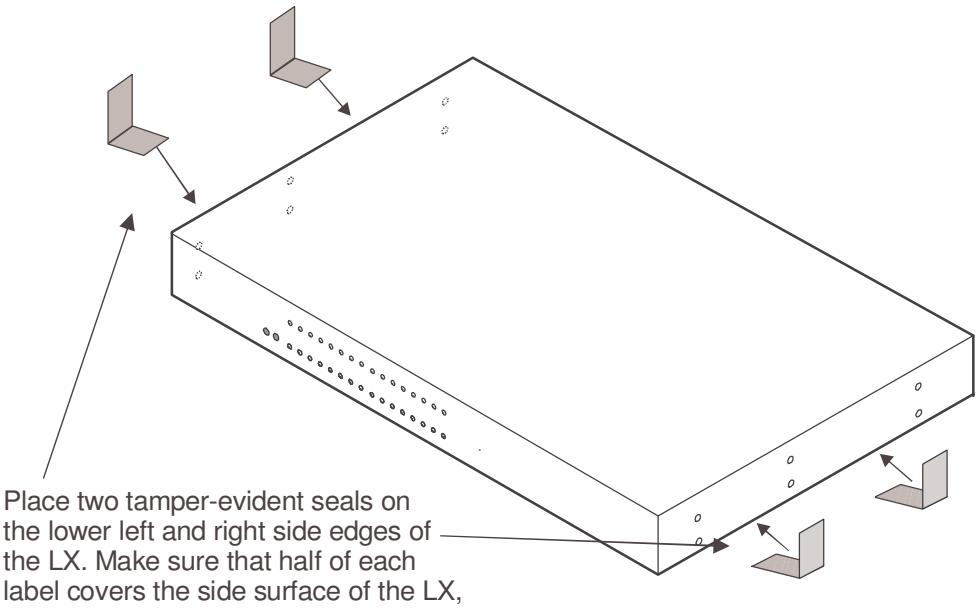



**Figure 1 – Location of the Tamper Evident Labels**

3. Record the serial numbers of the labels you attached to the LX unit.
4. Allow 24 hours for the adhesive in the tamper-evident labels to cure.

NOTE: You should periodically check the labels to ensure that no one has tampered with the unit.

## 4.4. Making Sure Your Software is FIPS 140-2 Validated

Do the following to determine if the software you are running has been FIPS 140-2 validated:

1. Log into the CLI.

2. Enter the `show version` command at the **InReach:0 >** prompt; for example:

   **InReach:0 >** `show version`

The Show Version screen appears, with the relevant fields highlighted:

```
Linux Kernel Version:                                    x.x.x.x
Linux In-Reach Version:                                        x
Software Version (Runtime):                          x.x.x.x (FIPS)
Software Version (Flash):                            x.x.x.x (FIPS)
Ppciboot Version:                                    x.x.x.x (FIPS)
```

**Figure 2 – Show Version Screen**

If the software you are running has been FIPS validated, the word (FIPS) appears to the right of the Software Version number and the Ppciboot Version number. If (FIPS) does not appear, your software has not been validated.

## *4.5. Enabling FIPS 140-2 Mode of Operation*

**IMPORTANT!**

If you want to configure your unit to run FIPS 140-2 Mode of Operation, you must do so ***before*** you attempt to configure the unit over and above the default settings. The act of enabling FIPS 140-2 mode will default the unit's configuration.

When FIPS 140-2 is enabled, the configuration file is returned to defaults. Therefore, if you fully configured your unit and then turned on FIPS 140-2, your configuration will return to factory defaults. FIPS 140-2 mandates this to ensure that any passwords with fewer than six characters are purged, and that all unsupported applications are disabled.

NOTE: If you enable FIPS 140-2 Security, option `[1] Boot from Network` is set to `Flash Only` automatically. You can only update from the CLI or GUI while FIPS 140-2 is enabled. Option `[4] Update ppciboot Firmware` is disabled when FIPS 140-2 is enabled.

The following passwords must be at least six characters long:

- Subscriber
- Config
- ppciboot
- Radius Secret
- TACACS+ Secret
- PAP/CHAP Outgoing Secret

- SSH Public Key must be at least 1024 bits.

The `FIPS 140-2 Security` option lets you enable or disable FIPS 140-2 mode of operation.

```
      Welcome to In-Reach ppciboot Version 3.6.0
                Main Menu
[1] Boot from network:      Flash
[2] Time Out, in seconds (0=disabled): 8
[3] IP Configuration Menu
[4] Update ppciboot Firmware
[5] Ethernet Network Link
[6] Change ppciboot Password
[7] FIPS 140-2 Security:                                    yes
[*] Reset to System Defaults
[S] Save Configuration
[B] Boot System
Make a choice:
      __
```

To enable or disable FIPS 140-2 security:

1. Press the number 7 (FIPS 140-2 Security). The following prompt appears:

   `Enabling FIPS security will reset run-time configuration to defaults. Are you sure? (y/n):`

2. If you select `y` (this defaults the flash immediately), a `Resetting Linux Configuration` message appears, and the Main Menu reappears after a few seconds. If you select `n`, the Main Menu reappears immediately.
3. If FIPS 140-2 is already enabled and you want to disable it, press `7 (FIPS 140-2 Security)` from the Main Menu.
4. Press `B` to Boot the system. Do this only after you have configured the ppciboot options and saved the configuration.

## *4.6. Changing the Default ppciboot Password*

After enabling FIPS 140-2, you must enter a new ppciboot password of greater than six characters.

The `Change ppciboot Password` option lets you change the ppciboot password for the unit. To change the ppciboot password:

1. Press the number 6 (`Change ppciboot Password`). The following prompt is displayed:

   **Enter your current ppciboot password:**

Enter the current ppciboot password at the above prompt. After you have entered the current ppciboot password, the following prompt is displayed:

**Enter your NEW password: :**

2. Enter the new ppciboot password at the above prompt. The password must be greater than six characters long.

   After you have entered the new ppciboot password, the following prompt is displayed:

   **Re-enter your NEW password:**

Re-enter the new ppciboot password at the above prompt. A confirmation message is displayed.

## *4.7. Changing the Default Subscriber Password*

It is widely known that the default password for the **InReach** user is **access**. If an unauthorized user knew this username/password combination, he/she could log on to your LX unit. For this reason, you must change the InReach user's password to something other than **access**. The password must be at least six characters long.

*Changing the Default Password for the InReach User*

Do the following to change the User-level password of the **InReach** User:

1. Access the Configuration Command Mode.
2. Access the Subscriber Command Mode for the **InReach** subscriber. You do this by entering the `subscriber` command with **InReach** as the command argument; for example:

   **Config:0 >>** `subscriber InReach`

3. Enter the `password` command at the **Subs_InReach** >> prompt; for example:

   **Subs_InReach:0 >>** `password`

4. Enter a new User password at the **Enter your NEW password:** prompt. The password will be displayed as asterisks, as in the following example:

   **Enter your NEW password:*****************

5. Re-enter the new User password at the **Re-Enter your NEW password:** prompt. The password will be displayed as asterisks, as in the following example:

   **Re-Enter your NEW password:*****************

*Changing the Default Configuration Password*

It is also widely known that the default Superuser password is **system**. To reduce the risk of an unauthorized user gaining access to the Superuser Command Mode, you must change this password to something other than **system**. The password must be at least six characters long.

To change the Configuration password for the LX unit, do the following:

1. Access the Configuration Command Mode.
2. Enter the password command at the **Config:0 >>** prompt; for example:

   **Config:0 >>**`password`
3. Enter a new Superuser password at the **Enter your NEW password:** prompt. The password will be displayed as asterisks, as in the following example:

   **Enter your NEW password:**`**********`
4. Re-enter the new Superuser password at the **Re-Enter your NEW password:** prompt. The password will be displayed as asterisks, as in the following example:

   **Re-Enter your NEW password:** `**********`

## *4.8. FIPS 140-2 Mode Console Access*

When the LX is in FIPS 140-2 mode telnet is not allowed. Therefore, you must ssh to the unit in Version 2 mode.

```
ssh -l InReach 10.10.10.10
```

If non-FIPS 140-2 approved algorithms are being used, please see and edit the `/etc/ssh/ssh_config` file on your host system.

## *4.9. Applications Unsupported in FIPS 140-2 Mode of Operation*

Listed below are all the unsupported FIPS 140-2 protocols and features, which are disabled when FIPS 140-2 mode of operation is enabled on the LX software.

**Unsupported FIPS Protocols and Features**

| Feature | Impact | Reason |
|---|---|---|
| Telnet client/server | Disabled | Passwords are passed in plaintext |
| rlogin client | Disabled | Passwords are passed in plaintext |
| Web GUI | Disabled | Only AES encryption mode will be |

| | | |
|---|---|---|
| unencrypted | | supported, customer is required to run FIPS 140-2 approved JRE on host machine |
| SNMP v1 & v2 | Disabled | Community strings are passed in plaintext |
| SSH V1 Client / Server | Disabled | Security flaws / known vulnerabilities |
| Passwords/ Secrets less than 6 characters | Disabled | Due to FIPS 140-2 max authentication fail attempts |
| Linux shell access | Restricted | Disabled access to secret and private keys |
| Boot or load software image from network | Disabled | FIPS 140-2 requires DSA signatures on images, units must boot from FLASH |
| Updating ppciboot.img from ppciboot menu | Disabled | FIPS 140-2 requires ppciboot to be updated from runtime software via CLI or GUI |
| LDAP | Disabled | Passwords passed in plaintext |
| Login mode shell | Disabled | Unfettered access |
| Broadcast Groups | Limited | No support for groups that have a master/slave of TCP |
| Fingerd | Disabled | Allows anyone to see who is logged in |
| Boot config from network (tftp) | Disabled | Configuration sent in plaintext |
| Save config to network (tftp) | Disabled | Configuration sent in plaintext |
| No authentication | Disabled | Insecure |
| Dedicated Services | Disabled | Passwords are passed in plaintext |
| Port Async Connect | Disabled | Insecure |
| TCP Pipe | Disabled | In plain text |

## 4.10. Upgrading Software

The `ppciboot.img.sign` and `linuxito.img.sign` digital signature files are used to authenticate load images during loading. Place these

files on the TFTP server. The LX unit will download them automatically.

Refer to "How to Upgrade the Software" in the *LX-Series Configuration Guide* for more information on upgrading the software.

## 4.11. FIPS 140-2 JCE Module Commands

NOTE: These commands apply only if you want to use the GUI in FIPS 140-2 mode.

NOTE: You can purchase FIPS 140-2 compliant JCE modules from two vendors. The vendors are listed below, along with the specific JCE Module name.

- IBM – IBMJCEFIPS
- RSA – JSafeJCE

NOTE: These commands are available only when the LX is running in FIPS 140-2 Mode.

A new FIPS 140-2 JCE Module command allows you to name the web server FIPS 140-2 JCE Module. You can access it in the Configuration Command Mode.

### *Configuring a Web Server FIPS 140-2 JCE Module Name*

Use the following command to configure a Web Server FIPS 140-2 JCE Module name. The module name is set by the module vendor. For example, if you are using RSA's JSafe cryptographic module, the module name would be `JSafeJCE`. Enter `no web_server fips jcemodule` to reset to the default, which is "null". The module name can be up to 16 characters long.

**Config:0>>** `web_server fips jcemodule <module_name>`

**Examples**

**Config:0>>** `web_server fips jcemodule JSafeJCE`

**Config:0>>** `no web_server fips jcemodule`

## 4.12. Viewing the Web Server FIPS 140-2 JCE Module Name

Use the `show web characteristics` command to display the Web Characteristics Screen. An example of this screen follows, with the new `Web JCEModule` field highlighted:

```
Time:                                  Fri, 28 Jan 2005 13:52:48 US/EASTERN
Web Server:                  Enabled   Web Server Port:                    80
Web Server Timeout:               20   Web Encrypt:                  Disabled
Web Banner:                  Enabled   Web JceModule:            JsafeJCEFIPS
```

# 5. Definition of SRDIs Modes of Access

This section specifies the LX's Security Relevant Data Items.

## *5.1. Cryptographic Keys, CSPs, and SRDIs*

While operating in a level 2 FIPS compliant manner, the LX-8000 Series contains the following security relevant data items:

| Security Relevant Data Item | SRDI Description |
|---|---|
| SSH RSA host 1024-bit private authentication key | Used for SSH authentication. Stored in flash. |
| SSH DSA host 1024-bit private authentication key | Used for SSH authentication. Stored in flash. |
| Web Server RSA 1024-bit private key | Used for Web server authentication and key transport. Stored in flash. |
| SSH Session key (AES, TDES) | Used to encrypt SSH sessions. Not stored across power cycles, stored in RAM. |
| Cluster Secret | Shared secret used to authenticate cluster members. Stored in configuration file in flash. |
| User passwords | User passwords. Stored in configuration file in flash. |
| Crypto Officer password | Password used to authenticate Crypto Officer. Stored in configuration file in flash. |
| Iboot User password | Password used to authenticate Iboot User. Stored in flash. |
| SNMP v3 AES key | Key used for SNMP v3 encryption. Stored in flash. |
| Outgoing PAP Secret | Used in PPP authentication. Stored in configuration file in flash. |
| Outgoing CHAP Secret | Used in PPP authentication. Stored in configuration file in flash. |
| RADIUS secret | Shared secret used with authentication server. Stored in configuration file in flash. |
| TACACS+ secret | Shared secret used with authentication server. Stored in configuration file in flash. |
| Cluster Diffie-Hellman private key | Diffie-Hellman private key used in Clustering. Stored in RAM. |
| SSH Diffie-Hellman private key | Diffie-Hellman private key used in SSH. Stored in RAM. |
| Web Server Session | Web server session encryption key. Stored in |

| | |
|---|---|
| key | RAM. |
| Cluster Session key | Cluster session encryption key. Stored in RAM. |
| RSA SecurID Secret | Shared secret of RSA SecurID. Stored in Flash. |
| DSA public key for firmware load | DSA public key used in signature verification when loading firmware. Stored in flash. |
| Approved PRNG initial seed and seed key | Used to initialize approved PRNG. Stored in flash. |
| Runtime approved PRNG seed and seed key | The runtime seed and seed key values stored in RAM |

The following matrix defines the set of services to the CSP of the module, providing information on reading, writing, and deleting.

The matrix uses the following convention:

- R: Read
- W: Write
- D: Delete

| SRDI/Role/Service Access Policy | Security Relevant Data Item | SSH RSA host 1024-bit public authentication key | SSH RSA host 1024-bit private authentication key | SSH DSA host 1024-bit public authentication key | SSH DSA host 1024-bit private authentication key | Web Server RSA 1024-bit public key | Web Server RSA 1024-bit private key | SSH Session Keys | Cluster Secret | Default iboot, operator, enable passwords | Operator passwords | Enable passwords | Iboot password | Subscriber SSH Public Key | SNMP v3 AES key | Outgoing PAP Secret | Outgoing CHAP Secret | RADIUS secret | TACACS+ secret | Cluster Diffie-Hellman private key | SSH Diffie-Hellman private key | Web Server Session key | Cluster Session key | RSA Securid secret | DSA public key for firmware load | Approved PRNG initial seed | Runtime approved PRNG seed and seed key |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Role/Service | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| User role | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Connect to an outside unit via console ports | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Get system status | | | | | | | | | R | | R | R | | R | R | R | R | R | R | | | | | | | | |
| Clear screen | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Use ping utility | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Exit from system | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Crypto-Officer Role | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Configure system parameters | | | | | | | | | W | | W | W | W | W | W | W | W | W | W | | | | | | | | |
| Unconfigure system parameters | | | | | | | | | D | | D | D | D | D | D | D | D | D | D | | | | | | | | |
| Get system status | | | | | | | | | R | | R | R | | R | R | R | R | R | R | | | | | | | | |
| Save Configuration | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Exec system commands | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Exit from system | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Iboot User Role | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Configure boot parameters | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Unconfigure boot parameters | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Enable FIPS 140-2 mode | | D | D | D | D | D | D | | D | | D | D | D | D | D | D | D | D | D | | | | | | | | |
| Disable FIPS 140-2 mode | | | | | | | | | | | | | | | | | | | | | | | | | | | |

## 6. Mitigation of Other Attacks

This section is not applicable.