Lanner Electronics Inc.
Reinforced Networking Systems

FW-3600 Series

Mini Desktop Intel IXP 42x Network Security Platforms

User's Manual

Lanner Electronics Inc.
Reinforced Networking Systems

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The following information relates to the safety of installation and maintenance personnel. Read all instructions before attempting to unpack, install or operate this equipment, especially before connecting the power adapter.

Please keep the following in mind as you unpack and install this equipment:

- Always follow basic safety precautions to reduce the risk of fire, electrical shock and injury to persons.
- Do not apply power into FW-3600 before installation or when disconnecting this product from its original system setup.
- Use only the specified power adapter (output voltage: 5VDC/3A) and make sure the power adaptor's plug matches your electrical wall outlet.
- To prevent fire or shock hazard, do not expose the unit to rain, moisture or install this product near water.
- Locate a safe and dry location to place this product. Keep it away from wet surfaces/surroundings.
- Never push an object of any kind into this product through openings or empty slots, as you may damage parts.
- Do not attach the power supply cabling to building surfaces. Do not allow anything to rest on the power cabling or allow it to be abused by persons walking on it.
- Distance your working area from moist floors, ungrounded power extension cables, and unavailable safety grounds.
- Avoid installation of this product during a lighting storm.
- Damages caused by electrostatic discharge may result in total or intermittent system failures. To minimize the possibility of ESD damage, an anti-static strap is highly recommended.
- When cleaning or servicing this unit, avoid using highly toxic or aerosol cleaners. Use a clean damp cloth when wiping its surfaces.
- Do not place this device in a tight and sealed location. Place the unit where it can access sufficient airflow to its vent holes (openings along its sides). Never block or cover these openings.
- Do not disassemble this product on your own.

Getting Technical Assistance

Should you encounter questions or problems with your FW-3600, Lanner Electronics is ready to assist you within the guidelines of our product support programs. First, check the electronic product documentation for assistance. If you still cannot find the solution to your problem, contact Lanner sales team with the following information handy:

- FW-3600 model name
- Part number
- Local network configuration details
- The abnormal behavior and/or error messages reported by your network system
- Your questions, or a description of the problem you are experiencing

Call, fax, or e-mail Lanner Electronics for technical support.

Phone: 886-2-8692-6060

Fax: 886-2-8692-6101

E-mail: sales@lannerinc.com

About this Manual

This target audience of this manual includes users, administrators and technicians. This publication is a useful reference when installing, configuring, operating and managing the FW-3600. This breakdown and short descriptions of this manual's contents are as follows:

- Chapter 1 – Introduction provides an overview of the FW-3600 mini desktop firewall platform, including its related features, application usage and technical specifications list. The chapter also guides users through the pre and post installation process by listing safety tips plus an overall detailed description of the control board and system and their vital components.

- Chapter 2 – Image Download and Test Procedure points out the basic steps when upgrading your FW-3600 via command line interface.

- *Appendix A – summarizes all drivers contained in the FW-3600 Drivers and Documentation Disk.*

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Chapter 1
Getting Started

1.1 Introduction

Figure 1 – FW-3600 Outlook

The FW-3600 is a mini desktop Intel IXP based firewall platform equipped with an Intel IXP 422/425 processor. A cost-effective and fanless solution of its kind, it comes with a pre-installed Booting Code and Linux Kernel. Its onboard mini PCI slots are tested compatible with any type of WiFi 802.11g card and IPSec VPN Accelerating card. Software porting on the FW-3600 is fully compatible with Firewall/VPN Software Applications.

Based on Intel's Xcale architecture, FW-3600 bundles a 64MB SDRAM and a 16MB NOR Flash onboard. On top of these are additional features like three FastEthernet ports and one four-port switch, two mini PCI slots for additional flexibility.

The FW-3600 is a promising platform on various applications including Residential Security Gateway, Residential Security Wireless Access Point, SOHO/ROBO Firewall/VPN Network Security Appliance, Wireless 4A (Authentication, Authorization, Accounting, Administration) Gateway, Hot Spot Accentuation and Billing System, and many more.

1.1.1 Features

Listed below are the key features of FW-3600.

- Intel IXP 42x series RISC core base platform
- Fanless system design
- Slim-desktop form factor
- Two mini-PCI sockets for expansion purposes
- Easy Image Download Procedure for Software Programming

1.2 Technical Specifications

- **Chassis:**
  - Construction: Bench top Chassis
  - Chassis Material: SPCC 1.0T
  - Chassis Color: PMS 877C
- **Control Board:**
  - EM-434
  - Dimensions: 147mm x 209mm
- **Processor:**
  - Intel IXP425, 533MHz (FW-3600A)
  - IXP422, 266MHz (FW-3600B)
- **Flash RAM:** Onboard 16MB NOR Flash ROM
- **System Memory:** Onboard 64MB SDRAM
- **Boot Loader:** Redboot
- **Ethernet Connectors:**
  - One RTL8305SB switch (MII) with ONE four-port switch and ONE Fast Ethernet RJ45
  - Two RTL8100B 10/100 Ethernet controller with two Fast Ethernet RJ45
- **PCI Interface:** Two mini-PCI sockets onboard
- **Real Time Clock:** Li battery
- **I/O Connectors:**
  - One DB-9 console connector
  - Mini software reset button
- **Pin Header:**
  - One JTAG pin header
  - Hardware reset button onboard
  - 4-pin power connector onboard
- **LED Indicators:** Power, Status (programmable by GPIO), Ethernet Ports 1-7
- **Power Supply**:
  - +5V 3A auto-switching AC power adapter
  - One power jack, 5V/3A
  - Input Voltage Range: 100~240 V
  - Frequency Range: 50Hz~ 60Hz
- **Storage Temperature:** -20°C~70°C
- **Operation Temperature:** 0°C ~40°C
- **Relative Humidity:** 5%~95%, non-condensing
- **System Dimensions:** 235 x 161.9 x 37.6 mm
- **Device Weight:** 1 kg
- **Certifications:** CE/FCC

1.3 Packing Contents

Carefully unpack your package and make sure that you have the following items.

- FW-3600 Firewall Platform
- Console cable
- 1.8 meters long cross-over Ethernet cable
- 1.8 meters long straight-through Ethernet cable
- Face panel name plate label
- Power adapter
- Drivers and User's Manual Disk

If you find anything missing or damaged, promptly contact your dealer for assistance.

1.4 EM-434 System Board

EM-434 is the system board bundled with the FW-3600 firewall platform. The succeeding sections list all EM-434 related jumper settings and connector pin assignments.

1.4.1 Mechanical Dimensions

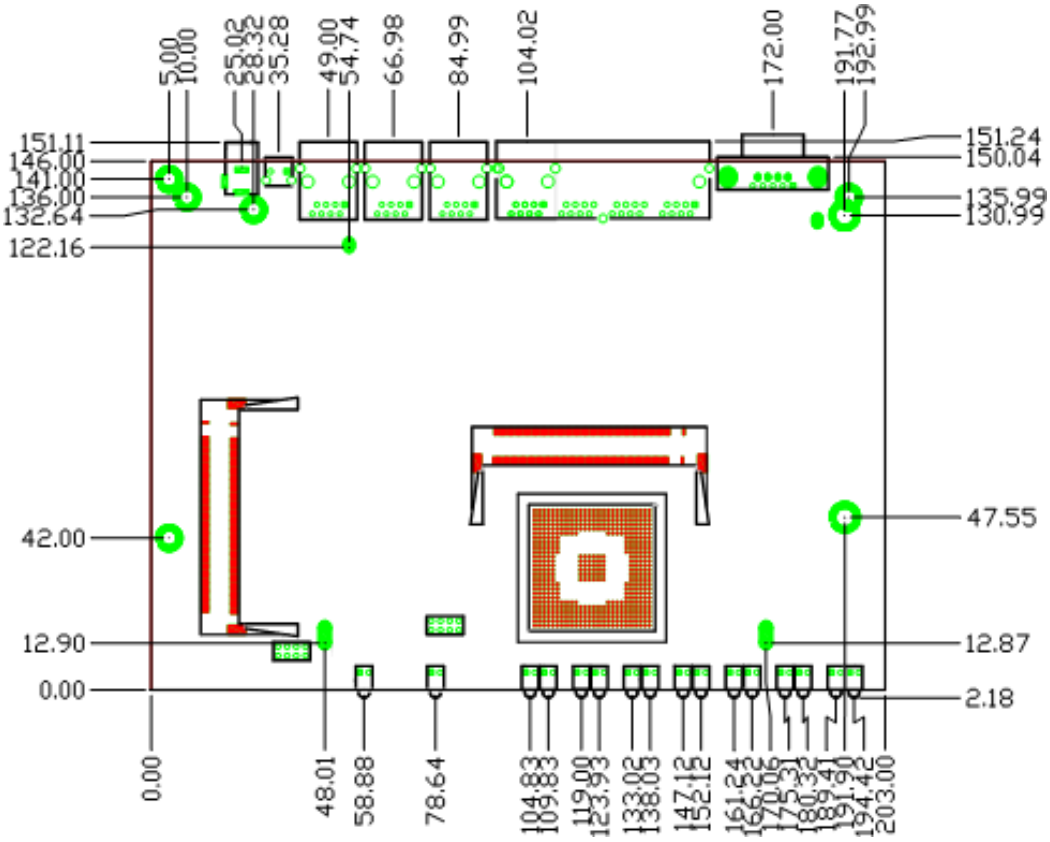


Figure 2 – EM-434 Control Board Dimensions (units in mm)

1.4.2 Board Layout

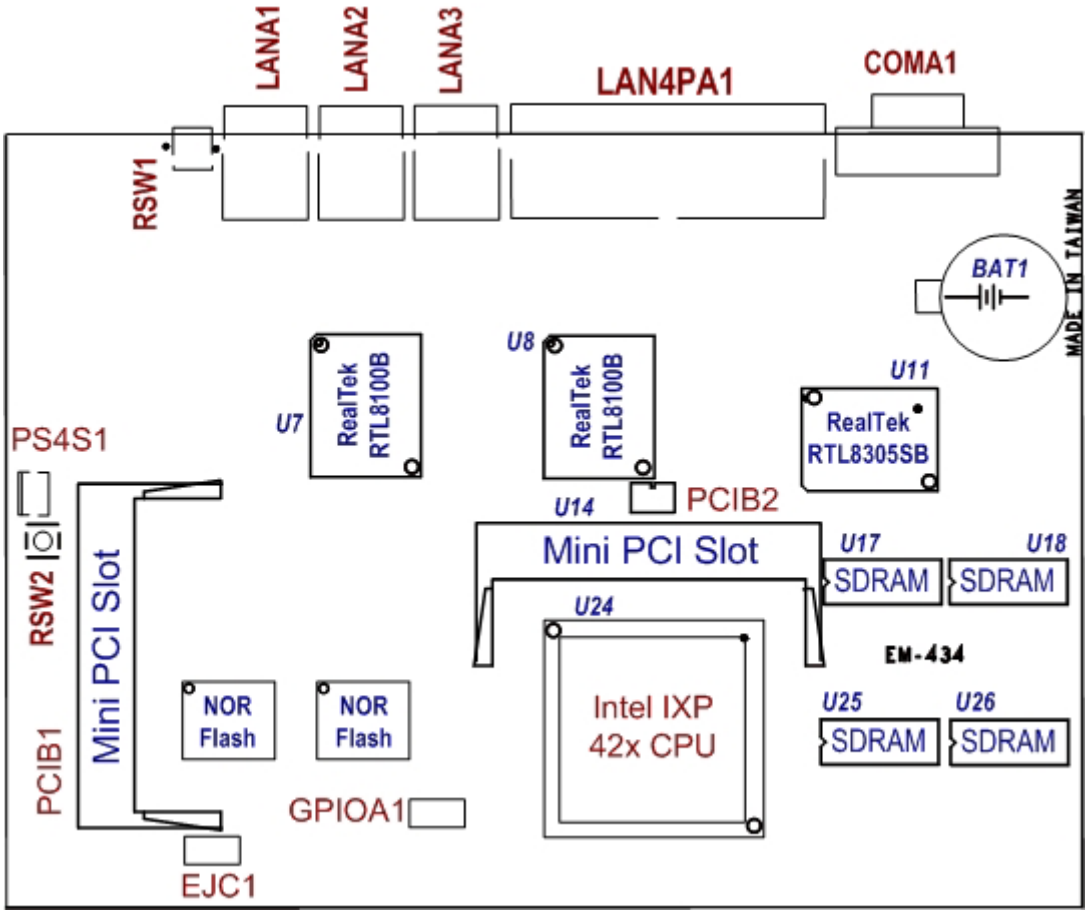


Figure 3 – EM-434 Jumpers and Connectors

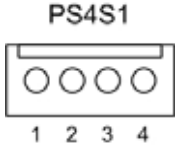
1.4.3 Jumper Settings

The onboard jumper settings of EM-434 are custom-tailored to fit the FW-3600 functionality. Changing the jumper settings may result in system malfunction or unforeseen damages.

1.4.4 Connector Pin Assignments

PS4S1: 4-Pin Power Connector (Small-4P)

Pin No.	Description
1	5V
2	Ground
3	Ground
4	12V

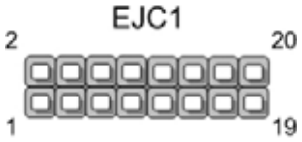


GPIOA1: 2x4 GPIO Pin Header

Pin No.	Description	Pin No.	Description
1	GPIO14	**2**	GND
3	GPIO7	**4**	GND
5	GPIO6	**6**	GND
7	GPIO5	**8**	GND

EJC1: EJPROB Connector

Pin No.	Description	Pin No.	Description
1	GND	**2**	EJTAG_TCK
3	GND	**4**	EJTAG_TMS
5	GND	**6**	EJTAG_TDI
7	GND	**8**	EJTAG_TDO

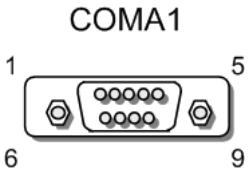


LANA1~ LANA3: Type 1 (RJ-45)

Pin No.	Description	
	Fast E-Net	**Giga Net**
1	TX+	MD0+
2	TX-	MD0-
3	RX+	MD1+
4	T45	MD2+
5	T45	MD2-
6	RX-	MD1-
7	T78	MD3+
8	T78	MD3-

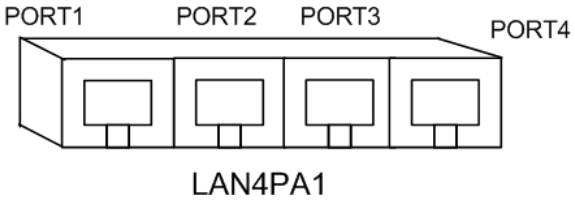
COMA1: RS-232 Serial Port #1 Connector (D-Sub)

Pin No.	Description
1	Data Carrier Detect (DCDA #)
2	Receive Data (RXDA)
3	Transmit Data (TXDA)
4	Data Terminal Ready (DTRA #)
5	Ground (GND)
6	Data Set Ready (DSRA #)
7	Request To Send (RTSA #)
8	Clear To Send (CTSA #)
9	Ring Indicator (RIA #)



LAN4PA1: 4 x RJ-45 Ports

Pin No.	Description	
1	RX+	PORT1
2	RX-	
3	TX+	
4	T45	
5	T45	
6	TX-	
7	T78	
8	T78	
9	RX+	PORT2
10	RX-	
11	TX+	
12	T45	
13	T45	
14	TX-	
15	T78	
16	T78	
17	RX+	PORT3
18	RX-	
19	TX+	
20	T45	
21	T45	
22	TX-	
23	T78	
24	T78	
25	RX+	PORT4
26	RX-	
27	TX+	
28	T45	
29	T45	
30	TX-	
31	T78	
32	T78	
41	GND	
42	GND	



LAN4PA1

PCIB1~2:124-pin Mini PCI Sockets

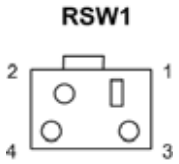
Pin No.	Description	Pin No.	Description
1	TIP	**2**	RING
3	8PMJ-3	**4**	8PMJ-1
5	8PMJ-6	**6**	8PMJ-2
7	8PMJ-7	**8**	8PMJ-4
9	8PMJ-8	**10**	8PMJ-5
11	LED1_GRNP	**12**	LED2_YELP
13	LED1_GRNN	**14**	LED2_YELP
15	CHSGND	**16**	RESERVED
17	INT-B	**18**	+5V
19	+3.3V	**20**	INT-A
21	RESERVED	**22**	RESERVED
23	GROUND	**24**	3.3VAUX
25	CLK	**26**	RST
27	GROUND	**28**	+3.3V
29	REO	**30**	GNT
31	+3.3V	**32**	GROUND
33	AD31	**34**	PME
35	AD29	**36**	RESERVED
37	GROUND	**38**	AD30
39	AD27	**40**	+3.3V
41	AD25	**42**	AD28
43	RESERVED	**44**	AD26
45	C_BE-3	**46**	AD24
47	AD23	**48**	IDSEL
49	GROUND	**50**	GROUND
51	AD21	**52**	AD22
53	AD19	**54**	AD20
55	GROUND	**56**	PAR
57	AD17	**58**	AD18
59	C_BE-2	**60**	AD16
61	IRDY	**62**	GROUND
63	+3.3V	**64**	FRAME
65	CLKRUN	**66**	TRDY
67	SERR	**68**	STOP
69	GROUND	**70**	+3.3V
71	PERR	**72**	DEVSEL
73	C_BE-1	**74**	GROUND
75	AD14	**76**	AD15
77	GROUND	**78**	AD13
79	AD12	**80**	AD11
81	AD10	**82**	GROUND

- More -

Pin No.	Description	Pin No.	Description
83	GROUND	**84**	AD9
85	AD8	**86**	C_BE-0
87	AD7	**88**	+3.3V
89	+3.3V	**90**	AD6
91	AD5	**92**	AD4
93	RESERVED	**94**	AD2
95	AD3	**96**	AD0
97	+5V	**98**	RESERVED-WIP
99	AD1	**100**	RESERVED-WIP
101	GROUND	**102**	GROUND
103	AC_SYNC	**104**	M66EN
105	AC_SDATA_IN	**106**	AC_SDATA_OUT
107	AC_BIT_CLK	**108**	AC_CODEC_ID0
109	AC_CODEC_ID1	**110**	AC_RESET
111	MOD_AUDIO_MON	**112**	RESERVED
113	AUDIO_GND	**114**	GROUND
115	SYS_AUDIO_OUT	**116**	SYS_AUDIO_IN
117	SYS_AUDIO_OUT GND	**118**	SYS_AUDIO_IN GND
119	AUDIO_GND	**120**	AUDIO_GND
121	RESERVED	**122**	MPCIACT
123	VCC5VA	**124**	3.3AUX

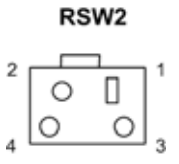
RSW1: 4-pin Software Reset Switch

Pin No.	Description
1	Reset signal
2	GND
3	GND
4	GND



RSW2: 4-pin Hardware Reset Switch

Pin No.	Description
1	Reset signal
2	GND
3	GND
4	GND



1.5 FW-3600 Mini Desktop Firewall Mechanisms

This section of the manual describes the mechanical and device nomenclature of FW-3600.

1.5.1 Mechanical Dimensions

The illustration below identifies the physical measurements of the FW-3600. The measurement unit used is in millimeters (mm).

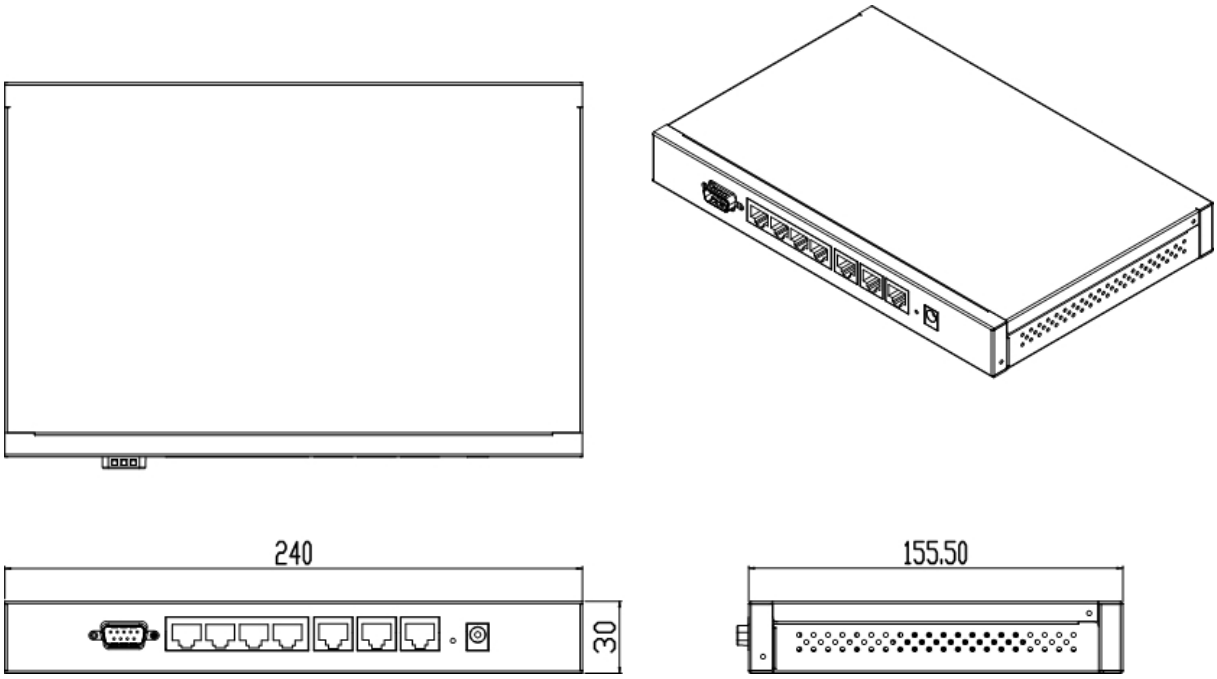


Figure 4 – FW-3600 Chassis Dimensions (units in mm)

1.5.2 Face Panel

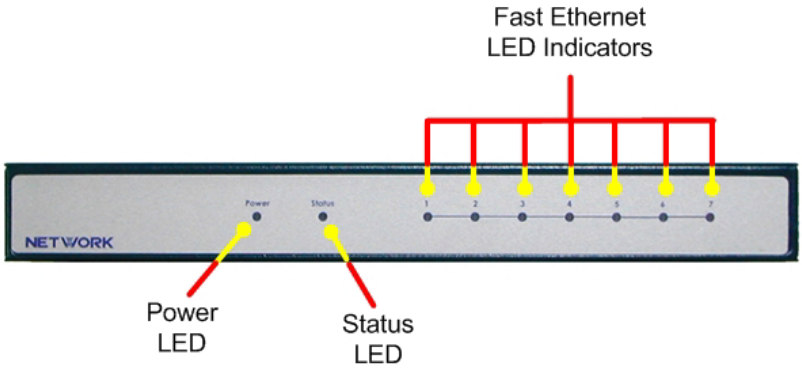


Figure 5 – FW-3600 Face Panel

Face Panel LED Status and Behavior

The following table lists and explains the behavior of each LED on the FW-3600 front panel.

LED	Color	Status	Description
Power	**Green**	On	When FW-3600 power is switched ON
		Off	No power connected
Status (programmable via GPIO15)	**Green**	On	When GPIO 15 is programmed and set to a value of "0"
		Off	When GPIO 15 is programmed and set to a value of "1"
Ethernet Ports 1~7	**Green**	Blinking	Data packets are being transmitted or received
		On	Linked/established Ethernet connection present
		Off	No existing Ethernet port connections to FW-3600

1.5.3 Rear View

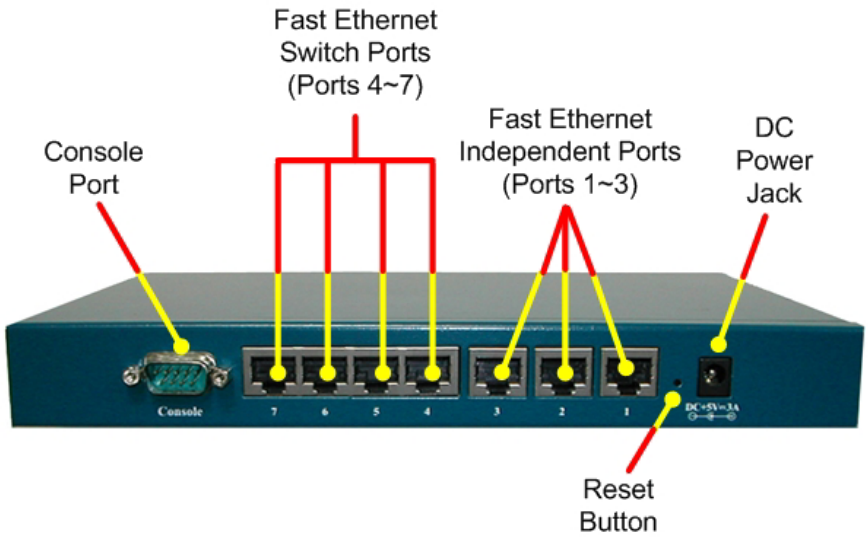


Figure 6 – FW-3600 Rear View

- **Console Port:** via the console port cable, this connector attaches FW-3600 to the host PC
- **Fast Ethernet Ports:** Ethernet RJ-45 connector, connected to networking environment using a RJ-45 Ethernet cable
- **DC Power Jack:** Power connector, connected to the power adapter packed with the FW-3600

Warning:

Faulty or improper use of the power adaptor may cause permanent damage to the power supply and the FW-3600. Plug the adaptor to an electrical wall outlet that matches its specifications.

Chapter 2

EM-434 Image Download

This chapter explains the procedures when configuring the FW-3600, including its OS and applications. The following sections and each procedure are highly required to achieve your technical requirements.

2.1 Pre-installed Linux Software

The pre-installed Linux Kernel in the FW-3600 has the following details:

- **Version No.: 02042004**
- **Software and Hardware Port Matching:**

OS	Hardware
Ethernet 1	LAN4PA1
Ethernet 2	LANA3
Ethernet 3	LANA1
Ethernet 4	LANA2
Ethernet 5	If one LAN card exists and installed on a mini PCI socket

Illustrated below are the FW-3600 factory default assignments.

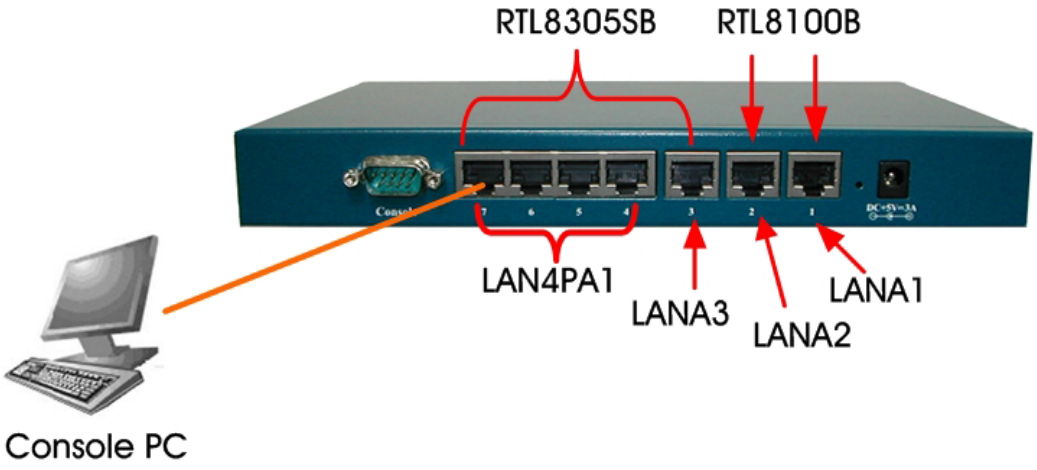
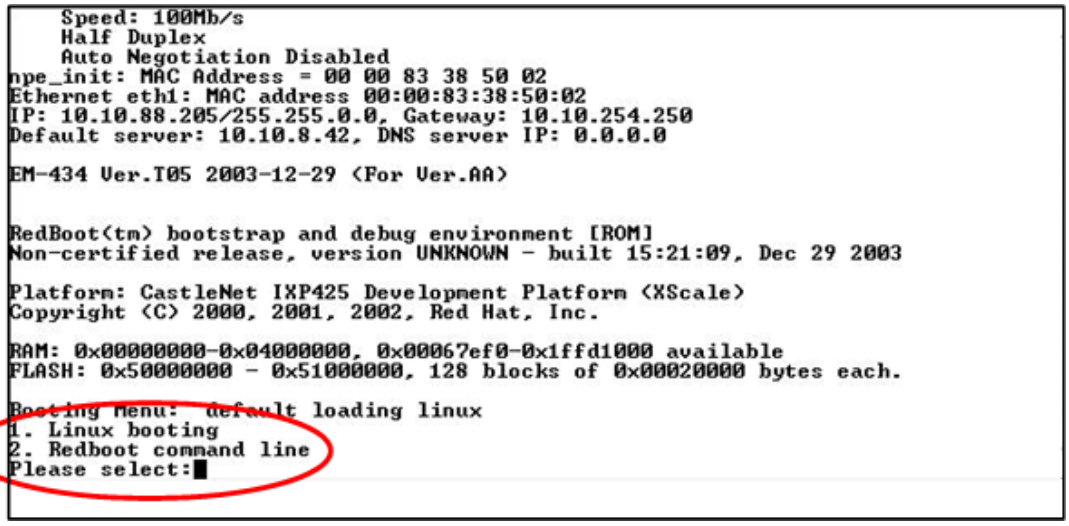


Figure 7 – FW-3600 Factory Default Assignments

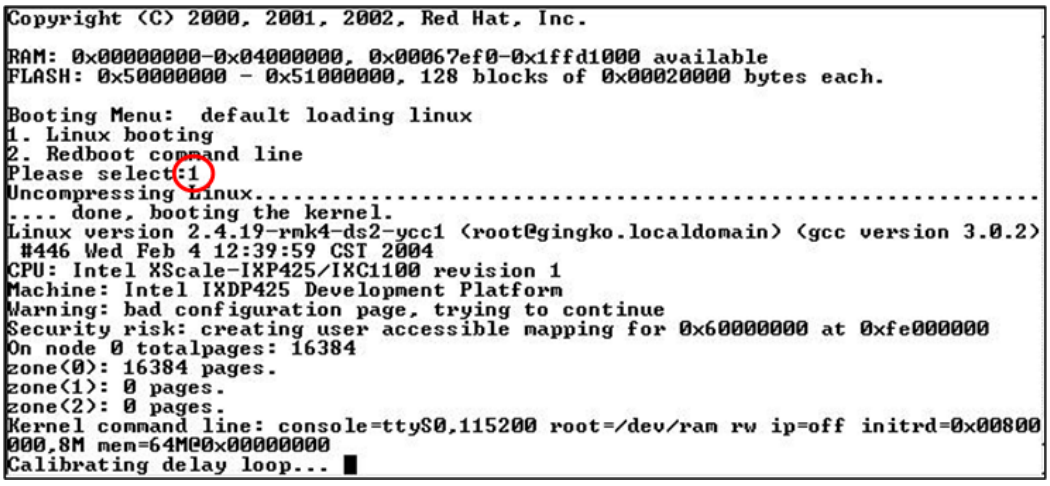
2.2 Boot-up Conditions

Once the FW-3600 console port is connected to a console PC, there will be two choices available mid-way during the FW-3600 system boot up:

- 1 Enter OS (default): ***"1"*** allows access into FW-3600 OS and runs the firewall
- 2 Enter Redboot: ***"2"*** allows entry to Redboot for downloading of boot code / OS from another PC via TFTP protocol.



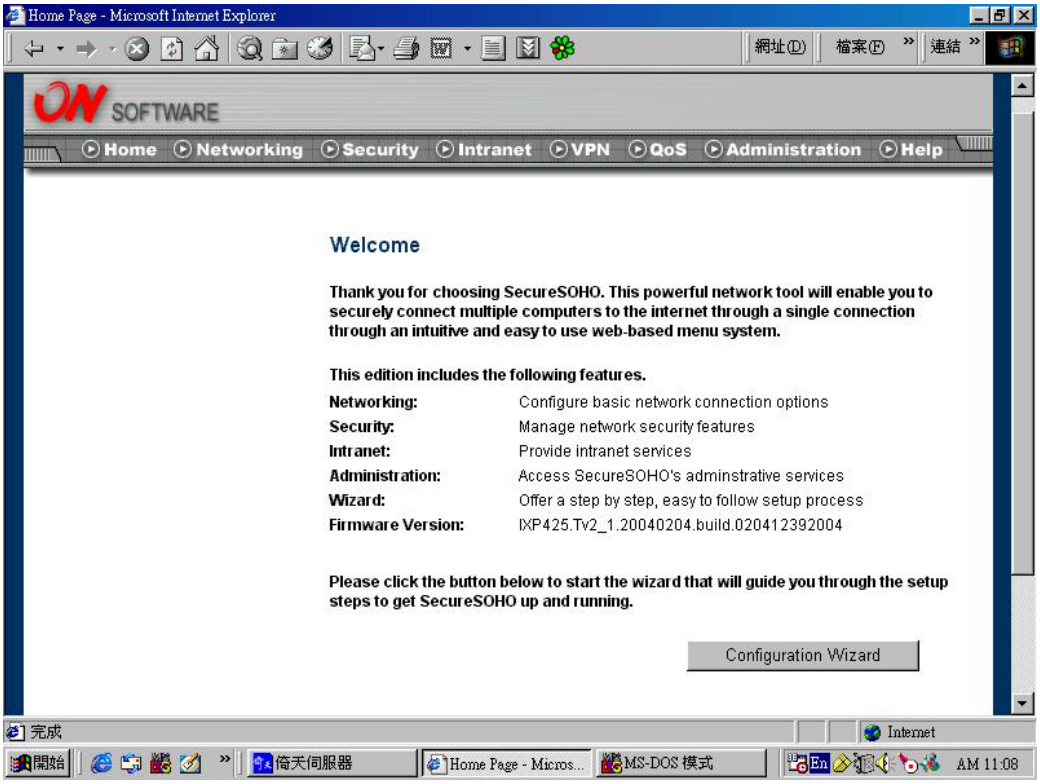
The following figure shows the screen after choosing the option ***"1"***.



After the OS completes boot up process, you can now open a browser from a connected PC to view the Configuration Wizard that allows you to setup and configure your system. Enter the following address on your browser to launch the Configuration Wizard:

http://192.168.1.254:8090

Follow the onscreen instructions to complete the process. Configure the WAN port type as static and using the default settings.



The displayed screen will show the figure below after selecting option ***"2"***.

```
npe_init: MAC Address = 00 00 83 38 50 02
Ethernet eth1: MAC address 00:00:83:38:50:02
IP: 10.10.88.205/255.255.0.0, Gateway: 10.10.254.250
Default server: 10.10.8.42, DNS server IP: 0.0.0.0

EM-434 Ver.T05 2003-12-29 (For Ver.AA)


RedBoot(tm) bootstrap and debug environment [ROM]
Non-certified release, version UNKNOWN - built 15:21:09, Dec 29 2003

Platform: CastleNet IXP425 Development Platform (XScale)
Copyright (C) 2000, 2001, 2002, Red Hat, Inc.

RAM: 0x00000000-0x04000000, 0x00067ef0-0x1ffd1000 available
FLASH: 0x50000000 - 0x51000000, 128 blocks of 0x00020000 bytes each.

Booting Menu:  default loading linux
1. Linux booting
2. Redboot command line
Please select:2

== Executing boot script in 1.000 seconds - enter ^C to abort
RedBoot>
```

2.3 Downloading Redboot

There are two standard boot code file names bundled with your FW-3600.

- **IXP422-based FW-3600:** JFIXP266.exe
- **IXP425-based FW-3600:** JFIXP533.exe

Downloading the Redboot is required when you intend to perform the following:

- modify the existing Redboot,
- replace the entire Redboot code, and
- recover to original Redboot code of FW-3600.

2.3.1 Hardware Requisites

Before executing any command line, a JTAG cable must connected from the EM-434 control board of FW-3600 to the parallel port of the console PC. To do this, follow the steps below.

1. Remove the cover of FW-3600.
2. Locate the designated connector, EJC1, onboard EM-434.
3. Connect the pin connector at one end of the JTAG cable onto EJC1.
4. Connect the parallel port connector of the JTAG cable onto the parallel port of the console PC.
5. Ensure and check the presence of a serial port connection (via console cable) from the FW-3600 console connector to the console PC.

Reminder: ***Redboot boot code download for modification/replacement/recovery purposes requires FW-3600connection to a PC via TFTP protocol.***

2.3.2 Procedures

After completing the hardware connections, you are now ready to download the Redboot code. The following is an example of the download process under Windows 98.

From the Windows98 Start menu;

Open a Hyper terminal program

Configure the Baud rate as 115200, N,8,1, NONE

Run

c:> JFIXP266 Fem434aa.T06, then press <Enter>.

2.4 Downloading Linux and Ramdisk

Note: ***Downloading of Linux and Ramdisk are only possible using the RTL8305SB Ethernet port: LANA3.***

The bundled Linux Kernel of FW-3600 is an open source architecture. This section is of vital use for programmers who wish to set up the FW-3600 into a TFT server. Downloading of Linux and Ramdisk are required when you intend to perform the following:

- modify the existing Kernel,
- replace the entire Kernel, and
- recover to original Kernel of FW-3600.

Reminder: ***Linux and Ramdisk downloads for modification/replacement/recovery purposes require FW-3600 connection to a PC via TFTP protocol.***

2.4.1 Procedures

From the TFTP server's configured protocol, run the following command lines:

Setup a TFTP server

RedBoot> fconfig → set the local ip address and tftp server ip address based on your preferred settings (mainly to configure FW-3600 as a TFTP server)

Reset the system (using the reset button the FW-3600 rear panel)

Use the following easy commands:

RedBoot>1 <Enter> (fis init –f)

RedBoot>2 xxxx (load -r -v -b 0x10000000 mac.bin) (xxxx = filename)

(fis create -b 0x10000000 -l 0x2000 mac)

RedBoot>3 Fem434aa.K01 (load -r -v -b 0x11600000 zImage)

(fis create -b 0x11600000 -l 0x100000 zimage)

RedBoot>4 Fem434aa.R01 (load -r -v -b 0x10800000 target.gz)

fis create -b 0x10800000 -l 0x600000 ramdisk)

RedBoot>5 fis create -b 0x100000 -l 0x2000 param

Reset the system using the reset button the FW-3600 rear panel)

Appendix A
Driver Information

This appendix contains a rundown of the drivers contained in the Drivers and User's Manual Disk. The drivers of each component are vital for programmers when developing their proprietary kernels.

- NOR Flash
- DRAM
- RealTek RTL8100B
- RealTek 8305SB
- Mini PCI Socket
- RTC

Lanner Electronics Inc.
Reinforced Networking Systems

Terms and Conditions

Date:2004.07.08

Warranty Policy

1. All products are warranted against defects in materials and workmanship for a period of two years from the date of your purchase.
2. The buyer will bear the return freight charges for goods returned for repair within the warranty period; whereas manufacturer will bear the after service freight charges back to user site.
3. The buyer will pay for repair (for replaced components plus service time) and transportation charges (both ways) for items after the expiration of the warranty period.
4. If the RMA Service Request Form does not meet the stated requirement as listed on “RMA Service“, RMA goods will be returned at customer’s expense.
5. The following conditions resulting to the defective goods are excluded from this warranty:
   A. Improper or inadequate maintenance by the customer
   B. Unauthorized modification, misuse, or reversed engineering of the product
   C. Operation outside of the environmental specifications for the product.

RMA Service

***1. Requesting for a RMA#*:**

To obtain a RMA number, simply fill out and fax the “RMA Request Form” to your supplier.

2. Shipping:

A. The customer is required to fill up the problem code as listed. If your problem is not among the codes listed, please write the symptom description on the remark.

B. Ship the defective unit(s) on freight prepaid terms.

C. Mark the RMA # clearly on the box.

D. Customer is responsible for shipping damage(s) resulting from inadequate/loose packing of the defective unit(s).

E. Use the original packing materials whenever possible.

3. All RMA# are valid for 30 days only:

RMA goods received after the effective RMA# period will be rejected.

Lanner Electronics Inc.
Reinforced Networking Systems

RMA Service Request Form

When requesting RMA service, please fill out this **RMA Service Request Form**.

Without this form your RMA will be REJECTED!!!

RMA No: Reasons to Return: ☐ Repair(Please include failure details) ☐ Testing Purpose

Company: Contact Person:

Phone No. Purchased Date:

Fax No.: Applied Date:

Return Shipping Address: _____

Shipping by: ☐ Air Freight ☐ Sea ☐ Express_____ ☐ Others:_____

Item	Model Name	Serial Number	Configuration

Item	Problem Code	Failure Status

*Problem Code:

01:D.O.A.	07: BIOS Problem	13: SCSI	19: DIO
02: Second Time R.M.A.	08: Keyboard Controller Fail	14: LPT Port	20: Buzzer
03: CMOS Data Lost	09: Cache RMA Problem	15: PS2	21: Shut Down
04: FDC Fail	10: Memory Socket Bad	16: LAN	22: Panel Fail
05: HDC Fail	11: Hang Up Software	17: COM Port	23: CRT Fail
06: Bad Slot	12: Out Look Damage	18: Watchdog Timer	24: Others (Pls specify)

Request Party ***Confirmed By Supplier***

Authorized Signatures / Date **Authorized Signatures / Date**

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