



Fratech **FE900**
Digital IP Receiver

from **ir** inner range www.innerrange.com
Intelligent Security Solutions

Installation Guide

1. Contents

2. Safety Warnings and Important Notes	2
3. Introduction	3
4. Requirements	3
4.1. PC Requirements	3
4.2. Network Requirements	4
4.3. Mechanical Specifications	4
4.4. Power Supply Requirements	4
4.5. Automation System Connection	5
5. Installation	5
5.1. Check kit	5
5.2. Mechanical Installation - General	6
5.3. Mechanical Installation - Rack Mounting	6
5.4. Electrical Installation	11
5.5. Power-Up Check	13
5.6. Software Installation	14
5.7. Basic FE900 Configuration	14
6. Appendices	15
6.1. Front Panel LEDs	15
6.2. Line Connector Layouts	17
6.3. Inserting & Removing Cards	19

2. Safety Warnings and Important Notes

- **ATTENTION!:** This equipment is connected to the Public Switched Telephone Network. As such, it **MUST** be installed by personnel authorised by the local telecommunications authority to connect devices to the telecommunications network.
- The FE900 Receiver should be connected to a local protective earth approved by the local telecommunications authority.
- The FE900 Receiver should be situated in a location only accessible by service personnel.
- **Backup battery:** If a sealed lead-acid battery is used, it should be located in a stable, well ventilated and shaded position where the battery cannot fall. The terminals and associated wiring should be insulated against inadvertent short circuit, as the battery can provide sufficient energy to cause serious burns. Check all battery wiring before connecting the battery. Always connect the battery terminals last.

3. Introduction

As a standalone receiver, the FE900 packs a powerful punch: It can communicate with automation systems via TCP/IP using its built-in Ethernet ports, and/or via its isolated RS232 ports, receive alarms in most communications formats on up to 32 PSTN lines and receive IP-Based Alarms over TCP/IP. Main hardware features include:

- Two inbuilt Ethernet ports per CPU Card
- Two isolated RS232 ports per CPU Card with auto-switching to shared sockets
- Supports up to 32 PSTN lines simultaneously
- Non-volatile 30,000 event buffer
- Hot swappable, auto-configuring cards
- Speaks all the main communications formats
- Line Cards feature advanced DSP, 8kV isolation and three stage lightning/transient protection
- Optional redundant processor card

The FE900 comes with an impressive configuration and management software tool. The client/server design of the FE900 software allows operators to configure, monitor and manage FE900 Receivers remotely from any point of an IP network - any time, any place. For instance, one can 'zoom' to any line on any Line Card on any FE900 in their system and interact with it.

4. Requirements

Prior to installation and commissioning, one should first make sure that power, physical mounting, PC and network facilities meet the requirements of the FE900 system:

4.1. PC Requirements

The FE900 configuration and management software is of a client/server design. In an FE900 system, there is always one 'server' PC. There may also be any number of optional 'client' PCs.

The 'server' PC hosts a database, which amongst other things contains events from FE900 Receivers, as well as the FE900 software 'client' interface. All PC communications to FE900 Receivers are routed via the 'server' PC. The requirements for the 'server' PC are thus slightly higher than for 'client' machines.

Note

If there is a need to access more than 100,000 call events at a time for reporting, etc., then SQL Server 2003 will be required due to the resultant size of the FE900 software's database.



Server PC Requirements

Minimum

- Windows® XP Professional / Windows® Vista
- Intel® Pentium 4 3GHz, AMD® Athlon 3000
- 512Mb RAM (May limit performance & some features)
- 120Gb HDD
- SVGA monitor at 800 x 600, 16 bit colour
- Keyboard & Microsoft Mouse or compatible pointing device
- 100Base-T Network Interface card for TCP/IP networking

Recommended

- Windows® 2003 Server
- SQL Server 2005 (For larger installations. Also requires Windows® 2003 Server)
- Intel® Xeon 3GHz / AMD® Opteron 3000 or better
- 1Gb RAM
- 120Gb HDD, RAID 1 (mirroring)
- XVG monitor at 1024 x 768, 24 bit colour

Client PC Requirements

Minimum

- Windows® XP Professional / Windows® Vista
- Intel® Pentium 4 3GHz, AMD® Athlon 3000
- 512Mb RAM (May limit performance & some features)
- 10Gb HDD
- SVGA monitor at 800 x 600, 16 bit colour
- Keyboard & Microsoft Mouse or compatible pointing device
- 100Base-T Network Interface card for TCP/IP networking

4.2. Network Requirements

An FE900 can use up to 4 Ethernet connections. The following requirements apply to the TCP/IP network:

- The FE900 Receiver uses one or two full-duplex 10Mbit Cat5 type Ethernet connections per CPU Card
- Both TCP and UDP are used by the FE900 to communicate over Ethernet
- A DHCP server is required on the network to establish unique Internet Protocol (IP) addresses
- The DHCP server **must** be pointing at a gateway on the same subnet as the FE900 Receiver(s). The gateway must **not** be 0.0.0.0.
- The network path between each FE900 Receiver and the FE900 software server component **must** support multicast addressing. (Note that most switches and routers support multicast addressing, but not all)



Note

Most networks meet the above requirements, and in most cases therefore, the FE900 Receiver should communicate over the network "straight out of the box". If difficulties with the network arise, please consult the Network Supplement in the *FE900 Software Guide*.

4.3. Mechanical Specifications

The FE900 is designed to be installed in a 19" rack mounting. Rubber feet are included in the kit should the FE900 Receiver need to be installed on a shelf or desktop, etc.

Dimensions:

Width:	19" (standard rack mount. 483mm)
Height:	4U (178mm)
Depth:	290mm
Installation Environment:	0°C - 50°C @ 15% - 85% relative humidity (non-condensing)

4.4. Power Supply Requirements

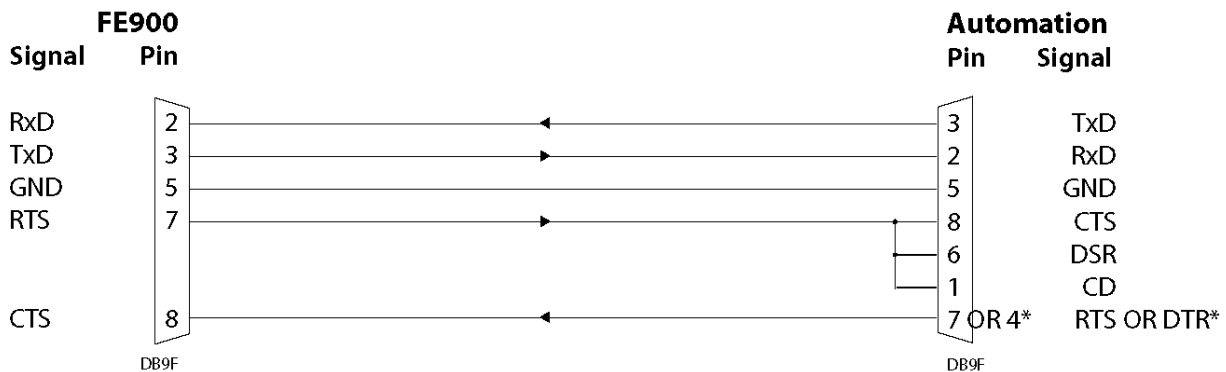
- To avoid start-up problems, *always* use a filtered power supply!
- Power supply must **not** dip below 8VDC
- Inner Range recommends a minimum of a 12VDC supply. Also strongly recommended is connection of a backup battery across the power supply, charged by a float charger capable of delivering an additional 2A per FE900 Receiver at 12VDC or 1A per FE900 Receiver at 24VDC

Power Supply Specifications

Power Supply Input:	8 - 35VDC, 25W 12VDC, battery backed supply is recommended as a minimum.
Ripple Limits:	0mV at 8VDC, 4Vp-p at 10VDC – 35VDC
CPU Card Operational Power:	<2W
Line Card Operational Power:	<2W
Fuse Protection:	2A (on backplane, labelled "F1") plus polyfuse protection on each card

4.5. Automation System Connection

The cable between the FE900 and the Automation system should be wired as shown. Both ends use DB9F plugs. Consult the documentation for the Automation System to determine whether CTS of the receiver should be connected to pin 7 OR pin 4 of the Automation System end:



5. Installation

These steps should be followed for correct installation of the FE900

1. Check kit
2. Mechanical installation
3. Electrical installation
4. Power-up check
5. Software Installation
6. Basic configuration

5.1. Check kit

The contents of the shipped FE900 package should consist of:

- An FE900 assembled as ordered.
 - A base model FE900 should come fitted with one CPU Card and one Line Card. If additional CPU or Line Cards were ordered at the time of purchase, these may be present in the chassis as well.
 - At the time of purchase, Krone and/or RJ PSTN connectors would have been chosen. These should have been fitted to the rear of the FE900 chassis at the factory.
- An accessories box. The box should contain:
 - 4 rubber feet. These can be fitted to the bottom of the FE900 chassis if required
 - Rack Mounting Components:
 - 2 x Brackets, each fitted with 2 x M6 x 12mm pan head screws and nylon washers
 - 4 x Nylon washers (in addition to the four on the brackets)
 - 4 x M6 x16 mm pan head screws
 - 4 x M6 Caged nuts
 - 2 x 4 way connectors to suit the 4 pin headers marked "Digital In" on the rear of the FE900 chassis
 - 2 x 4 way Phoenix removable screw-terminal connectors for the sockets marked "Digital Out" on the rear of the FE900 chassis
 - 1 x 2 way Phoenix removable screw-terminal connector for the power connection to the FE900
 - Spare fuse
 - Installation Guide. (This document)
 - FE900 Software Installation CD containing:
 - An installer for the FE900 Software
 - Electronic versions of Installation Guide and Software Guide
 - FE900 firmware
 - .NET Framework V2.0
 - SQL Express 2005

5.2. Mechanical Installation - General

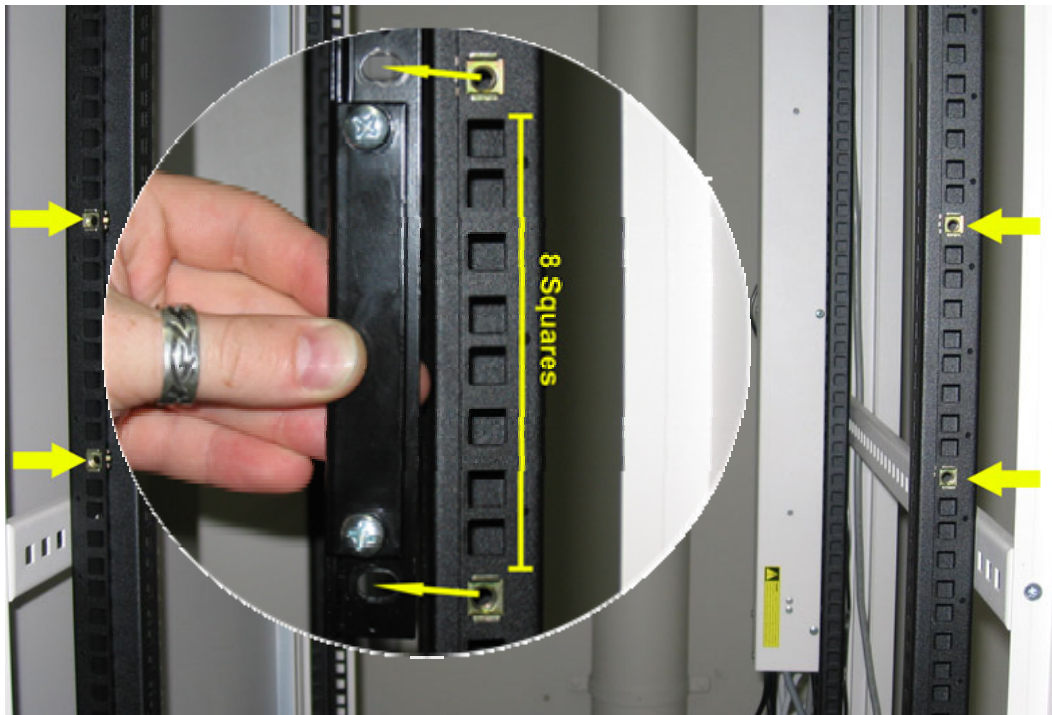
- 5.2.1. The FE900 has been designed to fit in a 19" rack, or mounted in a wall. If mounting the FE900 in a wall, the Rack Mounting Components listed in section 5.1 are not required.
- 5.2.2. Installation environment should be maintained at a temperature of 0°C to 50°C and 15% to 85% relative humidity (non-condensing).
- 5.2.3. The installation environment should be an ESD safe area.
- 5.2.4. The FE900 should be installed in a location where there is adequate access to fit PSTN, serial and Ethernet cables at the rear.
- 5.2.5. The FE900 should be oriented such that the front cover can swing downwards.
- 5.2.6. There should also be adequate space for the front cover to swing down when opened for maintenance.
- 5.2.7. Remove protective film from the Perspex on the front cover of the FE900 Receiver.

5.3. Mechanical Installation - Rack Mounting

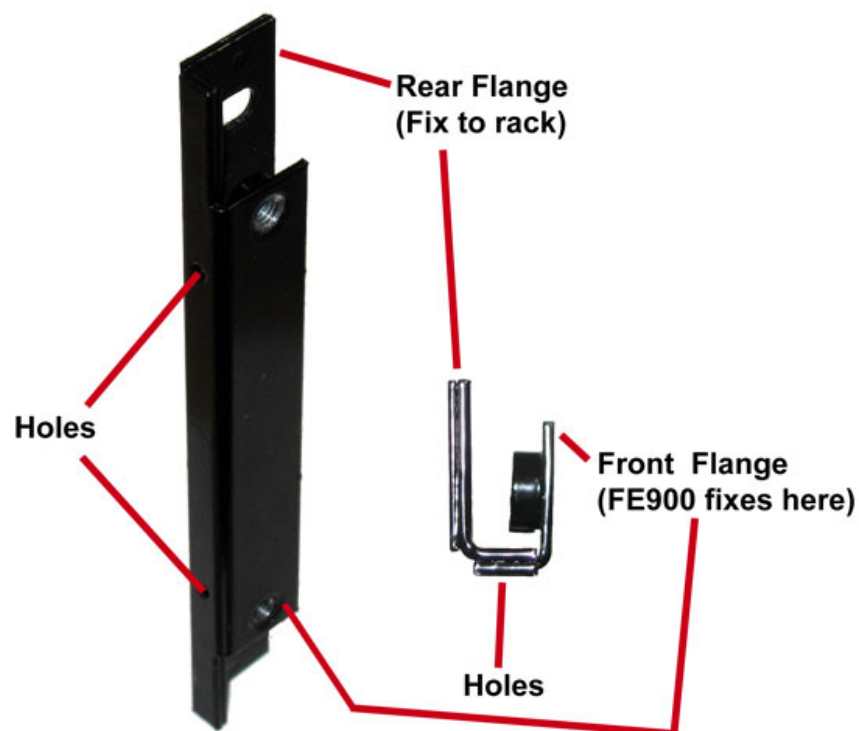
- 5.3.1. Observe Steps 5.2.1. – 5.2.5.
- 5.3.2. Pick the Rack Mounting Components from the Accessory Kit. As illustrated below, there should be:
 - 2 brackets. Each bracket comes fitted with two M6 x 12mm pan head screws and nylon washers
 - 4 nylon washers (in addition to the washers fitted to the brackets)
 - 4 x M6 x16mm pan-head screws
 - 4 x M6 caged nuts



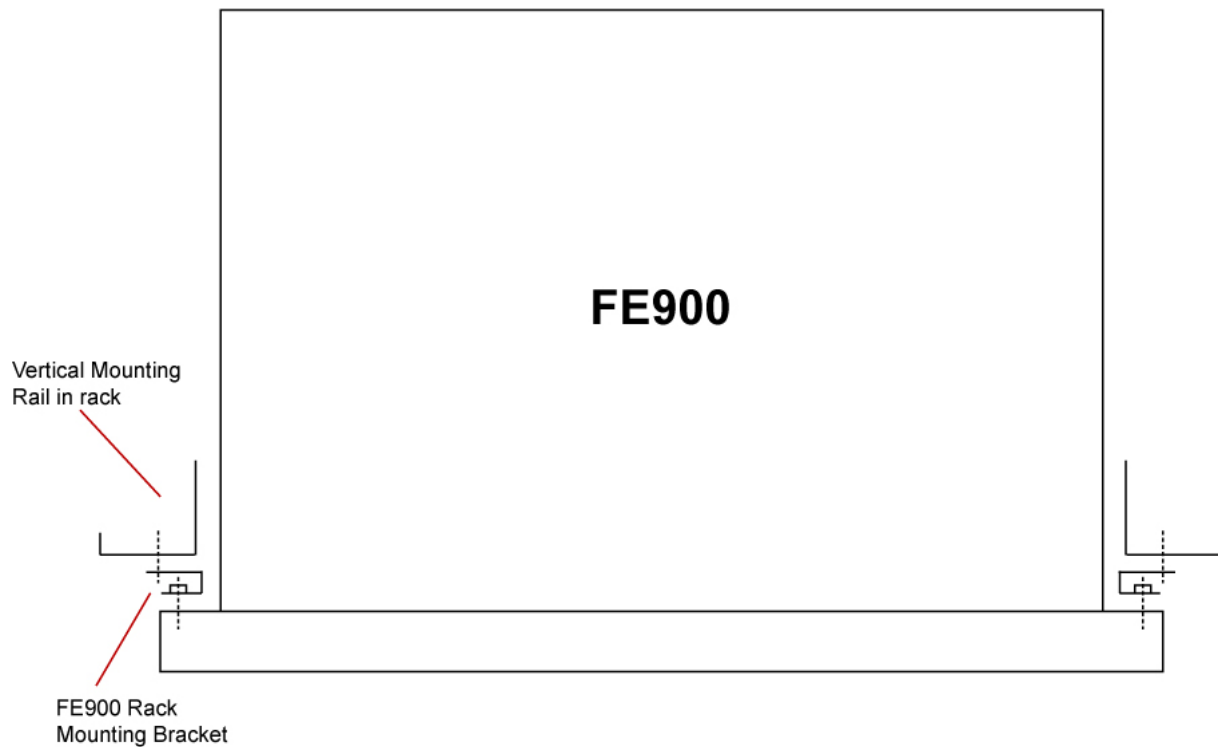
- 5.3.3. In the rack, fit 4 caged nuts in the desired location. Note that the caged nut locking flanges should be aligned vertically, as shown (which allows maximum adjustment of the receiver). There should be 8 squares separating the top and bottom caged nuts on each side.



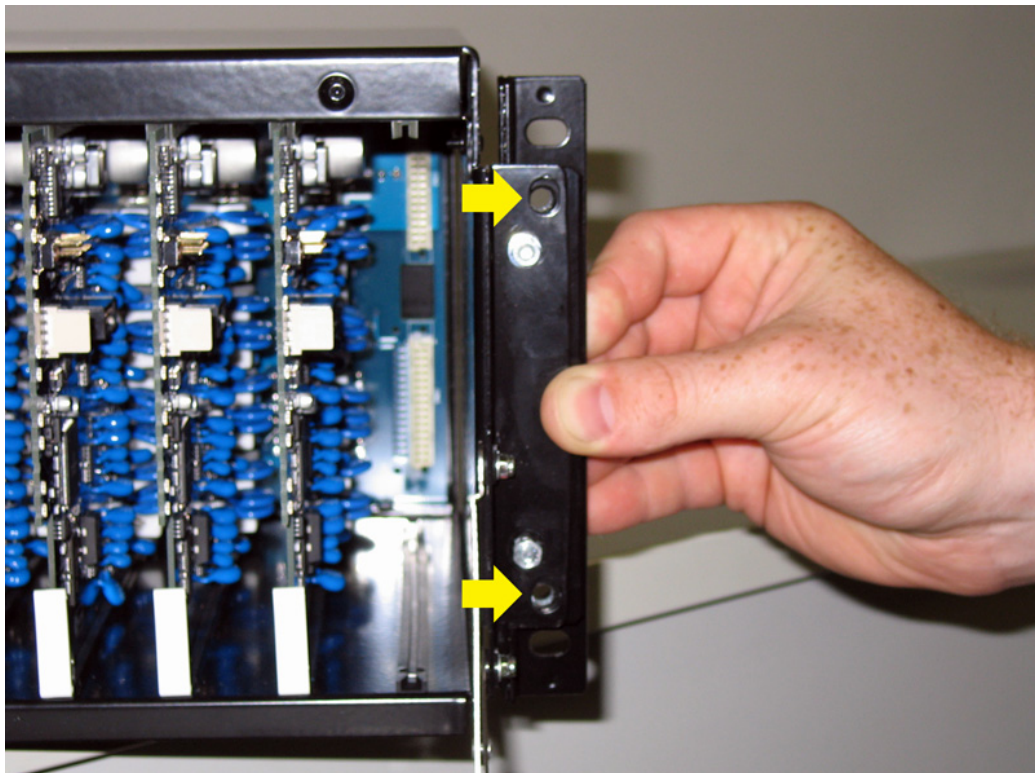
- 5.3.4. The diagram below shows oblique and top-down views of the brackets. Note that the Rear Flange extends the full height of the bracket. Also note that, when viewed from the top, the bracket describes a “U” shape – The base of the “U” has two small holes, pointed out at the left of the diagram.



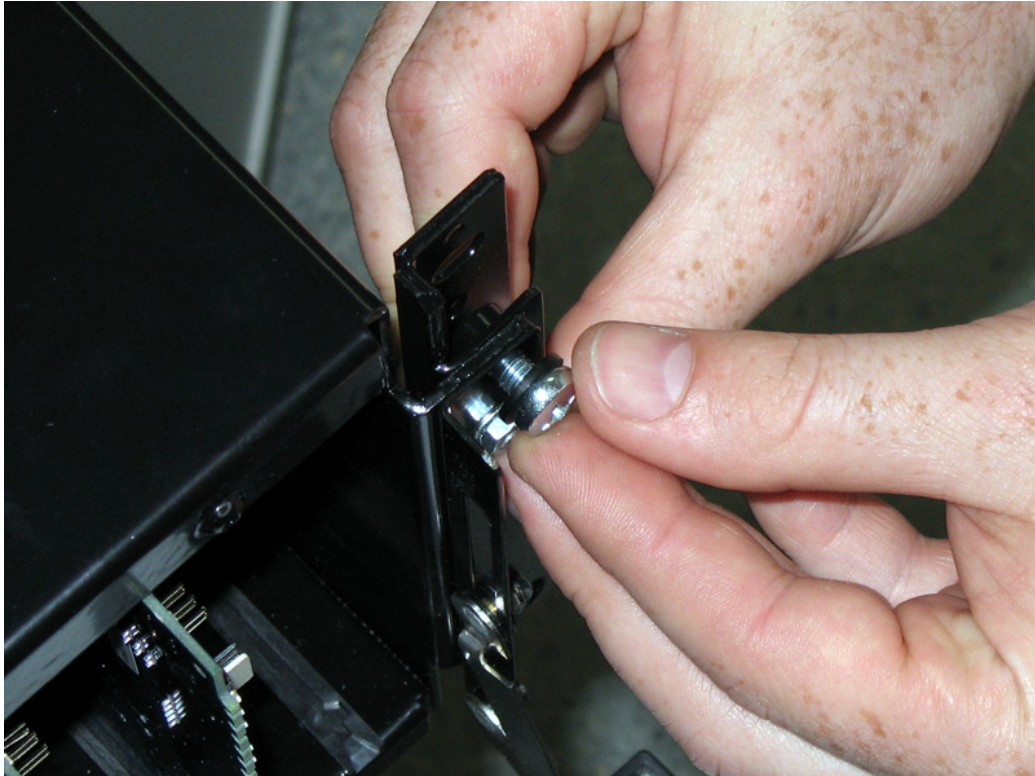
- 5.3.5. The diagram below shows, in plan view, the relationship between the FE900, the Rack Mounting Brackets and the vertical mounting rails in the cabinet. Observe the orientation of the Rack Mounting Brackets.



- 5.3.6. Take one of the Rack Mounting Brackets and remove the M6 x 12mm screws and washers from it. Open the door of the FE900 to access the mounting flanges. Orient the bracket so that the base of the "U", (as described in step 5.3.4.) is toward the centre of the receiver. Align the holes on the Front Flange of the bracket with the holes on the receiver's flange as shown.



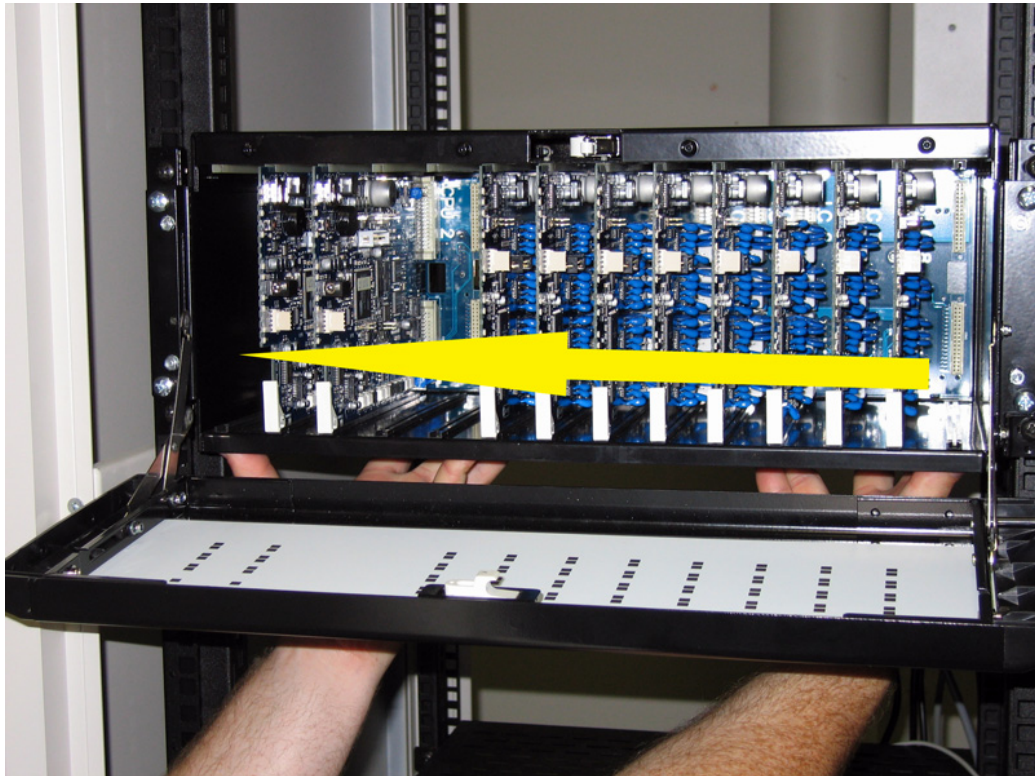
- 5.3.7. Fit the washers back on the M6 x 12 screws and secure the Rack Mounting Bracket on to the receiver by fitting and fastening the M6 x 12mm screws.



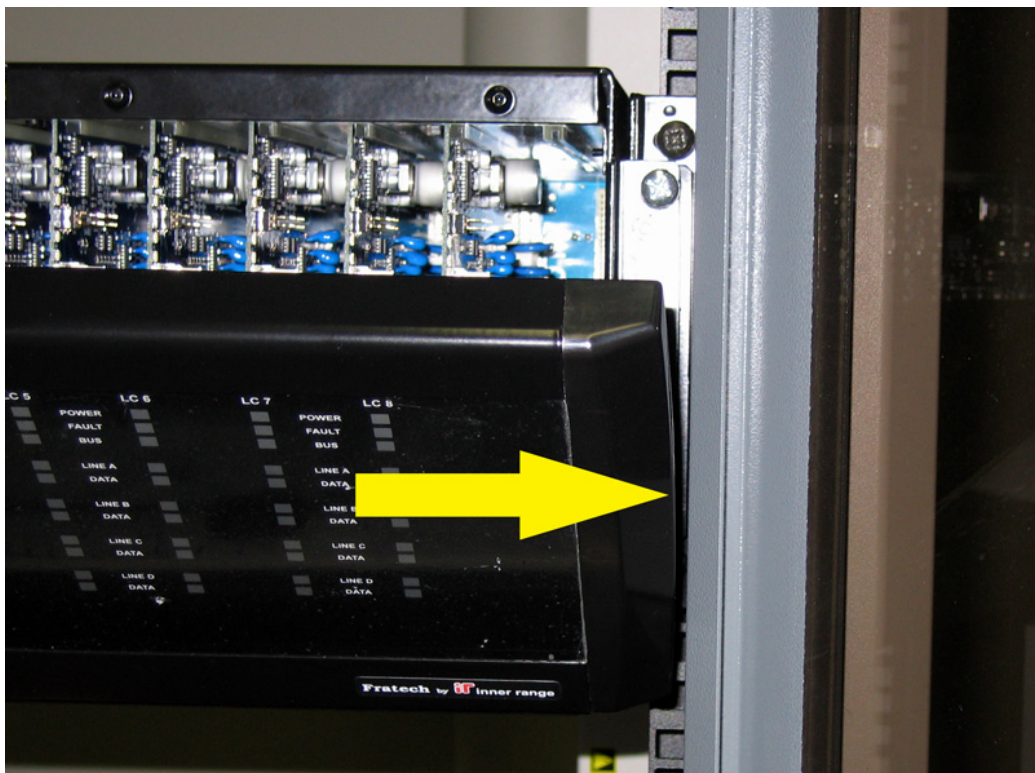
- 5.3.8. Repeat steps 5.3.6. and 5.3.7 for the remaining bracket.
- 5.3.9. Fit nylon washers to the M6 x 16mm screws. Line up the holes in the rear flanges of the Rack Mounting Brackets with the caged nuts in the rack. Using the M6 x 16mm screws, fasten the FE900 to the rack. Tighten the screws to finger tightness to allow for horizontal adjustment of the receiver.



- 5.3.10. As shown below, push the FE900 as far away from the side of the cabinet where the door hinges as possible. (In this example the door hinges are on the right hand side, so the receiver is being pushed as far to the left as possible). Once the FE900 has been positioned, fully tighten the four 16mm screws.



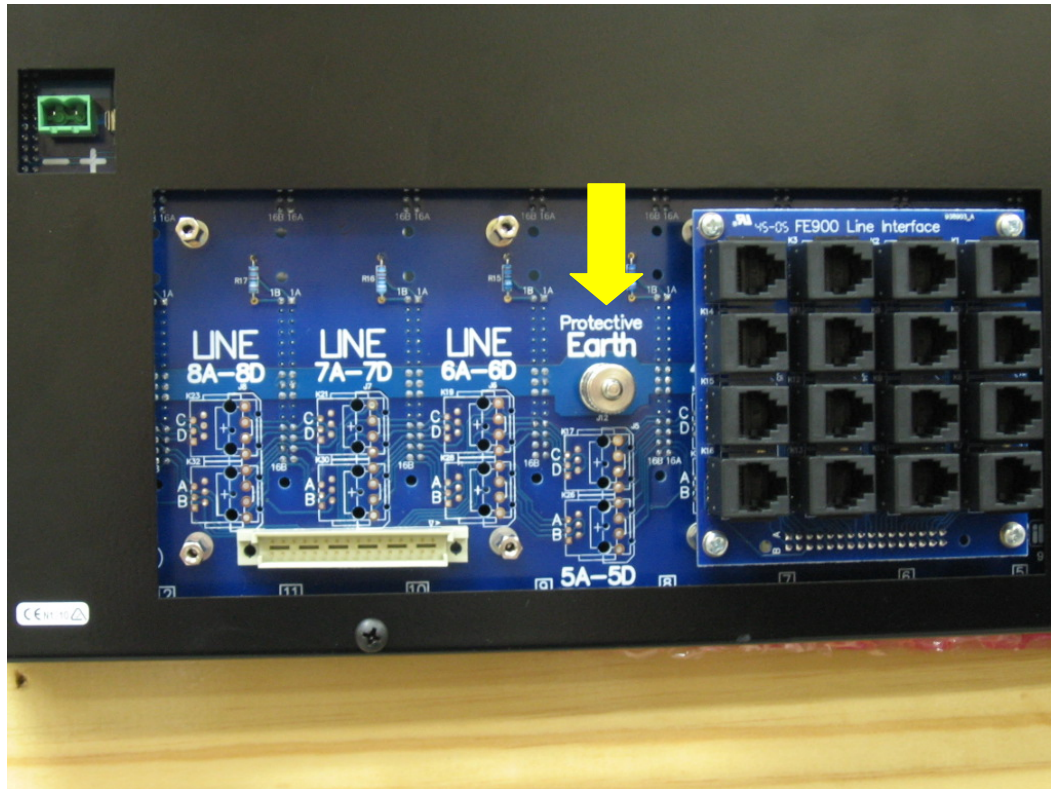
- 5.3.11. Check that the door of the FE900 will not foul on the hinge side of the cabinet door as shown below. If the preceding instructions have been carried out correctly, the door of the FE900 should be able to move its full travel without touching the cabinet door.



5.4. Electrical Installation

5.4.1. Connect local telecom earth to protective earth stud.

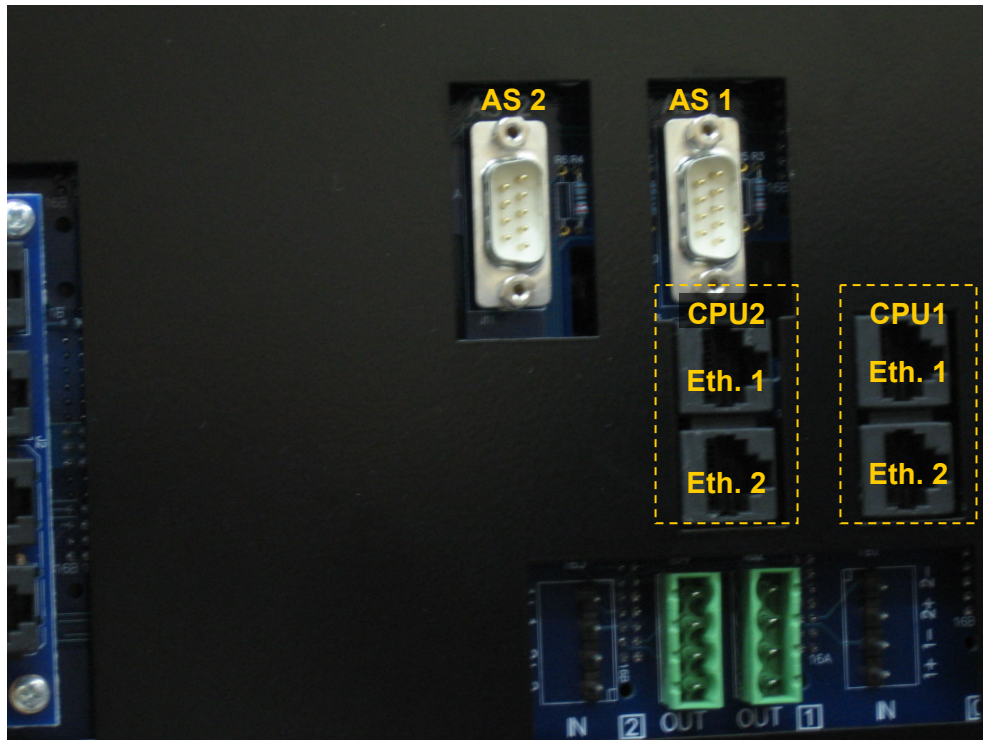
- 5.4.1.1. Measure and cut an appropriate length of insulated cable to connect the FE900's earth stud to the **telecom approved local earth**. (4mm² cable is recommended as a minimum).
- 5.4.1.2. The FE900 has an M5 earth stud. Fit off one end of the cable to a spade lug that will fit correctly onto the FE900 earth stud.



- 5.4.1.3. Fit off the other end appropriately to the **telecom approved local earth**.

5.4.2. Connect RS232 cables.

- 5.4.2.1. There are two DB9M RS232 connectors on the back of the FE900 labelled, "AS1" and "AS2".



- 5.4.2.2. Using the connection cable as described in section 4.5., connect the AS 1 connector on the FE900 to the Automation System PC (if a serial connection is being used).
- 5.4.2.3. If there is a requirement to connect to a second Automation System, or to a serial printer, use the AS 2 connector

5.4.3. Connect Ethernet cables.

- 5.4.3.1. There are four Ethernet sockets on the back of the FE900. The right-most sockets are connected to the CPU 1 slot via the backplane. Obviously then, the left most connectors are connected to the CPU 2 slot.
- 5.4.3.2. The top Ethernet sockets are labelled, "Eth. 1"
- 5.4.3.3. If only one CPU Card is installed this is generally installed in CPU slot 1, although either slot can be used. At least one Ethernet connection must be provided for the occupied slot.
- 5.4.3.4. If dual redundant CPU Cards or an Emergency CPU Card and a standard CPU Card are installed, *both CPU slots must have at least one Ethernet connection to the network.*
- 5.4.3.5. If only one Ethernet connection is provided for a CPU slot, it would generally be connected to Eth. 1. However, either socket for that slot can be used.

5.4.4. Fit off power connector and connect power supply.

- 5.4.4.1. A two-way Phoenix removable screw-terminal is provided for the power supply connection. Measure and cut an appropriate length of insulated cable to connect the power supply to the FE900's power connector. (Figure-8 cable or similar is typical).
- 5.4.4.2. Ensure that the power supply meets the requirements in section 3.4.
- 5.4.4.3. Looking at the back of the FE900, the negative rail is on the left hand side. Be sure to wire the connector with the correct polarity. (The FE900 is fitted with reverse-polarity protection, but the unit will not operate if the input voltage is reversed).
- 5.4.4.4. Do NOT connect the power supply connector to the FE900 or turn the power supply on at this time.

5.6. Software Installation

When the Power-Up Check has been successfully completed, the FE900 Software needs to be installed so that the receiver can be configured.

- 5.6.1. Ensure that all PCs intended for use with the FE900 software meet the requirements outlined in section 4.1.
- 5.6.2. The PC that is designated as the 'server' should be identified first. Whilst there can be many FE900 Receivers in a system and many PCs to interact with the receivers, there is typically only one FE900 'server' PC in a system.



Tip

There is usually only one FE900 'server' PC needed in a system.

- 5.6.3. The FE900 software on the CD has an installer for the FE900 both the server and client components of the FE900 and an installer for the FE900 client component. The FE900 software CD should be inserted into the 'FE900 Server PC'.
- 5.6.4. To install the software, run the Setup.exe file on the CD.
- 5.6.5. The installer will prompt for an installation directory. The default installation location is, "C:\Program Files\Inner Range\FE900\". If the default location is suitable, select "OK". If required, browse to a different location and then select, "OK"
- 5.6.6. Prior to writing any files, the installer will check for the presence of:
 - .NET Framework v2.0
 - MSDE engine, SQL Express 2005 or SQL Server
- 5.6.7. If either of the above are not found, the installer will indicate what is missing and offer to run the installer for the missing component(s). If this is the case, install the missing co-requisite software, then run the FE900 installer again.
- 5.6.8. As soon as a successful installation is completed, the installer will start the FE900 software server component. Any FE900 Receivers on the network will connect to the FE900 software server. (Verification of this step can be done by checking that the windows service, "Inner Range FE900 Service" is running).
- 5.6.9. The installer should have also installed the client component of the FE900 software on the machine. This is the user interface from which one interacts with FE900 Receivers. Run the client by selecting, "Inner Range > FE900 > FE900 Client" from the "Start" menu.
- 5.6.10. In the main view of the FE900 client software, any FE900 Receivers on the local network will be shown as icons.

The client component of the FE900 may be installed on other PCs. Refer to *Installing the FE900 Software* in the *FE900 Software Guide* for instructions on installing the FE900 client software.

5.7. Basic FE900 Configuration

Consult *Quick-start FE900 Configuration* in the *FE900 Software Guide*.

6. Appendices

Contents:

1. Front Panel LEDs
2. Line Connector Layouts
3. Inserting & Removing Cards

6.1. Front Panel LEDs

6.1.1. CPU Card LEDs

LED	Description
Power	Green when the main CPU is powered
FAULT	Lit when there is a problem with the card, or the card is not ready yet (e.g. at power-on). The PC, if connected, will show the reason for the fault.
BUS	Lights when the card is receiving on the backplane bus.
MASTER	Lit when this CPU is bus master (for when a 2 nd CPU is installed).
AS OK	Lit when the connection to all enabled Automation Systems are working correctly.
SVR OK	Lit when the connection to the FE900 server software is working.
ALARMS	Lit when the CPU contains buffered alarms which have not yet been transmitted and acknowledged by an enabled Automation System.
BUF FULL	This LED only relates to event destinations (FE900 Server, AS1 & AS2) that are configured to NOT allow events to be discarded. Lit continuously when the event buffer has reached the 'nearly full' condition. Also a system alarm is sent. Flashing when the event buffer is full. The system can still record limited events in this state, so the associated system alarm can be stored and current calls will succeed, but answering of further calls is disabled.
ETH 1	Lit when the Ethernet connection is established. Flashes bright when there is activity on the Ethernet link.
ETH 2	Lit when the Ethernet connection is established. Flashes bright when there is activity on the Ethernet link.

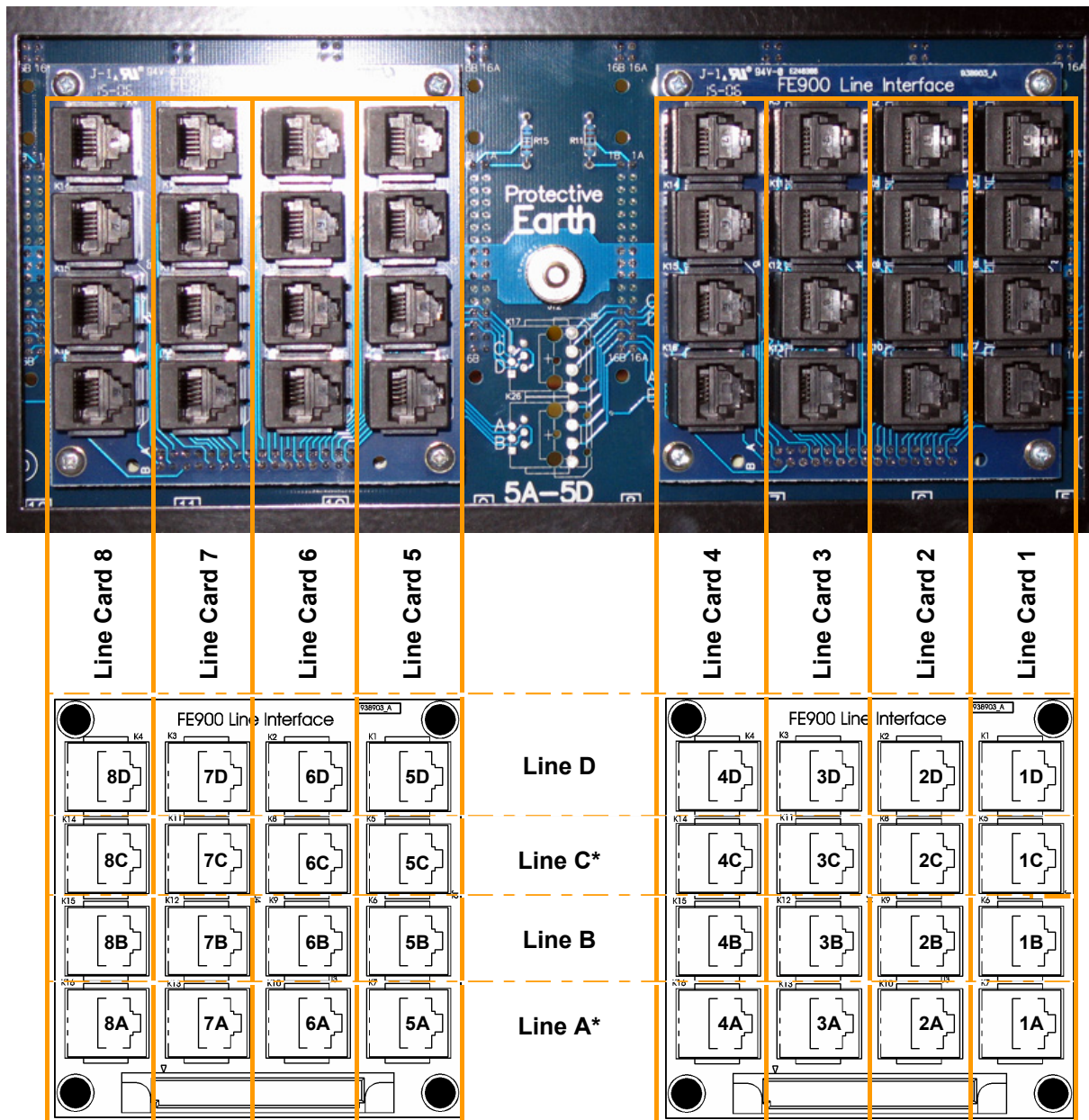
6.1.2. Line Card LEDs

LED	Description
Power	Green when the DSP is powered.
FAULT	Lit when there is a problem with the card, or the card is not ready yet (e.g. at power-on).
BUS	Lights when the card is transmitting on the backplane bus.
LINE A-D	When all lines on the Line Card are idle, the Line and Data LEDs participate in the 'Idle Lines Pattern Display'. As soon as there is any line activity the card's LEDs revert to their normal mode. The Line LED flashes to indicate ringing. (Note that if BOTH the LINE LED and the DATA LED flash simultaneously, there is a line fault or the PSTN connection for that line is unconnected or has the wrong line voltage). Continuously lit means the line is off-hook and a call is in progress.
DATA	Blinks as data is received from a panel. (Note that if BOTH the LINE LED and the DATA LED flash simultaneously there is a line fault.)

6.2. Line Connector Layouts

6.2.1. RJ Connector Layout

The picture below shows the rear of an FE900 Chassis that has up to 8 Line Cards installed. The diagram beneath the picture shows the mapping of each RJ connector to a Line on a Line Card:



***These sockets support dual-pair wiring. See notes overleaf**

So, when looking at the rear of the FE900:

- Line Card slots 1-4 are serviced by the Line Connector PCB to the **right** of the Protective Earth stud.
- Line Cards slots 4-8 are serviced by the Line Connector PCB to the **left** of the Protective Earth stud (if fitted).

**Note**

The 'Line A' and 'Line C' RJ11 sockets on the receiver are wired in a way that allows either four cables or just two to be used. The A socket has line A connected to the centre two pins (3 & 4), and line B connected to the next pins (2 & 5). The B socket uses just the centre pins. The C socket has line C connected to the centre two pins (3 & 4) and line D connected to the next pins (2 & 5). The D socket has just the centre pins connected.

**Important!**

If single-line connections are used, please ensure that the unused 2nd pair are not connected to anything. Ideally a single-pair cable should be used.

If twin-pair connections are used, the cable must be a twin-pair cable. Only sockets A and C should be used in this case.

6.3. Inserting & Removing Cards

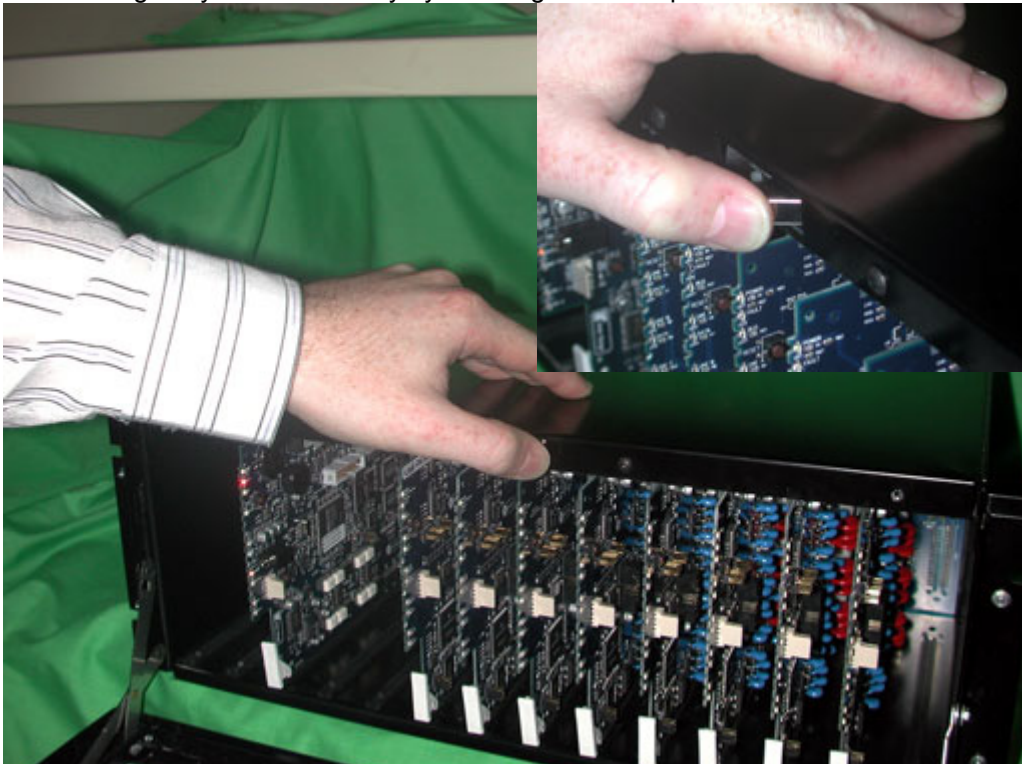
6.3.1. Inserting Cards

Whilst the cards in the FE900 are quite robust, one should always observe ESD precautions whilst handling the cards to prevent damage.

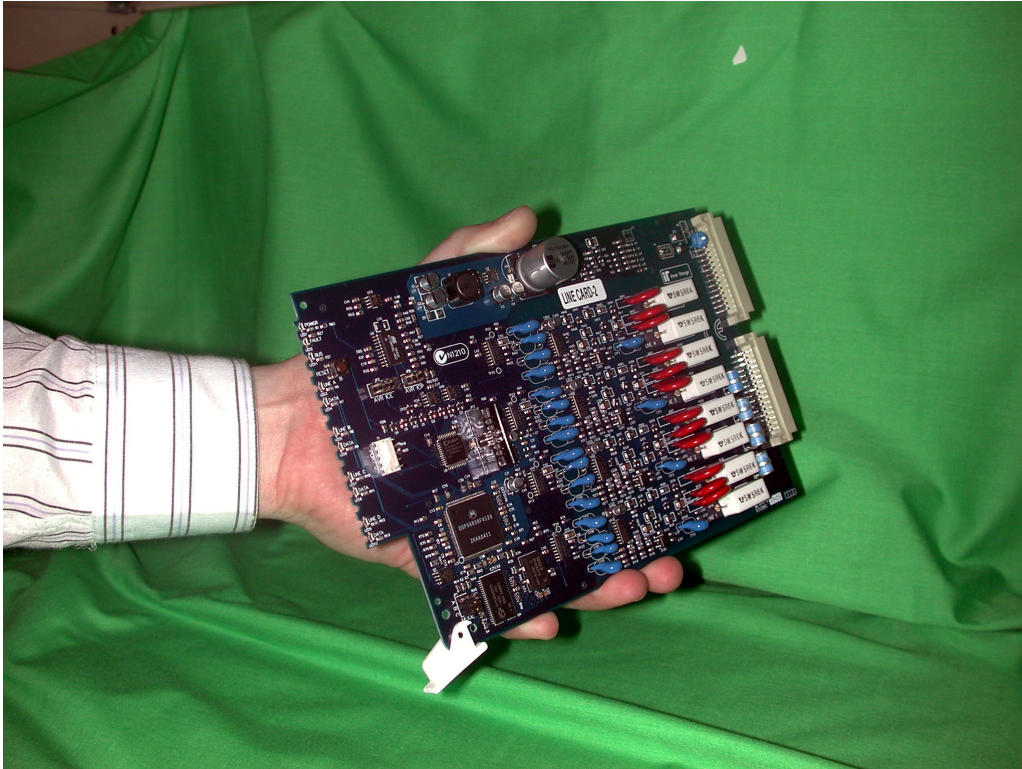
- 6.3.1.1. Open the FE900 front cover by pressing the hand symbol on the top-middle of the front cover. The cover will open forward and down.



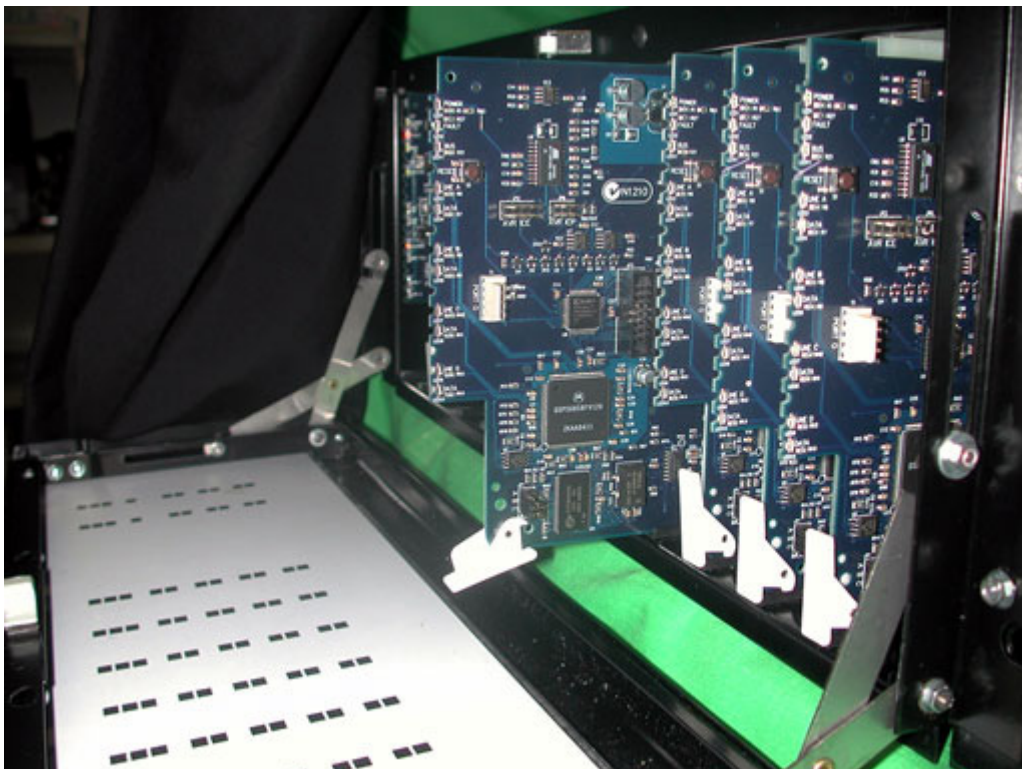
- 6.3.1.2. Discharge any static electricity by touching the metal part of the latch as shown below.



- 6.3.1.3. Carefully take the card out of its ESD-safe bag by holding the card by the edges, taking care not to touch any components.

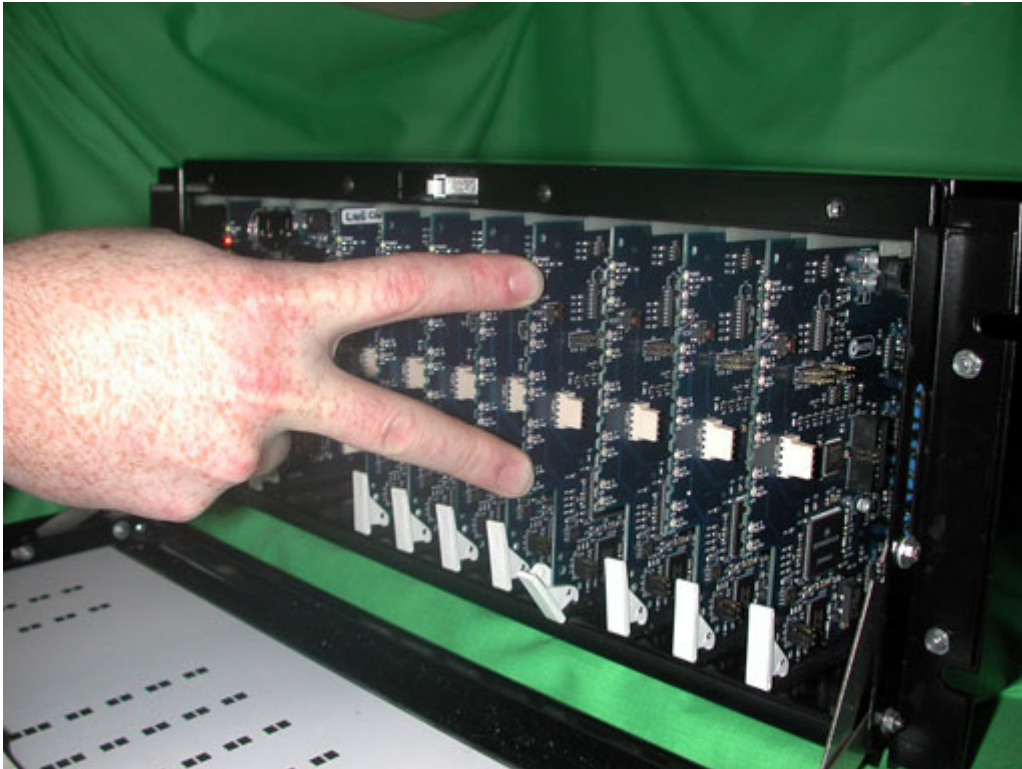


- 6.3.1.4. Align the card so that the white captive lever on the card is at the bottom and that the LEDs are pointing away from the FE900. *Note that the white captive lever **MUST** be in the open position (as shown).*
- 6.3.1.5. Carefully line up the card with the guides in the chassis, and insert the card.

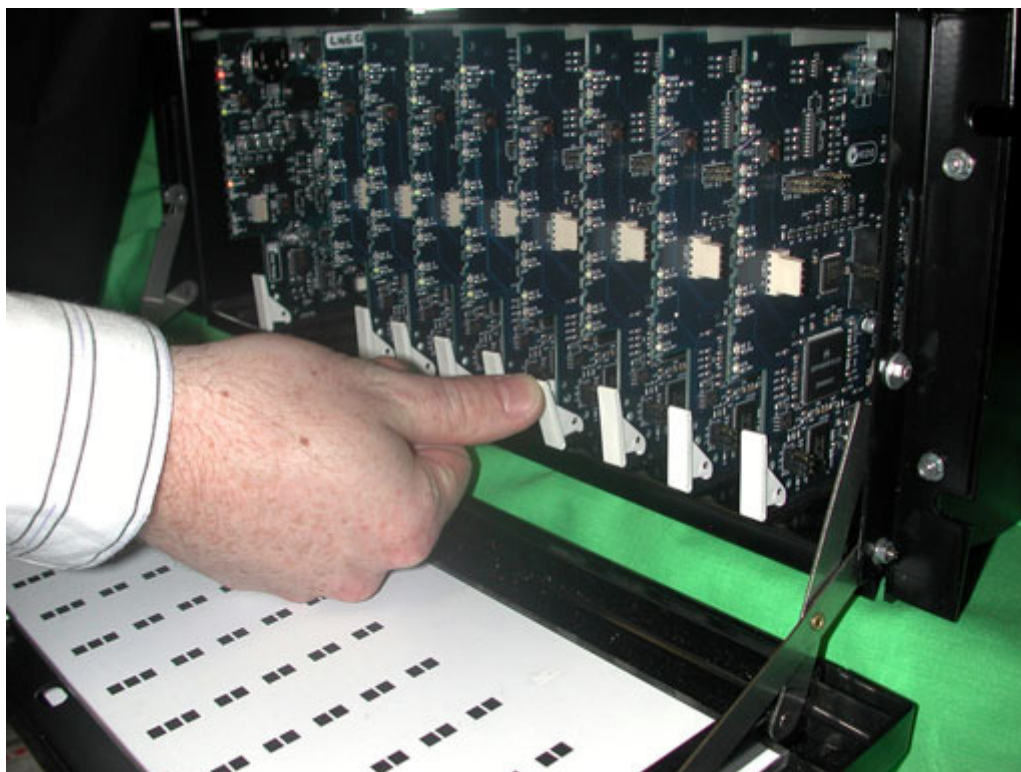


- 6.3.1.6. To complete the insertion, push the card onto its connector on the FE900 backplane by applying firm, even pressure with two fingers as shown below, or with the palm of the hand.

NOTE: Do not force a card if it will not seat properly in the slot. Check that you have put the card in a compatible slot and that the white captive lever is in the open position. Cards will not plug into the incorrect slot because the backplane connectors have different spacings. Attempting to force a card into the wrong slot could damage the card or the backplane.



6.3.1.7. Lift the white lever to lock the card in place.



6.3.1.8. Close the front cover when finished.

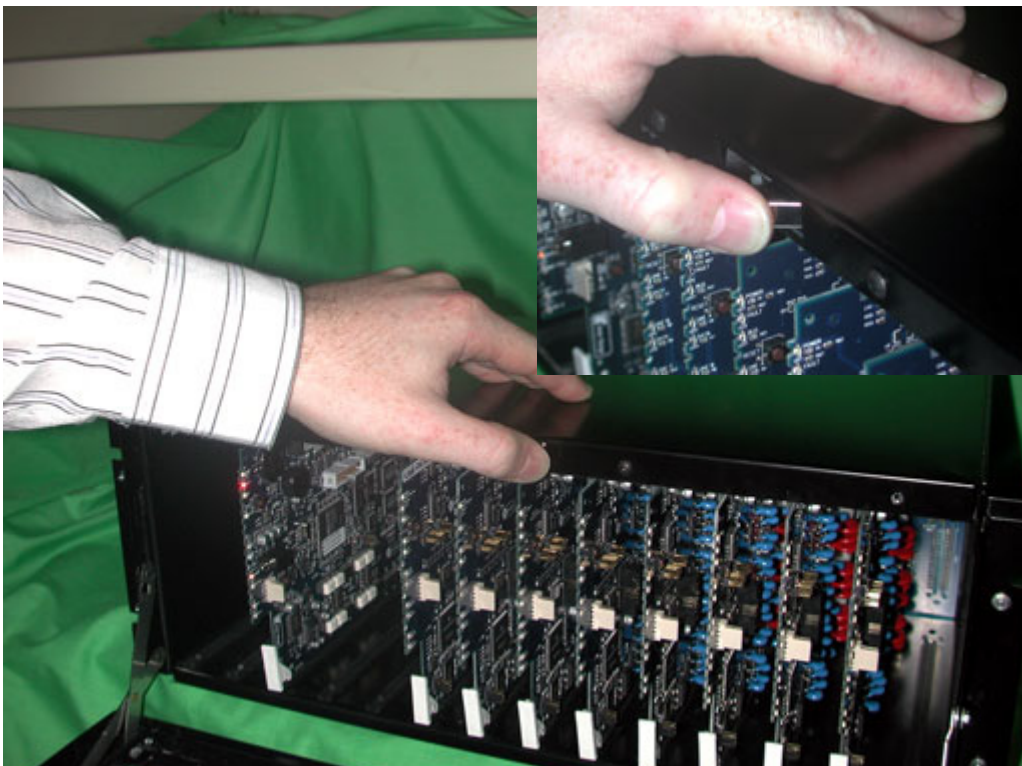
6.3.2. Removing Cards

Whilst the cards in the FE900 are quite robust, one should always observe ESD precautions whilst handling the cards to prevent damage.

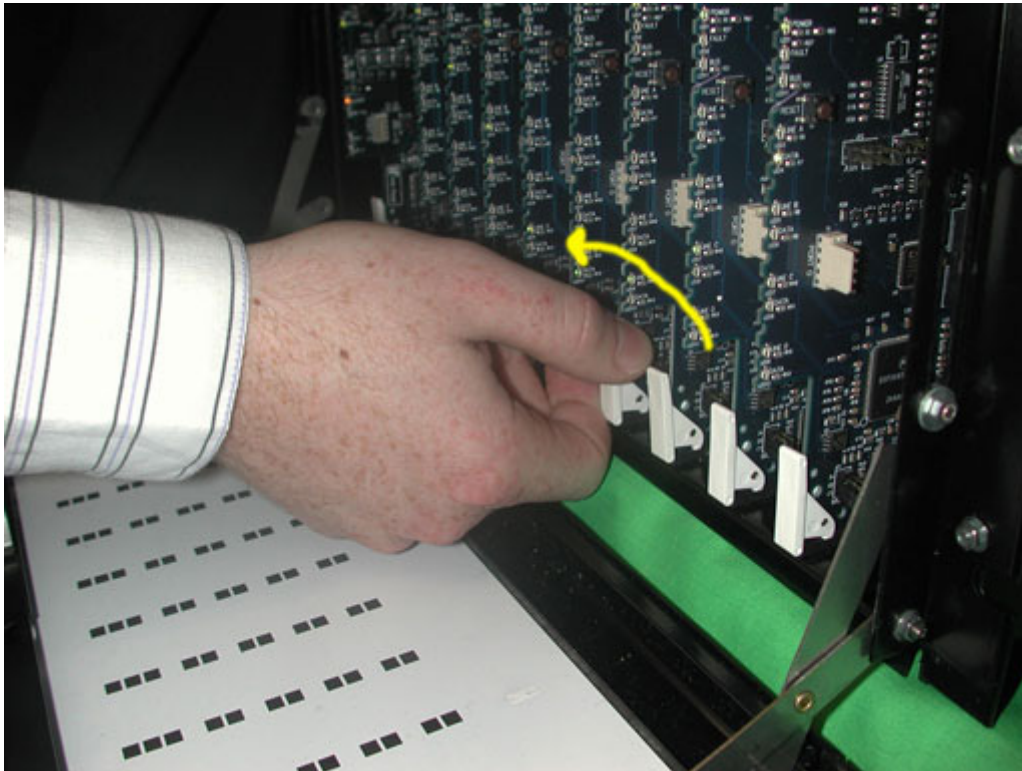
- 6.3.2.1. Open the FE900 front cover by pressing the hand symbol on the top-middle of the front cover. The cover will open forward and down.



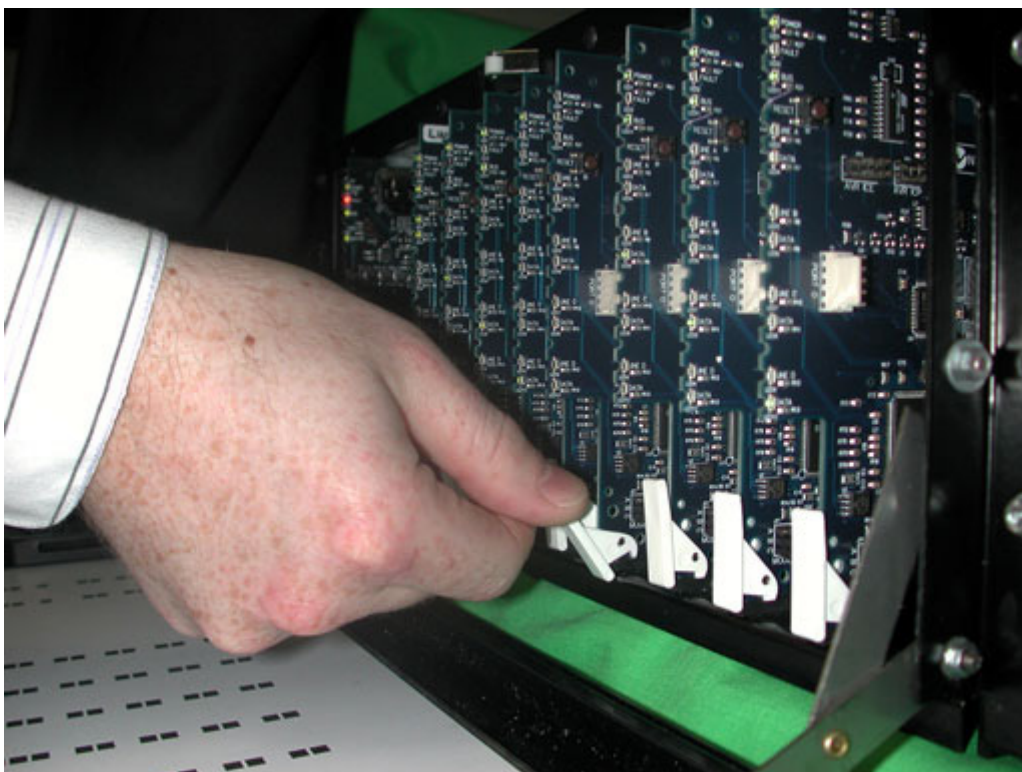
- 6.3.2.2. Discharge any static electricity by touching the metal part of the latch as shown below.



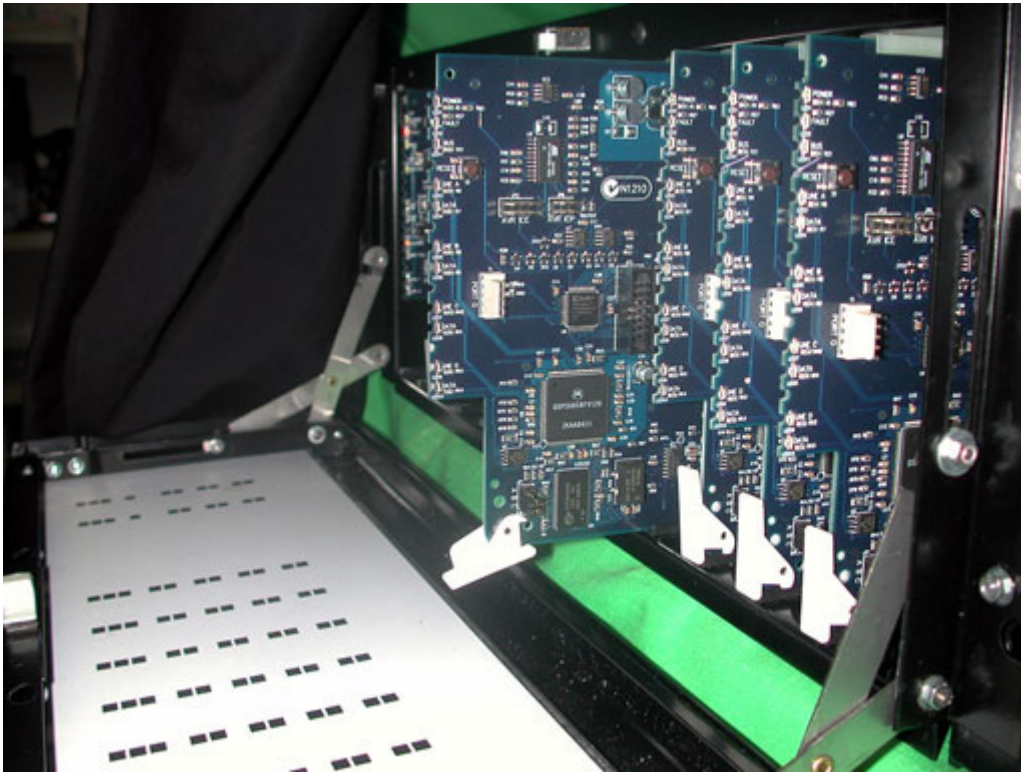
- 6.3.2.3. Release the selected card by twisting the white latch a little to the left, then pull the lever back.



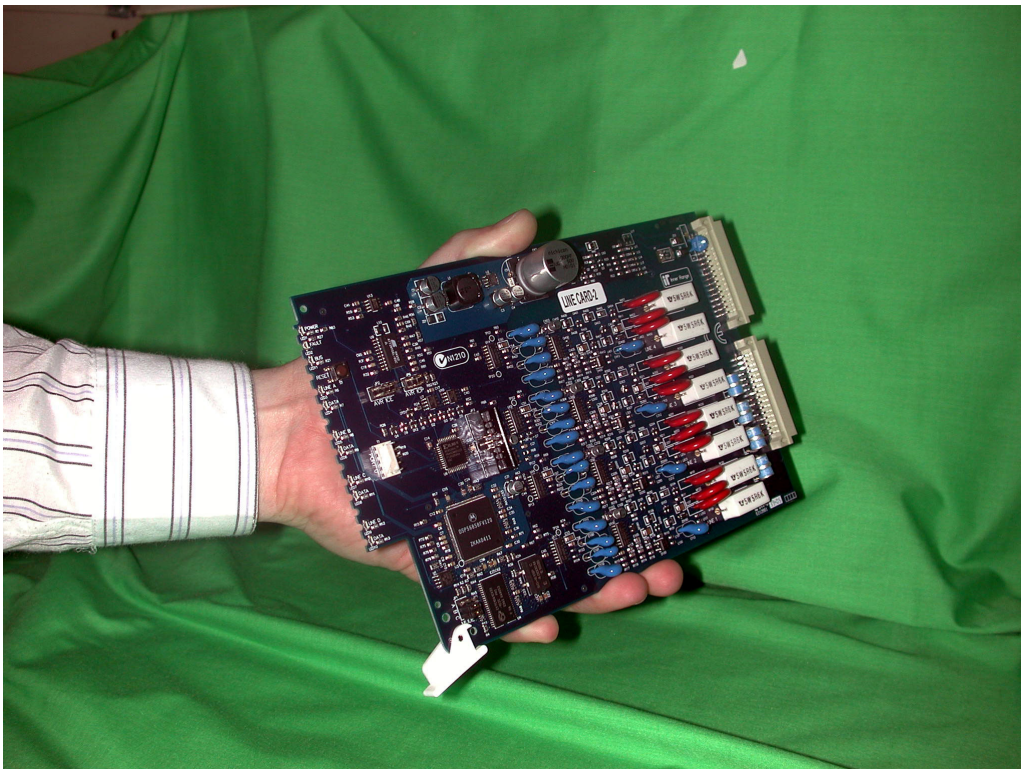
- 6.3.2.4. Push the latch all the way down to lever the card out of its socket.



- 6.3.2.5. Pull the card nearly all the way out by the white lever.



- 6.3.2.6. Ensure there is an ESD safe bag on hand to place the card into.
6.3.2.7. Carefully handle the card by the edges, taking care not to touch any of the components and slide the card fully out of the FE900.



- 6.3.2.8. Place the card into the ESD safe bag.