

PVMax

Hardware User Manual

Release Date: November 2006

Copyright © 2006 RiT Technologies. All rights reserved. No part of this book shall be reproduced, stored in a retrieval system, or transmitted by any means, electronic, mechanical, photocopying, recording or otherwise, without written permission from RiT Technologies. No patent liability is assumed with respect to the use of the information contained herein.

Although every precaution has been taken in the preparation of this book, RiT Technologies assume no responsibility for errors or omissions. Neither is any liability assumed for damages resulting from the use of the information contained herein.

Important Information

General Safety Notices

Review the following safety precautions to avoid injury and prevent damage to this product or any products connected to it.

Only qualified personnel should perform service procedures

Injury Precautions

Use Proper Power Cord. To avoid fire hazard, use only the power cord specified for this product.

Avoid Electric Overload. To avoid injury or fire hazard, do not apply potential to any input, including the common inputs, that varies from ground by more than the maximum rating for that input.

Avoid Electric Shock. To avoid injury or loss of life, do not connect or disconnect probes or test leads while they are connected to a voltage source.

Do Not Operate Without Covers. To avoid electric shock or fire hazard, do not operate this product with covers or panels removed.

Do Not Operate in Wet/Damp Conditions. To avoid electric shock, do not operate this product in wet or damp conditions.

Do Not Operate in an Explosive Atmosphere. To avoid injury or fire hazard, do not operate this product in an explosive atmosphere.

Product Damage Precautions

Use proper Power Source. Do not operate this product from a power source that applies more than the voltage specified.

Do Not Operate With Suspected Failures. If you suspect there is damage to this product, have it inspected by qualified service personnel.

Safety Terms and Symbols

Terms in This Manual. These terms may appear in this manual:



WARNING. Warning statements identify conditions or practices that could result in injury or loss of life.



CAUTION. Caution statements identify conditions or practices that could result in damage to this product or other property.

Symbols on the Product



Protective Ground (Earth) Terminal



ATTENTION – Refer to Manual

France

Récapitulatif des mesures de sécurité générales

Réviser les mesures de sécurité suivantes pour éviter toute blessure ou endommagement du produit ou des éléments qui lui sont connectés.

Seul du personnel qualifié devrait exécuter les procédures d'entretien

Précautions à prendre pour éviter toute blessure

Utiliser le cordon électrique correct. Pour éviter tout danger d'incendie, n'utilisez que le cordon d'alimentation propre à ce produit.

Eviter les surcharges électriques. Pour éviter tout risque de blessure ou d'incendie, n'appliquez pas de potentiel aux entrées, incluant les entrées communes, dont la puissance à partir de la masse varierait d'une manière supérieure au régime nominal maximum pour cette entrée.

Eviter les chocs électriques. Pour éviter toute blessure ou décès, ne connectez pas ou ne déconnectez pas les sondes ou conducteurs test alors qu'ils sont connectés à une source électrique.

Ne pas faire fonctionner l'appareil sans son couvercle. Pour éviter tout choc électrique ou risque d'incendie, ne faites pas fonctionner ce produit sans son couvercle ou ses panneaux.

Ne pas faire fonctionner l'appareil dans des conditions humides. Pour éviter tout choc électrique, ne faites pas fonctionner ce produit dans des conditions humides.

Ne pas faire fonctionner l'appareil dans des conditions où il existe un risque d'explosion. Pour éviter tout choc électrique ou risque d'incendie, ne faites pas fonctionner ce produit dans des conditions où il y a un risque d'explosion.

Précautions à prendre pour ne pas endommager le produit

Utiliser la source d'alimentation correcte. Ne faites pas fonctionner ce produit à partir d'une source électrique qui applique plus de tension que celle spécifiée.

Ne pas faire fonctionner l'appareil si un dommage est suspecté. Si vous pensez que le produit est endommagé, faites-le inspecter par du personnel d'entretien qualifié.

Termes et symboles de sécurité

Termes utilisés dans ce manuel. Les termes suivants apparaissent dans ce manuel :

	AVERTISSEMENT Les énoncés de mise en garde identifient des conditions ou pratiques qui pourraient provoquer des blessures ou un décès.
	ATTENTION Les énoncés de mise en garde identifient des conditions ou pratiques qui pourraient endommager le produit ou autres.

Symboles sur le produit



Borne de terre protectrice



ATTENTION – Se référer au manuel

Germany:

"Maschinenlärminformations-Verordnung - 3. GPSGV, der höchste Schalldruckpegel beträgt 70 dB(A) oder weniger gemäss EN ISO 7779"

Beachten Sie die folgenden Sicherheitsmaßnahmen, um Verletzungen zu vermeiden und Beschädigungen an diesem Produkt oder daran angeschlossenen Produkten vorzubeugen.

Wartungen dürfen nur durch qualifiziertes Personal durchgeführt werden.

Vorsichtsmaßnahmen zur Vermeidung von Verletzungen

Verwenden Sie das korrekte Netzkabel. Verwenden Sie zur Vermeidung von Brandgefahr nur das Netzkabel, das für dieses Produkt vorgesehen ist.

Vermeiden Sie elektrische Überlastung. Um Verletzungen oder Brandgefahr zu vermeiden, legen Sie an keinem Eingang, einschließlich den allgemeinen Eingängen, eine Spannung an, die über dem maximalen Grenzwert für diesen Eingang liegt.

Vermeiden Sie Stromschlag. Um Verletzungen oder Tod zu vermeiden, klemmen Sie keine Messsonden oder Testleiter an oder ab, während diese mit einer Spannungsquelle verbunden sind.

Betreiben Sie das Gerät nicht ohne Abdeckungen. Um Stromschlag oder Brandgefahr zu vermeiden, betreiben Sie dieses Produkt nicht ohne Abdeckungen oder wenn die Verkleidungen abgenommen wurden.

Betreiben Sie das Gerät nicht unter nassen oder feuchten

Umgebungsbedingungen. Um Stromschlag zu vermeiden, betreiben Sie dieses Gerät nicht unter nassen oder feuchten Umgebungsbedingungen.

Betreiben Sie das Gerät nicht in Umgebungen mit explosiven Stoffen.

Um Verletzungen oder Brandgefahr zu vermeiden, betreiben Sie dieses Produkt nicht in explosiven Umgebungen.

Vorsichtsmaßnahmen zur Vermeidung von Produktbeschädigungen

Verwenden Sie die richtige Stromquelle. Betreiben Sie dieses Produkt nicht mit einer Stromquelle, die mehr als die angegebene Spannung anlegt.

Betreiben Sie das Gerät nicht, wenn Verdacht auf einen Geräteschaden besteht. Falls Sie vermuten, dass das Gerät beschädigt ist, lassen Sie es von qualifiziertem Kundendienstpersonal untersuchen.

Sicherheitsbegriffe und Symbole

Begriffe, die in diesem Handbuch verwendet werden. Die folgenden Begriffe können im Handbuch erscheinen:

 x	WARNHINWEIS. Warnhinweise kennzeichnen Bedingungen oder Praktiken, die zu Verletzungen oder Tod führen könnten.
	VORSICHT. Vorsichtshinweise kennzeichnen Bedingungen oder Praktiken, die zu einer Beschädigung dieses Produkts oder anderem Sachschaden führen könnten.

Symbole auf diesem Produkt



Erdungsklemme



ACHTUNG – Bitte im Handbuch nachlesen

North America

For power connection, select a power supply cord that is UL Listed and CSA Certified 3 - conductor, [18 AWG], terminated in a molded on plug cap rated 125 V, [2 A], with a minimum length of 1.5m [six feet] but no longer than 4.5m.

Scandinavian Countries

- Denmark
"Unit is clasunit and shall be used with an AC cord set suitable with Denmark deviations. Cord shall include an earthing conductor. Unit shall be plugged into a wall socket outlet that is connected to a protective earth socket. Socket outlets which are not connected to earth shall not be used!"
- Finland - (Marking label and in manual)
"Laite on liitettävä suojamaadoituskoskettimilla varustettuun pistorasiaan"
- Norway (Marking label and in manual)
"Apparatet må tilkoples jordet stikkontakt"
Unit is intended for connection to IT power systems for Norway only.
- Sweden (Marking label and in manual)
"Apparaten skall anslutas till jordat uttag."

Note:

All Attachment cords between Scanners and Panels and RS232 or Ethernet Interfaces must be UL certified type DP-1 or DP-2.

Table of Contents

Chapter 1 - PVMax System Overview	1
<i>PVMax Scanner System</i>	1
Features of the PVMax System	2
How the System Works	2
Chapter 2 - Features and Functionality	4
Introduction to the PVMax System	4
<i>Site Definition</i>	4
<i>Topology Guidelines</i>	4
The PVMax Master	7
<i>The PVMax Master - Legend</i>	8
The PVMax Expander	9
<i>The PVMax Expander – Legend</i>	11
The PVMax Master Expander	12
<i>The PVMax Master Expander – Legend</i>	14
The PVMax Security Controller	15
<i>PVMax Security Controller Front View</i>	16
<i>The PVMax Security Controller - Legend</i>	17
The PVMax Indicator Controller	18
<i>The PVMax Indicator Controller - Legend</i>	19
The PVMax Scanner	20
<i>The PVMax Scanner - Front View</i>	20
<i>The PVMax Scanner - Back View</i>	21
The PVMax Local Scanner	23
<i>PVMax Local Scanner Front View</i>	23
<i>PVMax Local Scanner Control Buttons</i>	24
<i>Scanning of Single Site Connectivity</i>	24
<i>Untraceable Connection</i>	24
<i>Manual LED Scan</i>	25
<i>Automatic LED Scan</i>	25
<i>Buzzer</i>	26
<i>Control Button Functionality</i>	27
Communication with PV4E	28
SMART Patch Panels	30
<i>SMART Patch Panel – Front View</i>	31
<i>SMART Patch Panel – Back View</i>	31

PVMax Control Pad	32
<i>Specifications of the PVMax Control Pad</i>	34
Using the PVMax Control Pad	36
Chapter 3 - Installation	43
Site Requirements.....	43
PVMax System Capabilities	43
Cabling Length Guidelines (Maximum)	44
Loop Specifications.....	44
<i>Environmental Requirements</i>	46
<i>AC Power Connection</i>	46
<i>Clearance</i>	47
<i>Setting up the Physical Layer of the Network</i>	47
<i>Installation of Units</i>	47
<i>Unpacking</i>	47
<i>Installing a unit in the Wiring Rack</i>	48
<i>Units Connecting Cables</i>	48
<i>Cable Type Specification between Scanners, Indicator Controllers, Expanders, Master/Master Expander</i>	49
<i>SMART Patch Panel Connections</i>	49
<i>Scanner Attachment Cords</i>	49
<i>The PVMax Splitter</i>	50
To Connect the PVMax Scanner to the SMART Panels using the Splitter	53
<i>Table of Panel Types Connected to Scanners</i>	53
<i>Scanner Attachment Cord Configuration Table – Group A</i>	54
<i>Scanner Attachment Cord Configuration Table – Group B Communication Links (UP LINKS and DOWN LINKS)</i>	55
<i>Communication Links (UP LINKS and DOWN LINKS)</i>	56
<i>Connecting an PVMax Expander to a PVMax Scanner</i>	57
<i>Connecting an Expander to an Indicator Controller</i>	57
<i>Connecting an Expander to a Security Controller</i>	58
<i>Connecting a Master Expander to Expanders</i>	58
<i>Connecting a Master Expander to Indicator Controllers</i>	59
<i>Connecting a Master Expander to a Security Controller</i>	59
<i>Connecting a Master to Expanders</i>	60
<i>Connecting a Local Scanner</i>	60
Chapter 4 - Setup	61
PVMax Master Configuration Setup	61
Accessing the HyperTerminal	61

<i>Accessing the Setup Main Menu of the Master/Master Expander</i>	<i>64</i>
PVMax Local Scanner Configuration Setup	81
<i>Accessing the HyperTerminal</i>	<i>81</i>
Chapter 5 - Specifications	88
General	88
PVMax Master.....	89
PVMax Master Expander.....	90
PVMax Master Expander.....	91
PVMax Security Controller	92
PVMax Indicator Controller	93
PVMax Scanner / PVMax Mini Scanner	94
PVMax Local Scanner.....	95
PVMax Control Pad	96
Chapter 6 - Ordering Information	97

Chapter 1 - PVMax System Overview

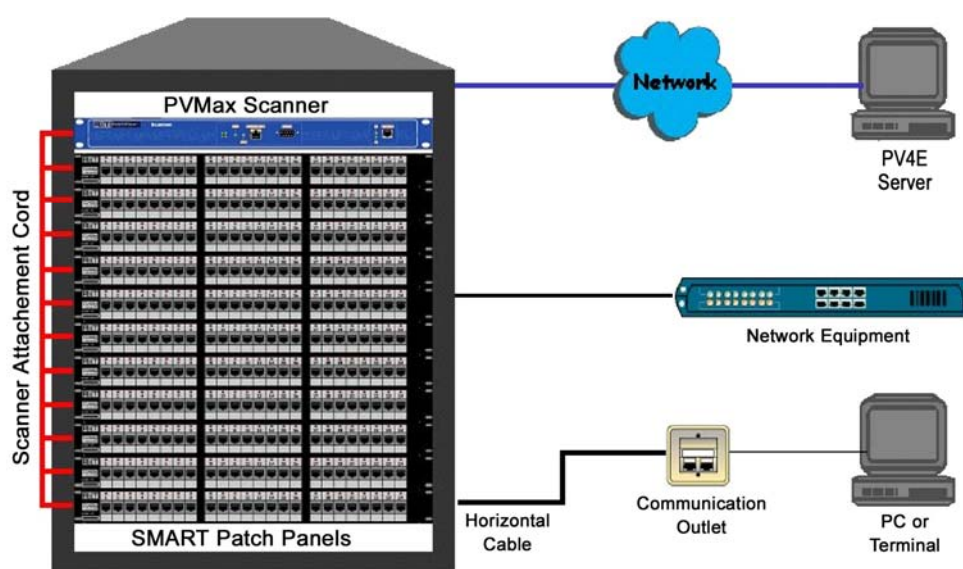
RiT's PatchView solutions are designed to provide real-time management of the enterprise network.

PVMax is the latest hardware configuration of RiT's pioneering PatchView Intelligent Physical Layer Management Solution (IPLMS).

Providing a complete and accurate view of physical layer connectivity, PVMax's modular design offers maximum flexibility of configuration.

Using the new PVMax Expanders the system can be cascaded from the PVMax Master to multiple levels. This hierarchical system allows the scanning of an unlimited number of ports located on SMART Patch Panels.

PVMax has the added advantage of allowing the user to operate the system over a large geographic area, and up to eight sites can be monitored by one PVMax Master.



PVMax Scanner System

Features of the PVMax System

In addition to the many features available in the previous PV solution, such as:

- Real time retrieval of connectivity information
- 100% accurate documentation of all network connectivity
- Simple LED guidance for carrying out work orders
- Complete graphic representation of the exact location of each network asset
- Increased network security through maintaining tight, computerized control
- Business continuity

The new PVMax has the following additional new features:

- Support for an unlimited number of ports
- Automatic mapping of all the PVMax hardware
- New scanning algorithm dramatically shortens scanning time
- Lower ratio of scanners: panels resulting in less “real estate”
- Ability to start work even before the database is prepared
- Rack indicator light makes it easier to pinpoint the exact rack in large communication rooms
- The PVMax Local Scanner is a single PV4E device that functions as a PVMax Master and a PVMax Scanner combined in one unit
- The Security Controller enables control of a variety of sensors and remote-controlled devices from the PV4E Management Station
- Backwards compatibility

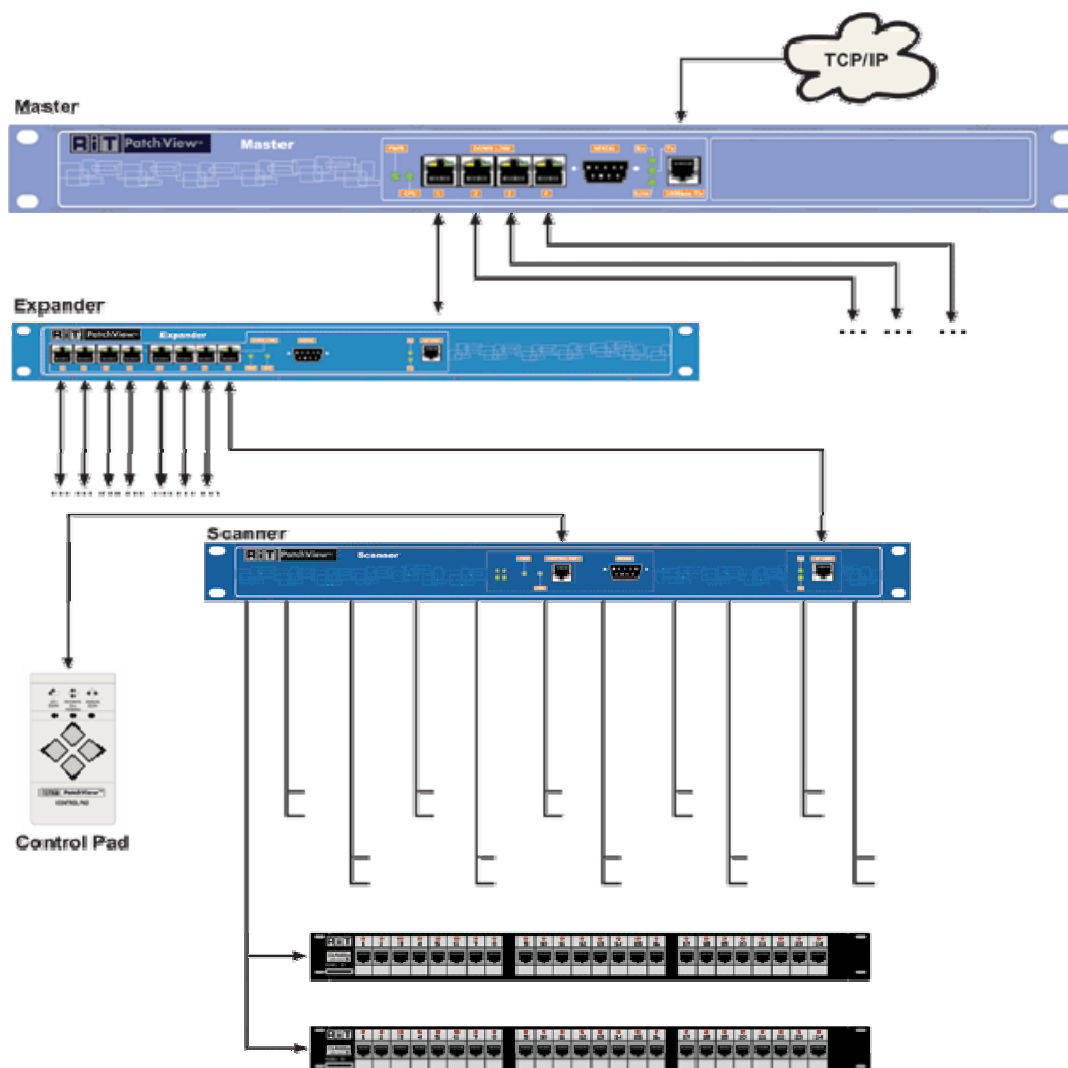
How the System Works

The basic components of the PVMax System are:

- PVMax Master
- PVMax Master Expander
- PVMax Expander

- PVMax Scanner
- PVMax Local Scanner
- PVMax Security Controller
- PVMax Indicator Controller
- PVMax Control Pad
- Scanner Attachment Cord
- SMART Patch Panel

The PVMax Master operates as a concentrator unit between the PVMax Scanners (via the PVMax Expanders) and the PatchView for the Enterprise (PV4E) Management Station. The PVMax Master collects the connectivity data from the PVMax Scanners, and is capable of monitoring up to four sites.



Basic Topology

Chapter 2 - Features and Functionality

Introduction to the PVMax System

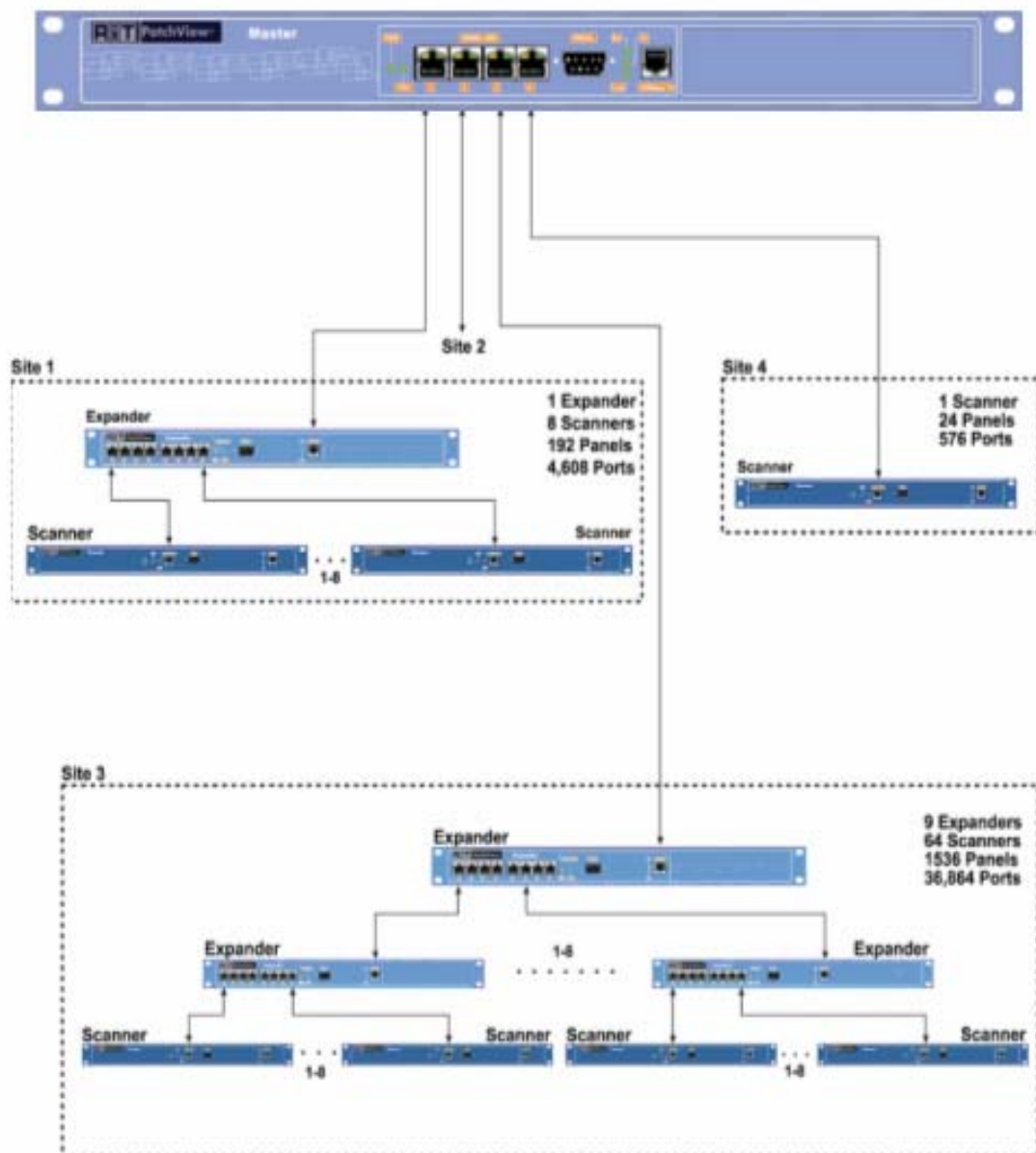
The PVMax System can successfully operate in a number of different configurations. From the PVMax Master, a total of four sites can be monitored. The PVMax Master Expander is used when there is only one site.

Site Definition

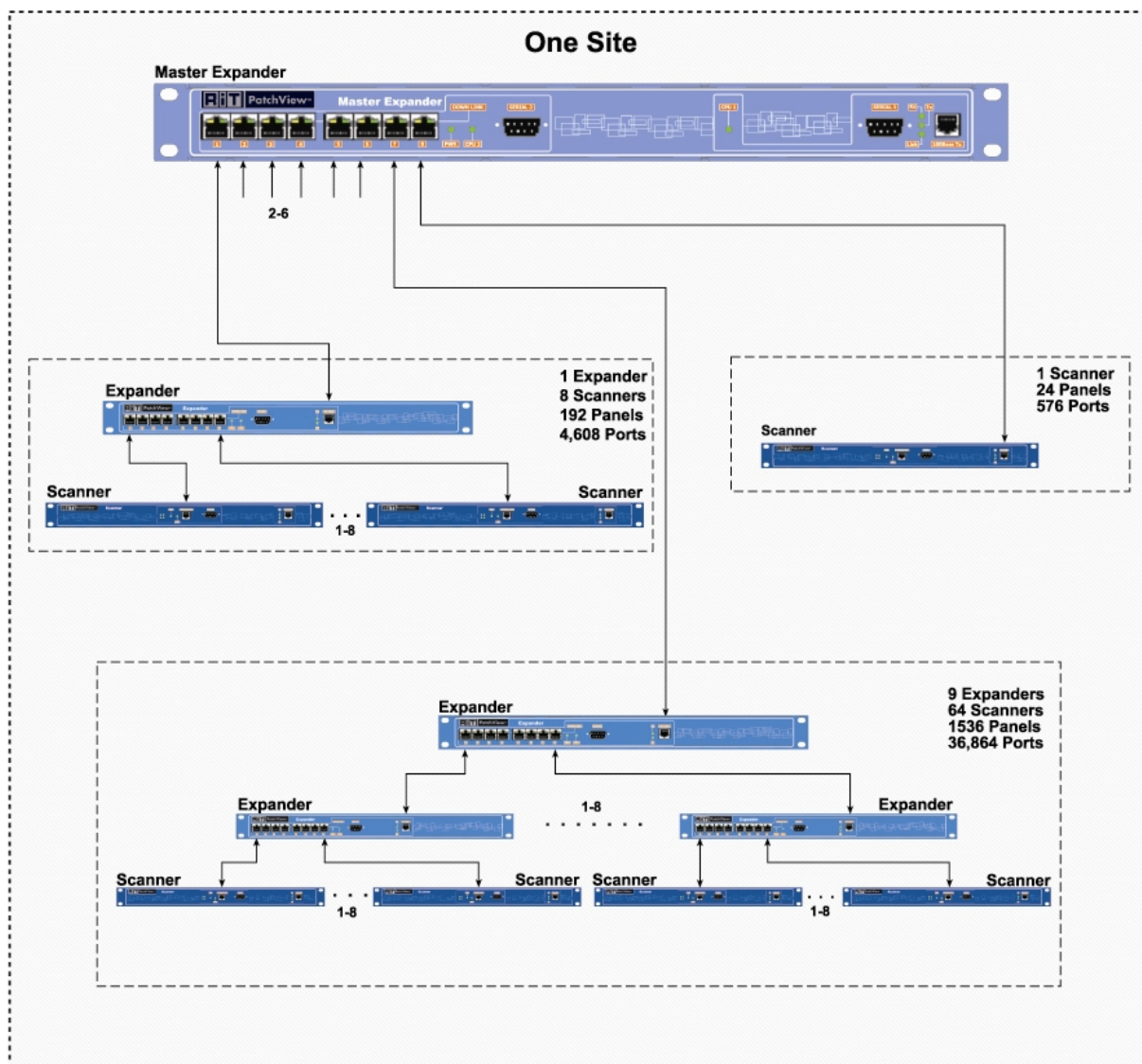
- A site is defined as one patching area
- There may be many patching areas/sites in one Communication Room
- Each site is connected to one port in the Master
- Each PVMax Master can have up to four sites
- The PVMax Master Expander can control only one Site

Topology Guidelines

- Each communication site operates as a self-contained patching area
- Sites are designed to operate independently
- FOR THIS REASON, THERE SHOULD BE NO PATCH CORDS CONNECTED BETWEEN PANELS IN DIFFERENT SITES
- The PVMax System components have automatic detection devices that are accessed by the software
- In order to ensure easy scanning, the topology should be planned logically, with as few levels as possible. This boosts the performance of the system



Example of the Topology using the PVMax Master and multiple sites



Example of the topology of One Site using the PVMax Master Expander

The PVMax Master

The PVMax Master manages the physical layer network. The Master controls all underlying PVMax Scanners, managing the scanning algorithm. The Master is always the apex of the hierarchy and has the ability to view the entire system.

The Master includes an SNMP agent, allowing the management software to receive all relevant data. It collects, saves, and transmits connectivity data from the PVMax Scanners via the Expanders and updates the PatchView for the Enterprise management station.

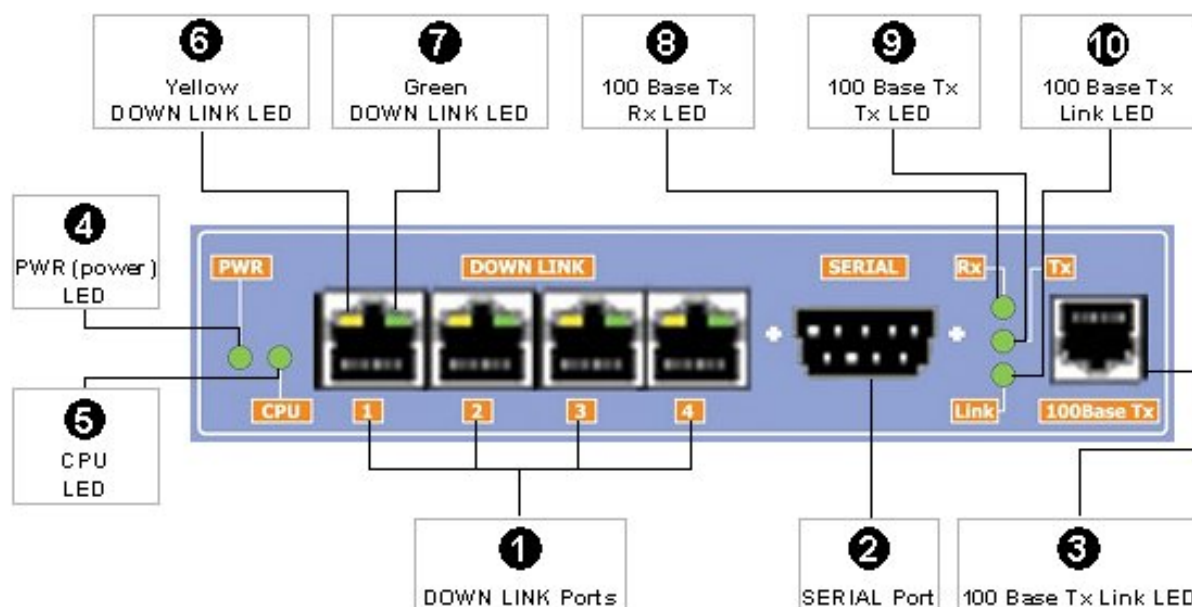
The Master can monitor up to 4 communication rooms.

The maximum length of a Copper cable connecting the Master to an Expander is 1,200m/4,000ft. Each one of these DOWN LINK ports represents a site. PVMax Scanners can be connected directly to the Master DOWN LINK Ports. In this case, PVMax Scanner will be one single site.

As the PVMax Master has a perspective of all PVMax Scanners, its main function is to scan for connectivity changes between any two ports. It is also in charge of controlling the Control Pad, the LED operation and the Indicator Controllers used in the system.



PVMax Master



Enlarged View of the PVMax Master Connectors and LEDs

The PVMax Master - Legend

Front Panel Ports	DOWN LINK	4 Ports RJ-45 socket, RS-485 for connection to PVMax Expanders or PVMax Scanners	1
	SERIAL	9- pin D-type, male, RS-232 for terminal connection/software download	2
	100Base Tx	RJ-45 socket, Ethernet IEEE 802.3, 100Base Tx/10Base T, 100/10 Mbps industry standard for connection to local area network	3
LED Indicators	PWR	Lit when the power is on	4
	CPU	Blinks when the PVMax Master is operational	5
	DOWN LINK-YELLOW	Blinks when the PVMax Master is transmitting data	6
	DOWN LINK-GREEN	Blinks when the PVMax Master is receiving data	7
	100Base Tx - Rx	Blinks when the PVMax Master is receiving data on the 100Base Tx Bus	8
	100Base Tx - Tx	Blinks when the PVMax Master is transmitting data on the 100Base Tx Bus	9
	100Base Tx LINK	Lit when link is active	10
Rear Panel Connectors	POWER	AC power connector with ON/OFF switch	

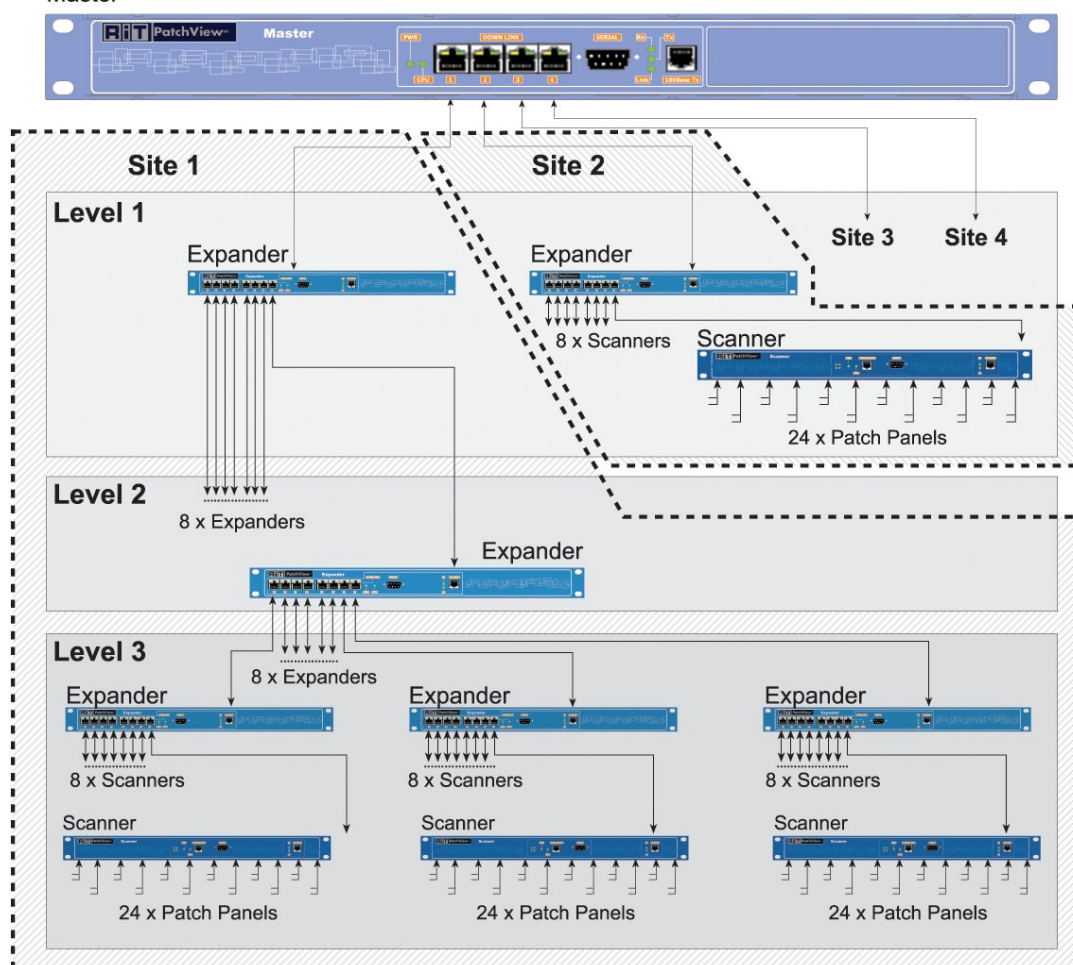
The PVMMax Expander

The PVMMax Expander is used to expand the capabilities of the Master.

Cascading Expanders from the DOWN LINK Ports of the Master achieves this. Each DOWN LINK Port of a Master is connected to the Level 1 Expander of a site.

Many levels of Expanders can be cascaded from the DOWN LINK Ports of upper level Expanders.

Master



An example of the cascading capabilities of the PVMMax Expanders from a PVMMax Master

The Expander allows all devices connected to its DOWN LINK Ports to communicate with all devices on its UP LINK Port. The Expanders are the links between the PVMMax Scanners, Security Controller or Indicator Controllers and the Master.

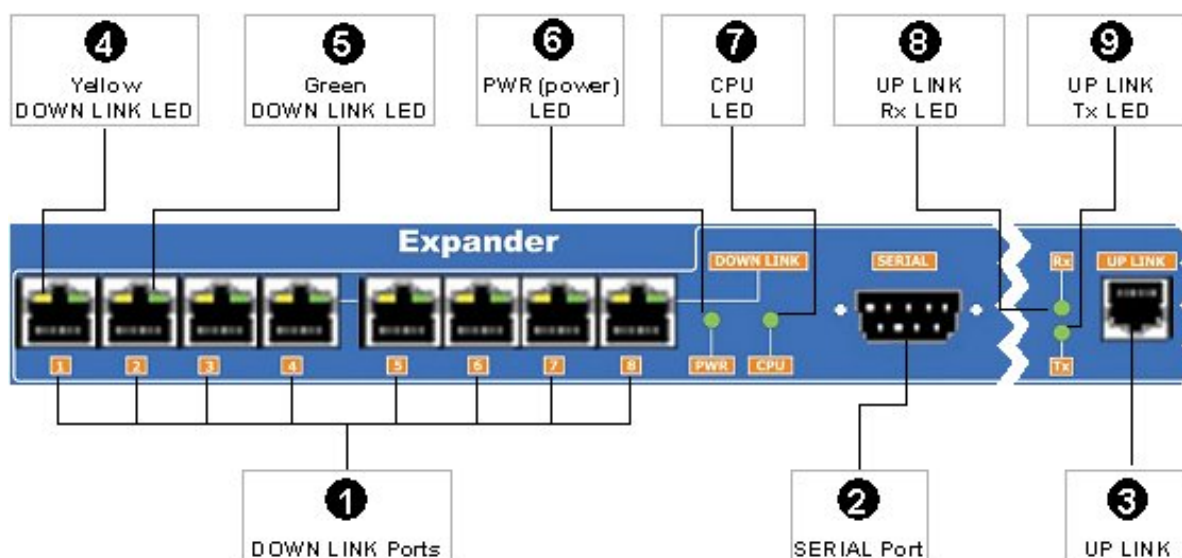
Each Level 1 Expander can be located in a separate site. The Level 1 Expanders are directly connected to one of the DOWN LINK Ports located on the front panel of the Master.

The PVMax Scanners and Security Controller / Indicator Controllers are connected to the DOWN LINK Ports of PVMax Expanders.

Up to eight PVMax Scanners and/or Security Controller and/or Indicator Controllers can be connected to each Expander. These Expanders are in turn connected to higher-level Expanders or directly to the Master/Master Expander depending on the configuration of the site.



PVMax Expander



Enlarged View of the PVMax Expander Connectors and LEDs

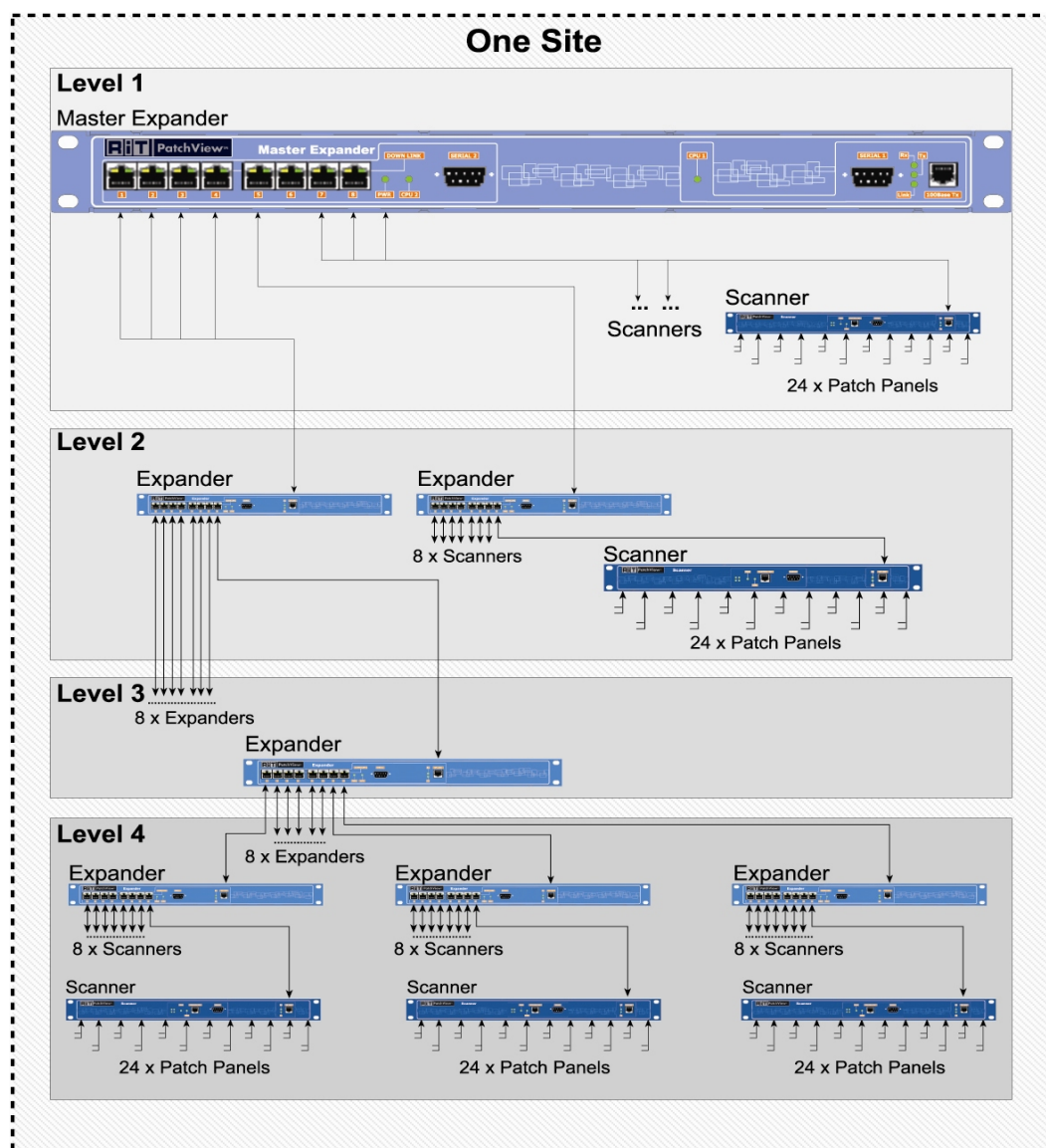
The PVMax Expander – Legend

Front Panel Ports	DOWN LINK	8 Ports RJ-45 socket, RS-485 for connection to PVMax Expanders, PVMax Scanners PVMax Security Controller or PVMax Indicator Controllers	1
	SERIAL	9- pin D-type, male, RS-232 for terminal connection/software download	2
	UP LINK	RJ-45 socket, RS-485 for connection to a higher level Expander or the PVMax Master	3
LED Indicators	DOWN LINK-YELLOW	Blinks when the PVMax Expander is transmitting data	4
	DOWN LINK-GREEN	Blinks when the PVMax Expander is receiving data	5
	PWR	Lit when the power is on	6
	CPU	Blinks when the PVMax Master is operational	7
	UP LINK Rx	Blinks when the PVMax Expander is receiving data on the UP LINK Bus	8
	UP LINK Tx	Blinks when the PVMax Expander is transmitting data on the UP LINK Bus	9
Rear Panel Connectors	POWER	AC power connector with ON/OFF switch	

The PVMax Master Expander

The PVMax Master Expander is a combination of both the PVMax Master and PVMax Expander. It includes all the capabilities and features of the PVMax Master and the PVMax Expander.

Only a single site may be defined when a PVMax Master Expander is used. A PVMax Master Expander cannot be connected to a PVMax Master.



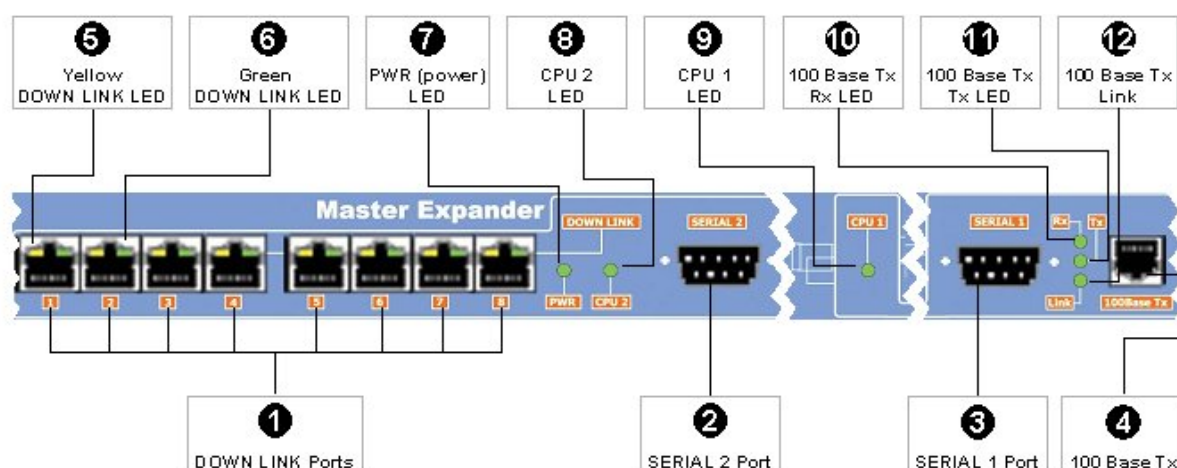
An example of the cascading capabilities of the PVMax Expanders from a PVMax Master Expander

The PVMax Scanners and Security Controller / Indicator Controllers are connected to the DOWN LINK Ports of PVMax Expanders.

Up to eight PVMax Scanners and/or Security Controller and/or Indicator Controllers can be connected to each Expander. These Expanders are in turn connected to higher-level Expanders or directly to the Master Expander depending on the configuration of the site.



PVMax Master Expander



Enlarged View of the PVMax Master Expander Connectors and LEDs

The PVMax Master Expander – Legend

Front Panel Ports	DOWN LINK	8 Ports RJ-45 socket, RS-485 for connection to PVMax Expanders, PVMax Scanners, PVMax Security Controller or PVMax Indicator Controllers	1
	SERIAL 2 Port	9- pin D-type, male, RS-232 for terminal connection/software download	2
	SERIAL 1 Port	9- pin D-type, male, RS-232 for connection to PC	3
	100Base Tx	RJ-45 socket, Ethernet IEEE 802.3, 100Base Tx/10Base T, 100/10 Mbps industry standard for connection to local area network	4
LED Indicators	DOWN LINK-YELLOW	Blinks when the PVMax Expander is transmitting data	5
	DOWN LINK-GREEN	Blinks when the PVMax Master is transmitting data	6
	PWR	Blinks when the PVMax Master is receiving data	7
	CPU 2 *	Lit when the power is on	8
	CPU 1 *	Blinks when an PVMax Expander is operational	9
	100Base Tx - Rx	Blinks when the PVMax Master is operational	10
	100Base Tx - Tx	Blinks when the PVMax Master is receiving data on the 100Base Tx Bus	11
	100Base Tx LINK	Blinks when the PVMax Master is transmitting data on the 100Base Tx Bus	12
	*	Lit when link is active	
Rear Panel Connectors	POWER	AC power connector with ON/OFF switch	

The PVMax Security Controller

The PVMax Security Controller enables control of various sensors and remote-controlled devices from the PatchView Management Station. Sensors such as temperature, humidity, floods etc., and remote devices such as rack indicators, door locks, door switches, fans, can be physically connected to the PatchView system using the PVMax Security Controller.

One PVMax Security Controller supports up to 32 external devices and sensors as described below:

- 8 dry contact ports– these ports are used as an electric switch which can open/close a circuit. The ports support up to 3 amp each
- 16 I/O ports - Digital ports that support input and output. This port sends an event to the management system if a circuit was opened or closed. Different sensors can be connected to these ports, when for example; the temperature exceeds a threshold, the electric circuit closes and is acknowledged by the controller
- 8 output ports- These ports activate any device which meets the specifications. The Rack Indicator can be connected and controlled from this port. A port output is 12 volts limitation of 60 m Amp

Supported Devices

Door – The PVMax Security Controller has the ability to send a command to open or close a door and has the ability to receive an indicator from the door as the door's circuit opens or closes.

Sensor – The PVMax Security Controller has the ability to receive an indication from the device as the device's circuit opens or closes.

Active Device – PVMax Security Controller has the ability to send a command to open or close the devices circuit.

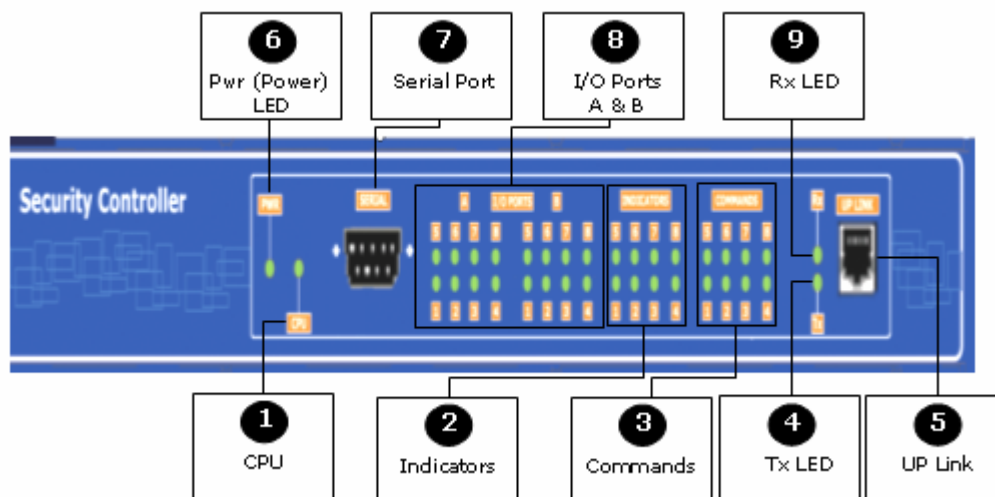
General

- The PVMax Security Controller, as the rest of the PVMax system, uses secure communication in order to avoid unauthorized access
- The PVMax Security Controller is 1U in height
- The PVMax Security Controller has a built-in LED matrix which provides a real time indication of the ports' activity

PVMax Security Controller Front View



PVMax Security Controller



Enlarged View of the PVMax Security Controller Connectors and LEDs

The PVMaX Security Controller - Legend

Interface	SERIAL		Standard RS-232 Connector 9 pin D-type male. Data Rate: Up to 115.2 Kbps Protocol: UART, Start bit 1, Stop bit 1, No parity
	UP LINK		RJ-45 socket, RS-485 for connection to the Expander, Master Expander or the Master
	I/O ports		16 separately configurable Inputs/Outputs Output: 5V, 24mA Input: 0-5V
	Command A		8 outputs for Rack Indicators 12VDCout, 650mA max current for all indicators.
	Command B		8 control relays for remote controls. VDCmax = 42VDC Imax=5A
LED Indicators	PWR		Lit when the power is on
	CPU		Blinks when the Indicator Controller is operational
	UP LINK	Rx	On during reception from Hub or Master
		Tx	On during transmission to Hub or Master
	I/O ports		Indicates when port transmits high level(output) or receives high level (input)
	Command A		Indicates when rack indicator is on.
	Command B		Indicates when circuit is closed.
Physical	Height		44.4mm/ 1.75" (1U)
	Width		482.6mm/19"
	Depth		159.5mm/6.28"
	Weight		1.6kg/3.5lb
Environment	Temperature		0 - 500C /32-1220 F
	Humidity		Up to 90% non-condensing
Power			100VAC to 240VAC 1.2- 0.6 A, 47 to 63 Hz, 30W max

The PVMax Indicator Controller

The PVMax Indicator Controller is a subset of the PVMax Security Controller and works independently when connected to a PVMax Master, Expander or Master Expander. It is used solely to activate the Rack Indicators.

The Indicator Controller supports up to 8 Rack Indicators.

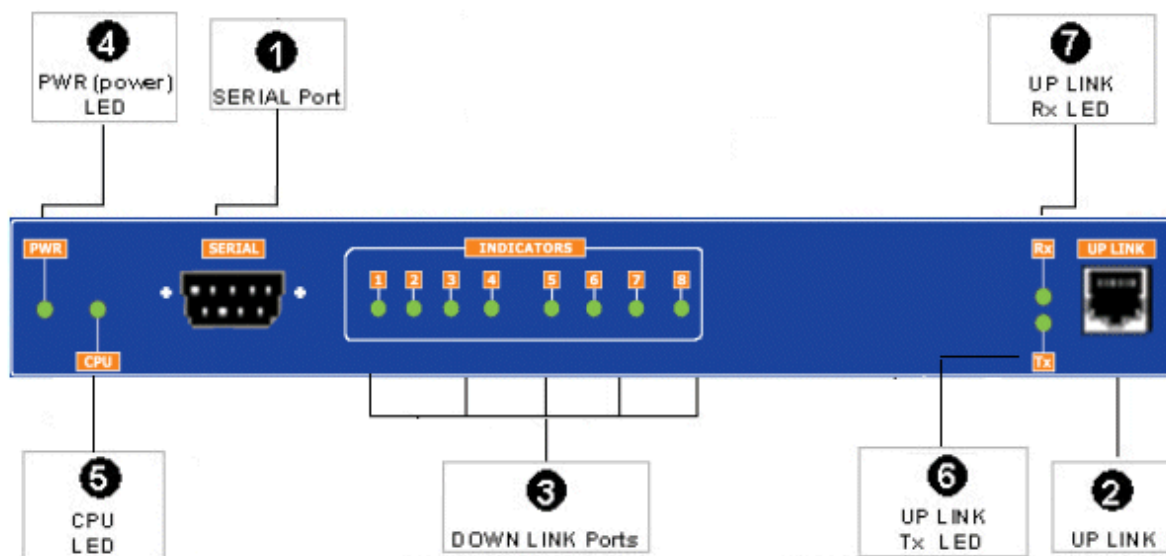
The PVMax Indicator Controllers are connected to the Expanders. The Rack Indicators, which are located on top of each Rack, are connected to the PVMax Expanders. The Indicator Controller is related to all ports on the SMART Panels of each Rack.

Whenever a LED is lit on any port in any SMART Panel, the Indicator Controller sends a signal to the Rack Indicator on top of that Rack. The Rack Indicator blinks to guide the technician to the Rack.

Indicator Controllers and Rack Indicators are usually used in large Communication Rooms.



PVMax Indicator Controller



Enlarged View of the PVMax Indicator Controller Connectors and LEDs

The PVMax Indicator Controller - Legend

Ports	SERIAL	9- pin D-type, male, RS-232 for terminal connection/software download	2
	UP LINK	RJ-45 socket, RS-485 for connection to the PVMax Expander or to the PVMax Master Expander.	3
LED Indicators	Down Link Ports	Blinks when the PVMax Indicator Controller is sending data to the beacons	1
	PWR	Lit when the power is on	4
	CPU	Blinks when the PVMax Indicator Controller is operational	5
	UP LINK Rx	Lit during reception from PVMax Expander	6
	TX LINK UP	Lit during transmission to PVMax Expander	7

The PVMax Scanner

The PVMax Scanners are connected to the SMART Patch Panels with Scanner Attachment Cords. The PVMax Scanner monitors all ports on these panels.

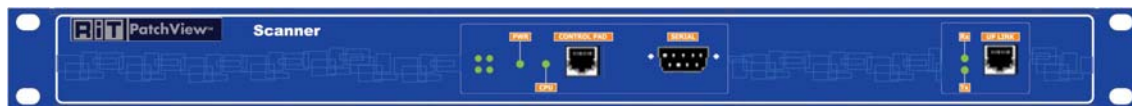
In addition to the core scanning functionality, the PVMax Scanner acts as the mediator between the Control Pad, which is used to control system processes, and the Master. The Control Pad may be connected to any scanner, both controlling the specific scanner locally, and sending\receiving instructions to\from the Master via the Expander.

PVMax Scanners are mounted in the communications center racks at various sites, such as different floors of a building or in other nearby buildings. They report on-site patch panel connectivity information to the Master, which contains the SNMP agent.

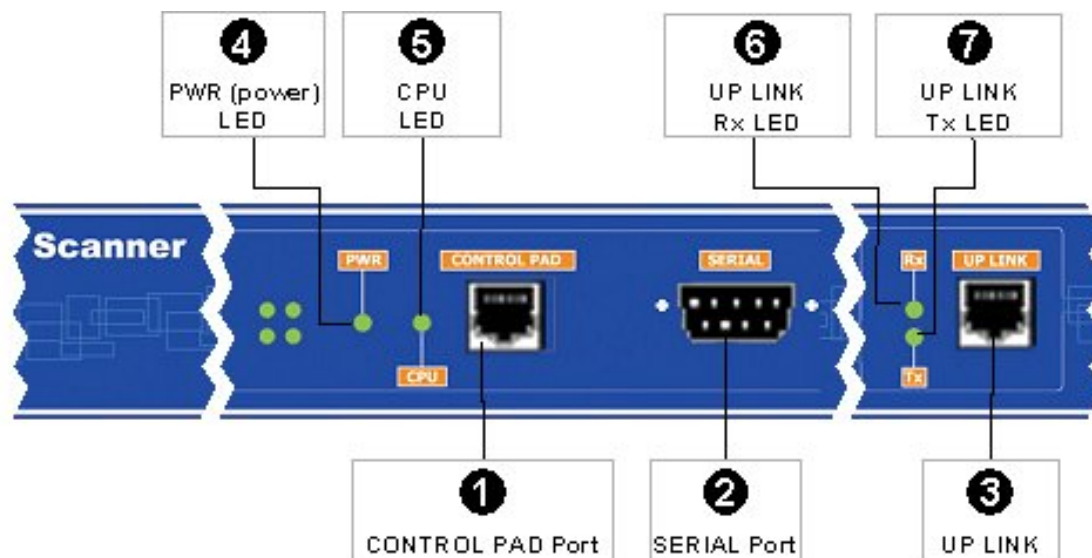
There are two kinds of PVMax Scanners:

- PVMax Scanner — Includes 12 connectors and can support up to 24 panels
- PVMax Mini Scanner — Includes 6 connectors and can support up to 12 panels

The PVMax Scanner - Front View



PVMax Scanner



Enlarged View of the PVMax Scanner Connectors and LEDs

Note:

PVMax Scanners emit a single 'beep' sound with each change made to the topology.

The PVMax Scanner - Back View



PVMax Scanner Back View



PVMax Mini Scanner Back View

The PVMax Scanner - Legend

Front Panel Ports	CONTROL PAD	RJ-45 socket for connection to the PVMax Control Pad	1
	SERIAL	9- pin D-type, male, RS-232 for terminal connection/software download	2
	UP LINK	RJ-45 socket, RS-485 for connection to the PVMax Expander, PVMax Master Expander or the PVMax Master.	3
LED Indica tors	PWR	Lit when the power is on	4
	CPU	Blinks when the PVMax Scanner is operational	5
	UP LINK Rx	Lit during reception from PVMax Expander	6
	UP LINK TX	Lit during transmission to PVMax Expander	7
Back Panel Conn ectors	POWER	AC power connector with ON/OFF switch	
	Patch View	6 or 12 x 26 pin 100 mil spacing headers for connection to the Patch Panels.	

The PVMax Local Scanner

The PVMax Local Scanner is a stand-alone device that manages the physical layer network. It is connected directly to the network and is able to monitor up to 144 ports (up to 6 panels). PVMax Local Scanner scans and processes the panels' physical connectivity information, and sends it via the network to the PV4E server.

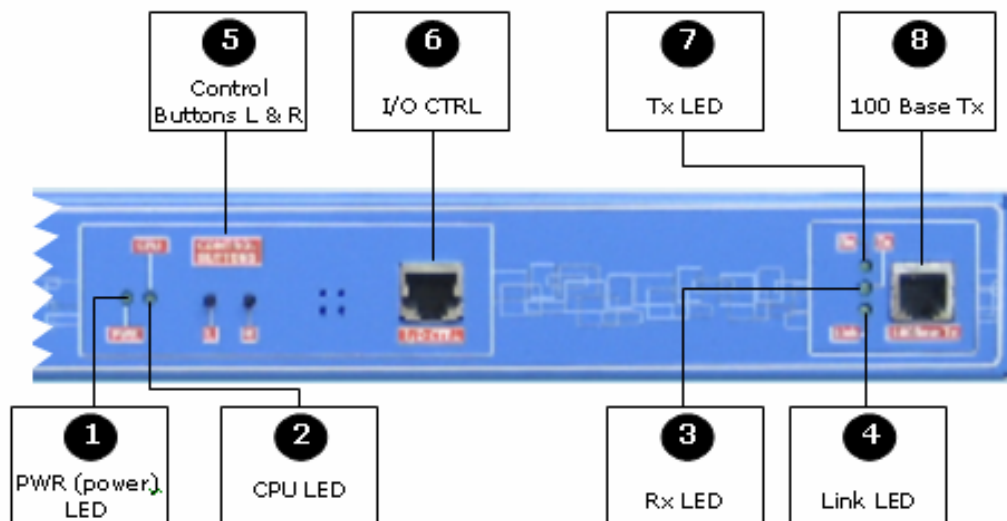
Some of the Local Scanner features are as follows:

- Built in control button capabilities
- Presents a complete and up-to-date picture of the network connectivity regardless of the physical location of the site
- Collects, saves, and transmits connectivity data from the SMART Panels and updates the PatchView's management station
- Connected to the SMART Patch Panels with Scanner Attachment Cords

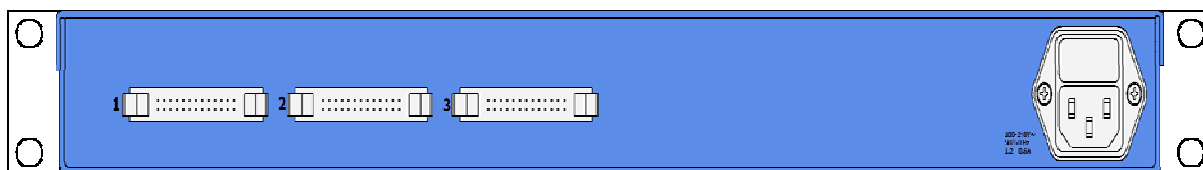
PVMax Local Scanner Front View



PVMax Local Scanner



Enlarged View of the PVMax Local Scanner Connectors and LEDs



PVMax Local Scanner Back View

PVMax Local Scanner Functions Table

Function	
Pwr	LED lights up when power is on
CPU	Blinks slowly when software is uploaded
Control Buttons	L Used to control various actions (see the Control Button Functionality table)
	R Used to control various actions (see the Control Button Functionality table)
I / O CTRL	Not currently used
Rx, Tx	Blinks when there is incoming and outgoing traffic
Link	Blinks when cable is connected
100 Base Tx	Used for fast internet

PVMax Local Scanner Control Buttons

Using the Control Buttons on the PVMax Local Scanner, the technician is able to perform both manual and automatic scans and is guided through the process of connecting and disconnecting the cables to complete the links defined in the system. The LED either stays lit or blinks depending on the activity being performed or required.

Scanning of Single Site Connectivity

The PVMax Local Scanner scans independent sites, which consist of up to six different panels. If ports are connected from a different site, the PVMax Local Scanner will detect these ports and mark them as untraceable, see the following section *Untraceable Connection*.

Untraceable Connection

The PVMax Local Scanner supports the following untraceable connectivity:

- Connectivity of two ports in the same row will be fully traced

- Connectivity of two parallel ports (the same columns: 1-9, 2-10 etc), in different rows of the same panel will be fully traced
- Connectivity of any other two ports on the same panel will not be fully traced and the detected ports will be marked as untraceable ports
- Multiple connectivity (more than two ports) will not be fully traced and the detected ports will be marked as untraceable ports
- Connectivity between two sites will not be traced and the involved port will be marked as untraceable port

LED Scan

The LED SCAN can be either automatic or manual and once activated, causes the LEDs of the ports to light in the sequence to which they are connected.

The LED SCAN is used to check that all the cable connections from the PVMax Scanner to the SMART Panels are operating and that the Scanner Attachment Cords were connected in the correct order.

LEDs lit out of sequence is an indication that the ports or panels have been incorrectly connected to the Scanner.

The LED SCAN begins by scanning and lighting each LED above the ports in each of the panels. They should run from the first port in the first SMART Panel to the last port in the last panel. The LEDs continue to light up until the LED SCAN is deactivated using the Control buttons.

If there is a change in connectivity while the LED are on, the module refreshes the active ports and verifies that their connectivity still exists.

Manual LED Scan

The manual LED scan enables you to find and review the current connectivity on the site. The manual scan is controlled by the control buttons or by LED on/off commands from the PV4E system.

The default order of the LED scan is according to the physical order of the panels.

Automatic LED Scan

The automatic LED scan is, in effect, the same as the manual LED scan but moves automatically from port to port without intervention by the user.

It is possible during an automatic LED scan to switch mode to a manual LED scan by simply pressing one of the control buttons (see Control Button Functionality table).

Buzzer

The PVMax Local Scanner is fitted with a buzzer to alert the user of events:

The buzzer has four types of sound:

1. Two sequential beeps are heard when the PVMax Local Scanner is switched on.
2. A single beep identifies a connect/disconnect link or connect/disconnect panel.
3. A very short beep, every few seconds, indicates there is a Work Order pending.
4. A short beep indicates that the system has detected an untraceable connection.

Control Button Functionality

The following table describes the functionality of the control buttons and the various actions and states of the system:

Action	System State	Control Buttons		Comments
		Left Button	Right Button	
To reset default IP. The default factory IP address is: 15.1.1.126 The subnet mask number is: 255.255.0.0	Power on	Press and hold down.	Press and hold down	This action is performed when the system is first switched on and only if you want to change the system setting back to the default IP. Perform action after both LEDs (Pwr/CPU) have stopped blinking.
Automatic LED scan mode	On line	-	Press and hold down for approx 3 seconds	
Manual LED scan mode	On line	Press and hold down for approx 3 seconds	-	
Link command mode	Pending Links	Press and hold down	Press and hold down	
Change mode from automatic to manual	Automatic led scan mode	Short Press	-	
Change mode from manual to automatic	Manual led scan mode	-	Short Press	
To turn off current LED and light left adjacent LED port and cross connected port	Manual led scan mode	Short Press	-	
To turn off current LED and light right adjacent LED port and cross connected port	Manual led scan mode	-	Short Press	
To exit current state and enter to on-line mode	All states except power up and On line	Press and hold down	Press and hold down	

Communication with PV4E

Communication with PV4E is via Ethernet IEEE 802.3, 100Base, 100/10 Mbps industry standard for connection to LAN.

The local scanner is SNMP agent.

The PVMax Local Scanner - Legend

Standards compliance	Safety		UL 60950, EN 60950
	EMC		EN-55022, FCC Part 15 Class A, EN-55024
Interface	100Base -T		RJ-45 socket, Ethernet IEEE 802.3, 100Base Tx/10Base T, 100/10 Mbps industry standard for connection to local area network.
	2 Push buttons		Controls port selection (Replaces control pad)
LED Indicators	Power On		Indicates power state
	CPU		Blinking to indicate CPU sanity
	100Base-T	Rx	On during reception from Local area network
		Tx	On during transmission to Local area network
		Link	On when link is active
Physical	Height		44.4mm/ 1.75" (1U)
	Width		482.6mm/19"
	Depth		127 mm/5" (including protecting brackets)
	Weight		1.0kg/2.2lb
Environment	Temperature		0 - 50 ⁰ C /32-122 ⁰ F
	Humidity		Up to 90% non-condensing
Power			100VAC to 240VAC 1.2- 0.6 A, 47 to 63 Hz, 30W max

SMART Patch Panels

There are over 100 models of intelligent data communications SMART Patch Panels manufactured by RiT and suited to almost any wiring system and application. Please refer to our e-catalog at <http://www.ecat.rittech.com> for a full list of the RiT SMART Patch Panels.

SMART Patch Panels provide a compact cabling environment for interconnection inside a LAN. A special Scanner Attachment Cord connects each SMART Patch Panel to a PVMax Scanner. The PVMax Scanners collect patching information and report it through the LAN to the Master via the Expanders.

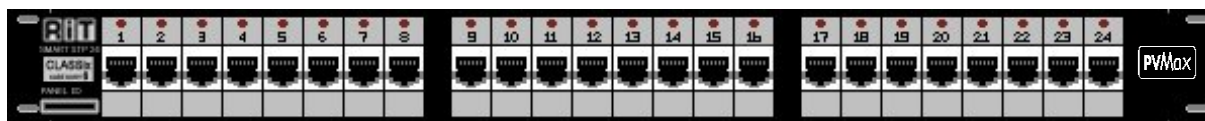
The panels feature a full range of standard compliances such as:

- Category 6a, Category 6 and Category 5e, performance for copper unshielded and shielded.
- SC, LC, and MT-RJ for fiber optics.
- Telco Panels.
- Voice Blocks

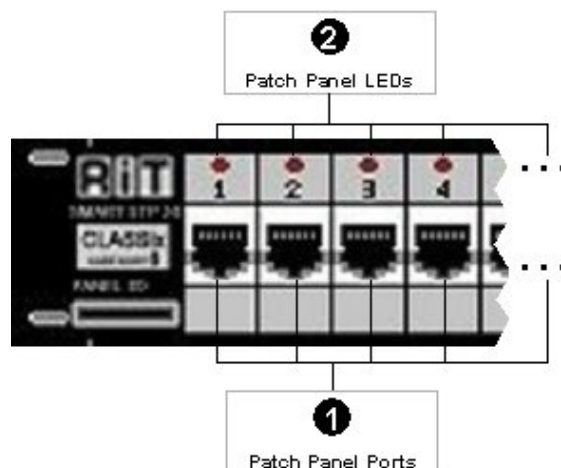
The MACs are sent to the PVMax Scanners from the Master. These changes are indicated by the LEDs on the Patch Panels. A PVMax Control Pad (see page 2-20) is connected to any Scanner in the site.

The Technician activates the Control Pad. The LEDs of the relevant ports start to blink indicating the sequence of the required MACs.

SMART Patch Panel – Front View



Front View - SMART CLASSix 24 Patch Panel



Enlarged View of a SMART Patch Panel's Connectors and LEDs

If you connect a SMART Jumper patch cord to the wrong port, the system alerts you and indicates that you must remove it.

At the end of the procedure, PatchView indicates that the task has been completed. This information is transmitted to the PV4E software via the Master.

SMART Patch Panel – Back View



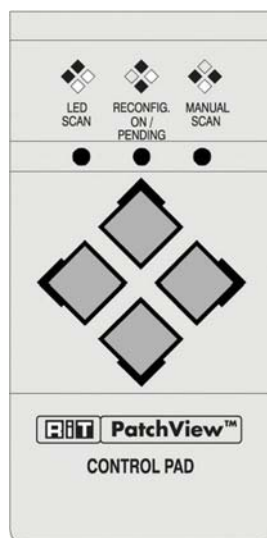
Figure 1 Back View - SMART CLASSix 24 Patch Panel

PVMax Control Pad

The PVMax Control Pad is connected to a PVMax Scanner via the Control Pad Port.

Using the Control Pad the technician is guided through the process of connecting and disconnecting the cables to complete the links defined in the system.

By activating one of the three functions of a Control Pad, the Technician is guided through different processes by the LEDs on the ports of the SMART Panels. The LED either stays lit or blinks depending on the activity being performed or required



The PVMax Control Pad

Each site or patching area may have many Control Pads.

These Control Pads can be connected to different Scanners within the site or patching area at the same time. Refer to the table of the PVMax Control Pad Functions on page 2-27 for further information on the different capabilities of the Control Pads when multiple Control Pads are connected to Scanners within a site/s.

Three options, Enabled, Disabled and Bypass are available for the Control Pad. These options are selected in the PV4E Software application. In the Enabled and Bypass options, you can activate the Manual Scan command by pressing the Manual Scan buttons on the Control Pad.

The following table describes the function of each option.

CONFIGURATION	CONTROL PAD IS ...
Enabled	Activated and link tasks are not indicated on the SMART Panels until the technician presses the Reconfig. On/ Pending buttons on the PVMax Control Pad
Disabled	Deactivated
Bypass	Disregarded and link tasks received by the PVMax Scanners are immediately indicated by the LEDs on the SMART Panels

The three functions that are activated by the Control Pad are:

■ **Led Scan**

- This is an automatic LED SCAN that causes the LEDs of the ports to light in the sequence that they are connected.
- The LED SCAN is used to check that all the cable connections from the PVMax Scanner to the SMART Panels are operating and that the Scanner Attachment Cords were connected in the correct order.
- In the event of the LEDs being lit out of sequence, this is an indication that the ports have been incorrectly connected. See Using the PVMax Control Pad on page 2-26 for further information.

■ **Reconfiguration On /Pending**

- When a work order or link task is sent to a Scanner, the Reconfiguration LED on the connected Control Pad/s starts to blink, indicating that there is a link task pending.
- The technician activates the link change process, by simultaneously pressing two of the buttons on the Control Pad.
- The Reconfiguration LED on the connected Control Pad/s stays lit indicating that the patching process is in progress.
- The appropriate LEDs on the SMART Panels turn on to guide the technician through the process.

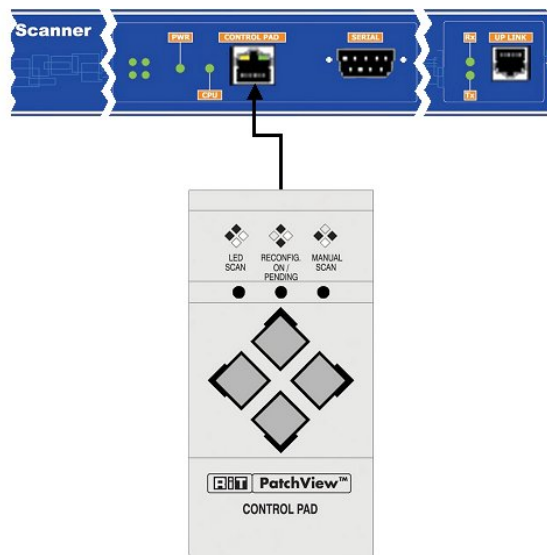
■ **Manual Scan**

- The ports on the SMART Panels can be manually scanned or browsed by first activating the Manual Scan buttons on the Control Pad and then moving to the required port using the directional buttons.

Specifications of the PVMax Control Pad

PVMax Control Pad to PVMax Scanner Connection

The PVMax Control Pad connects to the PVMax Scanner via the PVMax Control Pad RJ-45 connector to the PVMax Scanner front panel CONTROL PAD port.

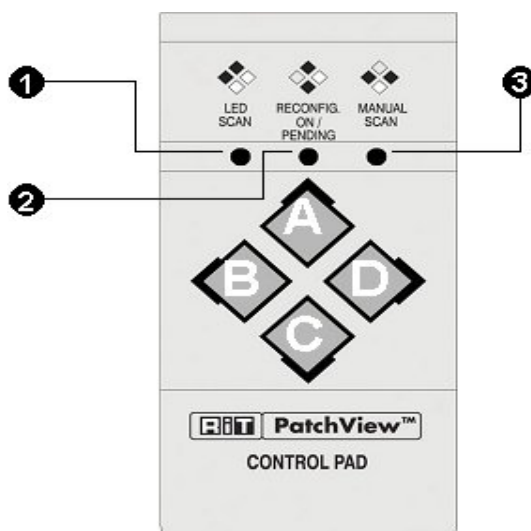


PVMax Control Pad connected to a PVMax Scanner

There are three LEDs on the PVMax Control Pad and three different actions that can be activated by pressing two of the four buttons in different combinations.

Note:

The buttons are labeled A, B, C and D in the diagram for explanation purposes only. They do not appear on the actual PVMax Control Pad.



Enlarged View of the PVMax Control Pad

PVMax Control Pad – Legend

LED SCAN	LED	Stays lit while Automatic Scan is in process	1
	Activate	To Activate press buttons A and B simultaneously until the LED is lit	
	Deactivate	A buttons press Deactivate To and B simultaneously until the LED turns off	
RECONFIG ON / PENDING	LED	Blinks Indicating that there are changes pending Stays lit when work is in progress	2
	Activate	To Activate press buttons A and C simultaneously until the LED stops blinking and remains lit	
	Deactivate	The LED turns off automatically when all the changes for that work order have been completed	
MANUAL SCAN	LED	Stays lit while Manual Scan is in process	3
	Activate	To Activate press buttons A and D simultaneously until the LED is lit	
	Deactivate	To Deactivate press buttons A and D simultaneously until the LED turns off	

Using the PVMax Control Pad

Note:

PVMax Control Pads connected to PVMax Scanners in different sites under the same PVMax Master, work independently. For example:

A LED Scan can be performed on Site #1, while Site #2's status is 'Pending'.

It is possible to switch from one function to another on the PVMax Control Pad by pressing the buttons for the new function. The old function stops and the new function begin.

PVMax Control Pad Functions

FUNCTION	DESCRIPTION
LED SCAN	Only one LED SCAN can be activated from one PVMax Scanner at a time within one site or patching area
	A PVMax Control Pad can only activate a LED SCAN within the circuit of the particular PVMax Scanner to which it is currently attached
	The LED SCAN LED of that PVMax Control Pad and any other Control Pads connected to PVMax Scanners within the site are lit for the duration of the LED SCAN
	No other Control Pad function within that site can be executed during a LED SCAN
	A LED SCAN continues until the command is deactivated
	A LED SCAN can be stopped from any Control Pad in the site
	When a LED SCAN of one circuit is complete, either that Control Pad is moved to another PVMax Scanner or a different Control Pad is activated
	This process is repeated until all the PVMax Scanner/ Panel/Ports circuits are Scanned
RECONFIG ON / PENDING	The RECONFIG ON/PENDING LED of all the Control Pads connected to PVMax Scanners within a site blinks when a work order or edit link command has been sent to the PVMax Master from the Management Station
	When the RECONFIG ON / PENDING buttons of one of the Control Pads, within the site, are activated, the LED stays Lit to show that the Patching Procedure is in progress

	The LED of that Control Pad and any other Control Pads connected to PVMax Scanners within the site is lit for the duration of the Patching Procedure
	No other Control Pad function within that site can be executed for the duration of a Patching Process
MANUAL SCAN	Only one MANUAL SCAN can be activated from one PVMax Scanner at a time within one site or patching area
	A Control Pad can only activate a MANUAL SCAN within the circuit of the particular PVMax Scanner it is currently attached to
	The MANUAL SCAN LED of that Control Pad and any other Control Pads connected to PVMax Scanners within the site are lit for the duration of the MANUAL SCAN
	No other Control Pad function within that site can be executed during a MANUAL SCAN
	The MANUAL SCAN LED stay lit until the command is deactivated
	A MANUAL SCAN can be stopped from any Control Pad in the site

LED Scan

The LED SCAN is automatic and once activated, causes the LEDs of the ports to light in the sequence that they are connected.

The LED SCAN is used to check that all the cable connections from the PVMax Scanner to the SMART Panels are operating and that the Scanner Attachment Cords were connected in the correct order.

In the event of the LEDs being lit out of sequence, this is an indication that the ports or panels have been incorrectly connected to the Scanner.

The LED SCAN begins by scanning and lighting each LED above the ports in each of the panels. They should run from the first port in the first SMART Panel to the last port in the last panel. The LEDs continue to light up until the LED SCAN is deactivated from the Control Pad.

To Activate the PVMax Control Pad for LED SCAN

Note:

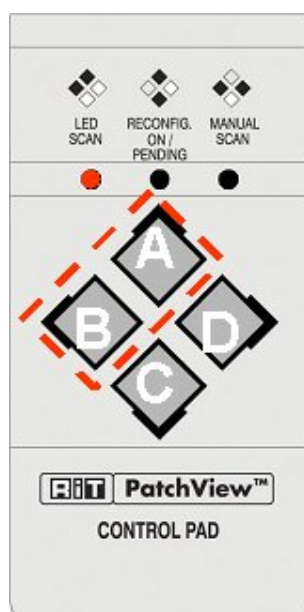
The PVMax Control Pad is activated at the actual PVMax Scanner that is to be scanned.

If all the Scanners in the Communication Room belong to one site (patching area) then only one LED Scan can be run.

If there are multiple sites (patching areas) in the Communication Room then LED SCANS on each site can be activated simultaneously.

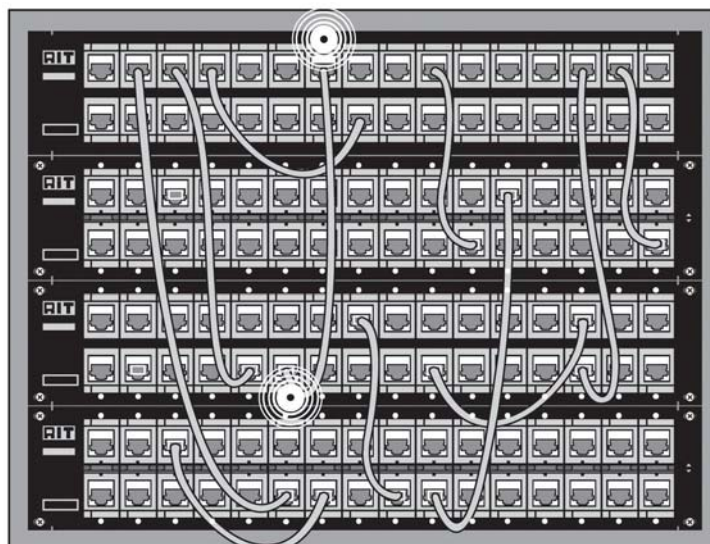
1. Activate the LED SCAN by pressing buttons A and B simultaneously until the LED lights up.

The LED remains lit throughout the LED SCAN process.



Activating the LED SCAN

The LEDs above the ports start to light in the order they are connected. If two ports are connected with a patch cord, both the LEDs light up.



Example of LEDs for two Connected Ports on a Panel

2. Once the LED SCAN is complete, deactivate the LED SCAN by pressing buttons A and D together until the LED turns off.
- 3.

Tip: The LED SCAN can be deactivated from any of the Control Pads connected to Scanners within the site.

Reconfig. On / pending

The function of the RECONFIG. ON/PENDING LED blinks to alert the technician when a Work Order or Edit link instructions have been sent from the Management Station. Once the RECONFIG. ON command has been activated by pressing the two buttons, the LEDs on the panels light according to the task required.

The RECONFIG. ON/PENDING LED stays lit indicating that the patching process is in progress.

The appropriate LEDs on the SMART Panels turn on to guide the technician through the process.

A blinking LED indicates that the link needs to be broken and a lit LED indicates which ports need to be linked.

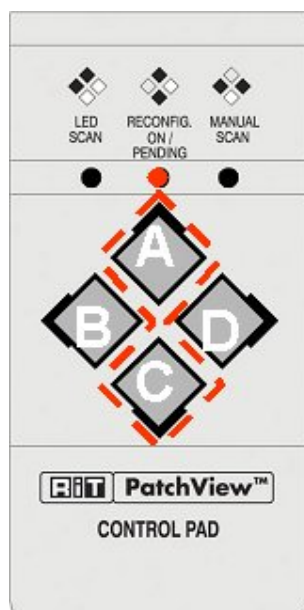
To Activate the RECONFIG ON / PENDING Function

Note:

All PVMax Control Pads connected to Scanners within a site show either the RECONFIG ON/PENDING LED blinking or lit. This is not dependent on the location of the link within the site.

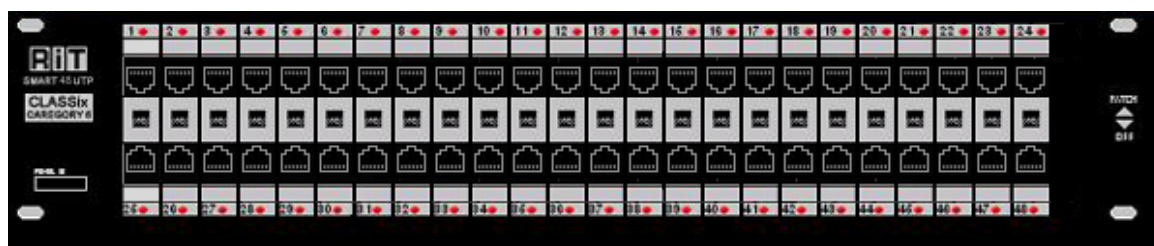
1. Activate the RECONFIG ON/PENDING by pressing buttons A and C simultaneously until the LED stops blinking and remains lit.

The RECONFIG ON/PENDING LED on the PVMax Control Pad remains lit throughout the entire process.



Activating the RECONFIG ON/PENDING Feature

2. The LEDs on the Panels start to indicate the order of work to be carried out for this task.



Example of LEDs on a SMART Panel

Note:

The LED either flashes to show which link is to be broken (SMART Jumper to be disconnected) or remains lit to show which link is to be created.

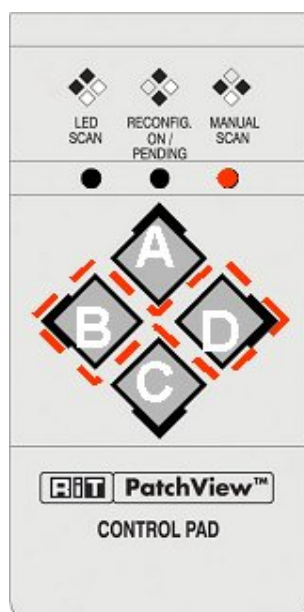
3. Either connect or disconnect the SMART Jumper from the first port.
4. The LED of the second port is lit. Either connect or disconnect the SMART Jumper from this port.
5. The process continues for all the links in that particular task.
6. When this is complete the RECONFIG ON/PENDING LED turns off on all the PVMax Control Pads in the site.

Manual Scan

The on-site MANUAL SCAN allows the technician at the wiring closet to view the SMART Panel connections using the Control Pad. When the technician turns on a port LED in the PV4E software, the corresponding patch connection LED lights up, giving the technician visual indication of the SMART Jumper connections.

➤ **To perform a MANUAL SCAN**

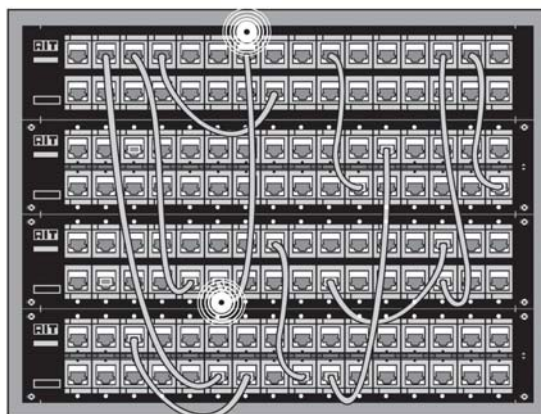
1. The Control Pad option must first be enabled at the Management Station (for information on enabling the Control Pad see the PV4E User Guide).
2. Make sure that the Control Pad is connected to a PVMax Scanner within the correct site.
3. Activate the MANUAL SCAN by pressing buttons B and D simultaneously until the LED lights.



Activating the MANUAL SCAN

4. The upper left hand SMART Panel LED lights first. Use the four Control Pad buttons to move the position of the lit LED in four directions and light the desired SMART Panel LEDs.

If two ports are connected, the LEDs of both connected ports light simultaneously when one of them is turned on.



Example of LEDs for two Connected Ports on a SMART Panel

Note:

You may notice that an LED flickers when lit continuously. The flickering occurs when the system verifies the LED connectivity information, and updates the LED display. LED flickering indicates that the LED connectivity information is up-to-date and that the system is operating normally.

5. To terminate the MANUAL SCAN press the B and D buttons on the Control Pad until the Manual Scan LED turns off.

Tip: *The Manual Scan can be terminated from any Control Pad connected to a Scanner within a Site.*

Chapter 3 - Installation

Note:

*It is recommended that a comprehensive plan of your site/s be available before the installation process begins. For recommendations of the optimum configuration, see **Setting Up**.*

Site Requirements

The following paragraphs describe the capabilities and limitations of the different components available in the PVMax System. These components are:

- PVMax Master
- PVMax Expander
- PVMax Master Expander
- PVMax Scanner / PVMax Mini Scanner
- PVMax Local Scanner
- PVMax Indicator Controller
- PVMax Security Controller
- Scanner Attachment Cord

Use these guidelines to allocate the optimum number of sites and PVMax System components to be included in your PVMax system.

PVMax System Capabilities

- A copper cable connects the Master to a Scanner or to an Expander in these sites
- One Master Expander can monitor one site only
- One Master Expander can be connected to eight Scanners, Expanders, Security Controller or Indicator Controllers or a combination of these
- One Expander can be connected to eight Scanners, Expanders, Security Controller or Indicator Controllers or a combination of these
- Expanders are cascaded from the Master or Master Expander creating various levels within the system
- An unlimited number of Scanners can be linked to the system using this method

Cabling Length Guidelines (Maximum)

Copper Cable between Master to Expander / Scanner	1,200m / 4,000ft
SMART Jumper	7.5m / 24ft
Flat Scanner Attachment Cord	2.5 m / 7.5ft
Round Flat Scanner Attachment Cord	12m / 36ft
Rack Indicator Cable	25m / 75ft

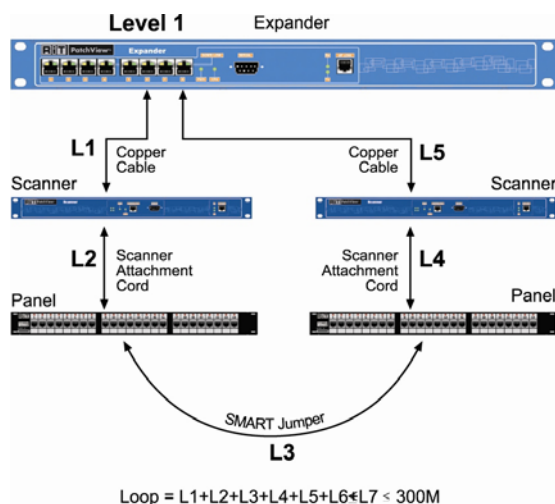
Loop Specifications

The total length of a communication loop cannot exceed 300m/975ft.

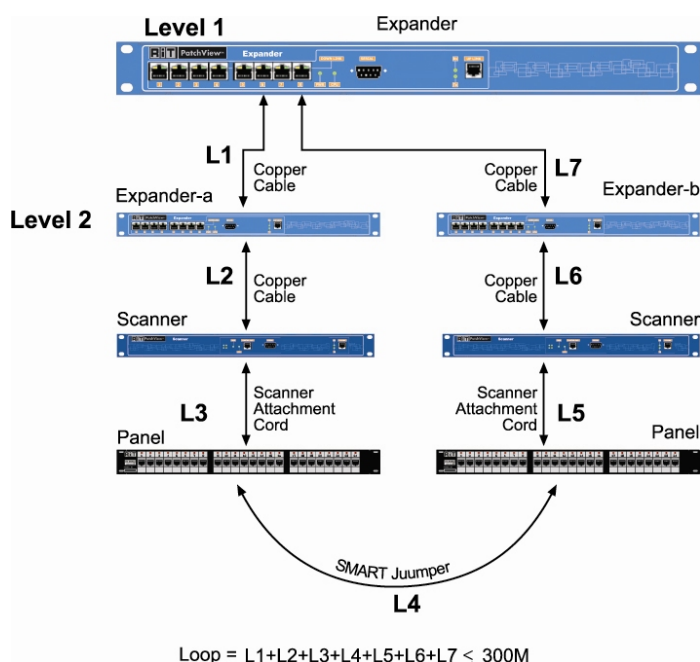
When a PVMax Master is used, this loop is calculated from the Level 1 Expander to subsequent Expanders, Scanners, SMART Panels and their SMART Jumpers, and their return route to the originating Level 1 Expander in the same Site.

When a PVMax Master Expander is used, this loop is calculated from the Master Expander to subsequent Expanders, Scanners, SMART Panels and their SMART Jumpers, and their return route to the Master Expander.

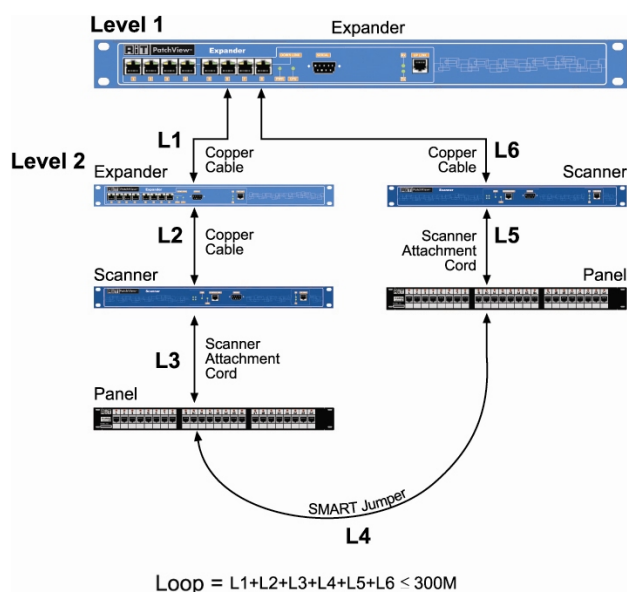
The following diagrams show examples of different configurations.



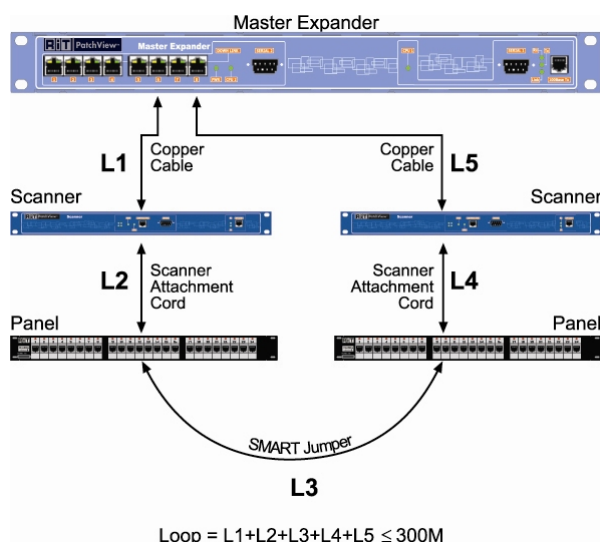
Example 1: PVMax Expander to PVMax Scanners and SMART Panels



Example 2: PVMax Expander to PVMax Expanders, PVMax Scanners and SMART Panels



Example 3: Mixed configuration



Example 4: PVMax Scanners connected directly to the PVMax Master Expander

Environmental Requirements

The ambient operating temperature range of the PVMax Scanner is 0 – 50°C (32 - 122°F) at a relative humidity of up to 90% - non-condensing.

AC Power Connection

- The Scanner should be installed within a maximum distance of 1.5 meters (5 feet) to a grounded, easily accessible AC outlet capable of supplying 100 - 240 VAC, 47 - 63 Hz, 1.2 — 0.6A (Master, Master-Expander - 30 W Max; Expander and Scanner - 15 W Max)
- AC power should be supplied to the unit through a 1.5 meters (5 foot) standard power cable, terminated by a grounded standard 3-prong plug
- Connect the IEC plug of the power cable to the AC mains IEC inlet
- Connect the power cable to a grounded AC outlet



Caution: Before switching on the unit, verify that the protective earth terminals of the unit are connected to the protective conductor of the mains power cord. Insert the mains plug only into a socket provided with a protective earth contact. The protective action must not be negated by use of an extension cord (power cable) without a protective conductor (grounding).

Clearance

Allow at least 90 cm (36 inches) of frontal clearance for operator access. Allow at least 10 cm (4 inches) at the rear of the unit for interface cable connections.

Setting up the Physical Layer of the Network

Tip: It is recommended that an additional number of ports be added to the actual figure of ports currently needed, to allow for adequate expansion of your system in the future. This minimizes the installation time of all equipment added to your system at a later date.

In order to define the optimum configuration of your site/s, the following information needs to be available:

- Over how many sites is the system located
- Distance between sites
- Number of ports to be scanned plus additional number of ports to be used in the future
- Number and type of SMART Patch Panels to be used
- Number of PVMax Scanners required
- Number of Expanders required
- Number of Security Controllers and Indicator Controllers required
- Types, length and quantity of cables
- Number of Splitters required

Installation of Units

Tip: It is recommended that the installation process begin with the SMART Patch Panels and Scanners in their wiring racks. Once this is complete, then proceed to install the Security Controller, Indicator Controllers, Expanders and the Master/Master Expander.

Unpacking

- Inspect the equipment before unpacking. Note and report evidence of damage immediately
- Place the container on a clean flat surface, cut all straps and open or remove the top of the container
- Carefully remove the unit from the container and place it on a clean surface

Installing a unit in the Wiring Rack

- Secure the units onto the Racks in the correct topology according to the plan
- Connect the unit to the power supply
- The Rack must be connected to a safety ground point
- The contact surfaces between the PVMax Modular Equipment and the Racks must be clean and unpainted to assure a good electrical contact

Units Connecting Cables

UNIT	UNIT	TYPE
Master	LAN	Patch cord or any cable CAT-5 or above
Master	Expander	Patch cord or any cable CAT-3 or above
Master Expander	LAN	Patch cord or any cable CAT-5 or above
Master Expander	Expander	Patch cord or any cable CAT-3 or above
Expander	Expander	Patch cord or any cable CAT-3 or above
Expander	Scanner	Patch cord or any cable CAT-3 or above
Expander	Indicator Controller Security Controller	Patch cord or any cable CAT-3 or above
Local Scanner	LAN	Patch cord or any cable CAT-5 or above
Security Controller	Rack Indicator External sensors	18 – 24 AWG wires cable
Indicator Controller	Rack Indicator	18 – 24 AWG wires cable
Scanner	Patch Panel Type A	Scanner Attachment Cord A (with or without splitter)
Scanner	Patch Panel Type B	Scanner Attachment Cord B (with or without splitter)
Local Scanner	Patch Panel Type A	Scanner Attachment Cord A (with or without splitter)
Local Scanner	Patch Panel Type B	Scanner Attachment Cord B (with or without splitter)
Patch Panel Port	Patch Panel Port	SMART Jumper

Cable Type Specification between Scanners, Indicator Controllers, Expanders, Master / Master Expander

The cables for connection between Scanners, Expanders, the Master Expander, the Master or the Network, must be eight wires (four twisted pairs).

You can use the following RiT P/N's or any CAT-5 or greater Patch Cords.

The RiT P/Ns are:

- R3208XXX - Giga UTP Patch Cords
- R3228XXX - CLASSix UTP Patch Cords
- R3257XXX - CLASSix STP Patch Cords

SMART Patch Panel Connections

Note:

The top SMART Panel should connect to Scanner Connector 1, the next SMART Panel to Scanner Connector 2, etc.

Scanner Attachment Cords



Scanner Attachment Cords

PVMax Scanners are connected to RiT's range of SMART patch panels with Scanner Attachment Cords:

- Supplied in various lengths
- Scanner Attachment Cords needed depend on the type of SMART Patch Panels to be connected and whether the Splitter is used
- Round Flat Attachment Cords are available in UTP and STP models
- Flat Attachment Cords are available in UTP models

The PVMax Splitter

- An attachment that doubles the functionality of the Scanner – two Scanner Attachment Cords can be fitted (PVMax Panels have the same functionality without using the Splitter)
- Up to 24 Patch Panels can be connected to the Scanner using the Splitter
- Either two Group A or Two Group B Scanner Attachment Cords are connected to the splitter

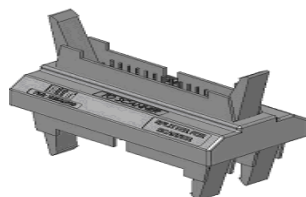


Figure PVMax Splitter

There are three different methods available to connect Patch Panels to PVMax Scanners.

1. **The first method** uses one of two different types of Scanner Attachment Cords. These are Group A and Group B. One end of the attachment cord is connected directly to the PVMax Scanner and the other end/s to the Patch Panel. This method allows a maximum of 12 Panels to be connected to each Scanner.

Group A

Each port of the PVMax Scanner is connected to a Patch Panel using a Scanner Attachment Cord with one 26-pin connector on each end.



Group B

Each port of the PVMax Scanner is connected to a Patch Panel using a Scanner Attachment Cord with a 26-pin connector on the Scanner end and two 14-pin connectors on the Patch Panel end.



2. **The Second method** uses the PVMax Splitter. The Splitter doubles the functionality of the PVMax Scanner, allowing up to 24

Panels to be connected to each Scanner. Both types can be connected to the Splitter as shown in the next two diagrams.

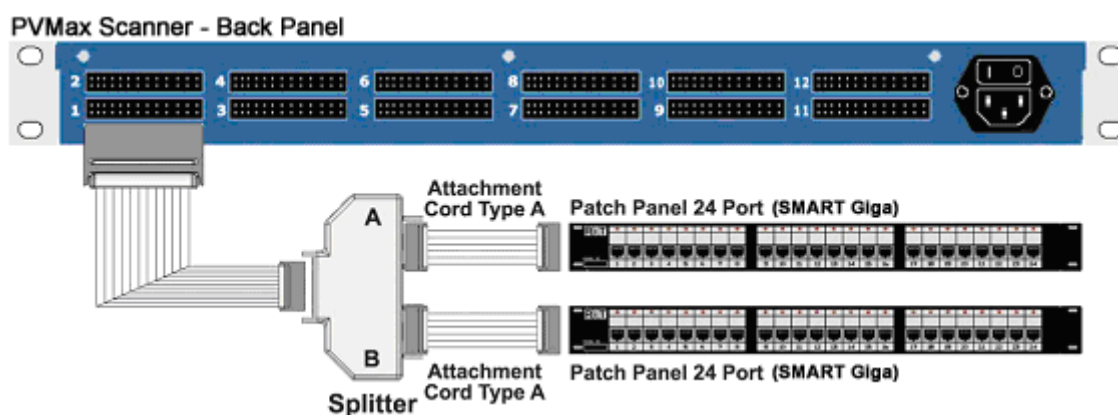
Splitter Attachment Cord

The connection between the Scanner and the Splitter can be made either with the regular Group A Scanner Attachment Cord or with the Splitter Attachment Cord, which is a short Group A Cord.

Group A:

Each PVMax Splitter is connected on one side to one port of the PVMax Scanner and on the other side to two Patch Panels using two Group A Scanner Attachment Cords.

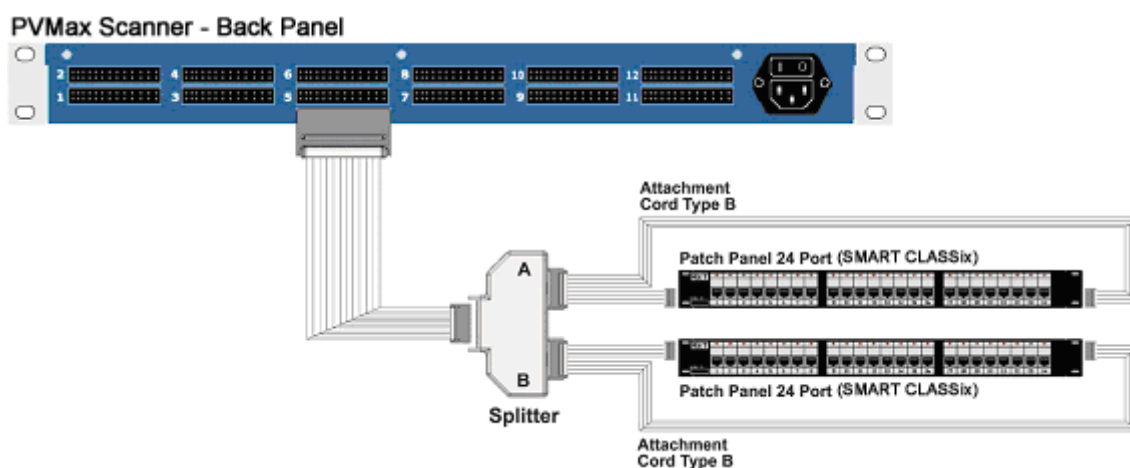
SMART Giga 24 Patch Panel example



Group B:

Each PVMax Splitter is connected on one side to one port of the PVMax Scanner and on the other side to two Patch Panels using two Group B Scanner Attachment Cords.

SMART CLASSix 24 Patch Panel example:



3. The third method uses PVMax Panels.

The PVMax Panels have been designed to work exclusively with the PVMax system without having to

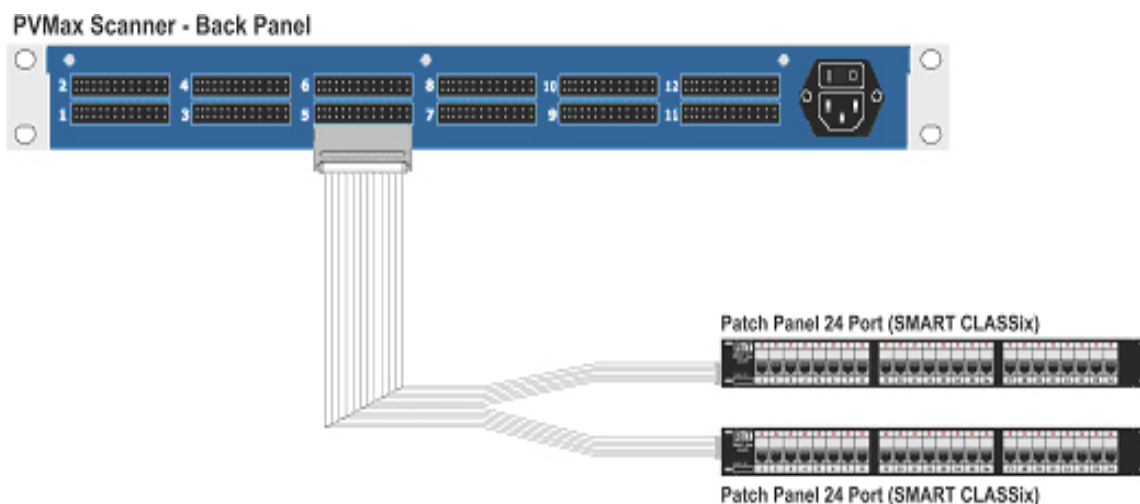
use Splitters. This method has the same functionality as the second method but it enables cutting by half the number of Scanner Attachment Cords required per installation.

In general all the panels are connected with Group B Scanner Attachment Cords. The top patch panel should connect to scanner connector 1A, the next panel to connector 1B and then 2A, 2B etc.

SMART CLASSix Panel, 24, PVMax

Each connector of the PVMax Scanner is connected to a PVMax Panel using a Group B Scanner Attachment Cord with a 26-pin connector on the Scanner end and two 14-pin connectors on the two PVMax Panel ends.

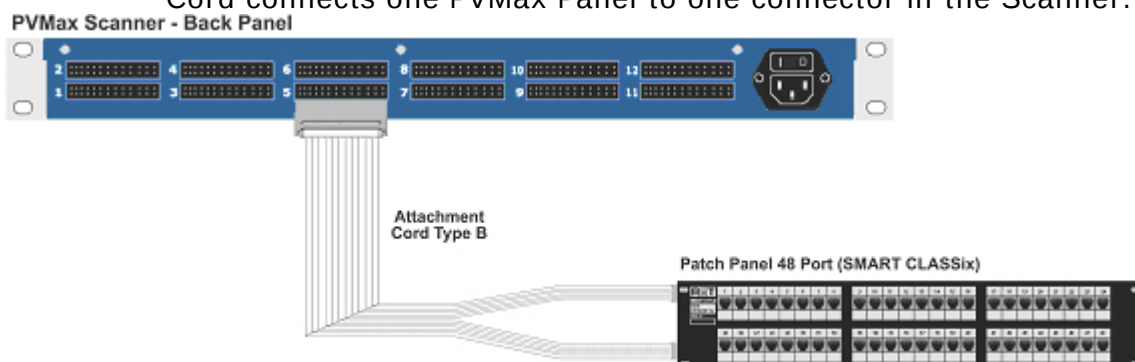
As seen in the following diagram, one Group B Scanner Attachment Cord connects 2 PVMax Panels to one connector in the Scanner.



SMART CLASSix Panel, 48, PVMax

Each connector of the PVMax Scanner is connected to a PVMax Panel using a Group B Scanner Attachment Cord with a 26-pin connector on the Scanner end and two 14-pin connectors on the PVMax Panel end.

As seen in the following diagram, one Group B Scanner Attachment Cord connects one PVMax Panel to one connector in the Scanner.



Note:

Ports cannot be patched in the same row on the panel.

Note:

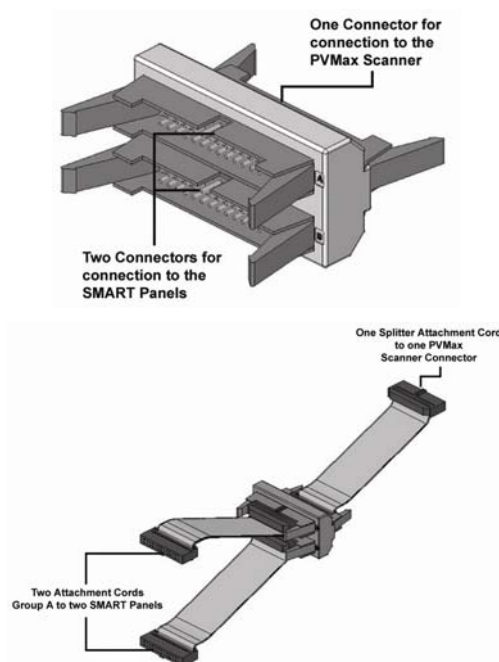
For a complete listing of all the SMART Panel types and their groupings, please refer to the RiT Enterprise Products Catalog.

To Connect the PVMax Scanner to the SMART Panels using the Splitter

Tip: First, determine how many SMART Panels are to be connected to a specific Scanner, and how many Splitters and Scanner Attachment Cords are needed.

1. Attach the Scanner and Panels in their correct order into the wiring rack.
2. Attach one Splitter Attachment Cord to the single connector on the upper end of the Splitter.

This is attached to the first connector in the Back of the PVMax Scanner.



3. Attach two Scanner Attachment Cords to the lower end of the Splitter.

These are attached to the first set of SMART Panels.

Table of Panel Types Connected to Scanners

The following table shows the different ways of connecting SMART Panels to Scanners, using Group A or Group B Scanner Attachment Cords and the Splitter.

Scanner Attachment Cord Configuration Table – Group A

Cable Group	Type	Part Number	Panel Type	Splitter	No. of Cables	No. of Panels	No. of Scanner connectors used
A	CLASSix	R3240001	SMART CLASSix 32 UTP with switches	No	1	1	1
		R3241001	SMART CLASSix 48 UTP with switches	Yes	2	1	1
		R3241011	SMART CLASSix 48 STP with switches	Yes	2	1	1
		R3243001	SMART CLASSix RJ-RJ 48 UTP	Yes	2	1	1
		R3243011	SMART CLASSix RJ-RJ 48 STP	Yes	2	1	1
	Giga	R38016X1	SMART-Giga 24 UTP, Vertical	Yes	2	2	1
		R38010X1	SMART-Giga 24 STP, Vertical	Yes	2	2	1
		R3331103	SMART Giga 32 UTP with switches	No	1	1	1
		R3333023	SMART Giga 32 STP with switches	No	1	1	1
		R3340403	SMART Giga RJ-RJ 32, 2 Row UTP	No	1	1	1
		R3341103	SMART Giga RJ-RJ 32 UTP	No	1	1	1
		R3343023	SMART Giga RJ-RJ 32 STP	No	1	1	1
	F/O	R32023X1	SMART SC 48	No	1	1	1
		R31970X1	SMART MT-RJ 48	Yes	2	2	1
	Other	R3723101	SMARTelco 24 Fast Ethernet	Yes	2	2	1

Scanner Attachment Cord Configuration Table – Group B

Cable Group	Type	Part Number	Panel Type	Splitter	No. of Cables	No. of Panels	No. of Scanner connectors used
B	SMARTen - PVMaX	R3940014	SMARTen UTP 24, PVMaX	No	1	2	1
		R3940114	SMARTen STP 24, PVMaX	No	1	2	1
	CLASSix	R3910011	SMART CLASSix 24 UTP	Yes	2	2	1
		R3910101	SMART CLASSix 24 STP	Yes	2	2	1
		R3914011	SMART CLASSix 48 UTP	Yes	2	1	1
	CLASSix - PVMaX	R3910014	SMART CLASSix 24 UTP, PVMaX	No	1	2	1
		R3910104	SMART CLASSix 24 STP, PVMaX	No	1	2	1
		R3914014	SMART CLASSix 48 UTP, PVMaX	No	1	1	1
		R3916014	SMART CLASSix 48 1U, UTP, PVMaX	No	1	1	1
		R3241004	SMART CLASSix 48 UTP with switches, PVMaX	No	1	1	1
		R3241014	SMART CLASSix 48 STP with switches, PVMaX	No	1	1	1
		R3243004	SMART CLASSix RJ-RJ 48 UTP, PVMaX	No	1	1	1
		R3243014	SMART CLASSix RJ-RJ 48 STP, PVMaX	No	1	1	1
	Giga	R38X2124	SMART Giga 24 UTP	Yes	2	2	1
		R38X2148	SMART Giga 48 UTP	Yes	2	1	1
		R3260011	SMART Giga 48 1U, UTP	Yes	2	1	1
	F/O - PVMaX	R41970X4	SMART LC 48, PVMaX	No	1	2	1
	Other	R3260080	SMART Keystone Panel, 24, PVMaX	No	1	2	1
		R3286111	SMART Voice Block 20	No	1	2	1
		R3286113	SMART Voice Block 16	No	1	2	1

Communication Links (UP LINKS and DOWN LINKS)

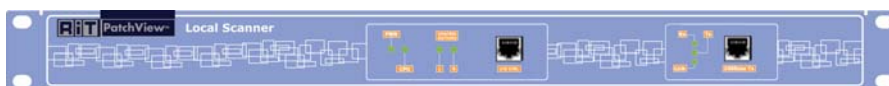
- The UP LINK of a Scanner is used for communication between the Scanner installed inside the site and one of the eight DOWN LINK ports of an Expander.
- The UP LINK of an Indicator Controller is used for communication between the Indicator Controller installed inside the site and one of the eight DOWN LINK ports of an Expander.
- The UP LINK of an Expander is used for communication between the low level Expander and one of the eight DOWN LINK ports of the high level Expander or one of the four DOWN LINK ports of the Master



PVMax Master



PVMax Master Expander



PVMax Local Scanner



PVMax Expander



PVMax Scanner



PVMax Indicator Controller

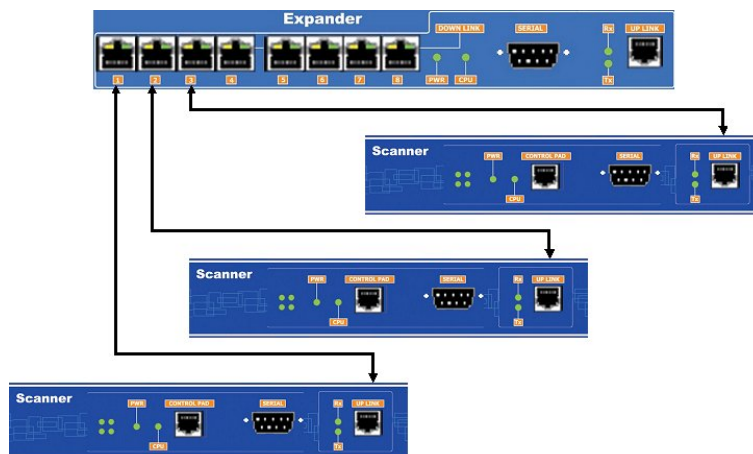


PVMax Security Controller

Connecting an PVMax Expander to a PVMax Scanner

Attach an RJ-45 connector to one of the eight DOWN LINK ports of the Expander and connect the other end of the cable to the UP LINK port of the Scanner.

Repeat until all required Scanners in the site are connected to Expanders.

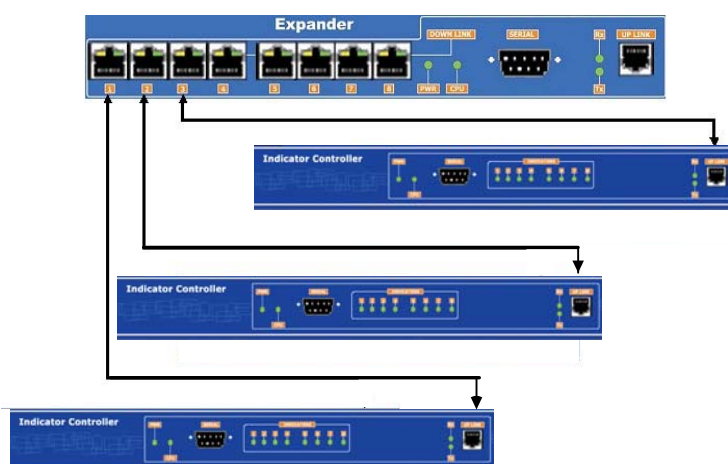


Connecting an Expander to Scanners

Connecting an Expander to an Indicator Controller

Attach an RJ-45 connector to one of the eight DOWN LINK ports of an Expander and connect the other end of the cable to the UP LINK port of an Indicator Controller.

Repeat until all required Indicator Controllers are connected at the site.

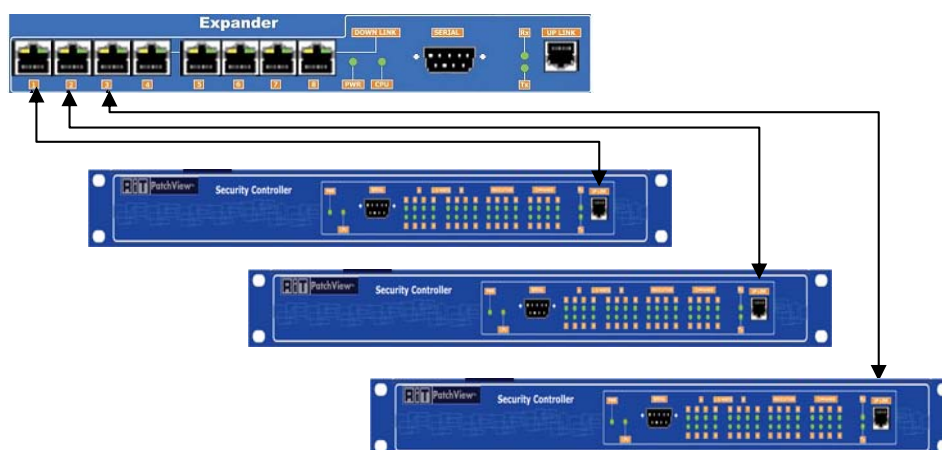


Connecting an Expander to an Indicator Controller

Connecting an Expander to a Security Controller

Attach an RJ-45 connector to one of the eight DOWN LINK ports of an Expander and connect the other end of the cable to the UP LINK port of a Security Controller.

Repeat until all required Security Controllers are connected at the site

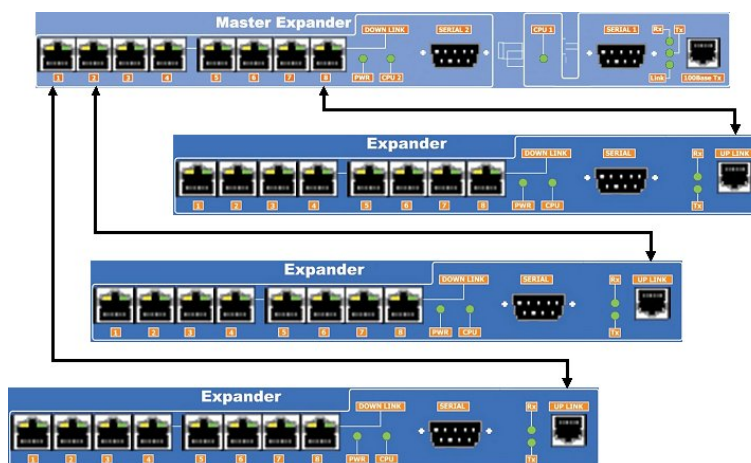


Connecting an Expander to a Security Controller

Connecting a Master Expander to Expanders

Attach an RJ-45 connector to one of the eight DOWN LINK ports of the Master Expander and connect the other end of the cable to the UP LINK port of the Expander.

Repeat until all required PVMMax Expanders are connected at the site. PVMMax Expanders can be cascaded from one level to the next level.



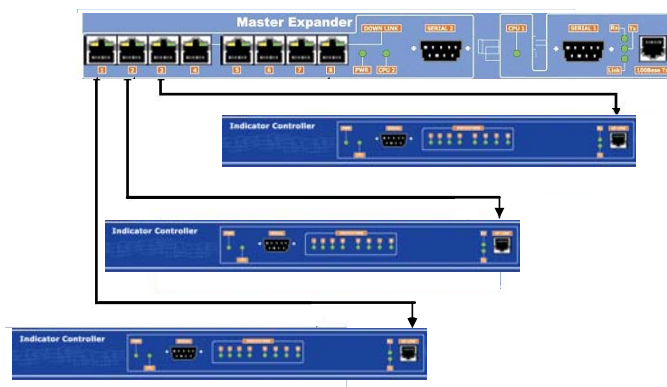
Connecting a Master Expander to Expanders

Connecting a Master Expander to Indicator Controllers

Attach an RJ-45 connector to one of the eight DOWN LINK ports of a Master Expander and connect the other end of the cable to the UP

LINK port of an Indicator Controller.

Repeat until all required Indicator Controllers are connected at the site.



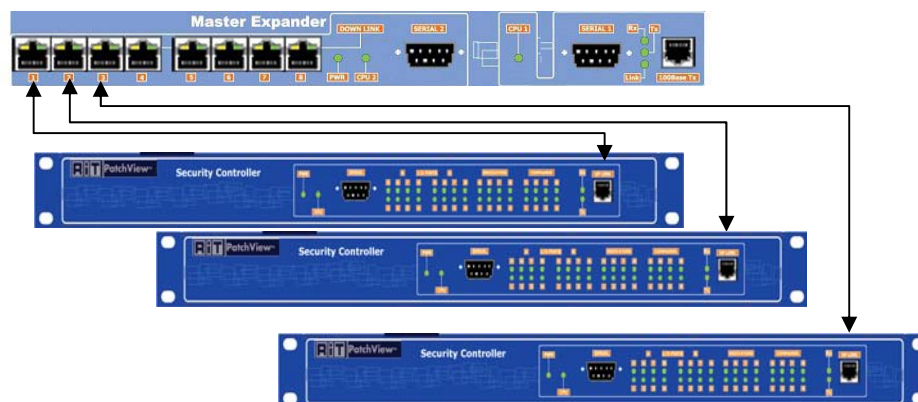
Connecting a Master Expander to Indicator Controllers Expanders

Connecting a Master Expander to a Security Controller

Attach an RJ-45 connector to one of the eight DOWN LINK ports of a Master Expander and connect the other end of the cable to the UP

LINK port of a Security Controller.

Repeat until all required Security Controllers are connected at the site.

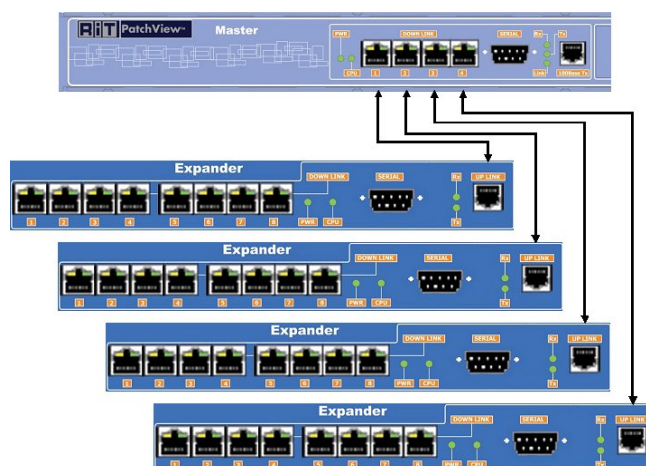


Connecting a Master Expander to Security Controllers

Connecting a Master to Expanders

Attach an RJ-45 connector to one of the four site ports of the Master and connect the other end of the cable to the UP LINK port of the Expander.

Repeat until four Expanders are connected to the Master. Each one of these Level 1 Expanders is located at a site.

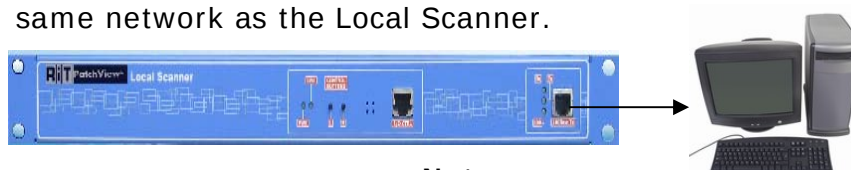


Connecting a PVMax Master to PVMax Expanders

Connecting a Local Scanner

Connect the power cord to the power socket located at the rear of the unit.

Attach an RJ-45 patch cord to the 100 Base Tx (Ethernet port) on the front of the Local Scanner and connect the other end to a PC. The TCP/IP address must be on the same network as the Local Scanner.



Note:

Panels that are connected to the Local Scanner cannot be connected to panels from another scanner.

Chapter 4 - Setup

PVMax Master Configuration Setup

The PVMax Master is defined as an SNMP agent node in the LAN. It can be set up for connection using any PC that contains an available serial port and HyperTerminal software, which is generally included as part of the Windows operating system.

The computer used for configuration is referred to as the "configuring computer".

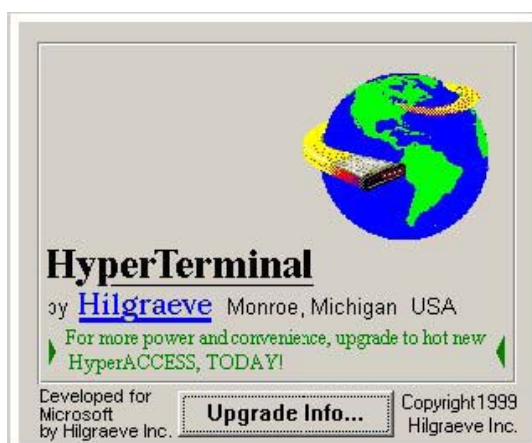
There are two different steps that need to be performed to configure the setup of the Master. These are:

- Accessing the HyperTerminal and defining the Port Settings
- Accessing the Setup Main Menu, which has two sub menus:
 - Defining the Parameter Settings of the Master/Master Expander
 - Defining the Software Settings of the Master/Master Expander

Accessing the HyperTerminal

- To access the HyperTerminal and define the Port Settings
 1. Attach a standard RS-232 NULL - cable (RIT P/N 4465430) to the SERIAL port on the Master's front panel ("SERIAL1" on the Master-Expander) and to a free serial port in the configuring computer.
 2. Execute the HyperTerminal software from the "Start-Menu > Programs > Accessories > Communications".

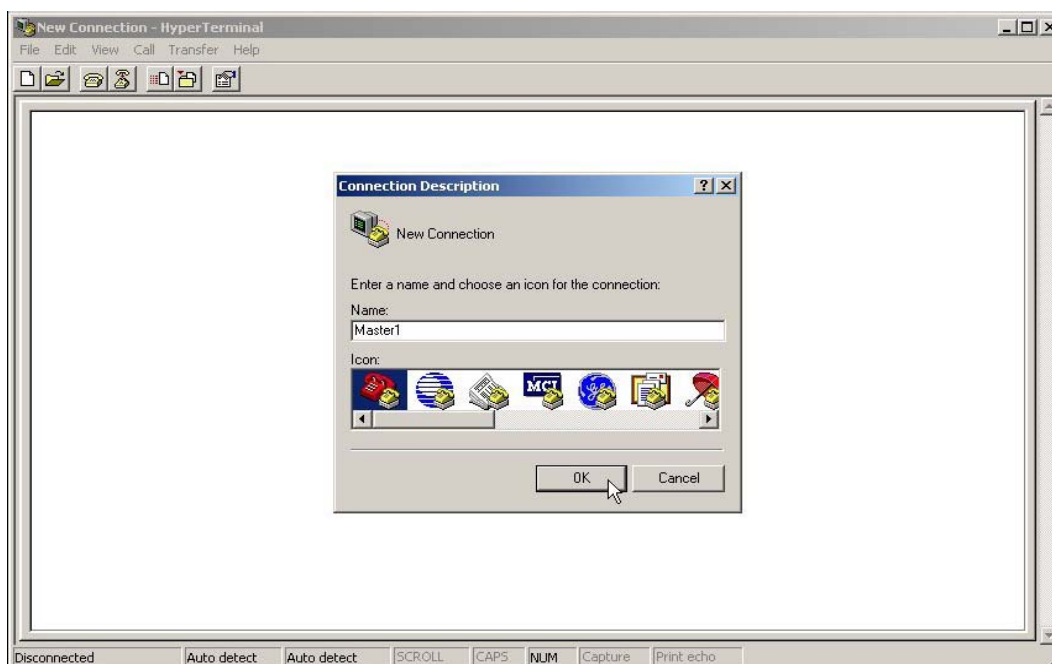
The HyperTerminal screen opens.



HyperTerminal Screen

The New Connection — HyperTerminal screen opens. Note that the screen is blank.

The Connection Description dialog box opens.



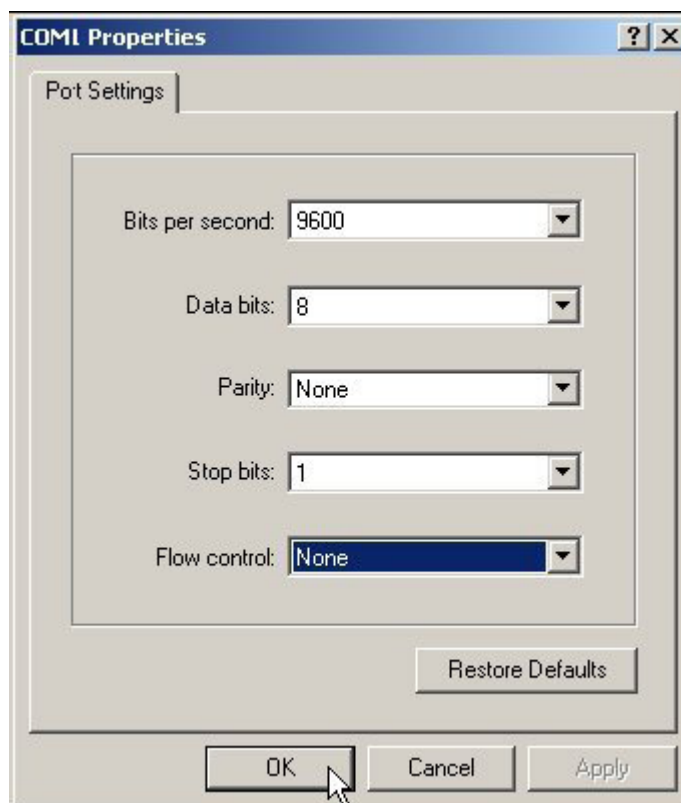
New Connection Screen

3. Enter the name of the device and click **OK** to continue.
The Connect To dialog box opens.



Connect To Dialog Box

4. In the *Connect using* field, select from the drop-down menu the serial port that the cable is connected to, for example: COM1 and click OK to continue.
The Properties dialog box opens.



COM1 Properties Dialog Box

5. Define the port setting, which is used to establish communication with the Master.

FIELD	SETTING
Bits per second	9600
Data bits	8
Parity	None
Stop bits	1
Flow Control	None

6. Click OK to continue.

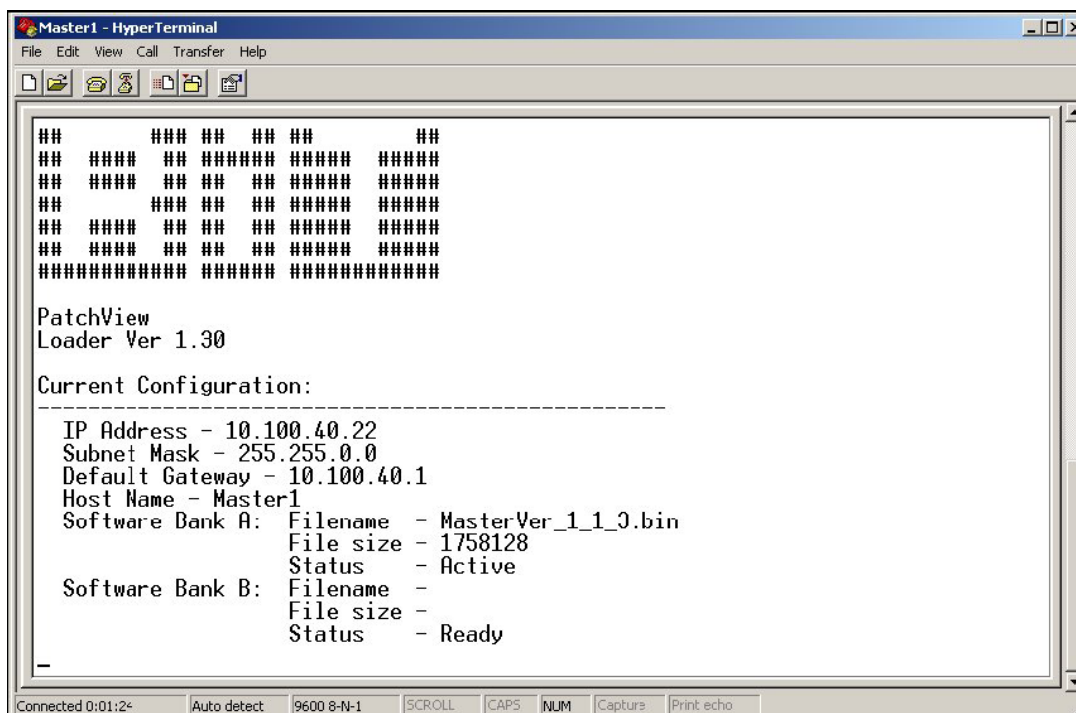
Accessing the Setup Main Menu of the Master / Master Expander

To access the Setup Main Menu in the Master / Master Expander

1. Turn on the Master/Master Expander's power switch.

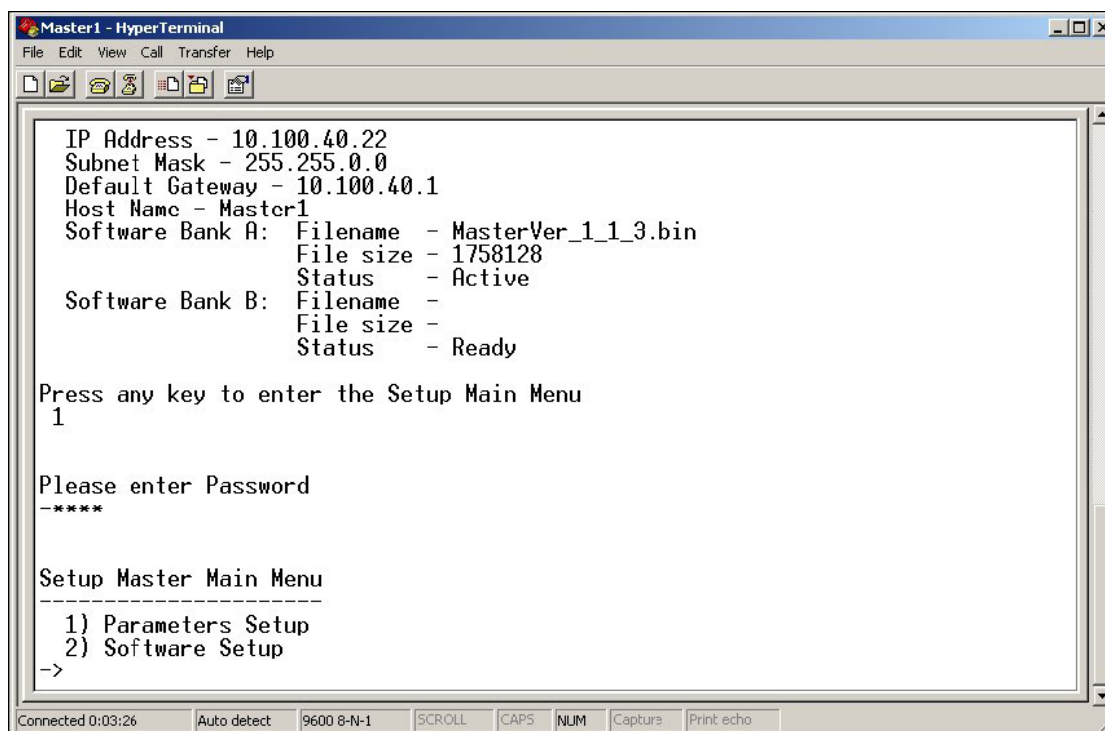
A countdown menu appears in the HyperTerminal screen as shown below.

HyperTerminal screen



HyperTerminal Screen

2. Press any key to stop the countdown.



Setup Master Main Menu

3. Enter the Password. Use the default password of '1234' if this has not been changed.

Note:

If an invalid password is entered you are asked to enter the password again.

The Setup Master Main Menu appears on the screen.

The Setup Master Main Menu is divided into the following two submenus:

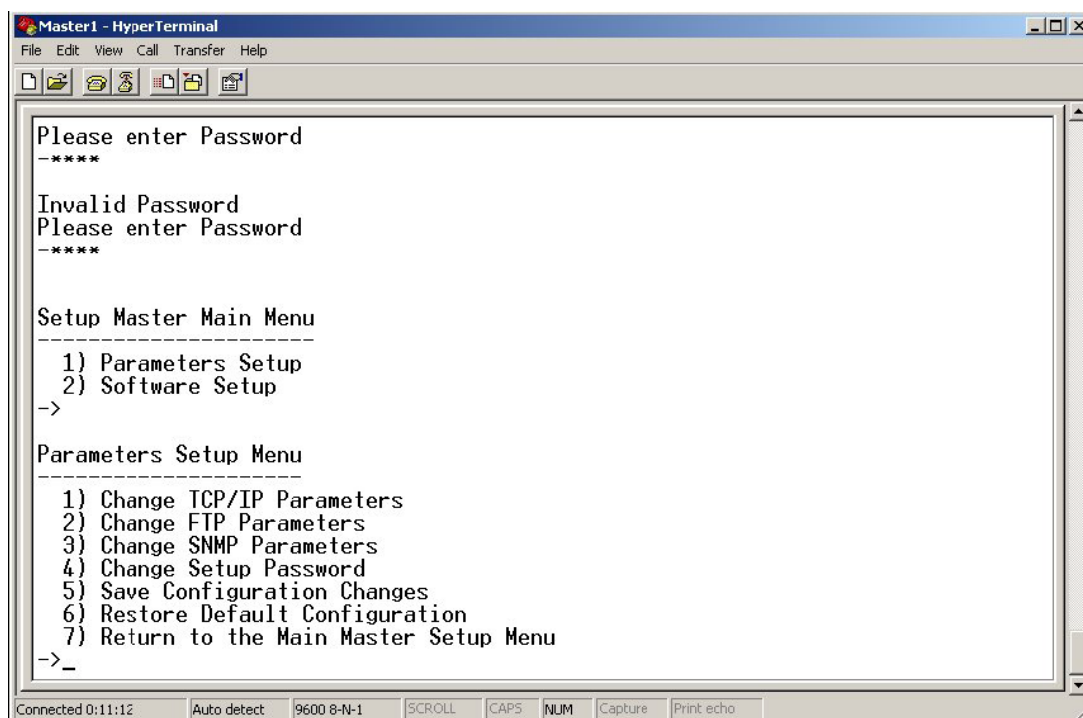
- Parameters Setup Menu
- Software Setup Menu

The Parameters Setup Menu

To set the parameters

1. Enter '1' to access the Parameters Setup Menu.

The Parameters Setup Menu opens.



Parameters Setup Menu

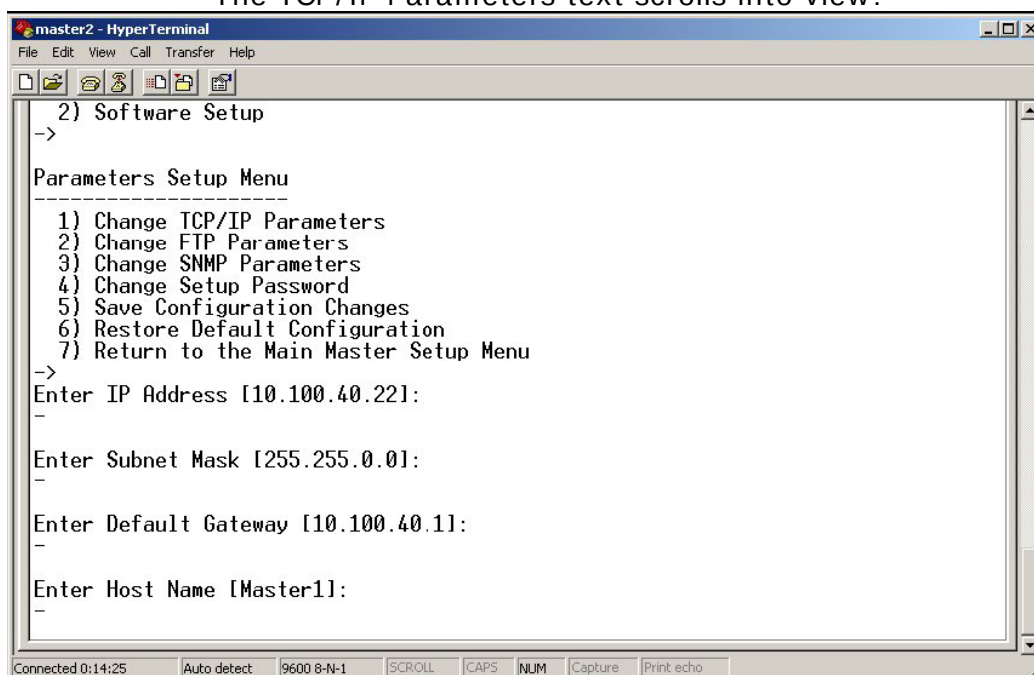
Note:

At any time during the process, you can enter 'Esc' to return to the Main Menu.

Tip: It is recommended to execute the Setup in the order of the Menu.

2. Enter '1' to display the TCP/IP Parameters screen.

The TCP/IP Parameters text scrolls into view:



TCP/IP Parameters Screen

3. Follow the configuration instructions:

Enter IP address [10.100.40.22]:

Enter the new IP address or press enter to keep the address displayed in the middle of the braces.

Enter Subnet mask [255.255.0.0]:

Enter the new Subnet mask or press enter to keep the mask displayed in the middle of the braces.

Enter Default Gateway [10.100.40.1]:

Enter the default gateway or press enter to keep the default gateway displayed in the middle of the braces.

Enter Host Name [Master1]:

Enter the Host Name or press enter to keep the Host Name displayed in the middle of the braces.

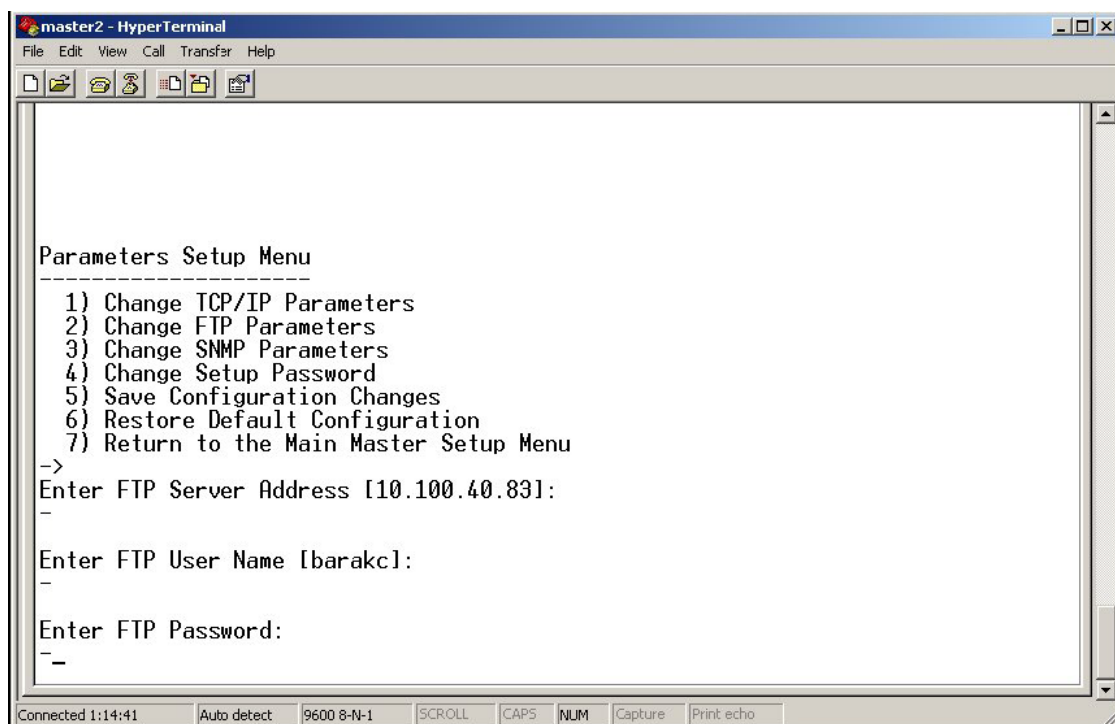
Note:

If an invalid parameter is entered you are asked to reinsert it. Throughout the setup process, when the last parameter of each sub menu is entered and Enter is pressed, the Parameter Setup Menu is displayed.

Press Esc to stop the configuration and to return to the PatchView Master's main menu.

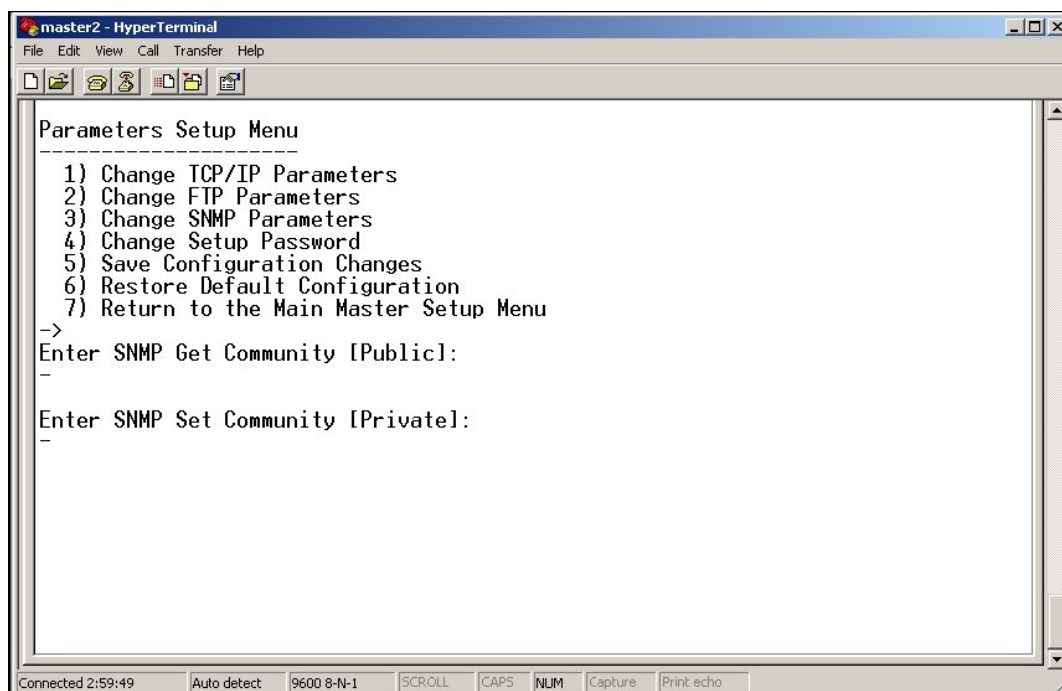
4. Press Enter to return to Setup Parameter Menu.

5. Press Enter several times until the end of the Setup Parameter Menu and enter '2' to display the FTP Parameters .



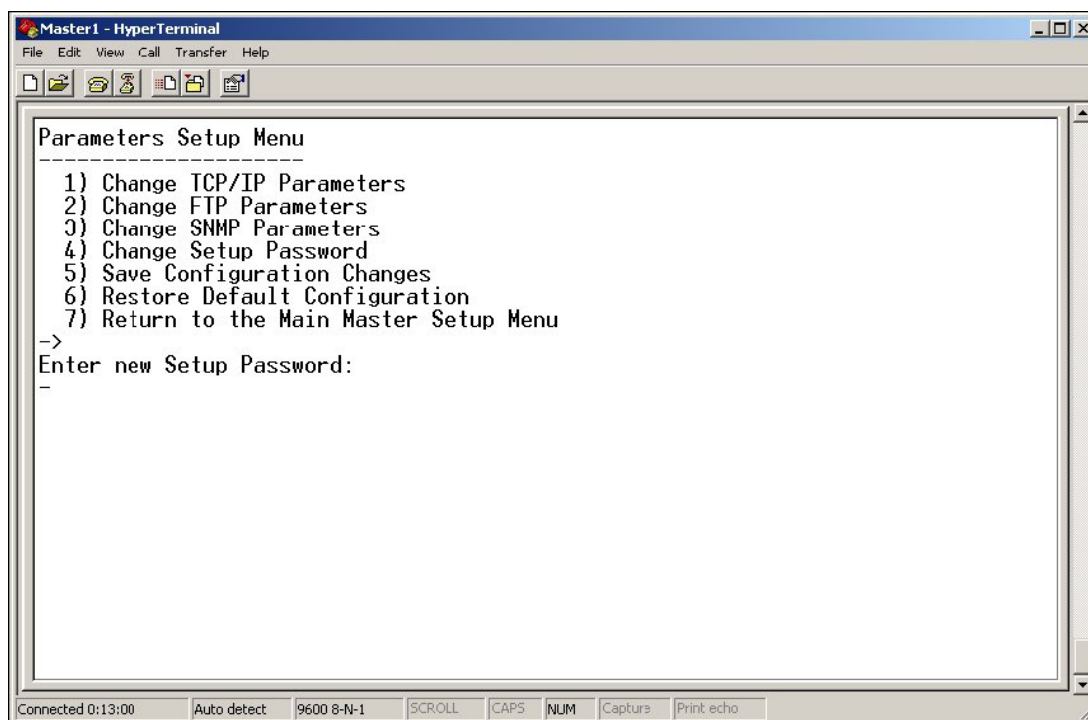
FTP Parameters Screen

6. Enter the FTP Parameters and press Enter after each FTP parameter.
7. Enter '3' to display the SNMP Parameters screen.



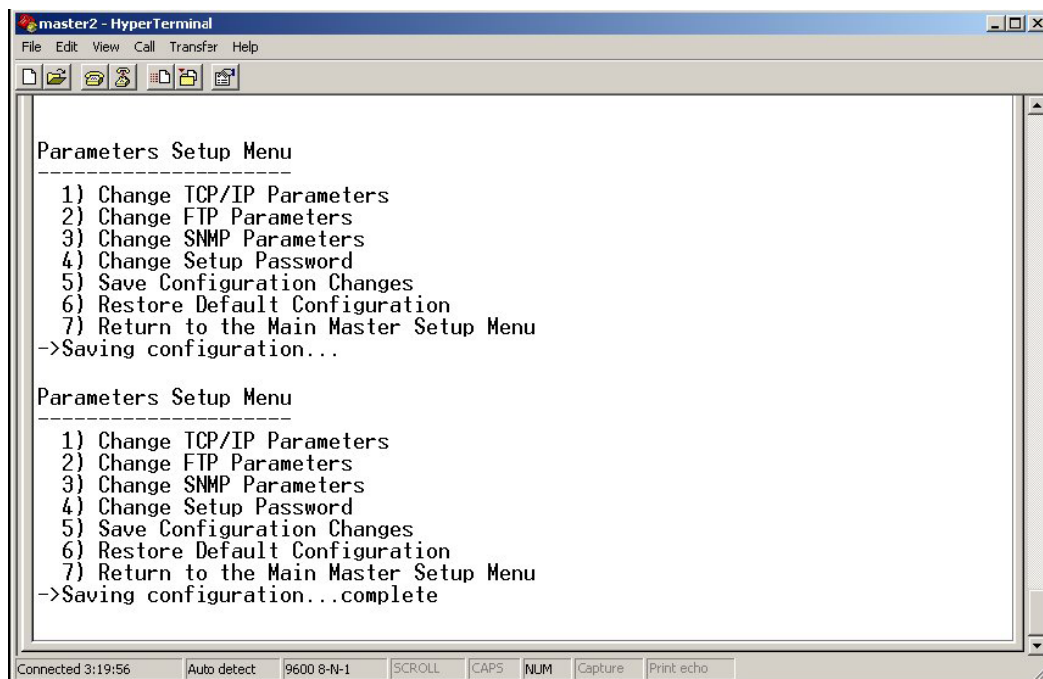
SNMP Parameters Screen

8. Enter the SNMP Parameters and press 'Enter' after each SNMP parameter. Each parameter is restricted to 30 characters.
9. The Parameters Setup Menu redisplay.
Note: This step is not mandatory and is only used if you want to change your password.
10. Enter '4' to display the Change Setup Password screen.



Change Setup Password Screen

11. Enter the Setup password and press 'Enter'.
12. Enter '5' to display the Save Configuration Changes screen.

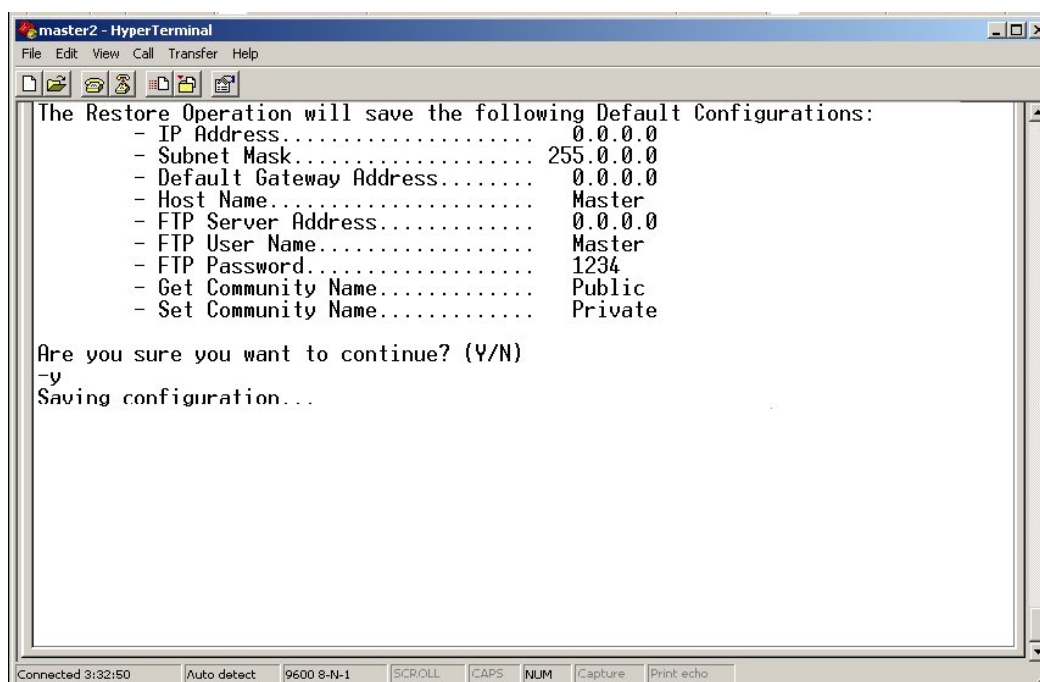


Save Configuration Changes Screen

The system automatically saves the configuration. The cursor flashes during the save process and the word 'complete' appears when the new parameters have been saved. The Parameters Setup Menu redisplay.

Note: This step is very important. All changes will be lost if you do not save the configuration changes!

13. Enter '6' to display the Restore Default Configuration screen (optional).



Restore Default Configuration Screen

Enter 'Y' to restore the configuration.

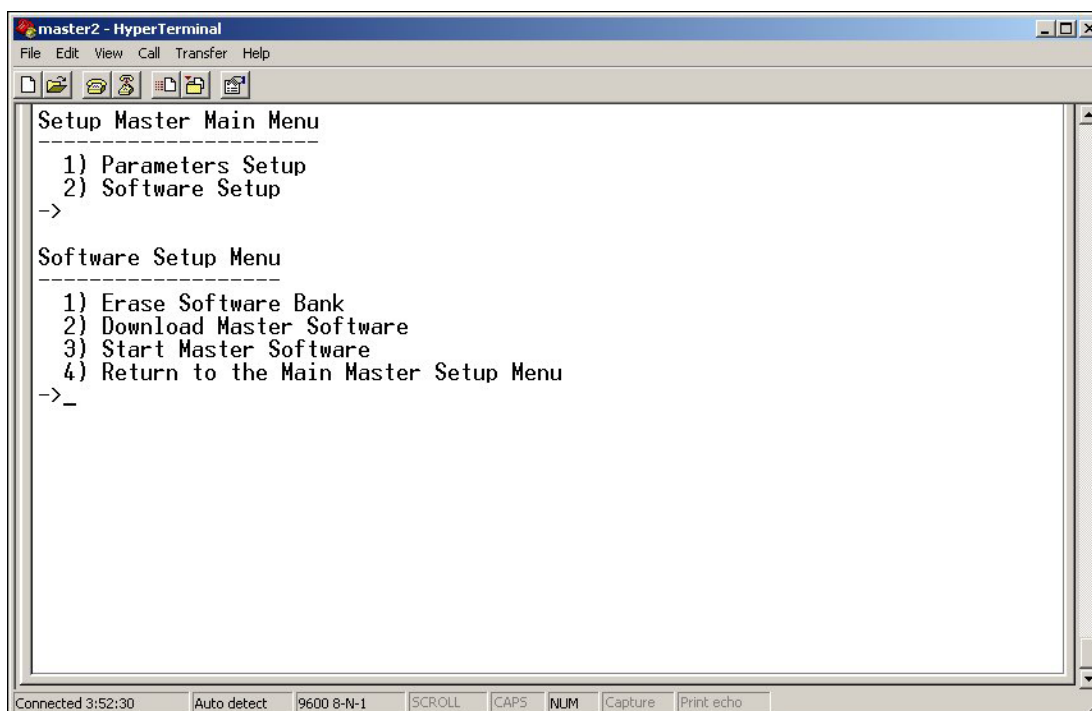
The system automatically restores the configuration. The cursor flashes during the restore process and the word 'complete' appears when the previous parameters have been reinstated.

The Parameters Setup Menu scrolls up into view.

14. Enter '7' to return to the Main Master Setup Menu.

The Main Master Setup Menu scrolls up into view.

The Software Setup Menu

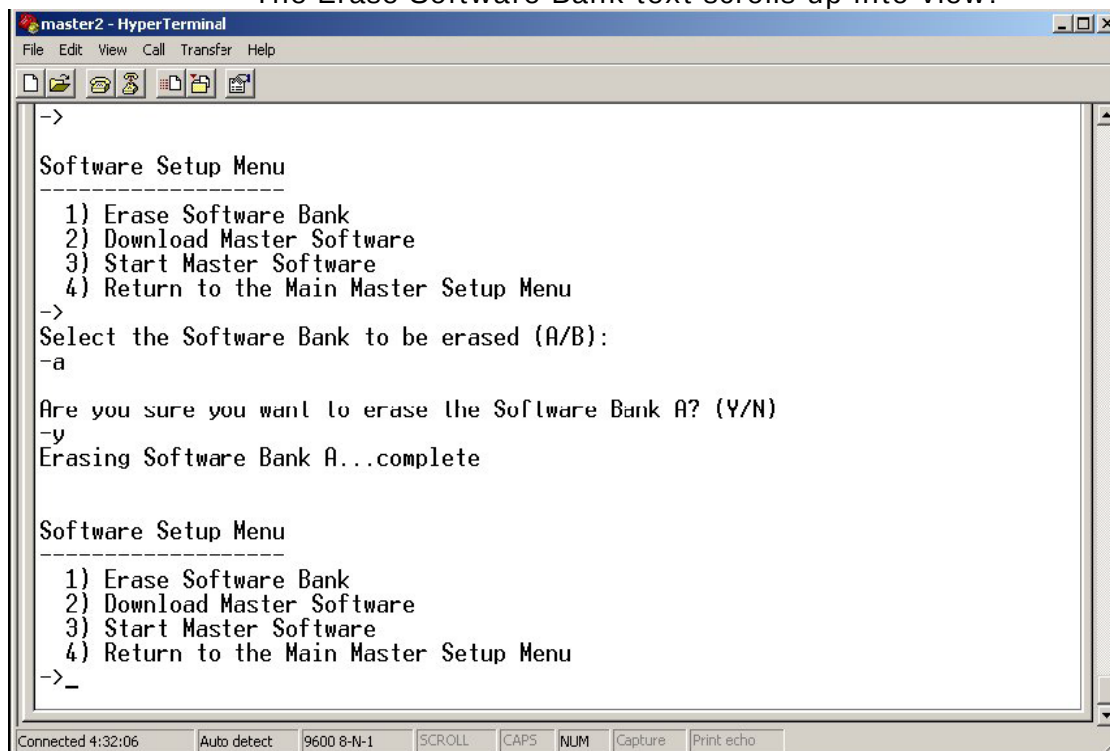


Software Setup Menu Screen

► To modify the Software Setup

1. Enter '1' to erase the Software Bank (optional).

The Erase Software Bank text scrolls up into view:



Erase Software Bank Screen

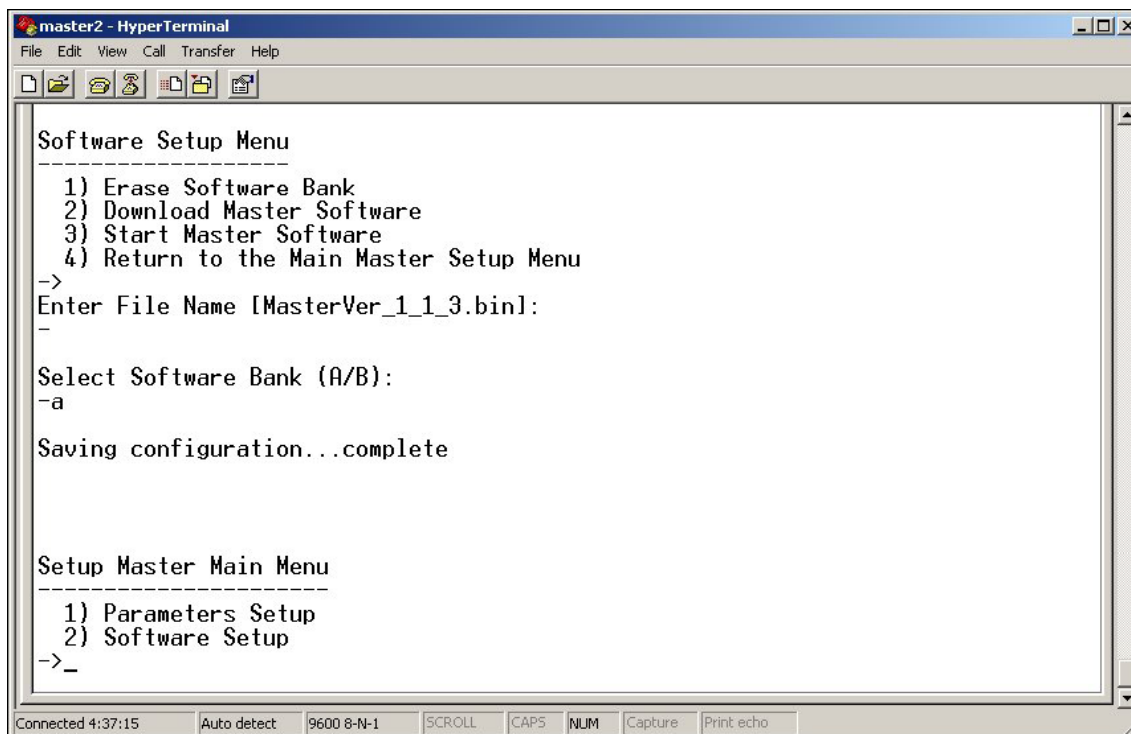
2. Select the Software Bank to be erased.

3. Confirm that you wish to erase the Software Bank.

The Software Setup Menu scrolls up into view

4. Enter '2' to download the Master Software.

The Download Master Software text scrolls up into view.

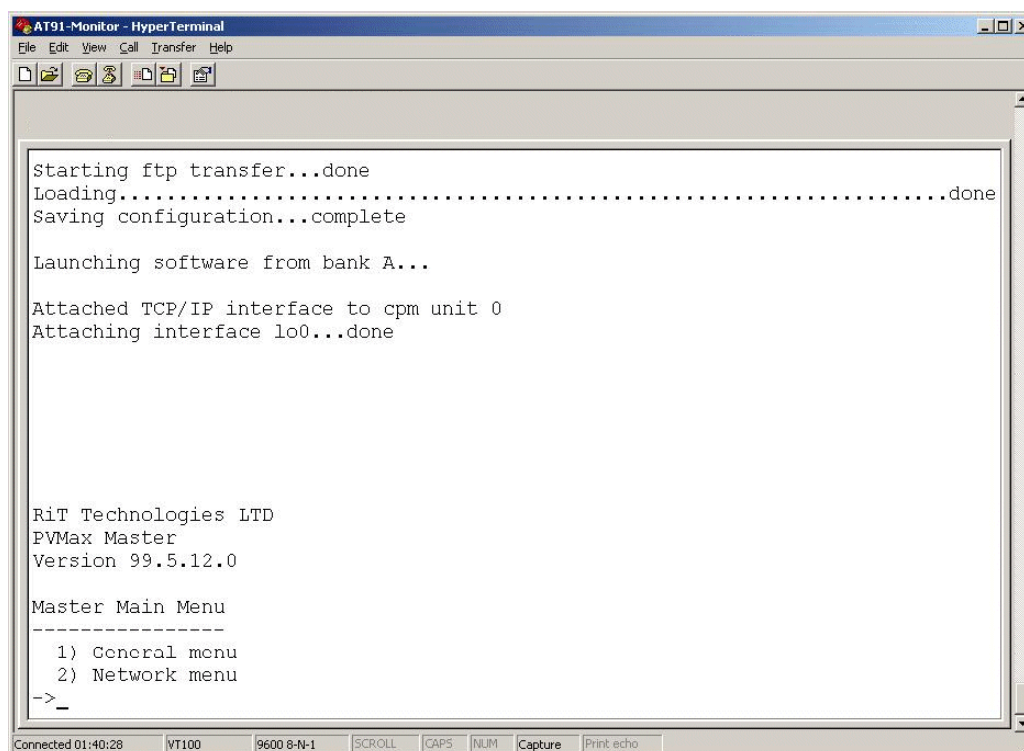


Download Master Software Screen

5. Enter the File Name including path. The file must reside on a FTP server which is defined in the above in the parameters setup
6. Select the Software Bank onto which the new configuration is to be downloaded.
7. Press the 'Enter' key.

The process begins. When complete the software is downloaded and launched from the selected Software Bank. The Master Main Menu scrolls up into view.

The Master Main Menu



```
AT91-Monitor - HyperTerminal
File Edit View Call Transfer Help

Starting ftp transfer...done
Loading.....done
Saving configuration...complete

Launching software from bank A...

Attached TCP/IP interface to cpm unit 0
Attaching interface lo0...done

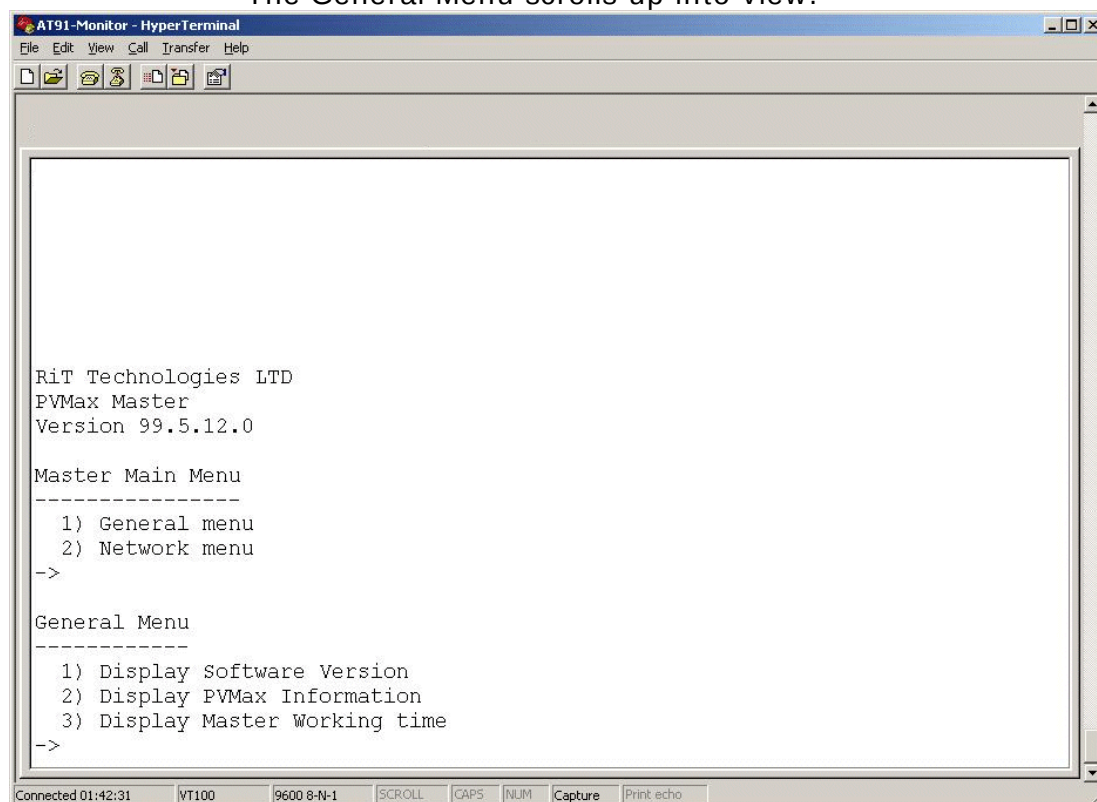
RiT Technologies LTD
PVMax Master
Version 99.5.12.0

Master Main Menu
-----
  1) General menu
  2) Network menu
-> _
```

Connected 01:40:28 VT100 9600 8-N-1 SCROLL CAPS NUM Capture Print echo

Master Main Menu Screen

- ▶ To view or change the Master Main Menu
 1. Enter '1' to display the General Menu (optional).The General Menu scrolls up into view.



```
AT91-Monitor - HyperTerminal
File Edit View Call Transfer Help

RiT Technologies LTD
PVMax Master
Version 99.5.12.0

Master Main Menu
-----
  1) General menu
  2) Network menu
->

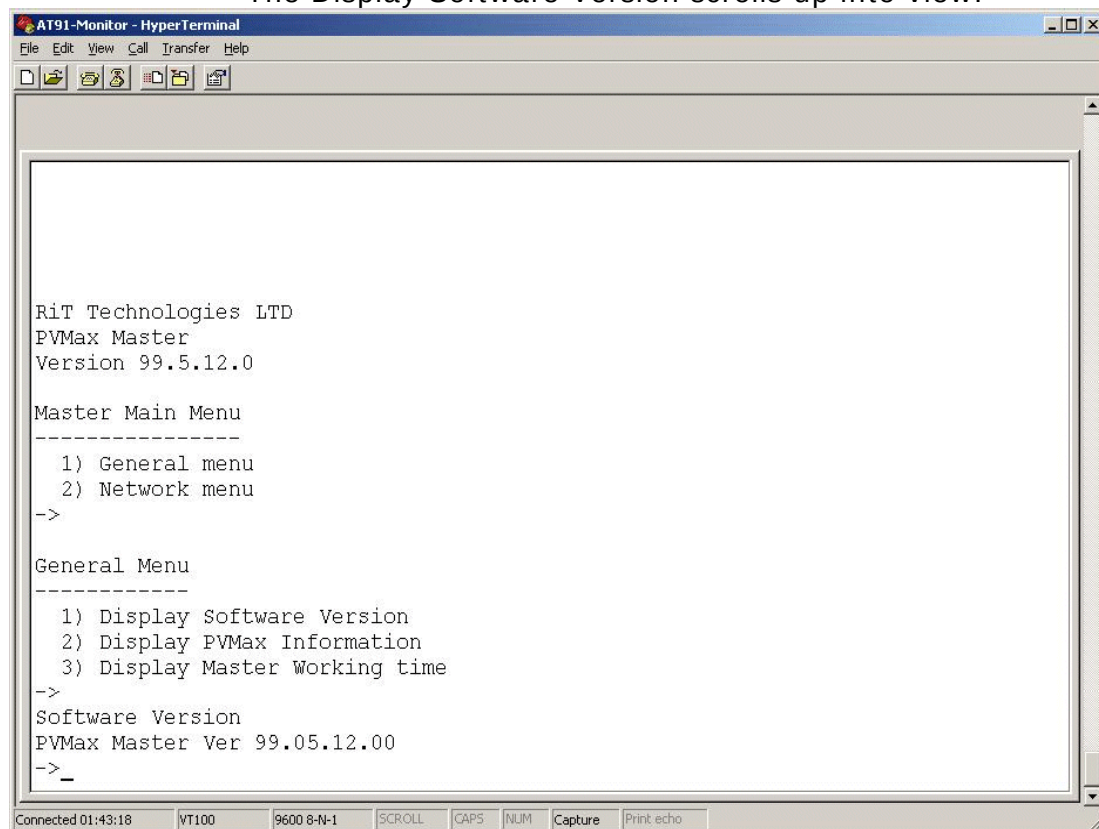
General Menu
-----
  1) Display Software Version
  2) Display PVMax Information
  3) Display Master Working time
->
```

Connected 01:42:31 VT100 9600 8-N-1 SCROLL CAPS NUM Capture Print echo

General Menu

2. Enter '1' to display the software version.

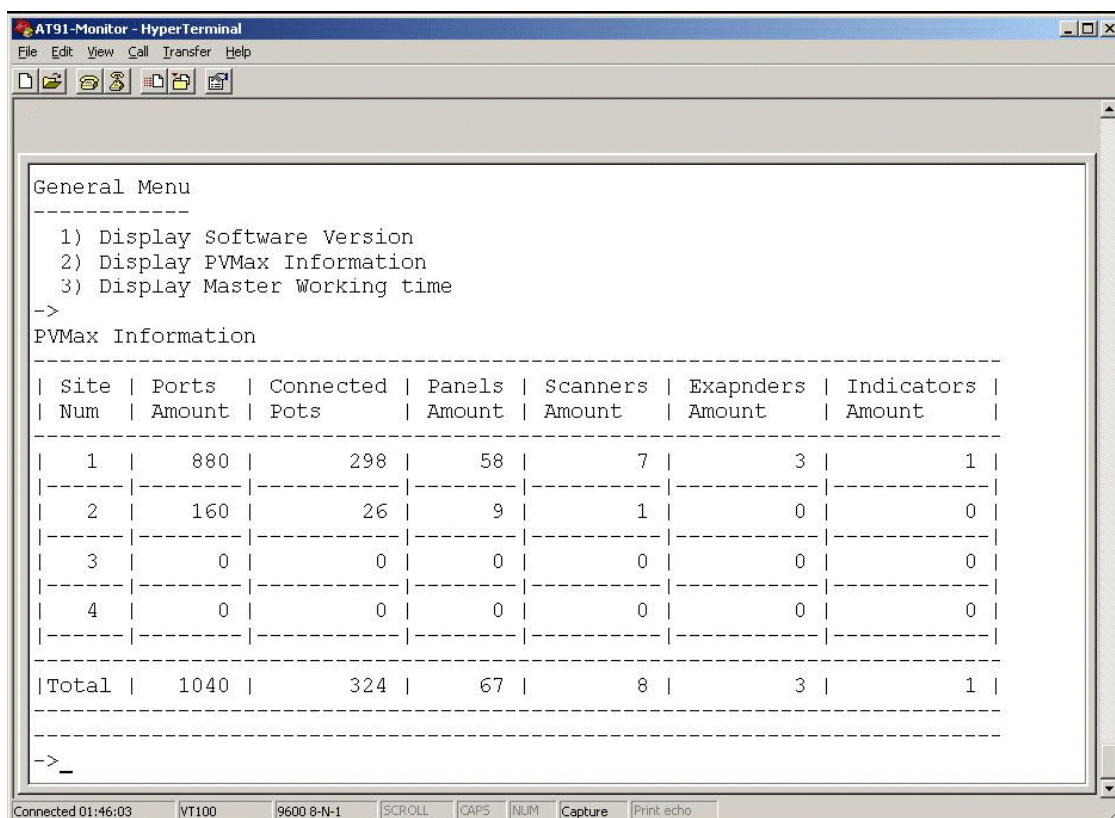
The Display Software Version scrolls up into view.



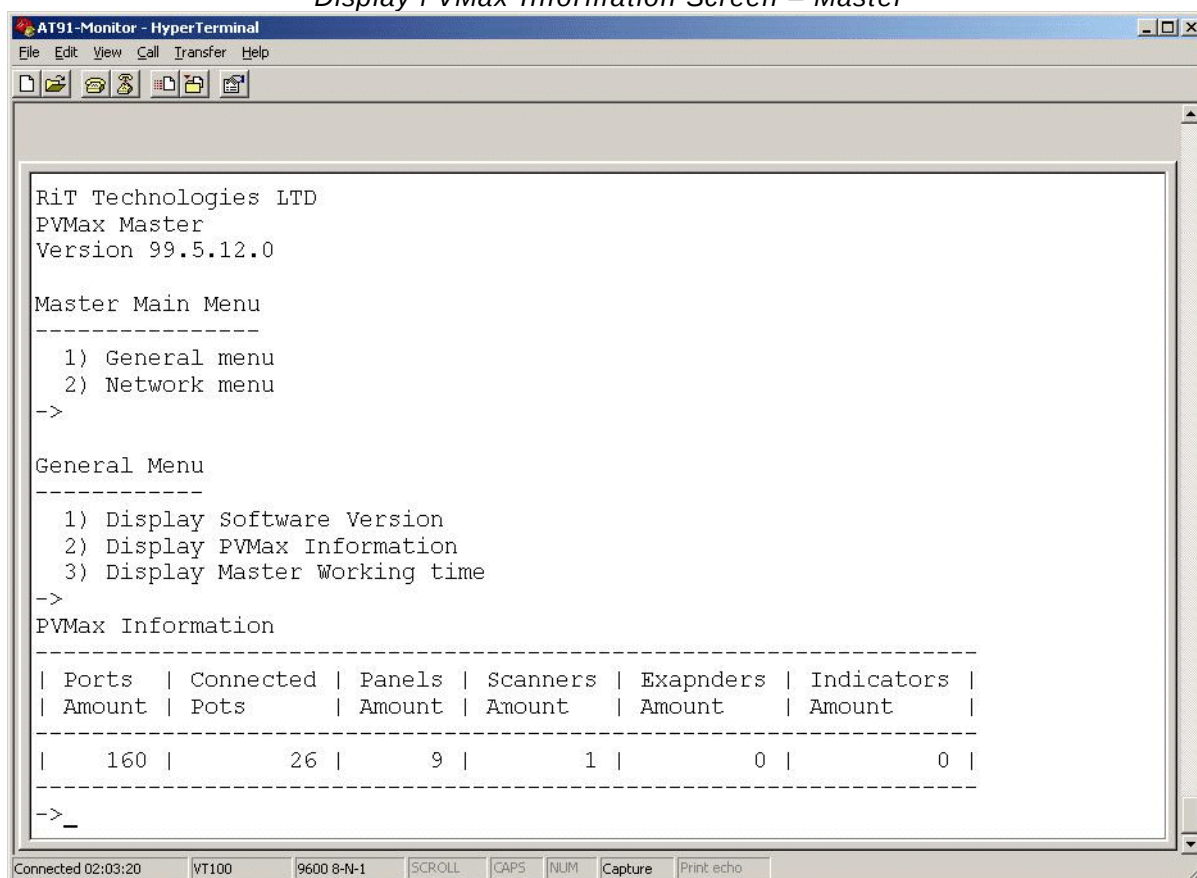
Display Software Version Screen

3. Enter '2' to display the PVMax information.

The Display PVMax Information scrolls up into view. The screen differs if the information being displayed is for a Master or Master Expander.



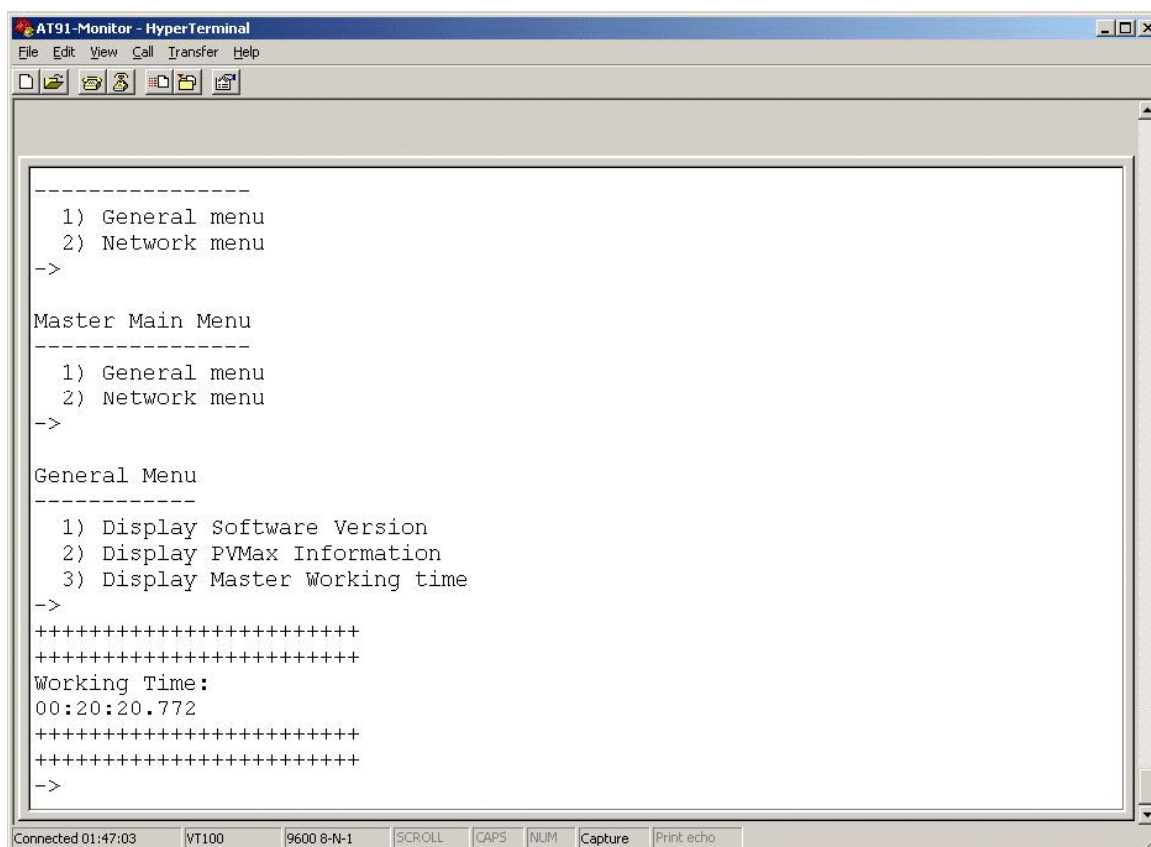
Display PVMax Information Screen – Master



PVMax Information Screen – Master Expander

4. Enter '3' to display the Master working time.

The Display Master Working Time scrolls up into view.



```
-----
 1) General menu
 2) Network menu
->

Master Main Menu
-----
 1) General menu
 2) Network menu
->

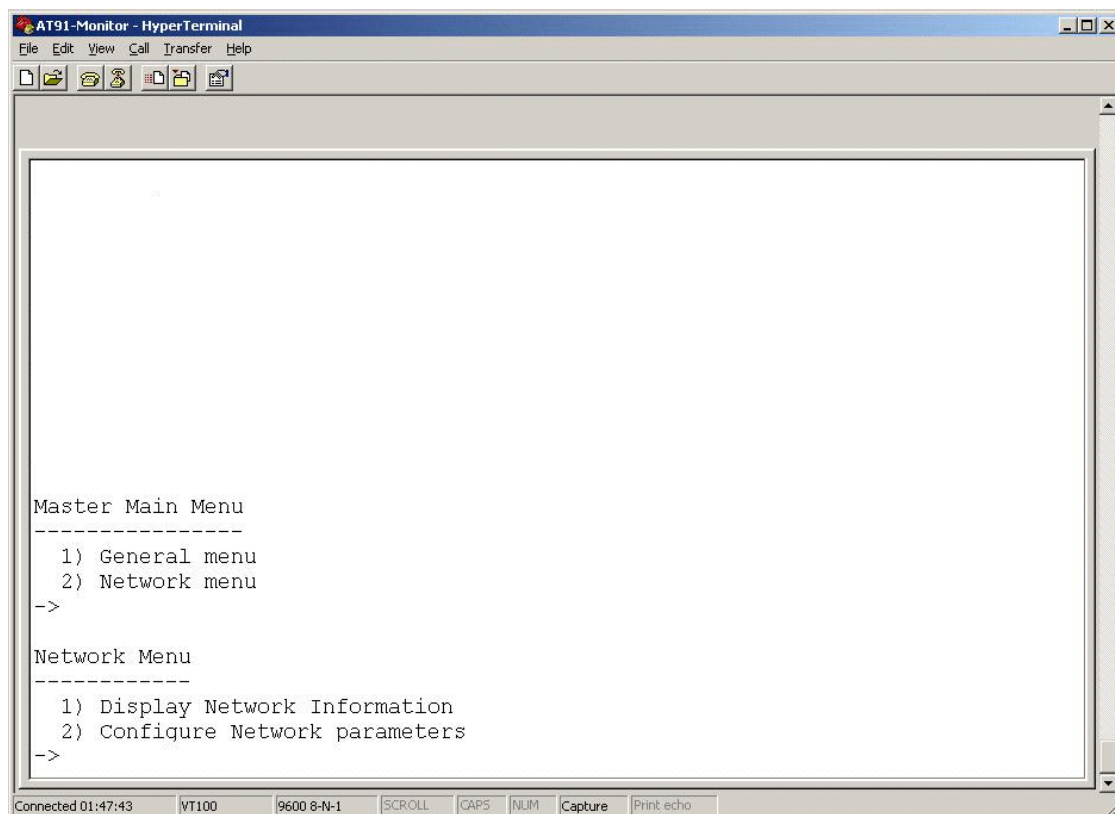
General Menu
-----
 1) Display Software Version
 2) Display PVMax Information
 3) Display Master Working time
->
+++++
+++++
Working Time:
00:20:20.772
+++++
+++++
->
```

Connected 01:47:03 VT100 9600 8-N-1 SCROLL CAPS NUM Capture Print echo

Display Master Working Time Screen

5. Press Enter to return to Master Main Menu.
6. Enter '2' to display the Network Menu.

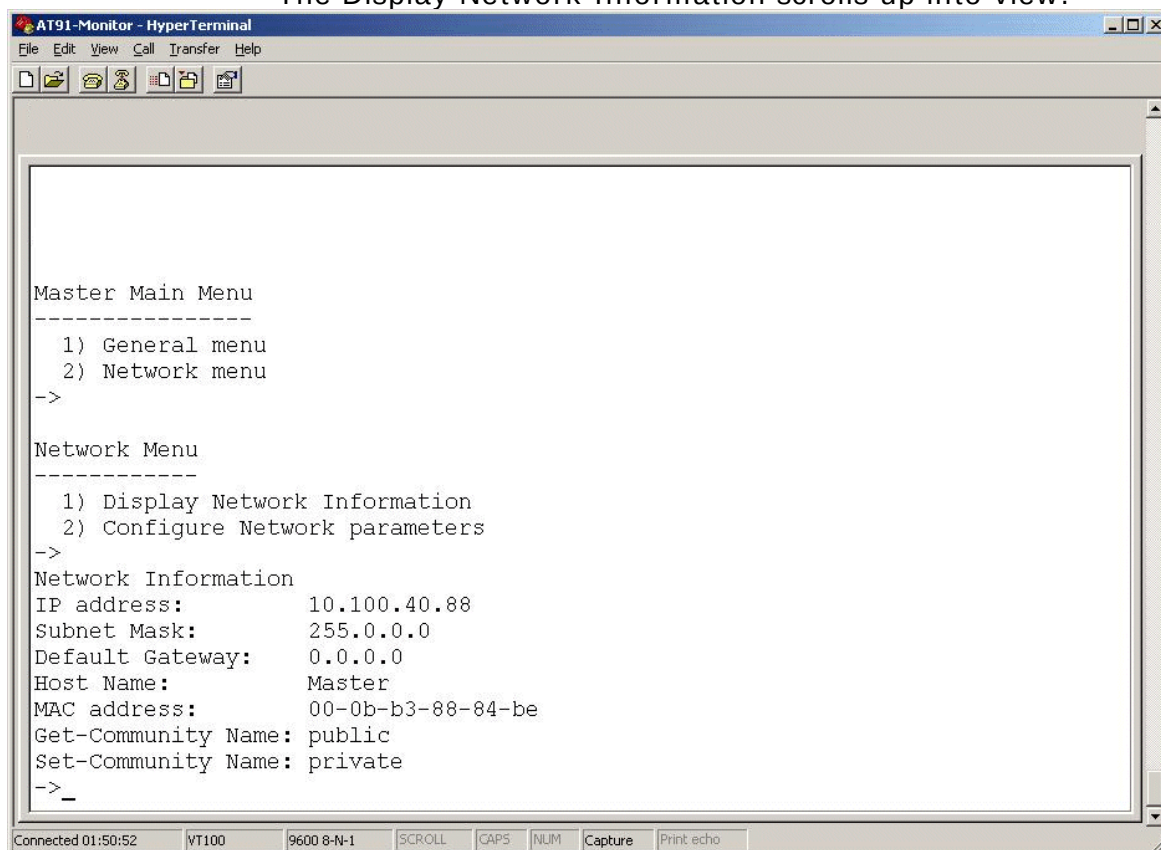
The Network Menu scrolls up into view.



Network Menu Screen

7. Enter '1' to display the network information.

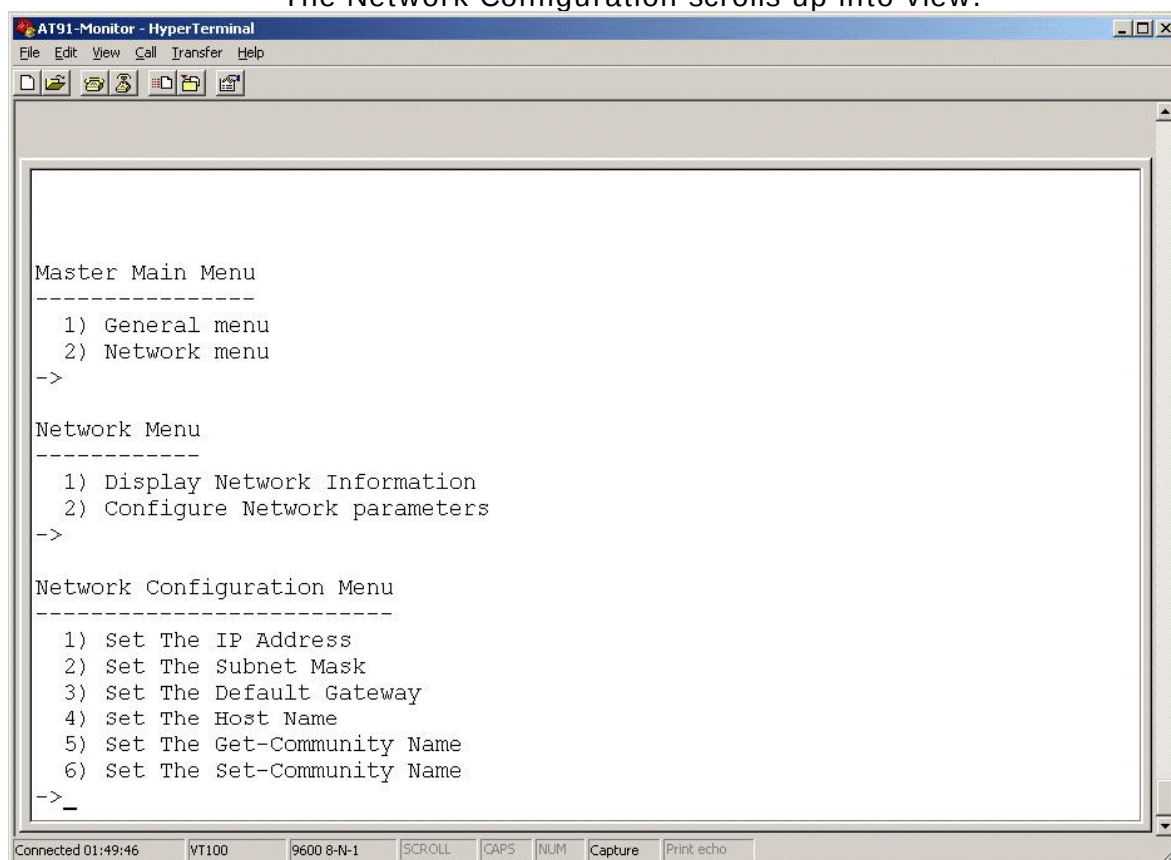
The Display Network Information scrolls up into view.



Display Network Information Screen

8. Enter '2' to display the Network Configuration Menu.

The Network Configuration scrolls up into view.

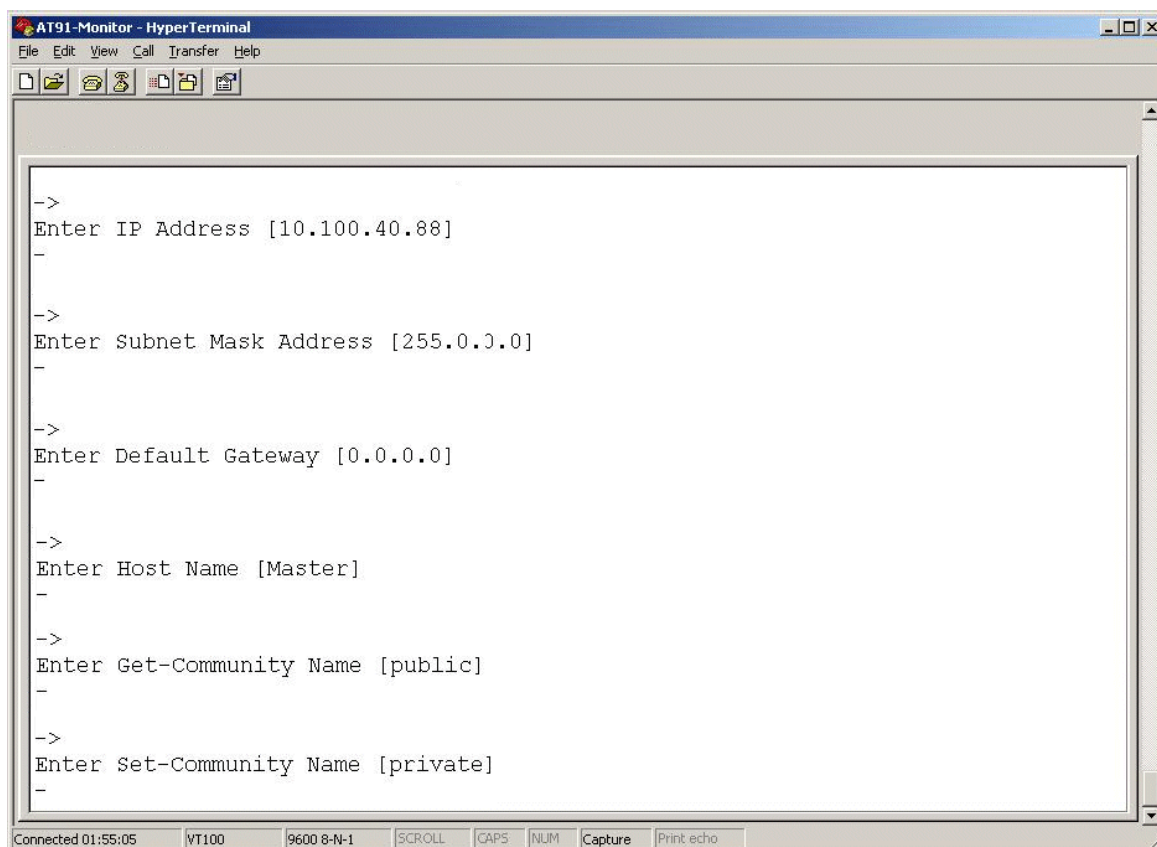


Network Configuration Menu Screen

Note:

At any time during the process, enter 'Esc' to return to the Main Menu.

Tip: It is recommended to execute the configuration in the order of the Menu.



Execute Configuration Menu Screen

9. Follow the configuration instructions:

Enter '1' to set the IP Address.

Enter IP address [10.100.40.00]:

Enter the new IP address or press enter to keep the address displayed in the middle of the braces.

Enter '2' to set the Subnet Mask.

Enter Subnet Mask Address [255.0.0.0]:

Enter the new Subnet mask or press enter to keep the mask displayed in the middle of the braces.

Enter '3' to set the Default Gateway.

Enter Default Gateway [0.0.0.0]:

Enter the default gateway or press enter to keep the default gateway displayed in the middle of the braces.

Enter '4' to set the Host Name.

Enter Host Name [Master]:

Enter the Host Name or press enter to keep the Host Name displayed in the middle of the braces. The Host Name is limited to 30 characters.

Enter '5' to set the Get-Community Name.

Enter Get-Community Name [public]:

Enter the Get-Community Name or press enter to keep the Get-Community Name displayed in the middle of the braces. The Get-Community Name is limited to 30 characters.

Enter '6' to set the Set-Community Name.

Enter Set-Community Name [private]:

Enter the Set-Community Name or press enter to keep the Set-Community Name displayed in the middle of the braces. The Set-Community Name is limited to 30 characters.

PVMax Local Scanner Configuration Setup

The Local Scanner is defined as an SNMP agent node in the LAN. It can be set up for connection using any PC that contains an available serial port and HyperTerminal software, which is generally included as part of the Windows operating system.

The computer used for configuration is referred to as the "configuring computer".

There are two different steps that need to be performed to configure the setup of the Local Scanner. These are:

- Accessing the HyperTerminal and defining the Port Settings
- Accessing the Setup Main Menu, which has two sub menus:
 - Defining the Parameter Settings of the Local Scanner
 - Defining the Software Settings of the Local Scanner

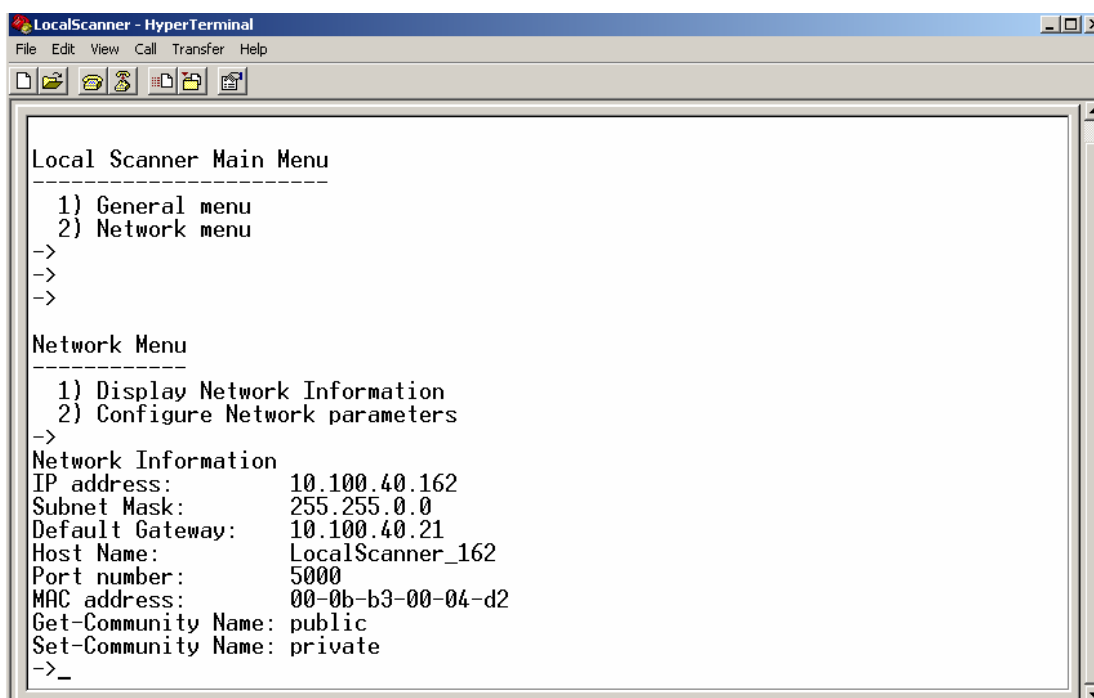
Accessing the HyperTerminal

To communicate with the local scanner you need to do the following steps:

1. Turn On the Local Scanner.
2. The CPU LED on the front panel will turn off. The Power LED is permanently on.
 - a. Press the two control buttons for 10 seconds.
 - b. Two audible beeps will be heard.
3. Wait one minute for the Local Scanner to load.
 - a. The CPU LED will blink normally.
 - b. Two audible beeps will be heard.

If the CPU activity led is turn off, restart the Local Scanner.

Important Note: The PC IP address should be on the same network as the Local Scanner (15.1.1.XXX)
Activate PING test between PC and Local Scanner (ping 15.1.1.126)



- To access the HyperTerminal and define the Port Settings
1. Attach a standard TCP/IP (Winsock) - cable to the TCP/IP port on the Local Scanner's front panel.
 2. Execute the HyperTerminal software from the "Start-Menu\ Programs\ Accessories\ Communications".

The HyperTerminal screen opens.



HyperTerminal Screen

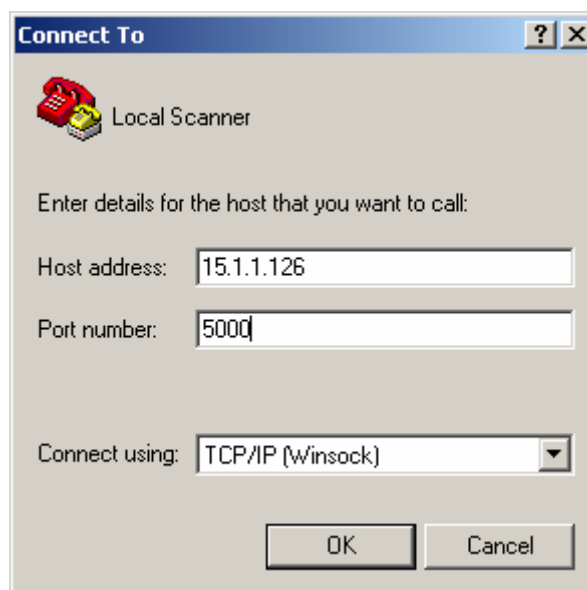
The New Connection — HyperTerminal screen opens. Note that the screen is blank.

The Connection Description dialog box opens.



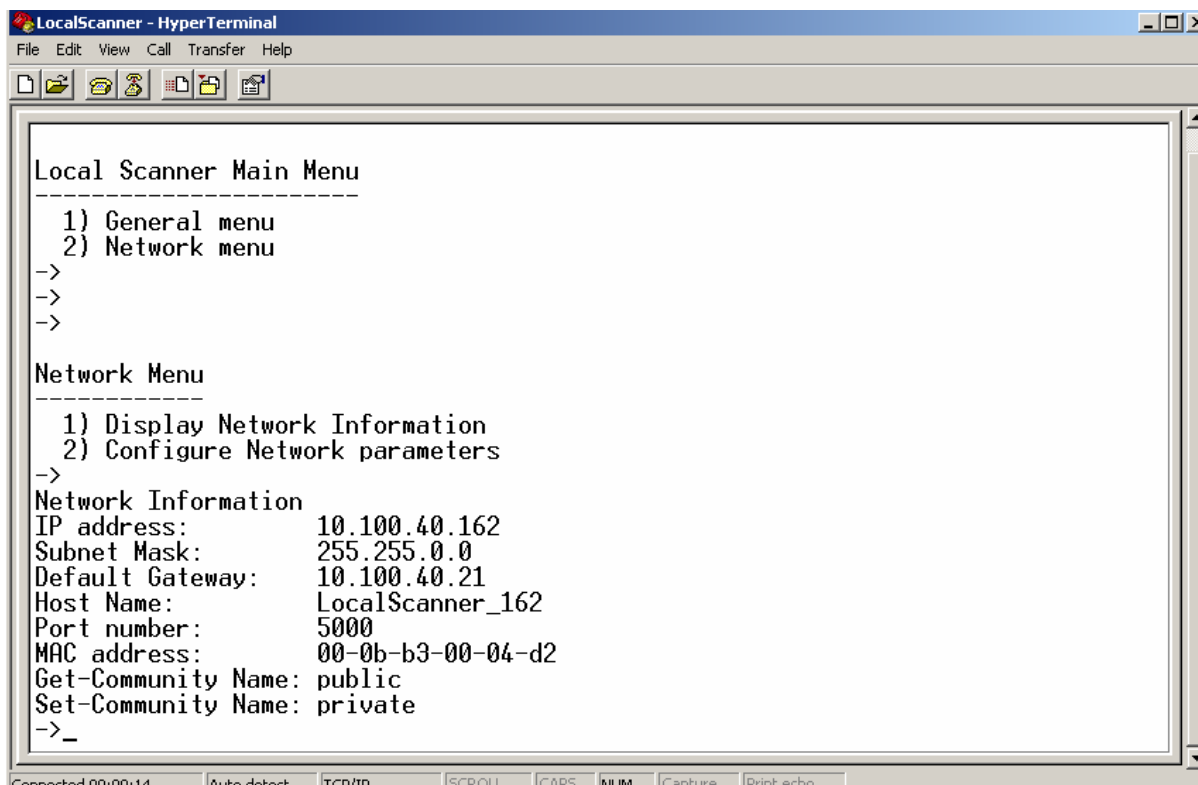
New Connection Screen

3. Enter the name of the device and click **OK** to continue.
The Connect To dialog box opens.
4. Enter Host address (the default IP address of the Local Scanner: 15.1.1.126).
5. Enter the Port Number (the default port number of the Local Scanner: 5000).



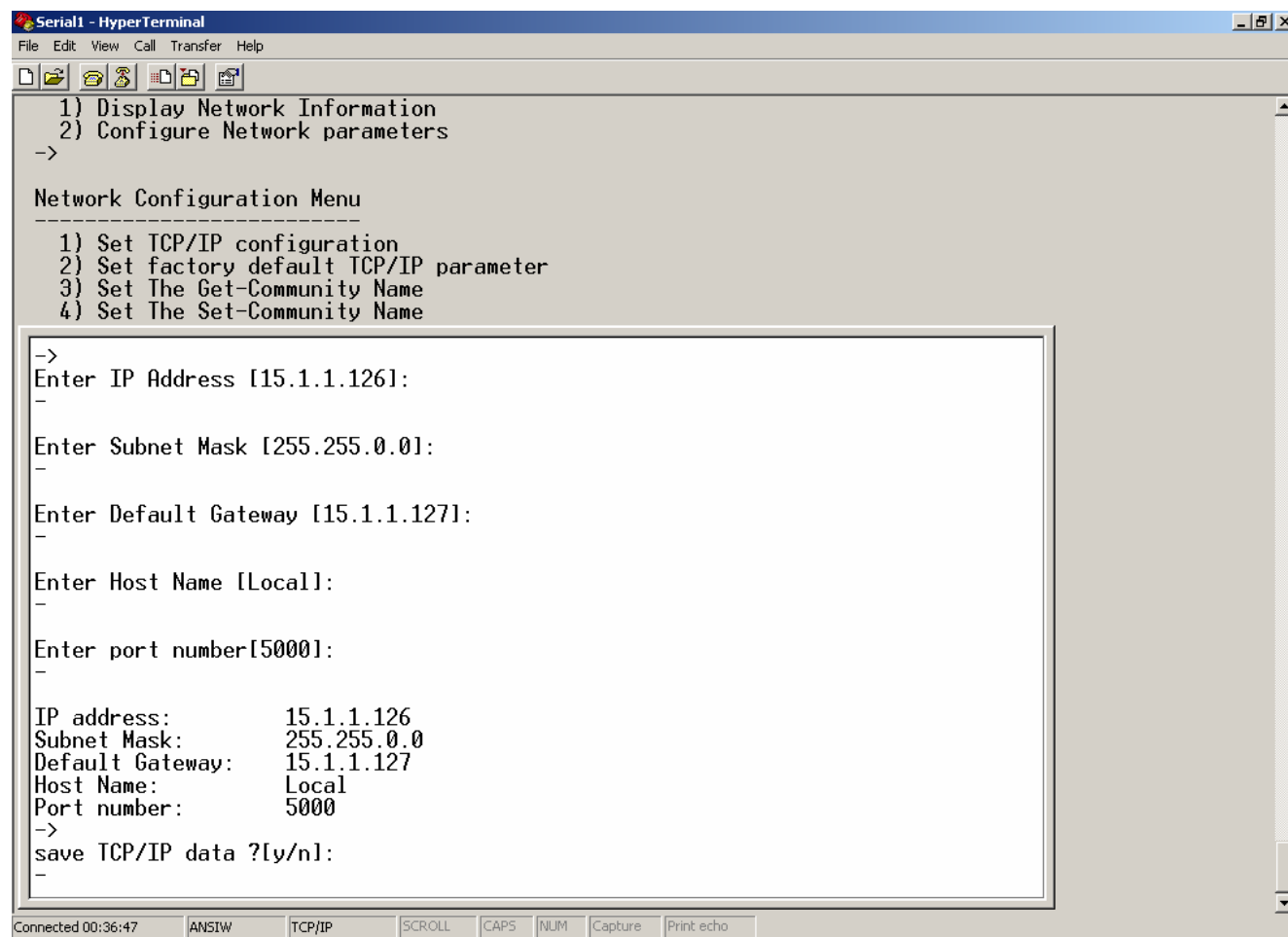
Connect To Dialog Box

6. In the Connect using field, select TCP/IP and click OK to continue.
7. Click OK to continue. The HyperTerminal screen opens:
8. Click the icon  to connect.



Local Scanner HyperTerminal Screen

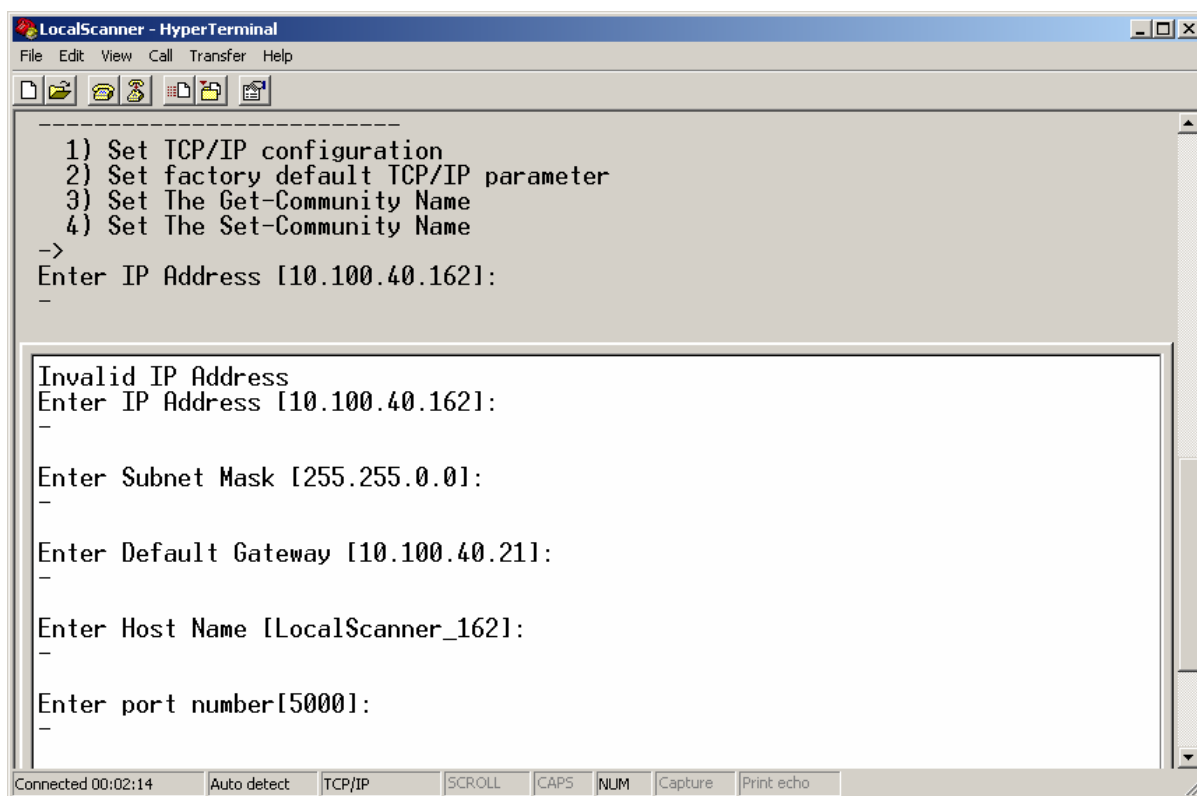
9. Press Enter to return to the Local Scanner Main Menu.
10. Enter '1' to display the Network Menu.
The Network Menu scrolls up into view.
11. Enter '2' to display the Network Configuration Menu.
The Network Configuration menu scrolls up into view.



Display Network Information Screen

12. Enter '1' to display the Network Configuration Menu.

The Network Configuration menu scrolls up into view.



TCP/IP Configuration Screen

Note:

At any time during the process, enter 'Esc' to return to the Main Menu.

Tip: It is recommended to execute the configuration in the order of the Menu.

13. Follow the configuration instructions:

Enter '1' to set the IP Address.

Enter IP address [15.1.1.126]:

Enter the new IP address or press enter to keep the address displayed in the middle of the braces.

Enter '2' to set the Subnet Mask.

Enter Subnet Mask Address [255.0.0.0]:

Enter the new Subnet mask or press enter to keep the mask displayed in the middle of the braces.

Enter '3' to set the Default Gateway.

Enter Default Gateway [0.0.0.0]:

Enter the default gateway or press enter to keep the default gateway displayed in the middle of the braces.

Enter '4' to set the Host Name.

Enter Host Name [Local Scanner]:

Enter the Host Name or press enter to keep the Host Name displayed in the middle of the braces. The Host Name is limited to 30 characters.

Enter '5' to set the Port number

Enter port number [5000]:

Enter the Port Number or press enter to keep the port number displayed in the middle of the brackets. The Port number is limited to 30 characters.

Enter '6' to set the Get-Community Name.

Enter Get-Community Name [public]:

Enter the Get-Community Name or press enter to keep the Get-Community Name displayed in the middle of the braces. The Get-Community Name is limited to 30 characters.

Enter '7' to set the Set-Community Name.

Enter Set-Community Name [private]:

Enter the Set-Community Name or press enter to keep the Set-Community Name displayed in the middle of the braces. The Set-Community Name is limited to 30 characters.

14. Save the configuration parameter.
15. Activate PING test between PC and Local (New IP address).
16. Connect the hyperTerminal with the new IP address.

Chapter 5 - Specifications

General

The Maximum distance between the DOWN LINK Port of the Master and the UP LINK Port of the Expander — 1,200m /4,000ft.

PVMMax Master

Standards compliance	Safety	UL 60950, EN 60950
	EMC	EN-55022, FCC Part 15 Class A, EN-55024
Interface	DOWN LINK	1 – 4 Ports Standard RS-485, Full – Duplex Connector Shielded RJ-45 socket Data Rate Up to 115.2 Kbps
	SERIAL	Standard RS-232 Connector 9 pin D-type male Data Rate Up to 115.2 Kbps Protocol UART, Start bit 1, Stop bit 1, Nonparity
	100Base Tx	RJ-45 socket, Ethernet IEEE 802.3, 100Base Tx/10Base T, 100/10 Mbps industry standard for connection to local area network.
LED Indicators	PWR	On when PVMMax Scanner is powered
	CPU	Blinking to indicate PVMMax Master heartbeat
	DOWN LINK-YELLOW	1 – 4 Ports On during transmission of each of the DOWN LINK Ports
	DOWN LINK-GREEN	1 – 4 Ports On during reception of each of the DOWN LINK Ports
	100Base Tx - Rx	On during reception from Local area network
	100Base Tx - Tx	On during transmission to Local area network
	100Base Tx LINK	On when link is active
Physical	Height	44.4mm/ 1.75" (1U)
	Width	482.6mm/19"
	Depth	159.3mm/6.27"
	Weight	2.0kg/4.4lb
Environment	Temperature	0 - 50 ⁰ C /32-122 ⁰ F
	Humidity	Up to 90% non-condensing
Power		100VAC to 240VAC 1.2- 0.6 A, 47 to 63 Hz, 30W max
Note: 8 Ports PVMMax Master is built from two 4 Ports PVMMax Masters		

PVMax Master Expander

Standards compliance	Safety	UL 60950, EN 60950
	EMC	EN-55022, FCC Part 15 Class A, EN-55024
Interface	100Base Tx	RJ-45 socket, Ethernet IEEE 802.3, 100Base Tx/10Base T, 100/10 Mbps industry standard for connection to local area network.
	DOWN LINK	1 – 8 Ports Standard RS-485, Full – Duplex Connector Shielded RJ-45 socket Data Rate Up to 115.2 Kbps
	SERIAL 1 SERIAL 2	Standard RS-232 Connector 9 pin D-type male Data Rate Up to 115.2 Kbps Protocol UART, Start bit 1, Stop bit 1, Nonparity
LED Indicators	DOWN LINK-YELLOW	1 – 8 Ports On during transmission of each of the DOWN LINK Ports
	DOWN LINK-GREEN	1 – 8 Ports On during reception of each of the DOWN LINK Ports
	PWR	On when PVMax Scanner is powered
	CPU 2	Blinking to indicate PVMax Expander heartbeat
	CPU 1	Blinking to indicate PVMax Master heartbeat
	100Base Tx - Rx	On during reception from Local area network
	100Base Tx - Tx	On during transmission to Local area network
	100Base Tx LINK	On when link is active
Physical	Height	44.4mm/ 1.75" (1U)
	Width	482.6mm/19"
	Depth	159.3mm/6.27"
	Weight	2.0kg/4.4lb
Environment	Temperature	0 - 50 ⁰ C /32-122 ⁰ F
	Humidity	Up to 90% non-condensing
Power		100VAC to 240VAC 1.2- 0.6 A, 47 to 63 Hz, 30W max

PVMax Master Expander

Standards compliance	Safety	UL 60950, EN 60950
	EMC	EN-55022, FCC Part 15 Class A, EN-55024
Interface	UP LINK	Standard RS-485, Full – Duplex Connector Shielded RJ-45 socket Data Rate Up to 115.2 Kbps
	DOWN LINK	1 – 8 Ports Standard RS-485, Full – Duplex Connector Shielded RJ-45 socket Data Rate Up to 115.2 Kbps
	SERIAL	Standard RS-232 Connector 9-pin D-type male Data Rate Up to 115.2 Kbps Protocol UART, Start bit 1, Stop bit 1, Nonparity.
LED Indicators	DOWN LINK-YELLOW	1 – 8 Ports On during transmission of each of the DOWN LINK Ports
	DOWN LINK-GREEN	1 – 8 Ports On during reception of each of the DOWN LINK Ports
	PWR	On when PVMax Scanner is powered
	CPU	Blinking to indicate PVMax Expander heartbeat
	UP LINK Rx	On during reception from UP LINK
	UP LINK TX	On during transmission to UP LINK
Physical	Height	44.4mm/ 1.75" (1U)
	Width	482.6mm/19"
	Depth	159.3mm/6.27"
	Weight	2.0kg/4.4lb
Environment	Temperature	0 - 50 ⁰ C /32-122 ⁰ F
	Humidity	Up to 90% non-condensing
Power		100VAC to 40VAC 1.2- 0.6 A, 47 to 63 Hz, 15W max

PVMMax Security Controller

Standards compliance	Safety		UL 60950, EN 60950
	EMC		EN-55022, FCC Part 15 Class A, EN-55024
Interface	SERIAL		Standard RS-232 Connector 9 pin D-type male. Data Rate: Up to 115.2 Kbps Protocol: UART, Start bit 1, Stop bit 1, No parity
	UP LINK		RJ-45 socket, RS-485 for connection to the Expander, Master Expander or the Master
	I/O ports		16 separately configurable Inputs/Outputs Output: 5V, 24mA Input: 0-5V
	Command A		8 outputs for Rack Indicators 12VDCout, 650mA max current for all indicators.
	Command B		8 control relays for remote controls. VDCmax = 42VDC Imax=5A
LED Indicators	PWR		Lit when the power is on
	CPU		Blinks when the Indicator Controller is operational
	UP LINK	Rx	On during reception from Hub or Master
		Tx	On during transmission to Hub or Master
	I/O ports		Indicates when port transmits high level(output) or receives high level (input)
	Command A		Indicates when rack indicator is on.
Physical	Height		44.4mm/ 1.75" (1U)
	Width		482.6mm/19"
	Depth		159.5mm/6.28"
	Weight		1.6kg/3.5lb
Environment	Temperature		0 - 500C /32-1220 F
	Humidity		Up to 90% non-condensing
Power			100VAC to 240VAC 1.2- 0.6 A, 47 to 63 Hz, 30W max

PVMax Indicator Controller

Standards compliance	Safety	UL 60950, EN 60950	
	EMC	EN-55022, FCC Part 15 Class A, EN-55024	
Ports	SERIAL	9- pin D-type, male, RS-232 for terminal connection/software download	2
	UP LINK	RJ-45 socket, RS-485 for connection to the Expander, Master Expander or the Master	3
LED Indicators	Down Link Ports	Blinks when the Indicator Controller is sending data to the beacons	1
	PWR	Lit when the power is on	4
	CPU	Blinks when the Indicator Controller is operational	5
	UP LINK Rx	Lit during reception from Expander	6
	UP LINK TX	Lit during transmission to Expander	7
Physical	Height	44.4mm/ 1.75" (1U)	
	Width	482.6mm/19"	
	Depth	159.3mm/6.27"	
	Weight	2.0kg/4.4lb	
Environment	Temperature	0 - 50 ⁰ C /32-122 ⁰ F	
	Humidity	Up to 90% non-condensing	
Power		100VAC to 40VAC 1.2- 0.6 A, 47 to 63 Hz, 15W max	

PVMax Scanner / PVMax Mini Scanner

Standards compliance	Safety	UL 60950, EN 60950
	EMC	EN-55022, FCC Part 15 Class A, EN-55024
Interface	UP LINK	Standard RS-485, Full – Duplex Connector Shielded RJ-45 socket Data Rate Up to 115.2 Kbps
	SERIAL	Standard RS-232 Connector 9-pin D-type male Data Rate Up to 115.2 Kbps Protocol UART, Start bit 1, Stop bit 1, Nonparity
	CONTROL PAD	Connector RJ-45 socket, 8 pins
	Patch Panel Connections	Connectors 6 or 12 headers, 26-pin, 100mil spacing
LED Indicators	PWR	On when PVMax Scanner is powered
	CPU	Blinking to indicate PVMax Scanner heartbeat
	UP LINK Rx	On during reception from PVMax Expander
	UP LINK TX	On during transmission to PVMax Expander
Physical	Height	44.4mm/ 1.75" (1U)
	Width	482.6mm/19"
	Depth	191.7mm/7.547"
	Weight	2.0kg/4.4lb
Environment	Temperature	0 - 50 ⁰ C /32-122 ⁰ F
	Humidity	Up to 90% non-condensing
Power		100VAC to 240VAC 1.2- 0.6 A, 47 to 63 Hz, 15W max

PVMax Local Scanner

Standards compliance	Safety		UL 60950, EN 60950
	EMC		EN-55022, FCC Part 15 Class A, EN-55024
Interface	100Base -T		RJ-45 socket, Ethernet IEEE 802.3, 100Base Tx/10Base T, 100/10 Mbps industry standard for connection to local area network.
	2 Push buttons		Controls port selection (Replaces control pad)
LED Indicators	Power On		Indicates power state
	CPU		Blinking to indicate CPU sanity
	100Base-T	Rx	On during reception from Local area network
		Tx	On during transmission to Local area network
		Link	On when link is active
Physical	Height		44.4mm/ 1.75" (1U)
	Width		482.6mm/19"
	Depth		127 mm/5" (including protecting brackets)
	Weight		1.0kg/2.2lb
Environment	Temperature		0 - 50 ⁰ C /32-122 ⁰ F
	Humidity		Up to 90% non-condensing
Power			100VAC to 240VAC 1.2- 0.6 A, 47 to 63 Hz, 30W max

PVMax Control Pad

Standards compliance	Safety	UL 60950, EN 60950
	EMC	EN-55022, FCC Part 15 Class A, EN-55024
	PVMax Scanner	Connector RJ-45 socket
Interface		Cable with two RJ-45 connectors on either side. One connects to the PVMax Control Pad and one to the CONTROL PAD PORT on the Front Panel of the PVMax Scanner
LEDs	LED SCAN	Stays lit while Automatic Scan is in process
	RECONFIG ON / PENDING	Blinks when Reconfig. Is pending. Stays lit while work is in progress
	MANUAL SCAN	Stays lit while Manual Scan is in process

Chapter 6 - Ordering Information

DESCRIPTION	RIT PART NO.
PVMax Master	R3820100
PVMax Master Expander	R3820110
PVMax Expander	R3820111
PVMax Security Controller	R3820130
Indicator Controller	R3820140
PVMax Scanner	R3820120
PVMax Mini Scanner	R3820121
PVMax Local Scanner	R3820151
PVMax Rack Indicator	R3825020
PVMax Control Pad	R3736300
PVMax Splitter	R3825010
Scanner Attachment Cords	See Catalog