gravitas X75 LITE
ENERGY SYSTEMS

UNIPOWER
Powering Technology

X75 LITE - DC POWER SYSTEMS
1RU HIGH - 48V, 24V and 12V

GRAVITAS X75 LITE SYSTEM

CE
LVD2006/95/EC

KEY FEATURES

- 1RU High Base System
- Fully Integrated System
- Hot-Swap Rectifier Modules
- Up to 36A at -54.4VDC
- Up to 55A at +27.2VDC
- Up to 75A at +13.6VDC
- Wide Range AC Input
- Relay or SNMP Alarm Options
- Up to 10 DC Load Circuits
- Quick and Easy Installation

SAFETY STANDARDS

UL60950-1 2nd Ed.
CSA22.2 No. 60950-1 2nd Ed.
EN60950-1 2nd Ed.

TWO-YEAR WARRANTY

DESCRIPTION

Gravitas X75 Lite is an ultra-compact, integrated DC power system. The system unit is a 1RU shelf holding up to three hot-swap rectifier modules. This system produces up to 1958 watts output at -54.4, +27.2 or +13.6VDC. It can also be operated as a 2+1 redundant system with up to 1305 watts output. Each rectifier module is cooled by a fan that operates at a speed which is a function of load and temperature.

There are up to five circuit-breaker protected DC outputs or up to 10 GMT fuse protected outputs on the system unit. A battery string breaker with Low Voltage Disconnect (LVD) option is available.

The system can also be operated as a battery backup, single feed power system (without load circuit breakers or fuses).

Alarm options include either Form-C relay outputs or SNMP alarm traps delivered over an Ethernet TCP/IP LAN interface.

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GRAVITAS X75 LITE SUMMARY FEATURES

- -48, +24, or +12VDC Rectifiers
- Hot-Swap Rectifiers Modules
- Power Factor Corrected
- Class B EMI Input Filter
- N+1 Redundant Operation
- Up to 10 DC Load Circuits
- Circuit Breakers or GMT Fuses
- Battery String Breaker / LVD Option
- Quick, Easy Installation
- 19 or 23-Inch Rack Mounting
- Form-C relay or SNMP Alarm Options

GRAVITAS X75 LITE CAPABILITY GUIDE

SYSTEM CAPABILITY

SYSTEM CAPABILITY	X75L-48	X75L-24	X75L-12
System Voltage System Max. Current System Current, N+1 Redundant	-54.4VDC 36.0A 24.0A	+27.2VDC 55.2A 36.8A	+13.6VDC 75.0A 66.0A
No. of Rectifiers, Max.	3	3	3
Battery String Breaker with Low Voltage Disconnect	Optional		
Total No. DC Loads, Max. Option A - miniature breakers Option B - GMT fuses	10 1-30A x 5 0.5A-12A x 10		
Alarm Options Relay Alarm Outputs SNMP Alarm Outputs	DC Fail, AC Fail, LVD Trip, Fuse/Breaker Trip Relay - Form-C SNMP - Alarm Traps / Email		
Communications (SNMP)	Ethernet TCP/IP		
Shelf Height	1RU		
Mounting Width, Inches	19 or 23 (universal reversible mounting brackets)		

Note:

For applications not requiring battery support consult UNIPOWER sales office about using Front-End power modules instead of rectifier modules.

For 12V systems with batteries, only two rectifier modules should be installed when the load is less than 33A.

RECTIFIER MODULES vs. SYSTEM CAPACITIES

MODULE MODEL NO.	OUTPUT VDC	OUTPUT AMPS	NO. SYST. MODULES	MAX. SYST. AMPS	NO. N+1 MODULES	N+1 SYST. AMPS
RSJ48/12	-54.4VDC	12.0	3	36.0	2+1	24.0
RSG48/10	-54.4VDC	10.1	3	30.3	2+1	20.2
RSF48/7	-54.4VDC	7.4	3	22.2	2+1	14.8
RSG24/18	+27.2VDC	18.4	3	55.2	2+1	36.8
RSF24/13	+27.2VDC	12.9	3	38.7	2+1	25.8
RSG12/33	+13.6VDC	33.0	3	75.0	2+1	66.0
RSF12/22	+13.6VDC	22.1	3	66.3	2+1	44.2

RECTIFIER MODULE SPECIFICATIONS

INPUT

Voltage Range	See Model Table
Power Factor	>0.99
Total Harmonic Distortion, Max.	5%
Frequency	47-63Hz
Inrush Current Limiting, Max.	30A Peak
EMI Filter, Conducted	FCC20780 pt. 15J Curve B
	EN55022 Curve B
Fast Transients	EN61000-4-4
Surges	EN61000-4-5
Remote Adjust	0 to +5V
Input Protection [1]	Internal Fuse, 10A

OUTPUT

Current & Voltage	See Model Table
Output Power	300-653W
Voltage Adjustment Range	±5%
Standby Output	+5V@250mA
Line & Load Regulation, Max.	2%
Holdup Time	10msec.
Overvoltage Protection	Latch Off
Filtering: Wideband Noise, 20MHz BW [2]	
48V/54.4V	500mV pk-pk
24V/27.2V	250mV pk-pk
12V/13.6V	125mV pk-pk
Current Limit	105-110% Rated Current
Efficiency [3]	85-90%

SAFETY STANDARDS UL60950-1 2nd Ed., CSA22.2 No. 60950-1 2nd Ed., EN60950-1 2nd Ed.

STATUS INDICATORS

AC GOOD	Green LED
DC GOOD	Green LED

ALARM SIGNALS (Logic LO, TTL compatible)

ACOK	AC present, 5V standby operating
DCOK	DC output within -10% of nominal

SERIAL COMMUNICATIONS

I²C	Optional, append add -Z to model number

ENVIRONMENTAL

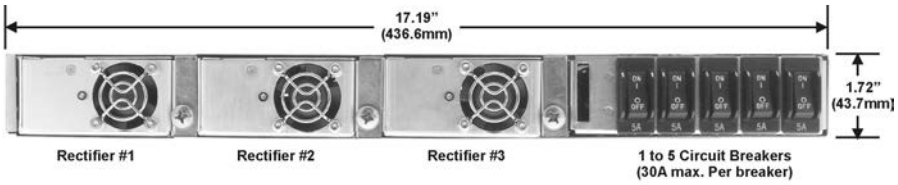
Operating Temp. Range	-20°C to +70°C
	-40°C start-up, reduced performance
Output Current Derating	2.5%/°C, 50°C to 70°C
Storage Temp. Range	-40°C to + 85°C
Environment	Pollution Degree 2
Humidity	0% to 95%, Non-Condensing
ESD	Bellcore GR-1089-Core and EN61000-4-2
MTBF, 35°C (Bellcore)	200,000 Hours
Cooling	Integral Ball Bearing Fan
Acoustic Noise @ 1m (module)	52-61dB

PHYSICAL SPECIFICATIONS

Case Material	Aluminum
Case Dimensions, Inches (mm)	1.6 H x 3.3 W x 11.0 D
	(40.6 x 83.8 x 279.4)
Weight	2.1 lbs. (0.95 kg.)

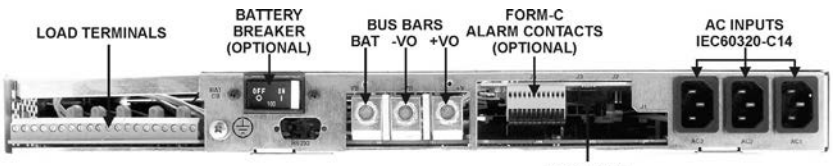
Notes:
1. External protection required when operating from HVDC.
2. 20MHz bandwidth. Measure with 0.1µF ceramic and 10µF tantalum capacitors in parallel across the output.
3. Typical efficiency is at low end of range for 12V output and at high end of range for 48V output.

X75 LITE SYSTEM FRONT VIEW



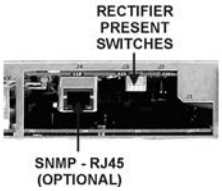
Depth is 15" (381mm) from the front face plate to the rear of the bus bar terminals. System weight is 11lbs (5kg) excluding the rectifier modules.

X75 LITE SYSTEM REAR VIEW



MOUNTING

The X75 Lite is designed for mounting in a 1U high space in either a 19" or a 23" rack-mount environment and is supplied as standard with dual purpose rack-mounting brackets.



Relay Alarm Contact Details

Pin	Function
1	AC Fail - n/o
2	AC Fail - common
3	AC Fail - n/c
4	DC Fail - n/o
5	DC Fail - common
6	DC Fail - n/c
7	Fuse/Bkr Alarm - n/o
8	Fuse/Bkr Alarm - common
9	Fuse/Bkr Alarm - n/c
10	LVD Alarm - n/o
11	LVD Alarm - common
12	LVD Alarm - n/c

Notes:
Pin 1 is at the right side when viewing the unit from the rear.
Relays are energised with the alarm condition is GOOD. The contact states shown above are when the unit is either switched off or the alarm is active.

For details of the SNMP alarm function see the separate X75 Lite SMNP option user manual

SHIPPING WEIGHTS & DIMENSIONS

	Width	Height	Depth	Weight
System Unit	24 (610)	7 (178)	28 (711)	48lbs (21.8kg)
Rectifier Module	19 (485)	6.5 (165)	7.5 (190)	16lbs (7.3kg)

Dimensions in inches (mm)

CONFIGURATION GUIDE

1. Determine the capacity of the system desired, taking into account future expansion, then check the type of rectifier required and fill in the initial quantity to be ordered including spares. This will determine the system unit base number.

SYSTEM OUTPUT, MAX.	SYSTEM OUTPUT, N+1	RECTIFIER MODULES CHECK TYPE REQ.	NO. MODULES REQUIRED	SYSTEM UNIT BASE NUMBER
-54.4VDC@36.0A -54.4VDC@30.3A -54.4VDC@22.2A	-54.4VDC@24.0A -54.4VDC@20.2A -54.4VDC@14.8A	❑ RSJ48/12 ❑ RSG48/10 ❑ RSF48/7	_____	**X75L-48**
+27.2VDC@55.2A +27.2VDC@38.7A	+27.2VDC@36.8A +27.2VDC@25.8A	❑ RSG24/18 ❑ RSF24/13	_____	**X75L-24**
+13.6VDC@75.0A +13.6VDC@66.3A	+13.6VDC@66.0A +13.6VDC@44.2A	❑ RSG12/33 ❑ RSF12/22	_____	**X75L-12**

2. Check either configuration A or B for DC distribution. For configuration A fill in the rating and code for each breaker to be installed.
For configuration B fill in the number of fuses for each value required including spares.

❑ **CONFIGURATION A:** Up to 5 Breakers Total, maximum 30A each.
1. Breaker ___ A, code ___ 3. Breaker ___ A, code ___ 5. Breaker ___ A, code ___
2. Breaker ___ A, code ___ 4. Breaker ___ A, code ___

Enter rating & code above: 1A(F), 2.5A(G), 5A(H), 10A(I), 15A(J), 20A(K), 25A(L) & 30A(M), Not required(X).

❑ **CONFIGURATION B:** Enter the quantity for each rating of fuse that you require (maximum 10 total).
Note that these are to be ordered as a separate line item using the listed part number and will be shipped as separate items:

½A (pt. no. 401-1500-0010) qty ____ **2A** (pt. no. 401-1500-0050) qty ____ **12A** (pt. no. 401-1500-0090) qty ____
¾A (pt. no. 401-1500-0020) qty ____ **3A** (pt. no. 401-1500-0060) qty ____ **dummy** (pt. no. 401-1500-0100) qty ____
1A (pt. no. 401-1500-0030) qty ____ **5A** (pt. no. 401-1500-0070) qty ____
1⅓A (pt. no. 401-1500-0040) qty ____ **10A** (pt. no. 401-1500-0080) qty ____

❑ **CONFIGURATION C:** Bulk Feed.

3. Check any options required.

❑ Form-C Relay Alarms or ❑ SNMP Alarms ❑ Battery String Breaker and LVD

4. Send the completed form to the relevant UNIPOWER sales office and we will issue a configuration Model Number which will use the following format.

- System unit Configuration A: **X75L-vv-A-bbbbb-yz**
- System unit Configuration B: **X75L-vv-B-yz**
- System unit Configuration C: **X75L-vv-C-yz**

Key:
vv = system voltage.
b = breaker code, five characters total.
y = L for battery string breakers & LVD option. (add as suffix)
z = R for Relay Alarm option or S for SNMP Alarm option. (add as suffix)

Optional decorative fasia: Order kit number 009-4005-0010, supplied loose for fitting after installation.

Rectifiers, fuses and other accessories are supplied as separate items from the main system unit and will be detailed separately in quotations, proposals and Sales Order documentation.

AC LINE CORDS, BATTERY & DC CABLE SETS

AC LINE CORD - 120V 15A **Part No.: 364-1412-0000**		**NEMA 5-15**	**IEC-C13**
One cord per installe power module. Cord length 6ft (1.83m)			
AC LINE CORD - 240V 15A **Part No.: 364-1414-0000**		**NEMA 6-15**	**IEC-C13**
One cord per installe power module. Cord length 6ft (1.83m)			
AC LINE CORD - 120/240V 15A **Part No.: 364-1421-0000**		**ROJ-LEADS**	**IEC-C13**
One cord per installe power module. Cord length 6ft (1.83m) REQUIRES CUSTOMER SUPPLIED PLUG			
BATTERY CABLE KIT - 1 to 2 LUG 30” **Part No.: 775-1497-1230**		**Start Lug**	**End Lug**
Pair of Black / Red #4AWG copper cable (600V 125A) 30” (76cm) with lug terminations and heat shrink. Hole size 0.25”, tongue width 0.55”, spacing 0.625”.			
BATTERY CABLE KIT - 1 to 2 LUG 84” **Part No.: 775-1497-1284**		**Start Lug**	**End Lug**
One pair Black / Red #4AWG copper cable (600V 125A) 84” (213cm) with lug terminations and heat shrink. Hole size 0.25”, tongue width 0.55”, spacing 0.625”.			
DC LOAD CABLE KIT - 2 to 2 LUG 30” **Part No.: 775-1497-2230**		**Start Lug**	**End Lug**
One pair Black / Red #4AWG copper cable (600V 125A) 30” (76cm) with lug terminations and heat shrink. Hole size 0.25”, tongue width 0.55”, spacing 0.625”.			

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INSTALLATION & OPERATING MANUAL
X75 Lite SERIES
DC POWER POWER SYSTEM

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Manual No. X75L-4a
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1.0 INTRODUCTION

Gravitas X75L is an ultra-compact, integrated DC power system. The system unit is a 1RU shelf holding up to three hot-swap rectifier modules. This system produces up to 1950 watts output at -54.4, +27.2 or +13.6VDC. It can also be operated as a 2+1 redundant system with up to 1300 watts output. Each recti¬fier module is cooled by a fan that operates at a speed which is a function of load and temperature.

There are up to five circuit-breaker protected DC outputs or up to 10 GMT fuse protected outputs on the sys¬tem. A battery string breaker with low-voltage battery disconnect is an optional feature. Alarm options include either Form-C relays or SNMP Alarm Traps via a TCP/IP Ethernet LAN interface.

The system can also be operated as a battery backup, single feed power system (without load circuit breakers or fuses).

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Figure 1 - X75L Compact Integrated DC Power System

2.0 FEATURES & OPTIONS

2.1 Standard Features

- 1RU High Base System
- Fully Integrated System
- Up to 36A at -54.4VDC
- Up to 55A at +27.2VDC
- Up to 75A at +13.6VDC
- Wide Range AC Input
- Up to 10 DC Load Circuits
- Circuit Breakers or GMT Fuses
- Quick and Easy Installation
- Universal 19/23-Inch Mounting Brackets

2.2 Options & Accessories

- Relay alarms
- SNMP Alarm Trapping ('S' Option)
- Various AC Line cords and DC cable sets
- LVD with Battery Breaker

3.0 SAFETY WARNINGS

3.1 The X75L Compact DC Power System operates at voltages that could potentially be hazardous. Furthermore, inadvertent short circuiting of the system battery and/or rectifier by mis-connection or other error could be harmful. This product should be handled, tested and installed only by qualified technical persons who are trained in the use of power systems and are well aware of the hazards involved.

3.2 When operating the X75L the chassis ground terminal must be connected to the system frame ground or other proper safety ground for the protection of personnel.

3.3 All connections to the X75L should be carefully checked for errors before applying power to it.

3.4 This equipment is intended only for installation in a "RESTRICTED ACCESS LOCATION".

4.0 WARRANTY (summary)

X75L Series DC power systems are warranted for two (2) years from date of shipment against defects in material and workmanship. This warranty does not extend to products which have been opened, altered or repaired by persons other than persons authorized by the manufacturer or to products which become defective due to acts of God, negligence or the failure of customer to fully follow instructions with respect to installation, application or maintenance.

For a complete text of UNIPOWER's warranty conditions please request a copy from your local Sales Office.

5.0 UNPACKING AND INSPECTION

5.1 This X75L DC power system was carefully tested, inspected and packaged for shipment from our factory. Upon receipt the unit should be carefully unpacked and inspected for any damage in shipment.

5.2 If there is evidence of damage, **do not attempt to install the unit**. The freight carrier should be notified immediately and a claim for the cost of the X75L should be filed with the carrier for direct reimbursement. Be sure to include the model and serial number of the damaged unit in all correspondence with the freight carrier. Also save the shipping carton and packing material as evidence of damage for the freight carrier's inspection.

5.3 UNIPOWER will cooperate fully in case of any shipping damage investigation.

5.4 Always save the packing materials for later use in shipping the unit. Never ship the system or the rectifier modules without proper packing.

6.0 GENERAL SPECIFICATIONS

6.1 Inputs

Supply Voltage:	85-264VAC Single Phase Each rectifier position is supplied via an individual IEC60320 C14 Inlet Socket.

A 3-phase supply may be connected provided that the voltage presented to each individual rectifier position does not exceed 264VAC.

Supply Current:	Max 9A input @ 85-264VAC per inlet socket.
Battery Input:	Direct connection to DC output bus or via protection breakers.

6.2 Outputs

Pluggable Breakers:	Up to 5 circuits, 30A max. per circuit.
GMT Fuses:	10 circuits, 12A max. per circuit.
Alarm Relay Contacts:	Form C, 1A max at 30VDC.
Ethernet:	10/100 Base T.

6.3 Protection

Supply Input:	Each rectifier is individual fused internally.
Battery:	100A Magnetic Circuit Breaker.
Output Distribution:	According to installed circuit breakers or fuses.
Bulk DC Bus:	Rectifier Current Limiting / Battery Breaker.

6.4 Safety

The X75L system is compliant with UL60950-1, EN60950-1, CSA22.2-60950-1 and all other derivatives of the core IEC60950-1 standard 2nd Edition when installed correctly within a restricted access environment.

The X75 system is CE marked to indicate conformance to the European Union's Low Voltage and EMC Directives.

6.5 EMC

The X75 complies with the following Norms when correctly installed.

Conducted Emissions:	EN55022, level A
Radiated Emissions:	EN55022, level A
ESD:	EN61000-4-2, level 4, criterion A - 8kV contact, 15kV air.
Radiated Immunity:	EN61000-4-3, level 3, criterion A - 10V/m.
Surges (power ports):	EN61000-4-5, level 1, criterion A - 500V

6.6 Environmental

Operating Temperature:	-20°C to 50°C
Storage Temperature:	-40°C to 75°C
Humidity:	0% to 95% Non-Condensing

6.7 Physical Specification

Case Material:	Steel
Finish:	Clear Passivated
Dimensions:	1.72H (43.7) x 17.2W(437) x 14.47D(368)
Rack Width:	19” or 23” using dual purpose kit supplied. NOTE: Mid-mount is recommended when used in free space.

7.0 PRINCIPAL OF OPERATION

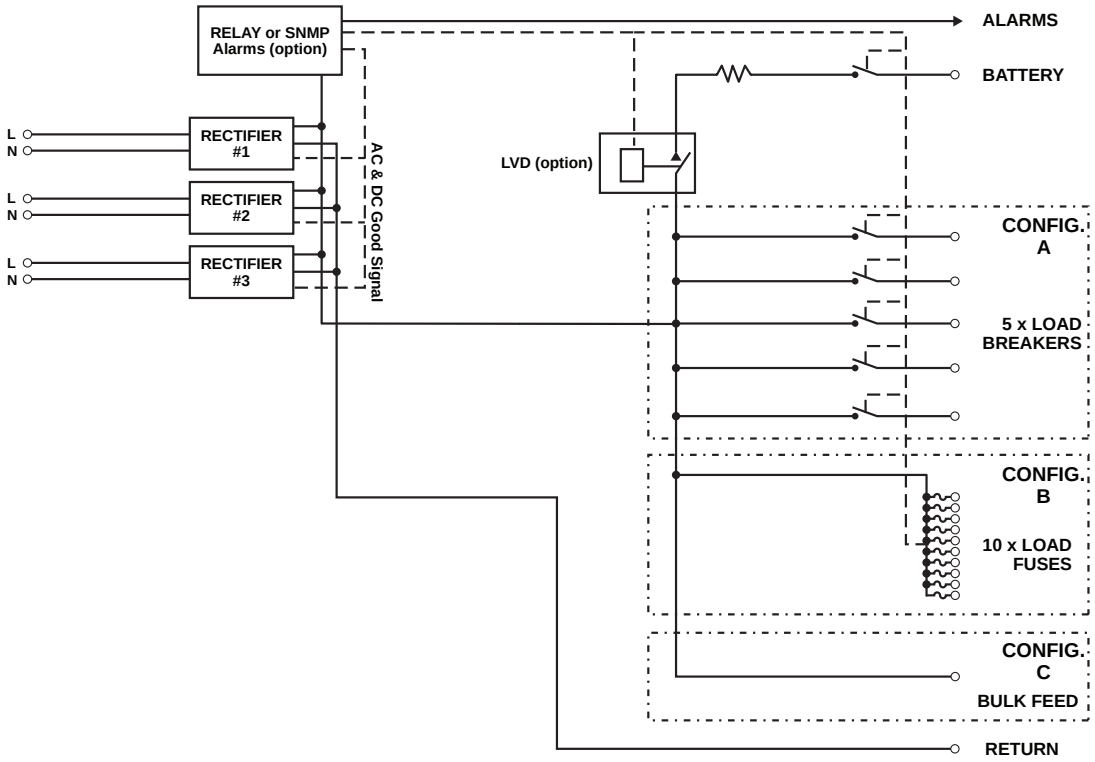


Figure 2 - Block Schematic

7.1 85-264VAC is supplied directly to each of the rectifiers which produce a nominal -48VDC, +24VDC or +12VDC output.

7.2 The rectifier DC output is fed to the battery terminals the LVD (Low Voltage Disconnect, current shunt and a 100A circuit breaker.

7.3 The rectifier DC output is also fed to the loads via up to 5 circuit breakers (configuration A) or 10 fused circuits (configuration B).

7.4 The optional Low Voltage Disconnect monitors battery voltage and disconnects the system when this reaches a critical level.

7.5 The Relay and SNMP options monitor the rectifier DC Good signals and provides alarms when any of these are bad.

8.0 FRONT PANEL DESCRIPTION

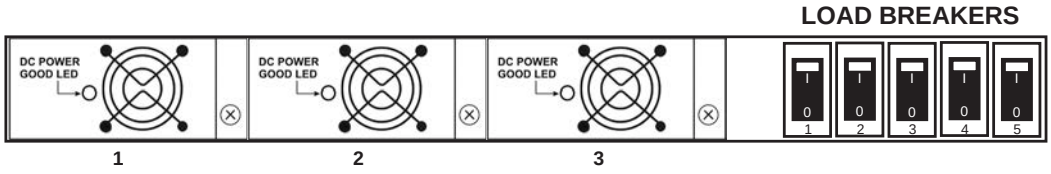


Figure 3a - Front View with Breakers (configuration A)

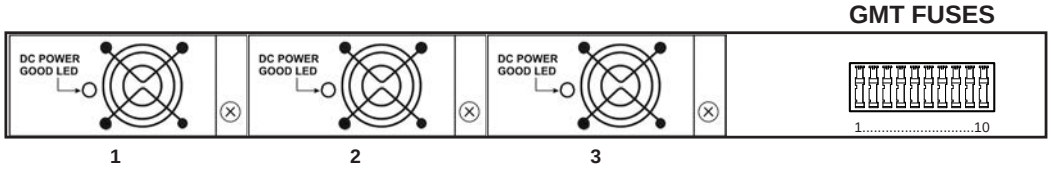


Figure 3b - Front View with GMT Fuses (configuration B)

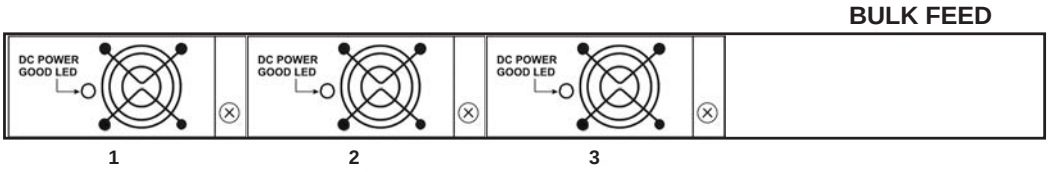


Figure 3c - Front View without Breakers or GMT Fuses (configuration C)

Figures 3a, 3b and 3c show the three system configurations as viewed from the front with breakers, fuses and neither respectively. Following is a description of each section.

8.1 From left to right there are 3 rectifier slots. Each slot can accept one rectifier from the Sigma Series rated up to 650W output power. Only identical model rectifiers of appropriate output voltage may be installed at the same time. For example, a nominal -48V system may contain between 1 and 3 model RSG48/10 OR between 1 and 3 model RSG48/12 but not a mixture of the two types.

8.2 On the right hand side of the unit is the DC distribution section which may contain between 1 and 5 circuit breakers (configuration A) or a 10-way GMT fuse block (configuration B). When configuration C (Bulk Feed only) has been specified this section is fitted with a blanking panel.

9.0 REAR PANEL DESCRIPTION

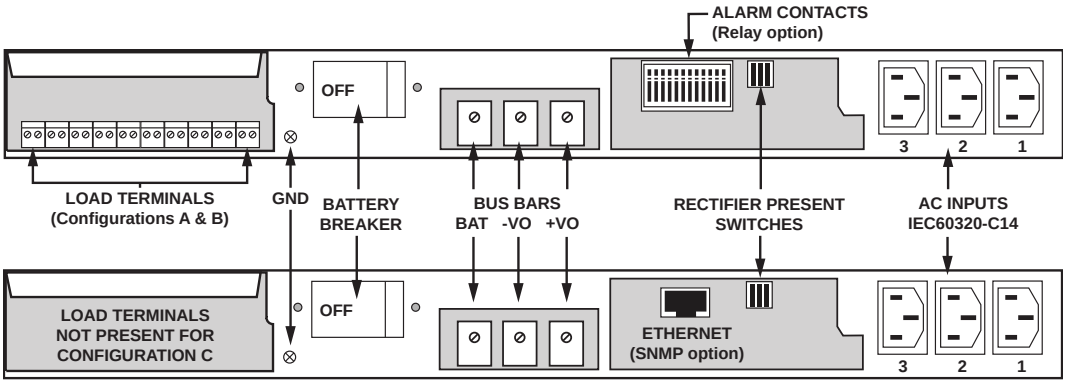


Figure 4 - Rear Views showing relay option (top) & SNMP option (bottom)

9.1 On the left hand side of the system, viewed from the rear, is a bank of screw terminal blocks for the DC load connections. Note that these are not present when congiguration C (bulk feed) has been specified.

When Circuit Breakers (configuration A) have been specified two connections are provided for Load and Return for each breaker position.

When GMT Fuses (configuration B) have been specified one connection is provided for Load and Return for each fuse position.

9.2 To the right of the Load connection terminals is the Battery Breaker. This is a magnetic circuit breaker rated at 100A. This circuit breaker provides two functions.

9.2.1 In the first instance it enables the user to disconnect the batteries from the system for maintenance, replacement or other purposed.

9.2.2 The second function is to protect the batteries against excessive charge or discharge currents.

9.3 In the centre of the unit are three bus bar terminals.

9.3.1 To the left side is the VB or BAT terminal. This is connected to the ‘hot’ or ‘feed’ side of the battery.

9.3.2 In the middle is the –V terminal. This is the ‘negative’ output of the rectifier bus.

9.3.3 To the right side is the +V terminal. This is the ‘positive’ output of the rectifier bus.

9.3.4 Battery connection for -48VDC systems is as follows:
+Ve battery terminal connects to the +V terminal.
–Ve battery terminal connects to the VB terminal.

Note that in -48VDC systems the +V terminal is internally connected to chassis ground.

9.3.5 Battery connection for +24VDC and +12VDC systems is as follows:
+Ve battery terminal connects to the VB terminal.
-Ve battery terminal connects to the –V terminal.

Note that in +24VDC and +12VDC systems the -V terminal is internally connected to chassis ground.

9.3.6 When the system is required to provide a bulk feed output without using the internal distribution the +VO and –VO terminals are used to provide this feed to the load.

9.4 Two options, mutually exclusive, are available for monitoring the status of the X75L.

9.4.1 Relay option – Form-C contacts provide the following alarms

9.4.1.1 AC Fail – Indicates failure of the AC supply.

9.4.1.2 DC Fail – Indicated that one or more rectifier has no DC output.

9.4.1.3 Fuse/Breaker – Indicates that a fuse has blown or a breakers in open.

9.4.1.4 LVD – Indicates that the

9.4.2 SNMP option – Sends the above alarm conditions as SNMP Traps via an Ethernet TCP/IP LAN connection to a suitable network management system. The alarm module can also be programmed to send emails to one or more email addresses.

Further details on how to set up the SNMP option are given in Appendix 1.

9.5 At the right hand side are three IEC60320 C14 inlets. These provide individual AC input feeds to each of the 3 rectifier slots.

The X75L employs UNIPOWER Sigma Series rectifiers which operate from a Universal 85-264VAC 50-60Hz single phase supply. The system is designed so that various single and 3-phase supply connections can be made. For example, in the U.S. it might be desirable to connect each rectifier between two 120VAC phases; in which case each rectifier is operating at 208VAC.

IMPORTANT NOTE: DO NOT CONNECT THE UNIT SUCH THAT MORE THAN 264VAC WILL BE PRESENT BETWEEN THE LIVE AND NEUTRAL TERMINALS OF ANY ONE INLET SOCKET. SUCH CONNECTION MAY BE HAZARDOUS, WILL DAMAGE THE UNIT AND INVALIDATE THE WARRANTY.

10.0 MAKING CONNECTIONS TO THE X75 Lite

10.1 DC Load Connections

The DC load distribution connections at the rear left of the unit are clearly marked as follows:

10.1.1 Circuit breakers (Configuration A)

For each load circuit there are two terminals marked V1, V2, V3, V4 and V5 respectively for the DC 'feed' and two marked RTN for the DC 'return'.

10.1.2 GMT Fuse (Configuration B)

For each load circuit there is one terminal marked V1 through to V10 respectively for the DC 'feed' and one marked RTN for the DC 'return'.

10.1.3 Bulk Feed (Configuration C)

The terminals referred to above are not present. The load is connected to the bulk feed output +VO and -VO.

Note that in the case of -48VDC system the 'feed' terminals are at a negative potential with respect to the 'return' terminals. In the case of +24VDC and +12VDC systems the 'feed' terminals are at a positive potential with respect to the 'return' terminals.

When connecting to the DC load terminals it is important to ensure that the cables used are adequately sized to carry the expected load current for the circuit in question.

The maximum current rating for the individual load terminals is 32A (configurations A and B), but where long cable runs to the load are expected care should be taken to avoid unacceptable cable voltage drop; this is most likely to occur at currents in excess of 20A if only a single feed and return cable are employed. It is recommended that for circuits where a 20A or greater breaker is fitted pairs of feed and return cables are installed.

The terminals can accommodate wire sizes in the range #24AWG to #12AWG.The table below gives recommended cable sizes for the available circuit capacities assuming semi-confined conditions.

Table 1 gives recommended minimum wire sizes for these connections dependent on the rating of breaker or fuse fitted.

Circuit Rating	Minimum Cable Size
½A , ¾A, 1A, 1⅓A, 2A, 2½A	24AWG
3A, 5A	22AWG
10A. 12A	18AWG
15A	16AWG
20A	14AWG or 2 x 18AWG
25A, 30A	12AWG or 2 x 16AWG

Table 1 - Recommended Load Circuit Wire Sizes

10.2 Alarm Relay Option

Connection to the Form-C alarm relay outputs is made through a 12-way spring clamp terminal connector. There are a total of 4 relay outputs with Normally Open, Normally Closed and Common Contacts available for connection. The individual relay contact sets are fully isolated and may be floated from GROUND by up to 100V. Maximum contact current and voltage are 1A and 30V (DC or AC) respectively.

This connector accommodates wire sizes in the range #28 to #20AWG.

TERMINAL	FUNCTION
1	AC FAIL – N/C
2	AC FAIL – COM
3	AC FAIL – N/O
4	DC FAIL – N/C
5	DC FAIL – COM
6	DC FAIL – N/O
7	FUSE/BREAKER ALARM – N/C
8	FUSE/BREAKER ALARM – COM
9	FUSE/BREAKER ALARM – N/O
10	LVD ALARM – N/C
11	LVD ALARM – COM
12	LVD ALARM – N/O

Note that terminal 1 is to the left when viewed from the rear of the system.

Table 2 - Alarm Relay Connector Pin-Out

10.3 SNMP Alarm Trap Option

The X75L is connected to a TCP/IP LAN (Local Area Network) or directly to a PC using the RJ45 connector. This is a standard network connector allowing connection of any generally available Ethernet cable. Note that if the X75L is to be connected directly to a PC rather than a LAN then a cross-over Ethernet cable will be required.

TERMINAL	FUNCTION
1	TX +
2	TX -
3	RX +
4	Not Used
5	Not Used
6	RX -
7	Not Used
8	Not Used

Table 3 - Ethernet Connector Pin-Out

NOTE: THE RELAY ALARM AND SNMP ALARM OPTIONS ARE MUTUALLY EXCLUSIVE.

11.0 INSTALLATION

The X75L can be mounted in either 19" or 23" racks by using the supplied brackets. Mount it from the front of the rack using the correct offsets to align with existing rack-mounted equipment. Once mounted in the rack the following connections must be made with the unit switched off.

CAUTION: Re-read the Safety Warnings and Precautions in Section 3. All power should be OFF for the input and output loads before making connections. Connection of the X75L chassis to frame ground should be made first. If the X75L has been turned on before installation connections, it should be turned off and given a 5-minute waiting period for all internal energy storage capacitors to be discharged.

11.1 Input AC Power Connection

A 3-wire AC power line should be connected to the input IEC connectors but not plugged into the AC power source. The line, neutral and ground connections should be carefully observed when making the AC connections. The AC line cord should be sized to safely carry 15 amperes AC each, minimum.

MODEL	Vin AC	Vout DC	WATTS	A @ 120Vac	A @ 240Vac
RSJ48/12	85-264	54.4	653	6.5	3.2
RSG48/10	85-264	54.4	550	5.4	2.7
RSF48/7	85-264	54.4	400	4.0	2.0
RSG24/18	85-264	27.2	500	5.0	2.5
RSF24/13	85-264	27.2	350	3.5	1.7
RSG12/33	85-264	13.6	450	4.4	2.2
RSF12/22	85-264	13.6	300	3.0	1.5

Note: ratings given are at nominal voltage for sizing breakers.
Label rating may be greater.

Table 4 - Input Current Ratings

11.2 Checking Outputs

Turn all output circuit breakers to the OFF position and/or remove all fuses from the GMT fuse-holder. With no loads connected and without the battery connected, plug in or connect the AC input cords one at a time to the AC power source. Be sure to use the correct AC voltage for the rectifier inputs.

Using a volt meter measure the DC voltage reading across the –VO and +VO bus bars at the rear of the unit. The voltage should be approximately 54.4, 27.2, or 13.6VDC (depending on model), which is the factory setting.

One by one, turn each output circuit breaker to the ON position and/or insert a GMT fuse and measure the DC voltage across the corresponding output terminals. The voltage should again read approximately 54.4, 27.2, or 13.6 volts. After each output is measured, turn OFF that circuit breaker and/or remove the GMT fuse and turn ON and/or insert a fuse in the next one. After measuring the last circuit, turn off that breaker and/or remove the GMT fuse and make sure that all output breakers are in the OFF position and/or all fuses are removed.

Unplug or disconnect the AC input power source. Before touching any terminals wait 5 minutes for the internal storage capacitors to discharge.

11.3 Connection to Loads

With input AC power unplugged, the battery disconnected and no other power sources connected to the loads, make sure that all load circuit breakers are set to the OFF position and/or all GMT fuses are removed.

Connect load wires to each set of output terminals, one at a time. Note that the front panel breaker and fuse numbers directly correspond to the output terminal numbers.

Be sure to connect the polarities correctly.

11.4 Connection to Battery

WARNING: Improper polarity of the battery connection may damage the power system. Take precautions when installing the battery and note that the battery cables are “hot” (live) and present an energy hazard.

With AC input unplugged, remove the three rectifier modules from the system chassis. Make sure all load circuit breakers are in the OFF position and/or all GMT fuses removed. Set the battery circuit breaker to the OFF position. Carefully connect the battery cables to the battery terminals shown in Figure 4 while observing the correct polarity as described in section 9.3.

Note that until AC power is applied to the system the the LVD contactor (when fitted) will not activate.

11.5 System Turn-On

Perform the following operations:

1. Set the battery and all load circuit breakers to the OFF position.
   For systems with GMT fuse distribution remove all fuses if already installed.
2. Plug in the rectifier modules.
   For any unused rectifier module positions within the shelf, the corresponding switch on S1 should be set to ON. For rectifiers that are fitted check that the corresponding switch is set to OFF as otherwise rectifier alarms will not be recognized. Setting the switch positions to ON will prevent erroneous alarms from empty slots. S1 position 1 corresponds to rectifier 1 which is the furthest left as viewed from the front of the system unit, S1 position 2 is the middle and S1 position 3 is the right most rectifier.

   See Figure 4 on page 11 for details of the location of this switch.

3. Connect the AC power cables to the AC source.

NOTE: It is not possible to start the system by connecting the batteries alone when the LVD option is fitted.

Appendix 1 - SNMP Alarm Trap Option

Introduction

This section details the available functions of the X75L SNMP alarm trap option. The primary purpose of this option is to provide SNMP traps when an alarm condition occurs so that a remote monitoring station can be alerted. The unit may also be set up to provide alert e-mails. SNMP monitoring is best achieved by using third party management software such as HP Open view. Setting up such software is beyond the scope of this manual.

Initial Setup

The module is intended to be connected to a local area network using Ethernet.

The module provides an RJ-45 socket for this purpose.

To assist in setting up the module initially, it is suggested that a crossover cable is used to connect directly between the module and a computer.

The module is initially set with the following network settings:

IP address:	192.168.0.200
Subnet mask:	255.255.255.0
Gateway:	0.0.0.0

A computer initially connected to the module must have it's IP address set in the range 192.168.0.x where x is 1 to 255 (not 200 though). The computers subnet mask must be set to 255.255.255.0.

It should then be possible to log in to the module using internet explorer or another web browser.

The rectifier shelf system should be powered up with the SNMP module connected to the 25-way connector on the rear of the shelf. You should see the yellow and green lights on the SNMP module flash a few times as it boots up.

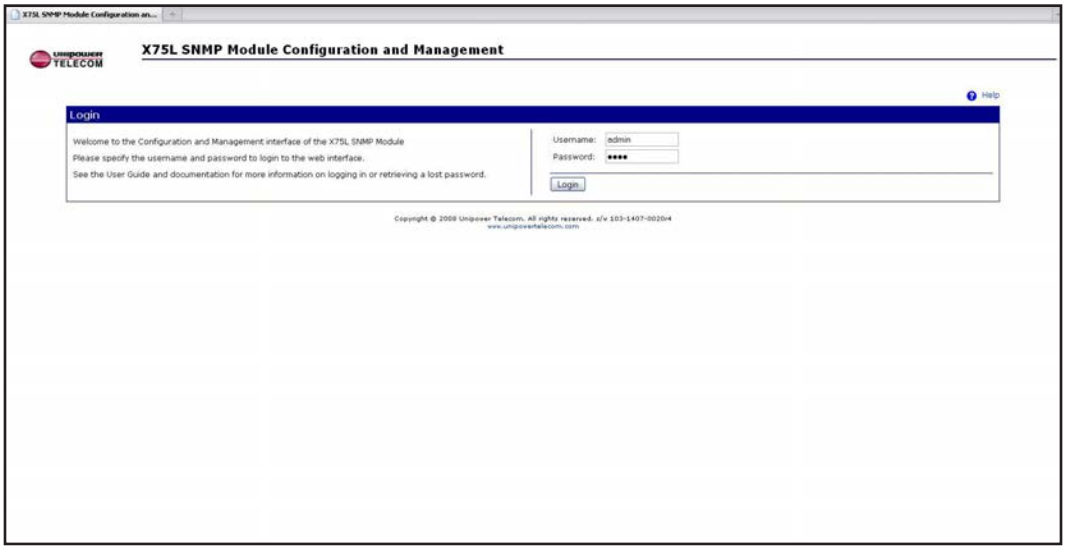
To connect to the module, simply type the following into the browsers address bar:

http://192.168.0.200

The log in web page should appear. If it does not, please recheck your computer network settings and ensure that a crossover cable is used for direct connection.

WEB PAGES

Initial log on



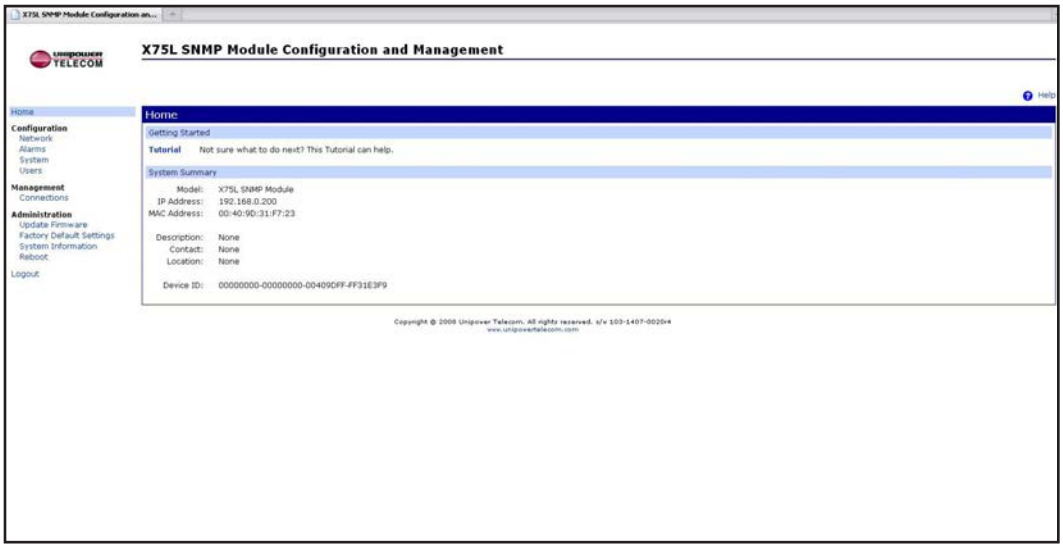
Type the following into the boxes as shown in figure 1 to log on:

Username: admin

Password: 1234

Press the Login button.

Home page

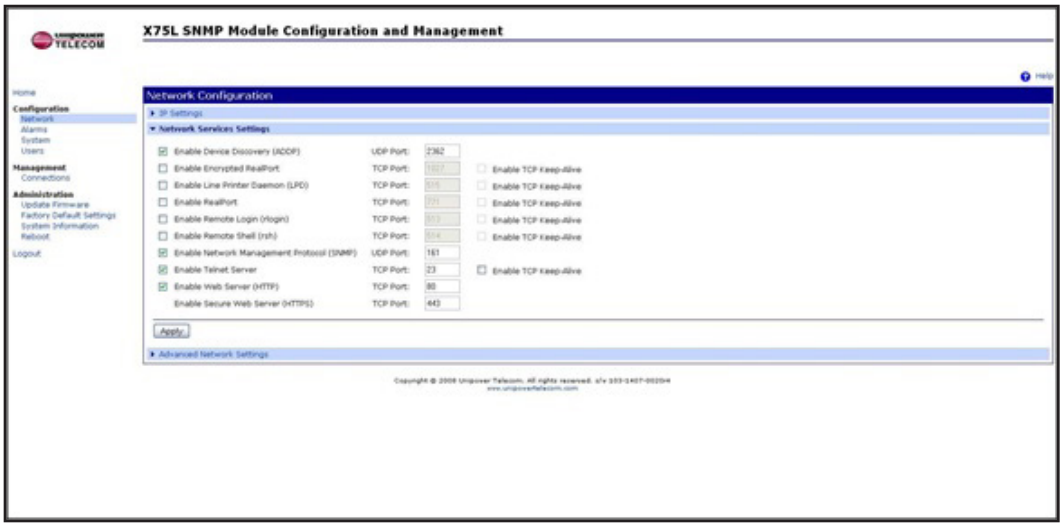


After successfully logging in, the module home page will be displayed. A menu is provided down the left hand side which allows access to various module set up features.

The home page displays some basic information about the adaptor including a description, contact details and location.

The tutorial link should not be used as it contains details of features not available in this module configuration.

Configuration – Network – IP Settings



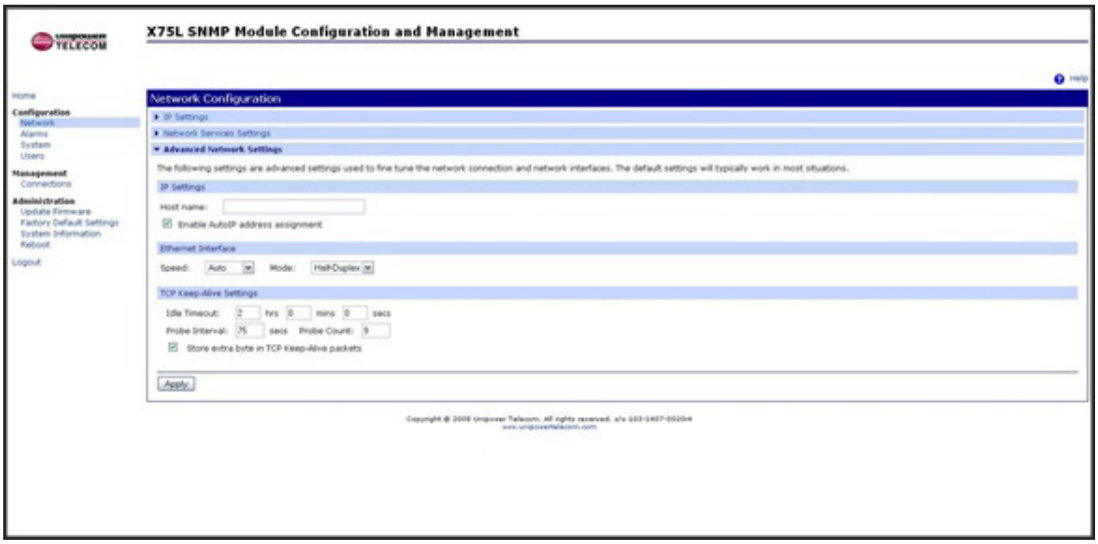
The ***IP Settings*** screen allows adjustment of basic network parameters (IP address, subnet mask and gateway). It will also allow the module to be configured to use DHCP.

A reboot will be necessary after changing any of these parameters.

Remember to redirect your browser to the new address and reconfigure the connecting computer if necessary.

Click the **APPLY** button when all settings have been entered.

Configuration – Network – Network Services Settings



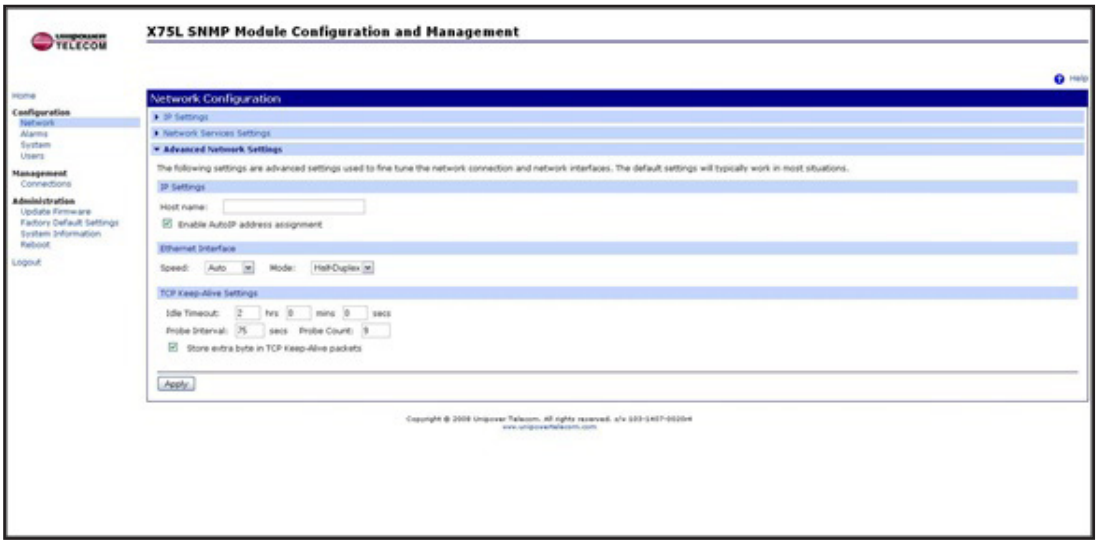
The ***Advanced Network Settings*** screen allows some of the network features to be enabled or disabled.

It is recommended to only enable the following since other features are not supported by this module:

ADDP Device discovery
Network management protocol (SNMP)
Telnet server
Web server (HTTP)

Click the **APPLY** button when all settings have been entered.

Configuration – Network – Advanced Network Settings

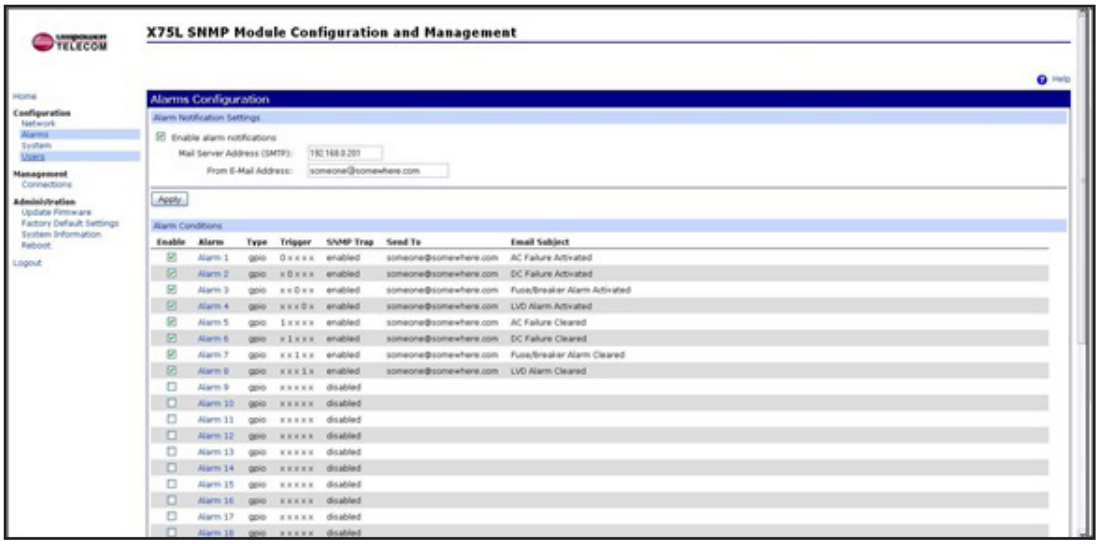


The ***Advanced Network Settings*** screen allows more precise adjustment of network parameters.

It is recommended that only advanced users adjust these parameters.

Click the **APPLY** button when all settings have been entered.

Configuration - Alarms Configuration



The ***Alarm Notification Settings*** & ***Alarm Conditions*** screen shows some preset alarm conditions so that any failing power supply module will provide an alarm output.

Alarm outputs will also be generated when faults are cleared. The ***Enable Alarm Notifications*** check box at the top must always be checked as otherwise no alarm outputs will be generated via either SNMP or e-mail.

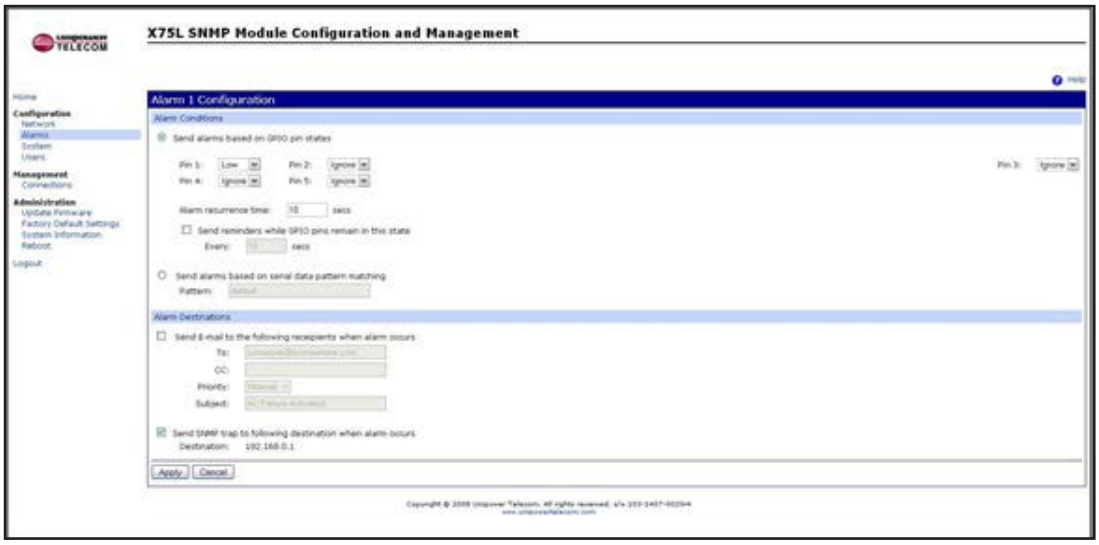
For the e-mail service, the mail server IP address must be entered into the relevant box. This box will only accept an IPv4 address in numerical format.

Most mail servers will require a 'from' e-mail address before they will accept outgoing mail. This address must be entered in the box. This address must be valid on the mail server.

Click the **APPLY** button when all settings have been entered.

To alter the e-mail address that alarms are sent to and to setup other parameters, click on the blue text in the second column of the alarm table.

A screen similar to that shown on the next page is available for each alarm.



The GPIO pin state combo boxes in the ***Alarm Conditions*** section of this screen should not be altered as this will affect how the module creates alarms. If reminders at regular intervals are required for a continuing alarm condition, then this can be enabled using the check box. The repeat time in seconds can then be entered into the box.

If an e-mail is required to be sent for this condition, then the check box must be checked next to 'Send E-mail to the following recipients when alarm occurs'.

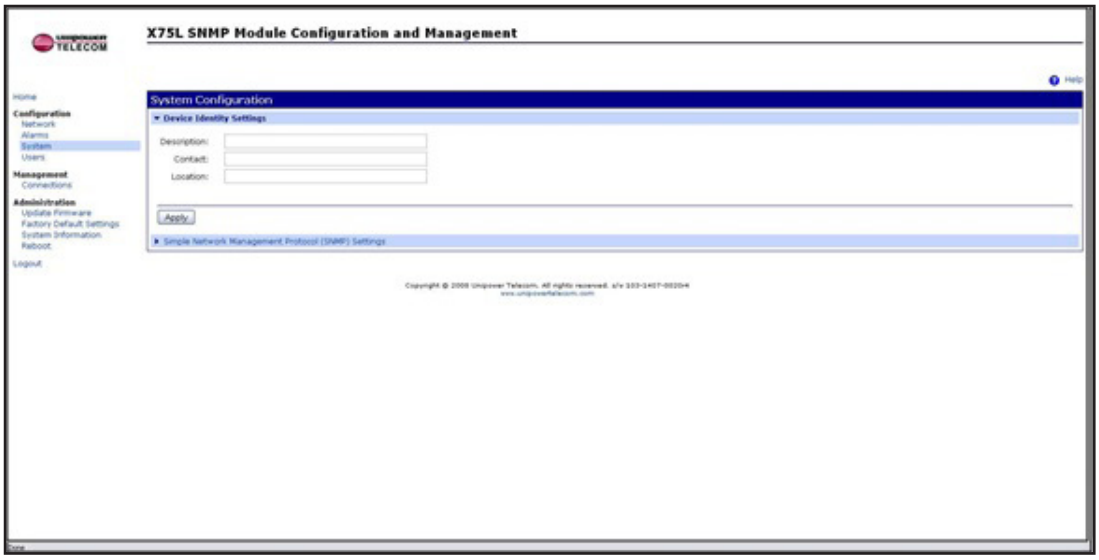
The text boxes should then be filled in with the relevant details.

Note that the e-mail subject is used to identify the alarm condition when SNMP traps are sent.

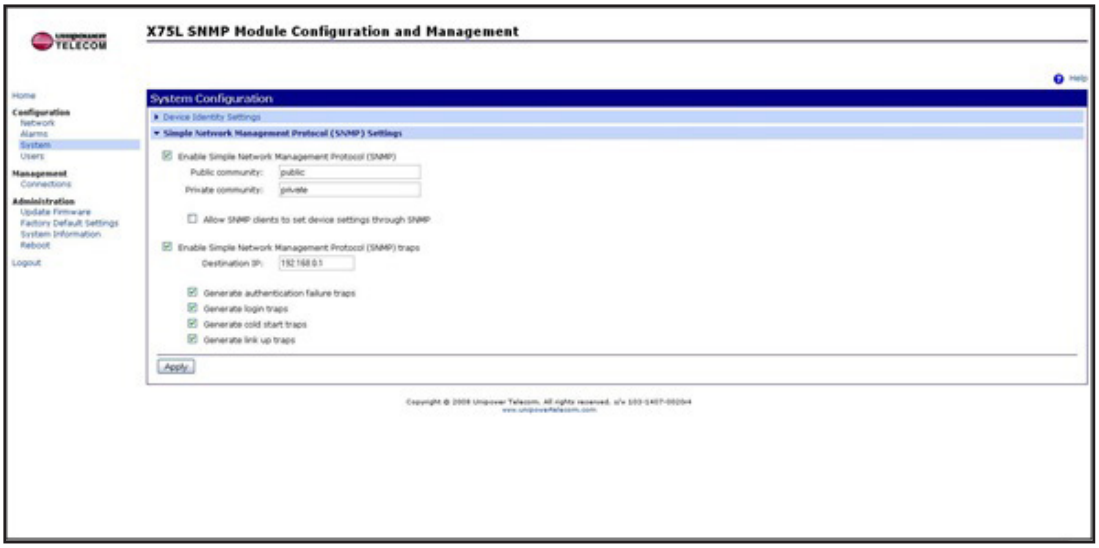
To enable an SNMP trap to be sent, make sure the check box is checked for that option.

Click the **APPLY** button when all settings have been entered.

Configuration – System - System Configuration



The ***Device Identity Settings*** screen allows the user to enter some information about the site. This information is present on the home page and can also be accessed when interrogating the module via SNMP.



The ***SNMP Settings*** screen allows the user to set up the SNMP. The community strings and trap destination can be set. Additional traps can be configured to be sent if desired by checking the relevant boxes.

Click the **APPLY** button when all settings have been entered.

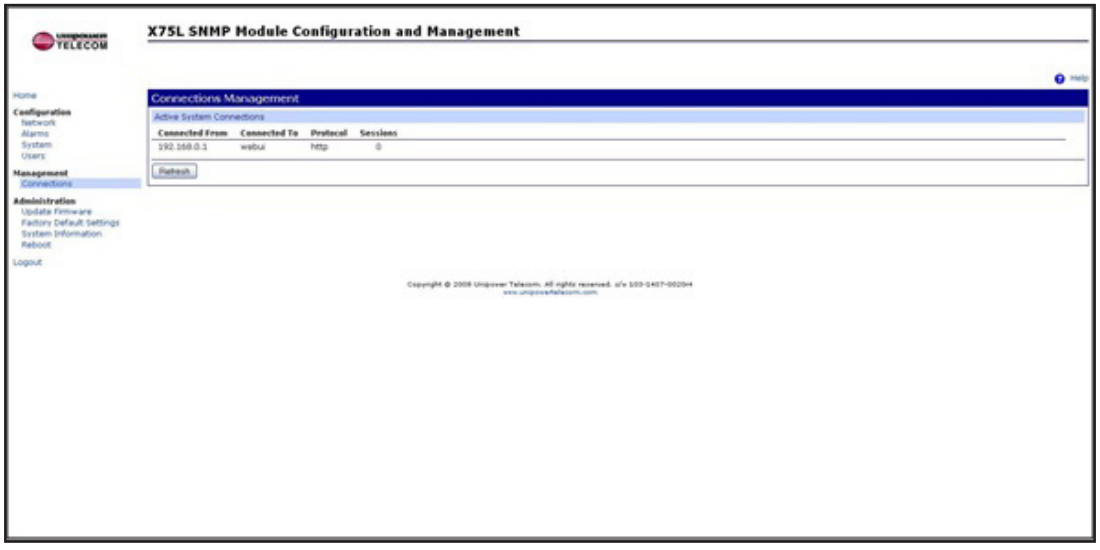
Configuration – Users

The ***Configure Users*** screen displays the possible user log in names.

The user "root" MUST NOT be removed as it may be required for factory configuration.

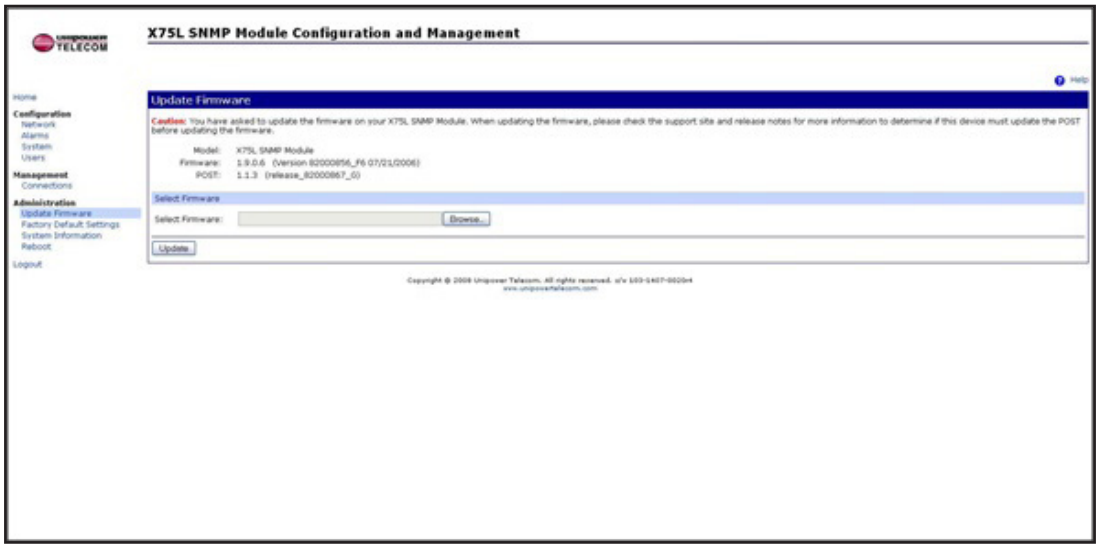
It is also not recommended to change any admin user settings as access to some of the menus may become impossible.

Management – Connections



This screen shows any active connections. No changes are possible on this screen.

Administration – Update Firmware



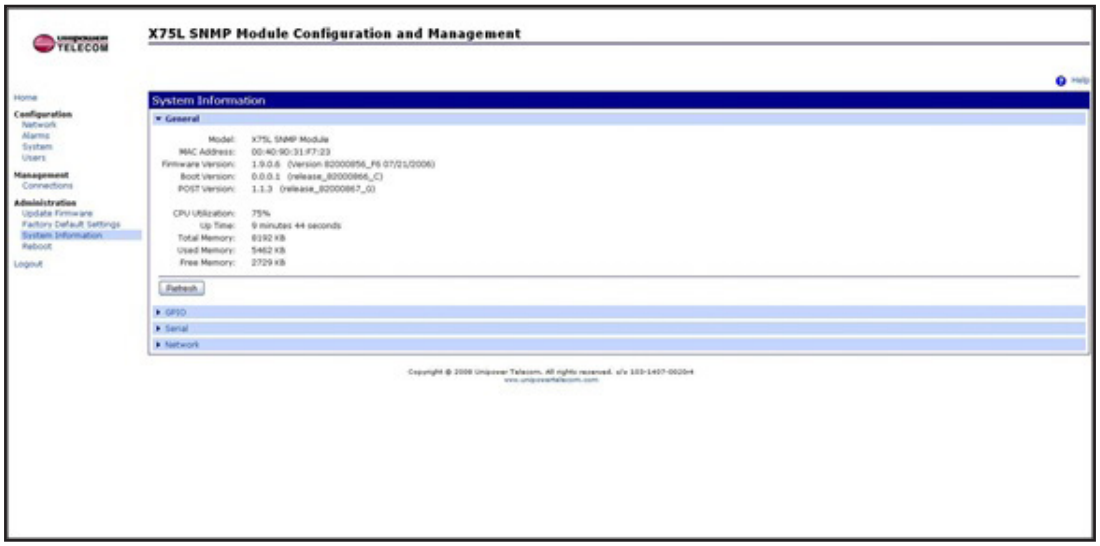
This screen allows updating of the 'core module' firmware. It is not recommended to do this unless advised by UNIPOWER; in which case the necessary files will be provided.

Administration – Factory Default Settings

This screen allows the user to revert to the default settings of the module as supplied by UNIPOWER.

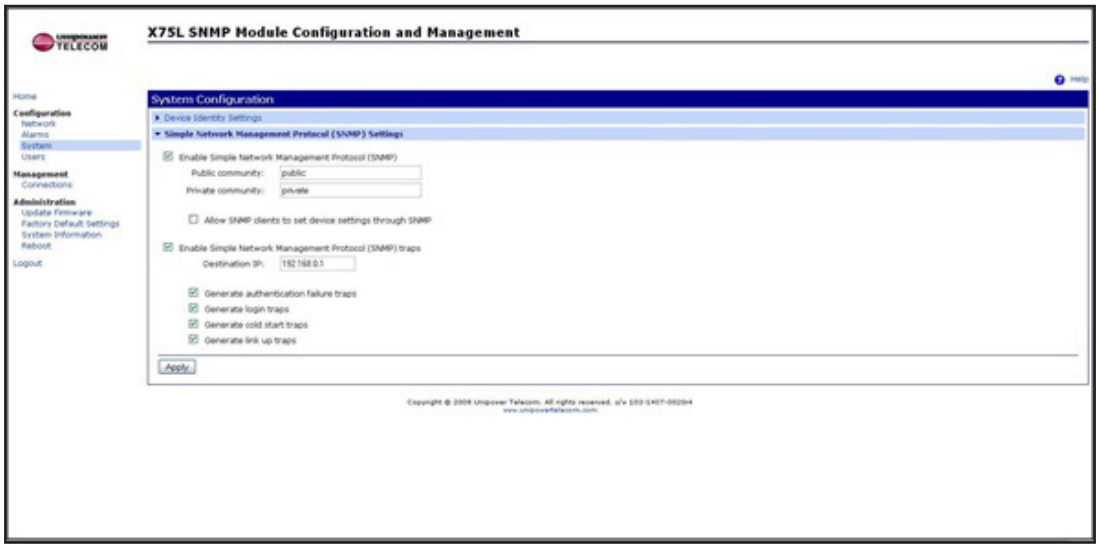
So as not to lose communications access to the module make sure that ***Keep network settings*** is checked before clicking the **RESTORE** button. The module will reboot.

Administration – System Information – General



The ***General*** screen shows basic information about the module system.

Administration – System Information – GPIO



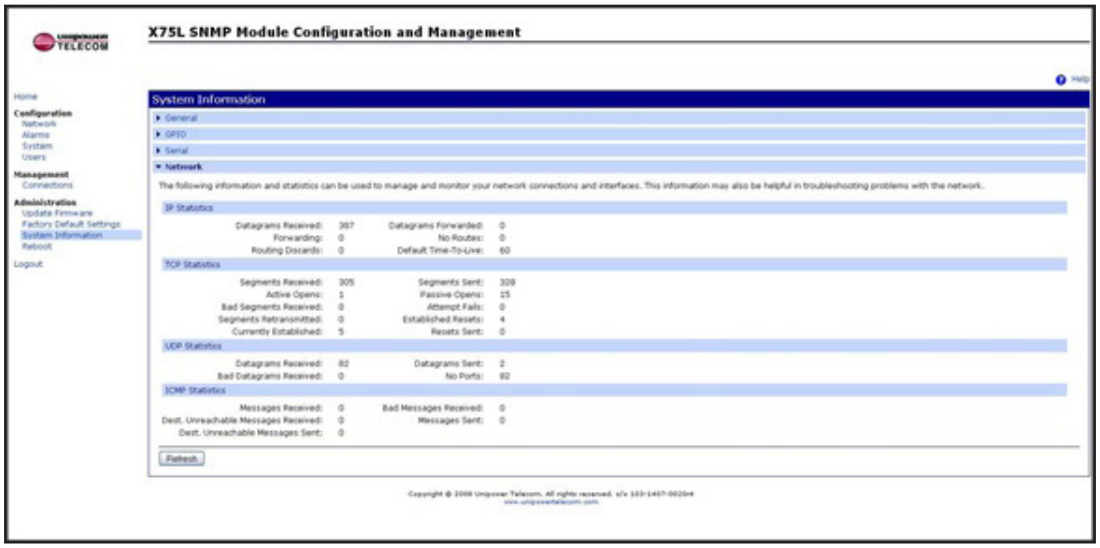
The ***GPIO*** screen shows the state of the monitored inputs. Each pin corresponds to one of the 4 alarm conditions as follows:

1. AC Alarm
2. DC Alarm
3. Fuse/Breakers Alarm
4. LVD Alarm

Administration – System Information – Serial

The ***Serial*** screen shows the status of the serial port within the module. This port is not available for external use and changes should NOT be made.

Administration – System Information – Network



The ***Network*** screen shows statistics about the network connection to the module. This data is also available via command SNMP.

Administration – Reboot

This page is used to reboot the module. This can be done if some changes have been made that require it.

Log out

This page will be displayed when the user has successfully logged out.

Further SNMP information

The SNMP module supports SNMP version 1.

The following MIBs should be used with the SNMP module:

RFC1213, MIB-II	Network Statistics
RFCs 1316, 1317	Port Statistics
DIGI-SMI	Enterprise MIB
DIGI-DEVICE-INFO-MIB	Enterprise MIB
DIGI-SERIAL-ALARM-TRAPS-MIB	Enterprise MIB

For more information on the statistics available through the standard RFCs listed above, refer to the RFCs available on the IETF web site (www.ietf.org). For enterprise MIBs, refer to the description fields in the MIB text.

Appendix 2 – Revision History

Rev. #	Date	Detail	Page
1	12/09	First Release	
2	12/09	DIP switch setting instructions added SNMP option screenshots updated GPIO description changed	19 22-34 32
3	07/13	Rectifier input current table added	17
4	11/13	New section “Principal of Operation” added. Subsequent sections renumbered Front and rear panel drawings revised Connector wire sizes added	9 10&11 13&14
4a	04/14	Fixed section number errors and numbered tables separately from figures	various