Operation	North American Model	Worldwide Model	Japanese Model
Power Capacity (kVA)	4-16kVA	4-16kVA	4-16kVA
Battery type	Hot swappable, sealed, maintenance-free lead acid batteries with 3-5 year typical lifetime.		
Recharge time with supplied packs	<3 hours		
Extended Battery Option	Yes		
Topology	Double conversion on-line		
Input Specifications			
Nominal input voltage	208 or 240 Vac	220/230/240 Vac (1:1 phase or 3:1 phase)	200 Vac
Nominal Input frequency	60Hz	50/60Hz	50/60Hz
Input voltage range	155Vac to 276Vac	155Vac to 276Vac	155Vac to 276Vac
Input frequency range	57-63 Hz or synch	47-63 Hz or synch	47-63 Hz or synch
Standard connections			Hardwire
Power factor correction supported		>0.98	
Output Specifications			
Nominal output voltage	120/208/240	220/230/240 Vac	100/200 Vac
Output voltage regulation	+/- 3%	+/- 3%	+/- 3%
Total voltage harmonic distortion		<5% at full load	
Power factor tolerance		Loads with .5 to 1.0 power factor	
Efficiency at full load	>87%	>90%	>87%
Load crest factor supported		up to 5:1	
Overload capacity		50% for 30 seconds, 25% for 10 minutes	
Features			
N+1 Redundancy capability	Yes	Yes	Yes
Power (kVA) Expandability	Yes	Yes	Yes
Runtime (battery) Expandability	Yes	Yes	Yes
Self Diagnostics	Yes	Yes	Yes
User Serviceable	Yes	Yes	Yes
Automatic bypass	Yes	Yes	Yes
Manual bypass	Yes	Yes	Yes
Indicators, Interfaces, and Controls			
LCD Display	Programmable 4 X 24 character backlit LCD, multiple languages (English, French, Spanish, Italian, German)		
Intelligent serial interface	Yes	Yes	Yes
SNMP Capability	Yes	Yes	Yes
Multiple server/operating system shutdown	via Share-UPS	via Share-UPS	via Share-UPS
Modem (out of band) control	via Call-UPS	via Call-UPS	via Call-UPS
Emergency Power Off (EPO) capability	input for external EPO closure	input for external EPO closure	input for external EPO closure
Environmental Monitoring/dry contact closures	via Measure-UPS	via Measure-UPS	via Measure-UPS
Physical			
Ambient Operation	0 to 40 C; 0 to 95% non condensing; up to 10,000 feet		
MiniFrame dimensions (hxwxd)	31"x24"x27" (78,7x60,9x68,6cm)	31"x24"x27" (78,7x60,9x68,6 cm)	31"x24"x27" (78,7x60,9x68,6 cm)
MasterFrame dimensions (hxwxd)	52"x24"x27" (132.1x60,9x68,6cm)	45"x24"x27" (114,3x60,9x68,6cm)	52"x24"x27" (132.1x60,9x68,6cm)
Warranty and Service Options			
Standard warranty	2 years, including battery	2 years, including battery	2 years, including battery
On-site service	Optional	Optional	Optional
Extended warranty	Optional	Optional	Optional

Symmetra Orderable SKU's

System Description	FRAME	208/240V (Domestic) w/PDU	220-240V 1:1 (Inter'l)	220-240V 3:1 (Inter'l)	200V (Japan)

Power Array™

The Symmetra™ Power Array™ does for power protection what RAID did for data storage.

Advances in enterprise *computing* and *storage* technologies are demanding a change in enterprise *power protection* technology. Today's computer room houses mission critical applications and databases running on Wintel and Unix-based machines, web servers, and dozens to hundreds of consolidated file and print servers. The reliability and availability of these machines depends on technological advances such as RAID storage, server mirroring, server clustering, and fail-over recovery.

Despite these advances in storage and processing availability, the mid-sized power protection industry has been populated with only legacy UPSs - centralized box-type UPSs that create multiple single points of failure. These UPSs offer little in the way of redundancy and scalability. According to one frustrated director of the Uninterruptible Uptime Users Group (UUUG), "a single legacy UPS failure can wipe out three years worth of carefully planned and controlled systems uptime."

But that all changes, with an exciting new power protection technology from APC: Introducing the world's first Power Array, a completely new category of power protection system designed by APC to meet today's customer demand for scalable and highly available power solutions.

A Power Array is a single unit composed of modular components. This modular architecture provides the foundation for building and scaling near-continuous availability power systems with a flexible range of power capacity.

Figure 1 (right) shows a diagram of a typical datacenter with a legacy UPS protecting processing and storage devices. Servers use clustering and mirroring technologies, and storage devices use RAID technology to create redundant paths so that no CPU or drive is a single point of failure. Since the power path from a legacy UPS is not redundant, the overall system availability is constrained by the UPS.

Figure 2 (right) shows how Power Array technology matches the modularity, redundancy and scalability of RAID and server clustering and mirroring to increase overall systems availability. In fact, Power Array technology, combined with it's manageability and serviceability, represents a fourfold advantage over a traditional UPS.

Power Array *redundancy* reduces the risk of systems downtime. By using an N+1 redundant Power Array, customers ensure maximum uptime and near-continuous systems availability.

Power Array *scalability* protects your investment in power protection by enabling expansion or reconfiguration simply by adding or removing modules. Scalable runtime allows extended back-up time with the addition of Battery Modules. Scalable power capacity enables you to pay as you grow by adding Power Modules in increments of 4kVA.

Power Array *serviceability* decreases the cost of systems ownership. Modular and hot-swappable components make maintenance simple.

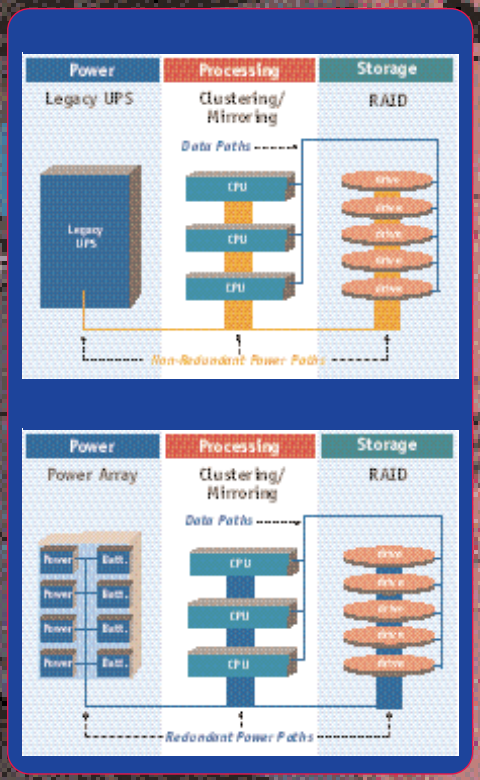
Power Array *manageability* means you can use APCs existing software and accessories to monitor and control your power and environment, as well as to shut down multiple servers and reboot individual locked up machines.

Total Solution

The Symmetra Power Array combines with the complete line of APC datacenter protection software and accessories to provide the four most critical elements of total datacenter protection: *redundancy, scalability, manageability* and *serviceability.*

This total solution promises to change the way you look at computer room power protection.

Introducing Symmetra™, the World's First Power Array™, and the Foundation for Building Near-Continuous Availability Power Systems.



Scalability

Protect your investment: scalable kVA and runtime ensure that Symmetra will meet your power needs now and in the future.

IS Managers want to be able to "pay as they grow" to meet the computing demands of the future. Changes in datacenter power requirements can make cost-effective power protection planning difficult. The Symmetra Power Array provides the flexibility to adapt and grow UPS power and runtime without complete reinvestment.

The Symmetra Power Array is made up of load-sharing modules so you can easily build and reconfigure your array. If you add computing power to your datacenter, you can add Power Modules, in increments of 4kVA, to expand your power capacity. If you need more battery run time, you can add Battery Modules. And if you re-deploy systems to different locations, you can move modules from one Power Array to another. All changes can be made while your systems are running and protected. Additional Battery Frames can be added for unlimited runtime.

Scalable Runtime

Additional Battery Modules increase runtime. Modules are added or moved while systems are running and protected.

Extended Battery Frames

Additional Extended Battery Frames can be daisy-chained for extended runtime. Models include the SYXR4, which can hold up to four Battery Modules, and the SYXR12, which can hold up to twelve Battery Modules.

Scalable Power

The Symmetra Power Array integrates load-sharing modules for easy custom configuration. Additional 4kVA modules expand power capacity.

SYXR12

SYXR4

Extended Battery Frames

Redundancy

MasterFrame*

MiniFrame* *The MasterFrame in international units is one level shorter than shown here.*

N+1 Redundancy ensures maximum uptime and continuous availability.

Symmetra achieves N+1 redundancy through a new power sharing technology. Power sharing means that all of the modules in a Power Array run in parallel and share the load evenly. N+1 redundancy means running one extra module than will support you full load. In this way, all of the modules support one another.

For example, if your computer load is 15kVA, you achieve N+1 with five Power Modules. If a module fails or is removed, the other modules instantaneously begin supporting the full load. It does not matter which module fails because all of the modules are always running and supporting your load.

N+1 redundancy is used today in disk arrays, in processor power supplies, and in processors themselves. But, until now, redundancy has never been offered for server level power protection. As critical applications and databases are moved to smaller machines, the Symmetra Power Array brings glass house reliability to the mid-sized power protection range.

What is N+1 Redundancy ?

Fig. 1

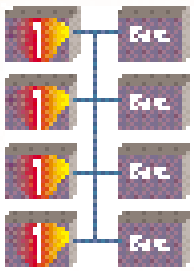
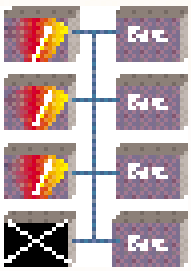


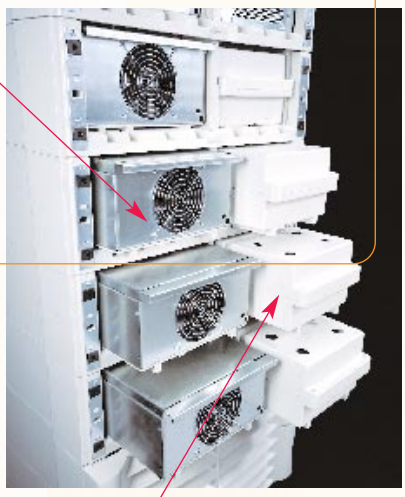
Fig. 2



Just as a RAID distributes data across multiple drives, Symmetra's unique power sharing technology allows multiple Power Modules to share the Power Array's connected load. (Figure 1)

If any module fails or is removed, the other modules take over the load. (Figure 2)

Individual 4 kVA Power Modules are easily installed or removed to manage redundancy.



Battery Modules can be quickly shifted to other Power Arrays or Battery Frames to manage runtime.

Serviceability

Symmetra lowers your cost of ownership by simplifying maintenance.

Service Made Easy

Because legacy UPSs are not modular, they require a special UPS technician for service. With only a handful of these proprietary technicians across the country and around the world, service contracts can add up to 50% to the cost of the UPS.

Power Array serviceability makes maintenance simple because its components are modular and hot-swappable. With a Power Array, you can reduce service costs by servicing the unit yourself, by using your current computer room service provider, or by choosing an on-site service contract from APC.

Because of its intelligence, Symmetra™ is self-diagnosing and automatically gives early-warning problem notification. Because of its redundancy, the system remains up, running and protected during the entire service process.

Symmetra comes with a standard two-year warranty. To increase your coverage, you can upgrade to a three-year PowerPlan Warranty or to a PowerPlan On-site Warranty (see details at www.apcc.com). With the PowerPlan program, you'll receive next day delivery of replacement modules, seven days a week.

On-site Service

With the PowerPlan On-Site Warranty, a service engineer will be dispatched to your site if required. 7x24 "Start-up" is also included with this warranty (this does not include electrical installation).

The bottom line: Symmetra™ modularity decreases the cost of systems ownership by simplifying maintenance.

ROI Worksheet

Average Cost per Downtime Event

		[Sample Data]
Company size (Annual Revenue):	1	[$400 mil.]
% Revenue directly linked to systems/network:	2	[80%]
Actual system-related revenue risk:	3	[$320 mil.]
Revenue loss per hour downtime: [*3* / 2000 hrs.]:	4	[$160,000]
Personnel cost per hour: [# of users x hourly wage]:	5	[$30,000]
Rev. & Pers. cost per event [*4* + *5* x MTTR (24 hours)]:	6	[$4.56 mil.]
Lost data cost per event: [*4* x 8 hrs x 12%]:	7	[$153,600]
Total cost per event [*6* + *7*]:	8	[$4.71 mil.]

A. No UPS protection	B. Legacy UPS	C. Power Array
Risk of downtime = 15* x *8*	Static downtime risk = 15 x *8* x .05**	Flexible downtime risk = 15 x *8* x n (n = % gap†)
$ [$70.7 mil.]	$ [$3.54 mil.]	$ [$7,065]

*LAN Computing, 11/2/92 **Published Competitor Legacy UPS Availability = 95% †Varies based on Power Array configuration

Power Array™ vs. Legacy UPS

Event	Legacy UPS	Power Array
Battery fails or needs replacement →	System is unprotected - system will crash at next power outage and must be brought down to service UPS. *Availability compromised.*	System remains up and protected. User notified proactively, service within minutes while load is up and protected.
Electronics fail →	Computer system crashes or will crash at next power outage. System is unprotected and must be brought down for service. *Availability compromised.*	Load remains up and protected. Only redundancy lost. User notified proactively; service within minutes while load is running and protected.
Load capacity reached →	User needs to buy new UPS.	User adds an extra Power Module for 15-25% of the cost of new UPS.
Overload →	UPS goes to bypass - system will crash at next power outage. *Availability compromised.*	Load remains up and protected, only redundancy lost.
Humidity too high →	No alert. Computer equipment can be damaged. *Availability compromised.*	Alert sent via network, SNMP, or web-based command.
Temperature too high →	No alert. Computer equipment can be damaged. *Availability compromised.*	Alert sent via network, SNMP, or web-based command.
Server locked up →	Nothing. User must manually reboot system. *Availability compromised.*	With MasterSwitch™ accessory, user can remotely reboot individual loads.

A typical legacy UPS is rated at approximately 95%** system availability, leaving a 5% power availability gap. A recent Oracle Corporation study of 400 large companies pegged the cost of downtime at an average of $100,000 per hour (based on company-wide downtime). When considering systems availability, Oracle shows that for a large company a gain of just one percentage point of availability is worth $7,358,400 per year. Multiply that by the five percentage points of availability unaccounted for by a legacy UPS ($36,792,000), and the costs quickly add up. Even at an average size company, one hour of downtime translates to $10,000 off the bottom line. With a 5% power availability gap, such companies risk $3,679,000 per year. (Source: Electric Power Systems Quality, 1996).

The truth is, whether your company is

Manageability

Build a customized UPS management strategy with Symmetra accessories.

Symmetra will do more than protect your investment; it will protect your career. Optional accessories and power management software provide the ability to manage your network from anywhere in your datacenter or anywhere in the world.

« PowerView (included)

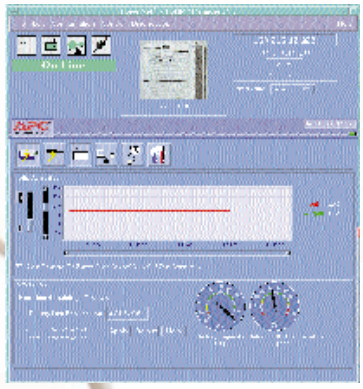
Symmetra's remote display puts all power and UPS information at a system administrator's fingertips in a menu-based format. With monitoring and control parameters such as input voltage, level of redundancy, temperature and humidity, the display helps manage Symmetra from a monitoring station up to 15 feet away.

» SNMP Management

APC's PowerNet SNMP products give you enterprise power management,automatic power failure notification, UPS testing and status, and power alarms (traps) sent to your network management console.

PowerNet™ SNMP Manager

PowerNet SNMP Manager is a windowed, snap-in application for popular NMSs such as HP OpenView, Novell NMS and IBM NetView/6000 that collects UPS/power status information graphically for easy problem analysis. PowerNet Manager also provides the tools to manage and con-

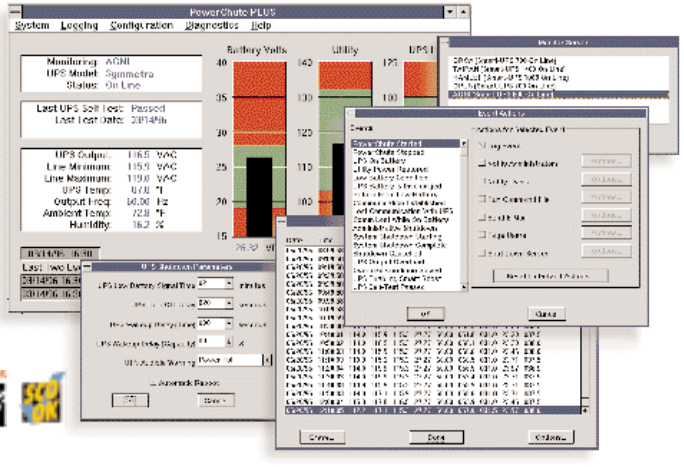


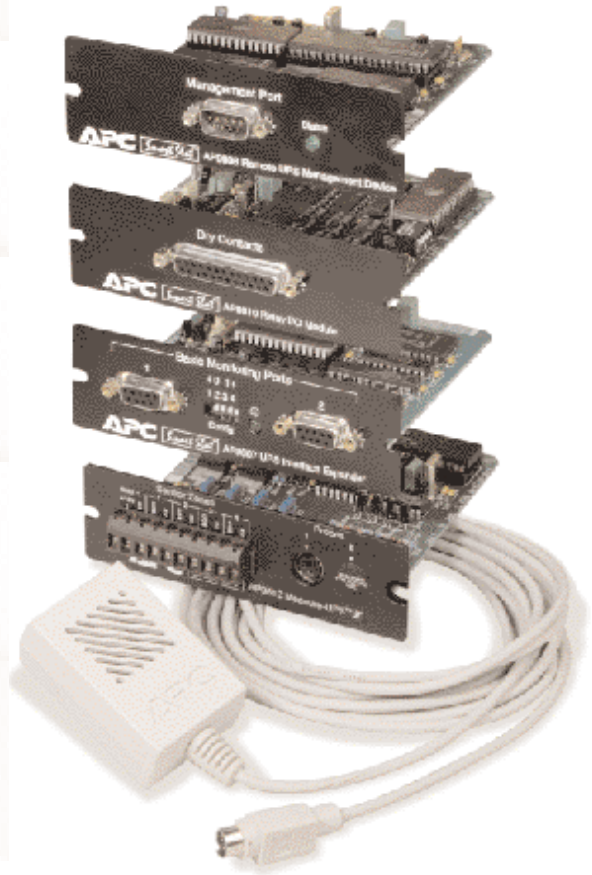
« MasterSwitch™ Power Management

APC MasterSwitch™ provides complete Web and SNMP management and control of your network's power. The MasterSwitch™ E515 network manageable power distribution unit (PDU) gives the network administrator complete control over the power to connected equipment. From anywhere on the network, administrators can use a network management station (NMS) or Web browser to power, shut off or reboot equipment. MasterSwitch™ cuts service costs and eases your power management burden.

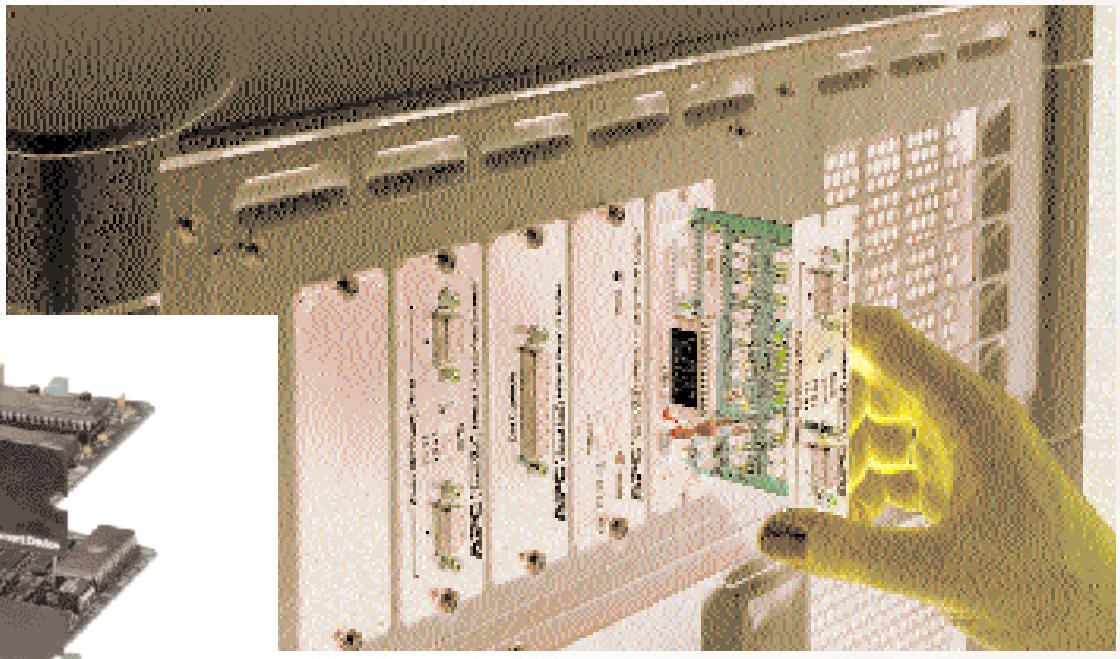
« PowerChute® *plus* Software

Since many LANs are unattended and network administrator time is at a premium, APC offers PowerChute plus *management software. PowerChute* plus *provides unattended shutdown of systems, UPS testing/status, remote UPS management and environmental/power monitoring.*





APC's line of award-winning SmartSlot accessories slide right into the back of Symmetra, and integrate with either PowerChute plus *or PowerNet SNMP management software to communicate necessary information and commands.*



APC SmartSlot™ Environmental and Security Management Accessories

ıartSlot™ Accessories provide stom Management

ımmetra comes equipped with four SmartSlots, e unique accessory bays that allow you to slide rious accessory cards into place without need- external communication or power supply nnections. These four SmartSlots give you the ılability needed to expand network power ınagement capabilities and build a custom wer management strategy to serve any mputing environment.

ıare-UPS™

ıen used with APC software and cable kits, are-UPS provides safe, automatic shutdown up to fifteen servers connected to the same ymmetra - even in mixed operating system environments. Share-UPS also supports remote UPS management via modem.

Measure-UPS™ II

Symmetra supports Measure-UPS II, which works with PowerNet SNMP and PowerChute plus *products to provide environmental information such as ambient temperature and humidity, and to provide four user-definable contact closures for external alerts.*

Call-UPS™ Out-of-Band Management

Call-UPS II works with an external modem to provide out-of-band UPS management for Symmetra. Call-UPS II allows you to reboot a distant locked-up device through an out-of-band modem link. You can also determine UPS status, diagnose power problems and configure UPS settings even when LAN communications are not available. Call-UPS II can even page you whenever UPS power alerts occur.

Other Symmetra Power Array Features

Self-diagnosing

In the event of an internal failure of any kind, Symmetra sends alerts to network managers and/or a service provider via network and network clients, SNMP, or out-of-band connection via modem.

Manual and Automatic Bypass

Manual and Automatic bypass provide another power path for N-only systems.

Power factor correction

Eliminates power line harmonics and neutral overloads that can cause building wiring to overheat.

Remote Emergency Power Off (REPO).

Ties into your primary Emergency Power Off switch (EPO) to integrate your UPS into enterprise safety plans, and to shut down loads in an emergency.

1:1 and 3:1 Systems

International models of Symmetra are available in either 1:1 (single phase in/single phase out), or 3:1 (three phase in/single phase out) modes.

Configuration

Power Array provides the flexibity to meet the needs of any mid-size datacenter.

PowerView™
Multi-lingual display console puts monitoring and control at your fingertips. The PowerView attaches to the nose of Symmetra or can be extended up to 15 feet to be more convenient to a monitoring station or administrator's desk.

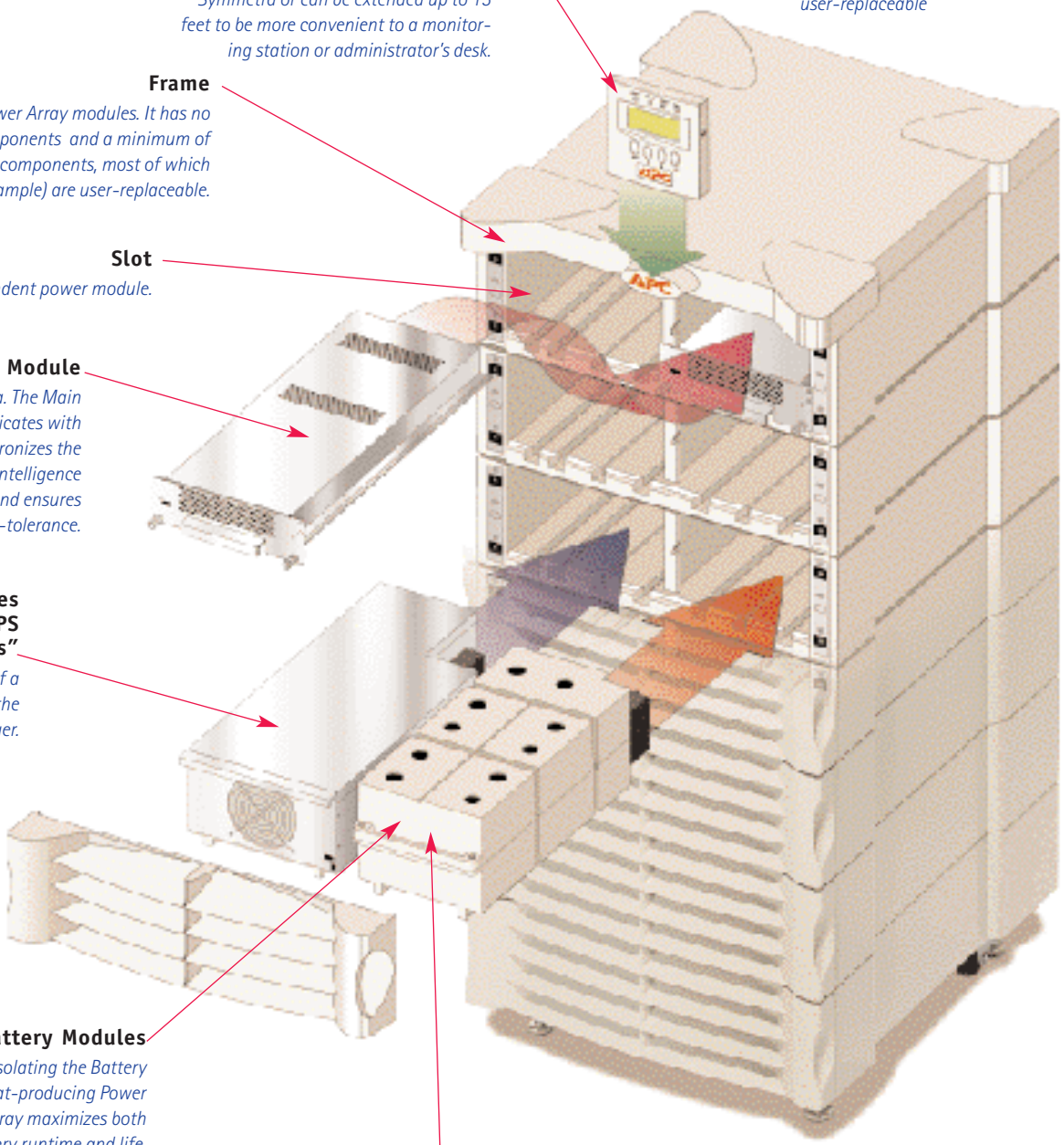
All of Symmetra's modules are hot-swappable and user-replaceable

Frame
Holds the Power Array modules. It has no active components and a minimum of mechanical components, most of which (fans, for example) are user-replaceable.

Slot
Slot for redundent power module.

Intelligence Module
The brain of the Symmetra. The Main Intelligence Module communicates with the outside world and synchronizes the modules. The Redundant Intelligence Module is the back-up brain and ensures fault-tolerance.

Power Modules (PM's): 4kVA UPS "building blocks"
Contain the electronics of a 4kVA UPS, including the inverter, rectifier, and charger.



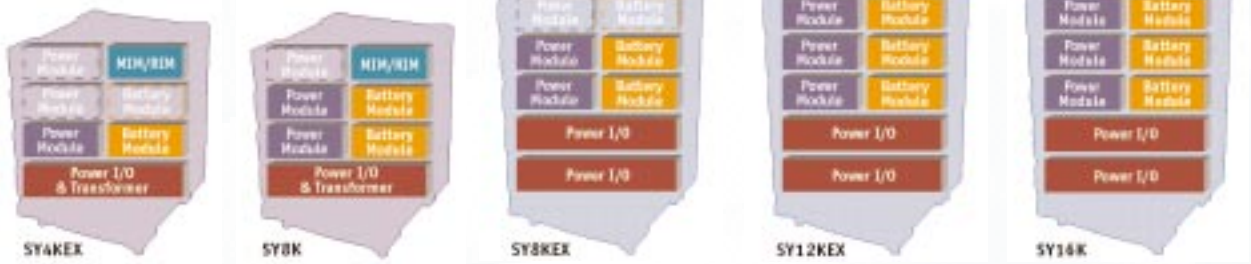
Isolated Battery Modules
By physically isolating the Battery Modules from the heat-producing Power Modules, the Power Array maximizes both battery runtime and life.

Parallel Battery Modules
Provide the runtime you need. Like Power Modules, Battery Modules are hot-swappable and user-replaceable.

Configuration Guide

Configure your Symmetra system as follows:

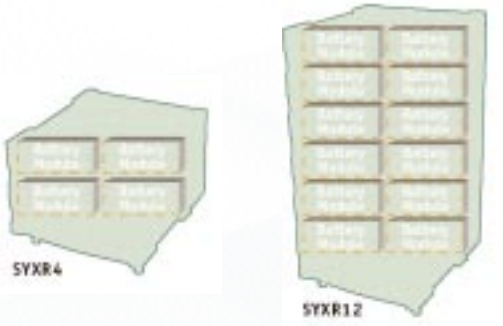
STEP 1: *Choose the Symmetra system you need based on your current VA load and future need to expand power. Note: Symmetra systems with an EX in the part number are expandable.*



Step 2: *Add an additional Power Module for N+1 Redundancy.*

Step 3: *Choose additional Battery modules and Extended Run Battery Frames for longer run times if needed. Use the Runtime chart below to determine how many Battery Modules you need*

**Batteries not included*



Runtime Chart

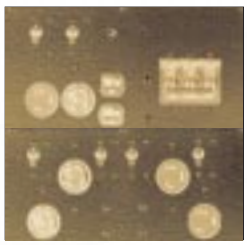
Number of Battery Modules (any Symmetra system, in minutes except where noted)

VA Load	1	2	3	4	5	6	7	8	9	10	12	15	20	25	30	40	50
2000	15	40	70	1.6 hr	2.1 hr	2.7 hr	3.2 hr	3.7 hr	4.3 hr	4.8 hr	5.9 hr	7.5 hr	9.9 hr	12.5 hr	15.0 hr	19.9 hr	24.9 hr
3000	9	23	40	58	1.3 hr	1.6 hr	2.0 hr	2.3 hr	2.6 hr	3.0 hr	3.7 hr	4.8 hr	6.6 hr	8.3 hr	10.0 hr	13.3 hr	16.6 hr
4000	6	15	27	40	53	68	1.37 hr	1.62 hr	1.9 hr	2.1 hr	2.6 hr	3.4 hr	4.8 hr	6.2 hr	7.5 hr	10.0 hr	12.5 hr
5000	n/a	11	20	29	40	51	62	1.22 hr	1.4 hr	1.6 hr	2.0 hr	2.6 hr	3.7 hr	4.8 hr	5.9 hr	8.0 hr	10.0 hr
6000	n/a	9	15	23	31	40	49	58	68	1.3 hr	1.6 hr	2.1 hr	3.0 hr	3.9 hr	4.8 hr	6.6 hr	8.3 hr
7000	n/a	7	12	18	25	32	40	47	55	63	1.3 hr	1.8 hr	2.5 hr	3.3 hr	4.0 hr	5.6 hr	7.1 hr
8000	n/a	6	10	15	21	27	33	40	46	53	1.1 hr	1.5 hr	2.1 hr	2.8 hr	3.5 hr	4.8 hr	6.2 hr
9000	n/a	n/a	9	13	18	23	28	34	40	46	58	1.3 hr	1.8 hr	2.4 hr	3.0 hr	4.2 hr	5.4 hr
10000	n/a	n/a	7	11	15	20	14	29	34	40	51	1.1 hr	1.6 hr	2.1 hr	2.7 hr	3.7 hr	4.8 hr
12000	n/a	n/a	6	9	12	15	19	23	27	31	40	53	1.3 hr	1.7 hr	2.1 hr	3.0 hr	3.9 hr
14000	n/a	n/a	n/a	7	10	12	15	18	22	25	32	44	1.1 hr	1.4 hr	1.8 hr	2.5 hr	3.3 hr
15000	n/a	n/a	n/a	6	9	11	14	17	20	23	29	40	58	1.3 hr	1.6 hr	2.3 hr	3.0 hr
16000	n/a	n/a	n/a	6	8	10	13	15	18	21	27	36	53	1.2 hr	1.5 hr	2.1 hr	2.8 hr

Factory installed power distribution option

Symmetra ships standard with input and output hardwire connections.

To order domestic units with pre-installed PDU's (Power Distribution



Units), see back cover for orderable SKU's. Additional 3rd partyCCPDU's (Cord Connected PDU's) can be added for further output receptacle connections.

Integrated, Failsafe Connectors

Built into the individual modules, these connectors use sensors to verify complete integration of modules with the intelligent frame.