Routing Switchers for SD/HD/3G-SDI/4K
64X64 up to 1152X1152 in 12 chassis sizes for fiber or coax
Company Information

Incorporated in 1973 and located in Huntsville, Alabama with regional offices throughout the United States, PESA is a leading manufacturer of high end analog and digital routing and signal distribution products used in professional AV, broadcasting, industrial, educational, medical, religious, and government markets. PESA's products are represented worldwide through a network of professional dealers and distributors. Our goal is to develop easy to use products with the latest technology components at cost effective pricing with maximum quality. We strive everyday to insure our customers receive the best in quality service and unquestionable superiority in product performance. We design, manufacture and test all of our products with rigorous procedures to provide zero defects in quality and performance. We continually monitor all of our in-house processes to insure exceptional quality, reliable performance, and innovative technology. We are committed to environmental awareness and the impact that our operations have on the environment.

ORDERING INFORMATION
U.S. Corporate Headquarters
PESA
103 Quality Circle, Suite 210
Huntsville, Alabama 35806
TEL: +1 256-726-9200
FAX: +1 256-726-9271
sales@pesa.com

Warranty:
Products manufactured by PESA are manufactured for performance and reliability. PESA warrants these products against defects and workmanship for a period of three years.

Services:
Customer support is available 24 hours a day, 7 days a week by calling 1-800-323-7372.
International customers call +1 (256) 726-9222.

In addition to our customer service support center, we offer extended warranties and online technical resources via our web site at: www.pesa.com

On site or factory training is available for control system operations, technical, and maintenance training. Contact our technical support group for additional information.

Spares can be ordered through your area sales representative.

Specifications subject to change without notice.

TABLE OF CONTENTS

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Company Information</td>
<td>2</td>
</tr>
<tr>
<td>System Diagram</td>
<td>3</td>
</tr>
<tr>
<td>Frame sizes</td>
<td>4</td>
</tr>
<tr>
<td>Overview</td>
<td>5</td>
</tr>
<tr>
<td>Router Frame Overview</td>
<td>6</td>
</tr>
<tr>
<td>Specialized Card Sets</td>
<td>7</td>
</tr>
<tr>
<td>64NE / 64NEX / 64XE</td>
<td>8</td>
</tr>
<tr>
<td>128NE / 128XE</td>
<td>9</td>
</tr>
<tr>
<td>144NE</td>
<td>10</td>
</tr>
<tr>
<td>Large Frame Sizes</td>
<td>11</td>
</tr>
<tr>
<td>Card Types</td>
<td>12-13</td>
</tr>
<tr>
<td>System Features and Options</td>
<td>14</td>
</tr>
<tr>
<td>Specifications</td>
<td>15-16</td>
</tr>
</tbody>
</table>
All of PESA’s routing systems are controlled by the most flexible and comprehensive router control system available. Users can easily control the router system from any number of remote control panels or through the Cattrax system control software. Cheetah frames can be configured by many 3rd party control devices such as Crestron, AMX, or other types of automation system via serial or network connectivity.
# Frame Sizes

## Cheetah Series Routing Frame Overview

<table>
<thead>
<tr>
<th>Frame</th>
<th>Size</th>
<th>Matrix</th>
<th>Signal Formats</th>
<th>I/O type</th>
</tr>
</thead>
<tbody>
<tr>
<td>64NE</td>
<td>64X64</td>
<td>64X64</td>
<td>CV/SD/HD</td>
<td>Coax/Fiber</td>
</tr>
<tr>
<td>64NEX</td>
<td>64X64</td>
<td>64X64</td>
<td>SD/HD/3G/4K</td>
<td>Coax/Fiber</td>
</tr>
<tr>
<td>64XE</td>
<td>64X64</td>
<td>64X64</td>
<td>SD/HD/3G/4K</td>
<td>Coax/Fiber</td>
</tr>
<tr>
<td>128NE</td>
<td>128X128</td>
<td>128X128</td>
<td>SD/HD/3G/4K</td>
<td>Coax/Fiber</td>
</tr>
<tr>
<td>128XE</td>
<td>128X128</td>
<td>128X128</td>
<td>SD/HD/3G/4K</td>
<td>Coax/Fiber</td>
</tr>
<tr>
<td>144NE</td>
<td>144X144</td>
<td>144X144</td>
<td>SD/HD/3G</td>
<td>Fiber Only</td>
</tr>
<tr>
<td>288XR</td>
<td>288X288</td>
<td>144X144</td>
<td>SD/HD/3G/4K</td>
<td>Coax/Fiber</td>
</tr>
<tr>
<td>288XE</td>
<td>288X576</td>
<td>144X144</td>
<td>SD/HD/3G/4K</td>
<td>Coax/Fiber</td>
</tr>
<tr>
<td>576XR</td>
<td>576X576</td>
<td>144X144</td>
<td>SD/HD/3G/4K</td>
<td>Coax/Fiber</td>
</tr>
<tr>
<td>512XE</td>
<td>512X1024</td>
<td>128X128</td>
<td>SD/HD/3G/4K</td>
<td>Coax/Fiber</td>
</tr>
<tr>
<td>864XR</td>
<td>864X864</td>
<td>144X144</td>
<td>SD/HD/3G/4K</td>
<td>Coax/Fiber</td>
</tr>
<tr>
<td>1024XR</td>
<td>1024X512</td>
<td>128X128</td>
<td>SD/HD/3G/4K</td>
<td>Coax/Fiber</td>
</tr>
<tr>
<td>1152XR</td>
<td>1152X1152</td>
<td>288X288</td>
<td>SD/HD/3G/4K</td>
<td>Coax/Fiber</td>
</tr>
</tbody>
</table>

Frame sizes listed are standard offerings. PESA can provide custom sizes and configurations to fit most any square or rectangular sizes. Contact the factory for your special needs.
Lowers total cost of ownership - PESA’s Cheetah line of routing switches combines the latest in robust technology with the flexibility required to future proof your investment in large-scale, multi-format, and expandable routing needs. PESA continues to lead in signal routing with the Cheetah’s ability to offer the widest range of frames and card configurations. Designed to support high-quality routing 24/7, Cheetah routing switches are well suited for government, military, broadcast, mobile, telco, and corporate applications where large numbers of signals need to be switched. Cheetah provides high-quality signal routing with matrix sizes 64X64 up to 1152X1152.

High Density Design - All Cheetah frames are designed to support the toughest environments and are well suited for mobile truck applications or military tactical operation centers (TOC). Each frame features hot-swappable modules for easy service and all modules employ the latest in digital technology for lower power consumption. All Cheetah routers incorporate redundant, load-sharing power supplies and feature a superior air flow design for even cooling across all critical components insuring longer life and preventing board-level failures.

Higher Reliability – Input and Output modules support sixteen ports per card, thus limiting the number of signals that can be affected by a single module. Cheetah systems are designed around architecture to support mission critical applications. Support for redundant power and redundant control are key elements of the frame package allowing users to easily swap over to backup systems without taking down the entire system.

System Flexibility – By offering a flexible crosspoint architecture, Cheetah can support signals from 143Mb/s up to 3Gb/s and can support any broadcast standard including ASI, SD-SDI, HD-SDI, 3G-SDI, and 4K in either optical or copper formats. In addition, Cheetah can support fiber CWDM inputs and outputs with up to 16 HD-SDI channels over a single fiber cable. With optional MUX and DEMUX modules, the Cheetah video router can operate seamlessly with PESA’s DRS distributed audio system allowing up to 128 audio channels per card to be embedded or de-embedded within the Cheetah video frame.

Frame Expansion – By using a modular approach to inputs and outputs, each Cheetah frame can be configured in non-square and square configurations as low as 16X16. This modular approach provides excellent in-service expansion without requiring complex and expensive frame swap-outs.

Wide Range of Frame Sizes – With the widest range of frame sizes, Cheetah offers up the most compact I/O configurations available. Cheetah can be configured as compact as 144X144 in just 4RU or up to 1152X1152 in one 41RU frame. With sixteen frame types, the Cheetah family of routing switches can easily fit any system requirements – large or small.

Integrated Audio – The Cheetah router can be integrated with the DRS Audio system allowing users the flexibility to route embedded AES or discrete audio with any SDI/HD-SDI video stream. With the DRS compact audio router system and Cheetah MUX/DEMUX modules, users have the ability to reduce overall cost and power consumption. With DRS integrated audio modules, any audio input can be embedded to any video output.

Comprehensive Control – All of PESA’s routing systems are controlled by the most flexible and comprehensive router control system available. Cheetah frames provide internal slots for up-to two system control cards providing complete connectivity control to every input and output. Users can easily control the router system from any number of remote control panels or through the Cattrax system control software. Cheetah frames can be configured by many 3rd party control devices such as Crestron, AMX, or other types of automation system via serial or network connectivity.

Internal Monitoring and Diagnostics – The Cheetah frame provides unmatched performance for signal management and diagnostics. Smart navigational tools allow quick preview of system performance, power supply voltages, interior temperature, and fan speed.
Cheetah Series Routing Frame Overview

All frames come with long-life fans for worry-free cooling

Single point lock-down for quick, hot-pluggable removal and insertion of input and output cards

BNC or SFP based I/O cards available

Supports redundant AC power in

Communications Port for RS232/422 and PRC

PESA Router Control (PRC) looping connector

PESA Remote Control Ports (RS-485)

System Control Alarm

Frame Alarm
tlow current (max. 20mA@24V n.o. contact closure)

Reference Connections accepts NTSC/PAL or SMPTE 240M tri-level

Matrix Frame Controller RJ-45, compatible with IEEE 802.3 for 100 Base-T

Typical Rear View showing card locations

Redundant or N+1 Power Supply depending on frame type

High density, hot pluggable, front loading matrix cards

Redundant, in-frame PERC2000 system controller cards
(Note: the PERC3000 provides redundant external system controllers)

Removable door and easy access to filter

Typical Front View showing card locations

Redundant, matrix frame controller cards support internal monitoring, networking, and diagnostics support for Cattrax software.
Specialized Card Sets

Fiber cards
Cheetah Fiber Input and Output Cards
PESA was the first to create a unique routing switcher solution supporting both fiber and coax in the same frame. The Cheetah 3G-SDI multi-rate digital routing switcher offers fiber input and output modules that coexist with traditional SDI or HD Multi-rate cards. No matter your cable requirements-optical or coax-the Cheetah is well suited to fit any I/O requirements. Cheetah fiber modules provide high performance, reliable singlemode communications in excess of 10km at data rates up to 3.0 Gbps. Although based on singlemode, the Cheetah fiber modules can accept multimode signals up to 600ft. Future expansion is simple and frames can be upgraded in the field.

Key Features
I/O Modules Install Directly in the Router Frame
Up to 16 Channels Per Card (36 for 144NE frame)
Compatible with SMPTE 259M, 292M, 424M
Handles Multi-Rate Signals from 143Mb/s to 3.0Gb/s
No Pathological Data Problems
Singlemode (Accepts Multimode)
Uses Industry Standard LC Type Connectors

Specifications:

<table>
<thead>
<tr>
<th>Specification</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transmission Method</td>
<td>Digital</td>
</tr>
<tr>
<td>Bit-Error Rate (@ -22dBm)</td>
<td>10-12</td>
</tr>
<tr>
<td>Jitter</td>
<td>&lt;0.2UI</td>
</tr>
<tr>
<td>Rise/Fall Times</td>
<td>&lt;270ps</td>
</tr>
<tr>
<td>Operating Wavelength</td>
<td>1310nm</td>
</tr>
<tr>
<td>(accepts 1270nm to 1600nm)</td>
<td></td>
</tr>
<tr>
<td>Transmitter Output</td>
<td>-7.5 dBm</td>
</tr>
<tr>
<td>Receiver Sensitivity</td>
<td>-22dBm</td>
</tr>
<tr>
<td>Optical Source</td>
<td>Laser diode</td>
</tr>
<tr>
<td>Optical Detector</td>
<td>PIN</td>
</tr>
<tr>
<td>Fiber Type</td>
<td>Singlemode</td>
</tr>
<tr>
<td>Connector Type</td>
<td>SFP / LC</td>
</tr>
</tbody>
</table>

CWDM
Cheetah V16 Coarse Wave Division Multiplexing
The Cheetah V16 CWDM fiber access system extends 16 channels of HD or Multi-rate video multiplexed over a single channel of fiber. The Cheetah V16 card set is a singlemode fiber cabling system. For services such as secure high-speed business data, HDTV broadcast, and other high-end digital video, CWDM fiber helps to lower system costs by reducing laser, packaging, and distribution cost as compared to alternative standard singlemode fiber. CWDM wavelengths are 20nm wide and range from 1410nm to 1610nm. The Cheetah V16 also integrates installer friendly SFP modules and LC connectors all engineered to work together to provide maximum cost-effective optical access performance. In fixed facilities where fiber systems are already in place and more distribution is required, CWDM provides the opportunity to expand signal capacity to 16 over the same fiber cable.

Key Features
Up to 16 channels of HD-SDI over one fiber line
Supports SMPTE 259M and SMPTE 295M
SFP hot pluggable modules
Singlemode fiber system
Industry standard LC type connectors

MUX/DEMUX
The Cheetah MUX and DE-MUX provide fully integrated routing of embedded audio signals from the Cheetah Video router and support seamless inter-mixing of a wide variety of signal formats including Embedded Audio, MADI, balanced and unbalanced AES and analog signal formats in both synchronous and asynchronous forms. Cheetah MUX and DE-MUX video option cards each feature sixteen video channels per card. The Cheetah DE-MUX video input card can de-embed 128 separate audio channels from any of sixteen video channels on a single card and provide discrete audio signals to the other DRS Audio system elements. The Cheetah MUX video output card can seamlessly embed up to 128 individual external DRS audio signals from MADI, AES and analog sources into any of sixteen video outputs. Every DE-MUX video input card features Auto-EQ and every output features auto-Re-clocking to support SMPTE 259, SMPTE 292M and SMPTE 424M to 3Gbs. Input DE-MUX and Output MUX video cards can be added as needed to any Cheetah Video frame. The Cheetah MUX and DE-MUX video options cards extend the range of DRS Audio remedies like delay, gain, invert, swap and sum available in other standard DRS components to embedded audio in the Cheetah video frame. Operators can now select any audio source with full confidence without regard to the source origination. Whether AES, MADI, analog or embedded, all audio signals can be treated as one large flat audio switching plane.

WatchDog Redundancy Option
For full frame redundancy, Cheetahs 64NE, 128NE, and 256CX frames can add additional protection with full matrix crosspoint redundancy, frame controllers, power supplies and cooling fans. In the event of a major card failure, signals and control can be manually re-routed to a secondary crosspoint or control card. By using the Cattrax software the optional Cheetah WatchDog Redundancy software can be enabled to offer full support for backup or re-routing of signals. Intelligent path management compares the signals through the main and redundant paths insuring immediate cross-over capabilities once a failure has been identified. LED indicators on the front of each crosspoint card offers easy recognition of active card status.
**64NE (64X64)**

**64NEX (64X64)**

**4RU**

PESA’s NE Series sets a baseline for the Cheetah family of routing switches supporting Analog Video, Serial Digital, DVB/ASI, and HD-SDI/3G up to 1080p60. Each frame supports redundant power and control for efficient monitoring and diagnostics of system health. The NE Series uses less than 300 Watts of power for any fully loaded system. Matrix cards, frame controllers, and power supplies are hot-swappable and can be easily removed from the front of the frame. Input and Output cards are offered for either fiber or coax interconnects and any mixture of fiber/coax can be supported. The NE Series can be configured to route HD-SDI Multi-Rate, SDI, composite analog video, or high-level analog such as telemetry data. The 64NEX Series supports SDI, HD-SDI, and 3G-SDI only. All inputs feature auto-equalization and auto-rate sensing. The digital output cards support relocking on all outputs and can be set for bypass if relocking is not required. DVB-ASI is fully supported on every path. Sync reference inputs accept analog black burst in NTSC or PAL formats as well as high definition Tri-level sync. A large number of control panels are offered for remote control and each system operates with the PESA PERC2000 or PERC3000 System Controllers.

<table>
<thead>
<tr>
<th>Features and Benefits</th>
<th>I/O Modules in groups of 16</th>
</tr>
</thead>
<tbody>
<tr>
<td>Small Frame Size – 64X64 in 4RU</td>
<td>Front loading, hot-swappable matrix, power, control for 24/7 operations</td>
</tr>
<tr>
<td>SD/HD/3G Multi-rate from 143Mbps to 3.0Gbps (64NEX)</td>
<td>Redundant power, control and matrix cards available</td>
</tr>
<tr>
<td>Digital video signals for SMPTE 259M, 292M, 372M, 424M</td>
<td>Optional Watchdog Matrix operations for redundant XPT cross-over</td>
</tr>
<tr>
<td>Analog Video for NTSC/PAL and High Level Analog</td>
<td>Available in coax or fiber I/O</td>
</tr>
<tr>
<td></td>
<td>Wide range of rack-mount and desktop control panels</td>
</tr>
<tr>
<td></td>
<td>Lower power consumption</td>
</tr>
</tbody>
</table>

---

**64XE (64X128)**

**6RU**

In many applications there is a need to support more outputs than inputs. The 64XE Series was designed with the flexibility to support additional outputs. In just 6RU, this frame can be configured to support up to 64X128. Frames can start with one matrix card installed to support up to 64X64 and then expanded to 64X128 with a second matrix card installed. The 64XE frame is perfect for applications where signals need to be linked to a multi-viewer or multiple destinations simultaneously. Customized output configurations can be setup easily using PESA’s PERC2000 or PERC3000 System Controllers and the Cattrax control software. Additionally, the 64XE supports both fiber and coax IO offering extreme flexibility in cable management. Fiber sources can be connected directly to each frame, thus eliminating the need for fiber-to-copper conversion gear. All cards are hot-swappable with the matrix card, power supplies, and matrix control systems easily removed from the front of the chassis.

<table>
<thead>
<tr>
<th>Features and Benefits</th>
<th>I/O Modules in groups of 16</th>
</tr>
</thead>
<tbody>
<tr>
<td>Small Frame Size – 64X128 in 6RU</td>
<td>Front loading, hot-swappable matrix, power, control for 24/7 operations</td>
</tr>
<tr>
<td>SD/HD/3G Multi-rate from 143Mbps to 3.0Gbps</td>
<td>Redundant power, control and matrix cards available</td>
</tr>
<tr>
<td>Digital video signals for SMPTE 259M, 292M, 372M, 424M</td>
<td>Optional Watchdog Matrix operations for redundant XPT cross-over</td>
</tr>
<tr>
<td>Matrix granularity - 64X64 ( two cards for 64X128 setup)</td>
<td>Available in coax or fiber I/O</td>
</tr>
<tr>
<td></td>
<td>Wide range of rack-mount and desktop control panels</td>
</tr>
<tr>
<td></td>
<td>Supports PESA router control and many 3rd party control systems</td>
</tr>
<tr>
<td></td>
<td>Lower power consumption</td>
</tr>
</tbody>
</table>
128NE (128X128) 7RU

The Cheetah 128NE Series of routing switches combine a high performance architecture with the flexibility required to future proof your investment. Designed to support high-quality routing in 24/7 operations, the Cheetah 128NE is well-suited for broadcast, mobile trucks, and government command and control operation centers. The 128NE provides SD/HD/3G digital routing up to 128X128 in 7RU. The 128NE features front-loading, hot-swappable matrix cards, power supplies, and frame controllers for ease of serviceability. With the latest in digital technology, the 128NE offers expanded functionality with power consumption of less than 600 watts. For further reliability, Cheetah allows IO expansion in groups of 16 with equalization on the inputs and re-clocking or bypass options available on the outputs. Sync reference inputs accept analog black burst in NTSC or PAL formats as well as high definition Tri-level sync.

Features and Benefits
- Small Frame Size – 128X128 in 7RU
- SD/HD/3G Multi-rate from 143Mbps to 3.0Gbps
- Digital video signals for SMPTE 259M, 292M, 372M, 424M
- Matrix granularity - 128X128
- I/O Modules in groups of 16
- Front loading, hot-swappable matrix, power, control for 24/7 operations
- Redundant power, control and matrix cards available
- Optional Watchdog Matrix operations for redundant XPT cross-over
- Available in coax or fiber I/O
- Wide range of rack-mount and desktop control panels
- Supports PESA router control and many 3rd party control systems
- Lower power consumption

128XE (128X256) 11RU

The Cheetah 128XE Digital Video Router is the latest development in 3G-SDI technology for formats up to 1080p/60 and 3D Stereoscopic transports. Based on field proven Cheetah Advanced Technology Systems (CATS™) technology, the 128XE adds the latest in high definition technology with exceptional package density. To support the needs of additional outputs, this frame can be configured with twice as many outputs making it an attractive solution for mobile applications using extensive monitoring. Each frame supports two 128X128 matrix cards allowing basic square matrixes of 128X128 and up to 128X256 using two matrix cards. The frame is based on a compact 11RU supporting input and output configurations in groups of 16 each. Additionally, the 128XE supports both fiber and coax IO offering extreme flexibility in cable management. Fiber sources can be connected directly to each frame, thus eliminating the need for fiber-to-copper conversion gear. All cards are hot-swappable with the matrix card, power supplies, and matrix control systems easily moved from the front of the chassis. The 128XE supports many 3rd party control protocols as well as the full featured PESA control system offered with the Catrax system control software and the PERC2000 or PERC3000 System Controllers. The 128XE provides exceptional features at a price point for most any budget.

Features and Benefits
- Small Frame Size – 128X256 in 11RU
- SD/HD/3G Multi-rate from 143Mbps to 3.0Gbps
- Digital video signals for SMPTE 259M, 292M, 372M, 424M
- Matrix granularity - 128X128
- I/O Modules in groups of 16
- Front loading, hot-swappable matrix, power, control for 24/7 operations
- Redundant power, control and matrix cards available
- Available in coax or fiber I/O
- Wide range of rack-mount and desktop control panels
- Supports PESA router control and many 3rd party control systems
- Lower power consumption
**144NE (144X144) 4RU**

PESA's Cheetah 144NE Fiber Router System is a high performance, modular fiber optic switch system for either ProAV or Broadcast HD-SDI and 3G-SDI applications. Cheetah 144NE Fiber is expandable in sizes from 36X36 up to 144X144 in the same 4RU frame. It is fully compatible with the new QFX Series of fiber media extenders for dual link DVI, HD-SDI, and 3G-SDI. The frame supports redundant power, control, and a hot-swappable 144X144 Crosspoint matrix. I/O cards allow easy expansion in groups of 36 inputs or 36 outputs per card which simplifies future expansion without the need to replace cards or frames. The frame system is based on the field proven Cheetah line of routers and maintains the same high reliability always found in the PESA brand.

Taking advantage of a small 4RU footprint, the Cheetah 144NE Fiber Router can be configured as a partially loaded frame allowing for easy future field expansion. The system’s integrated Matrix Frame Controller monitors the health of the unit and automatically recognizes any new I/O cards. Once the cards are installed, the Cheetah 144NE Fiber Router can be easily configured with the PERC 2000 or PERC 3000 System Controller software. The Cheetah 144NE Fiber Router can be controlled from the PESA control system or by any third-party control system such as Crestron® or AMX®.

To complete the control of end-to-end switching PESA’s full line of control panels provide users with a wide range of control panel options. Pushbutton panels include the new Touch 72 and Smart 32 programmable panels. In addition to standard hardware panels, users can now incorporate PESA Cattrax Web package allowing full Source/Destination switching using common network based browsers such as IE, Chrome, or Firefox.

Combine the Cheetah 144NE with Vidblox extenders to get a full 144X144 DVI or VGA matrix switcher. Vidblox units let AV professionals easily and economically scan convert, extend, scale, distribute and transport computer-based content to or from SMPTE compliant broadcast serial digital devices over long distance fiber or coax connections.

**Features and Benefits**

- Small Frame Size - 144X144 in 4RU
- SD/HD/3G Multi-rate from 143Mbps to 3.0Gbps
- Digital video signals for SMPTE 259M, 292M, 372M, 424M
- Matrix granularity - 144X144 Matrix Card
- I/O Modules in groups of 36

**Front loading, hot-swappable matrix, power, control for 24/7 operations**

- Redundant power, control and matrix cards available
- Available in coax or fiber I/O
- Wide range of rack-mount and desktop control panels
- Supports PESA router control and many 3rd party control systems
- Lower power consumption

**INPUT CARDS**

- LC Fiber - singlemode or multi-mode
- ASI, SD-SDI, HD-SDI, 3G-SDI
- mini-HDBNC SD-SDI, HD-SDI, 3G-SDI
- mini-HDBNC SD-SDI to SD-SDI
- mini-HDBNC NTSC/PAL to SD-SDI
- mini-HDMI HDMI to 3G-SDI (1080p)

**OUTPUT CARDS**

- LC Fiber - singlemode or multi-mode
- ASI, SD-SDI, HD-SDI, 3G-SDI
- mini-HDBNC SD-SDI, HD-SDI, 3G-SDI
- mini-HDBNC SD-SDI to NTSC/PAL
- mini-HDMI 3G-SDI (1080p) to HDMI output

**I/O Sizes Supported In 4RU**

- 36X36
- 36X72
- 36X108
- 36X144
- 72X36
- 72X72
- 72X108
- 72X144
- 108X36
- 108X72
- 108X108
- 108X144
- 144X36
- 144X72
- 144X108
- 144X144
Cheetah XR Series [288x288, 288x576, 576x576, 864x864, 512x1024, 1024x512, 1152x1152]

The Cheetah XR Series simplifies scalability at price points you’ll find hard to believe. Offering the most comprehensive, multi-format solutions for larger enterprise-based routing and switching needs and with years of proven in-field validation, the XR Series builds on a strong foundation of high definition R&D making this one of the industries true leaders in large scale routing systems. The XR Series of Cheetah frames offer the widest range of flexible sizes and configurations available. Combining multi-format video with high reliability and scalable efficiency, the Cheetah XR Series is the ideal choice for mobile trucks, broadcasting, telco, cable head-end, and fixed-facility command and control environments. With all of our Cheetah XR Series routers you get a massive amount of options to handle all of your current and future growth paths for multi-rate high definition and serial digital formats.

The Cheetah series is packed with distinctive features such as fiber-in-the-frame, matrix redundancy (on selected frames), redundant control, and redundant power. You can be confident that an investment in the Cheetah XR Series will be the foundation of building your next generation digital media infrastructure. Offered in frames sizes of 18RU, 27RU, and 41RU, the XR Series can scale to almost any size requirements needed from 288X288 up to a full 1152X1152 in a single 41RU frame.

**Scalability with Easy Expansion paths**

The XR Series features a scalable design to make future growth easy and cost effective. This straightforward design simplifies cabling and system pre-wiring with options to expand systems in groups of 16 inputs and outputs.

**Ensure High Performance Reliability**

Each frame is designed to minimize power consumption to insure high reliability and energy saving performance. A basic 288X288 router would require a maximum of 1200 watts. With built-in, multi-fan configurations, each frame ensures optimal performance even for the largest frames. The XR Series features a wide range of control connections supporting 3rd party control, networking, remote control panels, and alarm connections.

**Serviceability**

Each XR Series frame offers maximum serviceability with each module being hot-swappable. This approach allows systems to stay on-line during upgrades or service tasks. Additionally, each large frame offers optional digital output monitoring for quality assurance and signal monitoring. The XR Series supports basic Simple Network Management Protocol (SNMP) for remote management.

**Features and Benefits**

- Wide range of Matrix Frames and Sizes Supported
  - 18RU Frame (288X288)
  - 27RU Frame (512X512, 288X576, 576X576)
  - 41RU Frame (512X1024, 864X864, 1024X512, 1152X1152)
- SD/HD/3G Multi-rate from 143Mbps to 3.0Gbps
- Digital video signals for SMPTE 259M, 292M, 372M, 424M
- Matrix granularity - 144x144 or 288x288 depending on frame
- I/O Modules in groups of 16
- Front loading, hot-swappable matrix, power, control for 24/7 operations
- Redundant power and control cards available
- Available in coax or fiber I/O
- Wide range of rack-mount and desktop control panels
- Supports PESA router control and many 3rd party control systems
- Lower power consumption
- Supports many 3rd party SNMP Control Management Programs
### Optional Input card types for Cheetah frames

#### Input Cards
All Cheetah input cards provide a simple one-screw lock method to keep cards securely in place - even in the harshest environments. Each card is designed with on-board electronics to report health and diagnostics status back to the PESA control system or Cattrax monitoring and diagnostic software.

#### 3.0 Gbps Multi-rate Input Card
16 Channels of HD/3G or Multi-rate signals from 143Mbps to 3Gbs. Equalization to 400m at SMPTE ST-259, 200m for ST-292 or 140m for ST-424. Supports SD and ASI signal data rates at 270Mbps.

#### HD/3G Fiber Input Card
16 Channels of 3GHD/SDI or Multi-rate signals supporting SMPTE 424M, SMPTE 292M or SMPTE 259M data rates. Allows either singlemode or multimode cabling. Modules are SFP (small form factor pluggable) supporting 1310nm wave lengths. Optional wave lengths are supported on special order. Connector type is small form factor LC.

#### CWDM - Cheetah V16 Input Card
16 Channels of CWDM on-board fiber signals are de-muxed from a single output fiber cable that can be received from 5Km away. Modules use wavelengths from 1410nm to 1610nm. This input card supports HD, SDI, and Multi-rate signals from 300bs to 1.5Gbs. Connector type is small form factor LC.

#### Analog Video Input Card (64NE and CH Frames Only)
16 Channels of analog video supporting NTSC or PAL input. Bandwidth up to 50MHz. Also capable of distributing AES/EBU 75 Ohm digital audio.

#### Cheetah DEMUX card
16 Channels of 3GHD video input with de-embedding option for all sixteen channels. Interconnects with the Cheetah DRS audio system for seamless de-embedding of AES/Analog/MADI audio signals. Auto Equalization on all inputs and full support of all DRS audio remedies such as gain, delay, and swap.

#### NTSC/PAL to SDI Conversion
16 channels of NTSC/PAL converted to SDI transports at 270Mbps. easySFP modules support SMPTE ST-259 standards.

#### HDMI / DVI-D Input
Supports up to 8 channels of HDMI or DVI-D at video transports from 480p to 1088p60. Requires mini-HDMI adapter cable. Signals are converted to serial digital supporting SMPTE ST-259, ST-292, ST-424

#### Analog High Level Card (64NE and CH Frames Only)
16 Channels of high level video with sync levels up to +/- 5V referenced to ground. This card can be used in applications for telemetry or other sine wave type applications where critical high level video paths must be distributed.

#### 4K/2K Fiber Input Card
Four channels of 4K video supporting resolutions up to 3840x2160 from a super high definition 3GHD-SDIx4 channel source. Card works with board extenders easyPORT TX for 4K (3GHD-SDIx4 to a single 4K fiber output). Modules support multi-mode fiber for distances up to 1000m at a maximum of 12.8Gbps.
## Optional Output card types for Cheetah frames

### Output Cards
All Cheetah output cards provide a simple one-screw lock down method to keep cards securely in place. Each card is designed to provide on-board diagnostics, monitoring of health, and custom setups. With Cattrax software each output channel can be individually set to provide maximum performance.

### 3G/HD Multi-rate Output Card
- 16 Channels of 3G/HD or Multi-rate signals from 270Mbs to 3.0Gbs. Supports SMPTE ST-244, ST-292, ST-259 relocking standards of 270Mbs, 1.485Gbs, and 2.97Gbs. In addition non-standard signals from 270Mbs to 3.0Gbs are supported. With Cattrax software, each channel can be selected to turn on/off relocking.

### 3.0 Gbps HD Multi-rate Output Card (mini-HD BNC)
- 16 Channels of 3G/HD or Multi-rate signals from 270Mbs to 3.0Gbs. Supports SMPTE ST-244, ST-292, ST-259 relocking standards of 270Mbs, 1.485Gbs, and 2.97Gbs. In addition non-standard signals from 270Mbs to 3.0Gbs are supported. With Cattrax software, each channel can be selected to turn on/off relocking.

### HD Fiber Output Card
- 16 Channels of HD/SDI or Multi-rate signals supporting SMPTE ST-244, ST-292, ST-259 data rates. Allows either singlemode or multimode cabling. Cards can be set to support relocking or non-relocking modes. Modules are SFP (small form factor pluggable) supporting 1310nm wavelengths. Optional wavelength are supported on special order. Connector type is small form factor LC.

### SDI to NTSC/PAL decoder
- Up to 16 channels of SDI sources encoded to NTSC/PAL video sources for display on legacy monitors. Each SFP module supports two mini-HD BNC connections and requires a miniature HD-BNC connector.

### CWDM - Cheetah V16 Output Card
- 16 Channels of Coarse-Wave division Multiplexed on-board fiber signals are muxed to a single output fiber cable. SFP (small form factor pluggable) modules use wavelengths from 1410nm to 1610nm. This output card supports HD, SDI, and Multi-rate signals from 3Mbs to 1.5Gbs. Connector type is small form factor LC.

### HDMI / DVI-D Output
- Supports up to 8 channels of SD/HD/3G converted to HDMI or DVI-D video signals for display on standard computer LCD monitors. Resolutions up to 1080p60 are supported. Requires mini-HDMI adapter cable.

### Analog Video Output Card (64NE and CH Frames Only)
- 16 Channels of analog video supporting NTSC or PAL outputs. Bandwidth up to 50MHz. Also capable of distributing AES/EBU 75 Ohm digital audio.

### Analog High Level Card (64NE and CH Frames Only)
- 16 Channels of high level video with sync levels provided for +/- 5V as referenced to ground. This card can be used in applications for telemetry or sine wave type applications where critical high level video paths must be distributed.

### Cheetah MUX Card
- 16 Channels of SD/HD/3G outputs with embedding options for AES/Analog/MADI audio. Interconnects with Cheetah DMS Audio system and provides seamless integration and audio remedy controls such as gain, delay, and swap. Up to 128 Channels of audio per card. Each video output supports relocking for SMPTE 259M, 292M, and 424M up to 3.0Gbps or can be easily set to by-pass mode for non-standard formats.

### 4K/2K Fiber Output Card
- Four channels of 4K video supporting resolutions up to 3840x2160 to a super high definition 3GHD-SDIx4 channel display. Card works with outboard extenders easyPORT RX for 4K (3GHD-SDIx4 to a single 4K fiber output). Modules support multi-mode fiber for distances up to 1000m at a maximum of 12.6Gbps.
System Features and Options

Matrix Cards
- 64X64 Analog Video / 64X64 High Level Analog
- 72X72 Digital Video for 3G-SDI / HD-SDI / SDI / ASI
- 144X144 Digital Video for 3G-SDI / HD-SDI / SDI / ASI
- 288X288 Digital Video for 3G-SDI / HD-SDI / SDI / ASI

The Cheetah Matrix Card is offered in four versions. The 72X72 and 144X144
3G Multi-rate digital video, the 288X288 3G Multi-rate digital video, and the 64X64
Analog Video. Each card is built around high density packaging allowing the most
efficient use of space. Cards are hot-pluggable and front loaded. Each matrix type
offers easy to read LED displays for quick monitoring of power, control, and active
status. The 3G-MR version supports data rates from 143Mbs to 3.0Gbs and the
analog video supports bandwidth up to 50MHz. Another key feature is our optional
PESA Watchdog Matrix™ redundant crosspoint for hot swap-over should the
primary crosspoint card ever fail.

NOTE: Frames with matrix granularity of 64X64 use the 72X72 matrix card and frames
with matrix granularity of 128X128 use the 144X144 matrix card. Control and configu-
ration are auto-detected to allow for proper I/O setup.

SNMP CONTROL
Simple Network Management Protocol (SNMP)
In the world of digital video transmission and networking services for broadcast-
ing, the capability to monitor equipment health over a network is vital. All Cheetah frames
are equipped for network capabilities utilizing SNMP for monitoring and managing
the health of the router over TCP/IP. Using any 3rd party SNMP Management
System, the router can be interrogated to report information about signal types,
frame temperature for individual cards, power consumption, and crosspoint
switching status. With an SNMP Management System, you can set data descrip-
tors for corrective action emails, basic audio buzzer alerts, error logging, or other
types of indications to notify service and maintenance personnel of errors. There
is an SNMP agent resident in each Matrix Frame Controller card. By integrating
the SNMP MIB into the SNMP management systems, access to the router is
easily accomplished by providing diagnostic information retrieved from the Matrix
Frame Controller.

Among items that can be configured for diagnostics are:
- Providing a list of the boards configured within the frame.
- Providing a list of non-operational boards.
- Listing the current alarm state of the matrix frame
- Indicating those communications channels that are active.
- Providing statistics on memory resources available.
- Allowing for crosspoints to be switched on both the primary matrix and the output
monitoring matrix.
- Allow for the reset of the matrix frame controller.
- Report the status of the frame controller (Active or stand-by) and report whether
communications to the other board is possible.

Analog Video and Telemetry Routing
PESA’s line of Cheetah frames offer analog cards for systems that need to
maintain legacy equipment for single ended general purpose video transmission
applications such as video data for telemetry, telco DS3, radar, surveillance,
high-level TTL video switching and 75 ohm audio.

The analog inputs can accept signals from D.C. to the -3dB roll off at 50 MHz with
voltages up to +/- 2V standard and +/-5V for high-level cards. Selected frame
sizes have been maintained to support analog video, including the 64NE, 128CH,
256CH, and 512CH. Excluding the 64X frame, system configuration allows
partitioning for both analog and digital cards to reside in the same frame in blocks
of 64X64.

Two types of I/O cards are offered. First, a basic analog input card, output card,
and matrix card is available with a maximum bandwidth of 50MHz. The second
type, an input card and output card for High level signals is offered to support
telemetry or other types of sine wave signals with voltage levels to a maximum of
5V p-p. The frame architecture for the analog model uses common components
from the sister HD/SD frames, thus allowing for easy migration to full digital in the
future. Power supplies and matrix control cards are the same for the analog
version.

For users who wish to use video equipment to route and distribute audio signals,
the Cheetah analog video routing switcher is AES/EBU ready. Due to the similar
bandwidth to analog video, AES signal formats for coaxial data transmission can
also be passed through the Cheetah analog cards. AES-3d source impedance is
also 75 Ohms making it acceptable with standard coax connections. This interface
is accepted by many video engineers and offers greater compatibility for
equipment space and frame interchange issues.
- Analog bandwidth to 50MHz
- Single and Dual Outputs
- Systems can be partitioned to accept both digital and
analog cards in the same frame
- Dual Power and Control
- Network Control available
- Compatibility with the 3500PRO, PERC2000, or PERC3000 system
controllers and all Cheetah external control devices

All analog routers are built around 16 channel input and output cards, and a matrix
cross-point card, with a granularity of 64 square, designed specifically for analog
signals

<table>
<thead>
<tr>
<th>Frame Type</th>
<th>Matrix</th>
<th>Inputs</th>
<th>Outputs</th>
<th>Frame</th>
<th>Formats</th>
</tr>
</thead>
<tbody>
<tr>
<td>64NE</td>
<td>64X64</td>
<td>16 Coax</td>
<td>16 Coax</td>
<td>4RU</td>
<td>Analog Video, Telemetry Analog, ASI, SDI, HD-SDI</td>
</tr>
<tr>
<td>128CH</td>
<td>64X64</td>
<td>16 Coax</td>
<td>16 Coax</td>
<td>10RU</td>
<td>Analog Video, Telemetry Analog, ASI, SDI, HD-SDI</td>
</tr>
<tr>
<td>256CH</td>
<td>64X64</td>
<td>16 Coax</td>
<td>16 Coax</td>
<td>18RU</td>
<td>Analog Video, Telemetry Analog, ASI, SDI, HD-SDI</td>
</tr>
<tr>
<td>512CH</td>
<td>64X64</td>
<td>16 Coax</td>
<td>16 Coax</td>
<td>41RU</td>
<td>Analog Video, Telemetry Analog, ASI, SDI, HD-SDI</td>
</tr>
</tbody>
</table>

NOTE: The 128CH, 256CH, 512CH are legacy frames and must be special ordered.
Please consult the factory for availability and pricing options
### Digital Specifications

**Inputs / Outputs for Coax**
- **Connector Type**: 75 Ohm
- **Return Loss**: >15dB from 5MHz to 1.5GHz, >10dB, 1.5GHz to 3GHz
- **Input cable equalization**: SMPTE ST-259 - 400m, SMPTE ST-292 - 200m, SMPTE ST-424 - 140m
- **Output Signal Level**: 800mV, p-p, +/-10%
- **Output Signal Polarity**: Non-inverted

**Inputs/Outputs for Fiber**
- **Connector Type**: Dual Optical SFP (small form factor pluggable)
- **Compliance with ITU-T G.957**: LC
- **Input Data Rates**: 270 Mbps to 1.5Gbps - ASI/SD/HD
- **Input Optical Wavelength**: Singlemode (1310 nm optimal)
- **Input Power**: -18dBm (min), 0 dBm (max)
- **Output Data Rates**: 270 Mbps to 3.0Gbps
- **Output Power**: -5dBm (min), 0 dBm (max)
- **Optical Loss Budget**: Approx. 9dB
- **Assumes two optical connections over a 10km singlemode fiber**
- **Jitter**: < 0.2UI, p-p, SMPTE ST-259, 292, < 0.3UI, p-p, SMPTE ST-424 compliant with RP-184

**Fiber Transmission Specifications**
- **IEC 61754-20-1**
- **Typical Operating Distances**: 9/125u (10Km / 6.25 miles), 50/125u (400m / 1200 feet), 62.5/125u (200m / 600 feet)

**Note**: Operating distances are approximate only. Cable loss and other interconnects can affect the total light loss between a TX and RX path. These are only estimates and may not reflect the actual lengths achievable.

### Analog Video Specifications

**Available in 64X64 Matrix Cards only (64NE or CH Frames)**
- **Connector Type**: BNC
- **Impedance**: 75 Ohm, internally terminated
- **Signal Level**: 1V p-p nominal, 2V max. w/o obvious distortion
- **Return Loss**: > 40dB to 5MHz, > 15dB to 50MHz
- **Input Coupling**: Direct (DC)
- **Input Type**: Balanced
- **DC on Output**: < +/- 0.3 mV
- **Gain**: Unity
- **Gain Adjustment Range**: +/- 0.5dB
- **Frequency Response**: +/- 0.1dB to 10MHz, +/- 0.5dB to 35MHz, -3dB at 50MHz
- **Crosstalk (Video to Video)**: < -60dB to 5MHz
- **Differential Gain**: 0.1% at 4.43MHz
- **Differential Phase**: 0.1 degree at 4.43MHz
- **Signal to Noise**: -70dB, RMS Noise p-p video
- **Video Filter**: -70dB, RMS Noise p-p video

### Analog High Level Specifications

**Available in 64X64 Matrix Cards only (64NE or CH Frames)**
- **Connector Type**: BNC
- **Impedance**: 75 Ohm, internally terminated
- **Signal Level**: 1V p-p nominal, 2V max. w/o obvious distortion
- **Return Loss**: > 40dB to 5MHz, > 15dB to 50MHz
- **Input Coupling**: Direct (DC)
- **Input Type**: Balanced
- **DC on Output**: < +/- 0.5mV (max.)
- **Gain**: Unity
- **Gain Adjust Range**: < +/- 0.5 dB
- **Frequency Response**: < +/- 0.1 dB to 10MHz, < +/- 0.5 dB to 35MHz, -3.0 dB at 50MHz
- **Vertical Tilt**: 0.25% (50Hz square wave)
- **Horizontal Tilt**: 0.25%
- **Crosstalk**: < -50dB to 5MHz
- **Signal to Noise**: -70dB, RMS Noise to p-p signal to 5.0MHz

### SYNC REFERENCE SPECIFICATIONS

- **Sync Input Connector**: BNC X2
- **Sync Input Impedance**: 75 Ohm
- **Sync Input Return Loss**: > 40dB, 100kHz to 5MHz
- **Sync Input Level**: 0.37V p-p to 4.0V p-p
- **Sync Input Type**: NTSC, PAL, Black Burst, or HD Tri-Level
### Environmental

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Specifications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cooling</td>
<td>Forced air front to back</td>
</tr>
<tr>
<td>Operating Temperature 64NE &amp; 64NEX</td>
<td>0-50 degrees (C)</td>
</tr>
<tr>
<td>Operating Temperature 128 and up</td>
<td>0-40 degrees (C)</td>
</tr>
<tr>
<td>Operating Humidity</td>
<td>10-90% non-condensing</td>
</tr>
</tbody>
</table>

### AC power connections

<table>
<thead>
<tr>
<th>Model</th>
<th>Connector Type</th>
<th>Voltage Range</th>
<th>Maximum Watts per Frame</th>
</tr>
</thead>
<tbody>
<tr>
<td>64NE / XE</td>
<td>IEC - 60320 connector</td>
<td>95VAC to 240VAC, 47-63Hz</td>
<td>600W</td>
</tr>
<tr>
<td>128NE / XE</td>
<td>IEC - 60320 connector</td>
<td>95VAC to 240VAC, 47-63Hz</td>
<td>1200W</td>
</tr>
<tr>
<td>144NE</td>
<td>IEC - 60320 connector</td>
<td>95VAC to 240VAC, 47-63Hz</td>
<td>450W</td>
</tr>
<tr>
<td>288 / 256</td>
<td>Pigtails (95VAC to 240VAC)</td>
<td></td>
<td>1200W</td>
</tr>
<tr>
<td>512XR / 256CX / 288XR</td>
<td>Pigtails (95VAC to 240VAC)</td>
<td></td>
<td>2000W</td>
</tr>
<tr>
<td>512CH / 576XR / 864XR / 1024XR / 1152XR</td>
<td>Pigtails (95VAC to 240VAC)</td>
<td></td>
<td>6000W</td>
</tr>
</tbody>
</table>

### Mechanical

<table>
<thead>
<tr>
<th>Dimensions</th>
<th>Specifications</th>
</tr>
</thead>
<tbody>
<tr>
<td>4RU FRAME</td>
<td>19.00W X 7.00H X 21.00D</td>
</tr>
<tr>
<td></td>
<td>482.6mm X 177.8mm X 533.4mm</td>
</tr>
<tr>
<td></td>
<td>64NE, 64NE-3G, 144NE</td>
</tr>
<tr>
<td>6RU FRAME</td>
<td>19.00W X 10.50H X 21.00D</td>
</tr>
<tr>
<td></td>
<td>482.6mm X 266.7mm X 533.4mm</td>
</tr>
<tr>
<td></td>
<td>64XE</td>
</tr>
<tr>
<td>7RU FRAME</td>
<td>19.00W X 12.25H X 21.00D</td>
</tr>
<tr>
<td></td>
<td>482.6mm X 311.15mm X 533.4mm</td>
</tr>
<tr>
<td></td>
<td>128NE</td>
</tr>
<tr>
<td>11RU FRAME</td>
<td>19.00W X 19.25H X 21.00D</td>
</tr>
<tr>
<td></td>
<td>482.6mm X 488.95mm X 533.4mm</td>
</tr>
<tr>
<td></td>
<td>128XE</td>
</tr>
<tr>
<td>18RU FRAME</td>
<td>19.00W X 31.50H X 23.00D</td>
</tr>
<tr>
<td></td>
<td>482.6mm X 800.1mm X 584.2mm</td>
</tr>
<tr>
<td></td>
<td>288XR / 288XE / 256CH</td>
</tr>
<tr>
<td>27RU FRAME</td>
<td>19.00W X 47.25H X 23.00D</td>
</tr>
<tr>
<td></td>
<td>482.6mm X 1200mm X 584.2mm</td>
</tr>
<tr>
<td></td>
<td>576XR / 512CX / 512CH</td>
</tr>
<tr>
<td>41RU FRAME</td>
<td>19.00W X 71.75H X 23.00D</td>
</tr>
<tr>
<td></td>
<td>482.6mm X 1822mm X 584.2mm</td>
</tr>
<tr>
<td></td>
<td>512XE / 512CH / 864XR / 1024XR / 1152XR</td>
</tr>
</tbody>
</table>

### Safety and Conformance

FCC, CE, UL, RoHS/WEEE

### Warranty

3 years parts and labor

### Control and Interfaces

<table>
<thead>
<tr>
<th>Specification</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Panel communications</td>
<td>RS-485 / 3 pin detachable</td>
</tr>
<tr>
<td>Control communications</td>
<td>RS-232 / 422 / Ethernet</td>
</tr>
<tr>
<td>Connector type</td>
<td>9 pin D-SUB, RJ-45</td>
</tr>
<tr>
<td>Control system</td>
<td>PERC2000, PERC3000</td>
</tr>
<tr>
<td>Third Party Interfaces</td>
<td>use PESA P1 or P1N protocol</td>
</tr>
<tr>
<td>Network Software</td>
<td>Cattrax Network Interface</td>
</tr>
<tr>
<td>Number of Panels per frame</td>
<td>600</td>
</tr>
</tbody>
</table>

### Cooling

<table>
<thead>
<tr>
<th>Model</th>
<th>Fans</th>
</tr>
</thead>
<tbody>
<tr>
<td>64NE / XE</td>
<td>2</td>
</tr>
<tr>
<td>128NE / XE</td>
<td>3</td>
</tr>
<tr>
<td>512XR, 512CX, 1024XR</td>
<td>4</td>
</tr>
<tr>
<td>1152XR</td>
<td>8</td>
</tr>
</tbody>
</table>