Platinum™

Innovative Large-Scale Routing

The Platinum™ line of routing switchers combines a highly robust architecture with the flexibility required to future-proof your investment, delivering unsurpassed value for your large-scale routing needs. All Platinum frames provide independent signal paths and crosspoints for audio and video, allowing complete versatility regardless of matrix size.

Designed to support high-quality routing of all analog and digital video and audio signals, Platinum seamlessly integrates the capabilities of a discrete audio infrastructure in a fully embedded video plant without the need for a secondary audio frame.

In keeping with a tradition of innovation — the hallmark of Platinum routing systems — Harris introduced an eight-channel frame sync input card that allows up to eight wild video signals to be synchronized to house reference without the use of external frames or wiring. This optional card also will perform demultiplexing of up to 16 channels of embedded audio in each video stream, which can then be routed independently and discretely.

Created to support 24/7 operation, Platinum routing switchers are well-suited to network, local broadcaster, mobile production, cable, telco, military, government and corporate applications — any environment that requires routing of a large number of audio and video signals.

- 3Gb/s
- CCS
- SNMP

FEATURES
• Mixed-signal routing (SD, HD, 3 Gb/s and audio)
  ◦ Up to 256x256 video in 15RU (up to 512x512 discrete stereo/audio)
  ◦ Up to 512x512 video in 28RU (up to 1024x1024 discrete stereo/audio)
• All Platinum frames have independent signal paths and crosspoints for video and audio
• Mux/Demux audio processing support
  ◦ Mux/Demux 16 channels of audio per video stream
  ◦ Full mono breakaway audio routing support
  ◦ Seamless integration between demultiplexed and discrete audio
  ◦ Multiplex 16 channels of audio into each video output
• Optional eight-channel frame sync input card for wild feed ingest and audio shuffling, as well as demultiplexing of up to 16 channels of embedded audio in each video stream
• Modular I/O in groups of eight provide support for either coaxial or fiber connectivity
• Front-loading, hot-swappable modules for 24/7 operation
• Redundant power supplies, controllers and signal paths
• Enhanced control and monitoring
  ◦ Wide range of hardware control panels
  ◦ Powerful control integration for easy setup and configuraiton
  ◦ Software and web-based applications with user-configurable GUIs
  ◦ Protocol support for CCS Navigator™, SNMP and third-party vendors
  ◦ Secure access rights with restrictions by level, source and destination
• Video routing support
  ◦ 1080p (3 Gb/s) signal routing (any size)
  ◦ Almost any digital video signal from 3 Mb/s to 3 Gb/s including: HD-SDI, SD-SDI, ASI, SMPTE 310, SMPTE 305, etc.
  ◦ SMPTE-compliant analog video supported via conversion to/from SD-SDI on I/O
• Discrete audio routing support
  ◦ Digital audio signals including balanced and unbalanced AES
  ◦ Analog stereo/mono audio via conversion to/from AES on I/O modules
  ◦ Support for up to 16 embedded AES streams per video input
  ◦ “Quiet switch” with transitions
• CENTRIO™ integrated internal multiviewer
  ◦ 32 PiPs per CENTRIO module
  ◦ Onscreen control
  ◦ CC presence and text
  ◦ Clocks and timers
  ◦ Tallies and UMDs
  ◦ Audio meters and phase

PRODUCT DETAILS

World’s First True Embedded Audio Processing Router
Platinum combines the best of both high-bandwidth video signal routing and an internal TDM architecture to provide the world’s first embedded audio infrastructure router. By providing parallel signal paths and dedicated, redundant crosspoints for both audio and video within a single frame, Platinum is able to demux incoming embedded audio signals internally. All audio within the frame is presented to the TDM M•A•X crosspoint, routed independently and discretely, and can be multiplexed within the router into any digital video output. Additionally, utilizing the TDM M•A•X crosspoint, Platinum can perform phase
reversal, swap, sum and "quiet" breakaway switching of the audio between any discrete or embedded input, and provide gain/level adjustments on a per-channel basis. This ability to process and route both discrete and embedded audio within the Platinum frame eliminates the need for racks of external equipment and saves on space, cabling, troubleshooting and maintenance.

All the capabilities of a discrete audio infrastructure are now available with the straightforward wiring of an embedded plant. System designers can now reduce the number of modules and frames, and simplify wiring and system integration tasks while providing enhanced functionality for the end user.

**Enhanced Control and Monitoring**
Harris router control systems make even the most complex router configuration simple and intuitive to implement and maintain. Among the powerful tools available for administering systems are low-level discovery of available hardware, allowing database cre-ation and maintenance to be accomplished from the engineer’s desk; and automatic, wizard-based creation of logical source assignments for demulti plexed audio levels. The DB Editor interface provides access to the Platinum router’s distributed con-trol architecture, which drives router frames and control surfaces without reliance on a centralized controller. Each Platinum frame features redundant control modules that store configuration information related to that frame in non-volatile memory, protecting your crucial configuration information and current routing status. This topology also al-lows control panel communication to be distributed throughout the facility, eliminating single points of failure.

**Integrated Multiviewer Support**
Platinum is the only routing system in the marketplace to offer an integrated, internal multiviewer system. CENTRIO modules reside in the Platinum frame, seamlessly providing multiviewer support for all inputs coming into the router. Combining superior graphics, industry-proven architecture and integrated test and measurement tools, CENTRIO is a landmark development in multiviewer design and value. With multi-image processing, routing, superior graphics and an unrivaled monitoring toolkit all in one chassis, CENTRIO delivers a lower-cost solution, simpler system design and a more efficient use of space for broadcast video and audio monitoring, master control rooms, broadcast trucks and events. Each multiviewer output provides up to 32 discrete PIP (picture-in-picture) images that are controlled from the router control system in the same way as dedicated outputs, creating a user-friendly experience that is easily un-derstood by operators.

**Higher Reliability**
Platinum routing frames are designed for harsh operation (including mobile truck envi-ronments) and feature front-loading, hot-swappable modules for ease of serviceability. Employing the latest technology, Platinum allows more functionality at lower power consumption, and is supported by redundant, load-sharing power supplies. Airflow is from front to back, with each fan individually replaceable without taking the system offline. For further reliability, Platinum I/O modules support either eight inputs or eight outputs, thereby limiting the number of signals affected by any one module. Each Plat-num frame supports redundant control, and redundant cross-points are available in most configurations.
**IMAGES/DIAGRAMS**

<tr valign="top"><td><br/></td><td><br/></td><tr>

**SPECIFICATIONS**

Specifications and designs are subject to change without notice.

### HD Digital Video Inputs (PT-HS-IB+)

<table>
<thead>
<tr>
<th>Specification</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of Inputs</td>
<td>8</td>
</tr>
<tr>
<td>Input Connector</td>
<td>BNC, 75 ohms per IEC 169-8</td>
</tr>
<tr>
<td>Impedance</td>
<td>75 ohms</td>
</tr>
<tr>
<td>Signal Type</td>
<td>SMPTE 424M*, SMPTE 292M, SMPTE 259M, SMPTE 344M, DVB-ASI, other &lt;1 V pk-pk digital signals, 3 Mb/s to 3 Gb/s</td>
</tr>
<tr>
<td><strong>Maximum Input Amplitude</strong></td>
<td>880 mV</td>
</tr>
<tr>
<td>Nominal Input Amplitude</td>
<td>800 mV ±10%</td>
</tr>
</tbody>
</table>

### SD Digital Video Inputs (PT-S-IB+)

<table>
<thead>
<tr>
<th>Specification</th>
<th>Details</th>
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</thead>
<tbody>
<tr>
<td>Number of Inputs</td>
<td>8</td>
</tr>
<tr>
<td>Input Connector</td>
<td>BNC, 75 ohms per IEC 169-8</td>
</tr>
<tr>
<td>Impedance</td>
<td>75 ohms</td>
</tr>
<tr>
<td>Signal Type</td>
<td>SMPTE 259M, SMPTE 344M, DVB-ASI; other &lt;1 V pk-pk digital signals, 3 to 540 Mb/s</td>
</tr>
<tr>
<td><strong>Maximum Input Amplitude</strong></td>
<td>880 mV</td>
</tr>
<tr>
<td>Nominal Input Amplitude</td>
<td>800 mV ±10%</td>
</tr>
</tbody>
</table>

### Balanced Digital Audio Inputs (PT-AEBT-IB)

<table>
<thead>
<tr>
<th>Specification</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of Inputs</td>
<td>16</td>
</tr>
<tr>
<td>Input Type</td>
<td>Balanced, transformer coupled</td>
</tr>
<tr>
<td>Input Connector</td>
<td>DB-25</td>
</tr>
<tr>
<td>Impedance</td>
<td>110 ohms</td>
</tr>
<tr>
<td>Signal Type</td>
<td>AES3 AES frame rates 32 to 192 kHz</td>
</tr>
<tr>
<td></td>
<td>Other 40% to 60% duty cycle digital signals from 2 to 25 Mb/s</td>
</tr>
<tr>
<td>Input Amplitude</td>
<td>0.2 V to 7 V pk-pk</td>
</tr>
<tr>
<td>Nominal Input Amplitude</td>
<td>5 V pk-pk ±1 V</td>
</tr>
</tbody>
</table>

### Unbalanced Digital Audio Inputs (PT-AECT-IB)

<table>
<thead>
<tr>
<th>Specification</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of Inputs</td>
<td>16</td>
</tr>
<tr>
<td>Input type</td>
<td>AC, coupled</td>
</tr>
<tr>
<td>Input connector</td>
<td>BNC, 75 ohms per IEC 169-8 (via adapter)</td>
</tr>
</tbody>
</table>
Impedance: 75 ohms
Signal Type
- AES3id, SMPTE 276M AES frame rates from 32 to 192 kHz
- Other 40% to 60% duty cycle digital signals 2 to 25 Mb/s
Input Amplitude: 0.1 to 2 V pK-pK
Nominal Input Amplitude: 1 V pK-pK ±10%

**Analog Video Inputs (PT-DEC-IB)**
- **Number of Inputs**: 8
- **Input Connector**: BNC, 75 ohms per IEC 169-8
- **Impedance**: 75 ohms
- **Signal Type**: NTSC, PAL
- **Input Coupling**: DC, coupled
- **Maximum Input Amplitude**: 2 V pk-pk
- **Nominal Input Amplitude**: 1 V pk-pk ±10%
- **Clamping**: Automatic
- **Quantization**: 10 bits
- **Filter**: 5 line adaptive comb, notch, or trap
- **Output Data Rate**: 270 Mb/s per SMPTE 259C
- **Frequency Response**: ±0.1 dB to 5.75 MHz
- **Differential Gain**: <1%
- **Differential Phase**: <1°
- **Signal-to-Noise Ratio**: >65 dB
- **Bulk Delay**: <80 microseconds, typical

**Analog Audio Inputs (PT-ADCT-IB)**
- **Number of Inputs**: 16
- **Input Type**: Balanced
- **Input Connector**: DB-44
- **Impedance**: >20 k ohms
- **Signal Type**: Stereo analog audio
- **Maximum Input Amplitude**: +28 dBu
- **Full scale Adjustment Range**: 0 dBFS = +13 dBu to +28 dBu in 1 dB steps, ±0.5 dB
- **CMRR**: >75 dB rejection @ 60Hz
- **Conversion Type**: 128x oversampling, 1-bit, delta-sigma
- **Resolution**: 24 bits
- **Sampling Rates**: 32 to 192 kHz using external AES reference
  - 32 kHz, 44.1 kHz, 48 kHz, 88.2 kHz, 96 or 192 kHz using internal oscillators
- **Gain Stability**: ±0.01 dB
- **Frequency Response**: ±0.15 dB, 20 Hz to 20 kHz
- **Linearity Deviation**: <±0.5 dB typical
<±1.0 dB worst case

THD+N  
<0.01% @ 997 Hz, –1 dBFS = +23 dBu

Idle Channel Noise  
<100 dBFS CCIR-RMS, typical
<90 dBFS CCIR-RMS, worst case

Dynamic Range  
>100 dB CCIR-RMS, typical
>90 dB CCIR-RMS, worst case

Crosstalk  
>90 dB isolation, 20 Hz to 20 kHz, all hostile (hostile channels driven at -1 dBFS = +23 dBu)

**HD Digital Outputs (PT-HSR-OBG+)**

Number of Outputs  
8

Output Connector  
BNC, 75 ohms per IEC 169-8

Impedance  
75 ohms

Signal Type  
SMPTE 424M, SMPTE 292M, SMPTE 259M, SMPTE 344M, DVB-ASI

Other <1 V pk-pk digital signals, 3 Mb/s to 3 Gb/s

Reclocking  
Automatic for 2.970 Gb/s, 2.967 Gb/s, 1.485 Gb/s, 1.4835 Gb/s, and 270 Mb/s

Bypass for all other rates between 3 Mb/s and 3 Gb/s

Output Amplitude  
800 mV pk-pk ±10%

DC Offset  
0 V ±0.5 V

Rise/Fall Times  
400 ps to 1500 ps, for SMPTE 259M data rates
<135 ps, for SMPTE 424M and 292M data rates

Overshoot  
<10% of amplitude

**SD Digital Video Outputs (PT-SR-OBG+)**

Number of Outputs  
8

Output Connector  
BNC, 75 ohms per IEC 169-8

Impedance  
75 ohms

Signal Type  
Signal type SMPTE 259M, SMPTE 344M, DVB-ASI

Other <1 V pk-pk digital signals, 3 to 540 Mb/s

Reclocking  
Automatic for 270 Mb/s

Bypass for all other rates between 3 and 540 Mb/s

Output Amplitude  
800 mV pk-pk ±10%

DC Offset  
0 V ±0.5 V

Rise/Fall Times  
400 to 1500 ps

Overshoot  
<10% of amplitude

**Balanced Digital Audio Outputs (PT-AEBT-OB)**

Number of Outputs  
16

Output Type  
Balanced, transformer coupled

Output Connector  
DB-25

Impedance  
110 ohms

Signal Type  
AES3 AES frame rates from 32 to 192 kHz
Other 40% to 60% duty cycle digital signals from 2 to 25 Mb/s
Output Amplitude 5 V pk-pk ±1 V into 110 ohms load
DC Offset 0 V ±0.05 V
Rise/Fall Times 5 to 30 ns
Propagation Delay <170 ns

Unbalanced Digital Audio Outputs/Inputs (PT-AECT-OB)
Number of Outputs 16
Output Type Unbalanced
Output Connector BNC, 75 ohms per IEC 169-8 (via adaptor)
Impedance 75 ohms
Signal Type AES3id, SMPTE 276M
AES frame rates from 32 to 192 kHz
Other 40% to 60% duty cycle digital signals from 2 to 25 Mb/s
Output Amplitude 1 V pk-pk ±10% into 75 ohms load
DC Offset 0 V ±0.05 V
Rise/Fall Times 30 to 44 ns
Propagation Delay <170 ns

Analog Video Outputs (PT-ENC-OB)
Number of Outputs 8
Output Connector BNC, 75 ohms per IEC 169-8
Impedance 75 ohms
Signal Type NTSC, PAL
Output Amplitude 1 V pk-pk ±10%
Filtering CCIR-601-compliant
Resolution 10 bits
Frequency Response ±0.05 dB to 5.2 MHz
Differential Gain <0.8%
Differential Phase <0.6°
Bulk Delay <80 microseconds
Signal-to-Noise Ratio (RMS) >65 dB unified — weighting
DC Offset 0 V ±0.025 V

Analog Audio Outputs (PT-DACT-OB)
Number of Outputs 16
Output Type Balanced
Output Connector DB-44
Impedance 66 ohms
Signal Type Stereo analog audio
Maximum Output Amplitude +28 dBu
Full Scale Adjustment Range 0 dBFS = +13 dBu to +28 dBu in 1 dB steps, ±0.5 dB
DC Offset 0 V ±0.05 V
Conversion Type 128x oversampling, fifth-order, delta-sigma
Resolution 24 bits
AES Frame Rates 32 to 192 kHz
Gain Stability ±0.01 dB
Frequency Response ±0.25 dB, 20 Hz to 20 kHz
Linearity Deviation <±0.5 dB
THD+N <0.01% @ 997 Hz, -1 dBFS = +23 dBu
Idle Channel Noise <100 dBFS CCIR-RMS
Dynamic Range >100 dB CCIR-RMS
Crosstalk >90 dB isolation, 20 Hz to 20 kHz, all hostile, typical
( hostile channels driven at -1 dBFS = +23 dBu)

Physical
Dimensions (W x D x H) 15U (PM-FR-15): 17.5 x 18.4 x 26.25 in. (44.5 x 46.7 x 66.7 cm)
28RU (PM-FR-28): 17.5 x 18.4 x 49 in. (44.5 x 46.7 x 124.5 cm)
Weight Fully Loaded 15U (PM-FR-15): 210 lbs (95 kg)
(approximately) 28RU (PM-FR-28): 350 lbs (159 kg)

ORDERING INFORMATION

Frame Components
PT-FR-15 Platinum 15RU frame assembly (includes (2)-PS, -RES)
PT-FR-28 Platinum 28RU frame assembly (includes (4)-PS, -RES)
PT-PS Platinum and MX AC redundant power supply
PT-FAN Platinum and MX replacement fan
PT-ALARM Platinum and MX replacement alarm module
PT-FR-15-DC Platinum 15RU frame assembly with DC power (includes (2)-PS, -RES)
PT-FR-28-DC Platinum 28RU frame assembly with DC power (includes (4)-PS, -RES)
PT-PS-DC Platinum and MX DC redundant power supply

Control Components
PT-RES Platinum and MX resource controller module
PT-SNMP-128 Platinum and MX SNMP license (per 128 inputs and outputs)

Cross-point Modules
PT-128x256-3G15 Platinum 128x256 3 Gb/s cross-point module for 15RU
PT-128x256-3G28 Platinum 128x256 3 Gb/s cross-point module for 28RU
## TDM Cross-point Modules

<table>
<thead>
<tr>
<th>Model</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>PT-ATDM16-X15</td>
<td>Platinum and MX ATDM XPT for 16 slots audio in 15RU</td>
</tr>
<tr>
<td>PT-ATDM32-X15</td>
<td>Platinum and MX ATDM XPT for 32 slots audio in 15RU</td>
</tr>
<tr>
<td>PT-ATDM32-X28</td>
<td>Platinum and MX ATDM XPT for 32 slots audio in 28RU</td>
</tr>
<tr>
<td>PT-ATDM64-X28</td>
<td>Platinum and MX ATDM XPT for 64 slots audio in 28RU</td>
</tr>
</tbody>
</table>

## Input Modules

<table>
<thead>
<tr>
<th>Model</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>PT-HS-IB+</td>
<td>Platinum 8 HD-SDI input module with options and BP</td>
</tr>
<tr>
<td>PT-S-IB+</td>
<td>Platinum 8 SDI input module with options and BP</td>
</tr>
<tr>
<td>PT-DEC-IB</td>
<td>Platinum 8 analog to SDI decoder input with BP</td>
</tr>
<tr>
<td>PT-HSO-PIN-IB+</td>
<td>Platinum 8 input (4 SFP) optical input module with options and BP</td>
</tr>
<tr>
<td>PT-AECT-IB</td>
<td>Platinum 16 unbalanced AES input module with BP</td>
</tr>
<tr>
<td>PT-AEBT-IB</td>
<td>Platinum 16 balanced AES input module with BP</td>
</tr>
<tr>
<td>PT-ADCT-IB</td>
<td>Platinum 16 stereo to balanced AES input with BP</td>
</tr>
<tr>
<td>PT-DMX</td>
<td>Platinum and MX demux daughter board for video signals up to 1.5 Gb/s</td>
</tr>
<tr>
<td>PT-DMX-3G</td>
<td>Platinum and MX demux daughter board for video signals up to 3 Gb/s</td>
</tr>
</tbody>
</table>

## Output Modules

<table>
<thead>
<tr>
<th>Model</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>PT-HSR-OBG+</td>
<td>Platinum 8 HD-SDI with reclock output green module with options and BP</td>
</tr>
<tr>
<td>PT-SR-OBG+</td>
<td>Platinum 8 SD-SDI with reclock output module with options and BP</td>
</tr>
<tr>
<td>PT-HSR013-OB+</td>
<td>Platinum 8 output (4 SFP) optical output module with options and BP</td>
</tr>
<tr>
<td>PT-ENC-OB</td>
<td>Platinum 8 SDI to analog encoder output with BP</td>
</tr>
<tr>
<td>PT-AECT-OB</td>
<td>Platinum 16 unbalanced AES output module with BP</td>
</tr>
<tr>
<td>PT-AEBT-OB</td>
<td>Platinum 16 balanced AES output module with BP</td>
</tr>
<tr>
<td>PT-DACT-OB</td>
<td>Platinum 16 balanced AES to stereo output with BP</td>
</tr>
<tr>
<td>PT-MUX</td>
<td>Platinum and MX mux daughter board for video signals up to 1.5 Gb/s</td>
</tr>
<tr>
<td>PT-MUX-3G</td>
<td>Platinum and MX mux daughter board for video signals up to 3 Gb/s</td>
</tr>
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## Output Monitoring Modules

<table>
<thead>
<tr>
<th>Model</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>PT-HSR-OM</td>
<td>Platinum and MX HD-SDI output monitoring module</td>
</tr>
</tbody>
</table>

## Back modules (included with front module but orderable separately)

<table>
<thead>
<tr>
<th>Model</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>PT-BLANK1-BP</td>
<td>Platinum and MX 1 slot blank/spacer BP</td>
</tr>
<tr>
<td>PT-BLANK2-BP</td>
<td>Platinum and MX 2 slot blank/spacer BP</td>
</tr>
<tr>
<td>PT-BLANK4-BP</td>
<td>Platinum and MX 4 slot blank/spacer BP</td>
</tr>
<tr>
<td>PT-BLANK16-BP</td>
<td>Platinum and MX 16 slot blank/spacer BP</td>
</tr>
<tr>
<td>PT-V-BP</td>
<td>Platinum and MX 8 BNC BP (HSR, SR, ENC, DEC)</td>
</tr>
<tr>
<td>PT-A2-IBP</td>
<td>Platinum and MX 8 stereo audio input BP</td>
</tr>
</tbody>
</table>
PT-A2-OBP  Platinum and MX 8 stereo audio output BP
PT-AEB-IBP  Platinum and MX 8 balanced AES audio input BP
PT-AEB-OBP  Platinum and MX 8 balanced AES audio output BP
PT-AEC-IBP  Platinum and MX 8 unbalanced AES input BP with CAB
PT-AEC-OBP  Platinum and MX 8 unbalanced AES output BP with CAB
PT-CAB-AEC-BOC  Platinum and MX 8 unbalanced AES break-out cable
PT-A2-DTB  Platinum and MX 8 stereo break-out screw term. BP
PT-A2-44MALEDB  Platinum and MX 8 stereo 44-pin male DB connector
PT-AEB-25MALEDB  Platinum and MX 8 AES 25-pin male DB connector

**Ethernet Switch**

CCS-NET-24  24-port Ethernet switch for CCS routing networks
CCS-NET-24-PS  Redundant power supply for CCS-NET-24; requires 1 CCS-NET-PS-FR for every 2 CCS-NET-24-PS
CCS-NET-PS-FR  Redundant power supply tray for CCS-NET-24, holds 2 power supplies (power supplies not included), tray only required for redundancy

**SERVICE OPTIONS**

**90-Day Elite Care**

PT-90-ELITE  90-day Elite ServicePAK — Enhanced Elite support for the first 90-days: includes on-call project expert, next-day advance exchange of parts, RemoteDialup support and one wrap-up and review session (excludes travel and expenses, actual charges billed using PS-TE-V-SVC)

**QuickStart Commissioning**

PT-LG-QS  Mandatory 5-day QuickStart for 512X Platinum (includes travel and expenses)
*Applies to specific zones in Europe and Asia
PT-LG-QSNT  Mandatory 5-day QuickStart for 512X Platinum (excludes travel and expenses, which are billed separately)
PT-MD-QS  Mandatory 4-day QuickStart for 256X Platinum (includes travel and expenses)
*Applies to specific zones in Europe and Asia
PT-MD-QSNT  Mandatory 4-day QuickStart for 256X Platinum (excludes travel and expenses, which are billed separately)

**ServicePAK Agreements**

PT-LG-BASIC  1-year Basic ServicePAK for large (512X) Platinum router
PT-LG-GOLD  1-year Gold ServicePAK for large (512X) Platinum router
PT-MD-BASIC  1-year Basic ServicePAK for medium (256X) Platinum router
PT-MD-GOLD  1-year Gold ServicePAK for medium (256X) Platinum router
PT-RDOPT-BASIC  1-year Basic ServicePAK for Platinum redundant options (logic cards and power supplies)

PT-RDOPT-GOLD  1-year Gold ServicePAK for Platinum redundant options (logic cards and power supplies)

Training Courses
PT-OPS-OTR  2-day on-site Platinum operational training course (excludes travel and expenses)
PT-OPS-FTR  2-day factory Platinum operational training course (excludes travel and expenses)

<table>
<thead>
<tr>
<th>CONTACTS</th>
<th>North America</th>
<th>Caribbean and Latin America</th>
<th>Europe, Middle East &amp; Africa</th>
<th>Asia, Pacific Rim</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>+1 800 231 9673</td>
<td>+1 786 437 1960</td>
<td>+44 (0) 118 964 8200</td>
<td>+852 2776 0628</td>
</tr>
</tbody>
</table>

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