grass valley

product fact sheet

LDK 5000

HD Upgradeable Standard-Definition Camera



Grass Valley™ products from Thomson offer the most comprehensive, multi-format solutions for acquisition, production, storage and playback—and a strong foundation for centralized, proactive status and activity monitoring. These solutions include one of the broadest selections of standard-definition (SD) and high-definition (HD) digital video cameras.

For broadcasters and video professionals that need superb SD performance today and unmatched HD support in the future, the Grass Valley LDK 5000 is a perfect fit. Created by one of the best known imaging design teams in the world—one with five technical Emmy® awards to its credit—the LDK 5000 offers pristine oversampled SD acquisition and output as well as an easy migration path to HD acquisition.

Supporting everything from robotics to studio, mobile, and fixed camera installations—as well as portable hand-held and EFP uses—the LDK 5000 features a video processing architecture that includes three 9.2-million pixel CCDs, 12-bit analog-to-digital conversion, and 22-bit digital signal processing. Because this architecture is designed for HD acquisition and output, it's easy to upgrade an LDK 5000 for HD acquisition.

With a lightweight, ergonomic design, the LDK 5000 speeds production workflows with focus-assist tools as well as smart cards that store picture and operational settings. And its transmission system interfaces with standard triax-based infrastructures for maximum flexibility.

The LDK 5000 features a small, robust, and lightweight base station that provides SD video output, audio output, intercom, external video, genlocking, teleprompting, and control facilities. The smallest and lightest base station of its type, it also supports a variety of optional modules for re-configuration and customization.

The LDK 5000 supports two migration options to HD acquisition: one that results in the LDK 6000 mk II Standard camera, which supports 1080i/720p HD formats in 50 and 59.94 Hz, and simultaneously provides high-quality SD output in either 50 or 59.94 Hz; and one that results in the LDK 6000 mk II WorldCam system, which provides all the functionality of the Standard version as well as support for digital cinematography formats in 1080p and 720p at 24p.

Superb SD CCDs Built on HD Technology

Built on a video processing platform designed for native multiformat, multi-frame rate HD image capture, the LDK 5000 relies on three 9.2-million pixel HD-DPM+™ CCDs for superior SD output. The CCDs are based on frame-transfer technology so there is no lag or smear in the images you create. They also feature an image acquisition over-sampling rate to ensure an SD output with extremely low aliasing and very high resolution.

key features

- Superb oversampled SD acquisition and output
- Built on unmatched HD video processing architecture that features:
- Three 9.2-million pixel HD-DPM+ CCDs
- 12-bit A-to-D conversion
  - —22-bit digital signal processing
  - —2000 lux sensitivity at F8.0
- Unique focus-assist tools:
  - —Crawler, for creating motion on the edges of an object in focus
  - —Instant push-button electronic zoom for focusing on small details
- Low-cost 5" HD viewfinder system
- Smart cards store image, operational settings for easy recall
- Flexible HD transmission system
  - —Supports standard triax up to 3,300 feet/1,000 meters
- Small, robust base station with superior SD output
  - —Supports HD Triax Repeater for triax up to 6,600 feet/2,000m
- In triax mode, SuperXPander support enables configuration with studio lenses, accessories
- Two HD migration paths available:
  - —LDK 6000 mk II Standard (1080i/720p in 50 and 59.94 Hz, and simultaneous SD output in either 50 or 59.94 Hz)
  - —LDK 6000 mk II WorldCam (all formats of Standard version, plus 1080p and 720p at 24p)

To ensure optimal picture quality and performance, the LDK 5000 features 12-bit analog-to digital conversion and 22-bit digital signal processing. Because most of the quantization noise is outside of the visible SD band, the analog-to-digital conversion reaches a nearly 14-bit performance.

As the core architecture of the LDK 5000 is designed for HD acquisition and output, it reaches the full potential of its pixel count when upgraded to HD.

Convenient Assist Tools Speed Production

The LDK 5000 includes a number of features to speed the production process, from focus-assist tools to smart cards.

For precise focusing, the camera includes a patented "crawler" that creates a motion effect on the edges of an object in sharp focus; the contrasting motion helps a camera operator fine tune that focus quickly. The camera also features a unique electronic viewfinder zoom function that instantly enlarges an image with a simple press of a button; it's ideal for focusing on small details.

It's also easy to pre-configure the LDK 5000 for a variety of different settings—from sports and drama applications to studio settings—by storing operational and image settings on low-cost smart cards. Not only can the camera recall these settings quickly, you can transfer the cards from one camera to another for fast reconfiguration.

Choose Your Transmission System

Designed to support the widest array of applications possible, the LDK 5000 integrates with the Grass Valley TriaxHD transmission systems.

The sophisticated Grass Valley TriaxHD transmission system is the next step in the evolution of the Emmy-award winning triax transmission system. By interfacing with industry-standard triax cabling, the TriaxHD system offers the robustness and reliability of the medium and its connectors, a cost-effective way to reuse existing cable inventories.

The TriaxHD system supports cable lengths of up to 3,300 feet/1,000 meters without significant loss of signal quality.

For longer cable runs, the Grass Valley Triax HD Repeater is available.

Small, Robust, Flexible Base Station

The extremely robust, small (only 2 RU high), and lightweight base station for the LDK 5000 provides high-quality SD video output, audio output, intercom, external video, genlocking, teleprompting, and control facilities. In fact, it is the smallest and lightest base station of its type, and supports a variety of optional modules for reconfiguration and customization.

The base station's high-quality SD module provides three 270 Mb/s SDI and three analog outputs. You can program the analog outputs to R, G, B; three times CVBS (NTSC); or Y, R-Y, B-Y. You can also use one of the SDI or analog outputs of the module for high-quality monitoring.

The base station's audio and advanced intercom module provides two-channel audio and four-channel intercom capabilities. An installation menu lets you choose between a four- or two-wire intercom system; you can assign a channel for private data in either configuration.

Extending the audio and intercom capabilities further are a 1 kHz test-tone generator and a voicemail feature. The voicemail feature can store messages for a camera operator from a combination of sources, such as program, production, or engineering areas. The gain levels for these features can be remotely controlled from the base station or a Grass Valley camera master control panel.

The engineering intercom module of the base station provides two-channel communications between a camera operator and engineering. The module fits into the front of the base unit; an operator can then plug in a headset and adjust the levels appropriately. It is ideal for a simple intercom facility in a standalone mode of operation—or for expanding the four-channel advanced intercom to a five-channel system.

The base station's external video inputs can be configured in two ways. The first is analog only, providing two composite video inputs and loop-through analog outputs. This module supports non-synchronized operation.

The second configuration option enables switching between analog or SDI SMPTE 259, offering either two analog inputs as described above or two digital inputs. The inputs are prepared for video information coding. These digital inputs can compensate for 250m Belden coax 1694A. The loop-through outputs can compensate for 50m of the same coax. Therefore, five base stations can be looped through, saving you rack space and distribution amplifiers.

The LDK 5000 base station provides full HD support in addition to its robust capabilities when you upgrade the camera to HD.

Flexible and Future Proof

The LDK 5000 was designed for flexibility and cost-effective compatibility. Its docking concept, for example, makes it suitable for all applications. And its base station is easy to integrate into a mobile production facility.

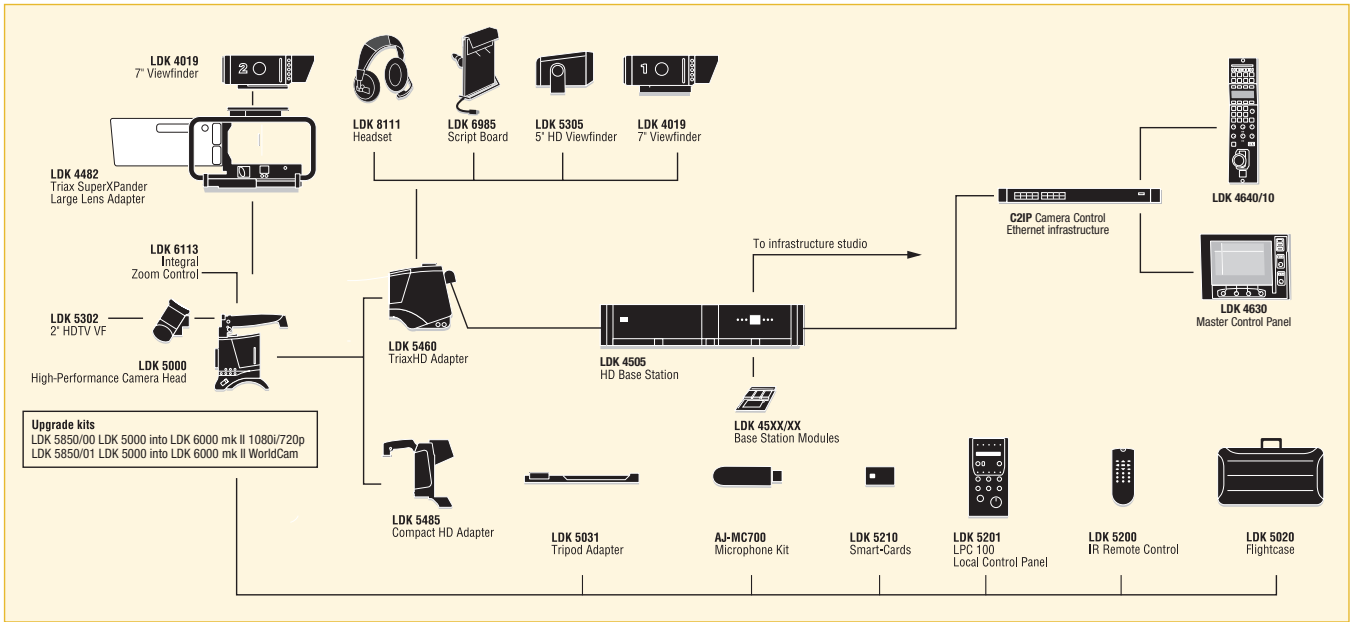
The lightweight LDK 5000 is also perfectly suitable for hand-held operations. Alternatively, with a SuperXPander large lens adapter and an optional five- or seven-inch HD high-resolution viewfinder, you can turn the camera into a fully featured studio head in triax mode.

LDK 5000 Base Station

The base station of the LDK 5000 is the smallest and lightest of its type and provides SD video output, audio output, intercom, external video, genlocking, teleprompting, and control facilities.



Camera Configurations LDK 5000 series



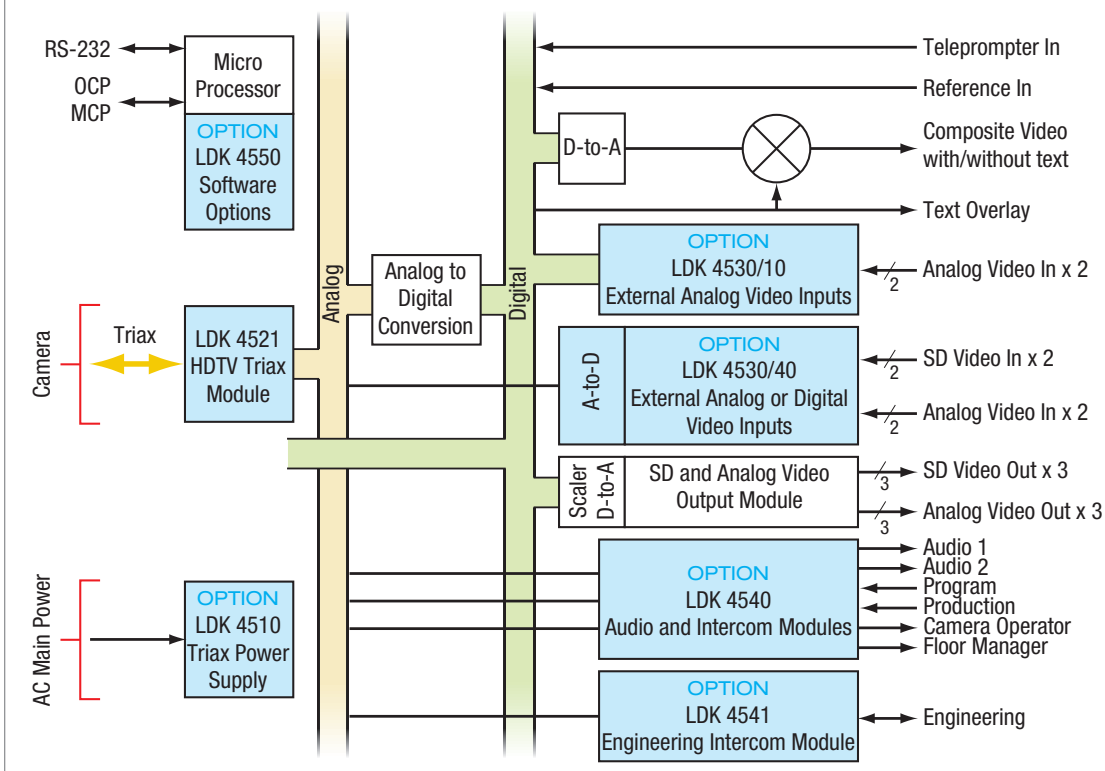
Two HD Migration Options

The LDK 5000 supports two migration options to HD acquisition: one that results in the LDK 6000 mk II Standard camera and the other that results in the LDK 6000 mk II WorldCam system.

The Standard version supports 1080i/720p HD formats in 50 and 59.94 Hz, and simultaneously provides high-quality SD output in either 50 or 59.94 Hz. The WorldCam version provides all the functionality of the Standard version as well as support for digital cinematography formats in 1080p and 720p. These formats provide an impression of motion (motion portrayal) comparable to that of dedicated digital cinematography cameras running at the same speeds.

The WorldCam version of the LDK 6000 mk II also provides convenient built-in frame-rate conversions for easy connection to existing HD peripherals. As a result, you get cost-effective monitoring and recording combined with the motion portrayal of film cameras.

LDK 5000 Base Station



HD Upgradeable LDK 5000 Series Camera Specifications

LDK 5000 Camera Head

General

This specification is valid for an operational system under normal conditions.

Power Requirements: Triax powered or DC 12 Volts

Power Consumption: 44 Watts incl. 2" viewfinder and TriaxHD adapter

Operating Temperature: –20°C to 45°C (–4°F to 113°F)

Storage Temperature: –20°C to 60°C (–4°F to 140°F)

Weight: 5.0 kg (11 lbs.) incl. 2" viewfinder and TriaxHD adapter

Dimensions: 205 (H) x 125 (W) x 357 (L) in mm with TriaxHD adapter

TriaxHD Cable Length: Y/Cr/Cb transmission over 1,000 m (3,300 ft.) with 14 mm cable

Viewfinder CRT: 2", 5", and 7" monochrome

2" Viewfinder resolution: >600 TV lines (center)

5" Viewfinder resolution: >650 TV lines (center)

7" Viewfinder resolution: >800 TV lines (center)

Camera Section

Pick-up Device: 3x 2/3" HD-DPM+ CCDs

Picture Elements: 9.2 million pixels 1920 (H) x 4320 (V) effective

Aspect Ratio: full 16:9 acquisition; 16:9 or 4:3 SDTV at base station

Temporal Frequency: 50 and 59.94 Hz

Smear: No vertical smear

Optical System: F1.4 prism system

Optical Filters on First Wheel: Clear, 1/4 ND, 1/16 ND, 1/64 ND

Optical Filters on Second Wheel: Clear, four-point star, six-point star, soft-focus

Electronic Filters: 3200°K, 5600°K, 7500°K, FL, 2 AWB presets, continuous auto white, color filter

Digital Quantization:12-bits A-to-D

Digital Signal Processing: >22-bits

Sensitivity: 2000 lux at F8.0 (typical)

Gain: –3 dB to +12 dB in 3 dB steps (user definable presets)

S/N Ratio: 62 dB in Y (typical) at the high-Q SDTV output at base station

Modulation Depth: 90% at 5 MHz at the high-Q SDTV output at base station

Exposure Control: Down to 1/1000 sec

Clean Scanning:
- 50.8 to 125 Hz (at 50 Hz temp. freq.)
- 61 to 150 Hz (at 59.94 Hz temp. freq.)

Front Microphone In: 1x XLR-3 female, balanced, +48V, CH1 on HD base station (selectable at backside adapter)

Viewfinder Out: 20-pin connector

Lens: 12-pin connector

Control Input: 9-pin, RS-232 compatible

LDK 5440 Triax Adapter

TriaxHD: Trilock, Fischer, ARD or Lemo

Video CVBS Out: BNC 1x, 1.0 Vp-p, 75Ω (viewing quality)

Monitor Out: BNC 1x, Y-signal of viewfinder (HD-Y component), 1.0 Vp-p, 75Ω

Teleprompter Out: BNC 1x, 1.0 Vp-p, 75Ω

Rear Microphone In (2x): 2x XLR-3 female, balanced, +48V selectable

DC 12 Volts In: XLR-4 male

DC Out:12 Volts, 1.5 Amps, 4-pin Hirose (DC out and Tally indication)

Scriptlight: 12 Volts, 0.25 Amps, 3-pin Fischer

Tracker: 11-pin Fischer (Comm/Signaling)

Auxiliary/Data: 11-pin Fischer (Private data)

Intercom: 1x XLR-5 female or Tuchel, with channels for Eng/Prod Program

Monitor Out: BNC 1x, Y-signal of viewfinder (HD-Y component), 1.0 Vp-p, 75Ω

Teleprompter Out: BNC 1x, 1.0 Vp-p, 75Ω

Rear Microphone In (2x): 2x XLR-3 female, balanced, +48V selectable

DC 12 Volts In: XLR-4 male

DC Out:12 Volts, 1.5 Amps, 4-pin Hirose (DC out and Tally indication)

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Auxiliary/Data: 11-pin Fischer (Private data)

Intercom: 1x XLR-5 female or Tuchel, with channels for Eng/Prod Program

Optional

LDK 5850/00 Upgrade option to LDK 6000 mk II Standard version camera system

LDK 5850/01 Upgrade option to LDK 6000 mk II WorldCam version camera system

LDK 5302 2" HD viewfinder

LDK 5305 5" HD viewfinder

LDK 4019 7" HD viewfinder

LDK 4482 Triax SuperXpander

LDK 5031 Tripod adapter plate

LDK 6113 Integral zoom control in handgrip

LDK 6985 Script board with light

AJ-MC700 Microphone kit

LDK 5210 Set of 10 user cards

LDK 5220 Smart-Touch™ software

LDK 5200 IR remote control

LDK 5020 Flight case

Supplied Accessories

- Operator's manuals
- Rain cover camera
- 1x Owner card
- Shoulder strap camera
- 2x User cards

LDK 5000 Base Station Specifications

LDK 4505/00 Slim Line Base Station

General

Dimensions (WxHxD): 438 (19" rack) x 88 (2 RU) x 510 mm (17.2 x 3.5 x 20.1 inches)

Operating Temperature: –0°C to +50°C (–4°F to 122°F)

Storage Temperature: –40°C to +70°C (–40°F to 158°F)

Operating Humidity: Max. 90% (non-condensing)

Shock Resistance: Max. 10G (transport), Max. 2G (operating)

Altitude: Max. 50,000 ft.

Weight: 17.0 kg (37.5 lbs.) fully equipped with options

Transmission

Typical Cable Length With: Triax 14 mm/0.55" 1000m (3,281 ft.)

Bandwidth: 30/15/15 MHz (Y/Cr/Cb)

Connectors

SDI Out: BNC 3x, 0.8 Vp-p, 75Ω, SMPTE 259M, ITU-R BT.601

Analog Out: BNC 3x, R, G, B or Y, Pr, Pb, or 3x CVBS (menu selection):

- RGB out: 3x 0.7 Vp-p (±1%), 75Ω
- Y, Pr, Pb: 3x 0.7 Vp-p (±1%), 75Ω
- CVBS out: 3x 1.0 Vp-p (±1%), 75Ω

Frequency Response: 0.1 to 6 MHz (+0.5 dB/–1 dB)

K Factor: Less than 2%

Teleprompter In: BNC 1x (and loop-through output), 1.0 Vp-p, 75Ω

Reference In: BNC 1x (and loop-through output), 1.0 Vp-p, 75Ω (SD Black Burst)

Text Out: BNC 1x, 1.0 Vp-p, 75Ω (VBS)

Composite Video Out: BNC 1x, 1.0 Vp-p, 75Ω (CVBS, multi-standard w/ or w/o text; for viewing purposes only)

Signaling In/Out: D-sub 15-pin, male

- Preview, green tally (call), dry contact
- Yellow tally (ISO), dry contact
- Red tally (on-air), dry contact
- Remote audio level control (22-64 dB), DC

Auxiliary in/out: D-sub 9-pin, female

- An0, 0-5 VDC in, output on camera head
- An1, 0-5 VDC in, or aspect ratio remote control
- 16:9 <0.8 VDC in, 4:3 >2.4 VDC in
- Private data in/out, 2.4 kB TTL (RS-232)

RS-232: D-sub 9-pin, male (RXD, TXD, DTR, DSR, RTS, CTS)

Control Data: series 9000,4-pin male, 2 wire camera control – Ethernet, IEEE 802.3 10/100 Mb

LDK 4510/10 Triax AC/DC Power Module for Studio and Portable Camera Heads

Power Requirement: AC 115V/230V ±15%, 47 to 63 Hz

Power Connector: IEC type, 3-pin male

Power Consumption:

- 470 VA or 270 Watts max. (with studio camera head)
- 360 VA or 210 Watts max. (with port. camera head)

Utility Power:

- 150 VA or 150 Watts max. (on studio camera head or LLA)
- 80 VA or 80 Watts max. (on port. camera head)

LDK 4521 Triax Modules

LDK 4521/10 TriaxHD Module with Fischer triax connector

LDK 4521/20 TriaxHD Module with Tri-Lock triax connector

LDK 4521/30 TriaxHD Module with ARD triax connector

LDK 4521/40 TriaxHD Module with Lemo 4 triax connector

LDK 4521/50 TriaxHD Module with Lemo BBC triax connector

LDK 4521/60 TriaxHD Module with Lemo 3 triax connector

LDK 4530/10 Analog Video Input Module

External Video In: BNC 2x, 1.0 Vp-p, ±6 dB, 75Ω (loop-through) (CVBS or VBS)

LDK 4530/40 Digital or Analog Video Input Module

Switchable in Base Station Menu

- Digital in BNC 2x passive loop-through
- Video standard, acc. SMPTE 259M
- Input cable length 250m max, Belden 1694 or eq.
- Loop-through equivalent with 50m Belden 1694 or eq. in total 5x loop-through max, last one loaded with 75Ω
- Delay compensation 9 µs max, adjustable in base station menu
- Bandwith (out on PXM/WFM) 0.1-5 MHz 0-0.5/1 dB
- K ratings <2%
- Prepared for Video Index Information Coding
- 525 line TV acc. ANSI/SMPTE 125
- 625 line TV acc. ANSI/SMPTE 267
- Analog in BNC 2x, 1.0 Vp-p ±6 dB, 75Ω (loopthrough) CVBS or VBS

LDK 4540/10 2 ch. Audio & 2/4-wire Intercom

Audio Out: XLR–3 2x, 0/+6 dBu (±1.5 dB, max. 18 dBu, 600Ω, Gain max. 70 dB)

Frequency response: 40 Hz to 15 kHz, (+1/–3 dB, 1 kHz, –10 dBu output level)

Distortion: Less than 0.5% (100 Hz/1 kHz, +6 dBu out, 600Ω)

S/N Ratio: 58 dB (unweighted RMS)

Intercom In/Out: D-sub 15-pin, female (program in, production in/out, engineering in/out, 2/4 wire in: 0 or 6 dBu (max. 6 or 12 dBu), 9 kΩ, out: 0 or 6 dBu (±2 dB, max 12 dBu), 600Ω

Frequency Response: 150 Hz to 6 kHz (1 kHz, –10 dBu output level)

Distortion: Less than 2% (1 kHz, +12 dBu level)

LDK 4541 Engineering Intercom Module

LDK 4541/10 XLR-5 (female) engineering intercom module

LDK 4541/20 Tuchel 6-pin engineering intercom module

LDK 4541/30 Tuchel 5-pin engineering intercom module

LDK 4541/40 XLR-7 (female) engineering intercom module (6 dBu, ±2 dB, max 12 dBu, 25-400Ω)

Frequency Response: 150 Hz to 6 kHz, ±3 dB (0 dB, 1 kHz, –10 dBu output level)

S/N Ratio: 46 dB (unweighted RMS)

Phantom Power: +12 VDC (±1V), menu selectable

Ordering Information

Please contact your authorized Grass Valley representative.

Support Services & Training

The Grass Valley Support Services & Training team delivers complete service solutions that enhance your return on Grass Valley products and global systems solutions. Advanced training and proactive support, by reducing down time, keeps your equipment and staff performing at optimum productivity and quality.

Our pre-packaged suite of SupportPRO Services provides support though the whole process:

- StartPRO Commissioning Support
- Factory, On-Site and Web Training Classes
- TechPRO On-Site and Comprehensive Software and Hardware Support
- ServicePRO Comprehensive Software and Hardware Support
- PartsPRO Advanced Exchange Hardware Support
- Critical Spares Kits for Most Products

For specific requests, our worldwide experienced Support Services & Training experts can build and assist you with customized solutions.

For more information contact your authorized Grass Valley representative or visit us online at www. grassvalley.com/support.

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CAM-1000D-3

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