4K VARIABLE FRAME RATE CAMERA

FT-ONE-LS

Camera lenses are sold separately.
The Perfect High-Speed 4K Camera for Live Sports Coverage

Adding compact size and portability to the revolutionary FT-ONE 4K UHD high speed camera, the FT-ONE-LS separate the camera head from the body, offering exceptional mobility, and enable unprecedented shooting positions or angles for live sports or other events. With a 2/3-inch lens, the FT-ONE-LS offers improved performance in low light conditions, often found in sports stadium venues that can prove troublesome for most high-frame-rate cameras.

FOR-A’s exclusive “flicker corrector” technology, offered as an optional feature, helps set this camera apart from all others.

No longer will the effects of low light and high-speed 4K production be a concern when shooting night games or in domed stadiums.

Simultaneous output of live and super slow-motion video

Simultaneous output of live and super slow-motion video makes FT-ONE-LS more than a dedicated high-speed solution. The cameras are also ready for live workflows of all kinds.

Move the camera head around to capture video during super slow-motion playback

While playing back super slow-motion coverage, the operator has the ability to turn off the camera head and move around to capture the next crucial shot. Unbeatable versatility! This is especially useful when covering live action events requiring mobility. With its camera head linked to the base station over a single optical camera cable, the FT-ONE-LS have a maximum extended range over a mile*. Additionally, footage can be captured at the base station on no more than two SSD cartridges, with a maximum storage capacity of 4 TB.

* When using a camera cable longer than 1 km, an external power supply may be necessary.
**Features**

- Shoots up to 500 frames per second (fps) in 4K, up to 1200 fps in HD
- Supports 2 x SSM in 4K 60p or 6 x SSM in HD 60i. Works with EVS XT-3
- High speed shutter: Down to 1/50,000 second with blur-free shots
- Recording time: Up to 19.6 sec of 4K DCI recording at 500 fps
- SSD cartridge (optional) allows up to 76,000 frames (FT-ONE2T), or 38,000 frames (FT-ONE-1TL) of 4K RAW data to be recorded.

**Storage partitioning**

The internal memory on the FT-ONE-LS can be used as a single partition or divided into 2-16 partitions for simultaneous recording or playback. For continuous recording, material can be left intact prior to recording the next segment. Partitioning allows the operator to record new scenes while playing back already recorded ones.

**Versatile trigger support**

As soon as the FT-ONE-LS is turned on, video is constantly being buffered by the camera and can instantly be saved to memory with the push of a button. Choose the optimal recording trigger for the subject or scene by selecting from a start, center, or end trigger or by specifying the start time of the recorded segment. With the pre-roll function, playback starts from the specified position, keeping playback focused on required segments.

**24-axis color correction**

The video operator will be awed by the amazing 24-axis color correction, offering improved camera and color matching compared to the usual trichromatic correction. Specific colors can be corrected by adjusting hue and saturation separately on the 24-axis. This is very convenient for on-site color-matching between scenes, or when ensuring color consistency with video from other cameras. Choose from a variety of color presets*3 or, import your own.

**Triple intercom connectivity**

Intercoms are indispensable when it comes to live coverage. With both a D-sub and XLR connector, the camera easily fits into live workflows, supports 2-wire, 4-wire, or Clear-Com* connections.
Live output at 2 x SSM for 4K
Connected to EVS sports replay server, the FT-ONE-LS provide impressive output of high-speed video. Material on the server can also be replayed as needed. The units also offers capability of long-duration recording in HD at 6x speed.

Outstanding video images – even with a B4 lens
High-quality video images are maintained even with gain increased for video captured with a 2/3-inch mounted lens. Operators will see significantly less noise, which tends to occur in low-light conditions.

High frame rate output ready for editing
Output rates of up to 500 fps in 4K or 1,200 fps in HD are supported.

Flicker correction
The optional Flicker Corrector offered on cameras, corrects, in real-time, that annoying flickering often put out by high-speed cameras when shooting under inconsistent lighting conditions. This option is a must-have for indoor live sporting events, especially when shooting night games or in domed stadiums or gymnasiums.
Options

SSD Cartridge
FT-ONE2T/FT-ONE-1TL
- Transfer material recorded on the FT-ONE-LS to an SSD cartridge.
- One FT-ONE2T cartridge holds up to 152 seconds of material.
- An cost-effective cartridge with half the capacity is also available: the FT-ONE-1TL.*
- Accommodates two cartridges, which can hold nearly five minutes of material.
- Switch the hot-swappable cartridges as needed when shooting.
*Not suitable for real-time playback due to low frame rates.

Cartridge Docking Station
FT-1ICDS
- Provides USB 3.0 connectivity between the FT-ONE-LS Cartridge (FT-ONE2T or others) and a Windows or macOS computer.
- Copy material from the SSD cartridge directly to storage on the computer or to an attached HDD or SSD.
- Provides color gamut adjustments, 3D-LUT creation*, and computer-based playback of material on the SSD cartridge.
- Can be used outdoors when powered via the IDX battery mount.
*Windows supported

Remote Control Unit
FT-1RUA/FT-1RUB
- Includes direct recording and playback buttons as well as a dial and touch-panel for a range of settings.
- Facilitate camera setup, recording, and playback.
- Intuitive controllers with a fader control

DPX Converter
FT-1READ
- Converts 12-bit RAW data on the FT-ONE SSD cartridge to a common file format for editing or color grading.

Accessories
Tripod adapter, AC cord, rack mount brackets, rubber feet, operation manual

4K Extraction System
ZE-ONE
Frame and extract specified HD scenes at any size from 4K sources using an intuitive touch-screen interface*. To simulate zooming, dynamic zoom effects at key points and in various sizing can be specified in slow-motion instant replay from the FT-ONE-LS high-speed 4K camera. Enjoy unprecedented creative freedom with replays of live sports and other applications.

Remote Control Panel
FT-1RCPA
- Remote control panel for image/color adjustment
- Real-time control is available via button, touchscreen and dial
- Iris control is available via joy-stick (FT-1RCPA).

Connector Conversion Cables
Conversion cables from waterproof camera head connectors to general-purpose connectors
# FT-ONE-LS

## Specification

### Camera Head

<table>
<thead>
<tr>
<th>Image sensor, shutter, other</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Sensor</td>
<td>CMOS sensor</td>
</tr>
<tr>
<td>Effective resolution</td>
<td>4096 x 2160</td>
</tr>
<tr>
<td>Sensor size</td>
<td>Super 35 mm-equivalent</td>
</tr>
<tr>
<td>Color filter</td>
<td>RGB Bayer</td>
</tr>
<tr>
<td>Shutter mechanism</td>
<td>Global shutter</td>
</tr>
<tr>
<td>Quantization</td>
<td>12-bit x RGB</td>
</tr>
<tr>
<td>Shutter speed</td>
<td>1/frame rate to 1/50,000 sec. (Preset stops)</td>
</tr>
<tr>
<td>Frame rate</td>
<td>4K High Speed mode: Max. 500 fps</td>
</tr>
<tr>
<td></td>
<td>HD High Speed mode: Max. 1,200 fps</td>
</tr>
<tr>
<td></td>
<td>4K 2x Speed mode: 100 fps / 120 fps (depending on system frequency)</td>
</tr>
<tr>
<td></td>
<td>HD 3x Speed mode: 150 fps / 180 fps (depending on system frequency)</td>
</tr>
<tr>
<td></td>
<td>HD 6x Speed mode: 300 fps / 360 fps (depending on system frequency)</td>
</tr>
<tr>
<td>Lens mount</td>
<td>PL mount</td>
</tr>
<tr>
<td>Trigger method</td>
<td>Arbitrary positions from START, 10%-45%, CENTER, 55%-90%, END</td>
</tr>
<tr>
<td></td>
<td>Pre-roll function: Adjustable playback position on FT-1RUA/RUB</td>
</tr>
<tr>
<td>Trigger signal input</td>
<td>From Remote Control Unit (FT-1RUA/RUB), GPI or camera button.</td>
</tr>
</tbody>
</table>

### Video settings

<table>
<thead>
<tr>
<th>Gain</th>
<th>Digital: 0 - 42 dB (0.1 dB increments)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Analog: 0 dB, 6 dB, 12 dB</td>
</tr>
<tr>
<td>White balance</td>
<td>PRESET: 3200K, 5600K, 6500K, 9300K</td>
</tr>
<tr>
<td></td>
<td>Semiautomatic correction</td>
</tr>
<tr>
<td>Pedestal</td>
<td>Black level set via R, G, B, Master</td>
</tr>
<tr>
<td>Color correction</td>
<td>Linear matrix: Phase R-G, R-B, G-R, G-B, B-R, and B-G</td>
</tr>
<tr>
<td></td>
<td>Hue and Saturation adjustments on 24-axis</td>
</tr>
<tr>
<td>Gamma</td>
<td>Linear(γ=1.0), γ=0.45, γ=0.50, HDTV, CINEMA, LOG</td>
</tr>
<tr>
<td>Knee</td>
<td>Knee point and Knee slope setting</td>
</tr>
<tr>
<td>Enhancement</td>
<td>On/Off, horizontal (H), vertical (V)</td>
</tr>
<tr>
<td>Chroma gain</td>
<td>Pb, Pr</td>
</tr>
</tbody>
</table>

### Audio inputs

<table>
<thead>
<tr>
<th>MIC IN</th>
<th>EEG.0T.305.CLL x 1 (1 stereo pair), balance, high impedance</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Input level: -60 dBu / -60 dBu / -40 dBu</td>
</tr>
<tr>
<td></td>
<td>Phantom power supply: +48 V / OFF</td>
</tr>
</tbody>
</table>

### Audio output

| Embedded                  | 2 channels (1 stereo pair), 48 kHz, synchronous             |
### Camera mode

- **4K mode**
  - 4K High Speed mode
  - 4K 2x Speed mode
- **HD mode**
  - HD High Speed mode
  - HD 3x Speed mode
  - HD 6x Speed mode

### Video outputs

- **4K OUT 1-4**
  - 75Ω DIN 1.0/2.3 x 4
  - Live video
  - 4K High Speed mode: x1 (3840 x 2160p) / 59.94, 50 (4:2:2)
    - 3G-SDI x 4, SQD (Level-A/B, SQD)
  - HD High Speed mode: x4 (1920 x 1080p) / 59.94, 50
- **VF OUT**
  - (1920 x 1080i) / 59.94, 50
  - 75Ω DIN 1.0/2.3 x 1
  - 4K High Speed mode: 4K-downconverted live, slow or RET1/RET2 input video
  - 4K 2x Speed mode: 4K-downconverted live, or RET1/RET2 input video
  - HD High Speed mode: Live, slow or RET1/RET2 input video
  - HD 3x Speed
  - HD 6x Speed modes: Live or RET1/RET2 input video

### External Interfaces

- **GPI**
  - EEG.0T.309.CLL (Lemo connector) x 1
  - GPI IN1-6, R TALLY OUT, G TALLY OUT
- **Iris control**
  - EEG.2T.312.CLL (Lemo connector) x 1
  - Manual / Auto
- **Intercom headset**
  - EEG.0T.304.CLL (Lemo connector) x 1
  - PRIV / LINE (producer line / engineer line)
- **Optical camera cable port**
  - Manufactured by Lemo

### General specifications

- **Temperature**
  - 0℃ to 40℃
- **Humidity**
  - 30% to 85% (no condensation)
- **Power**
  - Supplied from the base station, via optical camera cable or an external power supply: 100 V to 240 V AC (Max. 1 km)
  - DC IN: EEG.2T.302.CLL (Lemo connector) x 1, DC+12 to +17V
  - DC OUT: EEG.2T.303.CLL (Lemo connector) x 1, DC+12 to +17V (Max. 20 W)
- **Consumption**
  - 74 W
- **Dimensions**
  - 153 (W) x 148(H) x 336 (D) mm (excluding projecting parts)
- **Weight**
  - 7.1 kg
- **Consumables**
  - Cooling fan (P-1552-1): Replace every 4 years (at normal temperature)
Base Station

Video output (camera mode) (See p. エラー! ブックマークが定義されていません。for more details)
- CH A1-4: 4K mode x 2 (3840 x 2160p) / 59.94, 50 (4:2:2)
- CH B1-4: 3G-SDI x 4, SQD (Level-A/B, SQD)
- HD mode: x 8 (1920 x 1080i/p) / 59.94, 50
- HD SDI 1-2: 4K/HD mode x 2 (1920 x 1080i): 1080i / 59.94, 50
- 75Ω BNC x 2: Live or slow video

Video input
- RET 1: (1920 x 1080i) / 59.94, 50
- RET 2: 75Ω BNC x 2

Genlock input
- BB: NTSC: 0.429 Vp-p, PAL: 0.45 Vp-p or,
- Tri-level Sync: 0.6 Vp-p
- 75Ω BNC x 1 (w/ loopthrough, 75-ohm auto termination)

Genlock mode
- Internal sync or External sync (B.B. or Tri-level sync)

Memory partition
- 1 to 16 segments

Recording duration

<table>
<thead>
<tr>
<th>Frame rate (major)</th>
<th>Recording time</th>
<th>Image size</th>
<th>Frame rate (major)</th>
<th>Recording time</th>
<th>Image size</th>
</tr>
</thead>
<tbody>
<tr>
<td>24 fps</td>
<td>409.2 sec</td>
<td>4096×2160 pixel</td>
<td>24 fps</td>
<td>1365.2 sec</td>
<td>1920×1080 pixel</td>
</tr>
<tr>
<td>50 fps</td>
<td>196.4 sec</td>
<td></td>
<td>50 fps</td>
<td>655.3 sec</td>
<td></td>
</tr>
<tr>
<td>60 fps</td>
<td>163.6 sec</td>
<td></td>
<td>60 fps</td>
<td>546.1 sec</td>
<td></td>
</tr>
<tr>
<td>100 fps</td>
<td>98.2 sec</td>
<td></td>
<td>100 fps</td>
<td>327.6 sec</td>
<td></td>
</tr>
<tr>
<td>120 fps</td>
<td>81.8 sec</td>
<td></td>
<td>120 fps</td>
<td>273.0 sec</td>
<td></td>
</tr>
<tr>
<td>150 fps</td>
<td>65.4 sec</td>
<td></td>
<td>150 fps</td>
<td>218.4 sec</td>
<td></td>
</tr>
<tr>
<td>200 fps</td>
<td>49.1 sec</td>
<td></td>
<td>180 fps</td>
<td>182.0 sec</td>
<td></td>
</tr>
<tr>
<td>240 fps</td>
<td>40.9 sec</td>
<td></td>
<td>300 fps</td>
<td>109.2 sec</td>
<td></td>
</tr>
<tr>
<td>300 fps</td>
<td>32.7 sec</td>
<td></td>
<td>360 fps</td>
<td>91.0 sec</td>
<td></td>
</tr>
<tr>
<td>350 fps</td>
<td>28.0 sec</td>
<td></td>
<td>480 fps</td>
<td>68.2 sec</td>
<td></td>
</tr>
<tr>
<td>360 fps</td>
<td>27.2 sec</td>
<td></td>
<td>500 fps</td>
<td>65.5 sec</td>
<td></td>
</tr>
<tr>
<td>400 fps</td>
<td>24.5 sec</td>
<td></td>
<td>600 fps</td>
<td>54.6 sec</td>
<td></td>
</tr>
<tr>
<td>480 fps</td>
<td>20.4 sec</td>
<td></td>
<td>750 fps</td>
<td>43.6 sec</td>
<td></td>
</tr>
<tr>
<td>500 fps</td>
<td>19.6 sec</td>
<td></td>
<td>900 fps</td>
<td>36.4 sec</td>
<td></td>
</tr>
</tbody>
</table>

* Audio are not recorded.

SSD cartridge slots
- (For FT-ONE2T/FT-ONE-1TL option)
  - No of slots: 2
  - Replacement method: Hot-swap supported with no access

Intercom system
- COMMUNICATION: 25-pin D-sub (female) x 1
  - Intercom x 2 lines (ENG/PROD) if 4WIRE or 2WIRE selected.
  - PGM 2 lines
  - GPI 2 inputs (Default: R TALLY IN, G TALLY IN)
- HEAD SET: 4-pin XLR (male) x 1 (For intercom connection)
- INTERCOM IN1, IN2: 3-pin XLR (male) x 2 (when Clear-Com is selected)
Interface

LAN
100BASE-TX/1000BASE-T RJ-45 x 1
(For FT-1RUA/RUB and FT-1RCP connection)

Optical camera cable connector
Manufactured by Lemo

Flicker correction (Option)
Applicable to live and recorded footage in built-in memory and SSD cartridges, in real time. (Not applicable to VF-OUT and HD-SDI 1/2) FT-1RUA/RUB required for flicker correction control.

Temperature
0°C to 40°C

Humidity
30% to 85% (no condensation)

Power
AC IN: 100 V to 240 V AC
* Camera power supply is available using a camera optical cable (max: 1 km).

Power consumption
Single operation: 268 W (at 100-120V)
268 W (at 220-240V)
If camera head is connected: 389 W (at 100-120V)
381 W (at 220-240V)

Dimensions
430 (W) x 88 (H) x 500 (D) mm (excluding projecting parts)

Weight
15.4 kg

Consumables
Cooling fan (P-1546-2): Replace every 4 years (at normal temperature)
Button battery (for memory backup) CR2032
: Replace every 5 years (at normal temperature)
Fuse: Slow blow 5.2x20 mm, 5.0 A / 250 V

SSD Cartridge (Option) Specifications

<table>
<thead>
<tr>
<th>Model</th>
<th>FT-ONE2T</th>
<th>FT-ONE-1TL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Capacity</td>
<td>76,000 frames</td>
<td>38,000 frames</td>
</tr>
<tr>
<td>Recording speed</td>
<td>Apr. 27 sec/1,000 frames</td>
<td>Apr. 27 sec/1,000 frames</td>
</tr>
<tr>
<td>Playback frame rate</td>
<td>60 fps (max)</td>
<td>60 fps (max) *</td>
</tr>
<tr>
<td>Weight</td>
<td>0.6 kg</td>
<td>0.6 kg</td>
</tr>
</tbody>
</table>

* In rare cases, a frame may be output twice when playing back at a frame rate higher than 15 fps.
Dimensions
FT-ONE-LS (Camera Head)

(All dimensions in mm)