

Full 4K Variable Frame Rate Camera

FT-ONE/FT-ONE-OPT

FOR.A[®]
INNOVATIONS IN VIDEO
and AUDIO TECHNOLOGY

FULL 4K VARIABLE FRAME RATE CAMERA

FT-ONE FT-ONE-OPT



Award winning: Government Video magazine "2013 Government Video Salute Award"
Motion Picture and Television Engineering Society of Japan "MPTE Award 2013",
"Technology Development Award 2012"
BIRTV 2013 China "BIRTV 2013 Award"
TV Technology Europe "STAR Award 2012"
TVB Europe "Best of IBC 2012"

The ultimate 4K solution for super-slow motion

The world's first* high-speed camera designed for super-slow-motion acquisition at 4K resolution (4096 × 2160 pixels) up to 900 frames per second (fps). The FT-ONE incorporates the groundbreaking FT1-CMOS, a global shutter CMOS color sensor which was developed by FOR-A to provide superior resolution and sensitivity. RAW material is recorded at high speed to the internal RAM memory, which holds nearly 10 seconds of 4K content shot at 900 fps. For convenience, material can then be transferred to optional internal SSD cartridges. Unleash your creativity with this unprecedented innovation in super-slow-motion video at 4K resolution.



*According to internal research as of May 2012.

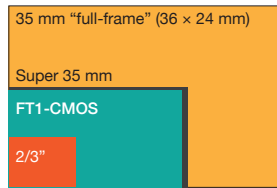
FT-ONE Highlights

Advanced FT1-CMOS sensor

- Equipped with Full 4K high-sensitivity CMOS color sensor FT-1CMOS.
- Equivalent in size to that of super 35 mm sensors.
- Offers outstanding sensitivity, responsiveness, resolution and transfer speed.
- Fast 900 fps shooting at 4K (2000 fps shooting at HD mode)
- Material is stored in internal memory in real time.
- The frame rate is also adjustable (24 fps min. base level).
- 11-stop dynamic range. ISO 640 sensitivity ensures stable, extremely low-noise results.



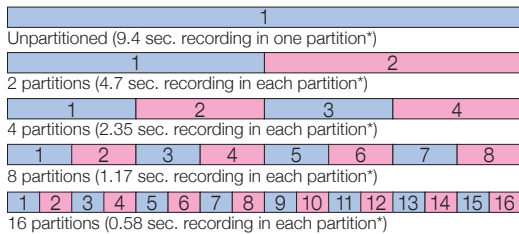
Groundbreaking FT1-CMOS sensor



Sensor comparison (actual size)

Storage partitioning

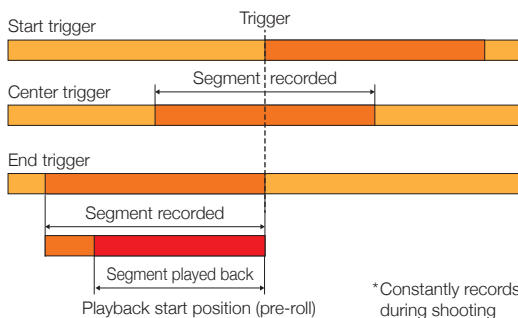
- The internal memory can be used as a single partition or divided into 2 to 16 partitions for simultaneous recording or playback.
- In continuous recording, material can be left intact before recording the next segment. Partitioning allows you to record new scenes while playing back scenes already stored in other partition.



*Maximum recording time at 900 fps

Versatile trigger support

- Constant image capture begins as soon as the FT-ONE is turned on.
- Pressing a trigger that can be set to record from the start, center or end of the event to be captured, starts recording to internal memory. Choose the optimal recording trigger for the subject or scene.
- With the pre-roll function, playback starts from the specified position, keeping playback focused on required segments.



Global shutter system

- Counteracts rolling shutter artifacts that might otherwise occur with fast motion.
- Capture instantaneous subject movement in crisp detail at 4K resolution.

Simultaneous 4K recording/playback

<FT-ONE>

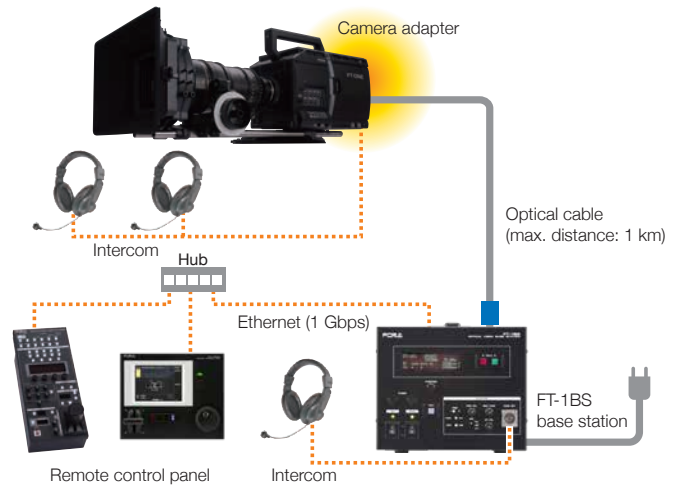
- Real-time 4K output. Auto-switched from real-time output to playback when slow motion playback.
- 3G-SDI x 4 output for 4K resolution
- HD-downconverted VF OUT and AUX output
- Menu can be displayed on VF OUT.

<FT-ONE-OPT>

- 2-ch simultaneous 4K (QFHD) output (CH A and B)
- CH A for live, and CH B for slow motion playback output.
- Output for return RET 1, RET 2 as well as VF OUT and AUX output.

Model with Fiber-Optic Connectivity FT-ONE-OPT

- Inheriting the features of FT-ONE, offers the extra mile by carrying camera signals much farther via optical cable.
- Base station FT-1BS can power the FT-ONE-OPT(max. distance: 1 km)
- Supports genlock signals
- Intercom for broadcast scenarios or emergencies
- Switchable output: VF OUT, RET 1/2



HD capturing mode (FT-ONE-OPT)

- Max. 1670 fps in 1920x1080 resolution, and max. 2000 fps in 1920 x 888 resolution.
- 4 outputs of each CH A and CH B. OUT 1 and 2 for HD-SDI, and OUT 3 and 4 for 3G-SDI.

Others

- Genlock input
- 12-axis color correction

Options

SSD Cartridge FT-ONE2T/FT-ONE-1TL

- Transfer material recorded on the FT-ONE to an SSD cartridge.
- One FT-ONE2T cartridge holds up to 84 seconds of material.
- An economical cartridge with half the capacity is also available: FT-ONE-1TL.*
- The FT-ONE accommodates two cartridges which can hold nearly 3 minutes of material in all.
- Switch the hot-swappable cartridges as needed when shooting.

*Not suitable for real-time playback, due to low frame rates.



SSD compartment (left side of the camera)



FT-ONE2T: SSD Cartridge

Cartridge Docking Station FT-1CDS

- Provides USB 3.0 connectivity between the FT-ONE SSD Cartridge (FT-ONE2T or others) and a computer.
- Copy material from the SSD cartridge directly to storage on the computer or to an attached HDD or SSD
- Color gamut adjusting, 3D-LUT creating, and easy computer-based playback of material on the SSD cartridge
- Can be used outdoors when powered via the IDX battery mount.



Remote Control Unit FT-1RU/RUA

- Includes direct recording and playback buttons, as well as a rotary encoder and touch-panel for a range of settings.
- Facilitates camera setup, recording, and playback.
- FT-1RUA with a playback controller with a fader control



Remote Control Panel FT-1RCP/FT-1RCP-J

- Real-time remote image adjustment for FT-ONE material.
- Efficient, intuitive adjustment via dedicated buttons for iris, pedestal, gain, and other settings.
- In conjunction with the FT-1RU, offers powerful support for FT-ONE cameras.



4K Extraction System ZE-ONE

Award winning:
TVB Europe
"Best of IBC 2013"



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



* Control software for Windows 7 or Windows 8 computers is provided to enable touch and mouse operations.

- Extract HD (1080i or 720p) output from QFHD (1080p × 4) input
- Isolate and enlarge the action in scenes
- Easy touchscreen-based framing and extraction
- Smoothly zoom in or out
- Compatible with FT-ONE high-speed 4K cameras
 - Simulate dynamic and flowing camera-work by setting desired replay extraction points and frame sizes
 - Perfect for capturing the excitement by zooming in to the action in slow-motion replays
- Includes an embedded audio delay processor (16 channel)

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 purposes.



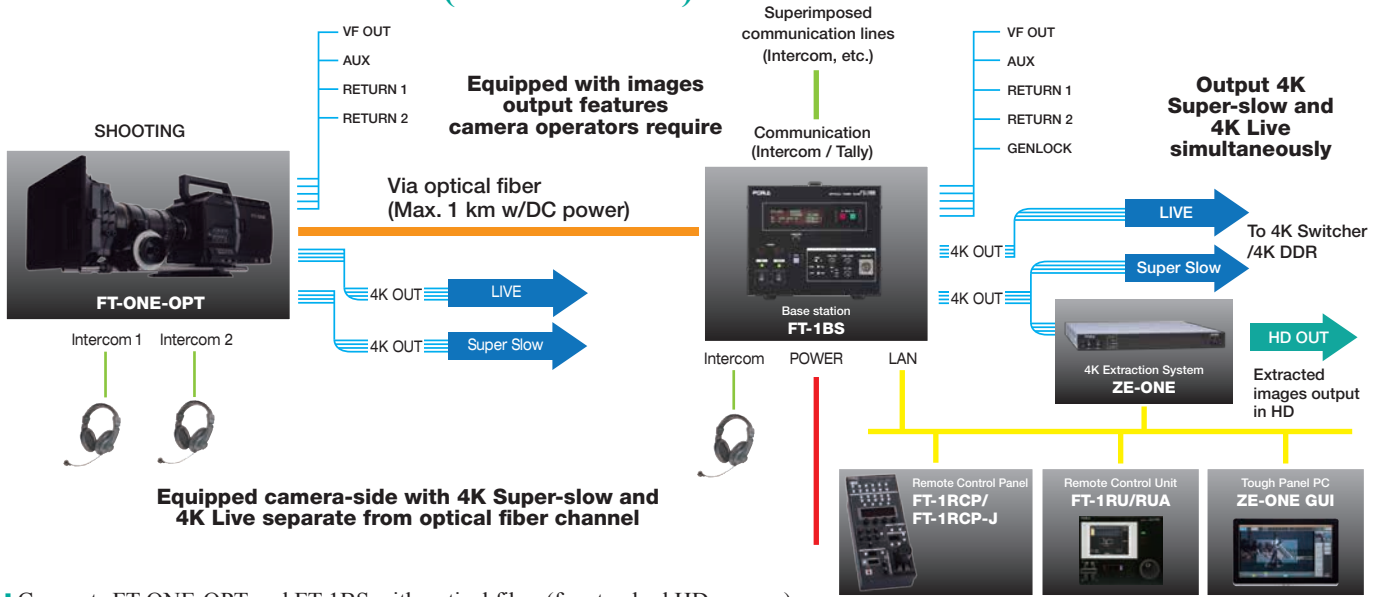
Base Station FT-1BS

- Base station for fiber-optic connectivity.
- Supplies power to the FT-ONE-OPT with max. distance of 1-km.
- Simultaneous video transfer of 2-ch 4K and 2-ch HD. The intercom system (clear-com, 2W/4W, RTS) contains 2-ch PGM and standby income.



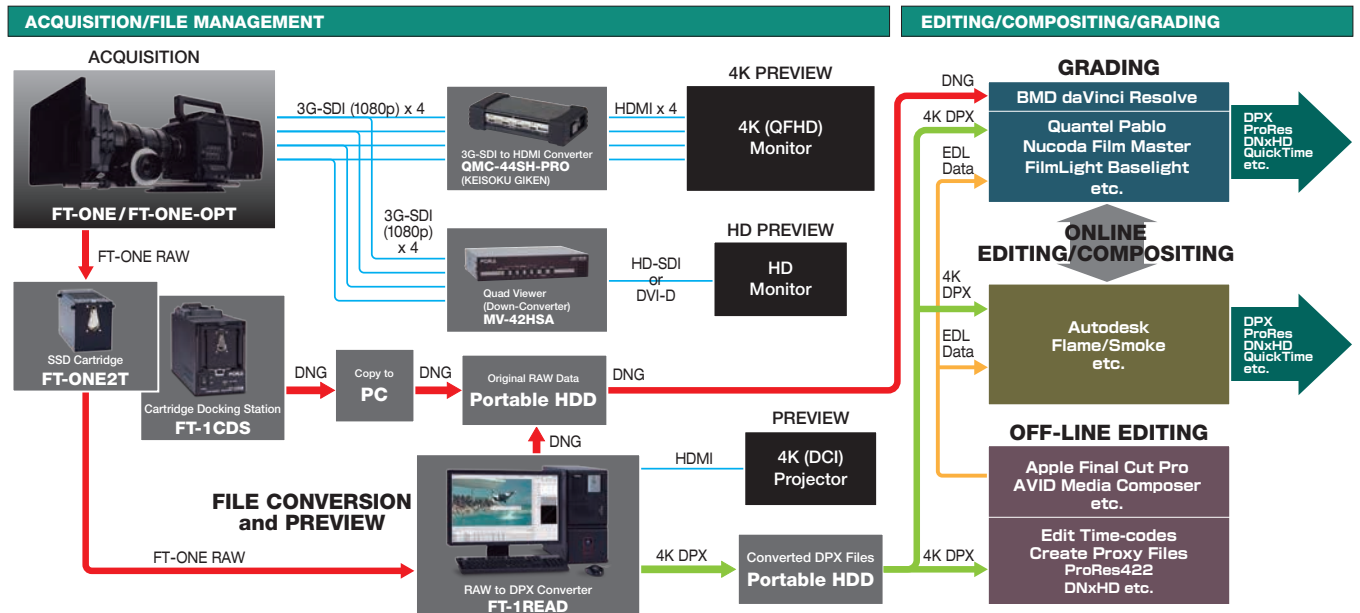
FT-ONE/FT-ONE-OPT Workflow

Live Production Workflow (FT-ONE-OPT)



- Connects FT-ONE-OPT and FT-1BS with optical fiber (for standard HD camera)
- Power supply and signals of captured video, return-video, incomes and other peripherals are all transferred via the optical fiber.
- FT-ONE-OPT and FT-1BS simultaneously output live and slow-motion playback.
- Records and plays with remote control unit FT-1RU or FT-1RUA.
- Video effect of gain and pedestals controls with remote control panel FT-1RCP or FT-1RCP-J.
- 4K to HD extraction available with ZE-ONE when slow-motion playback

DI (Digital Intermediate) Workflow (FT-ONE/FT-ONE-OPT)

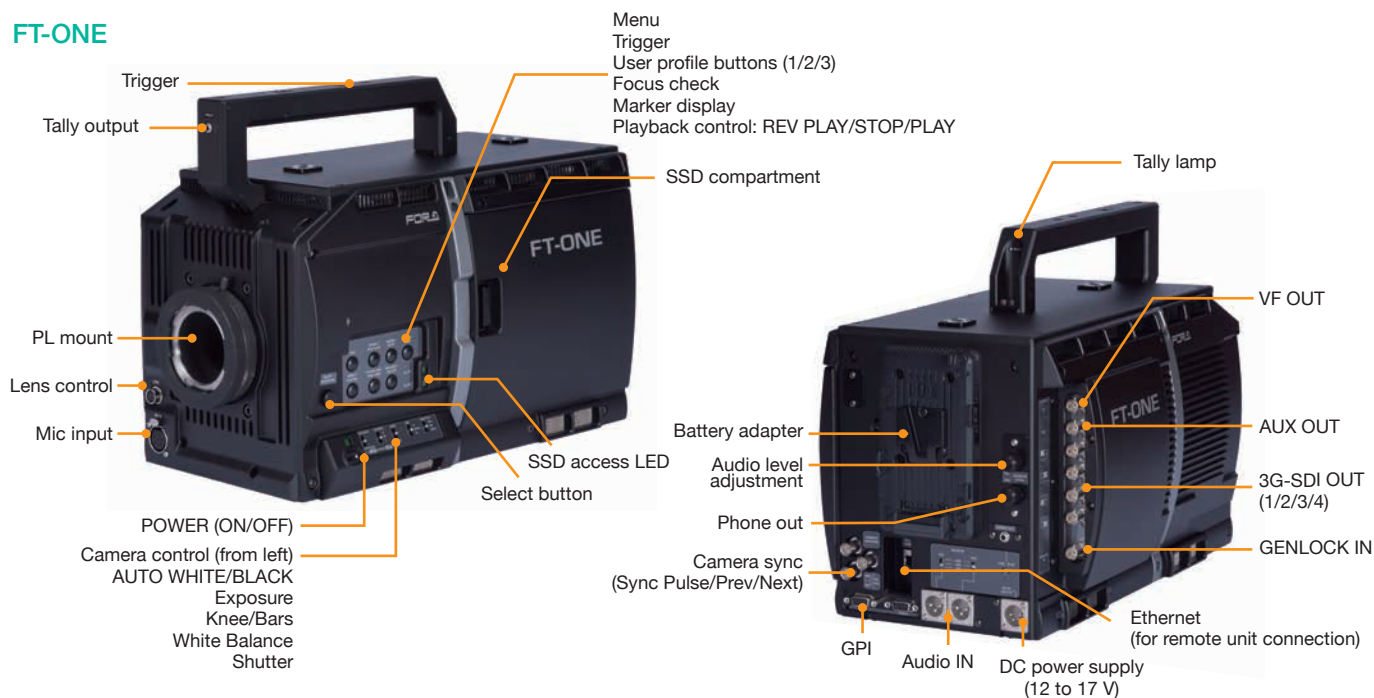


- Easy Previewing with 4K and HD outputs on FT-ONE
- Copying of FT-ONE captured video data from SSD cartridge to PCs (transform DNG to DPX when copying)
- 3D-LUT creation with captured video color chart available by FT-1READ.
- Proxy video generation for off-line editing, DNG or DPX file attached to time-code.
- EDL data generated at off-line editing sent to color grading and online editing.

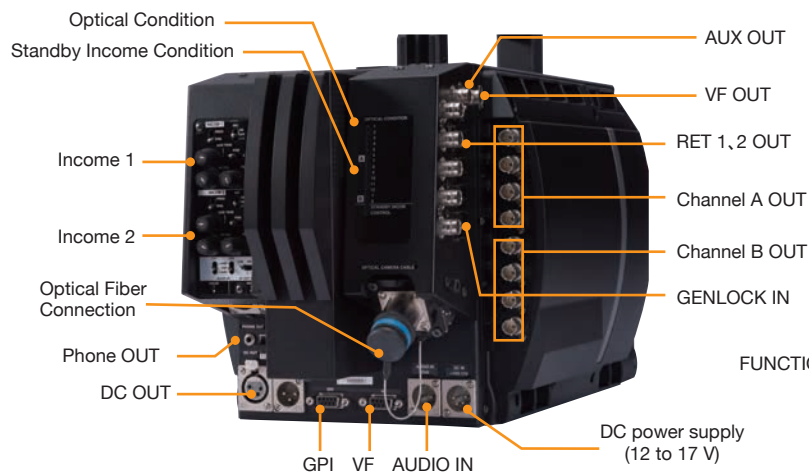
Exterior/Parts Guide

Note: Unlabeled interfaces are not used (only for maintenance)

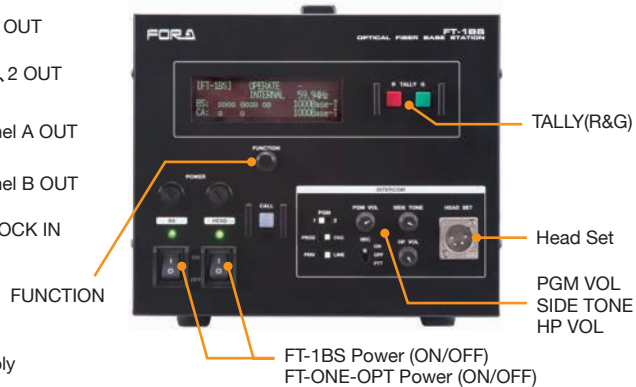
FT-ONE



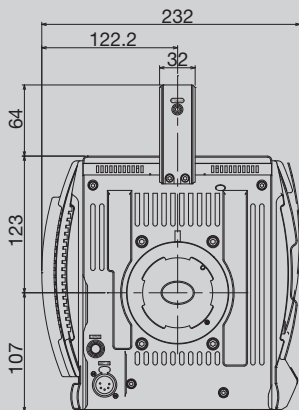
FT-ONE-OPT: Model with Fiber-Optic Connectivity



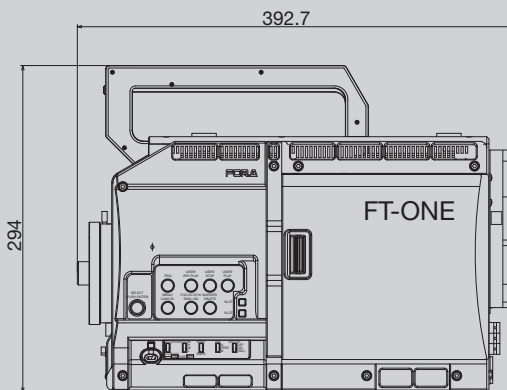
FT-1BS: FT-ONE-OPT Base station (optional)



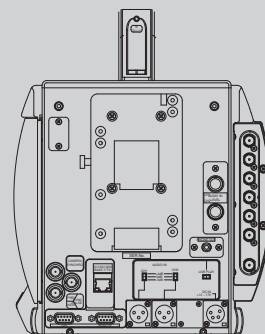
FT-ONE External Dimensions



Front



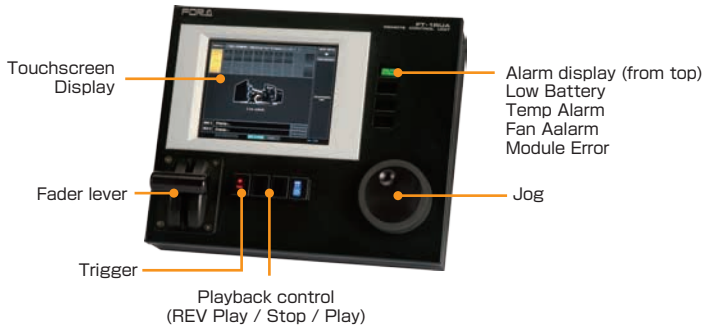
Left side



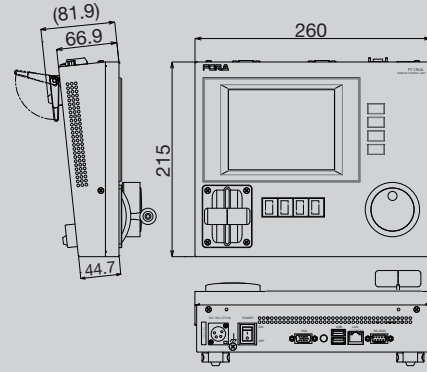
Rear

FULL 4K VARIABLE FRAME RATE CAMERA FT-ONE/FT-ONE-OPT

FT-1RUA: Remote Control Unit (optional)



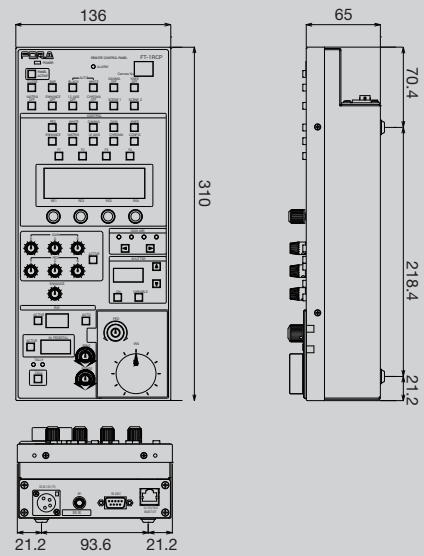
FT-1RUA External Dimensions



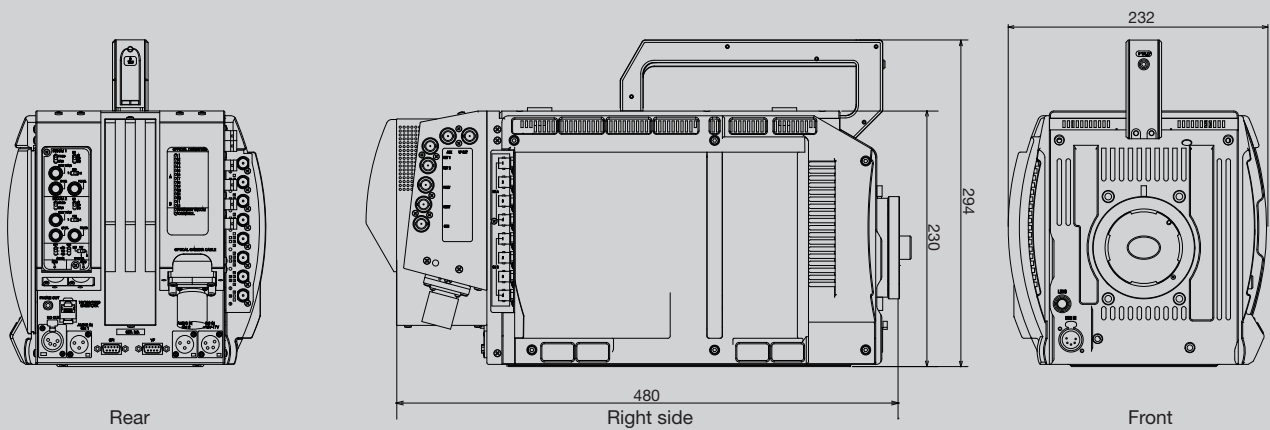
FT-1RCP-J: Remote Control Panel (optional)



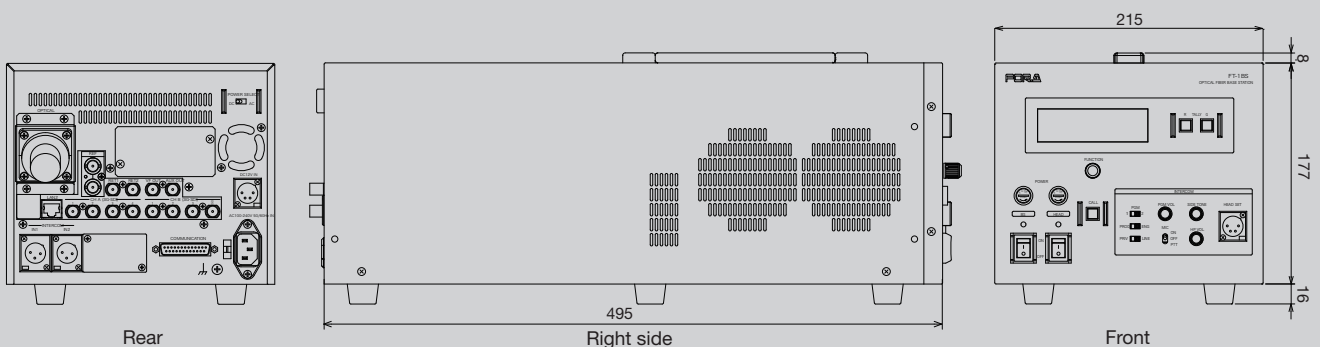
FT-1RCP-J External Dimensions



FT-ONE-OPT External Dimensions



FT-1BS External Dimensions



Specifications

	FT-ONE	FT-ONE-OPT
Camera Section		
Sensor	FT1-CMOS	
Effective resolution	4096 x 2304 (4096 x 2160 DCI-compliant)	
Sensor size	Super 35 mm-equivalent	
Color filter	RGB Bayer	
Shutter mechanism	Global shutter	
Quantization	12bit x RGB	
Sensitivity	ISO 640	
Dynamic range	11 STOPS	
Shutter speed	1/frame rate to 1/50,000sec.	
Lens mount	PL mount	
Recording Section		
Frame rate/recording time	See table below	
Partitioning	1 to 16 spaces	
Trigger method	START 10% to 45%, CENTER 55% to 90%, END setting available	
	Pre-roll function: Adjustable playback position	
Trigger signal input	Buttons on camera or remote control (optional)	
SSD Cartridge (FT-ONE2T)		
Capacity	Approx. 2 TB (accepts two 2 TB cartridges, for a total of 4 TB)	
Recording time	Equivalent to 76,000 frames of RAW material per cartridge	
Transfer from internal memory	1,000 frames in approx. 45 sec.	
Cartridge replacement	Hot-swappable (unused cartridge only)	
Video settings		
Gain	Digital gain: 0.0 dB to 42.0 dB (+0.5 dB increments) Analog gain: 0 dB, 3 dB, 6 dB, 9 dB, 12 dB	
White balance	PRESET: 3200K, 5600K, 6500K, 9300K AUTO WHITE: Semiautomatic correction, by shooting a white subject USER A / USER B: User profiles A/B	
Pedestal	Black level set via R, G, B, Master	
Linear matrix color correction	RB, RG, GR, GB, BR, and BG	
12-axis color correction	R, R-Ye, Ye, Ye-G, G, G-Cy, Cy, Cy-B, B, B-Mg, Mg, Mg-R	
Gamma	r1, r0.45, r0.50, HDTV, CINEMA, LOG	
Knee	Knee point and Knee slope setting	
Enhancement	On/Off, horizontal (H), vertical (V), Coring	
Video Output		
4K video output	Quad output of 3840 x 2160 video signals, 3G-SDI (Level-A) 75Ω BNC x 4 Output formats: 1080/59.94p, 1080/50p	Quad output of 3840 x 2160 video signals, 2-channel (CH A, CH B), 3G-SDI (Level-A) 75Ω BNC x 8
HD video output	—	1920 x 1080 video signals, 2-channel (CH A, CH B), 2-distribution for each channel, HD-SDI 75Ω BNC x 4 3G-SDI 75Ω BNC x 4
	—	OUT 1 and 2 for CH A and CH B: 1080/59.94i, 1080/50i OUT 3 and 4 for CH A and CH B: 1080/59.94p, 1080/50p
VF/auxiliary output	HD-SDI x 2 - VF output x 1 - AUX output x 1 (Downconverted signals of 4K material, with menus and markers layered on VF output) Formats: 1080/59.94i, 1080/50i	HD-SDI x 2 - VF, RET1, or RET2 selectable - AUX output x 1
Return output	—	HD-SDI x 2 (RET 1, RET 2)*1
Genlock input	BB: NTSC: 0.429 Vp-p/PAL: 0.45 Vp-p or Tri-level Sync: ±0.3 Vp-p x 1 Genlock modes: Internal or external sync (BB or Tri-level Sync)	

Audio Input		
	Audio embedded on SDI outputs No audio recording on camera or SSD cartridge.	
MIC IN	5-pin XLR (female) x 1 (1 stereo pair), balance, highimpedance Input level: -60 dBu / -50 dBu / -40 dBu Phantom power supply: +48 V / OFF	
AUDIO CH1 / CH2	3-pin XLR (female) x 2 (1 stereo pair), balance, highimpedance Input level: -3 dBu / 0 dBu / +4 dBu	
Audio Output		
Embedded Audio	2 ch (1 stereo pair), 48 kHz, balance	
Headset	3.5 mm stereo mini-jack x 1 (1 stereo pair)	
External Interfaces		
Ethernet	10/100/1000Base-T/TX x 1 (for connection with remote control unit)	
Iris control	12-pin (female), HR10A-10R-12S (71) (HIROSE ELECTRIC CO., LTD.), manual/auto	
Tally	At handle, 3.5 mm mini-iphonejack x 1: +5 V, within 300 mA	
GPI	9-pin D-sub (female)	
Intercom	—	2-channel Dynamic microphone headset or carbon microphone supported
General Specifications		
Temperature	0 °C to 40°C	
Humidity	30% to 85% (no condensation)	
Power	+12 V DC to +17 V DC (battery or external power supply)	+12 V DC to +17 V DC (deliverable up to 1 km over fiber optic cables)
Consumption	160 W (with full options: 180 W)	212 W (with full options: 232 W)
Dimensions	232 (W) x 294 (H) x 392.7 (D) mm (excluding projecting parts)	232 (W) x 294 (H) x 480 (D) mm (excluding projecting parts)
Weight	7.5 kg (with full options: 8.6 kg)	13 kg (with full options: 14.1 kg)
Other Specifications		
Accessories	Operation manual, Dedicated AC adapter	
Consumables	Cooling fan: Replace every 4 years (at room temperature) Button cell (for memory backup) CR 2032: Replace every 5 years (at room temperature)	
Options	FT-1RU/FT-1RUA Remote Control Unit FT-1RCP/FT-1RCP-J Remote Control Panel FT-ONE2T SSD cartridge (approx. 2 TB), FT-ONE-1TL Lowcost SSD cartridge (approx. 1 TB) FT-1CDS Cartridge Docking Station FT-1READ RAW → DPX converter — FT-1BS Fiber-Optic Base Station	
	*1 available when the FT-1BS is connected	

Frame rate / Standard recording time / Video clip size

4K High Speed	Frame rate	24 fps	60 fps	120 fps	180 fps	240 fps	300 fps	360 fps	420 fps	480 fps	540 fps	600 fps	720 fps	760 fps	780 fps	810 fps	860 fps	900 fps*2		
	Standard recording time	352.5 sec.	141.7 sec.	70.8 sec.	47.2 sec.	35.4 sec.	28.3 sec.	23.6 sec.	20.2 sec.	17.7 sec.	15.7 sec.	14.2 sec.	11.8 sec.	11.2 sec.	10.9 sec.	10.5 sec.	9.8 sec.	9.4 sec.		
Video clip size	4096 x 2304 pixels																4096 x 2160 pixels			
HD High Speed	Frame rate	24 fps	60 fps	120 fps	180 fps	300 fps	360 fps	420 fps	480 fps	600 fps	720 fps	840 fps	1000 fps	1200 fps	1440 fps	1670 fps	1680 fps	1800 fps	1980 fps	2000 fps
	Standard recording time	749.8 sec.	299.9 sec.	149.9 sec.	99.9 sec.	59.9 sec.	49.9 sec.	42.8 sec.	37.4 sec.	29.9 sec.	24.9 sec.	21.4 sec.	17.9 sec.	14.9 sec.	12.4 sec.	10.7 sec.	10.7 sec.	9.9 sec.	9.0 sec.	8.9 sec.
Video clip size	1920 x 1080 pixels																		1920 x 888 pixels	

*2 : Planned for future support



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