Panasonic
BUSINESS

AK-UC4000
4K Studio Camera

A High End System Camera
Setting a New Standard in
4K/HD HDR Acquisition
A 4K studio camera with high video quality. Compatible with a 2/3 lens mount and contains a newly developed large 4.4K sensor.

This camera offers the high video quality that is only possible with a large sensor, along with a wide range of 4K acquisition with the latest functions such as HDR, BT.2020 and high-speed shooting*. The camera keeps up with diversifying systems with features such as 12G-SDI, TICO*, over SDI (4K over 3G-SDI) output and MoIP*, making it suitable not only for studio production but for a wide range of operations such as sports and events. With high video quality and a system that can be adapted to various situations, this camera provides the level of high-end production that is needed in the 4K age.


High Resolution

This camera has a newly developed large 4.4K sensor. Beyond 4K sampling is used to achieve an ultra-high-definition resolution of 2000 TV lines.

12G-SDI / TICO

UHD 12G-SDI* output (x2) and TICO over SDI output (x1) included as a standard feature.

* Quasi-Link 3G-SDI output is also available.

High Speed

Supports high-speed 2x, 3x or 4x output in HD mode*1 at 1080p, 1080i and 720p simultaneously with standard (1x) output.*2

*1: When in HD Hi-Speed mode. *2: Requires a firmware upgrade scheduled for release in the fall of 2018.
Large 4.4K sensor
With a newly developed 4.4K sensor, it realizes ultra-high-definition resolution, high sensitivity, low noise and a wide dynamic range.

B4 mount
The 2/3 lens can be used without an external adapter, and the internal lens is specially designed for large sensors, ensuring high video quality. This new acquisition method maximizes the effectiveness of incident light.

2000-TV line resolution
Beyond 4K sampling achieves a resolution of 2000 TV lines in the horizontal and vertical directions for a richly detailed picture of a wide range of subjects in a variety of settings.

Supports 3 levels of high-speed output*1 in HD mode*2
High-speed capture at 1080p, 1080i and 720p is available for sports and other active settings. This feature achieves a richly detailed picture even for fast-moving subjects. 2x, 3x or 4x output can be selected for compatibility with various slow-motion servers.

Future proof infrastructure in AK-UCU600 (CCU)
This camera supports the uncompressed 12G-SDI output that is needed in the 4K age and enables 4K video to be transferred with one cable. Light compression technology called TICO*1 is also used, enabling 4K video to be sent by 3G-SDI without losing video quality, so that the current HD infrastructure can be used in 4K systems. It is also expected to support the next generation of MoIP (Media Over IP)*2.

*1: Requires a firmware upgrade scheduled for release in the fall of 2018.
*2: Optional feature with a charge, scheduled for release in the spring of 2019.
**High-quality video and excellent operability**

With the AK-UCU600 Camera Control Unit (CCU), uncompressed long-distance transmission of 4K/HD video signals via optical fiber is supported. The AK-HRP1000GJ/1005GJ Remote Operation Panel (ROP) is equipped with both a color LCD display that provides excellent visibility and functions for quick response. This system achieves high-quality video and excellent operability. In cases where power is supplied by the CCU, it is possible to transmit at a long distance of up to approx. 2,000 m between the camera and the CCU. The distance can be extended up to 10,000 m*1 by providing a local power supply at the camera head and using general-purpose single mode optical fiber. Between the CCU and the ROP, in addition to a dedicated serial line, IP connection via LAN cable is also supported.

**High sensitivity and low noise**

The AK-UC4000 is equipped with a newly developed large-format 4.4K MOS sensor. Two shooting modes can be selected. In High Sense Mode, it is possible to obtain an S/N ratio of 62 dB*2 or higher while also achieving F10 high sensitivity. The result is low-noise and high-image-quality video.

**Skew reduction realized through high-speed scans**

This camera’s normal and low skew reading speeds are around 1/2 and 1/3 of those on a standard camera (1/60 of a second) respectively. The skewing characteristic of MOS sensors has been reduced by reading out the MOS sensor signal at high speed.

**Chromatic Aberration Compensation (CAC)**

This exclusive technology utilizes communication between the lens and camera to deploy a sophisticated algorithm that will automatically compensate for the registration error caused by lens chromatic aberration, and minimize the circumjacent blur.*3

**HDR (High Dynamic Range) compatibility**

This mode provides rich gradation to render contrast, color and shadow in dark image areas that could not previously be reproduced due to blackout, thus resulting in more realistic image quality. It supports a variable HDR by adjusting the high dynamic range. In addition, it is possible to configure a system supporting simultaneous HDR/SDR in order to handle production environments with both. SDR image can be adjusted over exposed by offset gain and knee function adjusts bright image as well as HDR.

**ITU-R BT.2020**

This camera is compatible with BT.2020, a color space that can recreate almost every color in the natural world, enabling a wider range of color expression.

**Shockless gain**

It is possible to smoothly transition the image changes that occur when gain is changed. In addition, with the 0.1 dB step master gain adjustment function, you can fine tune the adjustments to match the scene being shot.

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*1: Adverse conditions, additional patching and longer runs will require repeater devices.
*2: During HD output
*3: For software supporting Chromatic Aberration Compensation (CAC) file, please download from "Software download" on Panasonic website: [https://pro-av.panasonic.net/en/](https://pro-av.panasonic.net/en/)
### Diverse color correction functions

In addition to EBU and NTSC preset color matrix, camera users can save two custom specified linear matrix tables, and additionally tune the saturation and hue individual colors with 12-pole color correction system. Specific skin tones can also be adjusted in addition to the primary secondary and tertiary colors in the 12-pole system.

### Extensive video and data transmission (TRUNK) functions

Since video and data can be transmitted between the camera and a Camera Control Unit (CCU) using optical fiber cable alone, system expansion to match operation conditions is possible.
- HD SDI (CCU→camera) two lines, VBS (CCU→camera) two lines: Can be used for monitoring with prompter, fixed return or camera (studio floor monitor), etc.
- HD SDI (camera→CCU) one line: This line can be used to transmit an additional video signal of a handheld or remote camera to the studio. Since the camera video input is equipped with a frame synchronizer, asynchronous video signals can also be used.
- LAN (1000BaseT) one line: To be used to control external devices and remote cameras by IP protocol. Transmission of streaming video is also supported.
- DATA (RS422A or RS232C) two lines: Can be used to transfer lens and pedestal position data in a virtual system.

### Skin Tone Detail Correction

Tone down wrinkles and blemishes in on air personalities to beautifully shoot natural skin tones. While designed to soften skin tones the skin tone detail feature can be applied to any hue phase so it could likewise be used to soften areas of other colors (such as green grass). The skin tone detail feature can define three independent skin tone ranges to manage different light levels or different people on camera. Skin-tone-get feature finds a specific color in frame to simplify the set up process.

### Servo control ND / CC filters

The cameras are equipped with filters for a variety of shooting environments.
- [ND filters] CAP, Through, 1/4, 1/16, 1/64
- [CC filters] Cross, 3200 K, 4300 K, 6300 K, Diffusion

### Focus assist functions

Quick and accurate focusing is supported with focus assist functions such as Focus Bar (indicates focus level), Focus-in-Red (uses color to indicate areas in focus), MAG (magnifies central portion), and Square (shows focus status of screen as a whole). Lenses with auto focus and focus assist capabilities are also supported*1. The Remote Operation Panel (ROP) can also be used to focus and zoom while using the digital lens.

### Camera standalone output formats

For camera head output (HD SDI 1/HD SDI 2), it is possible to select 1080p, 1080i, and 720p.
The CCU supports not only UHD and HD simultaneous output, but also enables high-speed output\(^1\) up to 240p in HD mode\(^2\) to be performed simultaneously with standard (1x) output, while still having a compact size.

- Contains a dual UHD 12G-SDI system, and supports 3G-SDI quad link with quadrant or two-sample interleave.
- Optical fiber transmission of uncompressed video signals over a distance of approx. 2,000 m between camera and CCU\(^3\).
- The compact, lightweight unit measures 2U in height and is rack-mountable.

### Supported formats

<table>
<thead>
<tr>
<th>UHD</th>
<th>HD High Speed(^2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>3840x2160/59.94p, 50p, 29.97p, 25p, 23.98p, 29.97PsF, 25PsF, 23.98PsF &amp; over 59.94i</td>
<td>1080/59.94p, 50p, 59.94i, 50i, 23.98p over 59.94i, 29.97PsF, 25PsF, 23.98PsF &amp; over 59.94i, 720/59.94p, 50p</td>
</tr>
<tr>
<td>HD</td>
<td></td>
</tr>
<tr>
<td>1080/59.94p, 50p, 59.94i, 50i, 23.98p over 59.94i, 29.97PsF, 25PsF, 23.98PsF &amp; over 59.94i</td>
<td>1080/59.94p-240fps, 180fps, 120fps, 1080/50p-200fps, 150fps, 100fps, 1080/59.94-240fps, 180fps, 120fps, 1080/50-200fps, 150fps, 100fps, 720/59.94-240fps, 180fps, 120fps, 720/50p-200fps, 150fps, 100fps</td>
</tr>
<tr>
<td>HD High Speed(^2)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1080/59.94p-240fps, 180fps, 120fps, 1080/50p-200fps, 150fps, 100fps, 1080/59.94-240fps, 180fps, 120fps, 1080/50-200fps, 150fps, 100fps, 720/59.94-240fps, 180fps, 120fps, 720/50p-200fps, 150fps, 100fps</td>
</tr>
</tbody>
</table>

\(^1\): When in HD Hi-Speed mode.
\(^2\): Requires a firmware upgrade scheduled for release in the fall of 2018.
\(^3\): When power is supplied from CCU.

### AK-HRP1000GJ
AK-HRP1005GJ

Remote Operation Panel (ROP)

- Two models: 1/4 rack size (AK-HRP1000GJ) and 1/5 rack size (AK-HRP1005GJ).
- LCD panels with enhanced visibility.
  - AK-HRP1000GJ: 8.9 cm (3.5 inches) (VGA)
  - AK-HRP1005GJ: 8.1 cm (3.2 inches) (VGA)
- Camera serial control and IP control (RJ45 LAN cable) are possible.
- Supports PoE\(^5\), which can supply power via LAN cable (CAT5e or faster).
- Functions for studio camera scene file registration and retrieval.
- Equipped with SD memory card slot for saving user files, scene file and updating firmware versions.

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* Requires firmware version 4.50 or later. For more details, please see “Service and Support” on the following website: http://pro-av.panasonic.net/en/.
*5: Abbreviation of Power over Ethernet.
AK–HVF100GJ
22.9 cm (9 inches) LCD Color Viewfinder

Equipped with newly designed tilt mechanism and extensive functions such as focus assist and external video input.

- High-resolution 22.9 cm (9 inches) color LCD panel displays full HD 1920 x 1080 pixels
- Focus assist functions (Focus-in-Red, Focus Bar*)
- Detail depends on zoom ratio*
- External HD-SDI (3G SDI) input
- External DC input (+12 V DC)
- Four assignable function buttons
- Contrast, brightness, and peaking are adjustable
- Pan, tilt, and lift structure used

*1: When connected to AK-UC4000.

AK–MSU1000GJ
Master Setup Unit (MSU)

Controls up to 99 CCU units via IP

- IP and serial connections supported.
  - IP connection: Up to 99 units
  - Serial connection: Up to six units
- 7-inch Touch Panel LCD
- Video monitoring function
- HD SDI Input (Monitoring) (1080i)
- Power DC12 V (DC10 V - DC17 V) or PoE+*1 (via PoE+ Hub)

*1: Requires firmware version 4.50 or later. For more details, please see "Service and Support" on the following website: https://pro-av.panasonic.net/en/.

AK–HBU500GJ
Build-up Unit

Enables use of large studio-use lens.

- Smooth camera mounting/removal possible
- Precise optical axis (horizontal/vertical) adjustment structure
- Rear control panel equivalent to that of a large camera
- DC OUT 12V 7.5 A (XLR4-pin)/DC OUT 1.5 A (4-pin)
**Other accessories**

- **AJ-CVF50G**
  38.1 mm (1.5 inches) HD EVF

- **AJ-HVF21KG**
  50.8 mm (2 inches) HD EVF
  59.94 Hz/50 Hz Switchable
  Not available in some areas.

- **AG-CVF15G**
  87.6 mm (3.45 inches) Color HD EVF
  Open two ways for LCD monitor viewing

- **AK-HVF70G**
  17.8 cm (7 inches) LCD Color Viewfinder

- **AJ-MC700P**
  Microphone Kit (monaural)

- **AW-PS551**
  AC Adapter

- **AJ-C10050G**
  Remote Control Cable
  (50 m / 164 feet)

- **SHAN-TM700**
  Tripod Adapter

- **AK-HRVF100GJ**

- **AK-UCU600PJ/UCU600EJ/UCU600PSJ/UCU600ESJ**
  Camera Control Unit

**System Configuration**

- **AK-HVF100GU**
  22.9 cm (9 inches)
  LCD Color Viewfinder

- **4K Studio Camera**
  AK-UC4000GJ/UC4000GJ

- **Tripod Adapter**
  SHAN-TM700

- **Optical Fiber multi Cable**
  Max 2,000 m

- **SD memory card**

- **Lens operation system**

- **2/3-type 4K or HD Lens**

- **2/3-type 4K or HD Lens**

- **Build-up Unit**
  AK-HBU500GU

- **Remote Operation Panel**
  *5: Requires firmware version 4.50 or later. For more details, please see "Service and Support" on the following website [https://pro-av.panasonic.net/en/].

- **Master Setup Unit**
  *5: Requires firmware version 4.50 or later. For more details, please see "Service and Support" on the following website [https://pro-av.panasonic.net/en/].
Specifications

AK–UC4000GJ/UC4000GSJ

Power Supply
DC 12 V (when using an external power supply)
AK-UC4000EJ/UC4000GPSJ/UC-UC4000EJ

AC 240 V, 50 Hz/60 Hz (when connecting to an AK-UC4000PJ/ AK-UC4000EJ/UC-UC4000GPSJ/UC-UC4000EJ)

Power Consumption
119 W (maximum for the camera only, when connecting to an external 12 V) 360 W (when connecting to an AK-UC4000PJ/AK-UC4000EJ/AK-UC4000GPSJ/AK-UC4000EJ)

Operating Temperature
–10 °C to 45 °C (14°F to 113°F)
(Preheating required under a temperature 0 °C [32 °F] or below)

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

Operating Humidity
85% or less (relative humidity)

Weight
Approx. 4.5 kg (9.92 lb) (body only, excluding the accessories)

Dimensions (W x H x D)
Body only 151 mm x 267 mm x 371.5 mm
(5-31/32 inches x 10-17/32 inches x 14-21/32 inches)
(excluding protrusions)

Pickup Device
11.14 megapixels, MOS x 1

Optical Filter
CC: 3200 K, 4300 K, 6300 K, Cross, Diffusion
ND: CAP, Clear, 1/4, 1/16, 1/64

Lens mount
2/3-type bayonet

Sensitivity
Two shooting modes
[HIGH SENS]: F10 (59.94 Hz)/F11 (50 Hz)
[NORMAL]: F6 (59.94 Hz)/F7 (50 Hz)
2000 lx, 3200 K, when white reflectivity is 89.9%

Horizontal Resolution
4K: 2000 TV lines or above (center)
AK-UC4000PJ/UK4000EJ/UK-UC4000GPSJ/
AK-UC4000EJ output
HD: 1000 TV lines or above (center)

S/N
62 dB or above

Horizontal Modulation
50% or above (27.5 MHz)

Gain switching
[NORMAL]: –6, –3, 0, 3, 6, 9, 12, 15, 18, 21, 24, 27, 30, 33, 36
[HIGH SENS]: –6, –3, 0, 3, 6, 9, 12, 15, 18, 21, 24, 27, 30, 33, 36

Shutter speed
• [59.94]/[59.94]) mode: 1/100, 1/120, 1/125, 1/250, 1/500, 1/1000, 1/2000
• [29.97] mode: 1/48, 1/50, 1/60, 1/96, 1/100, 1/120, 1/125, 1/250, 1/500, 1/1000, 1/1500, 1/2000
• [23.98] mode: 1/48, 1/50, 1/60, 1/96, 1/100, 1/120, 1/125, 1/250, 1/500, 1/1000, 1/1500, 1/2000
• [50]/[50]) mode: 1/60, 1/100, 1/125, 1/250, 1/500, 1/1000, 1/1500, 1/2000
• [25]) mode: 1/48, 1/50, 1/60, 1/96, 1/100, 1/125, 1/250, 1/500, 1/1000, 1/1500, 1/2000

<HD SD1> terminal
BNC x 1
3G/1.5G-SDI: 0.8 V [p-p], 75 Ω

<HD SD2> terminal
BNC x 1
3G/1.5G-SDI: 0.8 V [p-p], 75 Ω

<AUX> terminal
BNC x 1
Functions as an HD TRUNK terminal/Prompter output terminal by switching the setting in the menu
<HD TRUNK>: 1.5G-SDI: 0.8 V [p-p], 75 Ω
<PROMPTER2>: VBS signal 1 V [p-p], 75 Ω

<G/L IN/PROMPTER OUT> terminal
BNC x 1
<G/L IN>: Tri-level SYNC or BB (black burst)
<PROMPTER OUT>: VBS signal 1 V [p-p], 75 Ω
Functions as <G/L IN> when standalone, and as <PROMPTER OUT> when connecting to an AK-UC4000PJ/UK-UC4000EJ/UK-UC4000GPSJ/
AK-UC4000EJ

<MIC 1> terminal
XLR x 1, 3-pin (female)
<LINE>/<MIC>/<–48 V> switchable
<LINE>: 0 dBu, ±4 dBu menu selection available
<MIC>: –60 dBu, –40 dBu, or –20 dBu menu can be selected

<RET CTRL> terminal
4-pin x 1

<REMOTE> terminal
10-pin x 1

<TRUNK> terminal
12-pin x 1

<DC OUT> terminal
2-pin x 1, DC 12 V 2.5 A

<LAN> terminal
RJ-45 x 1

<USB2.0> terminal
Type A connector, DC 5 V 0.5 A
Build-up terminal
20-pin x 1

As of February, 2018
## Specifications

### AK-UCU600PJ/UCU600EJ/UCU600PSJ/UCU600ESJ

<table>
<thead>
<tr>
<th>Power Supply</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>AK-UCU600PJK/AKC-UCU600PSJ</td>
<td>100 V - 120 V AC, 50 Hz/60 Hz</td>
</tr>
<tr>
<td>AK-UCU600EJ/KUC-UCU600ESJ</td>
<td>42 V - 57 V DC (PoE power supply)</td>
</tr>
</tbody>
</table>

| Power Consumption           | 500 W (Without camera connected: 90 W) |

| Capacity for Supplying Power to a Camera | 240 V AC (tolerance: ±5%), 1.46 A, 50 Hz/60 Hz |

| Operating Temperature | 0°C to 40°C (32°F to 104°F) |

| Humidity | 10% or less (no condensation) |

| Weight | Approx. 8.8 kg (19.4 lb) |

| Dimensions (W x H x D) | 424 mm x 88 mm x 401 mm (16-5/8 inches x 3-7/16 inches x 15-13/16 inches) (excluding protrusions)** |

| Video Output | 3G-SDI/SDI: 7 lines (embedded audio is supported only for HD signals) HS/SDI: 1 line (shared with picture monitor output)*; embedded audio is supported only for HD signals) Analog composite: 2 lines (1 line shared with picture monitor output*) for details on output formats, see "Supported formats" on page 5. |

| HD TRUNK/TICO Output | HD-SDI: 1 line (HD TRUNK output) 3G/HD-SDI: 1 line (TICO output) |

| Return Input | 3G-HD/HD/SD-SDI: 4 lines (REI input has active-through output) Analog composite: 1 line |

| Prompter Input | HD-SDI: 1 line (with active-through output) Analog composite: 2 lines (through output of 1 input and 2 share the connector)* it is not terminated when the unit is turned OFF, no through output. |

| Reference Input | BB (black burst) / tri-level**: 1 line (automatic termination, connect to upper connector; BB signal and tri-level signal automatically recognized, with loop-through output) |

| Microphone Output | 0 dBm/600 Ohm, 2 lines (XLR, 3-pins, male) |

| Communication | Intercom input/output (ENI) / PROD, 0 dBm, 600 Ohm (4 W) / 1 V (p-p), 200 Ohm (RTS), 4 W / 48 Ohm (GCOMP): 2 lines** PGM input (0 dBm/600 Ohm): 2 lines Tally input (red, green, yellow): 1 input each |

| AUX | WFM control 6-bit (open collector output, terminal shared with microphone gain setting)** Camera microphone gain setting input 5-bit (photo-coupler input, terminal shared with WFM control)** Down-conversion system setting input 2-bit (photo-coupler input) |

| TRUNK | RS-422 / RS-232C 2 lines* |

| FRONT ROP | RS-422 1 line, 16 V DC output (only one of this and REAR ROP can be selected at one time via the menu or the [ROP FRONT/REAR] selection switch on the front panel) |

| REAR ROP | RS-422 1 line, 16 V DC output (only one of this and FRONT ROP can be selected at one time via the menu or the [ROP FRONT/REAR] selection switch on the front panel) |

| MSU | RS-422 1 line, GPI for control |

| LAN TRUNK** | LAN connection with camera side via an optical cable* 1 line, 10BASE-T, 100BASE-T |

| LAN | Personal computer connection for distribution via the Web* 1 line, 10BASE-T, 100BASE-T (use a crossover cable when connecting directly with a personal computer) |

### AK-HRV1000GJ/HRP1005GJ

<table>
<thead>
<tr>
<th>Power Supply</th>
<th>12 V DC (input range: 10 V - 16 V DC)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power Consumption</td>
<td>42 V - 57 V DC (PoE power supply)</td>
</tr>
</tbody>
</table>

| Operating Temperature | 0°C to 40°C (4°F to 104°F) |

| Humidity | 90% or less |

| Storage Temperature | -20°C to 60°C (-4°F to 140°F) |

| Weight | Approx. 4.0 kg (8.82 lb) |

| Dimensions (W x H x D) | 482 mm x 222 mm x 81.5 mm (18-3/16 inches x 8-3/4 inches x 3-7/16 inches) (including mounting brackets and dial heights) |

| Video Output | 3G/HD-SDI: 1 line (TICO output) 3G/SDI: 1 line (TICO output) |

| Return Input | 3G-HD/HD: 2 lines |

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<tr>
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</tr>
</tbody>
</table>

| Operating Temperature | 0°C to 40°C (4°F to 140°F) |

| Humidity | 90% or less |

| Storage Temperature | -20°C to 60°C (-4°F to 140°F) |

| Weight | Approx. 0.4 kg (0.88 lb) |

| Dimensions (W x H x D) | 240 mm x 234 mm x 95 mm (9-7/32 inches x 9 inches x 3-7/8 inches) |

| Camera/CCU Control | Control signals (camera, CCU control) Power supply 16 V DC when CCU is connected** Camera/CCU control 12 V DC when camera is connected** |

| Maximum Camera Length | When camera connected: 20 m (66.7 ft) When CCU is connected: 50 m (164 ft) |

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1. **Depending on the setting, one of them can be selected at one time.**
2. The BB (black burst) signal and tri-level sync signal of the reference input are recognized automatically.
3. **Requires a firmware upgrade scheduled for release in the fall of 2018.**
4. IP video cannot be transmitted when [CCU MODE] is set to [2160/23.98PsF], [1080/23.98p], or [1080/23.98PsF].
5. Can be provided from CCU.
Dimensions

AK-UC4000GJ/UC4000GSJ

AK-UCU600PJ/UCU600EJ/UCU600PSJ/UCU600ESJ

AK-HRP1000GJ

AK-HRF1000GJ

AK-MSU1000GJ

AK-HBU500GJ

AK-HVF1000GJ

Unit: mm (inches)

As of February, 2018

* Dimensions are for LEMO connector model.
Please refer to the latest Non-linear Compatibility Information, P2 Support, Download and Service Information, etc. at the following Panasonic web site.

https://pro-av.panasonic.net/