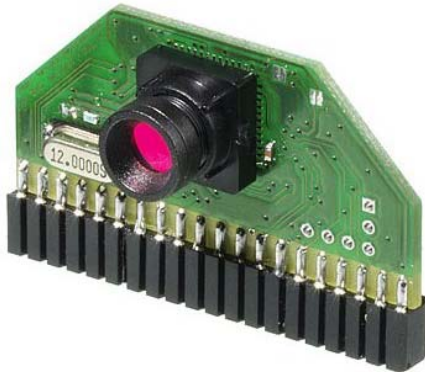


# NetView Extension Board



## Description

The NetView extension board enables a user of SND's Embedded Internet Technology to run a color image capture device or even a simple network camera with the Micro WebTarget™ or Micro BlueTarget™ Single Board Computers and the HyNetOS™ network operating system. It can be used in combination with SND's Micro WebTarget or Micro BlueTarget Starter Kits, since it plugs into one of the shuttle board's extension connectors as shown in the following image:



The Netview extension module consists of an intelligent CMOS image sensor and a FIFO device. In this way the image sensor is attached to the processor board by means of an intermediate image buffer for best possible image capture performance.

## Hardware Features

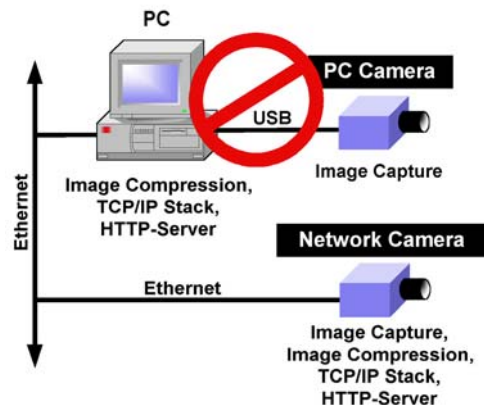
The NetView extension board is equipped with a highly integrated single-chip camera from IC MEDIA. Each pixel is covered by a color filter, which forms an industry-standard Bayer pattern. Correlated double sampling is performed by the internal ADC (analog-to-digital converter) and timing circuitry. Depending on the brightness of the scene, the raw data can be adjusted by the digital gain for all pixels, using the built-in automatic exposure control circuit. To eliminate the flickering caused by the 50Hz or 60Hz light source normally found indoors, an anti-flickering control circuit is built-in. The color interpolation module converts each pixel to RGB values using automatic white balancing to correct and enhance the color. After gamma correction is performed, the images can be output in formats including 8/16-bit YUV or YcbCr, 24-bit RGB, and 8-bit raw data. Images can be captured at up to 30 frames per second. Currently 2 different versions of the NetView extension board can be offered supporting the following image resolutions based on an 8-bit color coding per pixel:

Part no.	Resolutions
<b>NetView202</b>	QCIF (176 x 144 pixel) and CIF (352 x 288 pixel)
<b>NetView205</b>	QVGA (320 x 240 pixel) and VGA (640 x 480 pixel)

## Software Features

After images have been captured the operating system HyNetOS running on the Micro WebTarget and Micro BlueTarget boards as standard takes care of the further processing. First the images can be compressed to the JPEG image format, which will be executed purely in software partly on the RISC and partly on the DSP part of the Hyperstone E1-16XS CPU. The JPEG compression usually reaches a reduction of the image data by a factor of 15-20. In such way JPEG image sequences can be created also known as Moving-JPEG or Motion-JPEG (M-JPEG) video streams. The Hyperstone CPU is capable of reaching M-JPEG frame rates of 5-10 per second depending on resolution and image content.

Once compressed in JPEG format, the images can be stored on the local RAM disk, attached to E-Mails or sent over TCP/IP network connections or other available interfaces. A most popular way is to offer the video stream to web browser clients on the network by means of an HTTP server, which means to operate the system as a WWW-based network camera. In such way a security cam system can be operated just over an existing Ethernet network and does furthermore not need any software on the remote systems other than a standard web browser.



## Contents of the Extension Kit

- NetView202 or NetView205 hardware extension module
- Hardware schematics of extension module
- Image capture driver for HyNetOS (source code)
- Optimized JPEG compression/decompression library (YCbCr color space, 4:2:2 subsampling) for the Hyperstone RISC/DSP architecture and HyNetOS.
- Many demo applications (source code) including a ready-to-go WWW-based network camera application.

## Licensing

Apart from the license fees related to the Base HyNetOS system and eventual HyNetOS extensions (e.g. I\*Target Server for the HTTP server) no additional license fee is charged when using the Image Capture Driver and the JPEG compression/decompression library for serial production. However, the software related to the operation of the Netview extension board may be used only in combination with a HyNetOS license. The hardware design can be considered open source and can be copied, modified or otherwise re-used by SND's license customers.