

# Snímání obrazu v průmyslových aplikacích

# OMRON



# Xpectia

- Za tímto názvem jsou seskupeny systémy strojového vidění OMRON

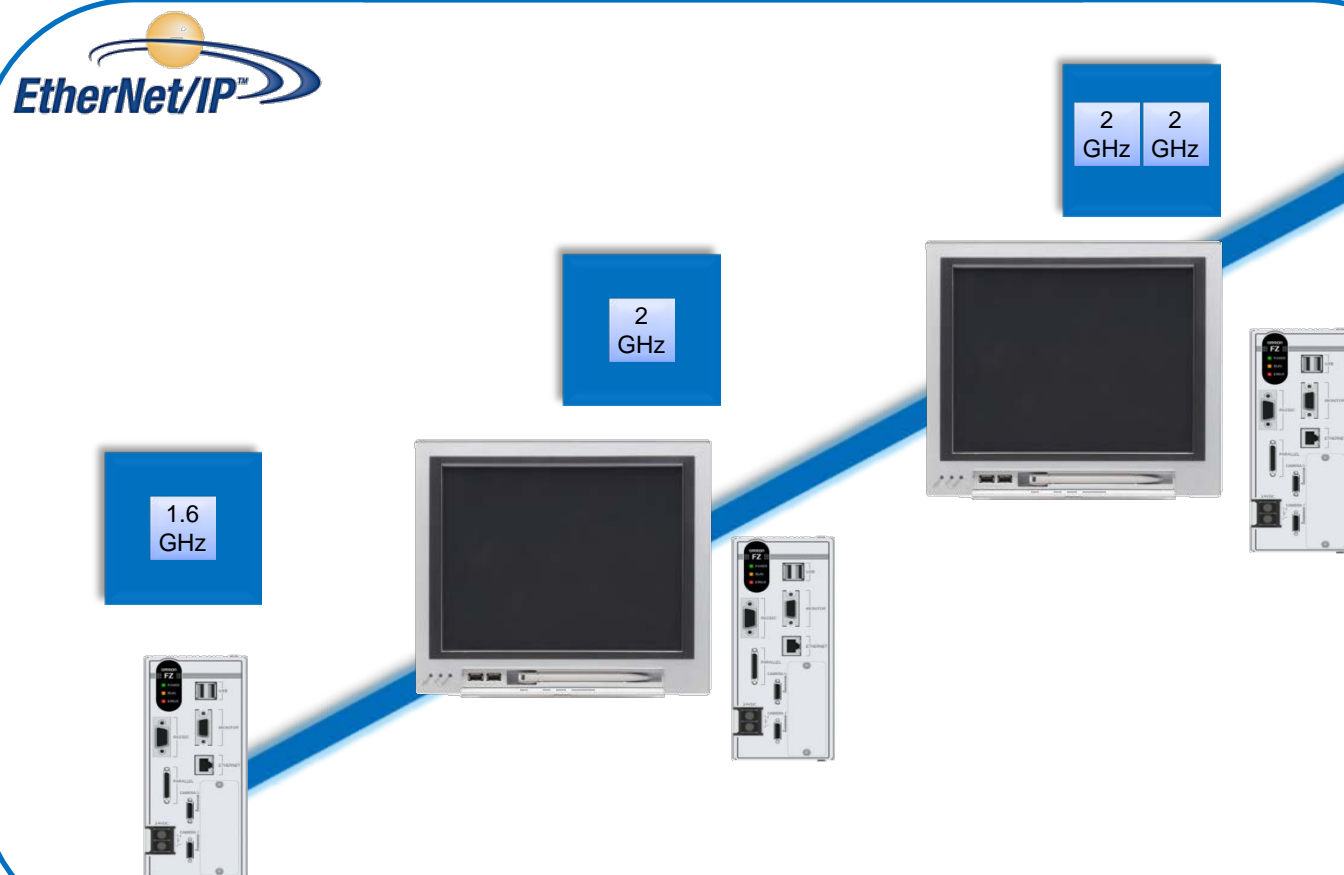
Projekt byl zahájen v roce 2008, tento program se nadále rozrůstá a nyní může nabídnout kompaktní řadu kamerových systémů.



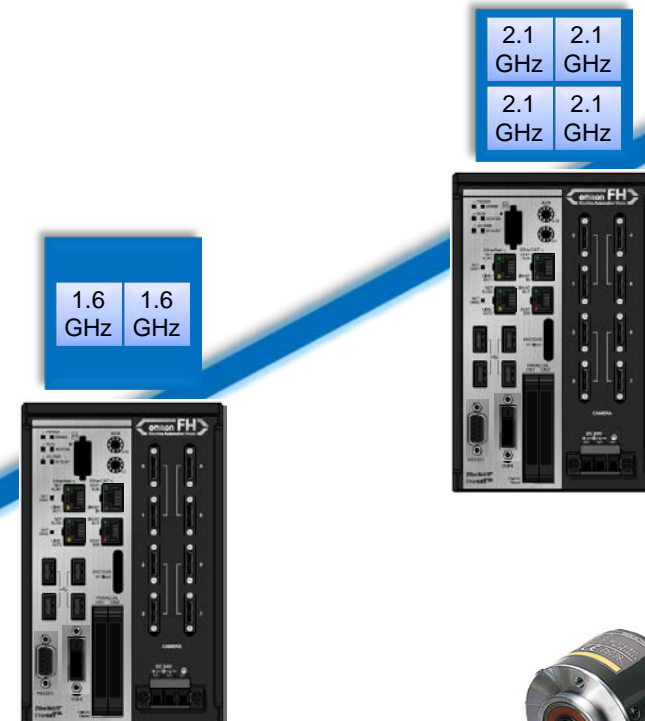
# Nejlepší volba pro vaše zařízení

Jednoduše si vyberte ovladač, který potřebujete.  
Všechny naše přístroje mají stejný software a  
Všechny nástroje pro strojové vidění  
Pouze změny procesor, aby co nejlépe vyhovoval vašim aplikacím

FZ5 : až 4 kamery



FH : až 8 kamer



**SYSTMAC**  
always in control

**EtherCAT**

**EtherNet/IP**

# Kamerové hlavice

## FZ5



5MP

- 2448 x 2044
- (16 fps / CCD)



2MP

- 1600 x 1200
- (30 fps / CCD)



0.3MP

- 752 x 480
- (60 fps)



VGA

- 640 x 480
- (88 fps / CCD)



# Kamerové hlavice

**FH**



**12MP**  
• 4096 x 3072 (33 fps)

**5MP**  
• 2448 x 2044 (16 fps / CCD)

**4MP**  
• 2040 x 2048 (118 fps)

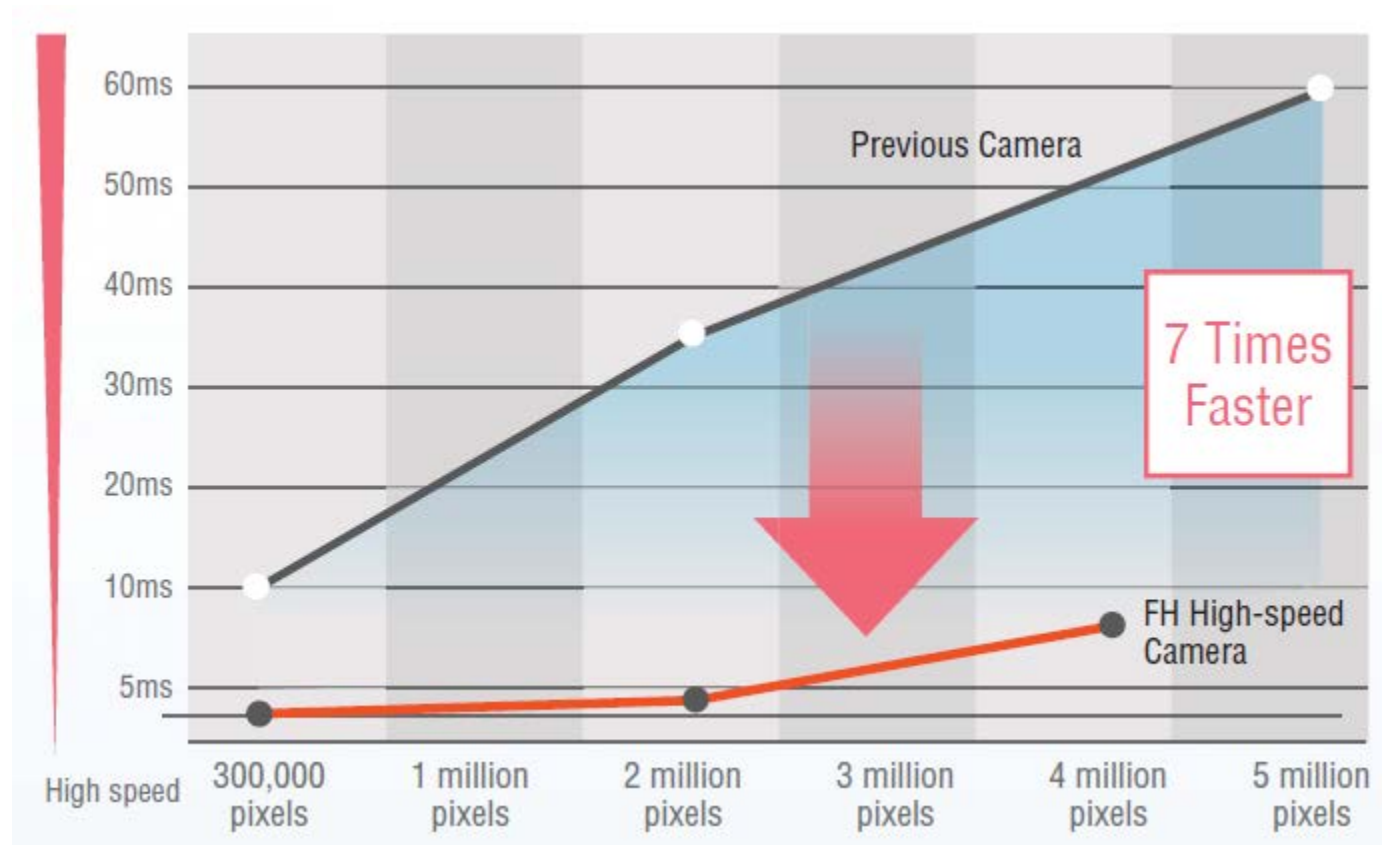
**2MP**  
• 2040 x 1088 (219 fps)  
• 1600 x 1200 (30 fps / CCD)

**0.3 MP**  
• 752 x 480 (60 fps)

**VGA**  
• 640 x 480 (308 fps)  
• 640 x 480 (88 fps / CCD)

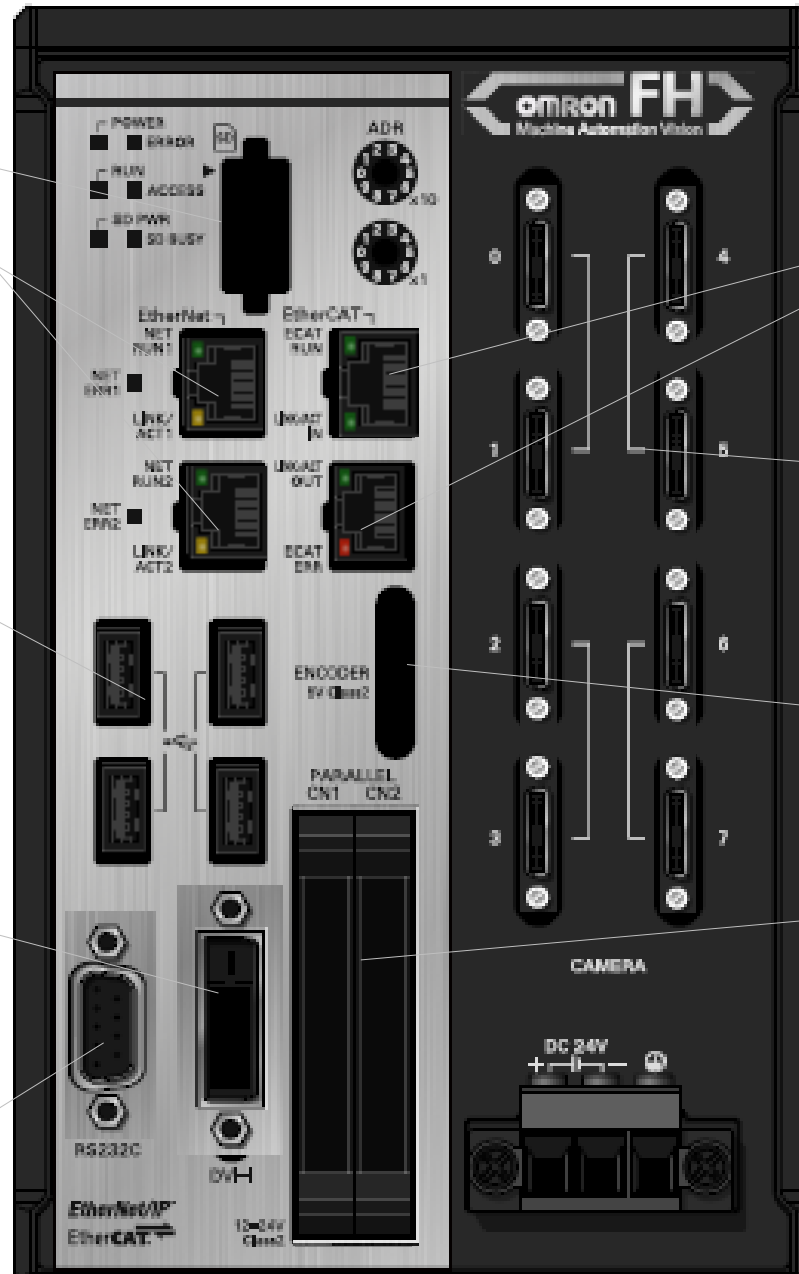
# Snímání obrazu

- Nové kamery CMOS můžou výrazně zkrátit dobu přenosu z obrazu paměti



# FH 1050

- SD Card
- Gigabit Ethernet x2
- 4 ports USB2.0
- DVI-I
- RS-232C/422

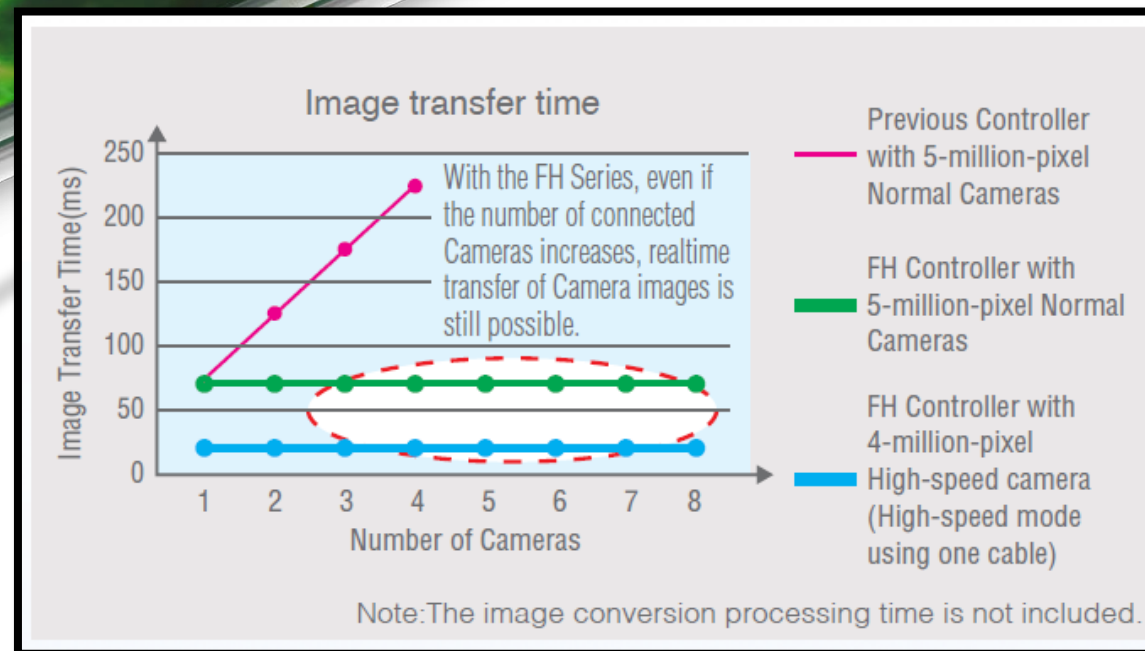
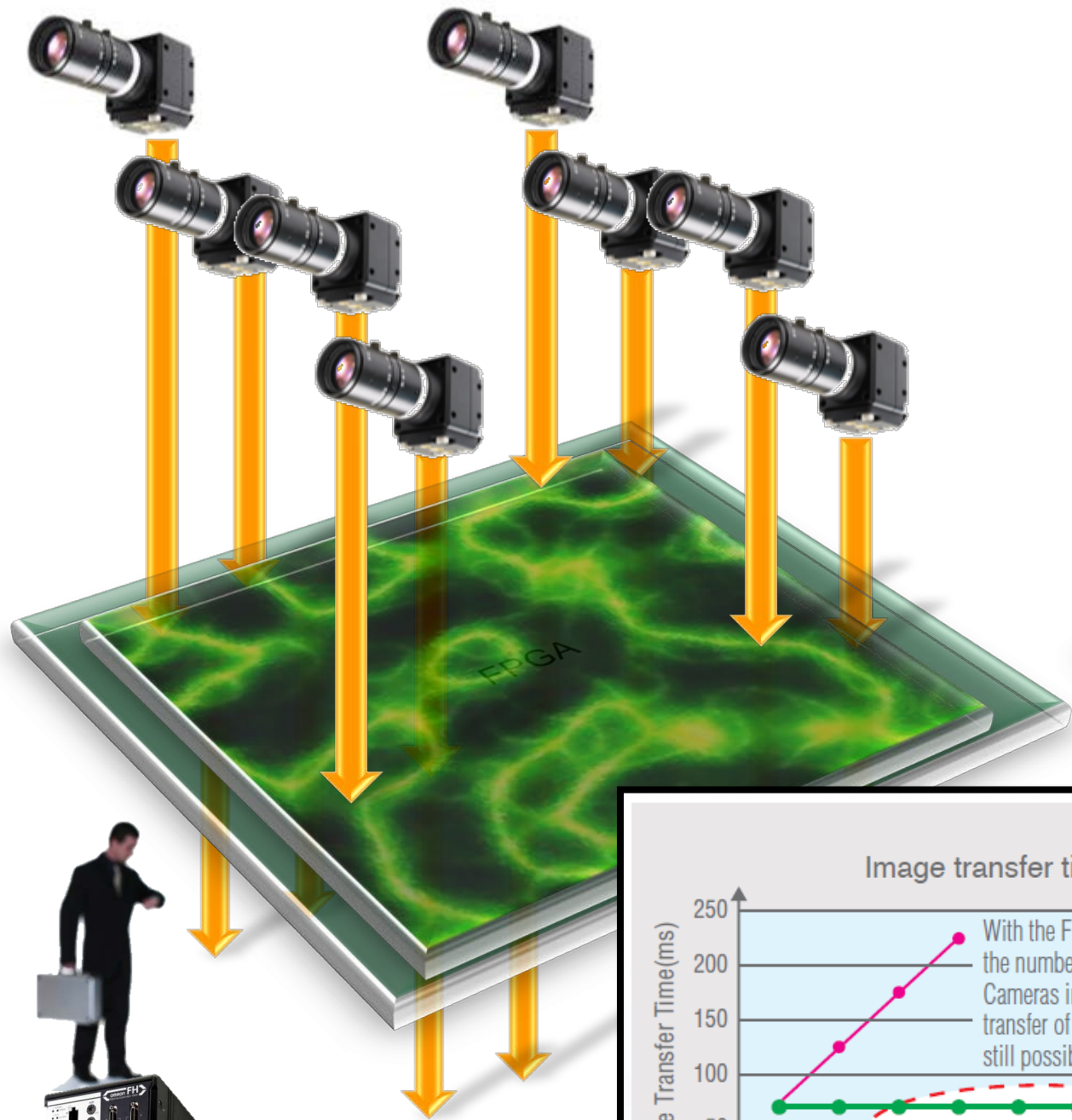


- EtherCAT
- Camera x2, x4, x8
- Encoder Input
- I/O port

Choix NPN ou PNP directement sur le contrôleur

W x H x D = 115 x 190 x 182.5mm

# Rozdíl zpracování obrazu





# Vysoký výkon!

- Výkon čtyř jednotek v jednom kontroléru
- Paralelní zpracování až 8 zdrojů

2.1 GHz	2.1 GHz
2.1 GHz	2.1 GHz



=



# Paralelní zpracování!

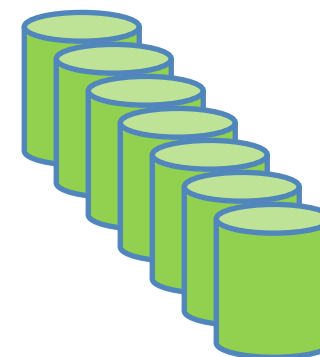
- Příklad použití  
-Multi-trigger



V tomto režimu je kamerový systém je schopen pracovat s několika startovacími signály. Systém FH umožňuje připojit až 8 trigr signálů

# Paralelní zpracování!

- Další příklady využití více procesorů
  - Single line High Speed
  - Změna nastavení za chodu
  - Loggování obrazu





# Komplexní knihovnu nástrojů



Measurement

- Search
  - Flexible Search
  - Sensitive Search
  - ECM Search
  - EC Circle Search
  - Shape Search II
  - Shape Search III
  - Ec Corner
  - Ec Cross
  - Classification
  - Edge Position
  - Edge Pitch
  - Scan Edge Position
  - Scan Edge Width
  - Circular Scan Edge Position
  - Circular Scan Edge Width
  - Intersection
  - Color Data
  - Gravity and Area
  - Labeling
  - Label Data
  - Defect
  - Precise Defect
  - Fine Matching
  - Character Inspection
  - Date Verification
  - Model Dictionary
  - 2DCode
  - Barcode
  - Circle Angle
  - Glue Bead Inspection

Input image

- Camera Image Input
- Camera Image Input FH
- Camera Image Input HDR
- Camera Image Input HDR Lite
- Camera Switching
- Measurement Image Switching

dynamic range  
Max. 5000 times higher than previous models

Compensate image

- Position Compensation
- Filtering
- Background Suppression
- Brightness Correct Filter
- Color Gray Filter
- Extract Color Filter
- Anti Color Shading
- Stripes Removal Filter II
- Polar Transformation
- Trapezoidal Correction
- Machine Simulator
- Image Subtraction
- Advanced filter
- Panorama

```
Max# = value#(I&)  
EndIf  
Next  
RESULTDATA#(0) = Max#
```

Support measurement

- Macro
  - Macro Calculation
  - Calculation
  - Line Regression
  - Circle Regression
  - Precise Calibration
- User Data
- Set Unit Data
- Get Unit Data
- Set Unit Figure
- Get Unit Figure
- Trend Monitor
- Image Logging
- Image Conversion Logging
- Data Logging
- Elapsed Time
- Wait
- Focus
- Iris
- Parallelize
- Parallelize Task
- Statistics
- Reference Calib Data
- Position Data Calculation
- Stage Data
- Robot Data
- Vision Master Calibration
- PLC Master Calibration
- Convert Position Data
- Movement Single Position
- Movement Multi Points
- Detection Point
- Camera Calibration
- Data Save

Branch

- Conditional Branch
- End
- DI Branch
- Control Flow Normal
- Control Flow PLC Link
- Control Flow Parallel
- Control Flow Fieldbus
- Selective Branch

Filter Coefficients

0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Output result

- Data Output
- Parallel Data Output
- Parallel Judgement Output
- Fieldbus Data Output

Display result

- Result Display
- Display Image File
- Display Last NG Image

Circle Search

The center coordinates of the marks are output.

Dirty Overlapping

EC Corner

Round Corners Chipped Corners

The intersection of two lines is output as the corner.



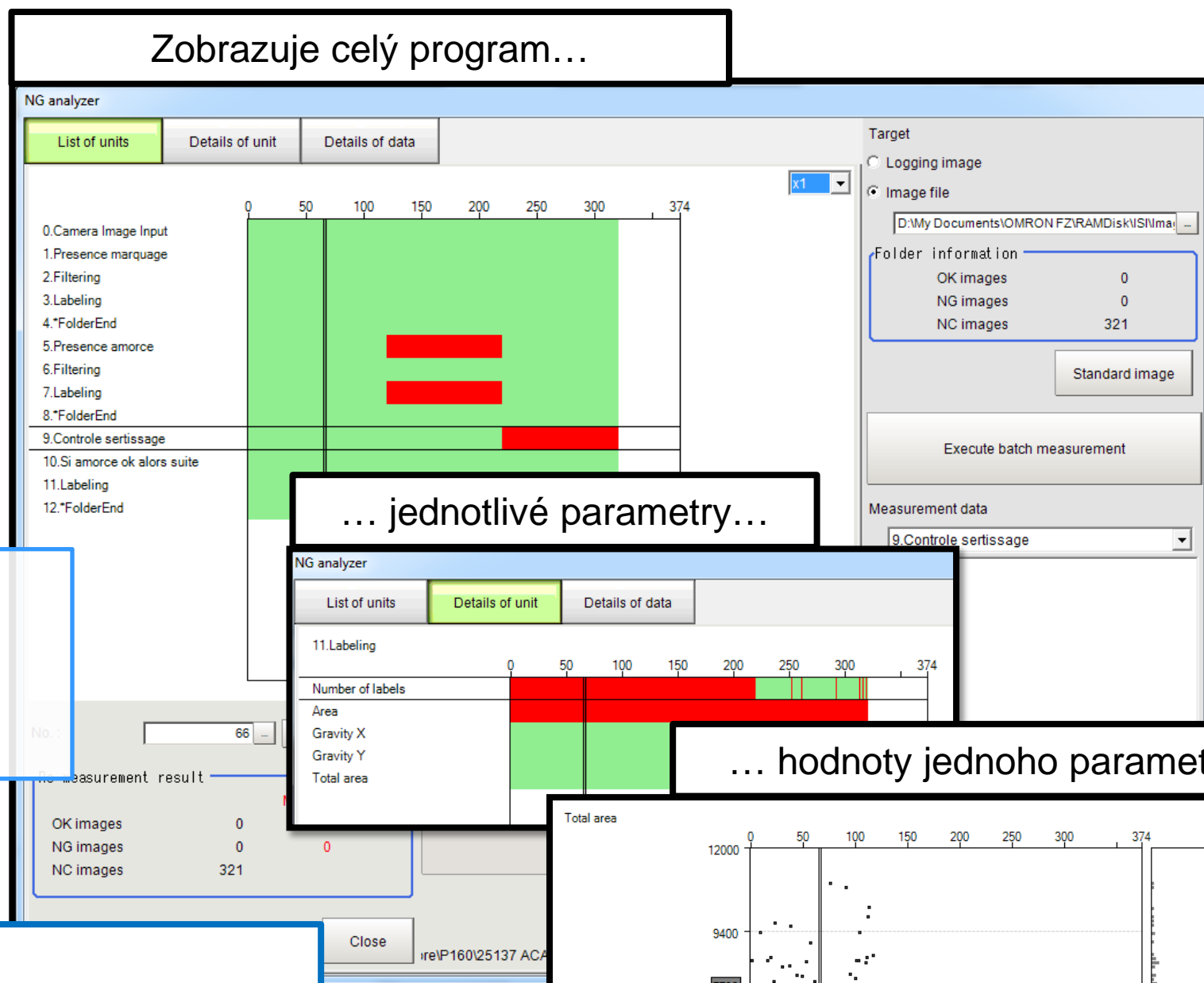
# Analyzujte své kontroly spolehlivěji



## NG Analyzer

- Tento nástroj je k dispozici v kontroleru i PC

Jedno kliknutí a tisíce výsledku najednou!



# Sysmac Studio

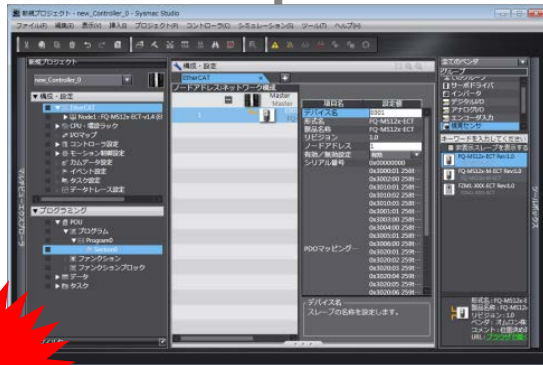
The screenshot displays the Sysmac Studio software interface. The main window is titled "NJ - FH training - new\_Controller\_0 - Sysmac Studio". The menu bar includes File, Edit, View, Insert, Project, Controller, Simulation, Tools, and Help. The toolbar contains various icons for file operations and simulation control.

The interface is divided into several panels:

- Multiview Explorer (Left):** Shows a tree view of the project structure. Under "Configurations and Setup", "Scene data" is selected. Under "Programming", "Section0" is selected.
- Configurations and Setup (Center):** Displays the configuration for "Scene data". It shows "Sensor 0 (Offline) Line 0" with a status of "OK" and a response time of "26ms". A table lists process units:

No.	Process unit
0	Camera Image Input FH
1	Shape Search III
2	
- Image Viewer (Center-Right):** Shows a camera image titled "0.Camera Image Input FH" containing six cookies. Below the image is a file path "C:\Users\010970048\D" and playback controls.
- Detail result (Bottom-Right):** Shows the result of the camera image input: "[0.Camera Image Input FH] Judge :OK".
- Toolbox (Far Right):** Contains a search bar and a list of steps: "00 Measurement", "10 Input image", "20 Compensate image", "30 Support measurement", "40 Branch", "50 Output result", and "60 Display result".

## EtherCAT



MAJ

Sysmac Studio



New

Contrôleur FH



Codeur



New

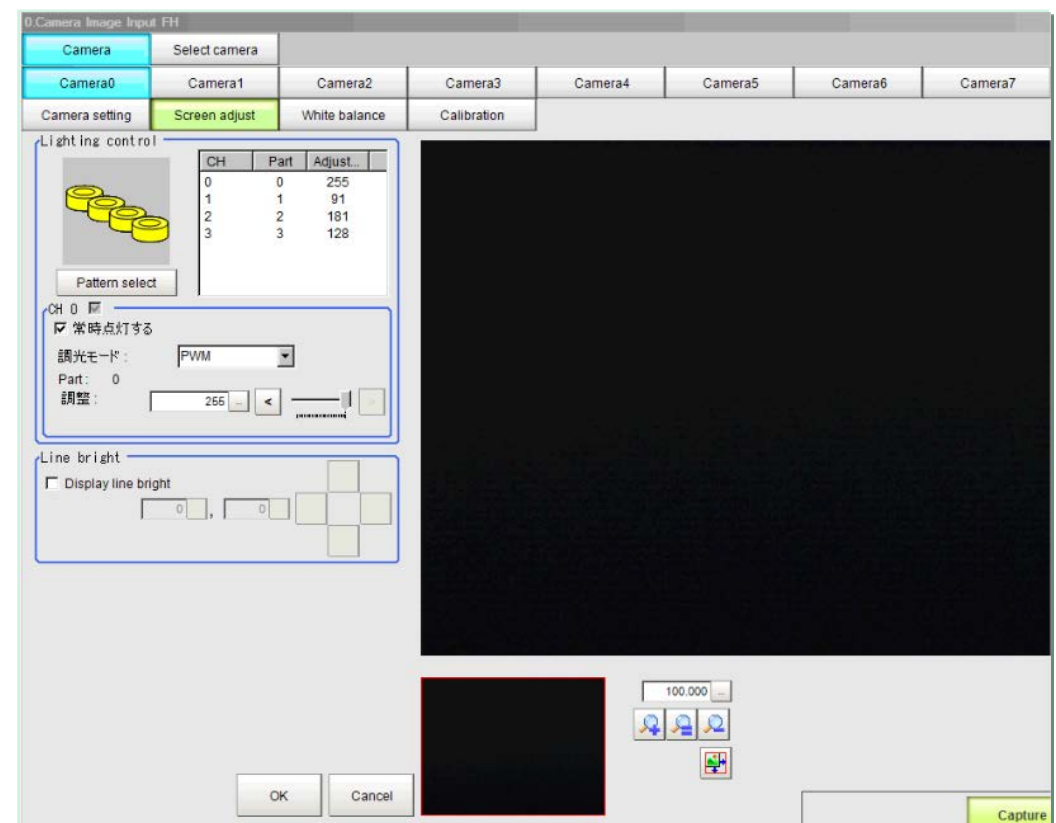
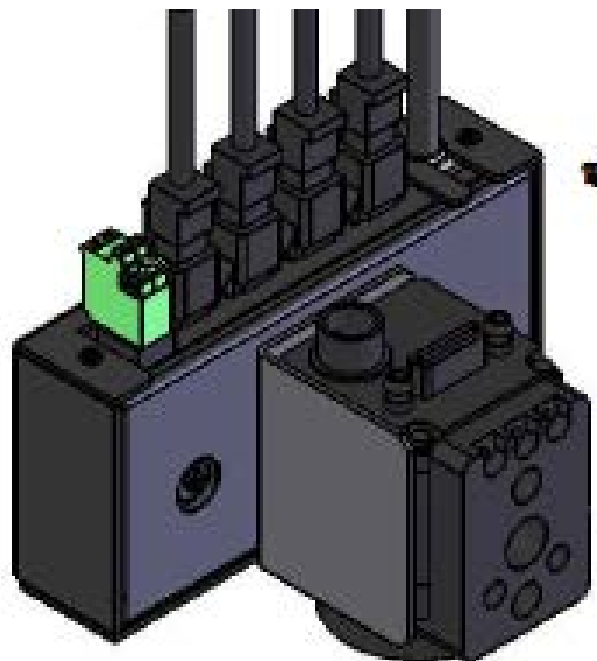
Caméras rapides (VGA, 2M, 4M, 12Mpix)

# Lighting controller

Ve stávajících systémech je osvětlení většinou odděleno od kamery a proto je třeba dalšího vedení pro připojení světla.

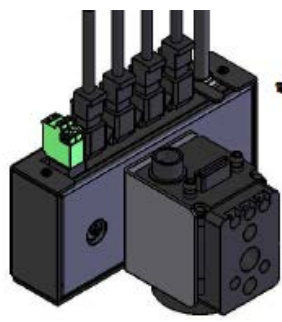
## *Easy to Use!!*

- Jednoduché propojení s kamerou
- Nastavení světla v konfiguračním nástroji s živým obrazem kamery.
- Až 4 světla lze připojit a ovládat jednou kamerou





<p>Světla</p>	<p><b><u>Lighting 11type 172units</u></b></p> <p>Direct Ring Light</p> <p>Bar Light</p> <p>Coaxial Light</p> <p>Direct Back Light</p> <p>Edge Type Light</p> <p>Low Angle Ring Light</p> <p>Line Light</p> <p>Spot Light</p> <p>Dome Light</p> <p>Edge Type Coaxial Light</p> <p>Shadow-less Light</p>	<p><b><u>Lighting Option</u></b></p> <p>Diffusers (Ring, Bar type)</p> <p>Polarizers (Ring, Bar type)</p> <p>Extension Cable (1,2,3,5m)</p> <p>Branch Cable (1,2,3,5m)</p>
<p>Kontroler</p>	<p><b><u>Camera Mount Strobe Controller 2type</u></b></p> <p>1ch Type</p> <p>4ch Type</p>	<p><b><u>Stationary Controller 126models=18type*7 plug</u></b></p> <p>Digital/Analog</p> <p>2ch/4ch</p> <p>24V/5V(Spot)/Line</p> <p>NPN/PNP</p> <p>Plug= A/C/B/B3/SE/BF/O</p>



FL series



Bar



Ring





Děkuji za  
pozornost