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REVOLON

free, fast, flexible - TEM Scan Controller
with open access and Python sample code

point electronic

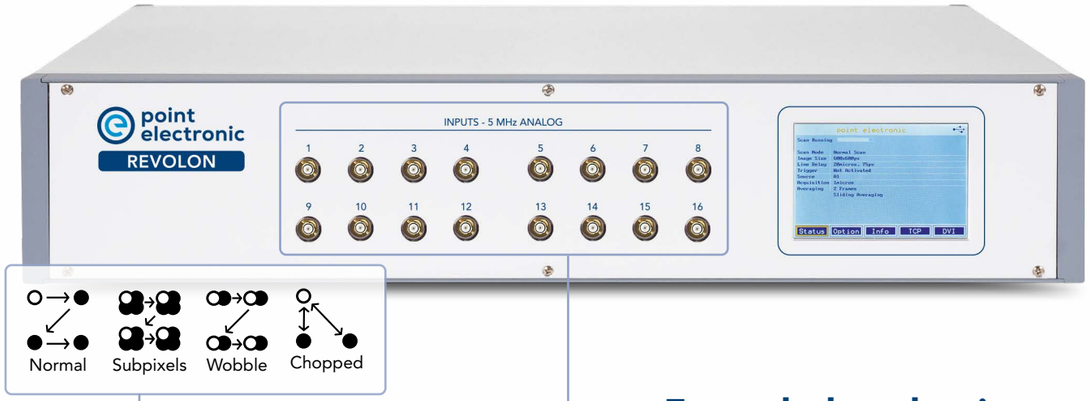
New standard in STEM control

REVOLON TEM Scan Controller defines new benchmarks with open access, high-performance functions, free scan patterns and compatibility with all major TEM models.

free microscopy
Unrestricted beam access with Python code

fast scanning
Highest speed for in-situ STEM

flexible control
Best 4D STEM synchronization



Extended analog inputs

Simultaneous acquisition of up to 16 signals with a maximum speed of 200 ns/pixel

Advanced image scans

Built-in scan generator and image acquisition modes

Gapless frames

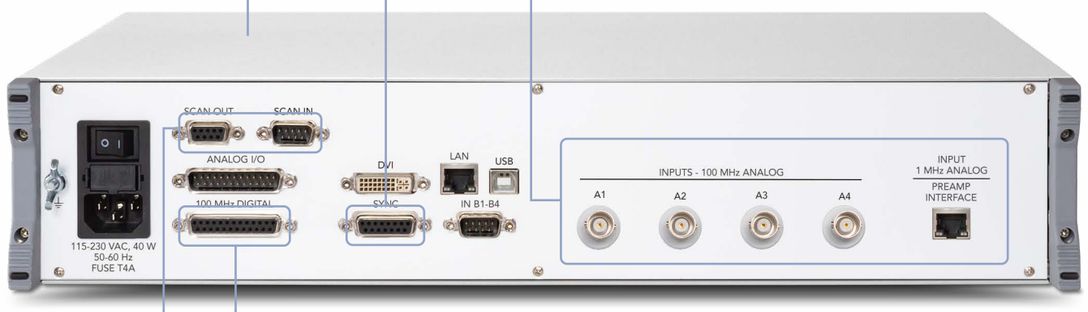
Time lapse acquisition of multiple frames without any gap, for in-situ microscopy

Camera synchronization

Adjustable TTL trigger inputs and outputs for 4D STEM cameras

Ultra-fast analog inputs

Shortest pixel acquisition time for TEM scanning with 10 ns/pixel



Digital pulse signals

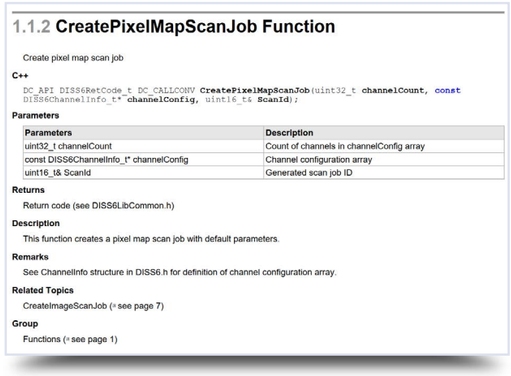
Inputs for pulse processors with single electron counting

Broad TEM compatibility

Connection via TEM's external scan interface, automatic scan switch included

To the cutting edge

Use point electronic Scan Control Software
or develop own application



1.1.2 CreatePixelMapScanJob Function

Create pixel map scan job

C++

```
DC_API DISS6RetCode_t DC_CALLCONV CreatePixelMapScanJob(uint32_t channelCount, const
DISS6ChannelInfo_t* channelConfig, uint16_t& ScanId);
```

Parameters

Parameters	Description
uint32_t channelCount	Count of channels in channelConfig array
const DISS6ChannelInfo_t* channelConfig	Channel configuration array
uint16_t& ScanId	Generated scan job ID

Returns

Return code (see DISS6LibCommon.h)

Description

This function creates a pixel map scan job with default parameters.

Remarks

See ChannelInfo structure in DISS6.h for definition of channel configuration array.

Related Topics

CreateImageScanJob (see page 7)

Group

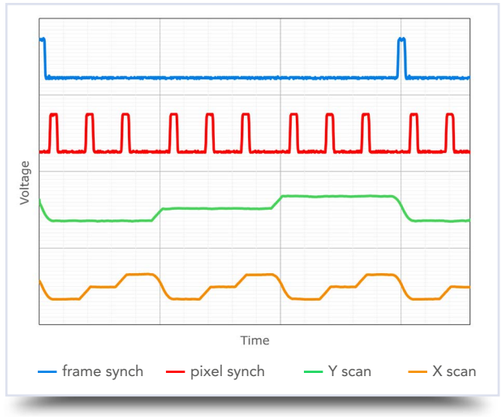
Functions (see page 1)

SDK for open device control

- Software Development toolKit (SDK) for complete configuration
- DLL control library for Windows and Linux
- Python sample code for independent coding

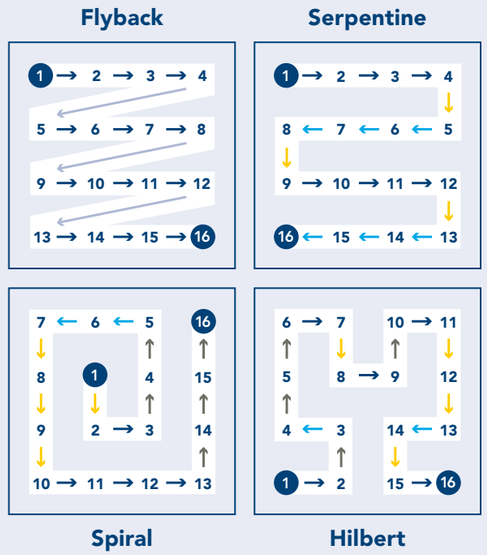
4D STEM synchronization

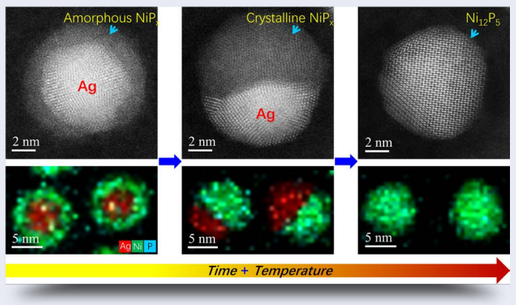
- Gain direct and unrestricted access to beam timing
- Freely configure frame/line/pixel scan triggers for camera synchronization
- Combine with advanced subpixel, chopped or wobble scan modes



Advanced pixel maps

- Prepare a list of coordinates
- Upload to the scan controller
- Run and download digitized values
- Make an image, display and repeat

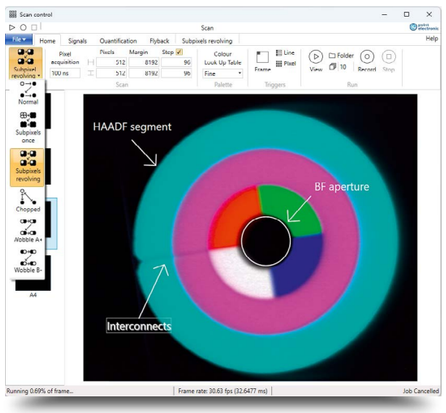




X Huang et al, ACS Nano, DOI:10.1021/acsnano.8b03106

Highest speed for in-situ STEM

- Speed up in-situ experiments with gapless frames
- Improve temporal resolution with fastest analog and digital inputs
- Optimize frame rate with full access to flyback parameters



Function highlights

- Additional digital 16-bit magnification, 10-bit scan shift and 360° scan rotation
- Built-in 1…50,000 kHz clock generator, with free running or synchronized scans
- Advanced 20-bit digital lock-in amplification on the 1 MHz analog input
- Optional GHz digital inputs with adjustable thresholds for ultrafast electron counting

REVOLON TEM Scan Controller

Inputs	**2x4 calibrated analog inputs** (A1…A4, B1…B4)
	12× digital inputs (D1…D12)
	4× calibrated analog inputs (M1…M4)
	12× calibrated analog inputs (M5…M16) (optional)
	1× calibrated analog input (L1)
	3× trigger inputs (Pixel, Line and Frame)
	1x TTL pause/resume input
Outputs	2× calibrated analog scan outputs (X, Y)
	1× calibrated analog magnification outputs (X, Y) (optional)
	2× external control outputs (Blank and Scan)
	4× clock outputs (Pixel, Line, Frame and Blank)
Control	USB2
	LAN
Pixel Maps	**16 MPixel size** (4,000x4,000 pixels)
	10 ns…10 s pixel set and hold times (adjustable per pixel)
	Pixel, Line and Frame triggers (adjustable per pixel)
Image scans	Normal (sawtooth)
	Subpixel (revolving, once)
	Chopped
	Wobble (A+, B-)
Scan generator	**16-bit** ±2.2V…±7.5/±0.65…±2.2V **analog X, Y scans (balanced)**
	16-bit ±3.5…±12 V analog X, Y scans
	16-bit 3.5…12 V analog X, Y magnification
	10-bit ±1.8 V analog X, Y shift
	Gnd., 5V, 15 V external bank/scan
	TTL clock and synchronization
	10 ns…10 s pixel dwell time (selection dependent)
	0…256× frame average
	0…50× line average
	Mains frequency synchronization
Signal digitization	**12-bit for analog A1..A4, B1…B4** (10 ns/pixel acquisition time)
	12-bit for analog M1…M4 (200 ns/pixel acquisition time)
	20-bit for analog L1 (1 µs/pixel acquisition time)
	16-bit for digital D1…D12 (TTL)
	32-bit for digital D1…D6 (TTL)
MICS amplifier	-1…1 V input offset M1…M16
	1× … 1,800× gain M1….M16
	-1…1 V output offsets M1…M16
	3.4 MHz…34 Hz low-pass filter
	4× averages M1…M4, M5…M8, M9…M12, M13…M16
	Automated 4Q global brightness and contrast
	Automated input offsets (dark correction)
Preamp interface	1...4,095 digital gain
	TTL reference frequency output
	Digital lock-in amplifier (optional)
Electron counting (optional)	2× inputs (ECL1…ECL2)
	2× threshold level outputs
	1 GHz bandwidth
Touch display	Scan status overview
	Installed options list
	Scan detailed information
	ETH connections settings
Housing	19-inch rack-mountable

PC/Laptop, display (optional)

PC/Laptop	Intel Core i3 minimum
	1× USB 2.0 minimum
	Network is recommended for remote support
Display	1,280 × 1,024 resolution minimum

Parts and cables

TEM scan controller unit	standard 1×
Imaging cable, Power cable, USB cable	standard 1×
USB flash drive	standard 1×
PC, keyboard, mouse	optional 1×
Displays	optional 1×

Software packages

Driver	PE USB for Windows
Library	**Windows and Linux binaries**
Software	Scan Control, Microscope Data, EMGateway
SDK	**API documentation, Python sample code**

Weight and dimensions

TEM scan controller	typ. 30 × 9.2 × 48.1 cm, typ. 4 kg
Shipping	typ. 36 × 32 × 60 cm, typ. 5 kg

Site requirements

Power	1× mains 105/240 VAC single phase 50/60 Hz
	On the same earth as the microscope
TEM connections	**1× external scan interface**
	Min. 1× video signal outputs
Space	Controller should be placed in a TEM rack

point electronic

Our design principles

We look back on 30 years of experience in development and manufacture of high-performance instruments and technologies for microscopy.

We are driven by an ambition to expand abilities and to improve performance of electron microscopes.

Our aspiration is to make the best quality tools and to join our customers on their journeys of scientific exploration and discovery.

Performance
Microscopy must be a reliable and enjoyable experience
- Design for highest speed and resolution at the lowest noise
- Develop smart independent controllers for live optimization
- Support new users with intuitive and automated controls
- Assist advanced users with access to all parameters

Efficiency
Microscopes must provide an uninterrupted focus
- Use standard microscope controls and data formats
- Give instant feedback with live image mixing and processing
- Add bespoke software tools and algorithms for repetitive tasks
- Support developers with open access libraries and documentation

Environment
Products and technologies must be sustainable
- Reduce power consumption through smart design
- Minimize material use, embrace reuse where possible
- Save weight and volume for shipping and maintenance
- Enable everyone to develop sustainable innovations

Quantification
Data and control must be in physical units
- Provide calibrated inputs and outputs for quantitative measurements
- Supply samples, procedures, and software for calibration
- Distribute all control parameters in device independent values
- Empower the user to operate the SEM as a measuring device

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