

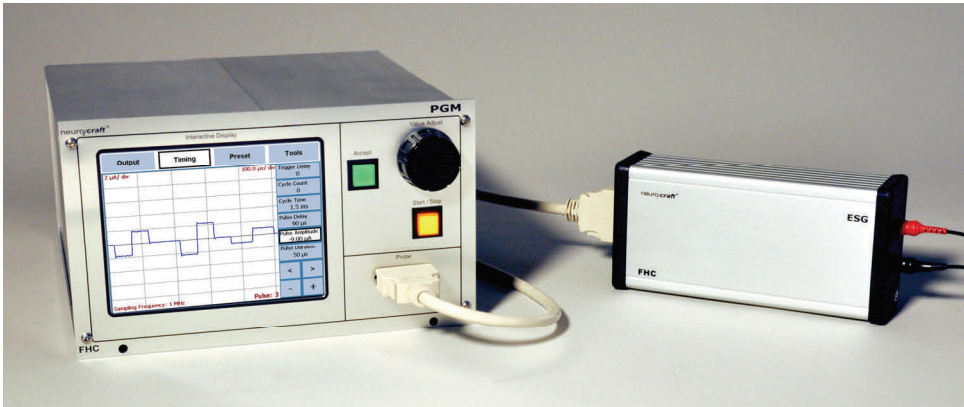
StimPulse

Features and Description

DRAFT

neuro/craft™

INSTRUMENTATION AND MICROELECTRODES FOR NEUROSCIENCE RESEARCH



The neuro/craft™ StimPulse is comprised of two devices, the PGM Pulse Generator Module and the ESG Electrical Stimulus Generator, that deliver isolated electrical stimulation in a wide range of user-defined timing and pulse parameters.

Flexibility

The Pulse Generator Module (PGM) provides a broad spectrum of timing control parameters, from simple to complex, without the need for additional channels or devices. A wide range of waveforms are supported including monophasic or biphasic square, charge-balanced biphasic, ramp, sine, zeta, and multi-level rectangular. Arbitrary waveforms are easily imported or exported from Matlab, or similar general-purpose waveform editors, through USB port connections. Simple or complex pulse timing trains of 1 microsecond resolution are created through an intuitive, graphical interface, or imported through the USB.

An onboard digital signal processor (DSP) performs real-time control of the operation. The PGM is fully customizable through simple firmware updates using provided USB ports. Additional USB interfaces to a PC, external storage device, keyboard and mouse are also provided.

The PGM's intuitive user interface supports straightforward creation and storage of multiple user presets.

Performance

The ESG Electrical Stimulus Generator delivers a galvanically isolated constant current or voltage with a compliance range of +/-125V. User-configurable features include AC/DC output coupling and multiple chassis shielding options. The ESG additionally includes ground shunts during low use periods to prevent leakage and noise artifacts.

Safety

To protect subjects, the ESG and PGM automatically shut off if output exceeds set voltage/current parameters. The mini transformers provide high output isolation characteristics. The microelectrode cabling is designed with "No Touch" connections.

Feature Rich

The compact PGM may be rack mounted or set on a desktop. The ESG is linked to the PGM by a 3m data cable, allowing placement close to the preparation. Digital inputs include programmable triggering options and outputs conveniently link to recording and behavioral systems. The PGM may also provide timing for other lab devices. The touch screen interface doubles as a graphic scope displaying the ideal or actual output during the experiment. A secondary analog output of the ideal or actual stimulus output is provided for viewing or recording.

FEATURES:

- ◆ Simple or complex timing trains of 1µsec resolution in a single channel device
- ◆ Highly isolated constant current or voltage with a compliance range of +/-125V
- ◆ Monophasic or biphasic, charge-balanced, and multilevel rectangular pulse output with additional ramp, sine, zeta, and arbitrary waveform support
- ◆ Built-in scope function displays ideal or actual stimulus delivered during output. No additional O-scope needed
- ◆ Custom waveforms and trains can be imported from Matlab or similar general-purpose waveform editors via USB port
- ◆ Safety output shutoff if actual voltage/current exceeds set parameters
- ◆ User-configurable AC/DC coupling of the output and multiple chassis grounding options
- ◆ Preset functionality allows storing of specific parameter settings for later recall
- ◆ Onboard Digital Signal Processor (DSP) performs real-time control of the operation. Flexible firmware and USB ports allow updates and customization through downloaded flash upgrade
- ◆ Digital inputs/outputs for interaction with recording and behavioral systems, or to provide timing for other lab devices
- ◆ Fully customizable for specific application needs through downloadable firmware upgrade
- ◆ Desktop or rack mountable

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"Innovation through collaboration"



SPECIFICATIONS

PGM:

Timing Range: Accurate timing specifications for the PGM are dependent on the load, and are given under the stimulus generator device (ESG etc.)

Train Cycles: 1 - 2.1×10^9

Pulse Type: Square, ramp, sine, zeta, or custom

Pulse Phase: Monophasic, biphasic, or charge-balanced

Pulse Polarity: Positive (+) or Negative (-)

Cycle Latency: $< 1 \mu\text{sec}$ between cycles

Timing Resolution: $1 \mu\text{sec}$, better than 100ppm

Digital Trigger In Latency: $< 10 \mu\text{sec}$

Touchscreen Area: 11.5cm X 8.2cm (4.5" x 3.2") ± 0.25 "

Touchscreen Resolution: 640X480 Color (256) min.

PC Interface: USB 2.0 Type B port

Data ports: 2ea. USB 2.0 Type A ports

Power Requirements: 100-240 VAC, 50-60Hz

Dimensions: Height: 13cm (5.22"); Width: 23cm (9"); Length: 24cm (9.6")

Weight: TBD

Mounting Options: Tabletop, 4 rubber feet prevent sliding
Rack mountable with SAF Rack Frame (Cat. #55-11-0 available separately)

Additional Items Required for Operation: (Ordered Separately)

1 ea. 55-XXX Line Cord

Optional Accessory:

55-11-0 SAF Rack Frame for Stand-Alone Modules

55-0-10 USB Mouse

55-0-11 USB Keyboard

55-0-12 Stylus

Replacement Items:

55-65-0-01 ESG Output Cable Pair (5')

55-65-0-02 ESG Output Cable Pair for FHC Microelectrodes (5')

55-65-0-04 Probe Communication Cable (5')

55-00-4 BNC Adapter Cable

55-00-9 Male Phono Patch Cable

ESG:

Note: All timing measurements made from 10% - 90% amplitude of leading edge under 100k load

Isolation Method: Digital, using micro-transformers

Isolation Impedance: $> 10^{11}$ Ohms @ 60Hz

Isolation Barrier Capacitance: < 25 pF

Isolation Voltage: 4000VAC

Train Time: 1ms – 596.5hrs(24days) at 1ms resolution (continuously adjustable)

Cycle Time: Constant Current Mode: $15 \mu\text{s}$ - 59.6hrs

Constant Voltage Mode: $4 \mu\text{s}$ - 59.6hrs in 0V-10V range; $60 \mu\text{s}$ - 59.6hrs in 10V-125V range (continuously adjustable, on-the-fly adjustable)

Pulse Delay: 5us – 35min at 1us resolution (on-the-fly adjustable, continuously adjustable)

Pulse Duration: Constant Current Mode: $15 \mu\text{s}$ - 5.9hr

Constant Voltage Mode: $4 \mu\text{s}$ - 5.9hr in 0V - 10V range;

$60 \mu\text{s}$ - 5.9hr in 10V – 125V range. (continuously adjustable, on-the-fly adjustable)

Constant Voltage Ouput: 0 - 125V at $1 \mu\text{A}$ (1Meg load); (continuously adjustable, on-the-fly adjustable)

Constant Current Ouput: Four ranges, 0 – $10 \mu\text{A}$, 0 – $100 \mu\text{A}$, 0 – 1mA, 0 – 10mA, (continuously adjustable, on-the-fly adjustable)

Compliance Voltage: $\pm 125\text{V}$ ($10 \mu\text{A}$ and $100 \mu\text{A}$ range) $\pm 100\text{V}$ (1mA and 10mA ranges)

Ouput Impedance: $< 1\text{k}$

Leakage Current: < 10 nA

Noise: $< 1\%$ of range (current or voltage)

Dimensions: Height: 4.5cm (1.77"); Width: 8cm (3.15"); Length: 16.5cm (6.5")

Weight: 2lbs

Mounting Options: Tabletop, 4 rubber feet prevent sliding

ORDERING INFORMATION

55-60-0 / PGM Pulse Generator Module- \$3950.00
Includes: PGM Module, A1005 Manual, Accessory Kit

Accessory Kit Includes: Probe Communication Cable,
USB 2.0 Cable, Rubber Feet (4 ea. Use Optional)

55-65-0 / ESG Electrical Stimulus Generator- \$1450.00
Includes: ESG Unit, Accessory Kit

Accessory Kit Includes: 1 ea. Stimulus Output Cable (5'),
Rubber Feet (4 ea. Use Optional)

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