INFOCO SPGD⁺ CU

SPGD⁺ Multi-Channel Blind Optimization Control Unit

An 8-, 16-, 24-, or 32-channel controller implementing the Optonicus’ proprietary latest advanced stochastic parallel gradient descent (SPGD⁺) control algorithm in hardware for various optimization tasks; includes user-friendly and platform-independent software that easily interfaces various systems with your PC.

The INFOCO SPGD⁺ multi-channel control unit (CU) can be used for different applications including phase locking of fiber-array systems, compensation of optical phase distortions such as atmospheric-turbulence-induced wavefront aberrations in laser beam projection (directed energy) and free-space optical communication systems, mitigation of mechanical and/or acoustical jitter and adaptive optics applications to drive deformable mirrors.

Key Features & Benefits

Electronics

- Optical (through FC/APC or FC/UPC connector) or electrical analog input (through BNC connector)
- 8 (SPGD⁺ CU-8), 16 (SPGD⁺ CU-16), 24 (SPGD⁺ CU-24), or 32 (SPGD⁺ CU-32) analog outputs with amplitude range ±2 V
- Full remote control through 10/100Base-TX Ethernet Interface
- Advanced stochastic parallel gradient descent (SPGD⁺) control algorithm embedded on ARM926EJ-S® 32-bit processor with controllable iteration rate from 10 to 250,000 SPGD⁺ iterations per second
- Hardware & software flexibility for various applications
- Open architecture allowing for firmware upgrade

Software

- Graphical interface for end-user operation
- Input signal time-history display
- Manual setting of the output voltages
- Options for a setting or an update of SPGD⁺ control parameters
- Setting the limits of individual control voltages
- Manual setting of the SPGD⁺ update rate
- Computer requirements: PC (Windows XP or later, Linux) or Mac
- Network requirements: TCP/IP connection between a computer and the INFOCO SPGD⁺ CU

The INFOCO SPGD⁺ CU is based on the latest microprocessor technology. The controller receives either an optical or an electrical analog input signal that is sent into the 12-bit analog-to-digital converters (ADC) of microcontroller channels running the Optonicus’ SPGD⁺ control algorithm. The INFOCO SPGD⁺ CU channels compute digital outputs that are sent to the corresponding 12-bit digital-to-analog converters (DAC) supplying analog output signals. In addition, a communication controller provides the interface through a local area network (LAN) between the end-user computer and the INFOCO SPGD⁺ CU, sending and receiving commands and system data.
INFOCO SPGD+ CU GUI

Controller Configuration Window

- Static Voltage Outputs
  - Upper Rail Voltage (LRV): +25
  - Lower Rail Voltage (LRV): -25
- Initial Parameters
  - Load Initial Parameters
  - Save Initial Parameters
- Parameters Update
  - Update perturbations table
  - Update kappas, gammas tables
- Adaptive Control Parameters
  - Use Adaptive Gamma
  - Use Adaptive Peg
- Channel 1-8
  - Limit Plus
  - Reset Plus
  - Limit Minus
  - Reset
- Controller Address
  - IP Address: 192.XXXXX.XX
  - Port: 5000
- Misc Optimization Parameters
  - Measurement Delay (us): 0.00
  - Pert Delay (Iterations): 0
  - Pert Delay (us): 0.00
  - SPGD Update Period (us): 4.50
  - Modal Threshold (V): 2.5
- Optimization Mode
  - Max_A
  - Max_B
  - Optimization OFF

[Controller Configuration Window Image]