LUNA

Migration Plan for Transitioning from MPC-201 to MPX 2010 Instruments

MP-241-001

Luna

Revision 1.1

Distribution in the UK & Ireland

λ Lambda

Lambda Photometrics Limited
Lambda House Batford Mill
Harpenden Herts AL5 5BZ
United Kingdom
E: info@lambdaphoto.co.uk
W: www.lambdaphoto.co.uk
T: +44 (0)1582 764334
F: +44 (0)1582 712084

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1.0   Introduction

The MPX 2010 offers improved performance, greater flexibility, and enhanced compatibility with current software and hardware technologies. While maintaining the advanced modulation and scrambling features of the MPC-201, the MPX 2010's compact design and faster processing speed create a more scalable platform.

The MPX 2010's enhanced connectivity options enable seamless integration into existing systems. It will improve the user experience with better software compatibility and faster data transfer speeds. The objective is to ensure that the new system keeps pace with evolving demands, providing long-term sustainability and superior overall performance.

2.0   Background and Purpose

2.1   Existing system (MPC-201)

The MPC-201 has been a reliable measurement and control system used across various applications, including polarization control and signal modulation. It Control the state of polarization (SOP) of an optical signal. This multifunction polarization controller has four operational modes for complete polarization control: variable rate polarization scrambling, manual polarization adjustment, polarization modulation, and externally triggered random SOP generation.

2.2   New system's (MPX 2010) features

The MPX 2010 is a modern hardware platform and signal modulation system, while is based on same patented polarization control technology used in MPC-201.

Maintaining Excellence with a compact design: Retaining Essential Scrambling Patterns, Modulation Functions, and Trigger Capabilities Despite a More Efficient and Space-Saving Structure.

Enhanced Signal Modulation Capabilities: Expanded frequency and amplitude control, with improved waveform generation options for precise signal modulation in high-performance applications.

Advanced Scrambling Features: Support for randomized, Rayleigh, and Tornado patterns with higher configurable frequencies.

Modern Connectivity: Integrated USB and Ethernet options enable flexible, robust connections and seamless integration with contemporary systems.

Software Support: Adherence to IEEE standard SCPI guidelines for consistent and streamlined software control across newer generation systems. The instrument provide C API for customer's application.

Scalable and Higher Speed Performance: Upgraded hardware and improved internal algorithms deliver superior speed, efficiency, and scalability to meet complex demands.

2.3   systematic integration

The MPX 2010 offers faster versatile connectivity options such as USB and Ethernet sockets, and advanced features that deliver enhanced performance. These upgrades are

designed to streamline operations, enable seamless integration with modern software, and support scalability.

3.0   Technical Specifications

3.1   Technical Specifications

For a detailed comparison of the improved performance metrics, please refer to the table 1.

Table 1 Rate comparison of MPX 2010 and MPC-201				
Controlling modes	Types	Units	MPX 2010 Rate	MPC-201 Rate
Polarization Scrambling	Discrete Random	Points/s	0.00~40000	0~20000
	Triangle	Rad/s	0.00~4000*2π	0.00~2000*2π
	Rayleigh	Rad/s	0.00~4000	0.00~2000
	Tornado	Revolutions/s	0.00~4000	0.00~2000
Polarization Modulation	Sine Triangle Square	Hz	0.00~4000	0.00~2000

3.2   Standard SCPI Command and Polax API

The MPX 2010 follows the SCPI (Standard Commands for Programmable Instrumentation) protocol with standard API form lib. By using SCPI's standardized text-based commands, the MPX 2010 simplifies integration with other instruments, ensuring reliable communication and ease of control. SCPI commands enhance interoperability, allowing for smooth data exchange across different platforms.

Additionally, the MPX 2010 features the PolaX API, available as a C++ library, which provides advanced control and customization for users. The PolaX API facilitates integration with other devices in the PolaX family, allowing for more complex operations and automation. This API is ideal for users needing a deeper level of system control, enabling the development of tailored applications, and expanding the MPX 2010's capabilities to meet specific needs. (Referring to the MPX 2010 user manual Section 9 PolaX API)

MPX-2010

	Subsystem/Register	Commonly Used Commands/Bits
Commands	IEEE Commands	• *IDN? • *RST • *CLS • *SAV • *RCL
	:SYSTEM	• :SYSTem:ERRor? • :SYSTem:VERSion • :SYSTem:COMMunicate:LAN:ADDRess
	:STATUS	• :STATus:OPERation[:EVENt]? • :STATus:OPERation:CONDition? • :STATus:QUEStionable[:EVENt]? • :STATus:QUEStionable:CONDition?
	:CONFigure	• :CONFigure:WAVElength
	:OUTPut	• :OUTPut:SOP • :OUTPut:SWEep:PATTern:SHAPe • :OUTPut:SWEep:PATTern:USRData • :OUTPut:SWEep:PATTern:DATA? • :OUTPut:SWEep:DWELl[:VALue]? • :OUTPut:SWEep:DWELl:UNIT • :OUTPut:SWEep:COUNt • :OUTPut:TRIGger[:STATe] • :OUTPut:TRIGger:PWIDth
	Trigger	• :TRIGger:SOURce • :TRIGger:CHANnel

Table 1 SCPI Remote Control Command List

MPC-201

Command Sequence	Parameters	Description/Example
System Information		
:SYSTem:ERRor?		Return error sequence, 20 error messages max, errors read out in FIFO sequence.
:SYSTem:VERSion?		Query firmware version: return value <string> (e.g. 1.0.1-20111216A)
Communication		
:SYSTem:COMMunicate:EOS	< LF| CR| CR+LF>	Set/query End Of String type for SCPI *:SYST:COMM:EOS CR+LF*
:SYSTem:COMMunicate:HSHake	< ON| OFF>	Set/query handshake enable/disable status. *:SYST:COMM:HSH ON*
:SYSTem:GPIB:ADDRess	< integer>	Set/query GPIB address, range: 0 to 30. *:SYST:GPIB:ADDR 10*
:SYSTem:NET:IP	< string>	Set/query IP address. *:SYST:NET:IP 192.168.1.122*
:SYSTem:NET:MASK	< string>	Set/query net mask. *:SYST:NET:MASK 255.255.255.0*
:SYSTem:NET:GWAY	< string>	Set/query gateway address. *:SYST:NET:GWAY 192.168.1.1*
:SYSTem:NET:NSERver	< string>	Set/query nameserver. *:SYST:NET:NSER 206.13.30.12*
:SYSTem:NET:MODE	< SIP | DHCP >	Set/query Ethernet mode (Static or Dynamic) *:SYST:NET:MODE DHCP*
:SYSTem:SERial:BAUDrate	0~12	Set/query RS-232 baud rate. 0: 110; 1: 300; 2: 600; 3: 1200; 4: 2400; 5: 4800; 6: 9600; 7: 19200 8: 28800; 9: 38400; 10: 43000; 11: 56000; 12: 57600 *:SYST:SER:BAUD 6*

Fig.1 Screenshot of the SCPI commands for MPX 2010 and MPC-201 comparison

3.3   Enhancements to Customer GUI

The MPX 2010 utilizes the unified PolaX user interface, seamlessly integrating the POD 2000, PSG 2000, and MPX 2010 systems into a Luna GUI platform that is ready for future expansions. This enhanced interface provides greater flexibility, ease of maintenance, and adaptability to evolving operational needs, significantly improving the user experience.
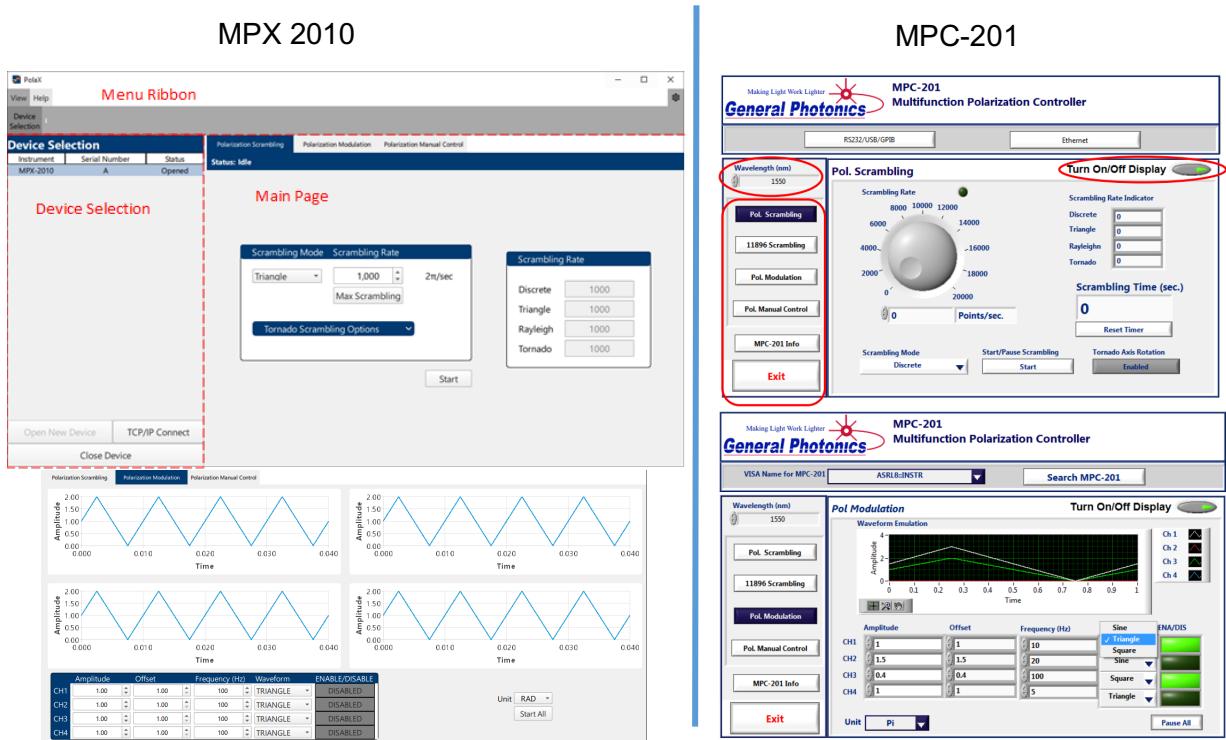
MPX 2010   MPC-201

Fig. 2 Customer GUI comparison

3.4   Potential Integration and Applications

Multi-instrument integration: The MPX 2010 is one instrument in whole polarization family, it could be connected to other Luna instrument, such as POD 2000, with same set of SCPI design.

Integration with New Software Tools: The improved user interface and connectivity (USB and Ethernet) open opportunities for integrating with modern software systems, enhancing analytics and reporting.

Remote Control and Monitoring: MPX 2010's advanced connectivity allows for remote management, enabling faster troubleshooting and better operational flexibility. This can be particularly beneficial for geographically dispersed teams.