

Release Notes (EN) PGC-1000 Grabber Card Rev. 1.1.5

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01 Introduction

01.1 Definitions and Abbreviations

Term/Abbreviation	Definition
PGC	PLC2 Grabber Card
PL	Programmable Logic (FPGA)
QSFP	Quad Small Form-factor Pluggable
MAC	Media Access Control
PC	Personal Computer
CPU	Central Processing Unit
PCIe	Peripheral Component Interconnect Express
MHD GeFe	Measurement and Hardware in the Loop Device Generic Frontend
UDP	User Datagram Protocol
TCP	Transmission Control Protocol
FW/SW	Firmware/Software
PDF	Portable Document Format

01.2 References

The PGC-1000 User Guide can be found on www.plc2.com

01.3 Product Documentation

The PGC-1000 product documentation in PDF format can be found on www.plc2.com.

02 Product Definition

02.1 Functions at a Glance

The PGC-1000 is a high performance, camera data stream capable PCIe® card with up to 40 Gbit/s Ethernet via a short-range QSFP+ connector in total. It is ideally suited to enable high-end multi-camera video data logging and replaying on mid-performance PCs, to avoid the need for costly, very high-end multiprocessor computers.

Feature list for recording use case combined with Windows driver and library:

- Ethernet camera data offloading
As its major purpose, the PGC-1000 Grabber Card takes the burden of video streaming protocol termination from the Host-PC CPUs.
- Video control interfaces (Networking Data)
On its 10G interfaces, the PGC-1000 supports camera data protocols. This is for instance used to configure the ethernet camera devices (e.g. the MHD GeFE) and to start the acquisition for the recording use case.
- Video streaming interfaces for video capture, single stream
On its 10G interfaces, the PGC-1000 supports camera data streaming. It is used to stream a single video data stream per 10G interface to the host PC over the PCIe interface. The PGC-1000 takes care of the video streaming protocol termination so that the host application must deal with raw payload data only.
- Network interfaces
The 10G interfaces of the PGC-1000 Grabber Card each provide a subset of typical network interface protocols. For instance, *ping* can be used to check connection. UDP and TCP can be used with some restrictions.
- Total streaming throughput (PGC-1000 inbound) of at least 2x8 Gbit/s
The PGC-1000 Grabber Card works with MHD GeFE with at least two 10G interfaces up to 2x8 Gbit/s. It has also been tested with all four 10G interfaces receiving data up to nearly 10 Gbit/s.
- PCIe transfer rate of up to 64 Gbit/s
The incoming maximum of total 40 Gbit/s is transferred over a PCIe 3.0 x8 lanes towards the host PC memory. There is enough margin to the PCIe interface capacity of 64 Gbit/s so that this cannot become a bottleneck.
- Attestation signed driver for Windows 10 version 2004 or higher
The PGC-1000 Grabber Card is accompanied by a signed Windows driver for Windows 10 version 2004 or higher. The Windows driver supports up to four 10G interfaces and has been thoroughly tested and released with two 10G interfaces corresponding to one MHD GeFE.

- C++ PGC-1000 software library for MD and MT runtime as debug and release. Built with MSVC2019 16.11 (x64).

The PGC-1000 Grabber Card and Windows driver are accompanied by a software library to expose the application programming Interface to the user application. The build environment has been MSVC2019 16.11 (x64).

- One software camera (with optional network functionality) per available network interface
The PGC-1000 software library provides one local software camera (with network functionality) per available network interface. The associated API functions can be used to develop own host PC application code without the necessity to acquire real data over the 10G interfaces of the PGC-1000 Grabber Card.

Please note: the optional network functionality is a beta feature. Performance and functionality may vary with used network adapter.

- Updater for PGC-1000 Grabber Card firmware

An updater tool is provided in addition to the PGC-1000 Grabber Card, Windows driver, and library. It runs on the host PC and can update the FW/SW on the PGC-1000 Grabber Card itself when it is plugged into a PCIe 3.0 x8 lanes slot of the host PC.

02.2 General Description

02.2.1 System Prerequisites

The following minimum system prerequisites must be met:

Required Hardware	Intel Architecture Processor
Required Operating System	Windows 10 Version 2004

02.2.2 Software Prerequisites

The PGC-1000 software library is compiled with 14.29, MSVC2019 16.11 (x64) with compiler version 19.29. This or another compatible compiler version is needed to use the software library.

02.2.3 Release Test Configuration

The release passed all Microsoft Driver Verification tests with standard configuration.

02.2.4 Restrictions

Activated memory compression under Windows 10 can result in system crashes on certain systems. Deactivating memory and page compression solves this. Even if memory compression is shown as »off«, you should disable it.

Certain network issues and side effects can arise if a firewall is used. Please exclude your libpgc1k application from your firewall. Libpgc1k uses network broadcast functionality for GVCP camera discovery.

02.2.5 Miscellaneous

There are no miscellaneous items which must be described.

02.3 Installation

The installation procedure is described in the following document:

PGC-1000 User Guide

02.3.1 Installation Hints

Please remove all previous versions of the PGC-1000 Windows driver from the drivers and driver store directories. You can follow these steps to remove all old driver versions:

1. Start cmd.exe as Administrator.
2. Execute pnputil.exe -e
3. Delete all PGC drivers with pnputil.exe -f -d oem<number>.inf

02.4 Licensing

There is no license necessary.

02.5 What's New

Libpgc1k API Changes:

- Stop_acquisition now only issues the stop acquisition command and does not close the stream channel. Use deinit_acquisition to close the stream channel.
- Changed the parameter order of prepare_acquisition
- removed obsolete get_library_version function

Libpgc1k New Features:

- Dry run option for firmware update function
- Multi channel camera data stream support for prepare_acquisition
- deinit_acquisition closes the stream channel
- Softcam frame rate configurable
- Automatic packet size for softcam and normal acquisition
- pgc1k::fio::wait_for_completion(handle) function that waits until all data is written to disk.

02.6 Compatibility to Earlier Releases

This release is not compatible with previous PGC-1000 releases.

02.7 Fixed Problems

This section describes the set of fixed problems of the released version.

Libpgc1k Bugfixes:

- Fixed a bug in softcam removal and native interface with attached softcam removal
- Multiple softcam bugfixes
- Multiple memleak fixes
- Multiple deadlock fixes
- Customer issue #15 (Setting event log file to nullptr leads to sporadic failures in `pgc1k::deinit()`)
- Customer issue #17 (`pgc1k::enable_auto_discovery(true)` leads to high CPU usage)

Libpgc1k Other Changes:

- N/A

Driver Bugfixes:

- Free MDL on application exit

Driver Other Changes:

- Hardened firmware update interface, added dry run feature
- Increased multicast addresses to 256
- Better real-time performance of worker processes

02.8 Known issues

Firmware: Pure UDP/TCP may expose lower performance or under rare circumstances lockups or packet loss.

Firmware: When the reset is done by the libpgc1k, it is possible, that old camera data remains inside the PGC-1000 card. When new camera data is received by the PGC-1000 card, the old data might be received by the libpgc1k.

Libpgc1k and PGC Driver: Multiple PGC-1000 cards in one PC are currently not supported.

Software Camera Beta Version is faulty and can generate errors on the receiver PC.

02.8.1 Hardware Related Items

There are currently no hardware related items available which must be described.

03 Hints

There are currently no hints available which must be described.

04 Hotfix information

There are currently no hotfixes available which must be described.

05 Contact, support, and problem reporting

For contact information, support, and problem reporting, visit www.plc2.com.