SAM600 version 1.2.2
Release note

SAM600 process bus I/O system: Enabling the digital substation

SAM600 process bus I/O system make substations safer and easier to upgrade and simplify operations and maintenance through a substation’s entire life cycle.

SAM600 interfaces conventional instrument transformers and can integrate with non-conventional instrument transformers as well, thus bringing the advantages of digital substations to new and existing installations.

The modularity of SAM600 systems allow for a broad application coverage. Built for the harshest environments, SAM600 modules can be placed alongside primary equipment in the switchyard, collecting information directly from the source and converting it into IEC 61850-9-2 digital format.

Kind regards,

Thomas Werner
Global Product Manager
Grid Automation Products
Benefits

Discover the full range of benefits below:

Safety
- As the high-voltage termination is moved to the field, maintenance and upgrade activities on the secondary system side on the protection and control panels are safe to execute.
- Easy to maintain and replace without switching off the complete bay.

Outage time reduction during retrofit upgrades and maintenance
- Process bus systems with optical cables is placed on-site while the old system is still in service. Service interruption window can be shortened when switching from old to new.

Cost-savings
- Pre-engineered, pre-fabricated and tested building blocks of SAM600 kiosks can be easily deployed. Possibility to late project changes and reduced risk on cable engineering, as process bus communication relies on IEC 61850. Testing and verification becomes more automated, thus reducing effort and equipment.
- Easy to extend, limited number of spare parts

Easy to extend, limited number of spare parts
- Modular product design optimally adapts to any application. Possible to integrate into primary switchgear

<table>
<thead>
<tr>
<th>Feature</th>
<th>Benefit</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>SAM600 system</strong></td>
<td></td>
</tr>
<tr>
<td>Housing</td>
<td>Closed housing if mounted horizontally</td>
</tr>
<tr>
<td>HMI</td>
<td>Operational LEDs at the front</td>
</tr>
<tr>
<td>Synchronization</td>
<td>- Synchronization via IEEE1588 (profile IEC 61850-9-3)</td>
</tr>
<tr>
<td></td>
<td>- Synchronization via 1PPS (optional)</td>
</tr>
<tr>
<td></td>
<td>- SAM600-TS module optional in system design</td>
</tr>
<tr>
<td>Application</td>
<td>IEC 61850-9-2 stream bridging with any communication port in a SAM600 system</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>SAM600-CT</strong></td>
<td></td>
</tr>
<tr>
<td>Cabling</td>
<td>Cabling is terminated at feed-through terminals</td>
</tr>
<tr>
<td>Measurements</td>
<td>- Measurement range between 0 and 70x in</td>
</tr>
<tr>
<td></td>
<td>- Precision measurement accuracy across measurement and operating temperature range</td>
</tr>
<tr>
<td><strong>SAM600-VT</strong></td>
<td></td>
</tr>
<tr>
<td>Measurements</td>
<td>- 4 measurement channels available</td>
</tr>
<tr>
<td></td>
<td>- Measurement range from 0 to 2.8x Un (400V RMS)</td>
</tr>
<tr>
<td></td>
<td>- Precision measurement accuracy across measurement and operating temperature range</td>
</tr>
<tr>
<td><strong>SAM600-TS</strong></td>
<td></td>
</tr>
<tr>
<td>Communication</td>
<td>Two LC communication ports</td>
</tr>
<tr>
<td>Time synchronization</td>
<td>- Supports IEEE1588 according to IEC 61850-9-3 profile</td>
</tr>
<tr>
<td></td>
<td>- Time synchronization with 1PPS in and 1PPS out</td>
</tr>
<tr>
<td></td>
<td>- SAM600-TS module is optional</td>
</tr>
<tr>
<td>Communication redundancy</td>
<td>- SAM600-TS supports communication redundancy according to IEC62439-3 (HSR, PRP) on the uplink ports</td>
</tr>
<tr>
<td><strong>SAM600 system configuration</strong></td>
<td></td>
</tr>
<tr>
<td>Configuration</td>
<td>SAM600 configuration with proven PCM600 configuration tool</td>
</tr>
<tr>
<td>System</td>
<td>- Configuration of SAM600 system</td>
</tr>
<tr>
<td></td>
<td>- Single access to SAM600 for downloading configuration</td>
</tr>
<tr>
<td>System size</td>
<td>- Up to 10 SAM600 modules per system</td>
</tr>
<tr>
<td></td>
<td>- Free assignments of IEC 61850-9-2LE streams per access point</td>
</tr>
</tbody>
</table>
## New and enhanced features
- IEC 61869-13 upcoming standard ready
- Various refinements/corrections in SAM600 product documentation and technical data

## Resolved known issues from previous releases
- **Fixed:** Configurable transducer value parameter names for SAM600-VT have wrong naming – indicating line-neutral, although setting parameter itself relates to line-line voltage
- **Fixed:** SAM600 systems (>8 modules in system bus ring configuration or >4 modules in chain configuration) interacting with PCM600 can cause disturbed IEC 61850-9-2LE traffic to IED devices
- **Fixed:** Large configurations (which include bridged streams) in SV configuration tool can display incorrect error messages concerning stream limitations
- **Updated:** Creating a SAM600 system, consisting of one SAM600-TS module and a SAM600-CT module connected in a ring in offline mode, and then performing a configuration write to such a system causes SAM600 ConnPack to throw a “topology mismatch” error while performing the write operation. The configuration is written successfully. Workaround: Create a new IED object from an online configuration

## Known issues
- **Physical topology change of a SAM600 system (removing/adding SAM600 modules in a system bus) causes the online scan feature in SAM600 ConnPack to not detect re-inserted SAM600 modules correctly.** Workaround: if a topology change is done, restart the SAM600 system
- **PTP connection values in Parameter Setting Tool may get swapped after common read/partial read is executed.** Info: PTP functionality is not affected
- **Export of parameters from Parameter Setting Tool of PCM600 doesn’t include global parameters.** Workaround: Export SAM600 configuration using PCM600 .pcmp export file.
- **IEC61850 SCL SV access points are not migrated from a SAM600 1.2.X configuration to a SAM600 1.2.2 configuration using PCM600 V2.10 and SAM600 ConnPack V1.2.2.** Workaround: Use SAM600 1.2.2 ConnPack together with PCM600 V2.8 or V2.9.
- A user is able to select SAM600 ConnPack V1.1.1 in PCM600 Updated Manager for PCM600 versions V2.8, V2.9, V2.10. SAM600 ConnPack V1.1.1 is not compatible with these PCM600 versions. Workaround: none
- It is not recommended to configure SAM600 1.2 or above IED object with SAM600 1.1 ConnPack since it will lead to errors during configuration process
- Don’t install SAM600 ConnPack version 1.1.0 and 1.2.0.0 on to of 1.2.2.0 version since it will lead to errors during configuration process.
- iEC 61850 9-2 specifies the SV control block type to multicast addressing as default. When using a IEC 61850 system engineering tool, this setting can be changed to unicast. Re-importing the SCL file into PCM600 with SV control block type set to unicast is not supported. Workaround: Leave SV control block setting to default setting.
- in IEC61850 SCL model, changing the access point name from “SAM600ServerModel” to a different name, or changing the subnetwork name from “ABB-USB” to a different name, causes the SCL model import to PCM600 to fail. Workaround: do not change the default
- Using PCM600 V2.8, importing a scd file for SAM600 in a FPN-enabled project throws an exception as the IED object under the “bay” node is not created. Workaround: Use PCM600 V2.10 or above for FPN-enabled projects where SAM600 scd files shall be imported
- Using SAM600 1.1, ConnPack together with PCM600 2.7 fails with hotfixes Rollup 20161222 and Rollup 20180706. Workaround: Remove those rollups from installed applications.
- Scanning or configuring SAM600 1.1 together with ConnPack version 1.2.0.0 fails. Workaround: Use ConnPack version 1.2.1.0
- ConnPack version 1.2.2.0 is not compatible with PCM600 FIPS option enabled. Workaround: Disable FIPS
### New and enhanced features

- Improved PTP performance (resynchronization, master switchover, holdover time, sync message handling)
- "GPS required" on SAM600 aligned to IEC 61850-9-3 (up to clock class 58 is considered "global with GPS")
- Introduced global/local indication with PPS out on SAM600-TS
- IEC 61850-9-2LE streams support configurable ApplID, VLAN and Priority ID
- Configurable time accuracy towards time master (1us/4us) in order to improve holdover time for protection-class applications
- Configurable transducer ratios per phase (including neutral) both SAM600-VT and SAM600-CT
- Digital inputs configurable for 220VDC input voltage
- Introduced new parameter for handling smpSynch behavior in free-running mode

### Resolved known issues

- Fixed phase shift introduction when a SAM600 analog module is removed from a configured stream
- Introduced new parameter in order to improve compatibility on free-running systems
- Improved resynchronization behavior (smpCnt) after a time jump
- Improved path delay reporting to the application and event log
- PTP priorities on SAM600 are lowered by default so that IEDs (bay level equipment) assumes time master functionality first
- Improved behavior when SAM600 analog module reconnects to a configured stream
- SAM600-VT simulation now uses line-line voltage for simulated values
- SetTime command allowed while system is synchronized to external PPS
- Simulation mode activates the "test" quality bit of IEC61850-9-2LE streams
- Event time stamp aligned with smpSync
- Improved log reporting for IRF contact opening and closing

### Known issues

- Configurable transducer value parameter names for SAM600-VT have wrong naming – indicating line-neutral, although setting parameter itself relates to line-line voltage
- SAM600 systems (>8 modules in system bus ring configuration or >4 modules in chain configuration) interacting with PCM600 can cause disturbed IEC 61850-9-2LE traffic to IED devices
- Large configurations (which include bridged streams) in SV configuration tool can display incorrect error messages concerning stream limitations
- In a SAM600 system (SAM600-CT and SAM600-TS) a topology mismatch error is wrongly reported while successfully writing configuration to system

---

ABB Power Grids Sweden AB  
Grid Automation Products  
SE-721 59 Västerås, Sweden  
Tel. +46 (0) 10 738 00 00

[abb.com/protection-control](http://www.abb.com/protection-control)

---

We reserve the right to make technical changes or modify the contents of this document without prior notice. With regard to purchase orders, the agreed particulars shall prevail. ABB AB does not accept any responsibility whatsoever for potential errors or possible lack of information in this document.

We reserve all rights in this document and in the subject matter and illustrations contained therein. Any reproduction, disclosure to third parties or utilization of its contents – in whole or in parts – is forbidden without prior written consent of ABB Power Grids.  
Copyright © 2020 ABB Power Grids  
All rights reserved