USE OF ST950 FIRMWARE AND HARDWARE CONFIGURATIONS 667/SU/46000/000

THIS DOCUMENT IS ELECTRONICALLY APPROVED

AND HELD IN THE SIEMENS DOCUMENT CONTROL TOOL

All PAPER COPIES ARE DEEMED UNCONTROLLED COPIES

	Prepared By	Checked and Released
Division/BU	Siemens Mobility Limited, Intelligent Traffic Systems	Siemens Mobility Limited, Intelligent Traffic Systems
Department	Engineering	Engineering
Name	Paul Cox, Kevin Napper & Mark Retallack, A Rhodes	Harry Smyth
Function	Lead Engineer	Lead Engineer
Date	April 2021	April 2021

Change History:

Issue	Change Reference	Date
1	First Issued	Sep 2013
2	Update the known problems section (section 4) Updates for ST950 firmware issue 5 (section 2.5)	Nov 2013
3	Update the known problems section (section 4)	Nov 2013
4	Add details of ST950 firmware issues 6, 7 and 8 (sections 2.6, 2.7, 2.8)	Aug 2014
5	Add details of ST950 firmware issue 9 (section 2.9)	Jun 2015
6	Add details of ST950 firmware issue 10 (section 2.10) Added CLS Waits to sections 3.2.3 and 3.3.5.	Sep 2016
7	Add details of ST950 firmware issue 11 (section 2.11)	Nov 2016
8	Add details of ST950 firmware issue 12 (section 2.12)	Jan 2018
9	Add details of ST950 firmware issue 14 (section 2.13)	Jul 2018
15	Add details of ST950 firmware issue 15 (section 2.14)	June 2019
16	Add details of ST950 firmware issue 16 (section 2.15)	Nov 2019
17	Add details of ST950 firmware issue 20 (section 2.16)	Feb 2020
18	Add details of ST950 firmware issues 21 to 24 (sections 2.17 to 2.20) Add mention of CLS LV & ELV Type B Signals (aka “CLS Lite”) to sections 3.2.3 & 3.3.5.	Apr 2021

CONTENTS

1 INTRODUCTION

1.1 Purpose

The purpose of this document is:-

1) To define the compatibility between all issues of ST950 firmware
2) To define the compatibility between all issues of ST950 hardware
3) To define the compatibility between the ST950 and other traffic products

1.2 Scope

All issues of ST950 Traffic Controller Family firmware and hardware.

A description of the ST950 traffic controller can be found in the ST950 General Handbook 667/HB/46000/000.

A description of the differences between the ST950 and previous traffic controllers can be found in the ST950 Facilities Handbook 667/HB/46000/001.

1.3 Glossary and Common Terms

Refer to the Glossary in the ST950 General Handbook 667/HB/46000/000.

Reference numbers in the form ‘TS00####’ refer to change request documents (RFC) within the Siemens Poole change control system. Reference numbers in the form ‘Ref 00#####’ refer to fault and enhancement reports within the Siemens Poole ‘bug tracker’ system.

2 Firmware Descriptions

The following sub-sections detail the changes made in each release of ST950 controller firmware package 667/1/46059/000. Changes to the firmware for the PHP Phase Bus Processor (3.2.4), LSLS Cards (3.3.4) and I/O Cards (3.5.1) are recorded in the relevant subsections of section 3.

2.1 Issue 1: 2013 Jun, Trial Version

Package 667/1/46059/000 issue 1 was produced as part of the initial controller street trials.

2.2 Issue 2: 2013 Jul, Trial Version

Package 667/1/46059/000 issue 2 included the LRT facility.

Contact Siemens Poole before attempting to upgrade controllers running these trial versions of firmware.

2.3 Issue 3: 2013 Sep, First Production Release

Package 667/1/46059/000 issue 3 is the first production release.

2.4 Issue 4: 2013 Sep, Not Released

Package 667/1/46059/000 issue 4 fixes a problem with the image used by production to install the firmware. The firmware contents are identical to those for the issue 3 release.

2.5 Issue 5: 2013 Nov, Conditioning Enhancements and Load Types

Package 667/1/46059/000 issue 5 includes a number of enhancements to Special Conditioning:

- The number of Conditioning Timers available has been increased from 96 to 480 (ref 0009219).
- New Special Conditioning operators have been added to hold, resume and wipe a Conditioning Timer (ref 0012367).
- Added 1024 general purpose ‘Conditioning Facility Flags’ – to allow the most flexibility, both Special Conditioning and the new handset command “CFF” (which is access level 2) have read and modify the state of each flag (ref 0009129 & 0009649).
- Doubles the space available for Special Conditioning (ref 0022260).

This release also adds the following ELV load types (section 3.3.5):

- KLT8: Low-power near-side pedestrian signals from Siemens (ref 0022243).
- KLT9: AGD Wait Indicators (ref 0022277).
- KLT11: 40V Silux aspects used with the new 40V ELV Controller to the firmware (ref 0022262).

This release also resolves these issues:

- The Self-Test SSR test can fail if no dimming transformer is fitted (ref CN002742 and 0022262). Fixed in Primary CPU firmware 46020 issue 4, which is contained within the ST950 46059 issue 5 firmware package.

- The CDT/PIR commands and the Special Conditioning Timers web page now accept values without a leading zero, e.g. ".4" is accepted as "0.4" (ref 0022265).
- The Special Conditioning Timers web page listed all possible timers, not the configured numbered (ref 0022257).
- IC4 View Differences could not update the controller if the LPR/LAR data items contain the 'not applicable' phase value of 255 (ref 0021771).
- Improved the wording of the programming sequence on the IC4 Import web page (ref 0022346).

2.6 Issue 6: 2014 Jun, ST950 Service Release 1

Package 667/1/46059/000 issue 6 includes the following new features:

- Supports different languages.
- Adds Last Lamp Failed (LLF) monitoring.
- Adds Smooth Base-Time CLF (from PB800-29).
- Allows for CLF cycle times up to 500 seconds by stepping plan at 2s intervals (CSS).
- Adds profiles (section 3.2.3) for Abu Dhabi signals.
- Changes and profiles (section 3.2.3) for Hong Kong (from PB800-30).
- Adds the KRW setting to allow monitoring of Helios CLS Ped Red + CLS Wait.
- Logs the original and new value when logging a change to a handset command.
- Adds a time-out to help exit from the Reserve State.
- Increases the size available for Site Log attachments.
- Warning triangle (top right-corner of web page) if faults/notifications present.
- Uses more secure user interfaces; using https (rather than http) for web pages and SSH (rather than telnet) for handset access.
- Numerous Linux kernel, web server and SSL security updates.

This release also makes the following improvements to the LRT facility:

- LRT Following Inhibit Period not started if LRT Phase terminates due to Cancel Actions (ref 0022695).
- LRT Stop-line Event not marked suspect or faulty if both it and Stop-line Cleared missed (ref 0022696).
- LRT Revertive Phase Demand not applied if LRT Phase at ROW when Cancel Timeout expires (ref 0023556).
- LRT Revertive Phase Demand only inserted once (ref 0022230).
- LRT Stop-line Presence Events marked faulty if Prepare faulty and Advance Event missed (ref 0022570).
- LRT: Clearance of Overlap Inhibit Bit for a unit does not check to see if other units are also requesting an Overlap Inhibit (ref 0022647).
- If LRT*DISUNIT is used to disable the current unit to allow another to take control, it doesn't work because the unit immediately regains control (ref 0023714).
- LRT Unit Overlap Inhibit permanently set if Overlap Inhibit Period is 0 when LRT Unit inhibited (ref 0022411).
- The 'LRT Event Active' Special Conditioning mnemonics for Stop-Line Cleared and Cancel never appear active (ref 0022259).

- ROW can oscillate between multiple Exceptional Stages (ref 0022533).
- Exceptional Stage movement to be ignored in lower priority modes (ref 0022562).
- Event no longer faulty notifications should be reformatted to be consistent with other LRT diagnostic log entries (ref 0021207).

This release also resolves these reported issues:

- Multiple Hurry Calls can fight and never complete (ref 0022463 & section 4.7).
- Inputs not forced to correct state if all I/O cards missing at power-up (ref 0023795).
- FLF13 not logged if no I/O cards are present at power-up (ref 0022805).
- Modifications to CFF were not reported by IC4 View Differences (ref 0023466).
- USB port slow to connect and creates a new network on Windows 7 (ref 0022303).
- Controller does not recognise some USB memory sticks formatted by windows (ref 0022078).
- RF1 and RF2 are treated as single bit by UTMC OTU (ref 0022408).
- IC4 Emulation and Windows 7: The time is always set one hour behind that requested (ref 0022414).

This release includes the following improvements to the Lamp Monitoring user interface:

- Adds the KLV field to the LMU General web page and treat all LV-CLS values (3+) as the same (ref 0021643).
- Adds 'Sensor Type' to the LMU-Sensors web page (ref 0022830).
- Sensors/Aspects: Adds the row for Wait lamp faults, i.e. Aspect 6 on ‘R,G,RW’ sensors (ref 0022753).
- Sensors/Aspect: Not yet learnt red highlight cleared too early (ref 0022960).
- Sensors/Aspect: Highlights 'lamp faults' in similar way to 'not yet learnt' (ref 0023099).
- Adds an indication in System Log when KRD times-out and it triggers red lamp faults (ref 0022770).
- Changes to KLT may not be pushed through to the LSLS cards; adds message to switch controller power off/on to reconfigure LSLS cards (ref 0022399).
- "Lamp monitor queue full" error occasionally reported on close down for a restart (ref 0021563)

This release includes the following improvements to the Factory Self-Test:

- Define separate scenario for factory board self-test (vs. scenario used for factory controller self test) (ref 0021955).
- Tester tests added: sigs on/off, door switch, RFL button & Cab Alarm (ref 0022591).
- There is no test of Modem Power switch in factory self test (ref 0021986).
- Factory self test extension - licence inventory & network inventory (ref 0022086).
- Self test failure in hot box - Fail:SEC (comms error) (ref 0022663).

This release also resolves these other issues:

- Fixed Time to Current Maximums failed to hold stage when returning to FTCM operation – multi-stream controllers only (ref 0023450).
- Occasional GSPI errors logged (ref 0021501).
- NTP peer enabled by default, but no address configured (ref 0016949).

- The "Controller Shutdown ..." Fault Table entries should not set FLF62 (ref 0022028).
- IC4 Emulator: No System Error indication or FLF62 '!FLF' set in when non-FLF faults are logged (ref 0022640).
- MOVA online reports in log but no offline reports - confusing (ref 0023983).
- "Type 2 UTC connection status" is shown as "STANDALONE", but application not running (ref 0023984).
- Make UTMC OTU licence specific to ST950, not Gemini 3 (ref 0021659).
- Add better display of Fault Table to Site Info Export (ref 0023985).
- Removed the redundant handset commands DFD and KRR (ref 0020717 & 0021738)

The following minor or unlikely issues have also been resolved:

- Lamp Monitoring of LED Signals where Dim current higher than Bright (ref 0016201).
- Programming Primary etc logged as 'download' not 'programming' (ref 0022339).
- Missing System Log Event: 'Communications lost to the SEC micro' (ref 0023602).
- Improve web page help for STS and SPH - SDE/SA notes (ref 0022549).
- ENG handset command allows read access to 64KB of RAM (ref 0023483).
- Outputs 9-12 on I/O Card 1 may reset briefly (ref 0023257).
- Web Level-3 Access Control should not use time() (ref 0023492).
- Angstrom version not available in exported site info (ref 0021361).
- OSS backup causes spurious fault table entry on poor comms networks (ref 0021746).
- Opening new telnet session under heavy telnet load interferes with scheduling and can cause reserve mode (ref 0021977).
- IC4 Config - Import Config - Wording improvements (ref 0023431).
- Error message on failed IC4 config load could be more helpful (ref 0022478).

2.7 Issue 7: 2014 Jul, Test Mode Added and Improvements

Package 667/1/46059/000 issue 7 includes the following new features:

- Reinstates the single-step Test Mode facility (TMA handset command).

This release also resolves these reported issues:

- Primary and SEC firmware changes to fix SPI sensitivity to humidity (ref 0024321).

2.8 Issue 8: 2014 Sep, Various Improvements

Package 667/1/46059/000 issue 8 resolves these problems:

- Certificates for https not accepted by Firefox v31 (ref 0024376).
- Problems with MOVA Mode and Extend All Red being forced to max (ref 0024245).
- NTP can be slow to establish the time on start-up (ref 0024266).
- System Log problems if SSH closed while using 'debug' command (ref 0024437).
- 'Real time view' webpage – GSPI IO bit 0 not updated on graph (ref 0024450).
- Software performance improvements (ref 0024395)

2.9 Issue 9: 2015 Jun, Service Release 2

This section details the changes for Service Release 2, firmware package 667/1/46059/000 issue 9.0 (and its trial version 8.28)

This release includes the following new features:

- Home page – An image to help identify the controller can now be added using the web page: System - Settings - Web Interface (ref 0020432)
- 'Site UI' – A live-update diagram of the intersection showing the live states of the phases and detectors (ref 0024708)
- 'Talking Controller' – The Real Time View speaks the Detector name when a vehicle is detected and the Phase colour when it changes (ref 0024709)
- Fault Table Help – Added additional Help to a number of common fault entries (ref 0015336)
- PKI log-in enabled for demonstration purposes, with user name logging of web page changes (ref 0025127 and 0025330)
- A Terminal session can be started from within the Web Browser so separate telnet / SSH applications are not required (ref 0024936)
- Customer Request: Individual phases can now be switched off by Special Conditioning. Details can be found in the facilities handbook (ref 0015149)
- LMP now uses the 'SPACE' key to test next colour/phase (ref 0024734)
- LMP can now be used to test switched signs (ref 0015156)
- Adds the ability to load new Time Zone data files. The included Time Zone information has been updated (2014j, 2015a), which includes an update for Chile.
- Includes the new ELV profile (KLT:19) for Swarco low-level Cycle Signals (ref 0026050 and section 3.3.5)
- The first version to include the Spanish language pack (although this not present in v8.28 trial version)

Outstation Support Server (OSS) Compatibility:

- This version of ST950 firmware requires (at least) version 9.0 of the OSS.

This release resolves these problems with UTC and MOVA:

- Fixed: Problem with MOVA priority demands when there are no other demands present (ref 0025666 and STAB15-0095)
- Fixed: Problems with internal I/O (including the Controller / MOVA / UTMC interfaces) if external I/O Cards are faulty or missing at start-up (ref 0024528)
- Fixed: MOVA mode can be set to automatically start the Pedestrian Window period (like UTC mode). The options for the Maximum Green and Window timers for both MOVA and UTC modes can now be changed via their respective web pages or MCM handset command (ref 0024647)
- Fixed: Import of UTMC-OTU CSV file failed (ref 0024481)
- Fixed: SCOOT Loop data mixed-up (loops 2 & 20) (ref 0024186)
- Added support in the UTMC-OTU for pre-programmed stage forces up to and including 30 minutes into the future (ref 0024901)

This release also resolves these other problems:

- Fixed: Start of Flashing Green not always synchronised (ref 0024601)
- Fixed: Unknown records '{0a:xxxxxx}' appear in Gemini2's 'Controller Log' with Last Lamp Failed Monitoring (Ref 0024782)
- Fixed: Problems when exporting Site Info to USB stick using handset (ref 0024433)
- Fixed: Export Site Info - Controller Data - STS abbreviated to just '+' (ref 0025003)
- Fixed: In Export Site Info, the Phase/Colour column in the Lamp Monitoring table appears as a number (ref 0025824)
- Fixed: CONDFLASH*n* should have worked even if Fail-To-Part-Time facility not enabled (ref 0023239)
- Fixed: WIZ rejected if '+' used immediately beforehand (ref 0023096)
- Various security and stability updates.

This release includes the following improvements to web pages:

- It is now possible to create and modify CLF plans; Influence Sets are now editable (ref 0019044)
- Recheck Timetable buttons (CCP=1: Call Current Plan) added to the CLF Status and Timetable web pages (ref 0024771)
- Various improvements to the LMU web pages (ref 0022964, 0024106, 0024653, 0024644, 0024819)
- Web pages now support buttons; improved the Controller-Faults web page (ref 0015838)
- New web page added showing the Special Conditioning Fault Flags and Data values (ref 0025128)
- Added more information as to why 'Cannot own the Heart while the controller is shutdown.' (ref 0023792)
- Customer Request: Display firmware checksum of Primary on web page (ref 0024842)

This release includes the following improvements to Self-Test:

- Allow longer time to release button to start Self-Test (ref 0023140)
- Cosmetic change to: "Waiting for EFC... EFC started..." (ref 0024825)
- Improved Licence Inventory text output (ref 0024550)
- Now checks the boot-loader version (ref 0024874)
- No fault was reported when I/O hardware ID changes due to H/W fault (ref 0024828)
- The sequencing of the factory PCB test was causing confusion (ref 0024794)

This release includes the following other improvements:

- STS handset command now shows when an Intergreen Delay is timing (ref 0020216)
- Option added to report LRT mode as Bus Priority mode for legacy equipment (ref 0022581)
- Customer Request: New 8DF file available to force inputs active on a backplane failure when DFM only set to 'Y' and not 'A' (ref 0022526)
- Improve checks to detect if Primary is still running the old configuration (ref 0024194)
- Added auto-baud to the optional USB RS232 handset interface (ref 0024574)

- The ‘System - Advanced’ settings on the ‘Status and Configuration’ web page are now hidden by default because these detailed options are not normally required. There is an option on the ‘System - Settings - Web Interface’ page to hide/show the advance options (ref 0025340)
- Backing up of the GVP configuration data to the OSS is now only performed between 4am and 5am (by default) to limit its impact on the system (ref 0025877)
- Relay Tests are now postponed until at least one Phase is at Green to help prevent Relay Test faults (FLF4) being reported erroneously on LV Controllers wired for Hardware Fail Flash fitted with LED Signals (ref 0025887)

2.10 Issue 10: 2016 Sep, UTMC Remote Monitoring MIB

This section details the changes for firmware package 667/1/46059/000 issue 10.0.

This release includes the following new features:

- Supports the UTMC Remote Monitoring SNMP MIB (version 201512141017Z)
- This is the first version to include the Russian language pack

This release includes the following improvements:

- Improves the 'Signals Off' Fault Table notification so it also appears during Low Lamp Supply (ref 0026521)
- Improves the Details column on the Status and Configuration – Controller – Phases – Status web page to show multiple active units (ref 0026905)
- Adds firmware support for the Uninterruptable Power Supply I/O inputs for fault and ‘on-battery’ indications; see the new web page Status and Configuration – Controller – Supply – UPS (ref 0026957)
- Identifies the complete product in the UTMC-OTU SNMP MIB field "Hardware Type" (ref 0027326)

This release resolves the following problems:

- FLF3 Correspondence Faults that are configured to not extinguish the signals sometimes remained logged after RFL=1 (ref 0023105)
- Handset: STS displayed “LRT+” when it should identify the active unit number (ref 0026707)
- Last Lamp Failed monitoring and Special Conditioning: ‘LLF Only’ faults for 'Calculated' Wait faults (LV) did not update the LMPANY* and ALMP* Special Conditioning status indications (ref 0026860)
- Special Conditioning: DSRACC always indicated handset connected until a handset is connected and removed (ref 0026924)
- System log filled with “E(DigitalIO): Attempt to set invalid output user 0xfffffff0” error messages when OSE I/O Mapping is configured incorrectly so the UTMC-OTU (for example) attempts to use an IC4 configured controller output port (ref 0027506)
- Priority and Emergency Vehicle Modes remained active if the priority maximum time expired while the priority extensions timer was counting (and the extension input was inactive) (ref 0027656)
- Export Site Information (and RM-MIB) returned information for two Pedestrian streams even though the second stream had been disabled by RLM1=0 (ref 0027711)

2.11 Issue 11: 2016 November, Stratos

This section details the changes for firmware package 667/1/46059/000 issue 11.0.

This release includes the following new features:

- Stratos connection. The ST950 can be configured to connect to Stratos and take advantage of the monitoring, management and remote access capabilities available through Stratos. This includes the new Controller Monitor application which presents a consistent view of monitored controllers to Stratos. The requirement and means of configuration are described in 667/HU/46000/000 and summarised in the Quick Start Guide 667/HQ/46000/010.
- Outstation user credentials. Outstation User Credentials are issued and managed through Stratos and provide a means for users to authenticate with and / or identify themselves to ST950 and Stratos Outstation. This removes the need to use a username and password, enhances security and supports identification of users in the System Log. The credentials are described in 667/HU/46000/000 and summarised in the Quick Start Guide 667/HQ/46000/007.

This release includes the following improvements:

- *movacomm* command added to GVP handset terminal interface. This allows access to movacomm functionality without the need for the stand-alone TRL movacomm program. More information on the *movacomm* command can be found in 667/HB/46000/003.
- Option added to disable the Controller's NTP/GPS Clock accuracy check (ref 0026518 and section 4.13).
- Controls to limit the availability of username & password login and prevent unauthenticated handset changes.
- Web page to list currently connected users.
- Fault history on Fault Table web page.
- Various security fixes.
- 2016a release of time zone data.

This release resolves the following problems:

- When using the 'Handset Command Memories' (e.g. '..1'), a different handset command may be stored than that typed (ref 0029081).
- ML reply bit to UTC not being set when MOVA is on control (ref 0028870).
- RF1 and RF2 are treated as single bit (ref 0022508).
- Incorrect UTMC UTC message counts on web page (ref 0028024 & 0028068).
- *osescoot* command does not save/restore pack size (ref 0028072).
- SiteUI handling of map image file could lead to a corrupted HTTP header (ref 0028225).
- GSPI watchdog expiry reported in System Log after restart (ref 0024586, 0026005, 26016).

2.12 Issue 12: 2018 January, Service release

This section details the changes for firmware package 667/1/46059/000 issue 12.0.

This release resolves the following problems:

- MOVA Phone Home not cleared from fault table
- UTC GP bits assigned to alerts only remain valid for 15 minutes.
- Resolution of the UTC Timing issue
- Upgrading from Stratos 7 to 8 causes MOVA corruption
- MOVA does not set CSI MOVA TO port if separate TO bit configured
- Speaking Controller not working on Issue 11
- Pre-existing core dumps are made visible after upgrade
- Sites reporting "Licence Container Damaged"
- Experiencing slow or inaccessible web pages with v11
- Disk becomes full during upgrade

A number of potential security issues have also been addressed by this release. For further details please contact Siemens Poole Engineering (Dave Martin)

Unlike previous upgrades this Firmware Upgrade does NOT require the Signals to be switched off – during the upgrade the controller will operate in reserve mode.. However it does require Issue11 to be running for the upgrade to work. The controller will refuse to upgrade from any earlier versions. If you need to upgrade to Issue11 first, please refer to STAB16-0106.

2.13 Issue 14: 2018 July, Service release

This section details the changes for firmware package 667/1/46059/000 issue 14.0.

NB Issue 13 was not released

Note:- The controller can only be upgraded to this version if already running either Issue 11 or Issue 12. If you need to upgrade to this version from a version prior to issue 11, you will first need to upgrade to issue 11.

This release resolves the following problems:

- Fixes an issue in the IO inputs after a quiet initialization or if the controller is rebooted instead of Power Cycled where the inputs stop toggling.

Changes in this release:

- The Web page option "Enable NTP" enabled by default has been made Read Only, as some users have been mistakenly been disabling NTP on ST950 Controllers thinking that this it was only used for network connected controllers, but NTP is used internally within the ST950 to arbitrate between the different time sources.

2.14 Issue 15: 2019 June, Service release

This section details the changes for firmware package 667/1/46059/000 issue 15.0.

This release resolves the following problems:

- The controller could soft reboot multiple times and subsequently stick in reserve mode or extinguish the signals. ·
- MOVA Data set loading sometimes caused issues. (The system web page showed MOVA as running, however using the movacomm1 command on webterm reported correctly that MOVA was not running after a data set load). ·
- MOVA Tools, when used over the local Wifi link, did not work. ·
- An issue with the internal time system where the Controller and system time drifted apart, resulting in the controller functionality having the incorrect time under some conditions. ·
- The driver necessary to allow USB connection between the controller and a local users PC has been updated to allow operation with Windows 10. ·

Changes in this release:

- Several security updates have been implemented.

2.15 Issue 16: 2019 November, Service release

This section details the changes for firmware package 667/1/46059/000 issue 16.0.

This release resolves the following problem:

- The EFC could reboot during a heart backup.

Changes in this release:

- No other changes

2.16 Issue 20: 2020 February, Add support for Plus+

This release includes the following new features:

- Support for Plus+ - see ST950 Plus+ User Manual (667/HE/53000/000) for further information

This release includes the following improvements:

- Improved usability with touch-screen devices (ref PLUS-3828)
- Various security improvements
- Improved configurability of GPS for use in areas of poor reception (ref PLUS-3358)

This release resolves the following problems:

- High CPU load warning no longer triggered by expected events (ref PLUS-3907)
- Drift of system time when time mode is set to “controller time” (ref PLUS-2499)
- Incorrect logging of actions against user “RS232” (ref PLUS-2867)
- Occasional failure of the programming button to operate correctly (ref PLUS-4293)

This release of ST950 firmware is only intended for Plus+ Controllers:

- LV Controllers are not supported
- ELV Controllers are not supported

Some features are not available in this release – see section 3.4.1

2.17 Issue 21: 2020 October, Add Plus+ comms rings & Smartloop

This release includes the following new features:

- Plus+ comms rings
- Plus+ Smartloop

This release includes the following improvements:

- Reduced start-up times
- Reduction in signals off time during firmware upgrade

This release of ST950 firmware is only intended for Plus+ Controllers:

- LV Controllers are not supported
- ELV Controllers are not supported

2.18 Issue 22: 2020 December, Adds Special Conditioning Improvements

This release includes the following new features:

- Supports Plus+ and LV Controller types (but not ELV)
- Adds support for integer values in IC4 Special Conditioning; see Help in IC4 v15.3.3 (or later)
- Adds support for a DVI35 facility (specific customer)

This release of ST950 firmware is only intended for LV and Plus+ Controllers:

- ELV Controllers are not supported

This version was not released to production.

2.19 Issue 23: 2021 February, Plus+ Improvements

This release includes the following changes:

- Supports all ST950 Controller Types: LV, ELV as well as Plus+
- Plus+ Fault Table keys standardised for Stratos
- Various Plus+ improvements

This version was not released to production.

2.20 Issue 24: 2021 March, Adds MOVA8 and I/O Count Logging

This release includes the following new features:

- MOVA8
- I/O Count Logging (see description in 667-HB-46000-001)

This release also resolves the following issues:

- PLUS-6058: The Clocks page only displays the Synchronisation Source when it is relevant.
- PLUS-6075: Fix 'Own Heart' status shown erroneously.
- Various Plus+ improvements

Refer to section 3.4.1 to determine which Plus+ features are available.

3 COMPATIBILITY

3.1 ST950 CPU Card – 667/1/46010/001 & 667/1/46010/101

All versions of firmware are compatible with both variants of CPU card. However, certain features require the newer /101 card.

ST950 CPU Card variant 667/1/46010**/101** must be used:

- When connecting to Stratos (available Firmware version 11)
- On Plus+ Controllers (available Firmware version 20)

3.2 LV Controller

3.2.1 MDU (Mains Distribution Unit) PCB – 667/1/27025/xxx

No compatibility issues at this time.

3.2.2 Mains LSC – 667/1/27221/xxx, 667/1/27223/xxx, 667/1/33905/xxx

Commonly used variants:

- /002 – (Original) Non-UK Variant (with Fail to Flashing option)
- /012 – (Original) UK Variant (Fail to Blackout)
- /302 – "LED Lamp Switch" – Non-UK Variant (with Fail to Flashing option)
- /312 – "LED Lamp Switch" – UK Variant (Fail to Blackout)

The ST950 controller is compatible with all variants and issues of these PCBs, except:

- The ST950 is not compatible with the variant used in the ST800P (667/1/27223/402). This is because there is no equivalent ST950P at this time.
- "LED Lamp Switch" (667/1/33905/3xx) – refer to Section 3.2.3 for firmware compatibility and the LV CLS Handbook 667/HB/32921/007 for more information.

For details on the various issues of these cards, refer to the ST800 Compatibility document 667/SU/27000/000.

3.2.3 LV CLS LED Signals

The ST950LED Traffic Controllers have been tested with the following LV LED Signals. These signals can be used for both Vehicle Signals and Far-Side Pedestrian and Bicycle Signals. These controllers are not capable of monitoring LED near-side pedestrian / cycle signals. See the LV CLS Handbook 667/HB/32921/007 for more information.

From 667/1/46059/000 issue 1 onwards:

- [KLT:1]
  - Siemens / Dialight (max 8 per sensor)
  - CLS LV Type B – 667/1/46700/20x (max 8 per sensor)
- [KLT:10]
  - Siemens / Futurit (max 8 per sensor)
- [KLT:11]
  - Siemens SILUX 1.230d Traffic (max 8 per sensor)

From 667/1/46059/000 issue 6 onwards:

- [KLT:1] Siemens CLS Wait using the KRW setting (max 4 waits per sensor and the number of CLS Waits plus CLS Pedestrian Reds not to exceed 8 per sensor)

- [KLT:12] Hong Kong Panasonic 210mm LED Signals
- [KLT:13] Hong Kong Panasonic 300mm LED Signals
- [KLT:14] Hong Kong Panasonic Pedestrian LED Signals + Audibles
- [KLT:15] Hong Kong Ketc 210mm LED Signals
- [KLT:16] Hong Kong Ketc 300mm LED Signals
- [KLT:17] Hong Kong Ketc Pedestrian LED Signals + Audibles
- [KLT:18] Abu Dhabi Sagemcom DIOFIT WE D300

The text '[KLT:n]' indicates the Load Type number 'n' that needs to be configured in order to lamp monitor each type of LED Signal. This can be set in the IC4 configuration or modified on-street by using the handset command KLT or LMU-Sensors web page.

NOTE: The correct Lamp Switch Card must also be installed on these controllers for LV LED Signals. The LSC should be a 667/1/33905/3xx variant and labelled "LED Lamp Switch" [3.2.2]

3.2.4 Phase Bus Processor (PHP)

The ST950 checks to ensure the correct version of PHP CPU Phase Bus Processor firmware is fitted on an LV Controller in order to ensure that two microprocessors are independently performing the green/amber conflict check.

LV Controllers: Require PB815 issue 4 or later. If earlier firmware is fitted, the fault "FLF 2:253" will be logged at power-up. SelfTest will also shutdown and report the incompatibility.

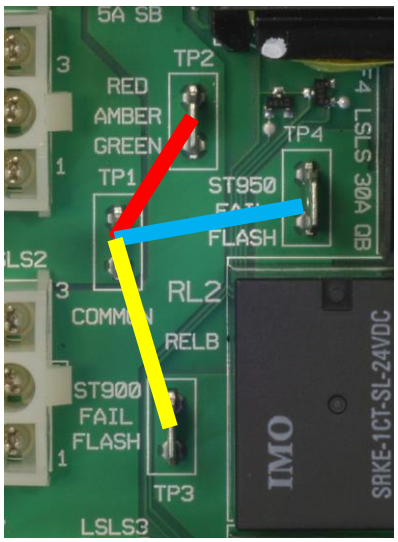
ELV Controllers: Normal operation will permit PB815 issue 2 to be used. However, SelfTest will shutdown and report the incompatibility as above.

3.3 ELV Controller

3.3.1 LPU PCB (Logic Power Unit) – 667/1/32971/xxx

No compatibility issues at this time.

3.3.2 HPU PCB (High Power Unit) – 667/1/33041/xxx



ST900/ST950 UK Non HFF
ST950 HFF
ST900 HFF

The HPU PCB includes a number of link positions used to set up the controller to either fail to all signals off or fail to hardware flashing.

Issue 6 (or later) is needed for HFF (hardware fail flash).

The newer versions of the HPU PCB have an additional link position TP4 for 'ST950 FAIL FLASH'. The original HFF link position TP3 must not be in an ST950ELV controller.

All new ST950ELV controllers are shipped with this version (or later).

However, when upgrading from an ST900ELV to ST950ELV HFF controller, check whether the HPU needs to be changed.

Older HPU (such as those fitted in existing ST900ELV controllers) may be used with the ST950ELV controller where HFF is not required (link between TP1 and TP2).

3.3.3 LSLS PCB – 667/1/32943/xxx

- Variant /001 (For UK – 32 Output LSLS Card)
  No compatibility issues at this time.

- Variant /002 (German Controller only)
  The controller is NOT compatible with this variant of the PCB.

- Variant /003 (For UK – 16 Output LSLS Card)
  No compatibility issues at this time.

3.3.4 LSLS Card Firmware

The ST950 is compatible with LSLS firmware 667/TZ/32941/000 issue 3 onwards.

667/TZ/32941/000 issue 4 includes a number of changes to assist in production testing and for the German hardware variant of the LSLS Card It can be used in the UK variant of the LSLS Card and does not affect the operation.

IMPORTANT: LSLS Cards with firmware issue 4 or earlier must be replaced with cards with firmware issue 5 or later (ref ECB08-0110).

667/TZ/32941/000 issue 5 fixes a problem with the stability of measurements which can cause lamp faults to be reported erroneously.

667/TZ/32941/000 issue 6 is the first to support a 16-channel LSLS Card (for ST750ELV).

667/TZ/32941/000 issue 7 includes a change for the German hardware variant of the LSLS Card (ref 0005366). It can be used in the UK variant of the LSLS Card and does not affect the operation.

667/TZ/32941/100 issue 8 includes changes to support hardware inventory information (PCB part number, serial number, etc.). The ST950 is compatible with this and previous versions of the LSLS firmware, although only issue 8 onwards can provide the hardware inventory information. Issue 8 also remains compatible with previous generations of the Siemens traffic controller (ST750ELV and ST900ELV).

There are no known hardware compatibility problems with the LSLS Cards.

3.3.5 ELV LED Signals

The ELV Controller has been tested with the following ELV LED Signals:

- [KLT:1] STC Helios ELV Signals [NEW]
  - CLS ELV Type A – 667/7/28586/10x
  - CLS ELV Type B – 667/1/46700/10x
  - Used for Helios ELV CLS Vehicle Signals, Far-Side Helios ELV Pedestrian & Bicycle Signals, and 'CLS Waits'.
  - Maximum of 8 aspects per sensor
- [KLT:2] STC Pedestrian Demand Accepted Indicators [MODIFIED]
  - 667/1/30680/001 Issue 3 and above.
  - Maximum of 6 aspects per sensor
- [KLT:3] STC Near-Side Red / Green Man and Toucan LED Signals [MODIFIED]
  - 667/1/30695/001 Issue 9 and above – Green Puffin
  - 667/1/30695/002 Issue 9 and above – Red Puffin
  - 667/1/30695/003 Issue 9 and above – Green Toucan
  - 667/1/30695/004 Issue 10 and above – Red Toucan
  - 667/1/30695/005 Issue 9 and above – Green Equestrian
  - 667/1/30695/006 Issue 10 and above – Red Equestrian
  - Maximum of 4 aspects per sensor
- [KLT:4] STC ELV LED Regulatory Signs [NEW]
  - HPU: Maximum of 8 aspects per sensor (one sensor per HPU)
  - Expansion Kit: Maximum of 6 aspects per sensor (two sensors per kit)
- [KLT:5] STC LED Wait Indicators [MODIFIED]
  - 667/1/30211/001 Issue 4 and above
  - Maximum of 6 aspects per sensor
- [KLT:6] AGD Near-Side Red / Green Man and Toucan LED Signals [MODIFIED]
  - Maximum of 4 aspects per sensor
- [KLT:7] AGD Pedestrian Demand Accepted Indicators [MODIFIED]
  - Maximum of 8 aspects per sensor

  Compatible AGD Signal Types (for KLT 6 and 7):
    - Puffin Signals: AGD940-660-000, AGD940-661-000,
    - Demand Units: AGD941-660-000, AGD941-662-000, AGD941-663-000,
    - Toucan Signals: AGD942-660-000, AGD942-661-000,
    - Combined Puffin: AGD946-660-000, AGD946-662-000, AGD946-665-000, AGD946-666-000,

    - Combined Toucan: AGD947-660-000, AGD947-662-000, AGD947-664-000, AGD947-666-000
- [KLT:8] Siemens Low-Power Puffin and Toucan Near-Side Signals
    - PCBs with part numbers 667/xx/33655/xxx
    - ST950 Firmware 46059 issue 5.0 or later
    - Maximum of 4 aspects per sensor
- [KLT:9] AGD LED Wait Indicators (5 LEDs / constant current)
    - ST950 Firmware 46059 issue 5.0 or later
    - Maximum of 4 aspects per sensor (limited by ambient temperature variations)
- [KLT:11] SILUX 1.40d 40V Aspects
    - ST950 Firmware 46059 issue 5.0 or later
    - For 40V ELV Controllers only (not 48V ELV Controllers)
    - Maximum of 8 aspects per sensor
- [KLT:19] SWARCO Low-Level Cycle Signals (5W Constant Power)
    - ST950 Firmware 46059 issue 9.0 or later
    - Maximum of 3 aspects per sensor
    - The optional Regulatory Sign (white LEDs) must be driven from a Switched Sign and not connected to the normal Reg. Sign supply.

No other types of ELV Signals should be connected to these controllers without first consulting Siemens Poole. The current profiles of these signals may cause the Controller to sporadically report erroneous lamp faults or fail to confirm a real lamp fault. They may also trigger the over-current / short-circuit check (FLF 33:1) performed by the controller, particularly when the signal is first switched on.

The near-side pedestrian signals (including Wait and Demand Accepted Indicators) have been modified to function with the ELV Controller and are clearly marked “ELV”. Unmodified original signals may cause similar problems to those described above. Visual identification of the compatible Siemens assemblies is described within the “Appendix – Visual Identification of ELV PCB. Assemblies” in the Helios General Handbook 667/HB/30000/000 issue 14 onwards.

The text ‘[KLT:n]’ indicates the Load Type number ‘n’ that needs to be configured in order to lamp monitor each type of ELV LED Signal. This can be set in the IC4 configuration or modified on-street by using the handset command KLT or LMU-Sensors web page.

3.4 Plus+ Controller

3.4.1 Plus+ Features

The following features are not initially available on Plus+ Controllers. This list will be updated as features become available in new releases of ST950 firmware.

Available?	Feature
No	Dimming level of Plus+ Signals set by IC4
No	Fail to Part-Time (aka software fail-flashing)
46059 v20	FLF55 indicates RLM faults only; useful for UTC 'LF' bit
46059 v21	FLF55 indicates 'any' lamp fault or any RLM fault; useful for UTC 'LF' bit
No	Lamp Faults in a legacy format, e.g. KLD Sensor/Aspect (New Plus+ lamp faults identify Phase, Colour and Pole no.)
No	Lamp Faults Special Conditioning mnemonics for Phases / Streams
No	Lamp Supply monitor relay output for Plus+ Controllers (for an external remote monitoring unit)
No	Last Lamp Failed (Red Lamp Monitoring is supported, as is the detection of no Nodes or Signals for any Colour of any Phase for Class DA1)
No	Mimic LEDs in a Plus+ Controller Cabinet
No	Pedestrian Centre Island (Red Man shows Blackout)
46059 v21	Ring Plus+ cabling
46059 v21	Smartloop Plus+ loop detector
46059 v23	Stratos fault mapping
No	Switched Signs

Also refer to the Plus+ LED Signals section below.

3.4.2 Plus+ LED Signals

The Plus+ Controller does not support traditional signals supported by LV/ELV Controllers. All Plus+ Signals are bespoke.

Available?	Signal Type
46059 v20	RAG Traffic Signals, inc Green Arrow
46059 v20	Far-Side Pedestrian Red/Green
No	Low Level Cycle Signals (LLCS)
46059 v20	Near-Side Puffin & Toucan
No	PCaTS (Pedestrian Countdown)
46059 v20	PDU Demand Unit & Pedestrian Wait Box
No	Pedestrian Central Refuge (Red Man shows Blackout)
No	Tram (LRT) indicator signals
No	Wigwag

3.4.3 Plus+ Detection

The Plus+ Controller is compatible with the same range of I/O devices as the ST950 LV/ELV Controllers – refer to section 3.5. However, much of the detection enters directly through nearby Plus+ devices and not through cabinet I/O cards.

3.4.4 Plus+ Hardware Compatibilities

Currently there are no known compatibility issues with Plus+ devices. But please note the facilities and devices that the Plus+ does not yet support – see the subsections above.

3.4.5 Plus+ Node firmware and Rings

Node firmware 53113 version 3 or greater is required in order to support Rings. This applies to RAG, Near-Side and PDU/Wait Nodes. Replacement of a Node in a Ring with one fitted with a lower firmware version is not supported. The Node must be upgraded to firmware version 3 or greater before it is used in a Ring.

3.5 Digital I/O

3.5.1 Serial I/O Cards & Intelligent Detector Backplane

The ST950 is compatible with Serial I/O Card and Intelligent Detector Backplane firmware 667/TZ/32998/000 issue 4 onwards. Note that the same firmware is used in both the Serial I/O Cards and the Intelligent Detector Backplanes.

The ST950 is capable of upgrading the firmware in cards containing issue 3 to later versions (e.g. upgrade from 3 to 4). However, the ST950 cannot communicate with nor upgrade the firmware in cards running firmware issue 1 or issue 2.

When upgrading an ST900 controller to an ST950, it is recommended that the version of firmware in each I/O card is checked using the VIO handset command ***before*** the controller upgrade is started and while the ST900 is still running.

There are no known hardware compatibility problems with these cards:

3.5.1a) PCB – Serial IO Card (24/16) – 667/1/32990/001

No hardware compatibility issues at this time.

To determine whether the Serial I/O Card contains firmware that is compatible with the ST950 examine the name of the card on the metal cover. If the name includes “ST900”, the card does **not** contain firmware compatible with the ST950 and needs to be replaced.

3.5.1b) PCB – Serial IO Card (24/4) – 667/1/32990/002

No hardware compatibility issues at this time.

To determine whether the Serial I/O Card contains firmware that is compatible with the ST950 examine the name of the card on the metal cover. If the name includes “ST900”, the card does **not** contain firmware compatible with the ST950 and needs to be replaced.

3.5.1c) PCB – Intelligent Detector Backplane – 667/1/32911/xxx and 667/1/32913/xxx

The Intelligent Detector Backplane consists of two connected PCBs:

667/1/32911/xxx – The larger backplane PCB is mechanically secured to the rack and includes the four backplane connectors, one for each loop detector card.

667/1/32913/xxx – The smaller 'backplane controller' PCB includes the microprocessor and address switch.

There are no hardware compatibility issues at this time.

To determine whether the Intelligent Detector Backplane contains firmware that is compatible with the ST950 examine the variant of the larger backplane PCB. If the PCB is the newer /950 variant, the assembly includes firmware compatible with the ST950. If the variant is /001, the whole assembly (both PCBs) should be replaced. The /950 variant also includes additional connectors to allow the SLD4 loop detector auto-configuration communications link to be wired between multiple backplanes within a controller.

NOTE: Other traffic equipment will not be able to access and therefore monitor the states of the loop detector card output relays when these are plugged in to the Controller's Intelligent Detector Backplanes. If it is required to monitor these detector outputs (inputs to the controller), then the loop detector cards must be connected to individual loop detector backplanes and 'soft-wired' to the inputs on a Controller Serial I/O Card instead.

3.5.1d) PCB – CPU I/O – 667/1/46015/001

No hardware compatibility issues at this time. All CPU I/O Cards contain firmware that is compatible with the ST950; no CPU I/O Cards have been manufactured with the older firmware.

3.5.2 WiMag Loop Detector Replacement Card

This card mimics the operation of an industry-standard 4-channel loop detector card and thus is compatible with all ST950 controllers. Refer to the WiMag documentation for further version and compatibility information.

3.5.3 WiMag Standard Interface Card

This interface card mimics the operation of a standard 24/4 Serial I/O Card and thus is compatible with all ST950 controllers. The 24 inputs provide 20 detectors and 4 fault indications. The 4 outputs are not used.

The ST950 is only compatible with firmware versions 3 or greater:

- Card assembly: 667/1/47221/000
- Card firmware: 667/TZ/45350/000 issue 3 or later

Refer to the WiMag handbook 667/HB/47200/000 for further version and compatibility information.

3.6 Other Controller Peripherals

3.6.1 GPS Clock Facility

No known compatibility problems.

When using the GPS clock facility, ensure the Time Zone and Daylight Saving Time (DST) settings have been set up correctly on the Status and Configuration web page 'System -

Settings - System Date & Time - System Time Zone', or with older firmware 'System - Advanced - Date and Time'. The defaults are set-up for the UK.

Reminder: When upgrading to ST950 from previous controllers, the serial cable between the controller and the GPS clock module needs to be changed; see 667/CI/33190/000, Installation of the GPS Clock Kit for ST800/900/950.

3.6.2 Manual Panel

The ST950 is compatible with the Manual Panels used by previous controller families using the usual 34-way IDC connector.

If a full panel is not required, the ST950 includes an alternative 'Cabinet Signals' connector (PL8) which can be used instead of the 34-way connector. This provides for a Signals On/Off Switch, Door Switch and Cabinet Alarm LED. It uses detector-style 24V input circuits, not the 5V logic inputs of the 34-way connector.

Note: The ST950 CPU Card RJ45 connection labelled 'PANEL' is currently not used.

3.7 Remote Monitoring and UTC

3.7.1 UTMC Remote Monitoring MIB

Firmware 46059 issue 10.0 onwards supports the UTMC Remote Monitoring SNMP MIB, currently at version 201512141017Z (14-Dec-2015).

3.7.2 3U-OMU and Gemini Unit

ST950 is compatible with the Gemini Unit with the following limitations.

For information on the hardware and firmware versions of Gemini that provide the various facilities mentioned below, refer to the Gemini documentation, particularly its compatibility document 667/SU/30600/000.

- IO – The Siemens OMU is limited to 8 input ports (64 inputs). Thus only controller inputs on its first 8 input ports (output ports are automatically skipped) can be 'named' and utilised in the OMU and RMS System (using a semi-integral unit).
- IO – A free-standing Gemini Unit will not be able to monitor the states of the loop detector output relays when the detector cards are fitted in a Controller Intelligent Detector Backplane. Refer to section 3.5.1 for more information.
- DFM – DFM faults on later controller input ports are still logged and reported by the OMU correctly, but these cannot be 'named' at the RMS Instation.

  There was also a minor issue with the RMS Instation (ref CQv100007367) in that only two digits of three digit I/O line numbers are displayed, e.g. "03" is displayed for I/O line number 103. This was fixed in RMS issue 39.00
- ELV – Lamp faults confirmed by the Controller are passed through a Serial OMU and reported to the RMS Instation. The free-standing OMU is not able to lamp monitor ELV LED Signals.
- ELV – The Mains State Inputs of a free-standing OMU can not be used to monitor the 'green states' of ELV traffic signals; use the semi-integral 'Serial' OMU option.
- ELV – on an ELV Controller, the Serial OMU will report 'Lamps Off' to the RMS Instation if the serial link to the controller fails or is unplugged. An ELV alternative to connecting the controller's 230V/160V lamp supply to a dedicated Mains State Input on the OMU is available, see ELV Lamp Monitor Kit 667/1/32612/000 (details on drawing 667/GA/32612/000). Use of this ELV Lamp Monitor Kit allows the ST950ELV

OMU to determine whether the lamp supply is present when the serial link fails, and report to the Instation accordingly.

- Serial Link – When it is required to perform an 'IC4 View Differences', the computer must be connected directly to the Controller's handset port. The Serial Gemini Unit must be temporarily disconnected.
- Serial MOVA – Serial MOVA can not use the ST950 'MOVA' mode of operation; it still uses UTC mode. Only the MOVA application internal to the ST950 can use MOVA mode.
- UTMC OTU and MOVA – The ST950 includes these applications and also supports the UTMC OTU/MOVA Gemini. However, if both facilities are required, they must both be provided by the Gemini or both internal applications used. The ST950 does not support internal UTMC-OTU with external (serial) MOVA, nor internal MOVA with an external UTMC-OTU (Serial UTC).
- UTMC OTU Gemini – The following facilities provided by the Gemini on previous controllers are now provided by the ST950 Controller itself:
    - Remote access to view/modify timings
      (the ST950 supports telnet and web pages)
    - Extraction of the IC4 configuration file
      (the IC4 file is stored as an attachment to the ST950 Site Log)
    - Time-stamped event log
      (the ST950 has its own System Log)
- Reactive DUSC – No known limitations with the ST950.
- Bus Processor – No known limitations with the ST950.
- 3U OMU – A licence is required to permit the OMU to use handset mnemonics continuously to interrogate the controller.

3.7.3 5U OMU

We cannot guarantee that the ST950 is compatible with the 5U OMU. We are aware of the following issues:

- The 5U OMU will not be able to monitor the states of the loop detectors connected to the Controller's Intelligent Backplanes since the relay outputs from the loop detector cards are not available. See section 3.5.1 for more information.
- The 5U OMU is unable to lamp monitor the ELV LED Signals used on the ST900 Controller.
- A licence is required to permit the OMU to use handset mnemonics continuously to interrogate the controller.

3.7.4 Stratos

Firmware 46059 issue 11 onwards supports connection to Stratos.

For Plus+, also refer to section 3.4.1.

4 KNOWN PROBLEMS AND CONCESSIONS

4.1 ST750ELV Platform

The ST950 firmware is not currently compatible with the smaller ST750ELV-style platform. For the time-being, use the larger ST950ELV platform.

4.2 [Resolved] SelfTest SSR Test Fails (No Dimming Transformer)

If the ST950 (LV) SelfTest is performed with no dimming transformer or loads connected, SelfTest may report an SSR fault.

The work-around is to connect a small load in place of the dimming transformer; a small 12V lamp signal head transformer is recommended. Connect the load to the Live and Neutral connections on back of the MDU, where the Dimming Transformer would normally be connected; no connection is required to the 'DIM' connection. Concession Number CN002742 raised.

Update Nov 2013: Fixed by Firmware 46059 issue 5.0

4.3 [Resolved] Hong Kong LED Signals (Changes for PB800 issue 30)

The initial releases of the ST950 firmware do not include the changes made in PB800 issue 30 for Hong Kong LED Signals, i.e. profiles KLT 12-17. This also includes the handset commands KRM, KNL, KSN and KSL.

Update Jun 2014: Added in Firmware 46059 issue 6.0

4.4 [Resolved] LV-CLS Red + Wait monitoring (Changes for PB800 issue 31)

The initial releases of the ST950 firmware do not include the changes made in PB800 issue 31 to allow LED Lamp Monitoring on sensors when Amber (Wait) Indicators are configured on for Pedestrian Phases, which includes the handset command KRW.

Update Jun 2014: Added in Firmware 46059 issue 6.0

4.5 [Resolved] Conditioning Enhancements (Changes for PB801 issue 12)

The initial release (issue 3) of the ST950 firmware does not include the conditioning enhancements made in PB801 issue 12. These included increasing the number of conditioning timers, new timer operators and the Conditioning Facility Flags (CFF).

Update Nov 2013: These enhancements are included in Firmware 46059 issue 5.0 onwards.

4.6 [Resolved] Low-Power Near-Side Signals (Changes for PB801 issue 13)

The initial release (issue 3) of the ST950 firmware does not include the profile (KLT8) for the new low-power near-side pedestrian signals from Siemens (part number includes 33655).

Update Nov 2013: This profile is included in Firmware 46059 issue 5.0 onwards.

4.7 [Resolved] Multiple Hurry Call Stages

If two Hurry Call requests are inserted, instead of one naturally having higher priority than the other, the two fight and ROW moves back-and-forth between the two stages on minimum greens and neither Hurry Call completes. (Ref 0022463)

A temporary workaround is to change the timings so the hurry call hold period is shorter than the phase minimum greens, so the Hurry Call hold period always completes when the Hurry Call stage gains ROW.

A better workaround is to add Special Conditioning to help the Hurry Call facility, such as:

```
;If any Hurry Call hold is active
;then Prevent all Hurry Call stages to stop any movements
(MODE0 EQL<5>).((HRYSTA0 EQL<2>)+(HRYSTA1 EQL<2>)+...)::=PRVST1
                                                        *=PRVST2
                                                        ...
```

(Take care when adding the above because it may need to be combined with other Special Conditioning that prevents stage movements)

Update Jun 2014: Corrected for Firmware 46059 issue 6.0.

4.8 USB Memory Sticks

Most USB memory sticks are suitably formatted when purchased. If a USB memory stick is not recognised by the ST950 traffic controller then please check the following:

- Check that the USB memory stick is formatted with the FAT32 file system and not NTFS.
- Check that the USB memory stick is not encrypted.
- If using firmware prior to Firmware 46059 issue 6.0, check that the USB memory stick has not been re-formatted using a Windows computer.

The Technical Bulletin STAB13-0083 contains more information.

4.9 Known Limitations with the Controller Web Pages

We are aware of the following issues with the ST950 Controller web pages:

- After changing the site name or loading an IC4 Configuration with a different EM-number, the user may be asked to enter their username and password twice. (Ref 0020683)
- Despite only changing Level-2 data, the Level-3 two-step submit and confirm process is triggered if the web page contains a mixture of Level-2 and Level-3 data and Level-3 access has been obtained by the user. Work-around: None; the controller is working as intended as it allows the user to confirm that no Level-3 items have been changed accidentally. (Ref 0016787)
- It is not currently possible to create a new CLF plan using the web interface. It is only possible to modify the settings and timings of an existing plan. Work-around: Use IC4 (and Quiet Initialisation) or handset commands to add a CLF plan. (Ref 0019044) [Resolved for Firmware 46059 issue 9.0]
- Setting the Clock is not possible until an IC4 configuration has been loaded. Work-around: Load the site's IC4 configuration before attempting to set the clock. (Ref 0019151)
- During a Controller SelfTest, some Controller web pages do not update, e.g. the lamp supply voltage and I/O states. This is because the SelfTest software is running

instead of the normal Controller software that supplies this information. Work-around: All the status information required during a SelfTest is available via the RS232 handset port (as with previous controllers). (Ref 0019693)

- Entering an input extension time (IPX) of ".4" is rejected on the web page. Work-around: Enter the value with a leading zero, e.g. “0.4”. (Ref 0021483)
- When using Windows Server 2003 and IE8, it is not possible to save the changes made on some of the controller web pages and the error ‘Submit Failed, access denied’ is displayed. Work-around: Use a different web browser. (Ref 0021956)
- We are aware that after the controller power is switched off and back on it can take over a minute to re-establish the web interface connection between a Windows 7 PC over the USB Handset port. (Ref 0022303) [Resolved for Firmware 46059 issue 6.0]
- For other known limitations, refer the user interface handbook 667/HU/46000/000.

4.10 Known Limitations with the LRT facility

We are aware of the following issues with the new LRT facility:

- A late Cancel event may cause the event error count to be incremented twice, once when the cancel time-out period expires and a second time when the late cancel event occurs (now out of sequence). Work-around: Ensure that the error count threshold is not set too low. (Ref 0021255)
- As intended, LRT mode does not permit further stage changes once the LRT Phase gains ROW. Work-around: Use S/C to briefly disable LRT mode when a stage change is required. (Ref 0021707)
- In Manual Mode, an LRT Phase terminates as expected but will not re-appear with a second tram (Ref 0023166)
- Special Conditioning mnemonic LRTnDISUNIT does not prevent LRT phase termination (Ref 0023127)
- Also see the improvements in Firmware 46059 issue 6.0.

4.11 Known Limitations with the RS232 Handset and Restricted Mode

- If Controller (EFC CPU) enters its ‘Restricted’ mode, the RS232 handset port does not function. Restricted mode is entered after a number of reboots in quick succession and in this mode, the software applications are not loaded in case there is problem with one of them, and this includes the Controller Application which normally responds to the RS232 handset port. Work-around: Restricted mode is clearly indicated by the green SYS (System) LED flashing very quickly (many times a second). Should a controller enter this state, use the web interface (locally or remotely) to diagnose the cause and reset the Restricted mode entry in the Fault Table. If this is not possible, and it is safe to do so, switch the controller power off/on. (Ref 0018695)

4.12 Known Limitations with the UTMC-OTU

Known problems and limitations when a Siemens Gemini UTMC-OTU is used with the ST950:

- The ST950 does not support the transfer of the IC4 config file (8SD) to a semi-integral UTMC OTU (as mentioned in the limitations on page 26) and may log the

error ‘CSI-UD: IC4 retrieval failed’. Work-around: Obtain the IC4 Configuration file (8ZP) from the ST950 Site Log. (Ref 0021591)

4.13 Known Limitations with the GPS clock module

Known problems and limitations when a GPS clock module is connected to the ST950:

- It is not possible to modify the Controller Time using the ’TOD’ handset command (during testing for example) when it is configured to use the GPS Clock. Work-around: Use the Controller-Clocks web page to temporarily change the Time Mode to ‘Dual Time’.
- If Controller is configured to use the GPS clock module and the correct time is not available from that module, the clock fault FLF7 will be set and the Timetable and CLF facilities are inhibited until the correct time is available from the GPS module. This is different to how the ST800/ST900 operate, which do not raise a fault under these conditions. From Firmware 46059 Issue 11 onwards, this check can be disabled by setting both the ‘NTP Accuracy Limit’ and ‘NTP Offset Limit’ to zero on the Controller-Advanced web page so that CLF and the Timetable are not inhibited when the time is unavailable from the NTP/GPS clock system.
- The event ‘No Active GPS Lock, discarding GPS data’ appears in the System Log when the GPS module indicates that the time is not available. However, when the time is available again, there is no corresponding entry ‘Active GPS Lock, using GPS data’ unless the Advanced GPS option ‘Log GPS Messages’ is enabled (Ref 0026045)

4.14 Known Limitations with Plus+

Please see section 3.4.1 for details known limitations with Plus+.