Distribution:	Document No.	WAG9-9K-EN5-RLN-13
To all Team Leads and CCU System Engineers.	Issue Date.	11-Feb-2025
	Format	Total Pages : 5 + Enclosures: 2 Document initiated by : Sudhanshu Jha Initiating Department : RC-IN SMO RS EN 6 This supersedes : WAG9-9K-EN2-RLN-12

Release of CCU & TCU software.

Table of Contents

1. Purpose

This document explains the process of for version management, monitoring & release of CCU, ACU, IOs and Driver Display software for Locomotives.

2. Scope

The scope of the documents is applicable for following activities.

i. CCU, IOs and DDU software release and status monitoring

ii. CCU, IOs and DDU Software version management

iii. CCU, IOs and Display Software Tag management

3. Abbreviations and Definition

CCU:	Central control Unit
DDU:	Driver Display Unit
PGM:	Program file
ACU:	Auxiliary Control Unit
IOs:	Input Output modules

4. Hardware Configurations

The device must be fulfilled following conditions.

Device	Order Nos. / Make
CCU (MCU2)	6FH5155-
DDU	1PA2B00075622
ACUs	M1300/M2000
IOs	LUTZE LION / LEROY
DDU AMiT	APTXA003C

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5. Released Software details.

Part.	Last released: 2.06 Dt: 10- Jul -24	Version to be released: 2.08 Dt: 11- Feb-25
MCU_CCU		
- Operating System	2.05 10-May-20	2.5 10-May-20
- Hardware module	70.01, 10-May-20	70.01, 10-May-20
- ETH2-Firmware	3.1 4-Dec-20	3.1 4-Dec-20
- Communication Drivers	17.0, 29-Aug-19	17.0, 29-Aug-19
- NSDB	2.80 10- Jul -24	**2.82** **11-Feb-25**
- Program	2.06 10- Jul -24	**2.08** **11-Feb-25**
- Parameter	0.224 10- Jul -24	**0.232** **11-Feb-25**
DDU		
- Program	SIEMENS DISPLAY Ver: - 1.2.0(6K) Ver: - 1.1.5(WAP-7) Ver: - 1.2.5(9K) Dt: - 10- Jul -24 AMIT Display 2.1.2 10- Jul -24	**SIEMENS DISPLAY** **Ver: - 1.2.1(6K)** Ver: - 1.1.5(WAP-7) Ver: - 1.2.5(9K) **Dt: - 11- Feb -25** **AMIT Display** **2.1.4 11- Feb-25**
- NSDB	SIEMENS & AMIT Display 2.66 20-Oct-21	SIEMENS & AMIT Display 2.66 20-Oct-21
ACU		
- Program	2.07, 10-Jul-24	2.07, 10-Jul-24
- NSDB	1.67	1.67
IO Station		
Lutze IO FW VER 1.05 & 1.2		
- Bus coupler Firmware	1.05/1.22	1.05/1.22
- NSDB	1.00, 0.02,0.01 and 1 respectively. 10/May/2020	1.00, 0.02,0.01 and 1 respectively. 10/May/2020
Lutze IO FW VER 2.0		
- Bus coupler Firmware	2	2
- NSDB	1.00 (11,12,21 &22), 13/Sept/2022	1.00 (11,12,21 &22), 13/Sept/2022
LEROY IO Ver		

Application	0.21 for IO Station 11 & 21 0.52 for IO Station 12 & 22	0.21/0.23 for IO Station 11 & 21 0.52 for IO Station 12 & 22
- NSDB	1.02	1.02

6. Software functions and added features.

Annexure I: List of changes carried out for CCU software versions.
Annexure II: Field Observations and analysis

7. Buffer

NIL

8. References

9. Appendices

i. WAG9_CCU_Control Software monitoring

10. Release Scope

This document releases the above-mentioned parts for being used for testing in a secured environment and test rides (test rides accompanied by Siemens personnel).

For testing in service in public railway environment the requirements for normal service must be fulfilled for the entire vehicle. The release for that is not part of this document. This document also does not provide the release for normal commercial service.

For testing in service and normal commercial service the project management must give a separate release. If all conditions are met, this document may be referenced by the general vehicle release.

11. Author, Functional Coordination

11.1 Author

Sudhanshu Jha RC-IN SMO RS EN 6

Jha Sudhanshu Digitally signed by Jha Sudhanshu Date: 2025.02.11 12:21:29 +05'30'

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11.2 Functional Coordination

This document was agreed with:

First and Last Name	Org. code	Review criterion	Date
Vijay Sahu	RC-IN SMO RS EN 1	Technical	11-Nov-2024

Revision Sheet:

Revision	Date	Section	Description of change
0	27.09.2021	All	1st Edition
1	20.10.2021	All	2nd Edition
3	03.02.2022	All	3rd Edition
3	29.06.2022	All	4th Edition
4	13.09.2022	All	5th Edition
5	30.12.2022	All	6th Edition
6	08.05.2023	All	7th Edition
7	04.07.2023	All	8th Edition
8	21.09.2023	All	9th Edition
9	04.12.2023	All	10Th Edition
10	10.07.2024	All	11th Edition
11	11.02.2025	All	12th Edition

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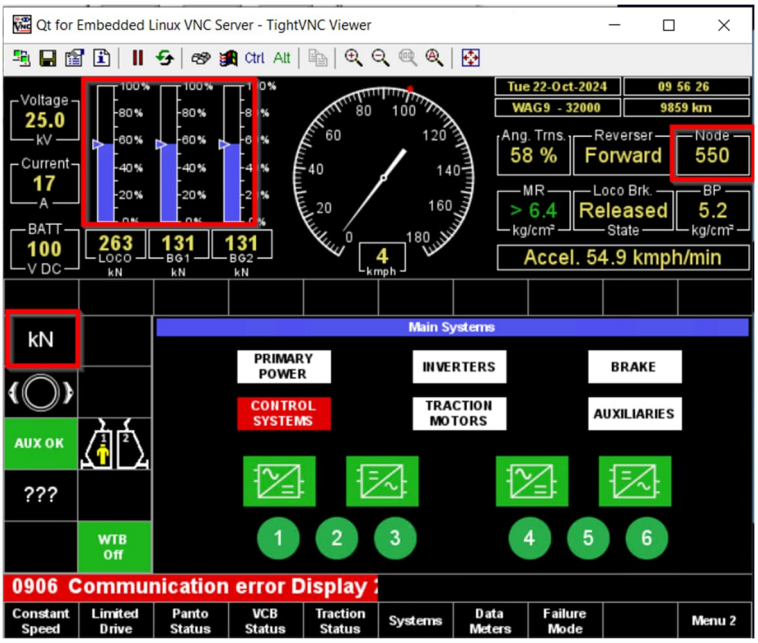
Changes done in Ver. 2.08:

1. Inclusion of Auto Flasher and Manual flasher recording in Event recorder data.
2. Location of Self-test mode has been shifted and made as password protected.
3. Conditions for Node not progressing has been changed.
4. Changes for Compressor CB tripping sometimes after neutral section reported by BRC (Vadodara Shed).
5. Introduction of FIFO feature in TREZ memory.
6. Changes in VCB Interface for TC1 and TC2 coolant level low.
7. TM4 and TM6 isolation message correction.
8. Traction interlock correction in Event recorder data
9. Changes in energy saving mode exit of slave loco.
10. Addition of new brake system in brake selection menu
11. Failure mode will be enabled only in case of angle transmitter failure.
12. Changes in rectifier and motor isolation indication with redundancy.
13. Transfer of BP pressure from Master loco to slave loco.
14. Addition of TCU configuration selection.
15. Protection scheme updated for coolant warning and TC isolation in case of low-level warning alarm.
16. Changes for loco number in Twin Co-Co combination.
17. Addition of WTB pages in AMiT display.

Analysis

1) Node not Progressing sometimes reported from SCR/LGD: -



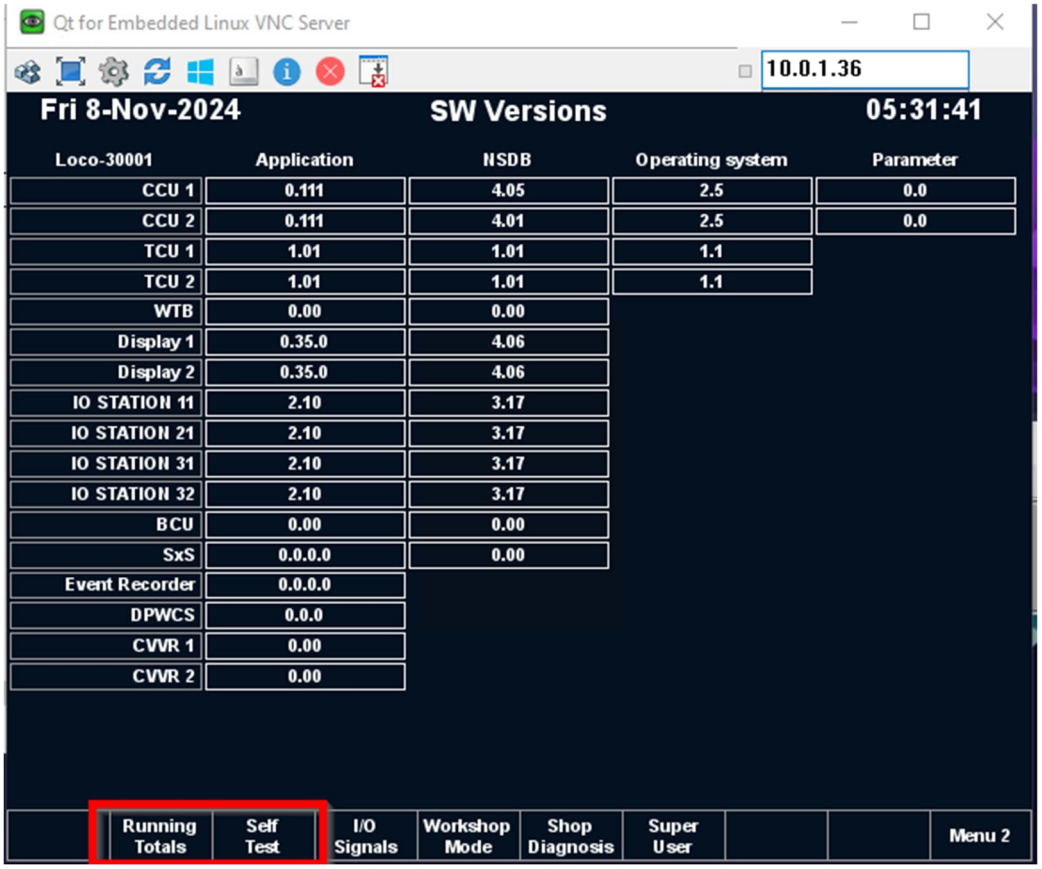
Conditions for Node increment from 550→560 Panto should be enabled and VCB ON command from operator should be enable during locomotive energization.

During testing it was observed this condition of node not increasing is occurring only when both pantos enable command 504→550 & VCB ON command 550→560 are initiated at same time. As the VCB ON command pulse will become zero after 2 sec's which is lesser than the Panto enable during only Locomotive energization time. For which the node remains at 550. How ever it doesn't impact on loco performance as the shown NODE no is only for display in SIEMENS propulsion.

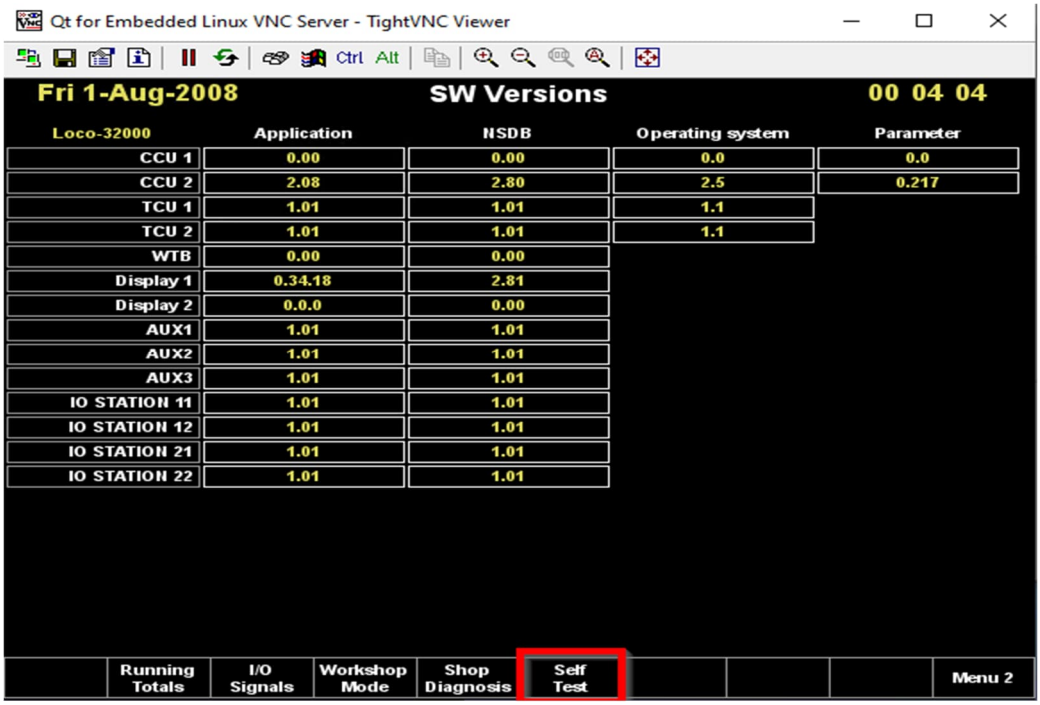
Changes done to overcome this condition of panto enable has bee not considered from 550→560 Node increment.

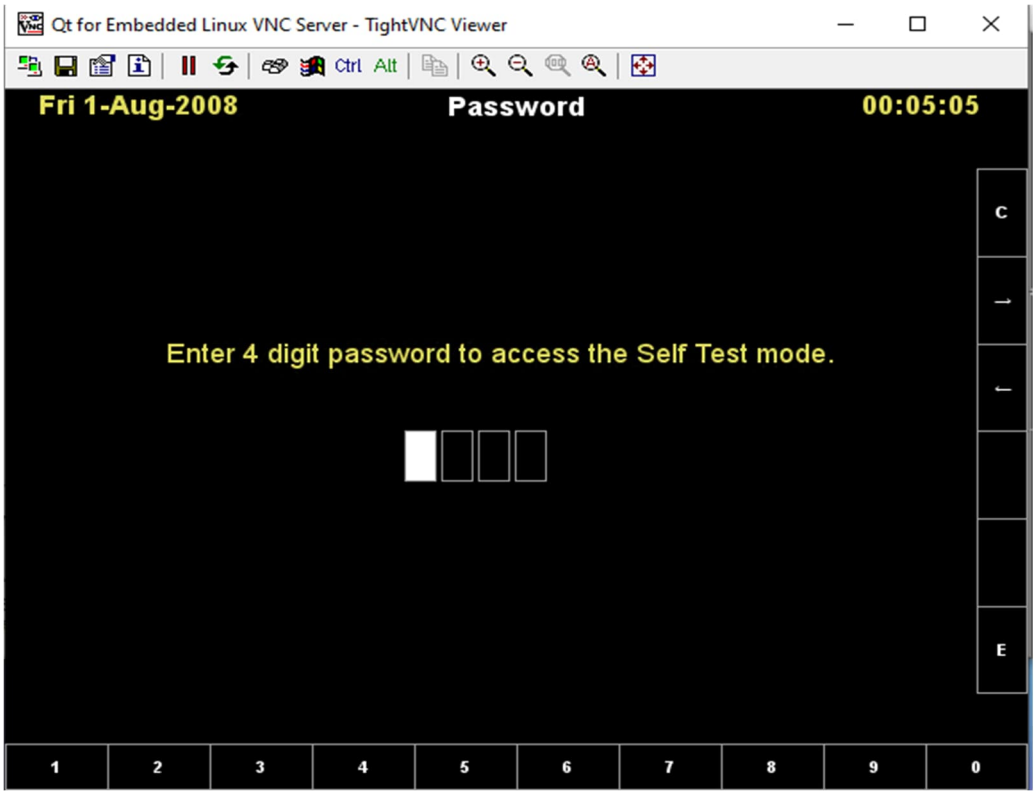
2) Loco Failed due to enabling the self-test mode reported from SCR/LGD: -

There were two failures reported from LGD/SCR regarding sudden pantograph lowering. On analysis of failure, it was observed from data that during the pantograph was lowered due to self-test enabling. As both Running totals and self-test activations are beside each other as shown below.



In new DDU software Location self-test function has been changed along with password protection enable.





PASSWORD: - 0000

3) Condition for Node not progressing has been changed

This was happening due to incorrect operation of driver when VCB close command is kept closed just after giving panto on command and node has not progressed to 550. Though many times, LP follows the above-mentioned practice, so necessary action has been taken on recommendation of shed upcoming version 2.08 of CCU

4) Compressor CB tripping Reported By BRC: -

The unloader valve command was released before the compressor but as there is additional delay in development of aux output when VCB is closed, this command is sustained for slightly longer period.

Due to the dynamic rise of aux frequency, unloader valve was getting closed earlier than the predefined time due to which the compressor current was rising because of the resistance offered by the compressed air in the tank. This sudden rise in current was disturbing the V/F ratio and the output voltage was also getting reduced.

Unloader and Aux frequency

The Above Scenario was taking place only if the time between VCB open to VCB close time is more than 20's. If the time is less than 20 sec from VCB open to VCB Close AUX will work on FAN Catch frequency mode in which frequency will not come to zero. To over come the changes done in CCU for operation of Compressor from min 20Hz if the time taken from VCB closer is more than 20'sec.

5) Inclusion of FIFO feature in TREZ memory: -

It was reported at multiple incidents that the memory of the remmlot device was full due to which it was not accommodating the new data. Earlier this process was manual, and data was downloaded and cleared manually after scheduled maintenance. Now there will be overwrite of data and this will ensure that the updated data is always available.

6) Changes in VCB Interface for coolant level low

It was reported by sheds that when VCB was opened and locked for coolant level low, if other TCC is also isolated, then the locking is cleared and VCB was allowed to close. This has been changed to the protection scheme that VCB lock will be removed after isolation of concerned converter only.

7) Traction interlock correction

Earlier there was latched control used for the traction interlock in the event recorder data. Same has been changed to the actual status of the traction interlock.

8) Change in date and time entry language

Earlier it was reported by shed that the language of time and date setting was foreign, and it was not understood by shed while setting time.
Same has been changed to English

9) Change in energy saving mode for slave loco in MU formation

Earlier it was reported that during MU operation, once slave loco enters in the energy saving mode, it only comes out of energy saving mode when brakes are released. This has been changed according to the latest instruction by RDSO.

10) Addition of new brake system in brake selection menu

Addition of Escort Kubota brake system in the brake selection menu. This is new addition to the existing brakes system to Knorr and Faviley brake system. Vigilance time setting is done accordingly.

11) Failure mode will be enabled only in case of angle transmitter failure.

Earlier enabling of failure mode was possible even when the angle transmitter was healthy. Same has been changed so that enabling of this mode is only possible only if angle transmitter is faulty.

12) Changes in rectifier and motor isolation with redundancy

Changes are incorporated for working with redundancy software.

13) Addition of angle transmitter fault with reduced delay.

Earlier there was 15s delay in triggering the fault of angle transmitter, based on the request from different sheds, it was reduced to 5s.

14) Transfer of BP pressure from Master loco to slave loco.

Earlier there was no transfer of BP pressure value on the slave loco. This has been changed and made sure that BP demand value is reflected on the display of slave loco.

15) Addition of TCU configuration selection

Selection of IGBT type menu is added in the loco configuration setting menu. This setting will be incorporated with the device id in the next version.

16) Addition of Auto-flasher and manual flasher recording in the event recorder data.

Based on the input received from RDSO, changes are incorporated to reflect the auto flasher and manual flasher recording in the event recorder and diagnostic data.