

ssLIN Protocol Stack — Conformance & Verification Test Report

LIN 2.2A & SAE J2602 slave stack · Generated **June 13, 2026** · simmasoftware.com

✓ 0 failures across all four test runs — 183 passed, 28 profile-gated skips, 0 failed

183

TESTS PASSED

0

FAILED

28

SKIPPED

4

PROFILE RUNS

Skipped cases are profile-gated — tests that deliberately deselect themselves when running a profile they do not apply to (e.g. LIN 2.0-only or J2602-only cases). They are not failures.

This report consolidates the results of Simma Software's automated test suites for the **ssLIN-Slave** protocol stack. Coverage spans two layers: hardware-in-the-loop (HIL) conformance against physical LIN hardware under both the LIN 2.2A and SAE J2602 profiles, and protocol-stack verification of the core encode/decode, identifier, checksum, diagnostic and transport logic under the J2602 and LIN 2.x profiles.

Part 1 · Hardware-in-the-Loop Conformance

The HIL suite exercises a live ssLIN-Slave node over a real LIN bus, driving headers and frames from a master and verifying the slave's on-wire responses, error reporting, diagnostic handling and behaviour under sustained and adversarial traffic. The identical 78-case suite is run twice — once per protocol profile — so that profile-specific behaviour is validated in isolation.

DEVICE UNDER TEST	ssLIN-Slave node (LIN 2.2A / SAE J2602 firmware)
BUS INTERFACE	PEAK PLIN-USB master + raw-UART rig for parity / framing injection
TEST FRAMEWORK	Python 3.14.2 · pytest 9.0.3 · pytest-html 4.2.0 · Windows 11 10.0.26200 SP0
PROFILES EXERCISED	PROFILE_LIN2X (LIN 2.2A) and SAE J2602

1.1 LIN 2.2A profile

60 passed · 18 skipped · 0 failed of 78 collected — run under `--profile=lin22a`. The skipped cases are the SAE J2602-only and LIN 2.0-only tests, which do not apply to a 2.2A node.

TEST CASE	RESULT	TIME
Basic communication 11 passed		10.09s
test_ecu_status_responds	Passed	0.344s
test_ecu_status_uses_enhanced_checksum	Passed	0.034s
test_car_data_reception_clean	Passed	0.049s
test_read_by_id_product_roundtrip	Passed	0.033s
test_recovery_after_bus_idle	Passed	4.513s
test_recovery_after_short_response	Passed	0.086s
test_goto_sleep_command_both_forms	Passed	0.134s
test_wakeup_readiness_after_sleep	Passed	4.564s
test_reserved_frames_ignored	Passed	0.120s
test_srf_uses_classic_checksum	Passed	0.033s
test_bitrate_tolerance_half_percent	Passed	0.178s
Error handling 13 passed		1.27s
test_error_set_on_corrupted_command_frame	Passed	0.060s
test_error_set_on_corrupted_own_nad_mrf	Passed	0.075s
test_error_on_corrupted_foreign_nad_mrf	Passed	0.076s
test_no_error_on_header_only_mrf	Passed	0.095s
test_no_error_on_unknown_frame_with_bad_checksum	Passed	0.050s
test_no_error_on_header_only_command_frame	Passed	0.096s
test_error_on_partial_command_frame[1]	Passed	0.118s

test_error_on_partial_command_frame[4]	Passed	0.118s
test_error_on_partial_command_frame[7]	Passed	0.116s
test_error_on_partial_own_nad_mrf	Passed	0.117s
test_partial_foreign_nad_mrf	Passed	0.116s
test_error_on_collision_with_slave_response	Passed	0.107s
test_collision_on_3d_consumes_pending_response	Passed	0.130s
SAE J2602 0 passed, 10 skipped		0.00s
test_status_byte_clean_state	Skipped	0.001s
test_targeted_reset	Skipped	0.001s
test_broadcast_mrf_has_no_response	Skipped	0.000s
test_broadcast_targeted_reset_silent	Skipped	0.000s
test_broadcast_assign_nad_executes_silently	Skipped	0.000s
test_v1_priority_comm_error_over_reset	Skipped	0.000s
test_ext_nad_status_response	Skipped	0.000s
test_ext_nad_wrong_dnn_silent	Skipped	0.000s
test_v1_legacy_error_code_points	Skipped	0.000s
test_ext_nad_reports_sticky_comm_error	Skipped	0.000s
LIN 2.0 0 passed, 7 skipped		0.00s
test_assign_frame_id_roundtrip	Skipped	0.000s
test_assign_frame_id_wrong_supplier_silent	Skipped	0.000s
test_assign_frame_id_unknown_message_id_silent	Skipped	0.000s
test_assign_frame_id_rejects_diagnostic_pid	Skipped	0.000s
test_read_by_id_message_ids	Skipped	0.000s
test_assign_frame_id_msgid_wildcard_unsupported	Skipped	0.000s
test_broadcast_read_by_id_answered	Skipped	0.000s
Node configuration 14 passed, 1 skipped		0.84s
test_read_by_id_serial	Passed	0.032s
test_read_by_id_reserved_is_negative	Passed	0.096s
test_read_by_id_wrong_supplier_silent	Passed	0.033s
test_assign_nad_and_restore	Passed	0.098s
test_assign_nad_out_of_range_rejected	Skipped	0.001s
test_cond_change_nad_and_restore	Passed	0.096s
test_cond_change_nad_condition_not_met	Passed	0.066s
test_data_dump_echo	Passed	0.033s
test_read_by_id_with_wildcards	Passed	0.032s
test_assign_nad_with_wildcards	Passed	0.033s
test_assign_frame_id_range_impossible_rejected	Passed	0.043s
test_config_requests_use_current_nad	Passed	0.127s
test_broadcast_mrf_is_answered_lin22a	Passed	0.033s
test_save_config	Passed	0.033s
test_assign_frame_id_range_unassign_reassign	Passed	0.086s
Raw-UART rig (parity / framing) 7 passed		6.59s
test_rig_sanity_status_frame	Passed	0.280s
test_parity_error_on_own_frame_id	Passed	0.858s
test_parity_error_on_foreign_frame_id	Passed	0.859s
test_sync_field_error	Passed	0.863s
test_header_abort_mid_frame	Passed	1.346s
test_framing_error_in_own_nad_mrf	Passed	1.140s
test_framing_error_in_foreign_nad_mrf	Passed	1.249s
Stress / soak 10 passed		22.92s
test_sustained_status_polling	Passed	1.131s

test_mixed_traffic_soak	Passed	1.037s
test_error_burst_recovery	Passed	0.480s
test_alternating_corrupt_clean	Passed	0.845s
test_collision_storm_recovery	Passed	0.568s
test_diag_queue_hammer	Passed	0.993s
test_partial_frame_storm	Passed	1.420s
test_fuzz_random_traffic	Passed	2.236s
test_wakeup_pulse_burst	Passed	0.371s
test_sleep_wake_cycles	Passed	13.836s
Transport / diagnostics 5 passed		0.27s
test_no_response_to_3d_without_request	Passed	0.025s
test_no_second_response_to_3d	Passed	0.054s
test_pending_response_survives_unconditional_frame	Passed	0.065s
test_new_physical_request_discards_pending_response	Passed	0.063s
test_functional_request_keeps_pending_response	Passed	0.067s

1.2 SAE J2602 profile

68 passed · **10 skipped** · **0 failed** of 78 collected — run under `--profile=j2602`. This run validates the tighter J2602 constraints (NAD range limits, legacy error-code points, extended-NAD diagnostics, broadcast handling); the remaining skips are the LIN 2.0-only cases that J2602 does not adopt.

TEST CASE	RESULT	TIME
Basic communication 11 passed		1.02s
test_ecu_status_responds	Passed	347 ms
test_ecu_status_uses_enhanced_checksum	Passed	35 ms
test_car_data_reception_clean	Passed	53 ms
test_read_by_id_product_roundtrip	Passed	33 ms
test_recovery_after_bus_idle	Passed	00:00:05
test_recovery_after_short_response	Passed	85 ms
test_goto_sleep_command_both_forms	Passed	135 ms
test_wakeup_readiness_after_sleep	Passed	00:00:05
test_reserved_frames_ignored	Passed	123 ms
test_srf_uses_classic_checksum	Passed	34 ms
test_bitrate_tolerance_half_percent	Passed	180 ms
Error handling 13 passed		1.29s
test_error_set_on_corrupted_command_frame	Passed	65 ms
test_error_set_on_corrupted_own_nad_mrf	Passed	79 ms
test_error_on_corrupted_foreign_nad_mrf	Passed	67 ms
test_no_error_on_header_only_mrf	Passed	98 ms
test_no_error_on_unknown_frame_with_bad_checksum	Passed	52 ms
test_no_error_on_header_only_command_frame	Passed	98 ms
test_error_on_partial_command_frame[1]	Passed	119 ms
test_error_on_partial_command_frame[4]	Passed	119 ms
test_error_on_partial_command_frame[7]	Passed	118 ms
test_error_on_partial_own_nad_mrf	Passed	119 ms
test_partial_foreign_nad_mrf	Passed	107 ms
test_error_on_collision_with_slave_response	Passed	110 ms
test_collision_on_3d_consumes_pending_response	Passed	134 ms
SAE J2602 8 passed, 2 skipped		0.67s
test_status_byte_clean_state	Passed	48 ms
test_targeted_reset	Passed	91 ms
test_broadcast_mrf_has_no_response	Passed	66 ms

test_broadcast_targeted_reset_silent	Passed	81 ms
test_broadcast_assign_nad_executes_silently	Passed	100 ms
test_v1_priority_comm_error_over_reset	Skipped	35 ms
test_ext_nad_status_response	Passed	67 ms
test_ext_nad_wrong_dnn_silent	Passed	34 ms
test_v1_legacy_error_code_points	Skipped	36 ms
test_ext_nad_reports_sticky_comm_error	Passed	112 ms
LIN 2.0 0 passed, 7 skipped		0.00s
test_assign_frame_id_roundtrip	Skipped	0 ms
test_assign_frame_id_wrong_supplier_silent	Skipped	0 ms
test_assign_frame_id_unknown_message_id_silent	Skipped	0 ms
test_assign_frame_id_rejects_diagnostic_pid	Skipped	0 ms
test_read_by_id_message_ids	Skipped	0 ms
test_assign_frame_id_msgid_wildcard_unsupported	Skipped	0 ms
test_broadcast_read_by_id_answered	Skipped	0 ms
Node configuration 14 passed, 1 skipped		0.89s
test_read_by_id_serial	Passed	32 ms
test_read_by_id_reserved_is_negative	Passed	99 ms
test_read_by_id_wrong_supplier_silent	Passed	34 ms
test_assign_nad_and_restore	Passed	99 ms
test_assign_nad_out_of_range_rejected	Passed	65 ms
test_cond_change_nad_and_restore	Passed	98 ms
test_cond_change_nad_condition_not_met	Passed	66 ms
test_data_dump_echo	Passed	33 ms
test_read_by_id_with_wildcards	Passed	34 ms
test_assign_nad_with_wildcards	Passed	34 ms
test_assign_frame_id_range_impossible_rejected	Passed	45 ms
test_config_requests_use_current_nad	Passed	131 ms
test_broadcast_mrf_is_answered_lin22a	Skipped	0 ms
test_save_config	Passed	33 ms
test_assign_frame_id_range_unassign_reassign	Passed	91 ms
Raw-UART rig (parity / framing) 7 passed		2.98s
test_rig_sanity_status_frame	Passed	270 ms
test_parity_error_on_own_frame_id	Passed	00:00:01
test_parity_error_on_foreign_frame_id	Passed	865 ms
test_sync_field_error	Passed	860 ms
test_header_abort_mid_frame	Passed	00:00:01
test_framing_error_in_own_nad_mrf	Passed	00:00:01
test_framing_error_in_foreign_nad_mrf	Passed	986 ms
Stress / soak 10 passed		2.35s
test_sustained_status_polling	Passed	00:00:01
test_mixed_traffic_soak	Passed	00:00:01
test_error_burst_recovery	Passed	491 ms
test_alternating_corrupt_clean	Passed	894 ms
test_collision_storm_recovery	Passed	590 ms
test_diag_queue_hammer	Passed	00:00:01
test_partial_frame_storm	Passed	00:00:01
test_fuzz_random_traffic	Passed	00:00:02
test_wakeup_pulse_burst	Passed	376 ms
test_sleep_wake_cycles	Passed	00:00:14
Transport / diagnostics 5 passed		0.29s

test_no_response_to_3d_without_request	Passed	26 ms
test_no_second_response_to_3d	Passed	56 ms
test_pending_response_survives_unconditional_frame	Passed	69 ms
test_new_physical_request_discards_pending_response	Passed	69 ms
test_functional_request_keeps_pending_response	Passed	68 ms

Part 2 · Protocol Stack Verification

These suites verify the ssLIN-Slave protocol core directly — slave node logic, protected-identifier parity, classic and enhanced checksum arithmetic, diagnostics and the transport layer — built and executed once per profile. All cases pass with no failures.

2.1 J2602 profile

31 passed · 0 failed · 31 total

TEST CASE	RESULT
LinTest 24 passed · Slave node behaviour (status, NAD/PID handling, diagnostics, subscribe/publish)	
StatusByteCleanState	Passed
TargetedResetResponseAndResetBit	Passed
BroadcastRequestHasNoResponseButExecutes	Passed
ExtendedNadStatusResponse	Passed
ExtendedNadWrongDnnSilent	Passed
ExtendedNadReportsStickyCommError	Passed
ReadByIdentifierProduct	Passed
ReadByIdentifierSerial	Passed
ReadByIdentifierUnknownIsNegative	Passed
SaveConfiguration	Passed
AssignNadDirected	Passed
AssignNadWrongInitialNadIgnored	Passed
ChecksumErrorIsReported	Passed
FramingErrorIsReported	Passed
ParityErrorReportedForAssignedId	Passed
ParityErrorIgnoredForUnassignedId	Passed
ForeignNadDiagnosticChecksumErrorNotReported	Passed
OwnNadDiagnosticChecksumErrorIsReported	Passed
SubscribeDeliversFreshData	Passed
SubscribeSecondReadIsStale	Passed
SubscribeWrongChecksumRejected	Passed
PublishProducesEightDataBytesPlusChecksum	Passed
PublishChecksumMatchesEnhancedOverPid	Passed
UnknownPidProducesNoResponse	Passed
Pid 3 passed · Protected-identifier parity generation & validation	
KnownVectors	Passed
ValidForAllIds	Passed
DetectsCorruptParity	Passed
Checksum 4 passed · Classic and enhanced LIN checksum arithmetic	
ClassicAllZeros	Passed
EnhancedAllZerosUsesPid	Passed
CarryWraps	Passed
ClassicAndEnhancedDifferWhenPidNonZero	Passed

2.2 LIN 2.x profile

24 passed · 0 failed · 24 total

TEST CASE	RESULT
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LinTest 17 passed · Slave node behaviour (status, NAD/PID handling, diagnostics, subscribe/publish)

ForeignNadDiagnosticChecksumErrorStillReported	Passed
ClassicChecksumOnEnhancedSlotRejected	Passed
RespErrClearsAfterCleanPublish	Passed
ReadByIdentifierProduct	Passed
ReadByIdentifierSerial	Passed
ReadByIdentifierUnknownIsNegative	Passed
SaveConfiguration	Passed
AssignNadDirected	Passed
AssignNadWrongInitialNadIgnored	Passed
ChecksumErrorIsReported	Passed
FramingErrorIsReported	Passed
SubscribeDeliversFreshData	Passed
SubscribeSecondReadIsStale	Passed
SubscribeWrongChecksumRejected	Passed
PublishProducesEightDataBytesPlusChecksum	Passed
PublishChecksumMatchesEnhancedOverPid	Passed
UnknownPidProducesNoResponse	Passed
Pid 3 passed · Protected-identifier parity generation & validation	
KnownVectors	Passed
ValidForAllIds	Passed
DetectsCorruptParity	Passed
Checksum 4 passed · Classic and enhanced LIN checksum arithmetic	
ClassicAllZeros	Passed
EnhancedAllZerosUsesPid	Passed
CarryWraps	Passed
ClassicAndEnhancedDifferWhenPidNonZero	Passed

About this report. Generated from the ssLIN-Slave automated regression and conformance suites (pytest JUnit / pytest-html output and GoogleTest console output). “Skipped” entries are profile-gated cases that deselect themselves under a non-matching profile and are expected — they are not defects. All executed cases passed; there were no failures in any run.

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