

USE CASE · CAN DEVICE VALIDATION

Validate ECUs, BMS boards and CAN devices with real bus traffic, not scripts.

Drive and observe the bus from the same sequence: DBC-defined signals, J1939 frames, UDS diagnostic sessions and raw IDs — while supplies, loads and I/O put the device through its paces.

DBC

import signals, no hand-decoding

UDS

diagnostic sessions and DID reads in-sequence

J1939

transmit status frames to mimic missing nodes

CAN FD

NI-XNET and Vector interfaces

What you're up against

- The device expects nodes that aren't on the bench — a chiller, a gateway, a vehicle
- Diagnostics (UDS, DIDs) and control traffic must run in the same test as power and load steps
- Heartbeats and rolling counters need watching continuously while the main flow proceeds
- CAN tools and instrument tools don't share variables — tests become two scripts and a spreadsheet

How the suite handles it

- Import the DBC; signals become named variables you can condition on, display and log
- Transmit periodic frames from the sequence to mimic missing nodes (J1939 status, keep-alives)
- UDS sessions and DID reads as guided steps — capture serials and software versions automatically
- A parallel branch monitors heartbeat, counters and CRC while the main sequence steps the device
- Power the DUT from a SCPI supply and switch it with Modbus I/O in the same workbook

A typical sequence

BMS bring-up and diagnostic read		
1	Start CAN	500 kbps, 11-bit · BMS.dbc
2	Write Inst	Bench supply: 24 V on (BMS wake)
3	Start Parallel	Branch: Heartbeat_Watch
3a	If Any	BMS_Alive_Counter stale > 500 ms → Set Fault
3b	Wait	100 ms · Goto 3a
4	Wait	until BMS_State == READY (timeout 10 s)
5	CAN Tx	J1939 chiller status frame, 100 ms periodic
6	UDS	Session · read DID 0xFD10 → BMS_Serial
7	If All	Contactors_Cmd == 1 and Contactors_Fb == 1 → PASS
8	Wait Parallel	All · log results · End

Step #	Description	Step Type	1	2
1	Start CAN	PACK CAN		
2	Setup start merged instrument log	Start Instrument Log	Logged	Merged
3	Setup reset output	Write Inst	NHR 5200: Reset	
4	EX1: start CC-CV charge (mode 2, 14 V, 10 A)	Write Inst	NHR 5200: Output Operation	2.2, 14.10, 10000.0
5	EX1: one-shot alert marker - fires ONCE if V<13.2 OR I>11, even if it flickers	If Any Once	NHR 5200: Voltage, NHR 5200: Current	Greater Than, Greater Than
6	EX1: one-shot taper cutoff - fires ONCE when V<13.8 AND I>10.5 together	If All Once	NHR 5200: Voltage, NHR 5200: Current	Greater Than, Less Than
7	EX1: pass the monitoring loop (1 s)	Wait		
8	EX1: keep looping while still charging (V<13.8 OR I>10.5) - plain if Any as loop guard	If Any	NHR 5200: Voltage, NHR 5200: Current	Less Than, Greater Than
9	EX1: safety net - make sure output is off	Write Inst	NHR 5200: Output Operation	0...
10	EX2: launch BOTH channel loops from one step (comma-separated names)	Start Parallel Sequence	Cycle_A, Cycle_B	
11	EX2: Main is free here (prompt, logging, safety all still live)	Wait		
12	EX2: wait for both branches to finish (2 h timeout)	Wait Parallel	All	7200
13	Done	End		

Sequence Editor — CAN start, instrument setup and If Any / If All conditions on decoded signals

Typical instruments and interfaces

NI 9862 CAN FD

Vector CAN

DBC / J1939 / UDS

Bench DC supply (SCPI)

Electronic load

Modbus relay I/O

RS-232 telemetry

"If it has a programmatic interface, EBE Test Stand Executive can drive it."

CAN, VISA, serial, Modbus and TCP instruments share one set of variables, one log and one sequence.