Lynxtester

GenerationRFID
EOL Test & Embedded Electronics

LYNXICT

CAN controlled Solid State Relay Test Board for functional EOL testers

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LynxICT

CAN controlled Solid State Relay Test Board for functional EOL testers

1. GENERAL DESCRIPTION

The **LynxICT** is a solid-state relay-based test board designed for EOL testing of electronic products.

It provides **It provides 50 independent test channels** to connect DUT pins to both common lines (BK+ and BK–) and **external stimulus**. Each DUT pin is routed through two solid-state relays, enabling flexible switching as illustrated in Figure 1.

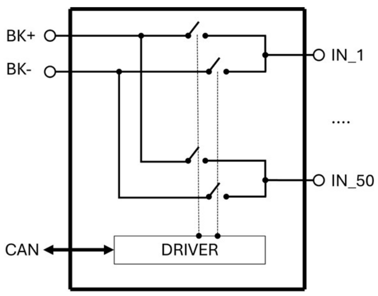


Figure 1. LynxICT functional Block Diagram

When connected to DMM measuring lines, the platform allows monitoring of multiple physical variables, such as voltages, resistances, capacitances, inductances, or frequencies, depending on the DMM capabilities. It is also designed to switch external stimulus into DUT pins.

The design ensures reliable and isolated distribution of signals and power rails, making it suitable for demanding testing and automation environments.

Each channel can be individually activated or deactivated, providing maximum flexibility for configuring test benches, switching external devices, or integrating into industrial processes.

The LynxICT is controlled via CAN bus, or via Ethernet when integrated within the Lynx Chassis

2. FEATURES

Board size: 293 × 100 mm (stackable board for 3U, 19” subracks).

Scalability: expandable when combined with Lynx backplanes

Compatibility: fully integrated with Lynx Tester Scheduler software

Number of channels: 50 independent test channels, each implemented with two solid-state relays.

Connector Type: female DB50.

Communications:

- CAN bus when used standalone.
- Ethernet when connected through a Lynx Chassis.

Status indicators (LEDs):

- **Blue:** General status (Power/OK).
- **Green:** CAN activity.
- **Red:** Error or fault indication red.

Power supply: 12 V DC.

Connectors:

- DB50 connector for the 50 relay outputs.
- DIN connector (Backplane) for power supply, CAN bus, and synchronization (SYNC).

Application highlights:

- Industrial automation – remote control and distribution of power or signals in manufacturing environments.
- Signal multiplexing – selective routing of digital or analog signals to measurement instruments.
- System integration – scalable control solution when combined with Lynx Chassis and LynxTester software.
- Remote device management – activation or deactivation of external circuits via CAN commands

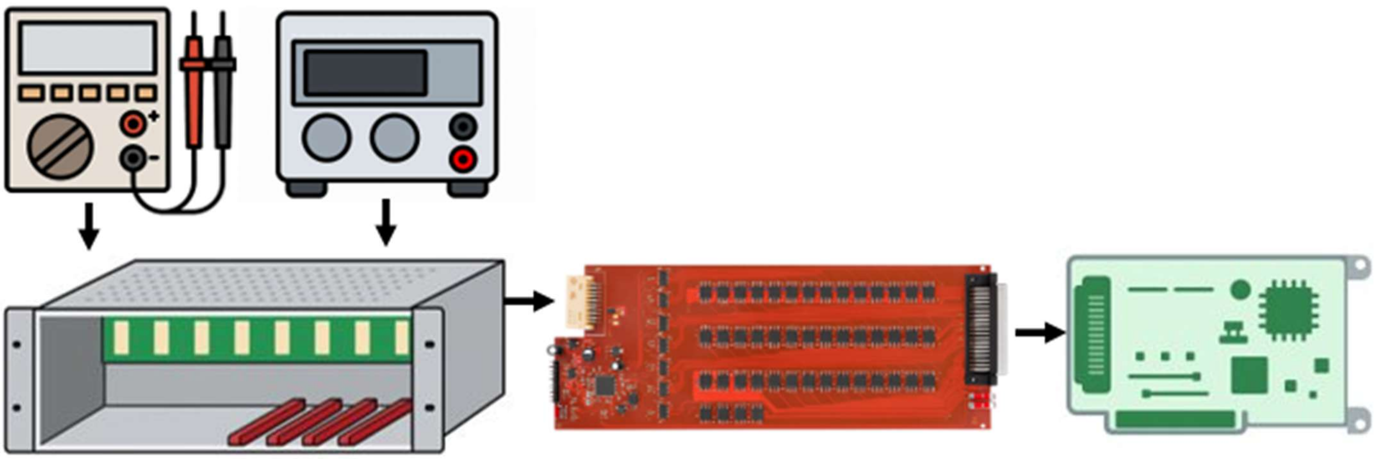
4. TERMINOLOGY

VSUPPLY – Supply rail for Lynx boards.
VDUT – DUT backline supply rail.
DMM – Digital Multimeter.
ICT – In-Circuit Test.
EOL – End-of-Line.
CAN – Controller Area Network.
RJ45 – Standard Ethernet connector.
Slot – Connector for Lynx daughter boards (×10).
Backline – Shared distribution bus for DUT supply and measurement.
Gateway – Internal converter between Ethernet (host) and CAN (test boards).
Scheduler – Lynx Tester software used to configure and execute test sequences.
SYNC – Synchronization line shared among boards.
BL1 / BL2 – Backline signal pairs distributed across the backplane.
Host – PC or controller that communicates with the chassis.

5. APPLICATION SETUPS

5.1. Low-Cost ICT

All control boards require a verification of the correct component soldered values. However, some projects do not justify high investment. LynxICT can measure physical variables of the DUT by connecting the Test Points to a DMM or any other test equipment. Therefore, variables such as Voltage drop, Resistance, Impedance, Capacitance or Frequency can be measured.



6. ELECTRAL SPECIFICATIONS

6.1. Recommended operating conditions

PARAMETER	NOTES	SYMBOL	MIN	TYP	MAX	UNIT
Supply voltage (nominal)	Input via backplane or external	V_{IN}	8	12	24	V
Current consumption	All relays OFF, 12 V supplied	I_{IDLE}		380		mA
On-resistance (DC only)	I_F = 10 mA, I_L = 2 A	R_{ON}		0.05	0.07	Ω
Turn-on time	I_F = 10 mA, V_L = 5 V, I_L = 1 A	t_{ON}	370		550	µs
Turn-off time	I_F = 10 mA, V_L = 5 V, I_L = 1 A	t_{OFF}	18		50	µs
Relay activation latency (UDS → ON)	Command reception to actuation	t_{UDS}			750	µs
Operating temperature	Industrial grade	T_{AMB}	0		+70	°C

Table 1. Electrical characteristics

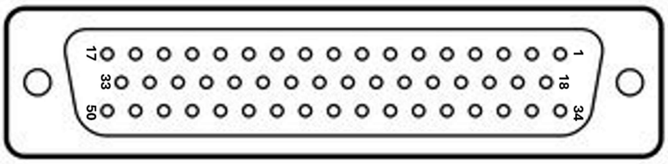
6.2. Absolute Maximum Ratings

PARAMETER	SYMBOL	VALUE	UNIT
DC or peak AC load voltage*	V_L	45	V
Load current (DC only)*	I_L	1000	mA

Table 2. Absolute Maximum Ratings

7. PINOUT

7.1. DUT connector Interface



PIN	NAME	TO BK+		TO BK-	
		Relay	Code	Relay	Code
1	**IN_1**	RL_1	*0x01h*	RL_51	*0x33h*
2	**IN_2**	RL_2	*0x02h*	RL_52	*0x34h*
3	**IN_3**	RL_3	*0x03h*	RL_53	*0x35h*
4	**IN_4**	RL_4	*0x04h*	RL_54	*0x36h*
5	**IN_5**	RL_5	*0x05h*	RL_55	*0x37h*
6	**IN_6**	RL_6	*0x06h*	RL_56	*0x38h*
7	**IN_7**	RL_7	*0x07h*	RL_57	*0x39h*
8	**IN_8**	RL_8	*0x08h*	RL_58	*0x3Ah*
9	**IN_9**	RL_9	*0x09h*	RL_59	*0x3Bh*
10	**IN_10**	RL_10	*0x0Ah*	RL_60	*0x3Ch*
11	**IN_11**	RL_11	*0x0Bh*	RL_61	*0x3Dh*
12	**IN_12**	RL_12	*0x0Ch*	RL_62	*0x3Eh*
13	**IN_13**	RL_13	*0x0Dh*	RL_63	*0x3Fh*
14	**IN_14**	RL_14	*0x0Eh*	RL_64	*0x40h*
15	**IN_15**	RL_15	*0x0Fh*	RL_65	*0x41h*
16	**IN_16**	RL_16	*0x10h*	RL_66	*0x42h*
17	**IN_17**	RL_17	*0x11h*	RL_67	*0x43h*
18	**IN_18**	RL_18	*0x12h*	RL_68	*0x44h*
19	**IN_19**	RL_19	*0x13h*	RL_69	*0x45h*
20	**IN_20**	RL_20	*0x14h*	RL_70	*0x46h*
21	**IN_21**	RL_21	*0x15h*	RL_71	*0x47h*
22	**IN_22**	RL_22	*0x16h*	RL_72	*0x48h*
23	**IN_23**	RL_23	*0x17h*	RL_73	*0x49h*
24	**IN_24**	RL_24	*0x18h*	RL_74	*0x4Ah*
25	**IN_25**	RL_25	*0x19h*	RL_75	*0x4Bh*
26	**IN_26**	RL_26	*0x1Ah*	RL_76	*0x4Ch*
27	**IN_27**	RL_27	*0x1Bh*	RL_77	*0x4Dh*
28	**IN_28**	RL_28	*0x1Ch*	RL_78	*0x4Eh*
29	**IN_29**	RL_29	*0x1Dh*	RL_79	*0x4Fh*
30	**IN_30**	RL_30	*0x1Eh*	RL_80	*0x50h*
31	**IN_31**	RL_31	*0x1Fh*	RL_81	*0x51h*
32	**IN_32**	RL_32	*0x20h*	RL_82	*0x52h*
33	**IN_33**	RL_33	*0x21h*	RL_83	*0x53h*
34	**IN_34**	RL_34	*0x22h*	RL_84	*0x54h*
35	**IN_35**	RL_35	*0x23h*	RL_85	*0x55h*
36	**IN_36**	RL_36	*0x24h*	RL_86	*0x56h*
37	**IN_37**	RL_37	*0x25h*	RL_87	*0x57h*
38	**IN_38**	RL_38	*0x26h*	RL_88	*0x58h*
39	**IN_39**	RL_39	*0x27h*	RL_89	*0x59h*
40	**IN_40**	RL_40	*0x28h*	RL_90	*0x5Ah*
41	**IN_41**	RL_41	*0x29h*	RL_91	*0x5Bh*
42	**IN_42**	RL_42	*0x2Ah*	RL_92	*0x5Ch*
43	**IN_43**	RL_43	*0x2Bh*	RL_93	*0x5Dh*
44	**IN_44**	RL_44	*0x2Ch*	RL_94	*0x5Eh*
45	**IN_45**	RL_45	*0x2Dh*	RL_95	*0x5Fh*
46	**IN_46**	RL_46	*0x2Eh*	RL_96	*0x60h*
47	**IN_47**	RL_47	*0x2Fh*	RL_97	*0x61h*
48	**IN_48**	RL_48	*0x30h*	RL_98	*0x62h*
49	**IN_49**	RL_49	*0x31h*	RL_99	*0x63h*
50	**IN_50**	RL_50	*0x32h*	RL_100	*0x64h*

7.2. Backplane Connector

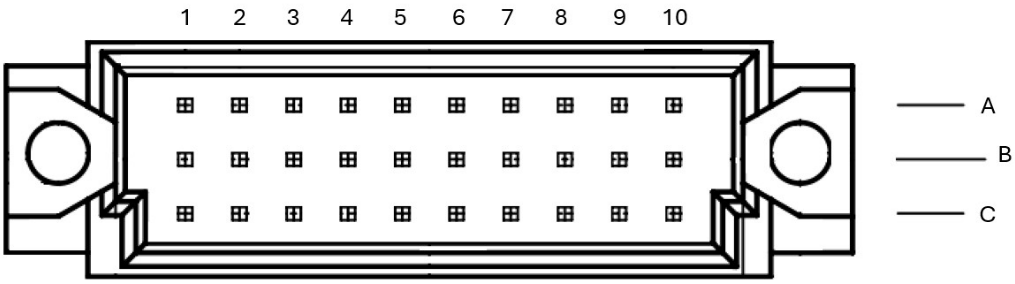


Figure 2. Backplane Connector Pinout

PINS	NAME	DESCRIPTION
A1	CAN_L	CAN Lo bus line
B1	CAN_H	CAN Hi bus line
C1, A2, B2, A9, B9, C9, A10, B10, C10	-	Not connected
C2	SYNC	Reserved for future use
A3, B3, C3	GND_control	Ground reference for the PS of the Lynx control boards
A4, B4, C4	PS_control	Power supply for the Lynx control boards
A5, B5, C5	GND_DUT	Ground reference for the PS of the DUT
A6, B6, C6	PS_DUT	Power supply for the DUT
A7, B7, C7	BK-	Connection to the measurement equipment, positive
A8, B8, C8	BK+	Connection to the measurement equipment, negative

8. DID LIST

8.1. Configuration

For all the frames, these parameters must be considered:

- **CAN Baudrate** = 500 Kbps
- **CAN-ID**
  - TX Frame = 1000 + (SERIAL % 100)
  - RX Frame = 1100 + (SERIAL % 100)
- **CAN FRAME LENGTH** = 0x08

8.2. Read Data Diagnostic List

DID	Name
0xF702	Get Relays State
0xF195	Read Software Version
0xF193	Read Hardware Version
0xF182	Read Product ID
0xF181	Read Product Name
0xF18C	Read Serial Number

8.3. GET RELAYS STATE

SENT FRAME

LENGTH	SERVICE	DID		BUFIN			
03	22	F7	02	-	-	-	-

- LENGTH (1 byte): 0x03 = 3 bytes frame length
- SERVICE (1 byte): 0x22 = Read Data Service
- DID (2 bytes): 0xF702 = Get Relays State

RECEIVED FRAME

SF INDEX	LENGTH	SERVICE	DID		BUFOUT		
10	1C	62	F7	02	RS (0-3)	RS (4-7)	RS (8-11)
SF INDEX	**BUFOUT**						
21	RS (12-15)	RS (16-19)	RS (20-23)	RS (24-27)	RS (28-31)	RS (32-35)	RS (36-39)
SF INDEX	**BUFOUT**						
22	RS (40-43)	RS (44-47)	RS (48-51)	RS (52-55)	RS (56-59)	RS (60-63)	RS (64-67)
SF INDEX	**BUFOUT**						
23	RS (68-71)	RS (72-75)	RS (76-79)	RS (80-83)	RS (84-87)	RS (88-91)	RS (92-95)
SF INDEX	**BUFOUT**						
24	RS (96-99)	-	-	-	-	-	-

- SF INDEX (4 bytes): Sequential Frames Index
  - 0x10 = First frame index
  - 0x21 = Second frame index
  - 0x22 = Third frame index
  - 0x23 = Fourth frame index
  - 0x24 = Fifth frame index
- LENGTH (1 byte): 0x1C = 28 bytes frame length
- SERVICE (1 byte): 0x62 = Read Data Service OK
- DID (2 bytes): 0xF702 = Get Relays State
- BUFOUT (25 bytes): Relay State (RS, 2 bits per relay)
  - 0b11 = OFF
  - 0b10 = ON

8.3.1. Read Software Version

SENT FRAME

LENGTH	SERVICE	DID		BUFIN			
03	22	F1	95	-	-	-	-

- LENGTH (1 byte): 0x03 = 3 bytes frame length
- SERVICE (1 byte): 0x22 = Read Data Service
- DID (2 bytes): 0xF195 = Read Software Version

RECEIVED FRAME

LENGTH	SERVICE	DID		BUFOUT			
07	62	F1	95	SwVer [0]	SwVer [1]	SwVer [2]	SwVer [3]

- LENGTH (1 byte): 0x07 = 7 bytes frame length
- SERVICE (1 byte): 0x62 = Read Data Service OK
- DID (2 bytes): 0xF195 = Read Software Version
- 0 (4 bytes): Software Version

8.3.2. Read Hardware Version

SENT FRAME

LENGTH	SERVICE	DID		BUFIN			
03	22	F1	93	-	-	-	-

- LENGTH (1 byte): 0x03 = 3 bytes frame length

- SERVICE (1 byte): 0x22 = Read Data Service
- DID (2 bytes): 0xF193 = Read Hardware Version

RECEIVED FRAME

LENGTH	SERVICE	DID		BUFOUT			
07	62	F1	93	HwVer [0]	HwVer [1]	HwVer [2]	HwVer [3]

- LENGTH (1 byte): 0x07 = 7 bytes frame length
- SERVICE (1 byte): 0x62 = Read Data Service OK
- DID (2 bytes): 0xF193 = Read Hardware Version
- BUFOUT (4 bytes): Hardware Version

8.3.3. Read Product Id

SENT FRAME

LENGTH	SERVICE	DID		BUFIN			
03	22	F1	82	-	-	-	-

- LENGTH (1 byte): 0x03 = 3 bytes frame length
- SERVICE (1 byte): 0x22 = Read Data Service
- DID (2 bytes): 0xF182 = Read Product ID

RECEIVED FRAME

LENGTH	SERVICE	DID		BUFOUT			
07	62	F1	82	ProdID[0]	ProdID[1]	ProdID[2]	ProdID[3]

- LENGTH (1 byte): 0x07 = 7 bytes frame length
- SERVICE (1 byte): 0x62 = Read Data Service OK
- DID (2 bytes): 0xF182 = Read Product ID
- BUFOUT (4 bytes): Product ID

8.3.4. Read Product Name

SENT FRAME

LENGTH	SERVICE	DID		BUFIN			
03	22	F1	81	-	-	-	-

- LENGTH (1 byte): 0x03 = 3 bytes frame length
- SERVICE (1 byte): 0x22 = Read Data Service
- DID (2 bytes): 0xF181 = Read Product Name

RECEIVED FRAME

SF INDEX	LENGTH	SERVICE	DID		BUFOUT		
10	17	62	F1	81	char1	char2	char3
SF INDEX	**BUFOUT**						
21	char4	char5	char6	char7	char8	char9	char10
SF INDEX	**BUFOUT**						
22	char11	char12	char13	char14	char15	char16	char17
SF INDEX	**BUFOUT**						
23	char18	char19	char20	-	-	-	-

- SF INDEX (4 bytes): Sequential Frames Index
  - 0x10 = First frame index
  - 0x21 = Second frame index

- 0x22 = Third frame index
- 0x23 = Fourth frame index

- LENGTH (1 byte): 0x17 = 23 bytes frame length
- SERVICE (1 byte): 0x62 = Read Data Service OK
- DID (2 bytes): 0xF181 = Read Product Name
- BUFOUT (25 bytes): Product Name

8.3.5. Read Serial Number

SENT FRAME

LENGTH	SERVICE	DID		BUFIN			
03	22	F1	8C	-	-	-	-

- LENGTH (1 byte): 0x03 = 3 bytes frame length
- SERVICE (1 byte): 0x22 = Read Data Service
- DID (2 bytes): 0xF18C = Read Serial Number

RECEIVED FRAME

LENGTH	SERVICE	DID		BUFOUT			
07	62	F1	8C	SerNum[0]	SerNum[1]	SerNum[2]	SerNum[3]

- LENGTH (1 byte): 0x07 = 7 bytes frame length
- SERVICE (1 byte): 0x62 = Read Data Service OK
- DID (2 bytes): 0xF18C = Read Serial Number
- BUFOUT (4 bytes): Serial Number

8.4. Write Data Diagnostic List

DID	NAME
0xF701	Enable Relay
0xF700	Disable Relay
0xF703	Disable All Relays
0xF709	Enable / Disable Watchdog
0xF70A	Refresh Watchdog
0xF705	Set Serial Number
0xF606	Set Product Name
0xF704	Set Hardware Version
0xF601	CAN enable configuration of the serial
0xF603	CAN configuration of the serial

Table 3. Write Data DID List

8.4.1. Enable Relay

SENT FRAME

LENGTH	SERVICE	DID		BUFIN			
04	2E	F7	01	RelayIndex	-	-	-

- LENGTH (1 byte): 0x04 = 4 bytes frame length
- SERVICE (1 byte): 0x2E = Write Data Service
- Did (2 BYTES): 0xF701 = Enable Relay
- BUFIN (1 bytes): 0xF18C = RelayIndex in Hex Format (from 0x01-0x64)

RECEIVED FRAME

LENGTH	SERVICE	DID		BUFOUT			
03	6E	F7	01	-	-	-	-

- LENGTH (1 byte): 0x03 = 3 bytes frame length

- SERVICE (1 byte): 0x6E = Write Data Service OK
- DID (2 bytes): 0xF701 = Enable Relay

8.4.2. Disable Relay

SENT FRAME

LENGTH	SERVICE	DID		BUFIN			
04	2E	F7	00	RelayIndex	-	-	-

- LENGTH (1 byte): 0x04 = 4 bytes frame length
- SERVICE (1 byte): 0x2E = Write Data Service
- DID (2 bytes): 0xF700 = Disable Relay
- BUFIN (1 byte): RelayIndex in Hex Format (from 0x01-0x64)

RECEIVED FRAME

LENGTH	SERVICE	DID		BUFOUT			
03	6E	F7	00	-	-	-	-

- LENGTH (1 byte): 0x03 = 3 bytes frame length
- SERVICE (1 byte): 0x6E = Write Data Service OK
- DID (2 bytes): 0xF700 = Disable Relay

8.4.3. Disable All Relays

SENT FRAME

LENGTH	SERVICE	DID		BUFIN			
03	2E	F7	03	RelayIndex	-	-	-

- LENGTH (1 byte): 0x03 = 3 bytes frame length
- SERVICE (1 byte): 0x2E = Write Data Service
- DID (2 bytes): 0xF703 = Disable All Relays

RECEIVED FRAME

LENGTH	SERVICE	DID		BUFOUT			
03	6E	F7	03	-	-	-	-

- LENGTH (1 byte): 0x03 = 3 bytes frame length
- SERVICE (1 byte): 0x6E = Write Data Service OK
- DID (2 bytes): 0xF703 = Disable All Relays

8.4.4. Enable/Disable Watchdog

SENT FRAME

LENGTH	SERVICE	DID		BUFIN			
04	2E	F7	09	En/Dis	-	-	-

- LENGTH (1 byte): 0x03 = 3 bytes frame length
- SERVICE (1 byte): 0x2E = Write Data Service
- DID (2 bytes): 0xF709 = Enable/Disable Watchdog
- BUFIN (1 byte):
  - 0x00 = Disable Watchdog
  - 0x01 = Enable Watchdog

RECEIVED FRAME

LENGTH	SERVICE	DID		BUFOUT			
03	6E	F7	09	-	-	-	-

- LENGTH (1 byte): 0x03 = 3 bytes frame length
- SERVICE (1 byte): 0x6E = Write Data Service OK
- DID (2 bytes): 0xF709 = Enable/Disable Watchdog

8.4.5. Refresh Watchdog

SENT FRAME

LENGTH	SERVICE	DID		BUFIN			
04	2E	F7	0A	AA	-	-	-

- LENGTH (1 byte): 0x03 = 3 bytes frame length
- SERVICE (1 byte): 0x2E = Write Data Service
- DID (2 bytes): 0xF70A = Refresh Watchdog
- BUFIN (1 byte): 0xAA = Key

RECEIVED FRAME

LENGTH	SERVICE	DID		BUFOUT			
03	6E	F7	0A	-	-	-	-

- LENGTH (1 byte): 0x03 = 3 bytes frame length
- SERVICE (1 byte): 0x6E = Write Data Service OK
- DID (2 bytes): 0xF70A = Refresh Watchdog

8.4.6. Set Serial Number

SENT FRAME

SF INDEX	LENGTH	SERVICE	DID		BUFIN		
10	0B	2E	F7	05	Pw[31:24]	Pw[23:16]	Pw[15:8]
SF INDEX	**BUFIN**						
21	Pw[7:0]	Ser[31:24]	Ser[23:16]	Ser[15:8]	Ser[7:0]	-	-

- SF INDEX (2 bytes): Sequential Frames Index
  - 0x10 = First frame index
  - 0x21 = Second frame index
- LENGTH (1 byte): 0x0B = 11 bytes frame length
- SERVICE (1 byte): 0x2E = Write Data Service
- DID (2 bytes): 0xF705 = Set Serial Number
- BUFIN (8 bytes):
  - Password (4 bytes) (always 0xAA 0x55 0x99 0x66)
  - Serial Number (4 bytes)

RECEIVED FRAME

LENGTH	SERVICE	DID		BUFOUT			
03	6E	F7	05	-	-	-	-

- LENGTH (1 byte): 0x03 = 3 bytes frame length
- SERVICE (1 byte): 0x6E = Write Data Service OK
- DID (2 bytes): 0xF705 = Set Serial Number

8.4.7. Set Product Name

SENT FRAME

SF INDEX	LENGTH	SERVICE	DID		BUFIN		
10	17	2E	F6	06	PN1	PN2	PN3
SF INDEX	**BUFIN**						
21	PN4	PN5	PN6	PN7	PN8	PN9	PN10
SF INDEX	**BUFIN**						
22	PN11	PN12	PN13	PN14	PN15	PN16	PN17
SF INDEX	**BUFIN**						
23	PN18	PN19	PN20	-	-	-	-

- SF INDEX (2 bytes): Sequential Frames Index
  - 0x10 = First frame index
  - 0x21 = Second frame index
  - 0x22 = Third frame index
  - 0x23 = Fourth frame index
- LENGTH (1 byte): 0x17 = 23 bytes frame length
- SERVICE (1 byte): 0x2E = Write Data Service
- DID (2 bytes): 0xF606 = Set Product Name
- BUFIN (20 bytes): Product Name (20 characters)

RECEIVED FRAME

LENGTH	SERVICE	DID		BUFOUT			
03	6E	F6	06	-	-	-	-

- LENGTH (1 byte): 0x03 = 3 bytes frame length
- SERVICE (1 byte): 0x6E = Write Data Service OK
- DID (2 bytes): 0xF606 = Set Product Name

8.4.8. Set Hardware Version

SENT FRAME

LENGTH	SERVICE	DID		BUFIN			
04	2E	F7	04	Hw[31:24]	Hw[23:16]	Hw[15:8]	Hw[7:0]

- LENGTH (1 byte): 0x07 = 7 bytes frame length
- SERVICE (1 byte): 0x2E = Write Data Service
- DID (2 bytes): 0xF704 = Set Hardware Version
- BUFIN (4 byte): Hardware Version

RECEIVED FRAME

LENGTH	SERVICE	DID		BUFOUT			
03	6E	F7	04	-	-	-	-

- LENGTH (1 byte): 0x03 = 3 bytes frame length
- SERVICE (1 byte): 0x6E = Write Data Service OK
- DID (2 bytes): 0xF704 = Set Hardware Version

8.4.9. Can Enable Configuration Of The Serial

SENT FRAME

LENGTH	SERVICE	DID		BUFIN			
03	2E	F6	01	-	-	-	-

- LENGTH (1 byte): 0x03 = 3 bytes frame length
- SERVICE (1 byte): 0x2E = Write Data Service
- DID (2 bytes): 0xF601 = CAN enable configuration of the serial

RECEIVED FRAME

LENGTH	SERVICE	DID		BUFOUT			
03	6E	F6	01	-	-	-	-

- LENGTH (1 byte): 0x03 = 3 bytes frame length
- SERVICE (1 byte): 0x6E = Write Data Service OK
- DID (2 bytes): 0xF601 = CAN enable configuration of the serial

8.4.10. Can Configuration Of The Serial

SENT FRAME

LENGTH	SERVICE	DID		BUFIN			
03	2E	F6	03	-	-	-	-

- LENGTH (1 byte): 0x03 = 3 bytes frame length
- SERVICE (1 byte): 0x2E = Write Data Service
- DID (2 bytes): 0xF603 = CAN configuration of the serial

RECEIVED FRAME

LENGTH	SERVICE	DID		BUFOUT			
03	6E	F6	03	-	-	-	-

- LENGTH (1 byte): 0x03 = 3 bytes frame length
- SERVICE (1 byte): 0x6E = Write Data Service OK
- DID (2 bytes): 0xF603 = CAN enable of the serial

9. OTHER RELEVANT CHARACTERISTICS

9.1. Watchdog functionality

The LynxICT includes a configurable watchdog mechanism to ensure safe operation. When enabled, the watchdog requires the user to send refresh frames within the configured timeout period.

9.1.1. Fall-safe behavior

- If no refresh frame is received within 10 seconds, all relays are automatically deactivated.
- The blue status LED turns off, and the red error LED turns on.
- A diagnostic flag (Timeout Expired) is raised.

9.2. Control via CAN (UDS service 0x2E)

DID (hex)	COMMAND	DESCRIPTION	EXAMPLE
0xF709	Enable / Disable Watchdog	Activates or deactivates the watchdog function.	04 2E F7 09 01 → Enable 04 2E F7 09 00 → Disable
0xF70A	Refresh Watchdog	Must be sent periodically (≤ 10 s).	04 2E F7 0A AA

9.2.1. Operation summary

- **Enable** the watchdog (DID 0xF709).
- Send **refresh frames** (DID 0xF70A) at intervals shorter than 10 seconds.
- If refresh is not received within the timeout, the system enters the fail-safe state.

This mechanism prevents uncontrolled relay activation in case of communication loss, software malfunction, or operator inaction.

9.3. LEDs Manage

LynxICT includes three status LEDs that provide quick visual feedback on system operation:

COLOR	INDICATES
Blue	Power ON (board ready)
Green	Reception of CAN frames (blinks 3 times per frame)
Red	Watchdog timeout (fail-safe state)

9.4. Relay Command Behavior

After receiving relay control commands, the board executes the following sequence:

1. Load commands
   - The requested relay switching operations are performed.
2. Reset watchdog
   - The watchdog timer is refreshed to avoid timeout.
3. Update LEDs
   - Current status is indicated via LEDs:
     - Red OFF
     - Blue ON

9.5. Can Identifier Configuration

Each LynxICT device generates its communication identifiers (CAN IDs) based on the assigned Serial Number.
ID generation rule:

- **Transmit ID (Tx):** 1000 + (Serial Number % 100)
- **Receive ID (Rx):** 1000 + (Serial Number % 100)

This mechanism guarantees that each device has a unique CAN identifier set, avoiding collisions when multiple boards are used in the same system.
Whenever the **Serial Number** is changed, the CAN ID configuration must be updated accordingly and stored in non-volatile memory (NVM).

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