



# LXA Test Automation Controller

## Typical Applications

The **LXA Test Automation Controller (TAC)** controls a single device under test (DUT) during development and testing. It is aimed at DUTs running Embedded Linux but can be used for a variety of embedded devices.

The LXA TAC provides the most common interfaces needed to remotely control a DUT. It can be extended using LXA IO-Bus devices.



### Typical Applications:

- Embedded Linux operating system development
- Application development on embedded devices
- Continuous testing of software on embedded hardware
- Embedded devices hardware bring up
- Remote development enablement

## Typical Use Cases

### • Interactive Development

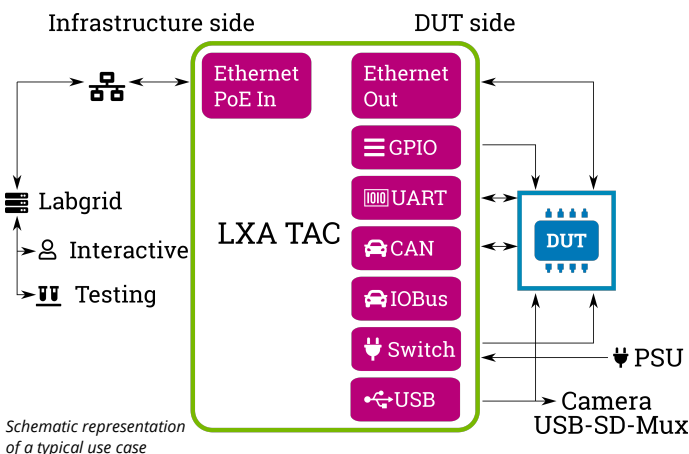
Remotely control a DUT during bootloader, operating system or application development.

### • Testing and Quality Assurance

Execute test suites for bootloader, operating system or application on real hardware.

### • Remote Development and Resource Sharing

With remote control over the DUT there is no need to have it on your desk. Remote development and sharing of scarce prototypes is possible.



## Infrastructure-Facing Interfaces

- Gigabit Ethernet with PoE (IEEE 802.3af), internal switch
- DC input (if PoE is not used)
- USB-C with USB 2.0 device port; can be used as USB gadget (either facing infrastructure or DUT)
- Serial debug console, LCD-display with button

## DUT-Facing Interfaces

- Gigabit Ethernet
- 3x USB 2.0 (power switchable per port)
- Combo-Header (2.54 mm for simple usage):
  - UART (3.3 V logic level) with RX, TX, RTS and CTS
  - 3.3 V supply for external level shifter
  - UART and power supply switchable
  - 2 potential-free contacts for switching of jumpers
- DUT power supply switch (max 48 V, 5 A) with voltage and current measurement
- CAN interface (for connection to DUT)
- LXA IOBus: For connection of LXA IOBus compatible extension devices

## User Interfaces

- 1.3" TFT Display with two Buttons:
  - Shows: DUT power state, IP address, IOBus state
  - Controls: DUT power supply switch, USB ports
  - Onboarding wizard
- Modern Web Interface with REST API
- 12 LEDs

## Open Source Linux Distribution

- Up-to-date Mainline Linux distribution (yocto based)
- Standard development tools included
- labgrid (<https://labgrid.org>)
  - For easy remote control of DUT
  - Can be used as "exporter" and integrate into existing labgrid infrastructure
  - Can be labgrid coordinator for stand-alone use
- LXA IOBus server for control of LXA IOBus compatible devices
- Hardware management daemon with REST API
- SSH access
- Support for privileged containers (e.g. Debian), using podman for quick and easy development
- A/B firmware upgrades using RAUC (<https://rauc.io>)

## Technical Data

<b>CPU:</b>	STM32MP153, 2x Cortex-A7 @ 650 MHz
<b>Coprocessor:</b>	Cortex-M4 (part of STM32MP15x)
<b>Storage:</b>	16 GiB eMMC A/B system partitions for updates Over 8 GB of storage available
<b>RAM:</b>	512 MiB
<b>Ethernet Switch:</b>	KSZ9563 Controllable from Linux via <i>switchdev</i> IEEE 802.1Q VLANs IGMP and IPv6 MLD snooping IEE 1588 PTP support
<b>Dimensions:</b>	Approx. 105 mm x 105 mm x 45 mm
<b>Environment:</b>	0 °C .. 40 °C, non condensing
<b>USB Host:</b>	3x USB 2.0 Individually power switchable Max 500 mA per port / 700 mA total
<b>Potential free contacts:</b>	Open: > 100 kΩ Closed: < 8 Ω Max 25 V, 120 mA
<b>IOBus:</b>	12 V, 400 mA: Allows up to 10 devices (More with external PSU)
<b>CAN:</b>	Normal: 20 Kbit/s .. 1 Mbit/s CAN FD up to 5 Mbit/s Exported as <i>socketcan</i> device
<b>UART:</b>	3.3 V logic level Up to 4 MBaud/s Inputs 5 V tolerant Power supply for accessories: 3.3 V, 50 mA
<b>Power Switch:</b>	Switchable range: 5 V .. 48 V Up to 5 A Reverse polarity protected
<b>Power Supply:</b>	IEEE 802.3af PoE or 48 V passive PoE on <i>Uplink</i> Port or DC Input: 12 V, 1.5 A, barrel jack 2.1mm/5.5mm (Würth 694106301002), center positive  Max. 13 W (PoE or DC in) Passive cooling
<b>Display</b>	TFT, 240x240 pixel (RGB), 1.3 inch / 3.3 cm
<b>Other:</b>	Hardware watchdog

Specification is based on the most recent prototype and can change as development progresses.  
This datasheet is subject to change without notice.

## Customization Services

In case the LXA TAC ecosystem does not fully fit your needs we provide customized hardware and software solutions based on our existing ecosystem.

## Integration and Test Development Services

With our partner Pengutronix we provide comprehensive services: We can help with integration of our LXA TAC into your existing remote-control or Labgrid environment and can get your Embedded Linux testing activities up to speed.

## Included Accessories

- **UART debug cable**  
2.5 mm headphone jack to USB
- **Set of 3 connectors for the DUT power supply switch**  
(4-position screw terminal connectors, Type: Würth Elektronik 691361100004)
- **CAT6 Networking Cable**

## Optional Accessories

- **UART level shifter to 2.5 V ,1.8 V and 1.2V**  
maximum Speed up to:  
2.5 V: 4 Mbaud/s, 1.8V: 2 Mbaud/s, 1.2 V: 1Mbaud/s
- **UART level shifter to RS232**  
maximum speed up to: 115200 Baud/s  
Voltage level: ±6 V
- **Top-Hat / DIN rail mount**
- **Power Supply**  
12 V, Type C / CEE 7/16
- **LXA IOBus Ethernet Mux:**  
Multiplexes a Base-T Ethernet connections between two upstream ports
- **LXA IOBus 4DO-3DI-3AI:**  
Provides digital inputs and outputs and analog inputs on IOBus

One of our focuses for the design of our software and hardware is the integration of labgrid.

