



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

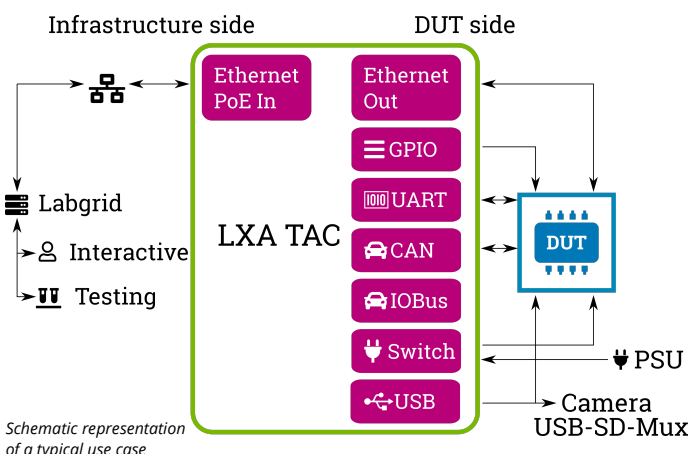
Remotely control a DUT during bootloader, operating system or application development.

• 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

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

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

- **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 debug cable**
2.5 mm headphone jack to USB
- **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.

