

Requirements / components with FANUC

The MIRAI UX1 kit includes key components that are required to set up the MIRAI robot control subsystem for a FANUC. The following components are included in the kit:



Figure 1-a. MIRAI robot controller incl. power supply and L-mount



Figure 1-b. Ximea xiQ USB3



Figure 1-c. Fujinon lens



Figure 1-d. camera fixtures

Scope of delivery:

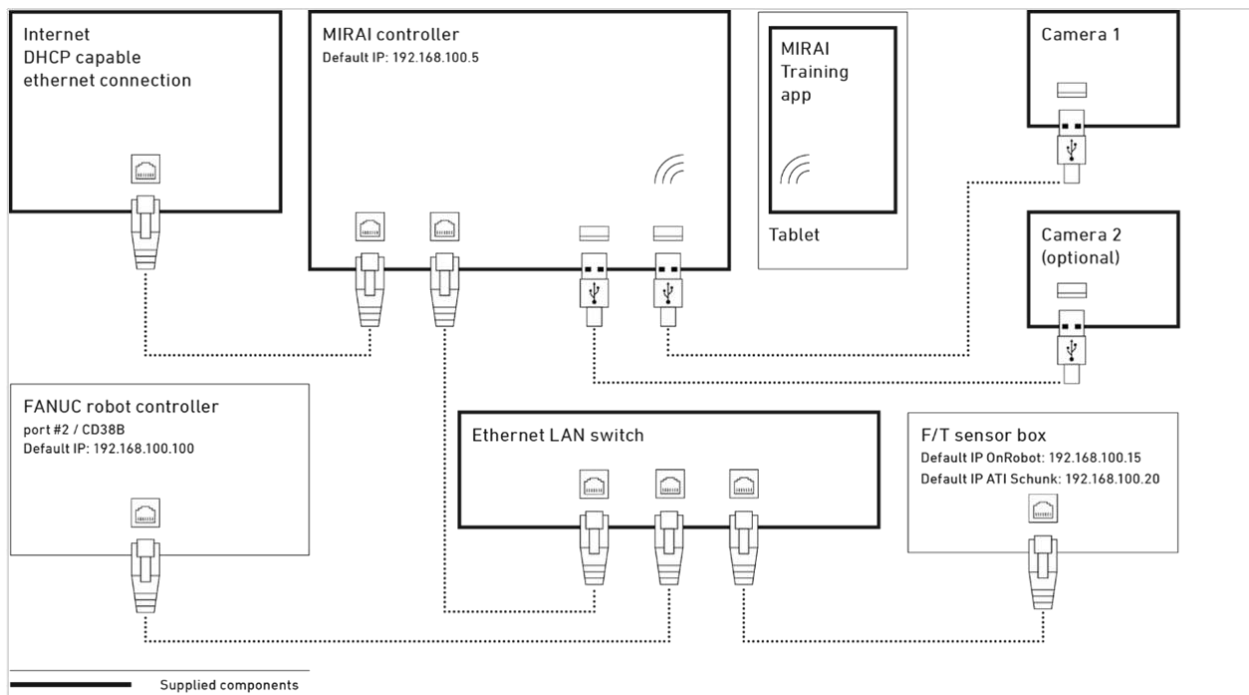
- 1x MIRAI UX1 robot controller (Figure 1a)
- 1x L-mount for MIRAI UX1
- 1x universal AC power supply, DC19V/120W
- 1x AC power cord for EU and US region
- 2x wireless antennas
- 1x Ximea xiQ USB3 camera (Figure 1b)
- 1x USB3 cable
- 1x Fujinon lens 1 (Figure 1c)
- 1x Fujinon lens 2
- 2x Camera fixtures for the robot arm (Figure 1d)
- 4x M-6 mounting screws (included with the camera)
- 4x CBSTSR6-16 screws to mount the fixtures
- 1x USB drive with the MIRAI Training App, SETUP.CM and MIRAIEXECUTE

Furthermore, the following system components are necessary for a minimum MIRAI controlled robot setup:

- FANUC robot arm and control system (CRX10iA/L) with the R-30iB Plus Mini controller: **minimum software versions required for FANUC robot control: V9.4**
- FANUC Tablet Teach Pendant (FANUC Tablet TP)
- **Important:** The following software options are prerequisites that need to be installed on the FANUC robot controller:

- R739 Dyn Path Modifier: 1A05B-2600-R739
- R648 User Socket Msg: 1A05B-2600-R648
- J742 Customize support function: 1A05B-2600-R742
- **US customers: R632 Karel + R553 HMI device** (This function allows an HMI Device to monitor and control data remotely [from] within a robot controller. The robot communicates with the remote HMI by using the same drivers and addressing as a GE Fanuc Series 90 PLC.)
- **EU customers: R651 FRL Params** (already shipped with EU FANUC robots)
- OnRobot HEX-E v2 or QC force/torque sensor **or**
- ATI F/T sensors supported models
 - All ATI sensors that support Network Force/Torque (NET F/T) system (tested with ATI-9105-Net-Gamma)
 - ATI Axia80-M20 with adapters
- Ethernet Gigabit switch (1GB per port, full duplex)
- Android based 10" tablet running Android 6 or higher
- An external lighting solution for cameras is recommended to ensure constant lighting conditions during recordings. We recommend Effilux ring light for your setup.

Connecting the components



Schematic view of a MIRAI controlled robot setup

The schematic view of a MIRAI controlled robot setup shows the various components that a MIRAI based solution includes. It also indicates all the components and peripherals supported by the MIRAI controller, and how these are connected through various available interfaces.

The MIRAI solution comprises of the following elements:

- MIRAI robot controller creates sensor-based, real-time robot movements based on trained ‘skills’.
 - ‘MIRAI Training App’ is the primary user interface for the MIRAI controller to record training episodes and manage MIRAI skills. It is a mobile app for Android based tablet devices.
 - The Micropsi Industries cloud training service calculates MIRAI skills based on the recorded and uploaded training episodes.
 - CM and MIRAIEXECUTE enable the user to access the MIRAI skills and integrate these in FANUC Tablet TP robot program flows.
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- Place the MIRAI controller in proximity to the FANUC robot arm or the FANUC robot control cabinet; since it must be connected to the USB cameras and the robot controller. When placing the controller ensure that there is enough intake of air (room temperature) through the ventilation slits. After the setup is complete, we recommend physically fixing the controller to protect it from falling and movement. The enclosed L-mount fixture allows mounting the controller to a surface.
 - The FANUC R-30iB Plus Mini controller board has three ethernet ports and the Ethernet cable must be connected in the second (the one in the middle) Ethernet slot. This port is known as **port #2** and labeled as **CD38B**.
 - Connect the MIRAI Ethernet interface for robot control, the Ethernet interface from the FANUC control cabinet, and the Ethernet interface of the ‘Compute Box’ of the OnRobot F/T sensor to a Gbit Ethernet switch using UTP cables, creating a local area network (LAN) for the robot control
 - Plug the remaining end of the USB cable that is connected to the camera into one of the free USB3 ports of the MIRAI controller. Several USB3 type A ports can be found at the rear or the front of the controller.
 - Connect the remaining free Ethernet WAN port to a network with WAN/internet access. Since the IP address of this port is expected to be set through a DHCP, ensure the connected network provides a DHCP service.
 - Mount the enclosed Wi-Fi antennas to the antenna connectors.
 - Connect the MIRAI controller to power using the enclosed universal AC power supply (240V, 120W)
 - Once you turn on the MIRAI controller, wait for the second ‘beep’, which indicates that the system is up and running. This can take between 2 and 4 minutes, depending on the setup.

- To test if the sensor is mounted correctly, test if the robot arm moves in the direction you push it in. If it e.g. moves in a different or even opposite direction than the applied force you most likely need to remount the sensor.
- The HDMI ports are not supported; therefore, do not connect a video output device to these.