

Benefit

BIXCS-1300 is a smart, freely programmable controller that enables completely new dimensions in terms of functional, commercial and physical footprint through expandable system functionality, modularity and openness. All BIXCS products impress with fanless operation, a lifecycle of 15 years and a 5-year warranty.



BIXCS-1300 in Housing 1, BxHxT= 110 x 85 x 25 mm

Ambient Temperature

BIXCS-1300 systems are offered in 3 temperature classes and support maximum operation at an ambient temperature of -40 ... +70 degrees Celsius.

Power Supply

The integrated power supply allows a supply of DC 10-24V and has a twist-lock socket, externally there are cables with an open end, plugs with screw terminals or AC power packs available for connection.

Housing

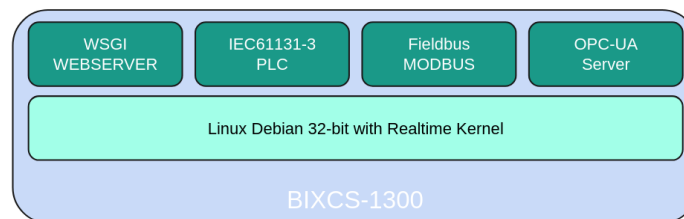
BIXCS-1300 systems can be supplied with or without a housing. All variants are implemented with passive cooling without any fan. The housings are made of powder-coated aluminum and can be individually adapted to customer requirements. There are 2 standard housing sizes available (Housing 1 with WxHxD = 110x25x85 mm, Housing 2 with WxHxD = 110 x 65 x 85 mm).

Mounting

BIXCS-1300 controllers can be mounted either on top-hat rails or on the back of touch displays. For special requirements, direct integration into other housings is also possible.

System Components

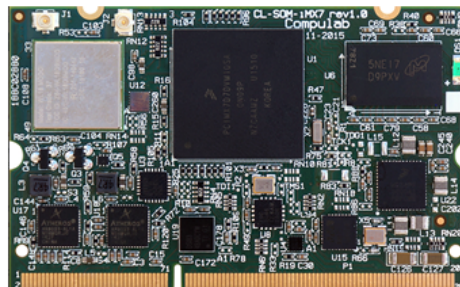
BIXCS-1300 systems consists of virtual PLC cores, the MODBUS field bus, an OPC UA server, an HTTP server that can be programmed using Python, and a C and Python interface for connecting additional applications. Linux Debian 32-bit with a real-time kernel is used as the operating system. No knowledge of the operating system is required to use the basic system.



BIXCS-1300 Typical Firmware Configuration

Open Hardware Platform

NXP [ARM iMX7](#) Cortex A7 dual core 1 GHz and Coprozessor Cortex M4 200 MHz are used in BIXCS-1300 devices.



BIXCS-1300 COM Module

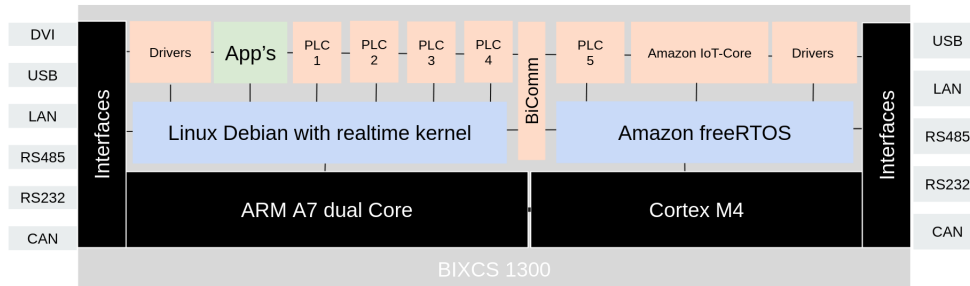
The hardware can be perfectly adapted to customer requirements by adapting the integrated interfaces, the capacity of the soldered RAM, mass storage (eMMC) and a pluggable SSD module (eUSB).

Open Firmware Platform

The BIXCS-1300 system offers a variety of options to extend firmware functionality. Optionally, the system can be expanded with additional PLC cores or other modules from the BIXCS platform. For example, other fieldbus drivers, smart services for messengers, IoT services, cloud connections (e.g. AWS-IOT), over-the-air update service and an HTML5-based visualization are available.

Heterogeneous architecture

In addition to the firmware modules for Linux, BIXCS-1300 offers the option of running additional software separately on the Cortex M4 coprocessor.

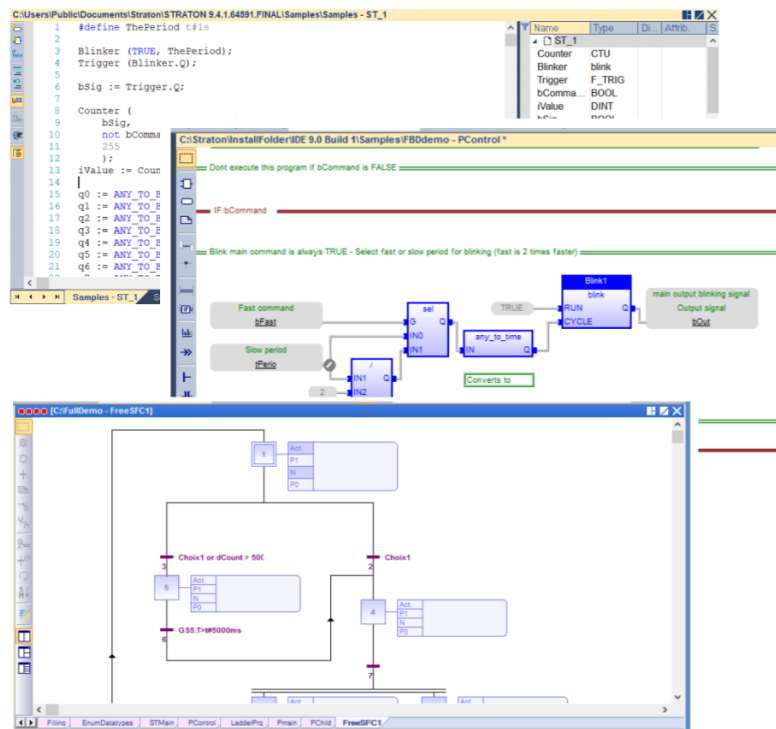


BIXCS-1300 Heterogeneous System

For example, a PLC core can run on the coprocessor, which works completely independently of Linux and meets the toughest real-time requirements.

BIXCS Workbench

A toolkit consisting of Microsoft Visual Studio Code and PLC workbench is available for programming, testing and commissioning. Visual Studio Code is used to create Linux applications, the PLC workbench is used for programming, testing and commissioning the integrated controls. The toolkit runs on any Windows 10/11 computer, the connection to BIXCS is made via any LAN/WLAN interface.



BIXCS PLC-Workbench

The programming languages Function Block Diagram (FBD), Structured Text (ST), Instruction List (IL), Sequential Function Chart (SFC) and Ladder Diagram (LD) are supported on the PLC side. The

workbench also offers extensive options for testing and simulating the applications. SVN or GIT can be used for versioning. Alternatively, the toolkit is also available as a VMware image.

Fieldbus

BIXCS-1300 comes with fieldbus drivers for MODBUS-RTU and MODBUS-TCP at no extra cost, which can be used by the integrated PLC cores in any master/slave combination. The fieldbus systems PROFIBUS, PROFINET, POWERLINK, Ethernet/IP and CANopen are optionally available.

Central IO's

Standardized extension boards including PLC drivers and interfaces to the SPI or I2C bus are available as dev kits including samples of extension housings for series customers who want to integrate special IOs directly into the BIXCS housing. This saves considerable development effort and reduces the time to market. Alternatively, MS-C also offers the development and production of such extensions at a fixed price with all services from a single source.

Webserver

Dynamic websites for device configuration and visualization can be created very easily for the integrated web server using the Python programming language and the Flask framework. The integrated DHCP server allows the implementation of service interfaces (e.g. via WLAN) without any configuration effort for the user.

OPC-UA Server

Standardized communication with higher-level SCADA systems via plug and play is possible via the fully-fledged OPC UA server (Open Process Control).

Database

BIXCS-1300 optionally enables direct access to local or remote SQL or NoSQL databases from the integrated PLC. The CouchDB database system is supported locally (optional SSD module required).

AWS IoT-Core

BIXCS-1300 devices can be easily and securely connected to the Amazon AWS cloud with this option. This makes it possible to communicate directly with AWS cloud applications or other devices. AWS IoT-Core enables communication via HTTP, websockets or MQTT.

Digital TWIN

With this option, BIXCS-1300 devices can be connected to OTA servers and then managed via them. The system enables modular updates including a fallback strategy in the event of transmission errors. This functionality is available either as Software-as-Service or on premise.

Specification of PLC ASL / Automation-System Linux / on ARM A7

Maximum number of PLC runtime cores on one device	4
Maximum number of POU (Program Organization Units) per PLC runtime core	32.000
Maximum size of a POU	64 kByte
Maximum number of FB instances per PLC runtime core	65.530
Maximum number of database connections per PLC runtime core	2
Number of IO channels	unlimited
Fieldbus MODBUS-RTU Master (RS485)	yes
Fieldbus MODBUS-RTU Slave (RS485)	yes
Fieldbus MODBUS-RTU Master & Slave (RS485)	yes
Nr of RS485-Interfaces (Housing Standard)	1
Nr of RS485-Interfaces (Housing Extended)	5
Fieldbus MODBUS-TCP Master	ja
Fieldbus MODBUS-TCP Slave	ja
Fieldbus MODBUS-TCP Master & Slave	ja
Nr. of Ethernet-Interfaces (Housing Standard)	2
Max. Nr. of WiFi-Interfaces (Housing Extended)	2
Typical Jitter of a PLC-Task	+/- 1ms

Specification of PLC-ASR / Automation-System RTOS / on Cortex M4

Maximum Nr. of PLC-Runtime-Instances per Device	1
Maximum Nr. of POU (Program Organization Units)	32.000
Maximum size of a POU	64 kByte
Maximum Nr. of FB-Instances	65.530
Maximale Nr. of database connections	0
Nr. IO Channels	unlimited
Fieldbus MODBUS-RTU Master (RS485)	yes
Fieldbus MODBUS-RTU Slave (RS485)	yes
Fieldbus MODBUS-RTU Master & Slave (RS485)	yes
Anzahl RS485-Schnittstellen (Gehäuse Standard)	1
Anzahl RS485-Schnittstellen (Gehäuse Extended)	1
Fieldbus MODBUS-TCP Master	yes
Fieldbus MODBUS-TCP Slave	yes
Fieldbus MODBUS-TCP Master & Slave	yes
Nr. of Ethernet Interface	1
Nr. of WiFi Interfaces	0
Typical Jitter PLC-Task	+/- 10 μ s

BIXCS-1300 order id's

BIXCS-1300 Processor	NXP iMX7 ARM Cortex A7 dual core 1,0 GHz with Coprocessor Cortex M4 200 MHz	BIX-13
Basic Interfaces	1x DVI Resolution up to 1920 x 1080 Pixel 2x LAN Gigabit Ethernet 4x USB2.0, 1x RS232 1x serial console (RS232-to-USB) 1x WiFi 802.11 bgn, 1x Bluetooth 4.1 LE	
Variant 1	Basic-Interfaces and 1x RS485	1
Variant 2	Basic-Interfaces and 1x CAN-Bus	2
Variant 3 ¹⁾	Basic-Interfaces, 5x RS485, 4x DC24V Sensor Power Supply	3
Variant 4 ¹⁾	Basic-Interfaces, 1x CAN-Bus, 4x RS485, 4x DC24V Sensor Power Supply	4
Variant 5	Basic-Interfaces, 1x RS485, Cellular GSM/4G	5
Variant 6	Basic-Interfaces, 1x CAN-Bus, Cellular GSM/4G	6
Variant 7 ¹⁾	Basic-Interfaces, 1x RS485, 2x WiFi, 2x Bluetooth	7
Variant 8	Basic-Interfaces, 1x CAN-Bus, 1x WiFi, 1x Bluetooth	8
Ambient Temperature	for operation at ambient temperature 00 ... +60 °C -20 ... +70 °C -40 ... +70 °C	0- 1- 2-
SSD-Modul ¹⁾	none	0000
available for	SLC 2 GB	0002
- BIXCS-133x	SLC 4 GB	0004
- BIXCS-134x	SLC 8 GB	0008
- BIXCS-137x	SLC 16 GB	0016
	MLC 8 GB	1008
	MLC 16 GB	1016
	MLC 32 GB	1032
	MLC 64 GB	1064
	MLC 120 GB	1120
	MLC 250 GB	1250

Firmware Modules Please add order codes separated with a "+"	1x PLC-Core Linux (ASL)	+101
	2x PLC-Core Linux (ASL)	+102
	3x PLC-Core Linux (ASL)	+103
	4x PLC-Core Linux (ASL)	+104
	1x PLC-Core freeRTOS	+201
	1x WSGI HTTP-Server	+301
	OPC-UA Serve	+401

¹⁾ Housing-Variant 2 necessary