µISP

Single Site In-System Universal Programmer

Hardware Manual

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algocraft

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1. µISP - At a Glance

Overview

Congratulations for purchasing a µISP In-System Programmer. Based on the Algocraft proprietary WriteNow! Technology, the µISP Series of In-System Programmers are professional programming instruments dedicated to the programming of devices. µISP can either work connected to a host PC (RS 232, USB, LAN connections are built in) or in standalone mode.

The programming cycle execution in standalone mode may occur by simply pressing the START button or through some control lines.

Its compact size and versatility allows a simple integration into production environments, manual and automatic.

The µISP series is compatible with the entire WriteNow! Series in order to allow an easy migration between the models. This is very interesting in order to migrate to multi-site solutions whenever needed into production.

The UISP1 in-system programmer

Key Features

- Universal In System Programmer.
- Standalone operations or host controlled.
- Easy to install and to use.
- Compact size, fixture friendly.
- Thousands of supported devices with different programming protocols.

Hardware Features

- Supports microcontrollers, serial memories and other programmable devices.
- High-speed.
- Small size (fixture friendly).
- Designed for easy ATE integration.
- Supports multiple interfaces (JTAG, SWD, UART, SPI/QSPI, BDM, SWIM, I2C, DAP, cJTAG, C2, ICSP, PDI, UPDI, FINE, MUST/MICE, MON08, ISSP, ICC, MDI, OUT, PSI5, SBW, custom, etc).
- Memorizes data on a built-in memory card.
- Programmable power supply output.
- Programmable I/O voltage.
- USB 2.0, LAN, RS-232 and low-level interface.
- START Push button.
- 5V USB powered or 5V AC/DC adapter.
- Dedicated outputs for relays barrier or demultiplexer modules.

Software Features

- Project Generator GUI with built in utilities: Image File Creation, File Manager, ISP Signal Connections, Memory Analysis.
- SDK/ API for custom application (Visual C, Visual Basic, C#, LabView**,** etc**).**
- ASCII based command line protocol.
- Variable data handling for serial numbering, MAC addresses, production codes, etc.
- Blank check/erase/program/verify/read operations;

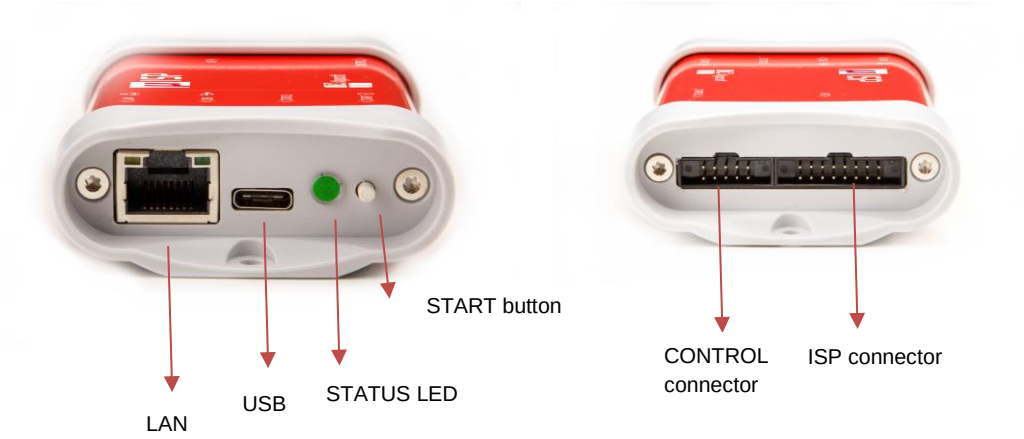
Package Checklist

The µISP programmer package includes the following items:

1. UISP1 unit.
2. AC/DC power supply adapter (5V output).
3. USB and Ethernet cables.
4. UISP1 test board.
5. DIN41612 48-way board adapter.
6. 16-ways and 10-ways 20cm flat cables.
7. 48-ways, female wire-wrap DIN41612 connector.

Connectors Overview

µISP has several connectors for interfacing to a host PC, to an Automatic Test Equipment (ATE), and to the target system(s) to be programmed. The following pictures show where the various connectors are located.



- The USB connector is used to communicate with a host PC system. µISP can also be powered by this USB type C (5V) port.
- The LAN connector is used to communicate with a host PC system.
- The multifunctional STATUS LED shows the status of programmer and the result of the project execution.
- The START button executes the programming process with the last downloaded project.
- The ISP connector is used to interface to the target system(s) to be programmed.
- The CONTROL connector is used to interface the instrument to an ATE or other systems. After the configuration of the parameters, the programmer can be controlled by I/O lines (START, BUSY, PASS/FAIL).

For details and pinout of the various connectors, see the “Connectors” chapter.

LED STATUS indication

The multicolor LED on the rear panel of the instrument, shows the status of the programmer. Solid on (BLUE color), blinks if the system needs user action.

Color	Status	Description
VIOLET	RESET/INIT	The programmer is in bootloader mode for internal system boot
BLUE	IDLE/READY	The programmer is in idle state, powered and ready to accept commands
RED	FAIL/ERR	Programming cycle completed with error
GREEN	PASS/OK	Programming cycle completed successfully
CYAN	BUSY	Programming cycle in execution

Additional Documentation

This hardware manual provides information about how to set up µISP and its hardware characteristics.
For any information about µISP commands and their syntax, please refer to the Programmer's Manual included (in PDF format) in WriteNow! setup.

2. Programming Installations

Algocraft's µISP series finds different applications into the device programming field: into an on-board programming system for standalone stations or into automatic test equipment. It can be used for a single programming or for a multi-device parallel programming using different units.

Stand-alone – Manual Programming

Once the programmer is configured, the programming cycle is executed by simply pressing the START button. The result of the programming is verified by the status of the multifunction LED (BUSY/PASS/FAIL). µISP can be used as a handheld instrument in standalone mode for in-field programming.

Stand-alone – Automated Programming

After the configuration of the parameters, the programmer can only be controlled by I/O lines (START, BUSY, PASS/FAIL). The needed signals to control the instrument in standalone mode are located in the "CONTROL" connector.

Multiple Programming system

By using a simple USB HUB or LAN switch, it is possible to create a parallel programming system.

3. System Setup

Software setup

Install the last software version of WriteNow! Setup available on our web site www.algocraft.com under **downloads > software** menu.

To install the system software, you must log in as Administrator.

The WriteNow! system software setup installs all of the required components to your hard drive. These components include:

- The WriteNow! Project Generator utility;
- Command-line utilities and Interface Library;
- Documentation in PDF format

Launch the Project Generator application, that is located under **Programs > Algocraft > WriteNow! Software > Project Generator.**

Configure your µISP instrument. Choose **Settings > Select Hardware Model**, and specify your µISP model and communication settings with the PC.

µISP can be connected through USB, LAN and serial port (RS232).

Hardware setup

To setup µISP, you must follow the steps below:

- Connect µISP to your PC through the provided Ethernet or USB cable.
- Power up µISP (by USB Type C (5V) or using the provided power supply).
- Set up LAN or USB port.
- Check µISP communication sending commands via WriteNow! Project Generator utility.

Project setup

Projects are sequences of commands collected in a text file. The project file contains all the target device information and user settings. Use the WriteNow! Project Generator utility to create or edit a project file and then follow the Project Creation Wizard steps.

Connect to Target Device

Connect µISP to your target system through the ISP connector. To view the connections for your selected target device, select **Project > Show ISP Connections**.

Interfacing with your Test/Programming Equipment

µISP can be controlled in three ways:

- By manually sending commands and receiving answers, using the Project Generator Terminal or any other terminal application;
- By configuring the instrument so that it can work in standalone, that is without a connection to a PC;
- By building your own PC software that interfaces to the instrument (for more information, see “WriteNow! API” on Programmer’s Manual).

Hardware Test

The diagnostic procedure is a very easy way to verify if any hardware faults occur. Use the provided test-board to check the programmer hardware functionality.

Programming Drivers

µISP comes with preinstalled programming drivers (algorithms) that support common microcontrollers and memories.

4. Standalone Mode (low-level interface)

Overview

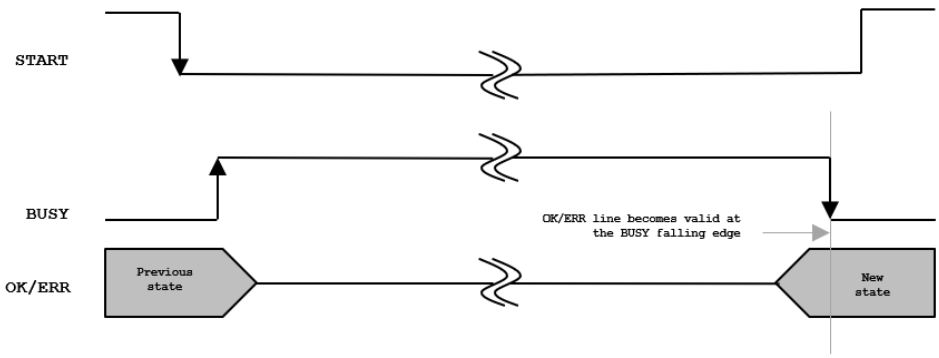
µISP can work with no connection to a PC (standalone mode). In standalone mode, the instrument is controlled through a low-level connection interface (CONTROL connector). With this simple interface it is possible to start a project (START) and check the result (OK/ERR).

Signals

The needed signals to control the instrument in standalone mode are located in the “CONTROL” connector and are explained as below.

Signal	Description
START	Executes the last downloaded project. Active low
OK/ERR	Valid at the end of project execution (when BUSY is low). Indicate, the success state of the programming project. (OK = high, ERR = low).
BUSY	Indicates that a project is being executed. Active high

Application Example



5. Power Supply and Modules

Power Supply

µISP can be powered in two ways:

- Through a 5V power supply connected to a USB (5V) connector.
- Dedicated lines in the “CONTROL” connector.

If the BUP (board under programming) is powered through the µISP at voltage greater then 5V, we suggest to use the AC/DC power adapter to power the programmer in order to avoid to exceed the maximum USB current limit (500mA)

Relays Lines

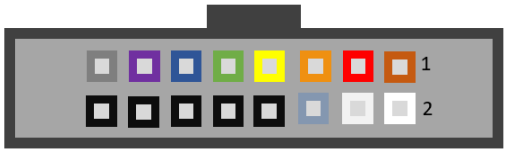
µISP features two lines (RLY0 and RLY1) on the “ISP” connector for driving an external relay barrier or a demultiplexer module.
When you create a programming project using the Project Generator application, relays are by default closed at the beginning of the project (with **`the #relay –o close`** command) and opened at the end (with **`the #relay -o open`** command). These signals are driven to ground when **`a #relay -o close`** command is executed, and driven to a weak pull-up at 5.5V when a **`the #relay -o open`** command is executed.

Demultiplexer Module

The demultiplexer module is designed to increase the number of ISP channels. The Reed relay technology ensures true galvanic isolation.

6. Connectors

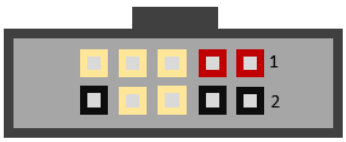
"ISP" Connector



ISP Signal Definitions

Description	Signal Name	Pin#	Pin#	Signal Name	Description
ISP Line 1	S1L01	1	2	RLY0	Relay Output 0
ISP Line 2	S1L02	3	4	RLY1	Relay Output 1
ISP Line 3	S1L03	5	6	5V5 OUT	Reserved
ISP Line 4	S1L04	7	8	GND	Ground
ISP Line 5	S1L05	9	10	GND	Ground
ISP Line 6	S1L06	11	12	GND	Ground
ISP Line 7	S1L07	13	14	GND	Ground
Target Programmable Power Supply	S1PPS	15	16	GND	Ground

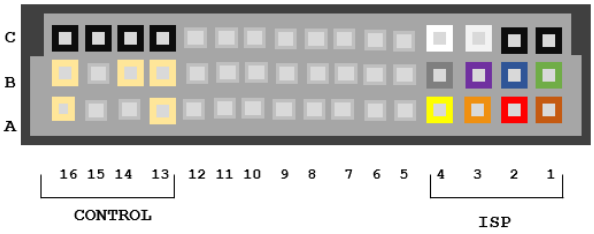
"CONTROL" Connector



CONTROL Interface Signals

Description	Signal Name	Pin#	Pin#	Signal Name	Description
Input Power Supply	5V_EXT	1	2	GND	Ground
Input Power Supply	5V_EXT	3	4	GND	Ground
RS-232 TX (Output)	TX_RS232	5	6	RX_232	RX_RS232 (Input)
Project Start (Input with pull-up)	START	7	8	BUSY	Busy (Output, push-pull)
OK/ERR (Output, push-pull)	OK/ERR	9	10	GND	Ground

"UISP1-DIN-ADP" Board Connector



A UISP1-DIN-ADP board adapter is included in the package. This adapter has been designed for an easy fixture wire-wrapping connection and it's also signal compatible with all the WriteNow! Series connectors.

UISP1-DIN-ADP Signals

Signal	Description	UISP1-DIN-ADP Pin
	ISP Signals	
S1L01	ISP Line 1	A1
S1L02	ISP Line 2	A2
S1L03	ISP Line 3	A3
S1L04	ISP Line 4	A4
S1L05	ISP Line 5	B1
S1L06	ISP Line 6	B2
S1L07	ISP Line 7	B3
S1PPS	Target Programmable Power Supply	B4
S1GND	Ground	C1/C2
RLY0	Relay Output 0	C4
RLY1	Relay Output 1	C3
	CONTROL Signals	
GND	Power Supply Ground	C13/C14/C15/C16
TX_RS232	RS-232 TX (Output)	A16
RX_RS232	RS-232 RX (Input)	B16
START	Project Start (Input, internal pull-up)	B13
BUSY	Busy (Output, push-pull)	B14
OK/ERR	Site OK/ERR (Output, push-pull)	A13

One of the most important parameters to take into account for ISP wiring is the connection length.
For this reason, the programmer should be placed as close as possible to the BUP (Board Under Programming) keeping the ISP wiring length as short as possible.
All the ground lines available on the ISP connector should be wired to the BUP.

7. Specifications

Electrical Specifications

Feature	Value
Maximum Ratings	
Power supply voltage	6.5V
ISP S1L[1..7] voltage	-0.7-6.5V
ISP S1L[1..7] current	±50mA
ISP S1PPS voltage	-0.7-18V
ISP S1PPS current(*)	170mA
ISP S1RLY[0..1] voltage	-1.0-30V
Control interface START, BUSY, OK/ERR voltage	-0.7-6.0V
Operating Ranges	
Power supply voltage	USB powered or external 4.5V-5.5V
ISP S1L1 voltage	0-15V
ISP S1L[2..7] voltage	0-5.5V
ISP S1L[1..7] adjustable voltage resolution	100mV
ISP S1PPS voltage	1.5-12.5V
ISP S1PPS current	150mA
ISP S1PPS adjustable voltage resolution	100mV
ISP S1RLY[0..1] voltage	0-28V
Control interface START, BUSY, OK/ERR voltage	0-5.5V
LAN	100Mbit/s
USB	2.0 full-speed

(*) Current limited, recovers automatically after fault condition is removed.

Physical and Environmental Specifications

Parameter	Value
Dimension (with enclosure):	90.0 x 60.9 x 23.4 mm
Dimension (without enclosure):	74.0 x 47.5 x 11.0 mm
“ISP” connector type:	Box header 8x2 pitch = 2mm (male)
“CONTROL” connector type:	Box header 5x2 pitch = 2mm (male)
UISP1-DIN-ADP connector type:	48 way, 3 row, DIN 41612, pitch = 2.54mm (male)
“USB” connector type:	USB Type C
“LAN” connector type:	RJ-45 connector
Operating conditions	0-40°C, 90% humidity max (without condensation)
SD card size:	16GB min.
Storage conditions	-10-60°C, 90% humidity max (without condensation)
EMC (EMI/EMS)	CE

Spare Parts

For wire wrapping:

DIN41612 connector, 3 rows, 48 pins, 180° female, C style
Manufacturer: Conec
Manufacturer Part Number: 122A10619X
Catalog Part Number: Mouser 706-122A10619X

For soldering:

DIN41612 connector, 3 rows, 48 pins, female, R/A C style
Manufacturer: FCI
Manufacturer Part Number: 86093488613755E1LF
Catalog Part Number: Mouser 649-8693488637E1L