

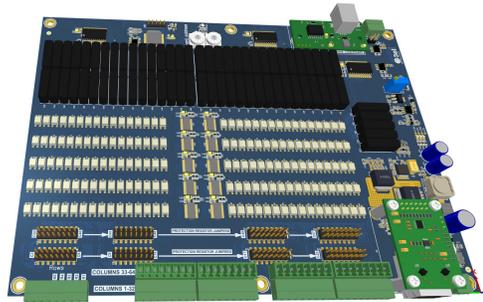
3el 5x64 Analog Multiplexer V1.0



5x64 AMUX V1.0

Features:

- 5 rows and 64 columns, scalable up to 75 rows and 960 columns
- external short circuit detection
- switch self-diagnose
- switching 60V@500mA signals
- low current consumption
- RS485 communication bus
- NI LabView integration, user interface



Description:

5x64 AMUX V1.0 is a microcontroller based analog multiplexer circuit for industrial automation featuring 5 rows and 64 columns, resulting in a 320 points matrix of individually controllable switches. The multiplexer circuit can be controlled and monitored through an Ethernet interface. In addition the circuit integrates a single bus structure over RS485 interface featuring address based extension of the switching matrix up to a maximum of 75 rows and 960 columns in one common MUX circuit.

All switches are implemented with OPTO-MOSFET based SSR relays. Each individual node can switch and hold a maximum current of 500mA.

Individual switches can be turned ON or OFF in sequential order or in a parallel handled group based on specialized commands sent to the MUX MCU over a TCP/IP socket.

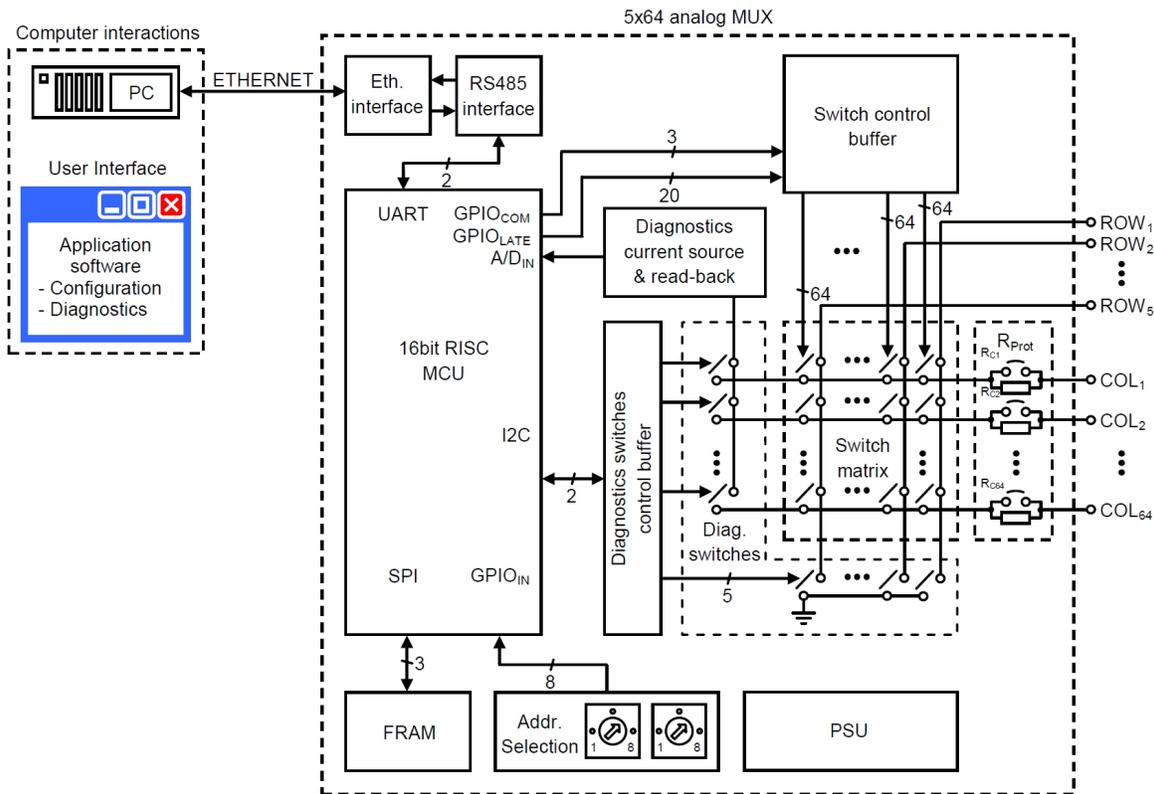
Block schematic:

- 16bit RISC CPU running at 48MHz clock signal
 - sequential or parallel control of switches (separately latched groups of switches)
 - self diagnostics featuring damaged switch and external short circuit detection
 - configurable series current limiting power resistors (100/1.5W)
 - Over the initial RS485 interface the 5x64 AMUX V1.0 can be configured with Ethernet (for UDP and TCP/IP protocols) or with USB communication interface module
 - Application software with intuitive graphical user interface for control and diagnostics purposes
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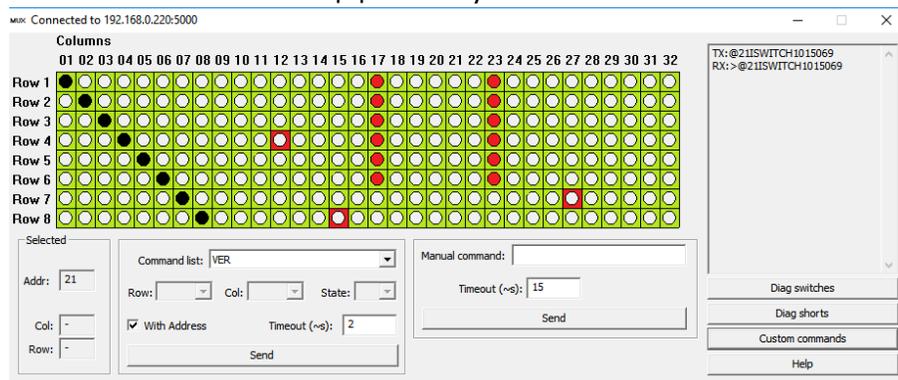
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Application software:

Started from the associated GUI the MUX firmware is able to execute two type of self-tests: checking short circuit between a selected row and a selected column or detecting short circuit between two columns (for external short circuits).

A turned ON switch is marked with a black dot in green square, a defective switch is marked with a white dot in red square, a short circuit detected in between two columns turns in a red dot in green square (the switch itself is healthy but an external short circuit happened).

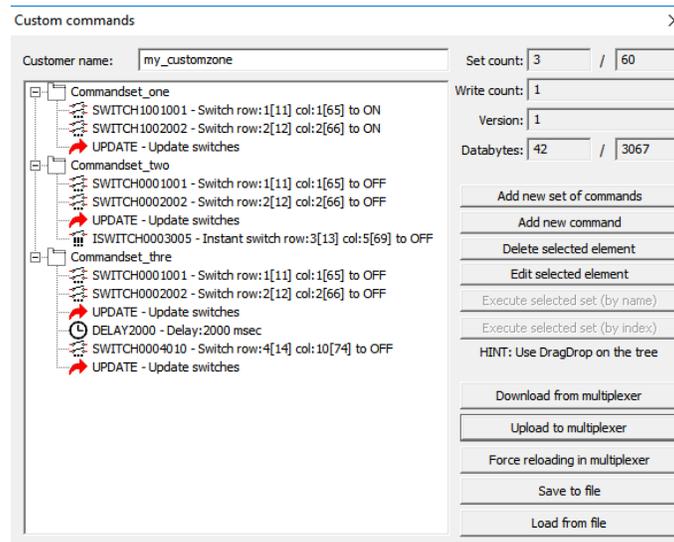


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The MUX firm-ware is able to execute predefined switching macros. A switching macro can contain a set of individual switch and (optional) delay commands. Inside a macro group switch commands can be executed sequentially or in parallel.



A maximum number of 100 macros can be stored in a dedicated memory in the system (the maximum commands distributed between the macros are only limited by the integrated MCU EEPROM memory capacity). The macros can be edited in a dedicated graphical user interface and are interpreted as a flexible tree of commands where nodes can be rearranged with drag and drop. The list can be stored or loaded locally on the computer.

The circuit also comes with a predefined NI LabView VI interface for easy system integration.

Applications:

- Multiplexing low current analog signals between electronic circuits
- Multiplexing analog instruments for multipoint measurement schematics
- Switching between multiple reference voltage sources and external circuits
- Multiplexing non-differential, low or mid speed communication lines

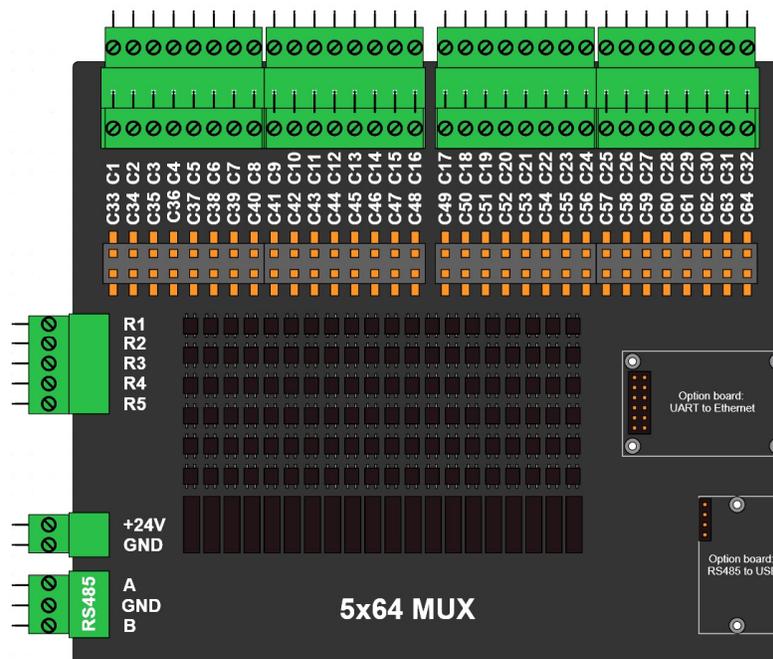
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Board schematic symbol and pinout:

For CAD software integration the 5x64 AMUX V1.0 has a predefined schematic symbol containing the pinout following the physical connector arrangement of the real board. The rows and columns are grouped by functions. Next to the column connectors there are jumpers for series current limiting resistors. The schematic symbol also defines RS485, Ethernet and optional USB communication connectors.



Basic requirements before use:

- The 5x64 AMUX V1.0 should be mounted on four, 6mm (minimum) tall standoffs ensuring optimal distance from any conductive or electrically sensitive surface and the circuit PCB.
- The 5x64 AMUX V1.0 should be powered from an external, primary 24VDC power supply

Important note:

- Before executing self test the 5x64 AMUX V1.0 should be entirely disconnected from any external circuit except the power supply.

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Electrical characteristics:

Nominal supply voltage:	24V
Power consumption in standby state:	2.7W
Power consumption with all switches ON:	14W
Operating temperature range:	-40°C ... 85°C

SWITCH outputs:

Maximum switching voltage:	peak 60V AC
Load current:	500mA
Peak load current:	1500mA
ON resistance:	0.85Ohm
Turn ON time:	0.9ms typical, 3ms max.
Turn OFF time:	0.5ms typical, 2ms max.
Power dissipation:	300mW
Isolation voltage:	1500VAC

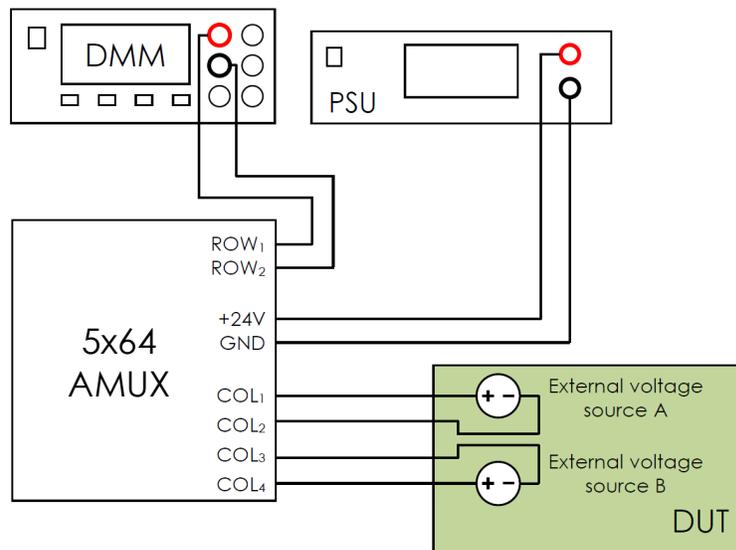
Current limiting resistors:

Series resistors (can be shorted with jumpers):	100Ohm
Resistance tolerance:	+/- 1%
Power rating:	1.5W

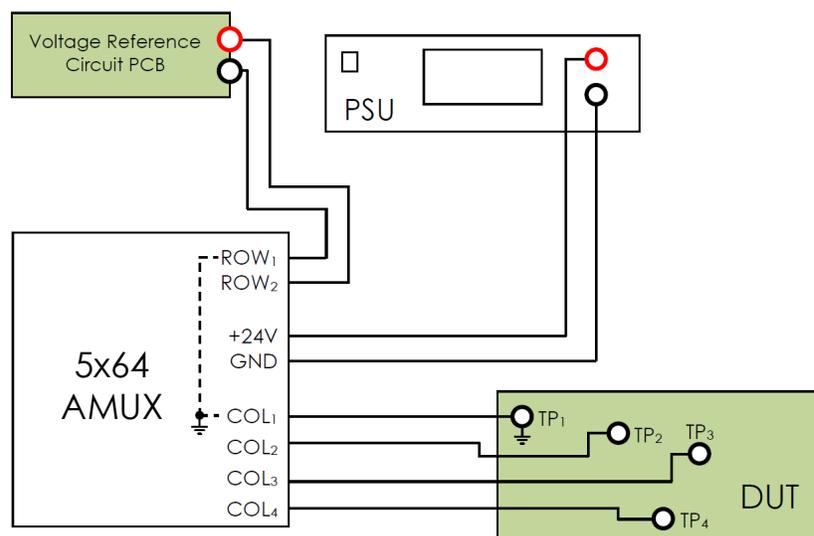
Schematic examples:

The electrical wiring diagram shows application examples for different use cases.

- DMM sharing
 - using one single DMM for measuring multiple external voltage sources (ROW₁ to COL₁, ROW₂ to COL₂ etc.)



- Signal source multiplication
 - using one single reference voltage source for triggering external circuit multiple test points (ROW₁ to TP₁, ROW₂ to TP₂, TP₃ etc.)



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Mechanical drawings:

