USB I/O CONTROL BOX

USB-I/O-4D2R

Two 24V outputs and 4 digital control output channels

The Big Deal

- 4 channel TTL/LVTTL adjustable digital outputs
- Noise reduction circuit on digital outputs
- Two channel opto-isolated relay outputs Each can supply DC 24V/0.375A

Case Style: LB1550

Included Accessories **Software Package**

Model No.	Description	Qty.
AC/DC-24-3W1	AC/DC 24V adaptor (see Ordering Information)	1
CBL-3W1-xx	AC power cord (see Ordering Information)	1
AC/DC-5	AC/DC 5V adaptor	1
USB-CBL-AB-3+	2.7 ft. USB cable	1
TBLK-4+	4 pin DC connector	1
FCBL-10-1+	10 pin flat cable	1

RoHS Compliant

See our web site for RoHS Compliance methodologies and qualifications

Applications

- Lab test equipment
- Automated test setups
- Control systems

Product Overview

Mini Circuits' USB-I/O-4D2R is a general purpose USB HID control box powered by a +24V_{DC} power adaptor for the analog outputs and a power adaptor selected by the user to power the digital outputs. The control box features four digital TTL/LVTTL output lines and two 24V DC output lines. The four digital output lines are buffered through noise reduction and voltage adjustment circuits creating outputs (with very low noise levels) which can be adjusted from 2.7V_{DC} to 5V_{DC} according to the level of the TTL Vcc supply voltage. These outputs are accessed through a 10 pin IDC connector. The 24V output lines are opto-isolated and supplied through relay contactors.

Full software support is provided, including our user-friendly GUI application for Windows and a full API and programming instructions for both Windows and Linux environments (32-bit and 64-bit systems). The latest version of the full software package can be downloaded from **https://www.minicircuits.com/softwaredownload/usbio.html** at any time.

The USB-I/O-4D2R is packaged in a small plastic case (size of 4.5" X 3.1" X 1.2"), and comes with a 2.7 ft USB cable, a DC connector, a 1 ft, 10 wire cable assembly, and power adaptors suitable for US, EU and other power systems, see page 6 for details.

Key Features

Feature	Advantages
Four TTL outputs	Allow controlling TTL devices, outputs through a 10 pin IDC connector. Each TTL output can supply up to 32mA.
Two DC high current 24V Outputs	Can be used to operate Mechanical RF Switches(Such as MCL mechanical SPDT and transfer) or any other 24V devices.
Adjustable TTL voltage	The USB-I/O-4D2R design allows the TTL voltage level to be adjusted to any value from 2.7V to 5V by selecting the suitable TTL Vcc voltage.
USB HID (Human Interface Device)	Plug-and-Play (no need to install a driver for the device).

Rev. E
M169105
EDR-10198/1
USB-IO-4D2R
RAV
180902

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Electrical Specifications [1]

Parameter	Port	Conditions	Min.	Typ.	Max.	Units
Rated Voltage	Vcc 24VDC	provided via external power adaptor	22	24	26	V
	DC OUT 1, OUT 2	–	21.8	24	26	
	Vcc for LVTTL/TTL	provided via external power adaptor	2.7	–	5	
Rated Current	Vcc 24VDC	Max. Load at outputs	–	–	790	mA
		No load at outputs	–	30	50	
	DC OUT 1, OUT 2	Note 2	–	–	375/750	
	Vcc for LVTTL/TTL	@'1'=5V	–	15	30	
	IDC connector	@'1'=5V	–	-	32	
	USB	–	–	50	70	
Switching time	DC OUT 1, OUT 2	–	–	4	–	msec
Operation Life (Output relays)	DC OUT 1, OUT 2	30 operations per min.	5 Million	–	–	operations
Operating Frequency (Output relays)	DC OUT 1, OUT 2	under load	–	–	30	operations per minute

[1] Power On Sequence: Connect the 24V power, followed by the 5V power and USB control last.
[2] Max . total current from both outputs combined 750mA. If only one output used max current from it 750mA, if identical loads at both outputs max. current 375mA.

Absolute Maximum Ratings

Operating Temperature	0°C to 50°C
Storage Temperature	-20°C to 60°C
Voltage @ Vcc 24V connector	20V to 28V
Voltage @ Vcc for LVTTL/TTL	-0.5V to +6.5V

Permanent damage may occur if any of these limits are exceeded.

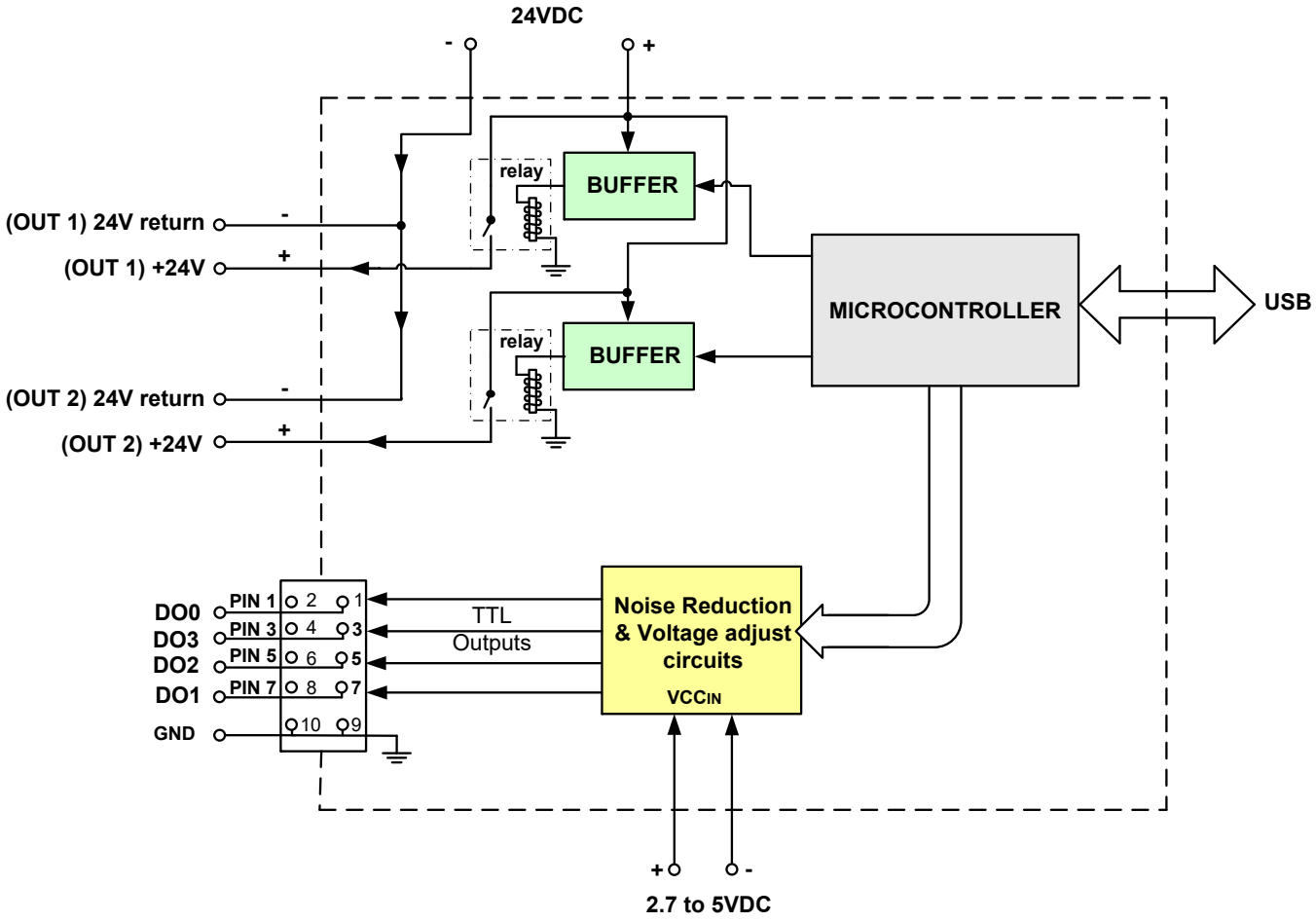
Connections

Vcc 24VDC	(2.1mm center positive DC Socket)
Vcc for LVTTL/TTL	(2.5mm center positive DC Socket)
DC OUT 1/ DC OUT 1 Return	(3.81mm DC socket)
DC OUT 2/ DC OUT 2 Return	(3.81mm DC socket)
USB Port	(USB B female)
TTL Outputs	(10 pin IDC female)*

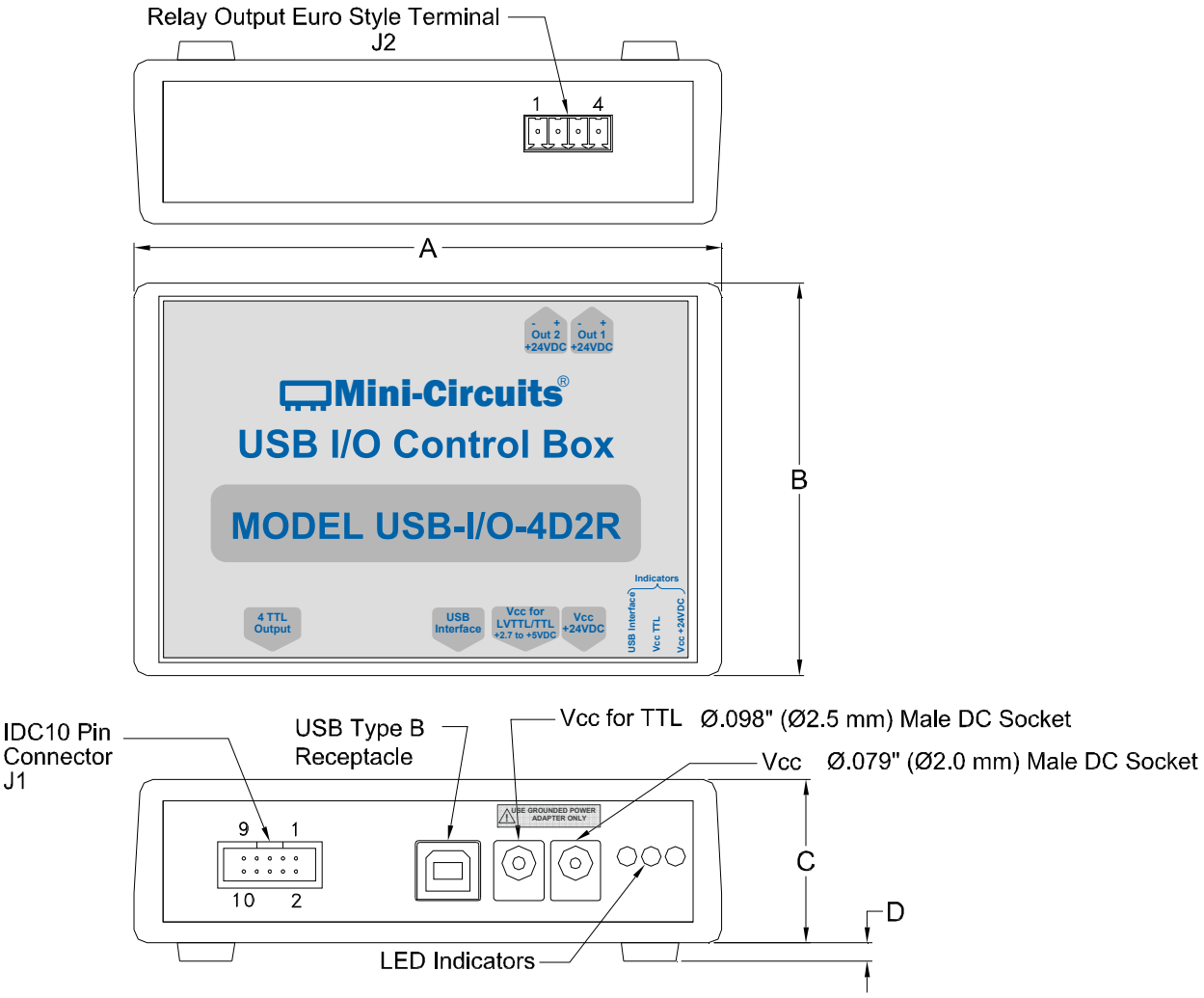
* Pin Connections (10 pin IDC)

PIN Number	Function
9,10	GND
1	TTL 1 Output (B0)
7	TTL 2 Output (B1)
5	TTL 3 Output (B2)
3	TTL 4 Output (B3)
2,4,6,8	Not connected

Block Diagram



Outline Drawing: (LB1550)



Outline Dimensions (inch / mm)

A	B	C	D	WT. GRAMS
4.50 114.3	**3.00** 76.2	**1.25** 31.8	**0.14** 3.6	150

Software & Documentation Download:

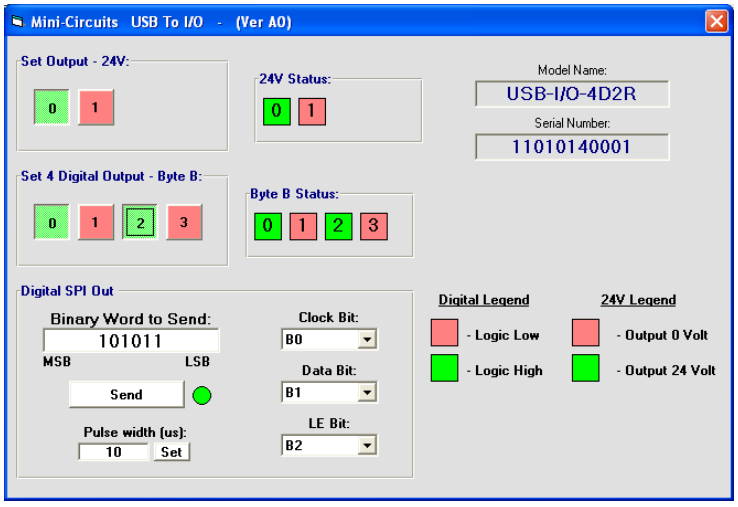
- Mini-Circuits' full software and support package including user guide, Windows GUI, DLL files, programming manual and examples can be downloaded free of charge from **https://www.minicircuits.com/softwaredownload/usbio.html**
- Please contact **testsolutions@minicircuits.com** for support

Minimum System Requirements

Parameter	Requirements	
Interface	USB HID	
System requirements	GUI:	Windows 32 & 64 bit systems from Windows 98 up to Windows 10
	USB API (ActiveX & .Net)	Windows 32 & 64 bit systems with ActiveX or .Net support from Windows 98 up to Windows 10
	USB direct programming support	Linux, Windows systems from Windows 98 up to Windows 10
Hardware	Pentium® II or better	

Graphical User Interface (GUI) for Windows
Key Features:

- Set status of 24V outputs
- Set status of digital outputs
- Configure three of the digital outputs as SPI.
- Send SPI words



Application Programming Interface (API)
Windows Support:

- API DLL files exposing the full power sensor functionality
  - ActiveX COM DLL file for creation of 32-bit programs
  - .Net library DLL file for creation of 32 / 64-bit programs
- Supported by most common programming environments (refer to application note **AN-49-001** for summary of tested environments)

Linux Support:

- Full power sensor control in a Linux environment is achieved by way of USB interrupt commands.

Ordering, Pricing & Availability Information see our web site

Model	Description
USB-I/O-4D2R	USB I/O Control Box

Included Accessories	Part No.	Description
	AC/DC-24-3W1	AC/DC 24V_{DC} Grounded Power Adaptor. Operating temperature: 0°C to +40°C, I_{Max}=2.5A
	CBL-3W1-XX	AC Power Cord (*Select one power cord from below with each control box)*
	AC/DC-5	AC/DC Power Adaptor with US, EU, IL, UK, AUS, and China two pin power plugs. Operating temperature: 0°C to +40°C, AC Input: 100-240 V, 47- 63 Hz DC Output: 5±0.25V, I_{Max}=2A
	USB-CBL-AB-3+	2.7 ft (0.8 m) USB Cable: USB type A(Male) to USB type B(Male)
	TBLK-4+	4 pin DC connector
	FCBL-10-1+	1 ft (0.3 m) 10 pin cable assembly with IDC conn.

AC Power Cords[3]	Part No.	Description
	CBL-3W1-US	Power Cord for United States
	CBL-3W1-EU	Power Cord for Europe
	CBL-3W1-UK	Power Cord for United Kingdom
	CBL-3W1-AU	Power Cord for Australia and China
	CBL-3W1-IL	Power Cord for Israel

[3] Power cords for other countries are also available, if you need a power cord for a country not listed in the table please contact **testsolutions@minicircuits.com** for support. .

Optional Accessories	Description
USB-CBL-AB-3+ (Spare)	2.7 ft (0.8 m) USB cable
USB-CBL-AB-7+	6.8 ft (2.1 m) USB cable
USB-CBL-AB-11+	11 ft (3.4 m) USB cable
FCBL-10-1+ (Spare)	1 ft (0.3 m) 10 pin cable assembly with IDC conn.
FCBL-10-2+	2 ft (0.6 m) 10 pin cable assembly with IDC conn.
FCBL-10-3+	3 ft (0.9 m) 10 pin cable assembly with IDC conn.
TBLK-4+ (Spare)	4 pin DC connector

Additional Notes

A. Performance and quality attributes and conditions not expressly stated in this specification document are intended to be excluded and do not form a part of this specification document.

B. Electrical specifications and performance data contained in this specification document are based on Mini-Circuit's applicable established test performance criteria and measurement instructions.

C. The parts covered by this specification document are subject to Mini-Circuits standard limited warranty and terms and conditions (collectively, "Standard Terms"); Purchasers of this part are entitled to the rights and benefits contained therein. For a full statement of the Standard Terms and the exclusive rights and remedies thereunder, please visit Mini-Circuits' website at www.minicircuits.com/MCLStore/terms.jsp