

THE BIG DEAL

- 4 mechanical SPDT absorption switches
- Software Control and Automation
- High reliability – supports millions of cycle operations
- Secure Ethernet communication
- LED switch status indicator light

APPLICATIONS

- Desktop and rack-mounted automated testing systems
- 5G FR1 & FR3, WiFi 6E MIMO, UWB, Bluetooth
- quantum computing
- Military radio systems, radar and electronic warfare
- Switch matrix



PRODUCT OVERVIEW

The YXMB-4SPDT-L18 product from YERSON Technology integrates four independently controlled electromechanical SPDT switches. Each switch supports a wide bandwidth range (DC – 18 GHz) and features high isolation and low insertion loss characteristics. These absorption switches employ a "open-closed" fault-safe design; under operating conditions that comply with the aforementioned technical specifications, each switch has a service life of 1 million switching cycles.

This switch box features a compact, rugged metal casing (dimensions: 178.5 × 146 × 62 mm), with the front panel equipped with all SMA(f) RF connectors. The switch can be controlled via USB or Ethernet, supporting both direct control from a PC and remote control over a network. We provide comprehensive software support, including a user-friendly graphical user interface (GUI) application for Windows systems, as well as full API documentation and programming guides for both Windows and Linux environments (supporting both 32-bit and 64-bit systems).

KEY FEATURES

Feature	Advantages
Mechanical switches	Mechanical absorptive switches provide high reliability, repeatable high performance, and internal termination of input signals on the disconnected paths
Fail-safe design	The switches revert to a known default state when the DC supply is removed, allowing their use in systems that must continue to operate safely in the event of power failure.
Break-before-make configuration	Prevents a momentary connection of the old and new signal paths, reducing the inconsistent transient effects that could otherwise be observed during switching
Secure Ethernet communication	Support for SSH (Secure Shell protocol) provides a means for secure communication over Ethernet networks with strict security policies. HTTP & Telnet communication via Ethernet are also supported.
Full software support	User-friendly Windows GUI (graphical user interface) allows manual control straight out of the box, while the comprehensive API (application programming interface) with examples and instructions allows easy automation in most programming environments

ELECTRICAL SPECIFICATIONS

Parameter	Condition	Min.	Typ.	Max.	Unit
frequency range		DC		18	GHz
insertion loss	DC – 6GHz		0.15	0.30	dB
	6 – 12.4 GHz		0.25	0.40	
	12.4 – 18 GHz		0.30	0.50	
Isolation (Non-active Path)	DC – 6GHz	75	90		dB
	6 – 12.4 GHz	70	80		
	12.4 – 18 GHz	60	66		
return loss	DC – 6GHz		20		dB
	6 – 12.4 GHz		20		
	12.4 – 18 GHz		19		
Switching Time			25		ms
RF Input Power (Cold Switching)	DC-18 GHz			40	W
	Into internal termination			1	
Switch Lifetime	100 mW hot switching		5		Million cycles
	1W hot switching		1		

1. Isolation measured between Com and any disconnected port. Example: Isolation for Com to 1 is the leakage measured at port 1 from a signal input at Com when the active switch path is set to Com to 2.
2. Return loss into all ports in all states
3. Hot switching power above this level will degrade the switch lifetime

ABSOLUTE MAXIMUM RATINGS

Parameter	Grade	Constraint	unit
Temperature	working temperature	-15 ~ +55	°C
	Storage Temperature	-45 ~ +75	
DC power supply voltage		+24	V
Input power (no damage)	Cold switch	40	W
	Hot switching	1	
	Internal Terminal	1	

Permanent damage may occur if any of these limits are exceeded. Operating in the range between operating power limits and absolute maximum ratings for extended periods of time may result in reduced life and reliability

POWER SUPPLY

parameter	condition	Typ	supreme	unit
DC voltage		+24	+24	V
DC Current Consumption	All switches are set to COM → 1	100		mA
	All switches: COM to 2	790		

Please use the included AC/DC-24-2A power adapter (Input Voltage: 110/240 VAC).

SWITCH CONTROL LOGIC

Switch command	Switch State				Front panel LED color			
	SW1	SW2	SW3	SW4	SW1	SW2	SW3	SW4
SETSW1 = 1	C - NC	N/A	N/A	N/A	red	N/A	N/A	N/A
SETSW1 = 2	C - NO	N/A	N/A	N/A	green	N/A	N/A	N/A
SETSW2 = 1	N/A	C - NC	N/A	N/A	N/A	red	N/A	N/A
SETSW2 = 2	N/A	C - NO	N/A	N/A	N/A	green	N/A	N/A
SETSW3 = 1	N/A	N/A	C - NC	N/A	N/A	N/A	red	N/A
SETSW3 = 2	N/A	N/A	C - NO	N/A	N/A	N/A	green	N/A
SETSW4 = 1	N/A	N/A	N/A	C - NC	N/A	N/A	N/A	red
SETSW4 = 2	N/A	N/A	N/A	C - NO	N/A	N/A	N/A	green

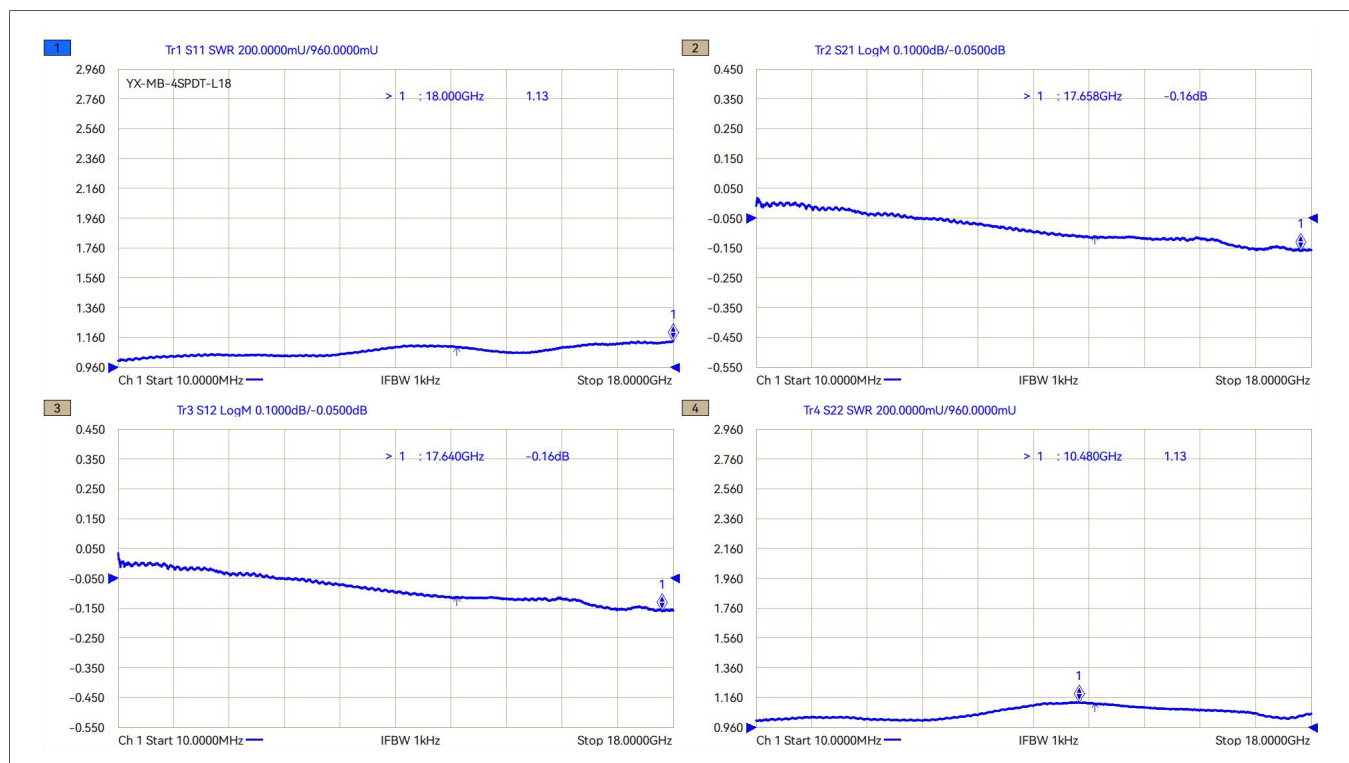
N/A = This switch command has no effect on the Switch/LED status.

POWER-UP OPTIONS

Mode	Initial Switch Paths
Default	Switches power up in the default state (COM to 1)
Last State	Switches resume the previous state from the point of last power supply disconnection

Switches revert to the default state when the power supply is turned off or disconnected

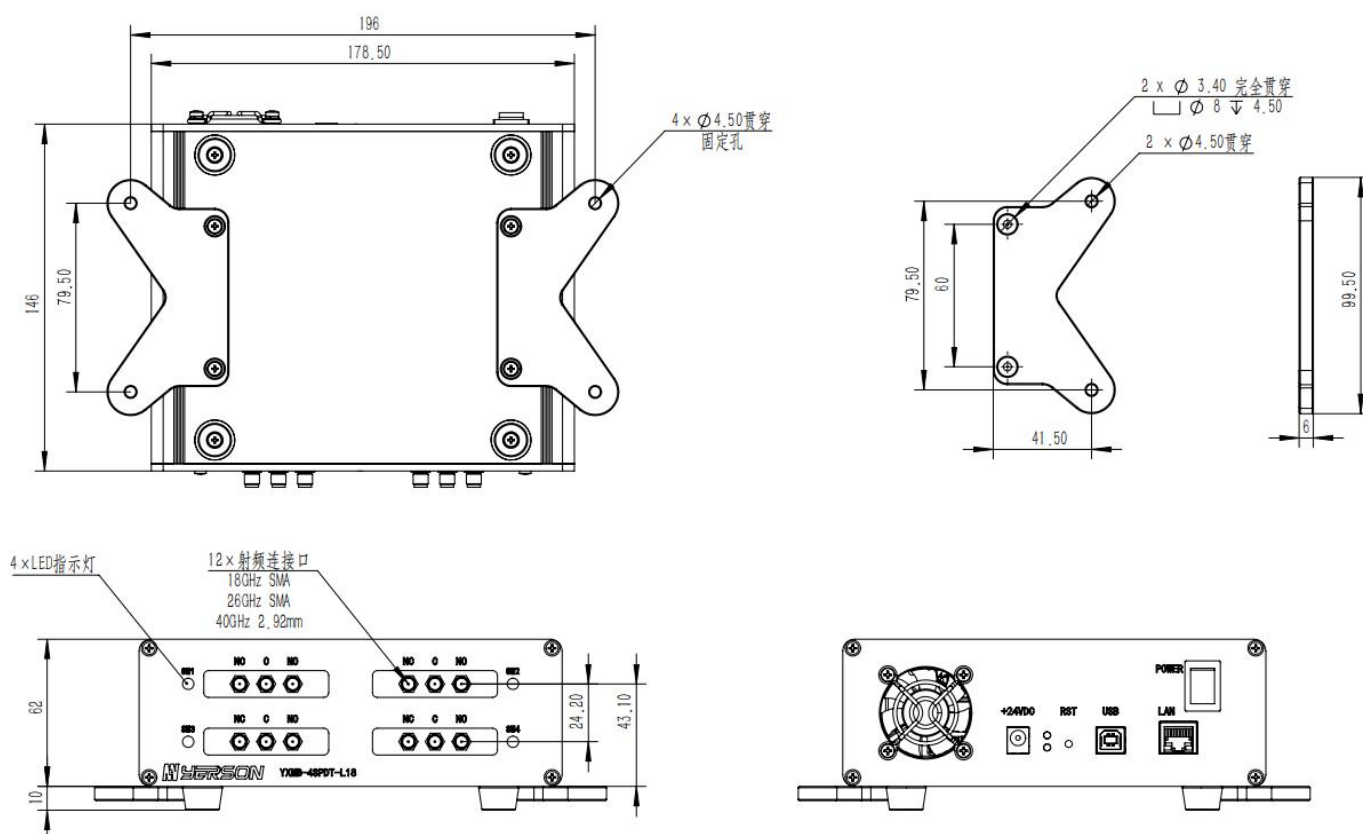
TYPICAL PERFORMANCE GRAPHS



CONNECTIONS

Port Name	Connector Type
24VDC IN	(2.1 mm central positive DC socket)
Switch A-D (Com & 1-2)	(SMA female)
USB	(USB Type-B receptacle)
Network (Ethernet/LAN)	(RJ45 socket)

OUTLINE DRAWING



CONTROL INTERFACES

Ethernet Control	Supported protocols	TCP/IP, SSH, HTTP, Telnet, DHCP, UDP (Limited)
	Maximum data rate	100 Mbps (100 Base-T full-duplex)
USB control	Supported protocols	HID-high speed
	Minimum communication time	400 μs typ

Polling interval based on the USB HID protocol (125 μs; each data packet contains 64 bytes) with no other significant CPU or USB activity

SOFTWARE & DOCUMENTATION

YERSON full software and support package including user guide, Windows GUI, API, programming manual and examples can be downloaded free of charge (refer to the last page for the download path).

A comprehensive set of software control options is provided:

- `GUI for Windows - Simple software interface for control via Ethernet and USB
- `Programming / automation via Ethernet
 - `Complete set of control commands which can be sent via any supported protocol - simple to implement in the majority of modern programming environments
- `Programming / automation via USB
 - `DLL files provide a full API for Windows with a set of intuitive functions which can be implemented in any programming environment supporting .Net Framework or ActiveX
 - `Direct USB programming is possible in any other environment (not supporting .NET or ActiveX)

MINIMUM SYSTEM REQUIREMENTS

Hardware	Intel i3 (or equivalent configuration) or a higher-generation processor
Graphical User Interface (USB or Ethernet control)	Windows 7 or later
USB API DLL	Windows 7 or a later version, with support for Microsoft.NET Framework or ActiveX
USB Direct Programming	Windows 7 or later; Linux
Ethernet	Supports Windows, Linux, or macOS systems that support the Ethernet TCP/IP protocol.

PROGRAMMING COMMANDS

The key ASCII/SCPI commands used to control the system via Ethernet or USB API are summarized below (for complete details, please refer to the Programming Manual):

Command/Query	Description
MN?\r\n	Read model name
*IDN? \r\n	Read serial number
system:version: \r\n	Read firmware version
SETSW[sw_label]=[port] \r\n	Set a single switch state: [sw_label] = 1-4 [port] = 1 (NC) or 2 (NO) Example: SETSW1=2 (Set SPDT1 to NO)
ifconfig\r\n	Query IP information
setip xxx.xxx.xxx.xxx\r\n	Set IP address
setmask xxx.xxx.xxx.xxx\r\n	Set subnet mask
setgateway xxx.xxx.xxx.xxx\r\n	Set up gateway
setport xx\r\n	Set Port
setmac aa bb cc dd ee ff\r\n	Set MAC address

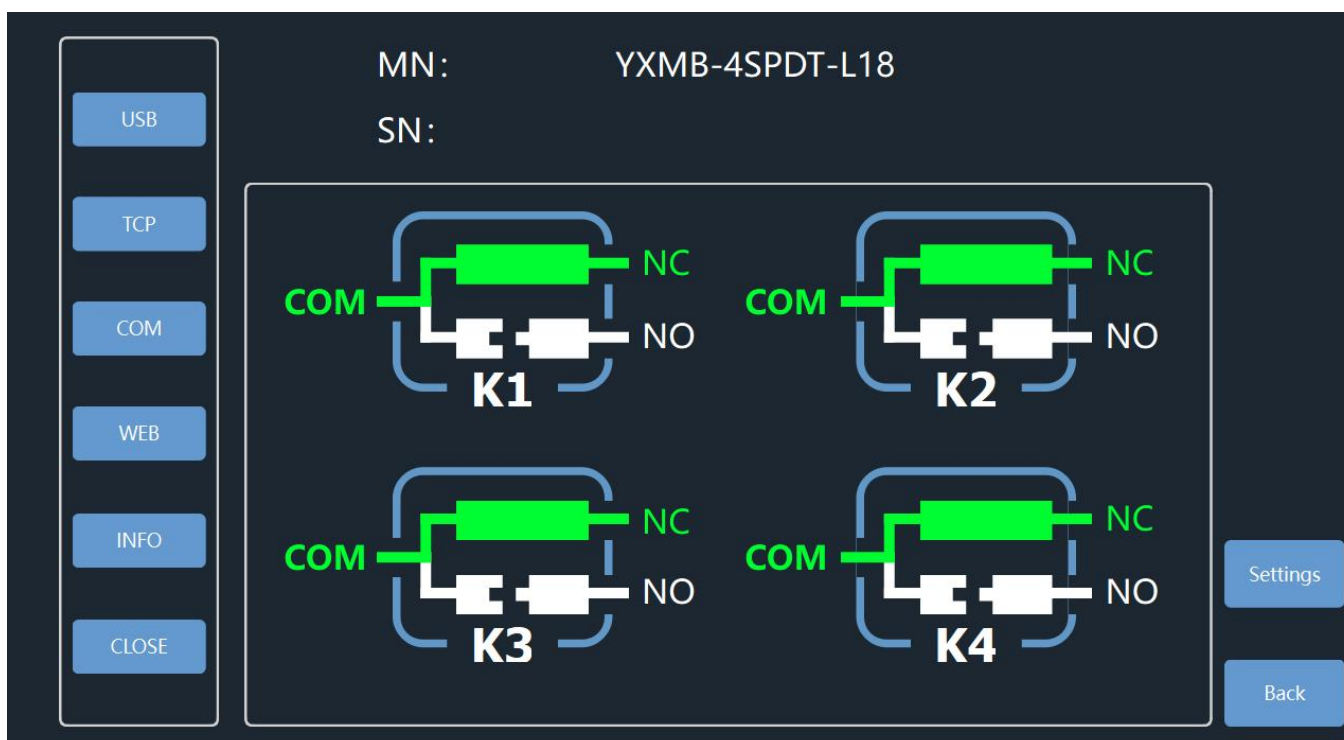
GRAPHICAL USER INTERFACE (GUI) FOR WINDOWS - KEY FEATURES

·Connect via USB or Ethernet

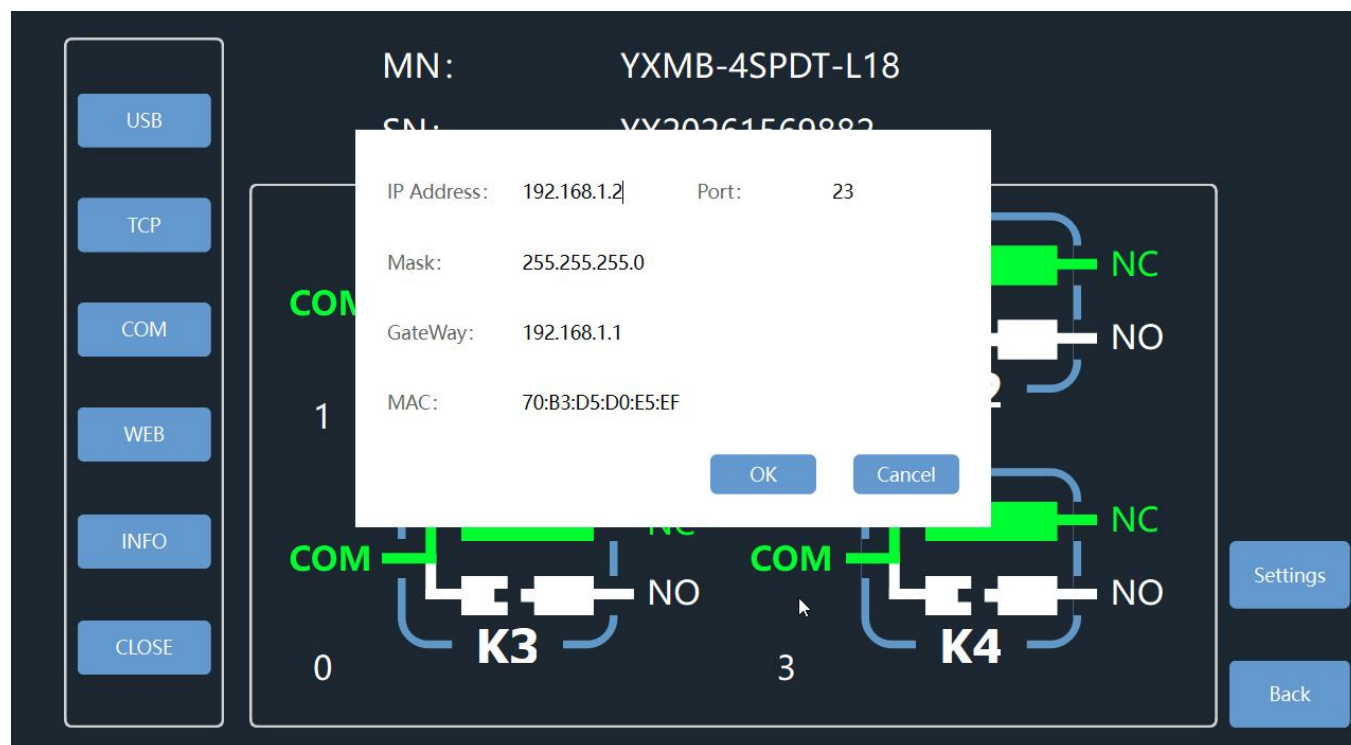
·Run the GUI for "Product Experience" – evaluate the software without any hardware connection required.

The screenshot shows the configuration interface of the YXMB-4SPDT-L18 device. On the left is a vertical sidebar with buttons: USB, TCP, COM, WEB, INFO, and CLOSE. The main area contains the following fields:

- IP Address:** A text box containing "192.168.1.2".
- Port:** A text box containing "23".
- Serial:** A dropdown menu currently showing "Nothing".
- Products:** A dropdown menu showing "YXMB-1SP6T-F18" with a "Try" button to its right.



· Configure Ethernet IP settings



Additional accessories	part number	description
	AC/DC-24-2A	AC/DC 24V DC ground power adapter. Operating temperature range: 0-40°C; Maximum current: 2A
	user's guide	

Explanatory note

- A. Any performance or quality attributes and conditions not explicitly specified in this Technical Specification Document shall be deemed irrelevant and shall not form part of this Technical Specification Document.
- B. The electrical specifications and performance data contained in this technical specification document are derived from the current and effective test performance standards and measurement operation guidelines issued by Beijing YERSON Technology Co., Ltd.

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