

## GW-2SW6-40

### Mechanical Switch 2×SPDT 2.92mm Female

#### Applications

- 1-Automated Test and Measurement
- 2-5G and MIMO testing
- 3-Calibration systems
- 4-Wireless Communication Systems
- 5- Switch Matrixes

#### General description



The Gigawave GW-2SW6-40G features two independently controlled electro-mechanical single-pole Six-throw (SP6T) switches, operating from DC to 40 GHz with high isolation and low insertion loss. These absorptive switches are designed with a failsafe, break-before-make configuration and offer a typical lifespan of 2 million switching cycles when operated within the specified conditions.

Housed in a compact and robust metal enclosure, the switch box is equipped with 2.92 mm (f) connectors and front-panel LED indicators for convenient test bench operation. Control is facilitated via USB (communications device class CDC, virtual com port) or Ethernet, enabling direct operation from a PC or remote access over a network. Comprehensive software support is provided, including programming instructions compatible with both Windows and Linux environments.

#### Electrical Specifications

Frequency Range	DC-6 GHz	6-12.4 GHz	6-12.4 GHz	6-12.4 GHz	26.5-40 GHz
VSWR max	1.3	1.4	1.5	1.7	2.2
Isolation min	70	60	60	55	50
Switching Time	< 15 ms	< 15 ms	< 15 ms	< 15 ms	< 15 ms
RF Input Power	40W	30W	25W	15W	5W

DC Voltage	24-28V
Current Consumption when relay is not triggered	30mA
Current Consumption when relay is triggered	150mA

### Minimum System Requirements

	Requirements
Hardware	Intel i3 (or equivalent) or later
USB	Windows 7 or later; Linux
Ethernet	Windows, Linux or macOS with Ethernet TCP / IP support

### Control Interface

Interface	Supported Protocols
Ethernet Control	TCP / IP
USB Control	Virtual Comp Port at 115200 Baud

### Programming Commands

The primary ASCII/SCPI commands for system control via the Ethernet or USB API are summarized below. For comprehensive details, refer to the programming manual.

Command / Query	Description
*IDN?	Read model name, Serial Number, Software version.
SN?	Read serial number
SET,<PORTx>,<Cy>	<p>Set individual port channel,  x parameter [1 - 4]  y parameter [1 -6]  x refers to ports, y refers to channels</p> <p>example command: SET,PORT1,C1</p> <p>Explanation: On Port1 turn on Channel1</p> <p>Note: If individual channel on associated port is already active, device will reject command.</p>

Command / Query	Description
SET,<PORTx>,<Cy>	<p>Clears individual port channel,  x parameter [1 - 4]  y parameter [1 -6]  x refers to ports, y refers to channels</p> <p>example command: CLR,PORT1,C1</p> <p>Explanation:  Clears Channel1 on Port1</p>

\* All commands must be entered in uppercase letters.

\* Avoid engaging in multiple channels on a single port, as this may cause mechanical damage to the RF relays.

## User Manual and Command List

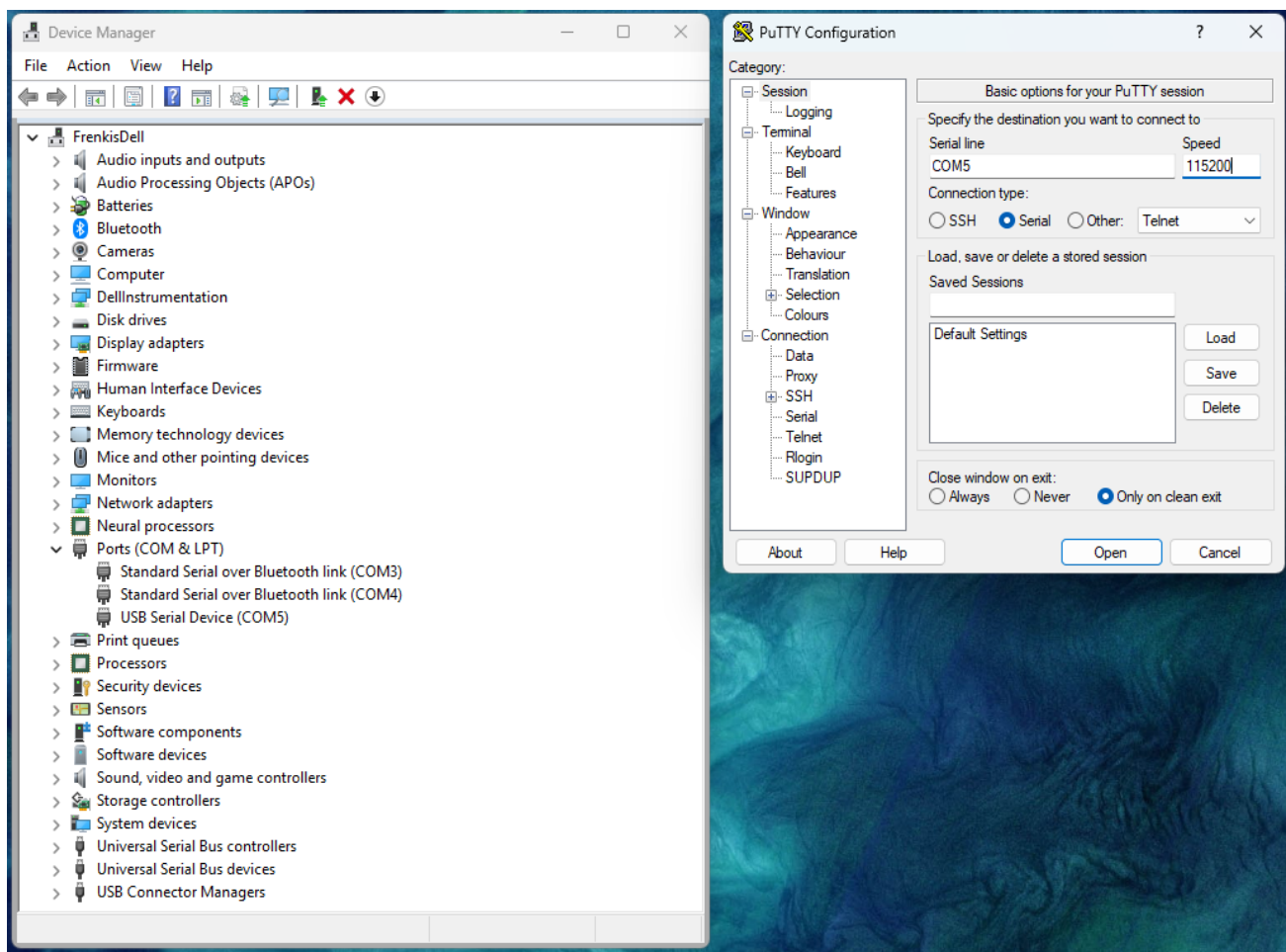
- 1.Connect a DC 24V power supply to the designated connector.
- 2.Connect the device to an available USB port on the computer.
- 3.Check the Device Manager for newly detected USB ports.
- 4.Open PuTTY.
- 5.Explore available commands.

## UART Communication Example

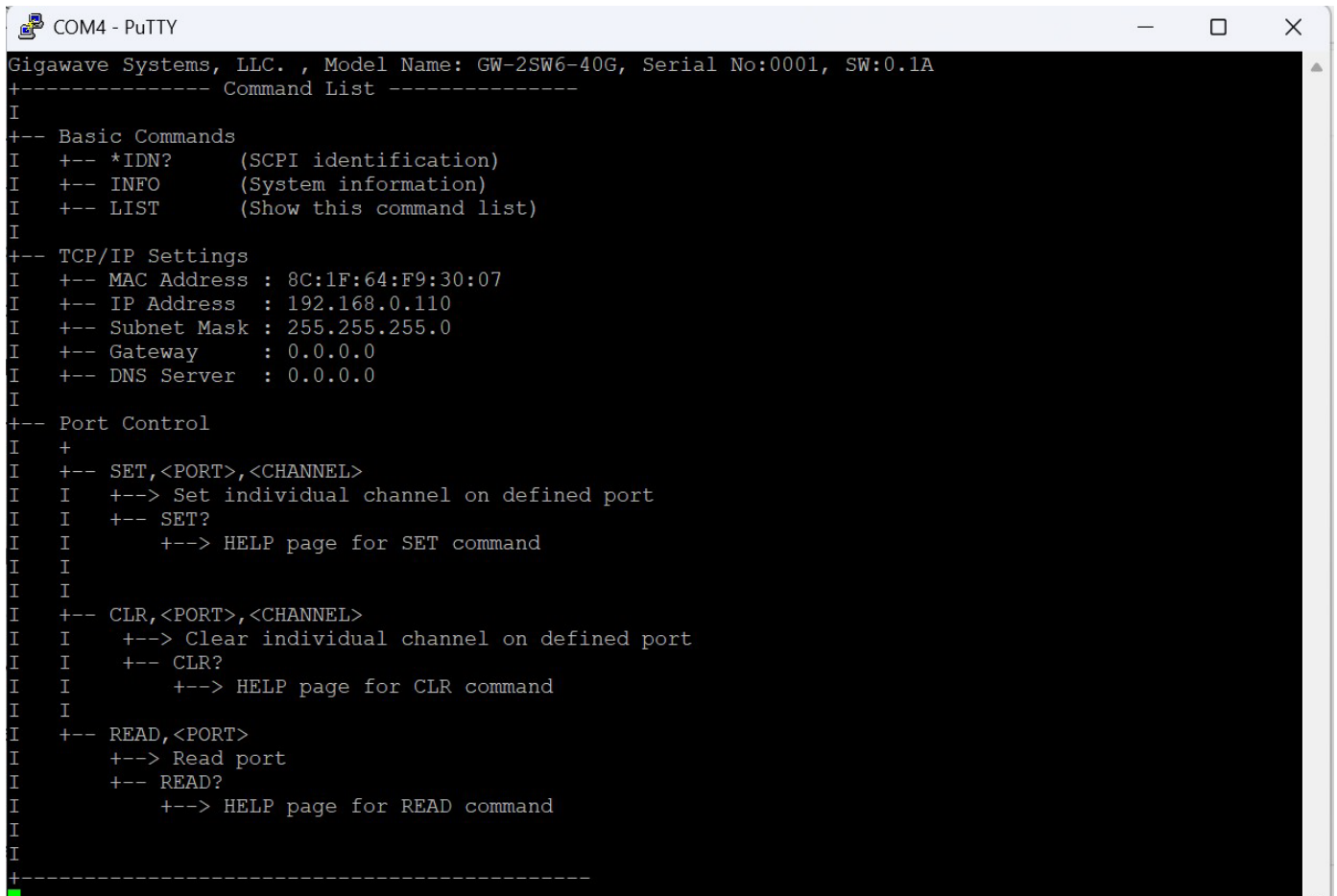
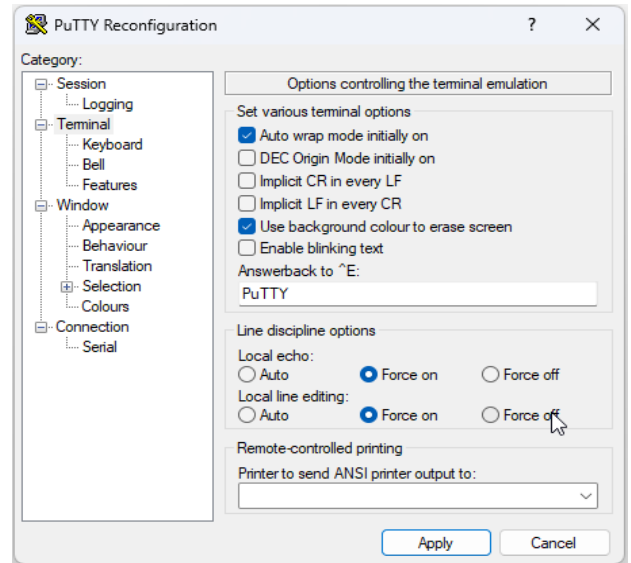
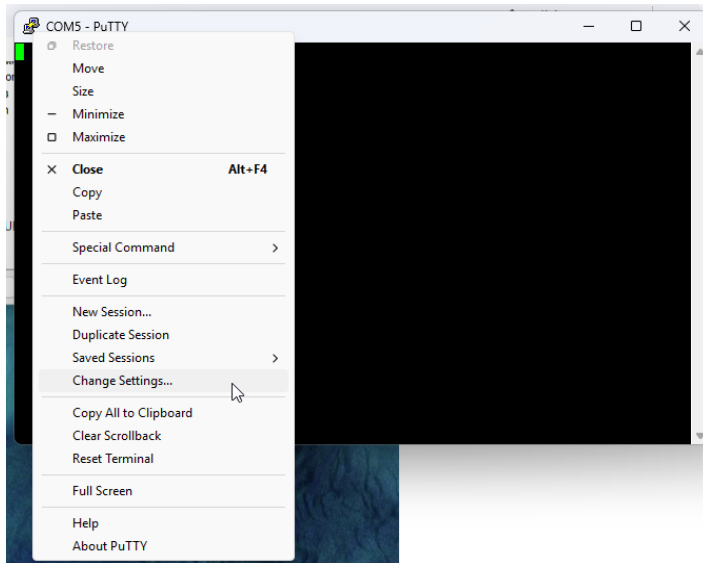
Upon connecting the USB cable to the development PC and powering the device, it will be recognized as a USB Serial Device (COM5) in the system. You can now start PuTTY or any other serial terminal program. In the Session category, select the Serial radio button and enter COM5 into the Serial Line field. Set the Speed to 115200. After entering the necessary information, click Open to launch the terminal window. Once the new terminal window is open, you will need to configure the terminal settings. Right-click on the two computers icon in the upper-right corner of the terminal window to access the terminal settings. By selecting the Change Settings option, we can modify the Line Discipline settings by enabling the radio buttons for Local Echo: Force On and Local Line Editing: Force On.

## Putty USB connection (Fresh System Setup)

1. Open PuTTY and establish a connection to the device.
2. Enter the \*IDN? command to verify communication.
3. Enter the LIST command to display available options.
4. Observe the returned output in the terminal window.



After adjusting these options, click Apply to confirm the changes. The terminal is now ready for use.



The first command to try is entering \*IDN? (without quotation marks) into the terminal and pressing the Return key. If the device is properly connected and configured, it will respond with a simple identification command to confirm its presence. The command INFO? will display all the relevant information about the device. Each command for controlling ports includes a built-in help page. For example, the SET command is used to close a selected channel on a desired port. To close the switch on Channel 3 associated with Port 4, the command would be SET,PORT4,C3. After entering the command and confirming it by pressing the Return key, the device will execute the command and close the RF path associated with Channel 3 on Port 4.

To disconnect the selected path, the command CLR,PORT4,C3 should be used. Upon confirming the command, the device will disconnect the selected path on the associated port.

```
+-----+
SET?
+--- SET Command Help -----
I Sets individual port channel
I Usage: SET,<PORT>,<CHANNEL>
+-----+
I
+--- <PORT>
I +--- PORT1 (Port 1 Control)
I +--- PORT2 (Port 2 Control)
I +--- PORT3 (Port 3 Control)
I +--- PORT4 (Port 4 Control)
I
+--- <CHANNEL>
I +--- Channel list
I +--- C1 (Set Channel 1)
I +--- C2 (Set Channel 2)
I +--- C3 (Set Channel 3)
I +--- C4 (Set Channel 4)
I +--- C5 (Set Channel 5)
I +--- C6 (Set Channel 6)
I
+-----+
```

```
+-----+
CLR?
+--- CLR Command Help -----
I Clears individual port channel
I Usage: CLR,<PORT>,<CHANNEL>
+-----+
I
+--- <PORT>
I +--- PORT1 (Port 1 Control)
I +--- PORT2 (Port 2 Control)
I +--- PORT3 (Port 3 Control)
I +--- PORT4 (Port 4 Control)
I
+--- <CHANNEL>
I +--- Channel list
I +--- C1 (Clear Channel 1)
I +--- C2 (Clear Channel 2)
I +--- C3 (Clear Channel 3)
I +--- C4 (Clear Channel 4)
I +--- C5 (Clear Channel 5)
I +--- C6 (Clear Channel 6)
I
+-----+
```

## Switch Control Logic

Switch Command	Switch State				Front Panel LED					
	Port1	Port2	Port3	Port4	1	2	3	4	5	6
SET,PORT1,C1	PORT1 Channel1 active				ON					
SET,PORT2,C2	PORT2 Channel2 active					ON				
SET,PORT3,C4	PORT3 Channel4 active							ON		
SET,PORT4,C6	PORT4 Channel5 active									ON

\*\* Notes . commands that reference ports beyond the supported port count are not available and will not execute.

## Extended Command List

Command	Command Group	Description
*IDN?	System	System identification command
INFO?		System info command
LIST		Command list
RESET		Software reset of device
IP	Network Settings	Set IP address
SBMSK		Set Subnet Mask
GTW		Set Gateway
DNS		Set DNS server
SET,<PORTx>,<Cy>	System Control	Set individual port channel
SET?		Set command help page
CLR,<PORTx>,<Cy>		Clears individual port channel
CLR?		Clear command help page
READ,<PORTx>		Read selected port
READ?		Read command help page
XSET?	Debugging	Use of these commands is only for debugging purposes. This command will be password protected, regular user should not have access to this commands.
XREAD		

Gigawave offers a complete software and support package, available for free download, which includes a user guide, Windows GUI, example programs in various programming languages (LabVIEW, Python), an API programming manual, and sample implementations (refer to the last page for the download link). A comprehensive range of software control options is provided.

- 1.GUI for Windows – A user-friendly software interface enabling control via Ethernet and or USB.
- 2.Programming and Automation via Ethernet
3. Provides a comprehensive set of control commands that can be transmitted through supported protocol, ensuring seamless integration into most modern programming environments.
- 4.Programming and Automation via USB/CDC
5. Provides same functionality as Ethernet but only over USB CDC
6. USB (Communication Device Class) is a standard USB device class that enables communication between a host computer (e.g., a PC) and a USB device (e.g., a microcontroller) via a virtual serial port.



## Windows GUI

You can download GUI from website and run an \*.exe file for windows . This GUI is so user friendly and has:

1- Circular RF Switch Control:

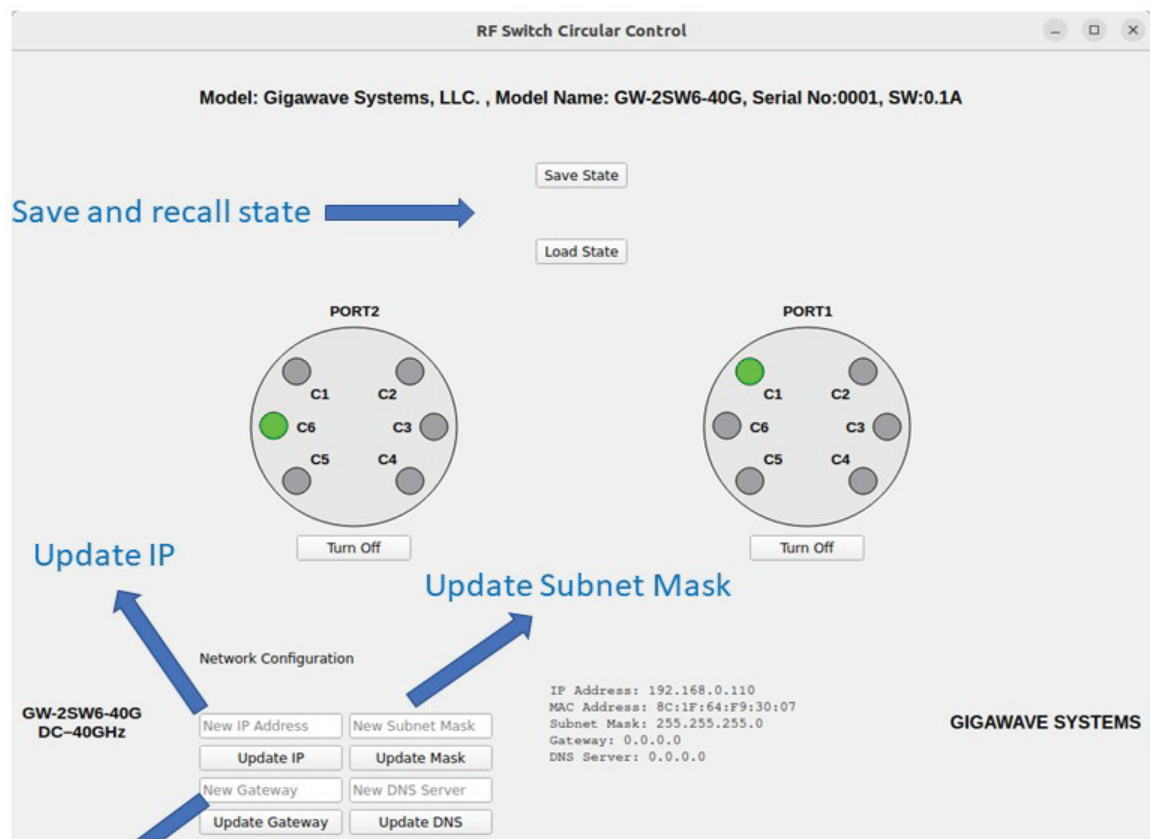
Interactive GUI displays four RF ports with selectable channels (C1–C6) in a circular layout.

2- Serial Communication Flexibility:

Supports COM ports and allows dynamic connection to the switch hardware.

3- State Management & Network Info:

Includes Save/Load state buttons, turn-off control, and real-time network/IP information.





## Linux Serial Control (Fresh System Setup)

The unit is controlled via a USB connection using a CDC-ACM serial interface. On Linux systems, command-based communication is supported through standard serial terminal applications, allowing users to issue text commands for configuration and control without the need for additional drivers.

### 1. Install Required Tools

On a fresh Ubuntu / Debian system, install the serial terminal and line editor:

```
$ sudo apt update
$ sudo apt install picocom rlwrap
```

### 2. Connect the Device

Connect the Gigawave switch controller via USB. Verify the serial device appears

```
$ ls /dev/ttyACM*
```

Expected output:

```
/dev/ttyACM0
```

### 3. Start the Serial Console (Recommended)

Use rlwrap to enable command editing and history:

```
$ rlwrap -a picocom -b 115200 --omap delbs /dev/ttyACM0
```

### 4. Basic Command Test

After the terminal is ready, verify communication:

```
*IDN?
```

Example response:

```
Gigawave Systems, LLC., Model Name: GW-2SW6-40G, Serial No:0001, SW:0.1A
```

```
SET,PORT1,C1
SET,PORT2,C4
SET,PORT2,C5
```

Expected response:

```
SET,PORTx,Cy,OK
```

### 6. Exit the Terminal

To exit the session cleanly:

```
Ctrl + A, then Ctrl + X
```

Notes Default serial settings: \*Baud rate: **115200** \* Data bits: **8** \* Parity: **None** \* Stop bits: **1** \* Flow control: **None**

The controller uses a raw serial interface; command echo is handled locally.

**rlwrap** is recommended for improved usability but is not required.

## Linux Serial Control (USB) displayed output

Representative command-response output displayed using the picocom serial terminal on a Linux system. Other standard terminal applications (e.g., minicom, screen) may also be used.

```
workspace@workspace:~$ rlwrap -a picocom -b 115200 --omap delbs /dev/ttyACM0
picocom v3.1

port is          : /dev/ttyACM0
flowcontrol      : none
baudrate is      : 115200
parity is        : none
databits are     : 8
stopbits are     : 1
escape is        : C-a
local echo is    : no
noinit is        : no
noreset is       : no
hangup is        : no
nolock is        : no
send_cmd is      : SZ -vv
receive_cmd is   : rz -vv -E
imap is          :
omap is          : delbs,
emap is          : crclrf,delbs,
logfile is       : none
initstring       : none
exit_after is    : not set
exit is          : no

Type [C-a] [C-h] to see available commands
Terminal ready
SET,PORT2,C4,OK
SET,PORT2,C5,OK
█
```

Command and control are supported via Ethernet (LAN) using a Telnet interface over TCP/IP. The device is accessed by connecting to its assigned IP address (e.g., 192.168.0.110) on port 3333, allowing text-based command operation from a host computer on the same local network.

## Linux LAN Control (Fresh System Setup)

### 1. Physical Connection

Connect the device's Ethernet (LAN) port to a network switch/router or directly to the host PC.

### 2. Network Configuration

Ensure the host computer is on the same subnet as the device. Device IP address: 192.168.0.110 and Subnet mask: 255.255.255.0

Verify the host IP:

```
$ ip a
```

If required, configure the host with a compatible IP address (example):

```
$ sudo ip addr add 192.168.0.50/24 dev <ethernet_interface>
```

```
$ sudo ip link set <ethernet_interface> up
```

### 3. Verify Network Connectivity

Confirm that the device is reachable:

```
$ ping 192.168.0.110
```

Successful replies indicate proper LAN connectivity.

### 4. Establish Telnet Connection

Install Telnet then open a Telnet session to the device on port 3333:

```
$ telnet 192.168.0.110 3333
```

Upon successful connection, the device is ready to receive commands.

### 5. Verify Communication

Send the identification command:

```
*IDN?
```

Example response:

```
Gigawave Systems, LLC., Model Name: GW-2SW6-40G, Serial No:0001, SW:0.1A
```

### 7. Close the Telnet Session

To exit the Telnet connection: 1. Press: Ctrl + ] 2. At the telnet> prompt, type: quit

#### Notes

- \* LAN control uses standard TCP/IP networking. \* Telnet communication occurs on TCP port 3333.
- \* Any Telnet-compatible client may be used. \* The device supports text-based, command-response operation similar to USB serial control.

## Linux LAN Control Output

Representative command-response output displayed using the telnet standard TCP/IP on a Linux system. Other standard terminal applications (e.g., minicom, screen) may also be used.

```
workspace@workspace:~$ ping -c 4 192.168.0.110
PING 192.168.0.110 (192.168.0.110) 56(84) bytes of data.
64 bytes from 192.168.0.110: icmp_seq=1 ttl=128 time=0.223 ms
64 bytes from 192.168.0.110: icmp_seq=2 ttl=128 time=0.316 ms
64 bytes from 192.168.0.110: icmp_seq=3 ttl=128 time=0.271 ms
64 bytes from 192.168.0.110: icmp_seq=4 ttl=128 time=0.279 ms

--- 192.168.0.110 ping statistics ---
4 packets transmitted, 4 received, 0% packet loss, time 3089ms
rtt min/avg/max/mdev = 0.223/0.272/0.316/0.033 ms
workspace@workspace:~$ telnet 192.168.0.110 3333
Trying 192.168.0.110...
Connected to 192.168.0.110.
Escape character is '^J'.
*IDN?
Gigawave Systems, LLC. , Model Name: GW-2SW6-40G, Serial No:0001, SW:0.1A
LIST
+----- Command List -----
I
+-- Basic Commands
I  +-- *IDN?      (SCPI identification)
I  +-- INFO      (System information)
I  +-- LIST      (Show this command list)
I
+-- TCP/IP Settings
I  +-- MAC Address : 8C:1F:64:F9:30:07
I  +-- IP Address  : 192.168.0.110
I  +-- Subnet Mask : 255.255.255.0
I  +-- Gateway     : 0.0.0.0
I  +-- DNS Server  : 0.0.0.0
I
+-- Port Control
I  +
I  +-- SET,<PORT>,<CHANNEL>
I  I  +--> Set individual channel on defined port
I  I  +-- SET?
I  I  +--> HELP page for SET command
I  I
I  +-- CLR,<PORT>,<CHANNEL>
I  I  +--> Clear individual channel on defined port
I  I  +-- CLR?
I  I  +--> HELP page for CLR command
I  I
I  +-- READ,<PORT>
I  I  +--> Read port
I  I  +-- READ?
I  I  +--> HELP page for READ command
I
I
+-----
```

## Linux GUI

You can download GUI from website and run GUI file (type `./2SW6-verxx` in terminal at the same folder that GUI file copied) .

This GUI is so user friendly and has:

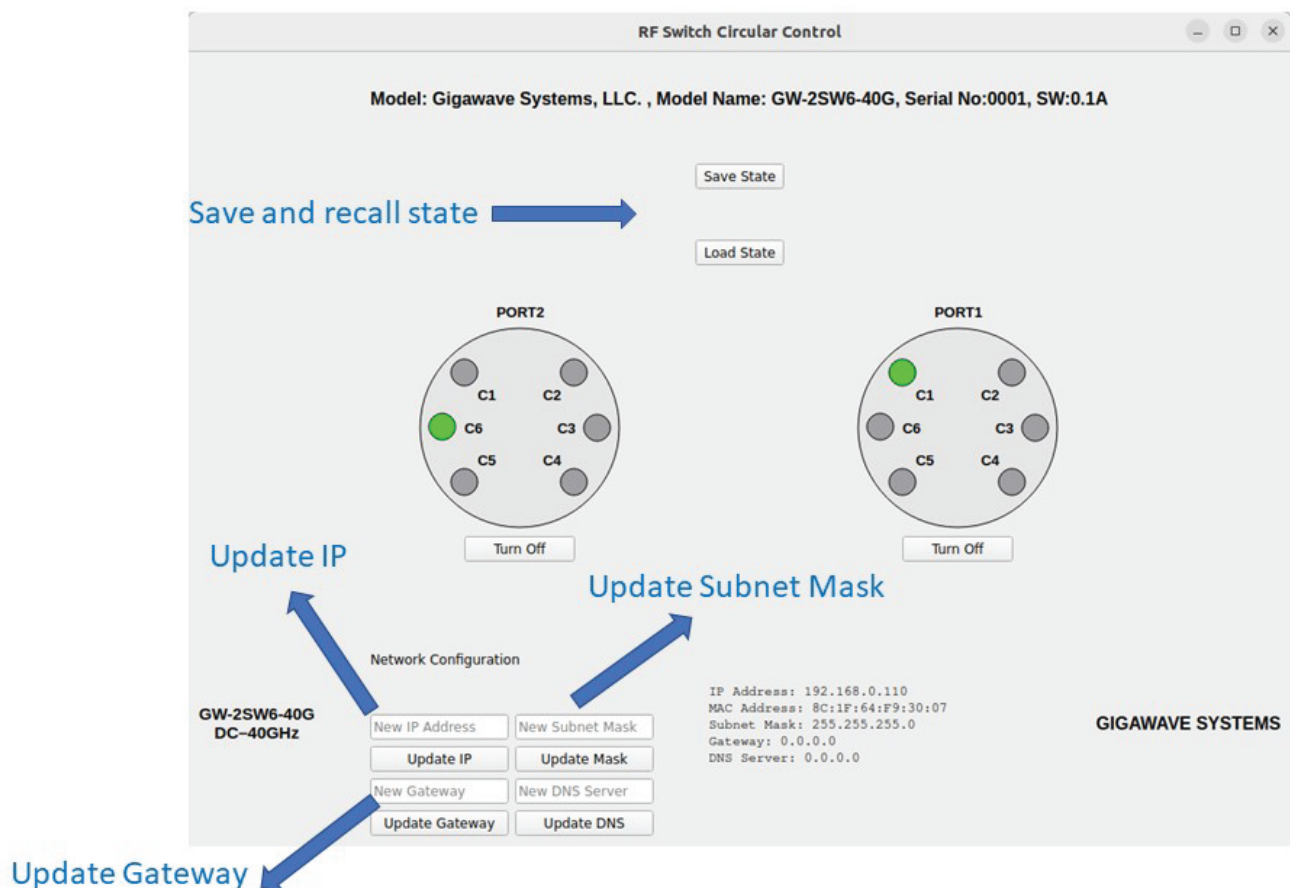
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Interactive GUI displays four RF ports with selectable channels (C1–C6) in a circular layout.

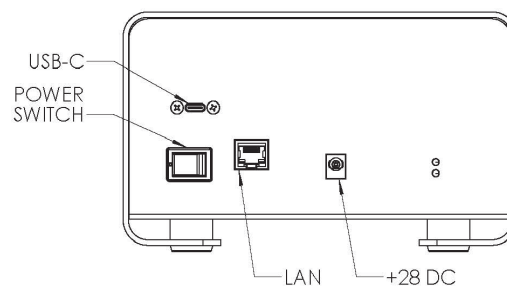
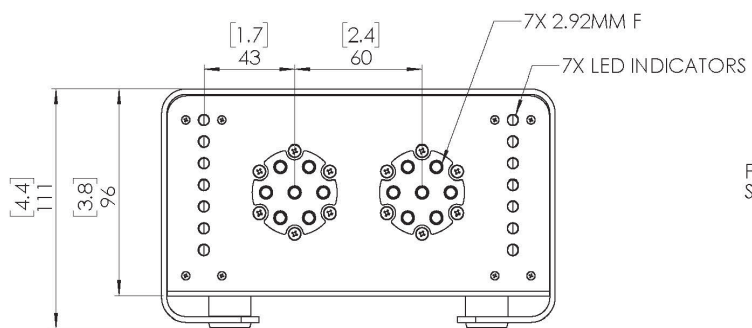
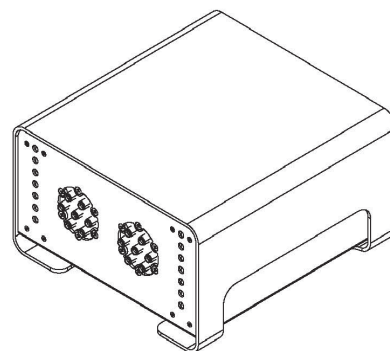
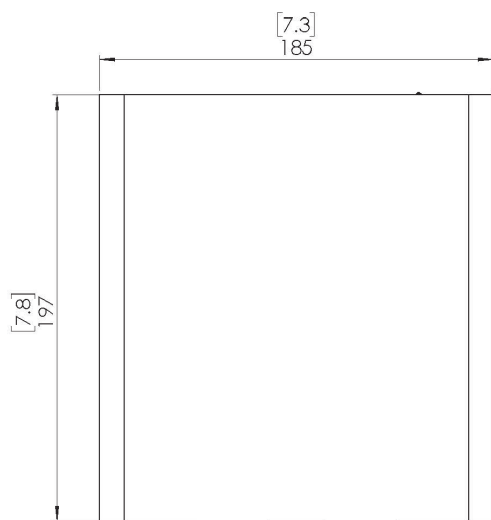
2- Serial Communication Flexibility:

Supports COM ports and allows dynamic connection to the switch hardware.

3- State Management & Network Info:



## Mechanical Specifications



\*All dimensions are in inch (millimeters)