SYN64-R 64-channel synchronization distributor

Data Sheet

EN01A



SYN64-R

Product Overview

The SYN64-R synchronization distributor is a 1:64 high-speed digital signal driver, which fans out the input into 64 outputs with low-jitter, low-skew. Its input offers both DC and AC coupling modes and adjustable trigger level.

Key Features

- 1:64 high-speed fanout
- DC-coupled and AC-coupled input modes
- -10 V ~ +10 V input range
- -10 V ~ +10 V trigger level adjustment range
- Low skew and low jitter
- 1U height, suitable for rack mounting
- Adjustable output delay



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1 Introduction

This datasheet contains important safety information related to the SYN64-R, as well as a basic tutorial on the SYN64-R's operational use.

2 Safety Instructions

This section contains essential information and warnings that must be adhered to while operating the SYN64-R under the respective safety conditions. In addition to the safety precautions outlined in this section, you must also follow recognized safety procedures.

- Intended for indoor use only.
- Keep the product's surface clean and dry.
- Do not operate in damp environments.
- Do not operate in potentially explosive atmospheres.
- Maintenance procedures should only be performed by qualified technicians.
- Ensure proper connection of signal wires, keeping the signal ground at the same potential as the ground voltage. Do not connect the ground wire to high voltage sources. During testing, avoid touching exposed contacts and components.
- If you suspect a product malfunction, refrain from further operation. In the event of suspected damage to the product, seek examination by qualified service personnel

2.1 Safety Terms and Symbols

Terms in this manual. Terms may appear in this manual:

⚠ WARNING	Warning statements indicate the conditions and behaviors that could result in injury or loss of life.
⚠ CAUTION	Caution statements indicate the conditions and behaviors that could result in damage to this product or other properties.

Terms used in this product. These terms may appear in the product:

DANGER	Indicates direct injury or hazards that may happen.
WARNING	Indicates potential injury or hazards that may happen.
CAUTION	Indicates potential damage to the instrument or other property that may happen.

Symbols used in this product. These symbols may appear on the product:


Hazardous Voltage


Warning


Protective Earth Ground


Terminal Ground


Power Switch

2.2 Operating Environment

This product is intended for indoor operation only. Before using this product, please ensure that the operating environment remains within the following parameter ranges.

Temperature: 0℃ to +50℃.

Humidity: Maximum relative humidity of 90% at 30℃, linearly decreasing to 50% at 40℃.

Altitude: Up to 10,000 feet (3,048 meters).

Note: Consider direct sunlight, electric heaters, and other heat sources when evaluating temperature.

⚠ WARNING Do not operate this product in explosive, dusty, or humid atmospheres.

⚠ CAUTION Do not exceed the specified maximum input voltage. For details, please refer to the technical data.

2.3 Calibration

The recommended calibration interval is one year and should be performed by personnel with the appropriate qualifications.

2.4 Cleaning

Only use a soft, damp cloth to clean the SYN64-R's surface. Do not use chemicals or corrosive substances. Under no circumstances should moisture be allowed to infiltrate the SYN64-R. To avoid damaging the SYN64-R, disconnect it from the SYN64-R before cleaning.

⚠ WARNING There are no user-serviceable parts inside. Do not remove the protective covers. Maintenance must be performed only by qualified personnel.

2.5 Abnormalities

- Use this SYN64-R only for the purpose specified by the manufacturer.
- The SYN64-R may be damaged if it exhibits visible damage or experiences significant transport pressure.
- If you suspect SYN64-R damage, disconnect it from the SYN64-R immediately.
- To use the SYN64-R correctly, carefully read all instructions and labels.

⚠ WARNING Using the SYN64-R in a manner not specified by the manufacturer may damage the SYN64-R. This SYN64-R and related accessories should not be directly connected to the human body or used for patient monitoring.

3 Delivery

3.1 Delivery Checklist

First, check that all items listed on the packing list have been delivered. If you note any omissions or damage, please contact your nearest **SIGLENT** customer service center or distributor as soon as possible. If you fail to contact us immediately in case of omission or damage, we will not be responsible for replacement.

3.2 Quality Assurance

The SYN64-R is covered by a 3-year warranty from the date of shipment, provided it is used and operated under normal conditions. **SIGLENT** can repair or choose to replace any product returned to an authorized service center during the warranty period. We must first examine the product to make sure that the defect is caused by the process or material, not by abuse, negligence, accident, abnormal conditions, or operation.

SIGLENT shall not be responsible for any defect, damage, or failure caused by any of the following:

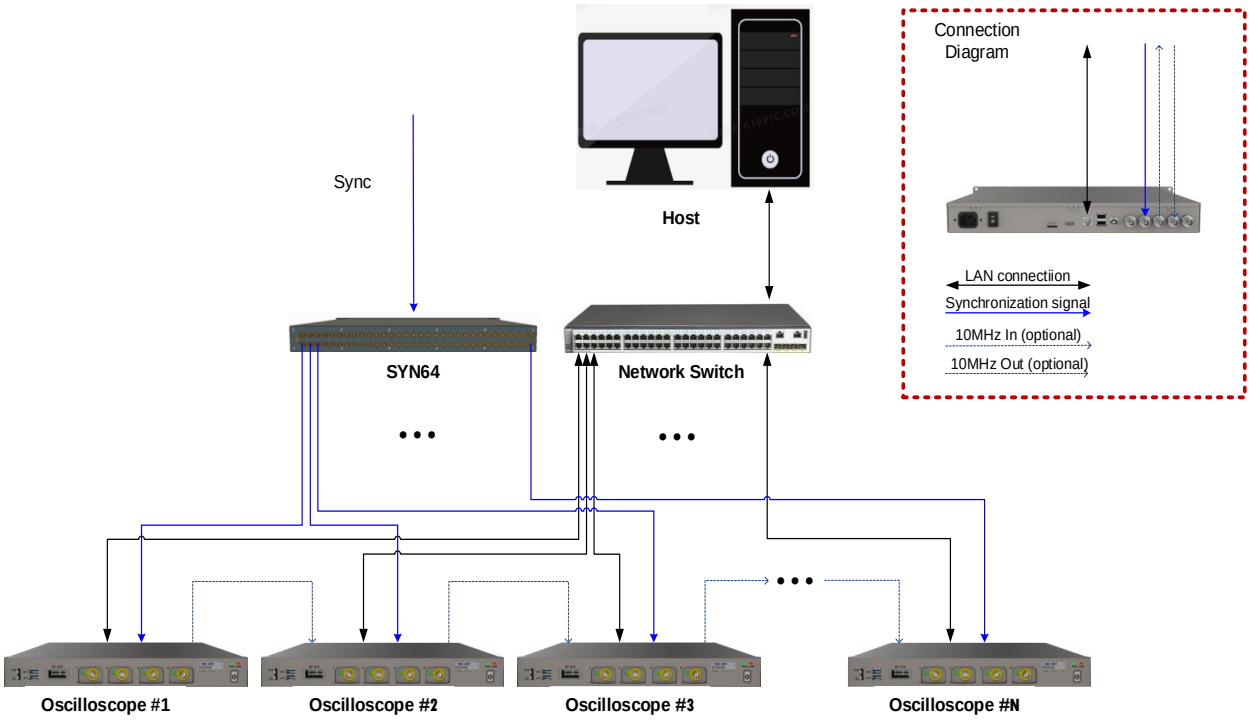
1. Repairs or installation conducted by individuals not authorized by **SIGLENT**.
2. Connection of incompatible devices and improper connections.
3. Any damage or failure resulting from the use of products provided by non-**SIGLENT** suppliers.

3.3 Maintenance Agreement

We offer a variety of services through maintenance agreements, including extended warranties that let you plan your maintenance budget after the three-year warranty period. We also provide installation, training, enhancements, on-site repairs, and other services through supplementary support agreements

4 Application

Multi-channel High-speed Acquisition System

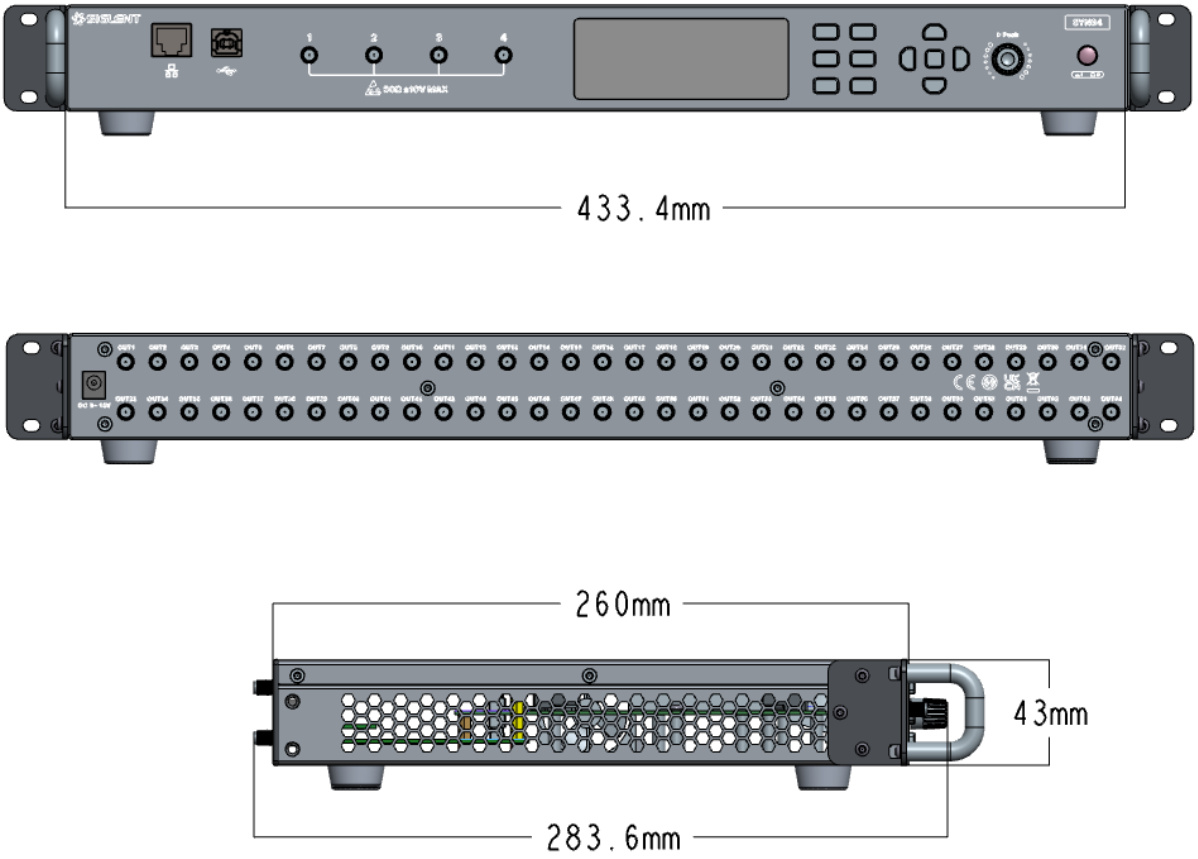


- Multiple units are combined to create a high-speed acquisition system with up to 512 channels by being triggered with low-skew synchronization signals from the SYN64-R
- The host can access each unit over 1000M LAN. A complete SCPI command set as well as LabVIEW and IVI drivers are provided for easy data acquisition. The LAN port is LXI compliant.

  Sample clocks are synchronized between all units in the test system by cascading the 10 MHz In and 10 MHz Out clocks in a daisy chain

5 Quick Start

5.1 Mechanical Dimensions



5.2 Front Panel



1. **Display Area:** The main display area of the SYN64-R.
2. **Keyboard:** Includes knobs and keys for configuring the SYN64-R.
3. **Signal Input Connector**
4. **LAN Port:** Used to connect to a network for remote control.
5. **USB 2.0 Device:** Connects with PC for USBTMC communication and control.
6. **Power Switch**

5.3 Rear Panel



1. Connectors for 64-channel synchronization signal output
2. DC Power Input and Fuse

5.4 Connections

The SYN64-R accepts a DC input of 9~15Vdc. Use the supplied power adapter to connect the unit to the power source.

6 Specifications

All specifications are not guaranteed unless the following conditions are met:
The module has been working continuously for at least 30 minutes at the specified temperature (18℃ ~ 28℃)

Parameter	Description
Input	
Channel	4
Voltage Range	-10 V ~ +10 V
Swing	0.5 ~ 20 Vpp
Impedance	50 Ω
Power	≤ 1 W
Minimum Pulse Width	Buff mode: 1 ns; Normal mode: 3.2 ns
Coupling	DC, AC (-3 dB @ 20 Hz)
Buff	Output pulse width same as input
Edge Trigger	Rising edge, Falling edge
Pulse Width Trigger	Positive pulse width, Negative pulse width, Resolution 3.2 ns
Force Trigger	Forces all channels to output one pulse
Trigger Level	-10 ~ +10 V
Trigger Holdoff Time	3.2ns ~ 30s
Trigger Holdoff Events	1 ~ 1e8
Connector	SMA
Output	
Channel	64
Group	8 groups; Out1~8 as Group1, Out9~16 as Group2, and so on
Voltage	800 mVpp swing, 400 mV DC offset (into 50 Ω)
Rise Time	≤ 500 ps
Jitter	1 ps typical
Skew	30 ps typical, 50 ps maximum, over the full operating temperature range
Channel Skew	Adjusted by group; Buff: 3 ns, resolution 10 ps; Normal mode: 30 s, resolution 7 ps
Load Requirement	50 Ω to GND, DC coupled
Connector	SMA
General	
Power Input	9 ~ 15 Vdc, 4 A
Dimensions (W × H × D)	433.4mm × 43mm × 283.6mm
Ambient Temperature	Operating: 0 ℃ to +50 ℃; Non-operating: -30 ℃ to +70 ℃
Humidity Range	Operating: 5% ~ 90% RH,30℃ degraded to 50%RH at 40℃ Non-operating: 5% ~ 95% RH
Altitude	Operating: ≤ 3048 m, 25 ℃ Non-operating: ≤ 15266 m

7 User Interface

7.1 Device Parameter Display



1. Trigger Source
2. Coupling Mode
3. Trigger Mode
4. Trigger Level
5. Trigger Type
6. Trigger Slope

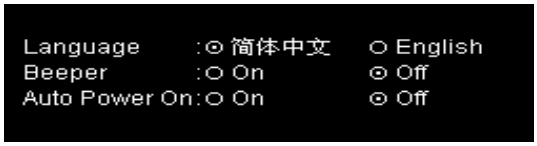
7.2 Main Menu



Use the Up/Down keys to move the cursor, press SEL to enter the corresponding function menu, and press ESC to exit the current function menu.

1. System Info: Displays the system information, where the current version information can be viewed.
2. System Setting: Displays the system settings.
3. Trigger: Displays the trigger configuration.
4. Output: Displays the output configuration.
5. Factory Setting: Restores the trigger and output configurations to factory defaults.
6. LAN: Displays the LAN configuration.
7. Maintenance: Displays the maintenance menu.
8. Reboot: Restarts the instrument.
9. Shutdown: Powers off the instrument.

7.3 System Setting



1. Language: Choose Chinese or English
2. Beeper: Enables or disables the buzzer
3. Auto Power On: When enabled, the instrument powers on automatically when AC-DC power is applied.

7.4 Trigger

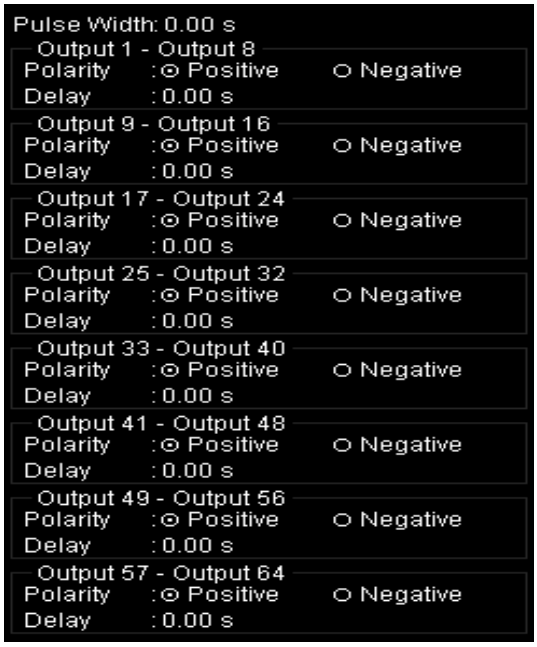


1. Trigger Mode: Select Buff, Normal, or Force.
   - Buff: The output pulse width is the same as the input waveform.
   - Normal: Different trigger types can be set, and the output pulse width can be adjusted.
   - Force: Forces the output of a pulse with a specific width.
2. Source: Select the current input signal port.
3. Level: The trigger level in Buff and Normal modes.
4. Type: The trigger type in Normal mode.
   - Edge: Use edge triggering for simple repetitive signals. Triggers on the rising or falling edge.
   - Pulse: Triggers at the end of a pulse when the pulse width meets the specified time condition. Positive or negative pulse widths can be defined, and triggering occurs when the pulse width is greater than or less than the specified value. A pulse width range can also be specified, and triggering occurs when the pulse width falls inside or outside this range.
5. Slope: When Edge Trigger is selected as the trigger type, this setting selects the edge type: rising edge or falling edge. When Pulse Trigger is selected, this setting selects the pulse type: positive pulse or negative pulse.
6. Holdoff: Trigger holdoff is an optional additional condition for edge/pulse triggering that helps stabilize triggering on complex waveforms, such as pulse trains. It can be set to a time or an event count.

- Holdoff by Time: Holdoff time is the period the unit waits after a trigger before the trigger circuit is re-enabled. The unit does not trigger again until the holdoff period has ended.
- Holdoff by Events: The Holdoff event is the number of times the trigger condition is met. For example, if a signal has multiple edges before the edge you want to trigger on, you can set the trigger holdoff to the number of edges preceding the desired trigger edge.

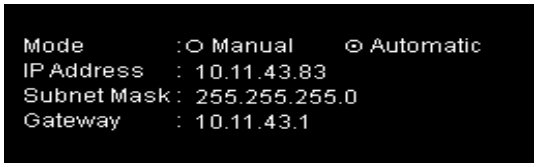
7. Start Holdoff On: Parameter Start Holdoff On defines the initial position of holdoff. It characterizes the relationship between the initial starting position of each triggering release and the previous triggering position.
   - Acq Start: The initial position of holdoff is the first-time point satisfying the trigger condition. In the example above, each holdoff starts from the first rising edge of the pulse sequence.
   - Last Trigger: The initial position of holdoff is the time of the last trigger. In the example above, the last trigger position is at the second rising edge of the pulse sequence and the second holdoff starts from that point.
8. Coupling: The coupling mode of the trigger signal.

7.5 Output



1. Pulse Width: The width of the pulse on the output channel.
2. Channel Group: Every 8 channels form a group. Polarity and delay are the same for all channels within a group and can be set independently for each group.
3. Polarity: The polarity of the output pulse.
4. Delay: The output pulse is delayed by the set time before being output.

7.6 LAN



Mode – The LAN IP assignment mode. Selectable as Automatic (DHCP) or Manual.

- When Manual is selected, the unit uses a static IP address, and the IP address, subnet mask, and gateway must be configured manually.
- When Automatic is selected, the unit automatically obtains an IP address and automatically configures the subnet mask and gateway.

7.7 Temperature Monitor



Displays the current CPU temperature, reference temperature, and fan speed of the unit.

7.8 Dialog Box



The dialog box is the main area for configuring the parameters of the selected function.

1. Parameter setting area.
2. The white bar indicates the current cursor position.
3. Scroll bar. When there are more parameters than can be displayed on the screen, a gray scroll bar appears on the right. In this case, use the keys or the knob to move the cursor and scroll to the area that is not displayed.

7.9 Entering/Selecting Parameters

The parameter area of the dialog box provides several different ways to enter or select parameters:



Radio Button – Used to switch between multiple selectable parameters, such as specifying the trigger source.

Method: Move the cursor left or right, press SEL to select the desired option, and press ESC to exit the parameter selection area.

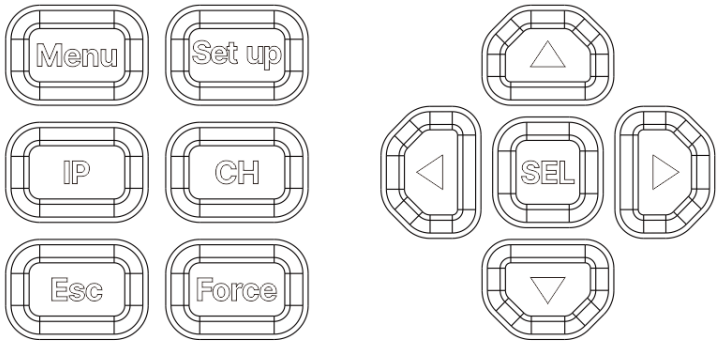


Numeric Input – Used for parameters that require a numeric value and unit, such as the trigger level.

Method: Use the Left/Right keys to move the cursor left or right to the position you want to change, including the sign, value, and unit. Press the Up/Down keys or rotate the knob to change the value or unit. Press SEL or ESC to exit editing.

Note: Any change to the value takes effect whether or not SEL is pressed.

7.10 Front Panel Operation



Menu: Displays the system main menu on the screen.

Set up: Quickly switches to the trigger menu.

IP: Quickly switches to the IP configuration menu.

CH: Switches the trigger source.

Esc: Returns to the previous menu.

Force: When not in force trigger mode, switches to force trigger mode. When in force trigger mode, forces one pulse to be output.

Arrow Keys: Move the cursor on the screen, or change the value or unit at the cursor position in the input field.

SEL: Selects and executes the item at the current cursor position.

7.11 Language Selection

To set the language: Menu > System Settings > Language .

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