

- Allows simultaneous sampling across multiple AlazarTech waveform digitizers
- Four coherent clock outputs
- Four synchronous trigger outputs
- Internal clocking up to 1 GHz
- External clocking up to 2 GHz
- Trigger holdoff function for safe synchronous arming of multiple boards
- Software library for user programmability
- USB 2.0 controlled
- Support for Windows® & Linux®



2015/863/EU



Product	Interface	Operating System	Max. Number of Digitizers	Max. Internal Clock Frequency	Max. External Clock Frequency
ATS Sync 4X1G	USB 2.0	64-bit Windows & 64-bit Linux	4	1 GHz	2 GHz

Overview

The AlazarTech ATS® Sync 4X1G is a device that allows simultaneous sampling across multiple independent AlazarTech waveform digitizers. This is achieved by providing common clock and trigger signals to each digitizer.

While it is possible to supply copies of clock and trigger signals using passive signal splitters, that scheme does not prevent the triggering of some digitizers while the rest of the digitizers are still being armed. Sync 4X1G solves this problem by allowing users to disable triggering during the digitizer arming process and enable it only after all digitizers are armed.

Sync 4X1G is supplied with a graphical user interface called SyncApp for Windows and a command-line application for Linux that allow users to control the trigger and clock.

Coupled with the provided AlazarDSO® oscilloscope software for Windows or AlazarFrontPanel for Linux, this allows users to get started immediately without having to write any software.

Users who need to integrate their digitizers and Sync 4X1G in their own program can use the provided drivers, library, and code sample with the ATS-SDK software development kit for Windows or Linux.

USB 2.0 Computer Interface

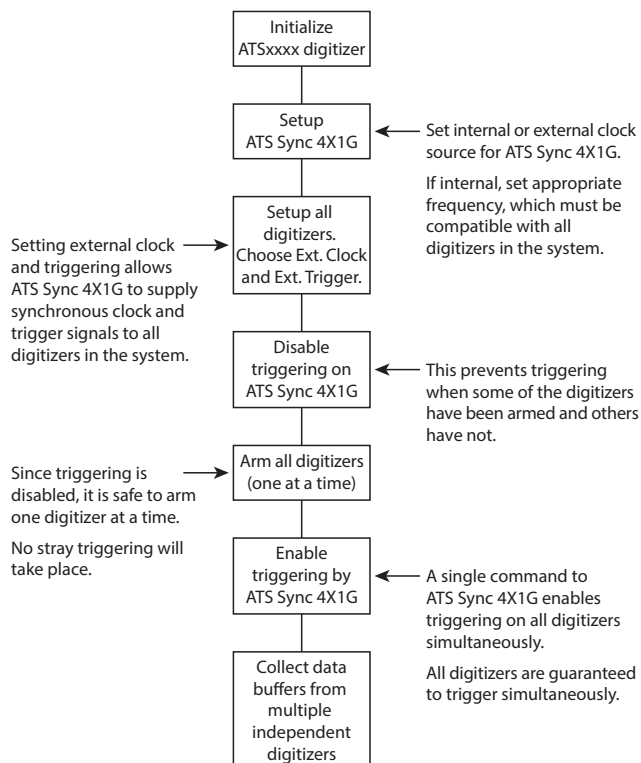
ATS Sync 4X1G interfaces to the host computer using a provided USB type A to type B cable.

The USB type A connector is used to connect to the host computer. The USB type B connector is used to connect to the Sync 4X1G.

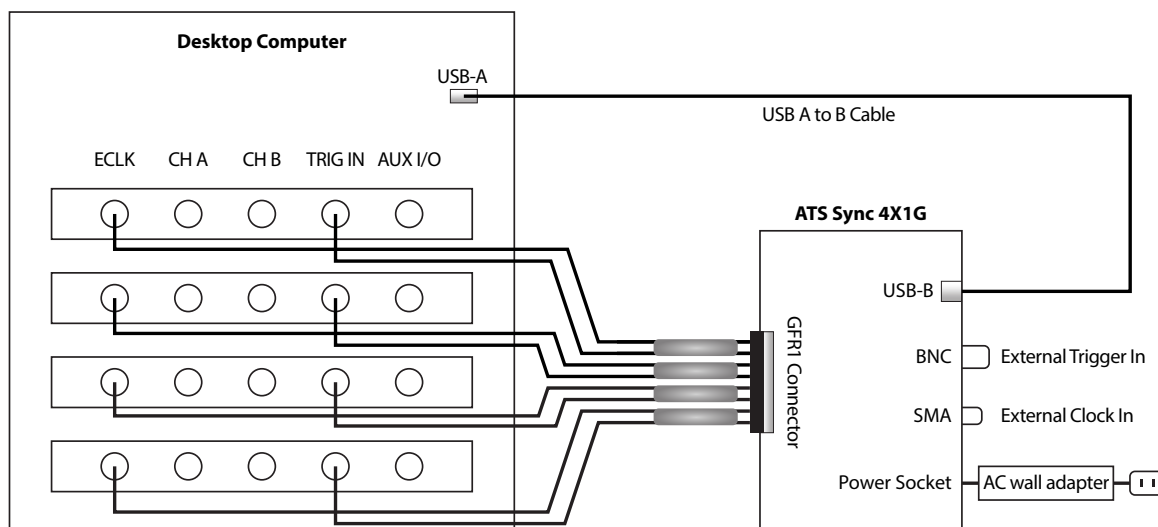
Compatible Waveform Digitizers

All AlazarTech PCI Express and Thunderbolt 3 waveform digitizers are compatible with ATS Sync 4X1G. AlazarTech PCI bus waveform digitizers are not supported.

How ATS Sync 4X1G Works



ATS Sync 4X1G Connection Diagram



ATS Sync 4X1G to Digitizer Interface

Sync 4X1G interfaces to AlazarTech digitizer cards using a proprietary high-frequency cable. The provided cable terminates in a ganged micro-miniature RF connector, which is used to connect to the Sync 4X1G.



The other end of the cable terminates in male SMA and BNC connectors, which are used to connect to the digitizer External Clock and External Trigger respectively.

Depending on the model of AlazarTech digitizer used with Sync 4X1G, BNC-to-SMA cable adapters may be necessary and must be sourced by the user.

One cable is included with the purchase of Sync 4X1G. Additional cables can be purchased (order number SYNC-4X1-CBL).

Clock Source

The ATS Sync 4X1G allows the user to programmatically choose between an external clock or an internally generated clock. The selected clock is then distributed to all four outputs.

External Clock

The user can supply a single-ended clock signal through ECLK IN connector. This signal can have variable frequency, such as a k-clock in OCT applications.

The clocking requirements of the AlazarTech digitizers being used must be satisfied. Refer to your digitizer specifications for the External Clock frequency requirements.

Internal Clock

The Sync 4X1G has an on-board low-jitter VCO that generates the required clock. The On-board low-jitter VCO uses a 10 MHz TCXO as a reference clock and a high-performance VCO and PLL chipset to generate a low-jitter clock.

The maximum frequency for internal clock is 1 GHz. Lower frequencies must satisfy the following formula:

$$output_clock = \frac{vco_clock}{vco_divider * output_divider}$$

Conditions:

- $1800 \text{ MHz} \leq vco_clock \leq 2200 \text{ MHz}$
- vco_clock must be a multiple of 10 MHz
- $2 \leq vco_divider \leq 6$
- $1 \leq output_divider \leq 32$

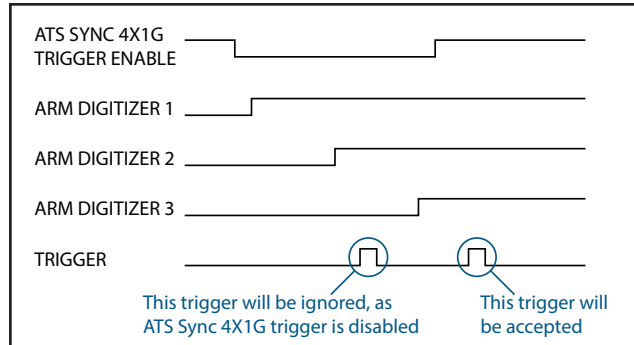
Users must use the above formula to calculate the appropriate internal clock frequency.

Triggering

Sync 4X1G supports digital (TTL) triggering. Four exact copies of the trigger signal supplied through the Sync 4X1G TRIG IN connector are output to the digitizer boards.

Note: to guarantee simultaneous acquisition, users must supply an external trigger signal to the Sync 4X1G; all boards in the system must be configured to be triggered by external trigger.

Sync 4X1G also supports Trigger Enable and Trigger Disable. This allows the user to hold off triggering until all digitizers are armed.



Use with digitizers operating at different sample rates

It is also possible to use Sync 4X1G with AlazarTech waveform digitizers operating at different sampling rates. These may be multiple digitizers of the same type, each setup with a different sample rate, or multiple digitizers of different types, e.g. ATS9371 and ATS9352.

In this case, Clock outputs of Sync 4X1G will not be connected to the digitizers. Each digitizer's clock source and sampling speed must be set as if it is an independent board. Trigger outputs of Sync 4X1G will be connected to the various digitizers to ensure that none of them accept a trigger before all of them are armed.

Note that only the trigger will be synchronized between digitizers. Sampling clocks will not be coherent.

Recommended AC-DC Power Supply

ATS Sync 4X1G is a self-powered USB 2.0 device; it does not draw any power from the USB cable. Users must supply the necessary power to the Sync 4X1G for it to operate.

The power supply must be ordered separately (order# SYNC-X1G-PWR). Customers may opt to order the Pihong USA PSC15A-050 or the CUI Inc. SWI18-5-N-P5 power supply directly from their preferred electronic component supplier such as Digi-Key or Mouser.

Please note that power supplies purchased from AlazarTech will come with a type A (NEMA 1-15P) plug. Customers who require a different plug type should refer to the section "AC Wall Adapter (sold separately)" on page 5 and source a suitable power supply from their preferred electronic component supplier.

The power supplies specified above have undergone testing at our factory and are recommended power supplies for the Sync 4X1G.

RoHS Compliance

ATS Sync 4X1G is fully RoHS compliant, as defined by Directive 2015/863/EU (RoHS 3) of the European Parliament and of the Council of 31 March 2015 on the restriction of the use of certain hazardous substances in electrical and electronic equipment.

All manufacturing is done using RoHS-compliant components and lead-free soldering.

REACH Compliance

AlazarTech verifies its supply chain against the latest REACH requirements.

A compliance statement is usually available within 6 months of release of the European Chemicals Agency (ECHA) updated substance of very high concern (SVHC), Authorizations, and Restrictions lists.

Performance Verification

Every ATS Sync 4X1G is tested at factory to ensure that it performs within specification.

ATS Sync 4X1G Installation Package

Sync 4X1G is supplied with software installation packages for Windows and Linux. The installation package includes:

- Sync 4X1G driver & library
- SyncApp control application, which allows the user to control the ATS Sync 4X1G's functions.
- Sync 4X1G code sample for use with ATS-SDK for customers who wish to create their own software to control their AlazarTech digitizers.

C++ and Python example code for using Sync 4X1G is included with the Sync 4X1G software installation package. The C++ example program is provided with CMake build files for use under Windows and Linux. Calling the function from other programming languages is the responsibility of the user.

The Windows installation package can be downloaded from any [Sync 4X1G accessory page](#) or it can be installed using APM www.alazartech.com/apm.

The Linux installation package will be available from the *Linux Resources* section on their digitizer's product web page.

Support for Windows

Windows support for ATS Sync 4X1G includes Windows 11, Windows 10, Windows Server® 2019, and Windows Server 2016. As Windows Server 2019 and 2016 are seldom used by our customers, they are expected to work but are not regularly tested with each software release. If there are issues related to Windows Server 2016 or 2019, tech support may not be as rapid as for other operating systems.

Only 64-bit Windows operating systems are supported.

Linux Support

AlazarTech offers Dynamic Kernel Module Support (DKMS) drivers for the following Linux distributions: Debian and RHEL® for Sync 4X1G.



ATS SYNC 4X1G

Clock & Trigger Synchronizer

AlazarTech DKMS drivers may work for other Linux distributions but they have not been tested and technical support may be limited.

Users can download the Sync 4X1G Linux installation package for their specific distribution from the Linux Resources section on their digitizer's product web page.

Only 64-bit Linux operating systems are supported.

Accessories for Out-of-Warranty Products

Accessories, such as the DC power supply, purchased for use with an in-warranty Sync 4X1G will be covered by a 1-year warranty.

Accessories purchased for use with out-of-warranty Sync 4X1Gs will not be warranted against defects in materials and workmanship. As AlazarTech cannot verify with certainty that the cause of any malfunction is not due to the non-warranted Sync 4X1G, accessories purchased for an out-of-warranty Sync 4X1G will require a warranty waiver.

Extended Warranty

As of November 1, 2025, the purchase of an ATS Sync 4X1G includes a standard two (2) year parts and labor warranty. AlazarTech hardware parts and labor warranty should be maintained to ensure uninterrupted access to technical support and warranty repair services.

Customers may extend their warranty by ordering an Extended Warranty (order number SYNC-4X-061). This must be purchased before expiration of the standard warranty (or before expiration of an Extended Warranty).

If the warranty lapses, renewal at a later date will incur reinstatement fees for the forward service period and any applicable warranty extension to cover the lapsed period, as well as a 6-month waiting period for repair claims. Furthermore, warranty must be extended at least 6 months past the current date. The reinstatement fee is 15% of the cost of warranty extension.

Get your warranty end date by registering your product at: www.alazartech.com/en/my-account/my-products/.

ORDERING INFORMATION

ATS Sync 4X1G	Please refer to your digitizer's price list for order number
ATS Sync 4X1G: GRF1-SMA/BNC	SYNC-4X1-CBL
Sync 4X1G: One Year Extended Warranty	SYNC-4X1-061
ATS Sync xX1G: DC Power Supply	SYNC-X1G-PWR
ATS-SDK purchased with a digitizer board or ATS-GPU: License + 1 Year Subscription (Supports C/C++, Python, MATLAB, and LabVIEW)	ATS-SDK
ATS-SDK purchased separately: License + 1 Year Subscription + 5 hours of technical support (Supports C/C++, Python, MATLAB, and LabVIEW)	ATS-SDK-WOD
5 Hours of technical support	SUPPORT-HR5

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RHEL is a registered trademark of Red Hat, Inc. in the United States and other countries.
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ATS SYNC 4X1G

Clock & Trigger Synchronizer

System Requirements

Personal computer with at least one free USB 2.0+ port, 16 GB RAM, 100 MB of free hard disk space.

Power Requirements

+5 V 1 A, typical

AC Wall Adapter (sold separately)

Output	+5 Vdc, 3 Amps (15 W)
Output connector type	Barrel, Male plug
Inner pin	2.1 mm diameter
Outer barrel	5.5 mm diameter
Pin length	9.5 mm
Polarity	Center pin POSITIVE
Tested AC wall adapters	Phihong USA PSC15A-050 CUI Inc. SWI18-5-N-P5

Physical

Size	Metal chassis measures 5.1 x 2.6 x 1.6 inches (excluding any protruding connectors).
Weight	166 g

I/O Connectors

TRIG IN	BNC female connector
ECLK IN	SMA female connector
Outputs	Ganged micro-miniature RF connector for connecting provided cable terminating in 4x BNC (TRIG OUT 1-to-4) and 4x SMA (ECLK OUT 1-to-4)

Environmental

Operating temperature	0 to 55 degrees Celsius
Storage temperature	-20 to 70 degrees Celsius
Relative humidity	5 to 95%, non-condensing

Internal Clock Generator

Reference clock	10 MHz
Maximum frequency for Internal Clock	1 GHz
Frequency output	$\text{output_clock} = \frac{\text{vco_clock}}{\text{vco_divider} * \text{output_divider}}$
Conditions:	
	◦ 1800 MHz ≤ vco_clock ≤ 2200 MHz
	◦ vco_clock must be a multiple of 10 MHz
	◦ 2 ≤ vco_divider ≤ 6
	◦ 1 ≤ output_divider ≤ 32

ECLK (External Clock) Input

Signal Level	500 mV _{p-p} to 2 V _{p-p}
Input impedance	50 Ω
Input coupling	AC
Maximum frequency for Fast External Clock	2 GHz
Minimum frequency for Fast External Clock	1 MHz

Clock Output

Source	External clock input or internal clock generator
Signal Level	400 mV _{p-p} ~ 800 mV _{p-p}
Output impedance	50 Ω
Output coupling	AC
Number of outputs	4 common (same frequency and phase)
Maximum frequency	2 GHz for external clock 1 GHz for internal clock
Minimum frequency	1 MHz. Note: Minimum clock frequency of your digitizer may be higher.

TRIG IN (External Trigger) Input

Input type	3.3 V TTL
Input coupling	DC only
Analog input impedance	2 kΩ
Max. frequency (-3 dB)	DC - 10 MHz
TTL min. pulse width	32 ADC sampling clocks
TTL min. pulse amplitude	2 Volts
TTL absolute max. input	-0.7 V to +5.5 V

Trigger Output

Signal type	3.3 V TTL
Number of outputs	4 common (same frequency and phase)
Input coupling	DC only
Max. frequency (-3 dB)	10 MHz

Materials Supplied

ATS Sync 4X1G
1 x Cable GRF1-SMA/BNC, order#: SYNC-4X1-CBL
1 x Cable USB 2.0, Type-A-Male to Type-B-Male

Required Accessories

ATS Sync 4X1G AC Wall Adapter, order#: SYNC-X1G-PWR

Certification and Compliances

RoHS 3 (Directive 2015/863/EU) Compliance
REACH Compliance
CE Marking — EC Conformity
FCC Part 15 Class A / ICES-003 Class A Compliance

All specifications are subject to change without notice

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DATASHEET REVISION HISTORY

Changes from version 1.0B (Jan 2024) to version 1.0C		Section, Page
Added note about the requirement of supplying an external trigger signal to the Sync 4X1G to guarantee simultaneous acquisition		Triggering, pg. 2
Removed USB flash drive and added download location	ATS Sync 4X1G Installation Package,	pg. 3
Updated description with Sync 4X1G information	Linux Support,	pg. 3
Added section	Accessories for Out-of-Warranty Products,	pg. 4
Updated standard warranty period from one year to two years	Extended Warranty,	pg. 4
Removed limit on the number of purchasable extended warranties		
Changes from version 1.0A (Dec 2023) to version 1.0B		Section, Page
Added detail on example code: C++ and Python	ATS Sync 4X1G Installation Package,	pg. 3
Updated digitizer driver location	Linux Support,	pg. 3
Added missing paragraph in warranty reinstatement policy	Extended Warranty,	pg. 4
Removed section; classification is inherited from digitizer	Export Control Classification,	pg. 4
Updated order information	Ordering Information,	pg. 4
Changes from version 1.0 (Aug 2023) to version 1.0A		Section, Page
Updated/added product photos	Global change	
Modified to include new warranty reinstatement policy	Extended Warranty,	pg. 3