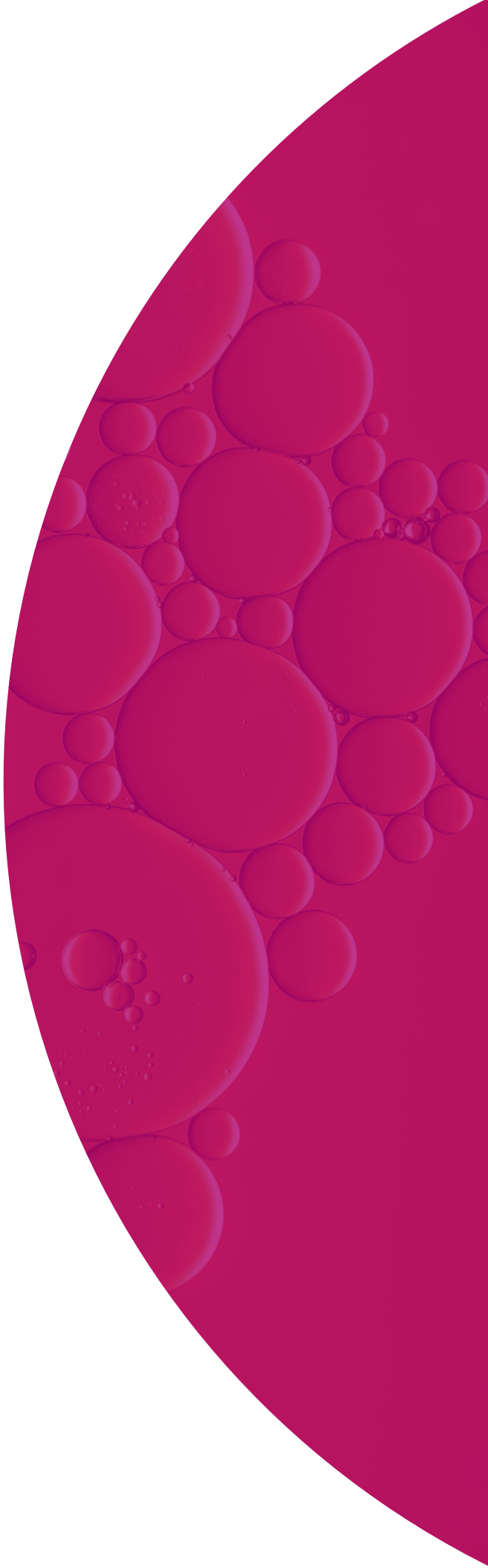
PacBio

Onso™ system and cluster generator

Site preparation guide



For Research Use Only. Not for use in diagnostic procedures.

P/N 103-072-800

Pacific Biosciences of California, Inc.
1305 O'Brien Dr.
Menlo Park, CA 94025
www.pacificbiosciences.com

Notice of Equipment Class (Korea)
For Class A

이 기기는 업무용(A급) 전자파적합기기로서 판매자 또는 사용자는 이 점을 주의하시기 바라며, 가정외의 지역에서 사용하는 것을 목적으로 합니다.

Table of contents

Introduction

The site preparation guide explains the site requirements for the Onso system and cluster generator. Use this guide to understand the requirements for your laboratory to physically accommodate the systems. A PacBio® field representative will schedule a site preparation visit leading up to the installation of your systems.

Safety considerations

Safety notes, cautions and warnings are referenced in the *Safety guide - Onso system and cluster generator*. Read and follow all safety recommendations.

Delivery and installation

An authorized service provider contracted through PacBio along with PacBio field personnel will deliver, uncrate and unbox the Onso system, cluster generator and system accessories. Work with your PacBio field representative and use the dimensions listed in this section to prepare for delivery and installation.

Caution: Only authorized personnel can uncrate, install, or move the Onso system and cluster generator. Mishandling of the instruments could lead to damage of instrument hardware which will impact system performance, and **may void any existing warranties.** If either system needs to be relocated, please contact your PacBio field representative to schedule a service visit.

Onso crate and Cluster Generator shipping box dimensions

Shipment of the Onso system and Cluster Generator will include the following:

- Onso system crate
- Onso accessory box
- Analysis computer box
- Cluster Generator shipping box (contains Cluster Generator system and accessory box)

Onso system crate

The Onso system will arrive in a crate with the following dimensions. The weight includes the weight of the crate and the Onso system.

Crate	Measurement
Width	52 in (132.1 cm)
Height	41 in (104.1 cm)
Depth	38.0 in (96.5 cm)
Weight	496 lbs (225.0 kg)

Onso accessory box contents

Item	Quantity
HDMI cable	1
Category 6 ethernet cables	2
USB 3.0 cable	1
Power cord	2
USB 4-port hub	1
Waste bottle	1
Wash pack	2
Wash consumables	4
Touchscreen monitor	1
Keyboard and mouse set	2
Touchscreen monitor arm	1
Barcode scanner	1
Reagent pack removal tool	4
Flow cell workspace cover	1

Cluster Generator shipping box

The Cluster Generator system and accessory box are packaged together within a shipping box with the following dimensions. The weight includes the weight of the shipping container, accessory box and the Cluster Generator system.

Crate	Measurement
Width	22 in (55.8 cm)
Height	28 in (71.1 cm)
Depth	33 in (83.8 cm)
Weight	110 lbs (49.9 kg)

Cluster Generator accessory box contents:

Item	Quantity
Flow cell workspace cover	1
Category 6 ethernet cable	1
USB 4-port hub	1
Power cord	2
Waste bottle	1
Maintenance wash plate	1
Wash troughs	4
Barcode scanner	1

Laboratory space requirements

The Onso system and Cluster Generator require sufficient lab space and a robust lab bench to enable system operation and instrument servicing. This section will describe the instrument dimensions and lab space requirements.

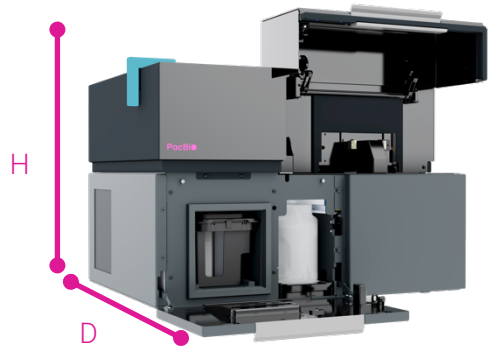
Instrument dimensions

The following describes the dimensions for the Onso system, analysis computer and Cluster Generator.

Onso System

Measurement	Dimension
Width	37 in (94.0 cm)
Height	27 in (68.6 cm)
Depth	30 in (76.2 cm)
Weight	272 lbs (123.4 kg)

Figure 1. Sequencing instrument, front view

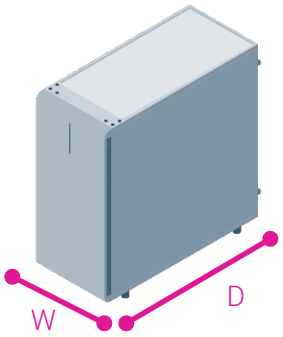


Measurement	Dimension
Height with flow cell cover open	32.3 in (82.0 cm)
Depth with reagent door open	41.3 in (104.9 cm)

Figure 2. Sequencing Instrument with the flow cell cover and reagent drawer open, side view

Caution: DO NOT place items or sit on the reagent door as this may damage the door or cause tipping.

Analysis Computer/Touchscreen Monitor



Item	Measurement
Analysis Computer	Width: 8 in (20.3 cm) Height: 18.1 in (45.9 cm) Depth: 18.4 in (46.7 cm) Weight: 33 lbs (15.0 kg)
Touchscreen Monitor	Diagonal size 15.1 in (38.3 cm)

Figure 3. Analysis Computer

Caution: DO NOT place items on top of the analysis computer as this can cause overheating.

Cluster Generator

Measurement	Dimension
Width	16 in (39.6 cm)
Height	18 in (46 cm)
Height with flow cell cover open	27.5 in (69.8 cm)
Depth	26 in (65.2 cm)
Weight	99 lbs (44.9 kg)

Figure 4. Cluster Generator, front view

Instrument placement requirements

The following describes the requirements for access and clearance dimensions to enable proper airflow and accessibility for servicing the instruments.

- Systems should be placed away from sources of direct sunlight exposure.
- Both instruments should be accessible from all sides using the following minimum clearance dimensions.

Access	Minimum clearance
Sides	8 in (20.3 cm)
Rear	4 in (10.2 cm)
Top	30 in (76.2 cm)

Lab bench considerations:

Placement of the Onso system and Cluster Generator require lab benches that can support the weight and dimensions of each instrument and also accommodate the analysis computer for the Onso system.

- It is strongly recommended that designated lab benches have levelings casters installed to facilitate the installation, maintenance and servicing of the instruments.

The following table lists the minimum required lab bench dimensions for the Onso system and Cluster Generator.

Note: The Onso system and Cluster Generator can be placed on the same lab bench as long as the bench accommodates the weight, dimensions and minimum clearance guidance of both systems listed in this guide. The following table lists the recommended lab bench dimensions for supporting both the Onso system and Cluster Generator.

Measurement	Min. Lab Bench Dimensions
Width	82 in (208.3 cm)
Height	36 in (91.4 cm)
Depth	30 in (76.2 cm)

For only the Onso system (including the monitor and analysis computer), PacBio recommends the following lab bench: Global Industrial Model # WB183166A.

Vibration considerations:

The Onso system must be placed in a location that minimizes exposure to sources of exernal vibrations to ensure optimal instrument performance during sequencing. The following are best practices to minimize external vibration exposure:

- Ensure the lab bench is sturdy and clear of equipment that cause vibrations such as a vortex shaker or a centrifuge.
- Avoid placing objects on the top panel of the system.

- While the instrument is sequencing, minimize vibrations on the floor near the system from personnel or adjacent equipment.

Establishing proper lab setup & best practices for PCR procedures

The primary library preparation method used on the Onso system requires the use of the polymerase chain reaction (PCR) process which can be prone to contamination issues if best practices are not maintained.

Establish & adhere to the following guidelines to prevent PCR product contamination:

- Have dedicated pre-PCR lab space for pre-PCR processes.
- Have dedicated post-PCR lab space for post-PCR sample processing.
- Have dedicated equipment and supplies for the pre-PCR and post-PCR lab spaces. Do not share equipment between the two lab areas.
- Have dedicated storage areas for each designated lab space.
- Wear proper laboratory personal protective equipment (PPE) when entering each lab area.

Sequencing and clustering consumable storage conditions

The Onso system sequencing and clustering consumables are temperature sensitive and require proper storage. Use the following table to ensure proper storage of the consumables.

Note: When the consumable kits arrive, immediately unpack and place the kit contents in the appropriate area to accommodate the storage conditions for each consumable as indicated in the following table:

Kit name	Storage conditions	Packaging dimensions (W x D x H in)	Packaging dimensions (W x D x H cm)
Clustering Reagent Plate	-20°C	5 x 3.3 x 2.3	12.8 x 8.5 x 5.8
Sequencer Reagent Pack	-20°C	18 x 8 x 8	45.7 x 20.3 x 20.3
Flow Cell Kit	4°C	8 x 3.5 x 3.5	20.3 x 8.9 x 8.9

Electrical requirements

This section lists power specifications and explains the electrical requirements for your facility. The sequencing instrument, analysis computer and monitor should plug into a properly grounded 20 amp receptacle.

Power specifications

Component	Peak Power Consumption	Line Voltage
Onso System	800W	100-240 VAC at 50-60 Hz
Cluster Generator	400W	100-240 VAC at 50-60 Hz

Uninterruptable power supply (UPS)

Powering the Onso system, Cluster Generator and analysis computer via an uninterruptible power supply (UPS) is highly recommended. PacBio is not responsible for sequencing runs impacted by interrupted power.

The following tables lists recommended UPS for International and North America customers:

North America Recommendation	
UPS	Tripp Lite SmartPro 120 V 2.2kVA 1.6kW Line-Interactive Sine Wave UPS, Tower, Network Card Options, USB, DB9 Model #: SMART2200SLT
Nominal Input Voltage	120V AC
Output Capacity	1600 W/ 2200 VA
Frequency Compatibility	60 Hz
Input Connection Type	5-20 P
Output Voltages Supported	110V; 115V; 120V
Dimensions	10.5 in x 8.9 in x 12.5 in (26.67 cm x 22.61 cm x 31.75 cm)
Weight	56 lbs (25.85 kg)

International Recommendation	
UPS	SmartPro 230V 2.2kVA Line-Interactive UPS, Tower, Network Card Options,USB,DB9 Serial Model #: SMARTINT2200VS
Nominal Input Voltage	230V AC
Output Capacity	2200 VA
Frequency Compatibility	50/60 Hz
Input Connection Type	C20 inlet
Output Voltages Supported	220V; 230V; 240V
Dimensions	49.02 cm x 38.61 cm x 40.39 cm
Weight	53 lbs (24.04 kg)

Environmental considerations

Environmental specifications

The following table lists the environmental specifications for both the Onso system and Cluster Generator

Element	Specifications
Temperature	Maintain a lab temperature of 18°C to 26°C. This temperature is the operating temperature range of the instrument.
Humidity	Maintain a noncondensing relative humidity between 20–80%.
Elevation	Locate the instruments at an altitude below 2000 meters (6500 feet).
Air Quality	Operate the instruments in a Pollution Degree II environment or better. A Pollution Degree II environment is defined as an environment that normally includes only nonconductive pollutants.
Ventilation	Maximum thermal output is 4000 Btu/h.

Noise Output

The sequencer has a maximum noise level of less than 55 dBA for an 8-hour TWA with a 5 dBA exchange rate.

Computer security

The following section outlines the proper guidance to maintain the computer security for the Onso system's analysis computer and the Cluster Generator.

User guidance

The analysis computer is considered a subcomponent of the Onso system that is optimized to only handle standard sequencing, data transfer and data analysis operations. The analysis computer and Cluster Generator should not be treated as personal computers and all nonessential operating tasks should be avoided to ensure optimal compute and instrument performance.

Third party software

PacBio will only support software that was installed on the system at the time of installation by PacBio field personnel. Third party software may impact instrument performance and compromise the security of the system.

Antivirus software

The analysis computer and Cluster Generator can support the installation of an antivirus software of the user's choice but the user must abide by the following guidelines to minimize impact to sequencing performance:

- Disable automatic scans to avoid interrupting instrument operations.
- Perform manual scans on the system only when it is idle.

- Whitelist the following directories as these are actively used by the instrument during normal operation:
    - C:\PacBio\
    - C:\ProgramData\PacBio\
    - C:\ProgramFiles\PacBio\
    - D:\PacBio\

Windows firewall defender

The Windows Defender Firewall protects the analysis computer and Cluster Generator from any potential security threats. For the Onso system and Cluster Generator is turned on for both Private and Public networks by default.

Networking considerations

The Onso system is designed for use with an established network connection to allow for data transfer to a network attached storage (NAS) and to optionally send instrument health data to PacBio support personnel.

The following sections provide guidelines for connecting the Onso system to the user's network and general best practices.

Network connections

Use the following guidelines to configure a network connection:

- At a minimum use a dedicated 1 gigabit connection between the instrument and the data storage location.
- If connecting through network devices such as switches, ensure that all devices have minimum bandwidth rating of 1 gigabit per second.
- The required minimum bandwidth for a connection is 200 Mb/s/instrument for internal network uploads.
- It is recommended that users minimize network traffic from other devices that share the same connection as the analysis computer.

Internal connections

The following table lists the internal connections required for standard instrument use.

Internal Connection	Value	Description
IP Address	192.168.5.30 192.168.5.1 192.168.5.15 192.168.3.15	Allows communication from specific internal components to the analysis computer
Port	443/TCP 843/TCP 8888/TCP	Allows communication between the analysis computer and hardware components

Outbound connections

The following section outlines the various outbound connections needed to enable access to SecureLink and PacBio Insights to support remote troubleshooting and instrument health monitoring.

SecureLink domains

The following table outlines the ports that must be opened outbound to the various SecureLink servers to enable To enable remote troubleshooting access to PacBio support personnel.

Instance	Servers	Ports Required
US	securelink-us.pacificbiosciences.com securelink-us-001.pacificbiosciences.com 34.228.163.151 securelink-us-002.pacificbiosciences.com 18.207.27.182	22,80,443/TCP
EMEA	securelink-emea.pacificbiosciences.com securelink-emea-001.pacificbiosciences.com 3.122.45.57 securelink-emea-002.pacificbiosciences.com 3.121.132.217	22,80,443/TCP
APAC	securelink-apac.pacificbiosciences.com securelink-apac-001.pacificbiosciences.com 3.0.254.58 securelink-apac-002.pacificbiosciences.com 13.251.34.130	22,80,443/TCP

PacBio Insights

To enable PacBio Insights instrument health data, the IT administrator must open up the following outbound connections:

Use	Servers	Ports

AWS MQTT Messaging	insights-iot.pacificbiosciences.com	443/TCP
AWS S3 File Transfer	prod-pacbio-insights-landing-zone.s3.amazonaws.com	443/TCP

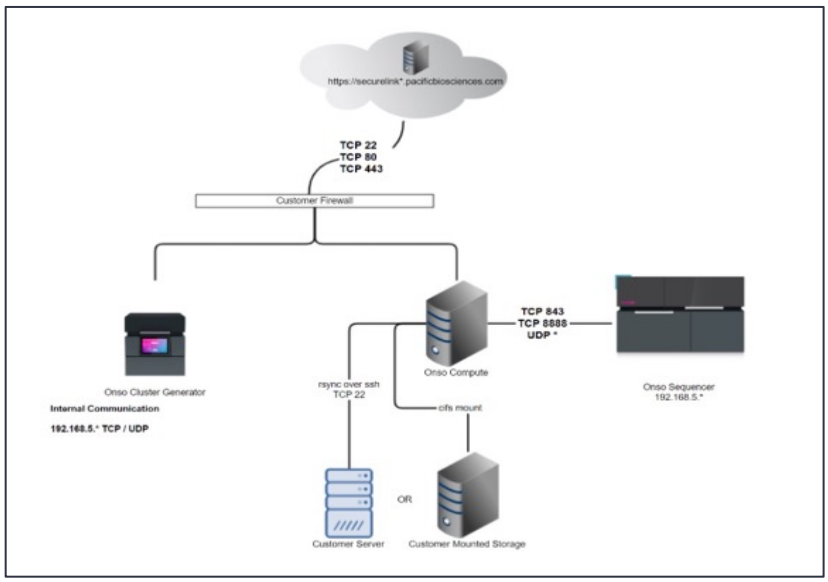


Figure 5. Onso networking architecture

Data output and storage

When considering the data storage location for sequencing data, ensure the path for data storage is decided before the date of installation so that the PacBio representative can test the data transfer process during installation.

Please choose a location with minimum of 1.2 TB of storage space to accommodate sequencing runs. The system will verify that there is enough local storage space during the sequencing pre-run checks prior to the start of a sequencing run. For a 2x150 sequencing run the expected output folder size is upwards of 250 GB.

User supplied equipment and consumables

The following equipment and consumables are required from the user to enable instrument operation and maintenance. For more information refer to the *Guide – Preparing SBB libraries for cluster generation and short-read sequencing.*

Equipment

Equipment	Source
Pipette Single Channel 10 µL	Major Laboratory Supplier (MLS)
Pipette Single Channel 20 µL	MLS
Pipette Single Channel 200 µL	MLS

Pipette Single Channel 1000 µL	MLS
Serological Pipettor	MLS
Vortexer	MLS
15 mL Tube Rack	MLS
50 mL Tube Rack	MLS
1.5 mL Tube Rack	MLS
Microcentrifuge	MLS
Freezer, -25°C to -15°C	MLS
Refrigerator, 2°C to 8°C	MLS

Consumables

Consumable	Source
DNA LoBind Tubes	MLS
Satellite Waste Container	MLS
Filter Pipette Tips	MLS
Bleach (NaClO), ≥5%	MLS
70% Isopropyl Alcohol	MLS
Sodium Hydroxide (NaOH), ≥ .1N	MLS
Nuclease free water, molecular biology grade	MLS
Low TE Buffer (10mM Tris, 0.1 mM EDTA, pH 8.0)	MLS
100X TE Buffer, molecular biology grade	MLS
Tween 20 molecular biology grade	MLS

Checklists

Use the checklists to ensure that you have made all the preparations necessary for PacBio personnel to install the Onso system and Cluster Generator.

Verified	
	Site preparation visit with PacBio field personnel scheduled.
	Laboratory personnel is available to: • To ensure that consumable items are promptly inspected and stored in the appropriate locations. • Proper equipment to perform the workflow is available in the lab space.

	Facilities personnel is available to: • To review environmental and electrical site-preparation requirements. • To supervise and guide PacBio installation and service personnel as they move and position the instrument (if applicable). • Provide a IT/ Networking contact to ensure connectivity to server for data storage.
	Location and designated lab benches can accommodate the dimensions and weights for the Onso system, Cluster Generator and analysis computer.
	Location of the instrument considerations: • Away from heating and cooling ducts. • Away from direct sunlight. • Away from any sources of vibration.

Limited product warranty

PacBio and/or its affiliate(s) warrant their products as set forth in the PacBio General Terms and Conditions of Sale. If you have any questions, please contact PacBio at support@pacb.com.

Technical assistance

For technical assistance, contact Technical Support.

Email: support@pacb.com

Telephone: 1-877-920-7222, option 1