

Part 1 of 4	Illumina info@illumina.com San Diego, CA 858-202-4500 www.illumina.com	Illumina info@illumina.com San Diego, CA 858-202-4500 www.illumina.com	Illumina info@illumina.com San Diego, CA 858-202-4500 www.illumina.com
Name of system	iSeq 100	MiniSeq System	MiSeq System
System application/FDA cleared or approved	research use/not required	research use/not required	research use/not required
Country where designed/Manufactured	U.S./Singapore	U.S./Singapore	U.S./Singapore
First year sold in U.S./First year installed in U.S.	2018/2018	2016/2016	2011/2011
System sold internationally	yes	yes	yes
Dimensions of sequencer (H x W x D)/Footprint of sequencer	16.8 x 12 x 13 in./1.1 sq. ft.	20.4 x 18 x 18.9 in./2.4 sq. ft.	20.6 x 27 x 22.2 in./4.2 sq. ft.
Accessory equipment supplied with sequencer at no cost/Total footprint with accessory equipment	system test cartridge/—	system test cartridge/—	system test cartridge/—
Type of computer supplied with sequencer	computer for analysis and operations combined	computer for analysis and operations combined	computer for analysis and operations combined
Analysis options provided with sequencer	onboard, cloud based	onboard, cloud based	onboard, cloud based
Where library preparation is performed	wet bench	wet bench	wet bench
Bioinformatics tools provided with sequencer	Local Run Manager, BaseSpace	Local Run Manager, BaseSpace	Local Run Manager, MiSeq Reporter, BaseSpace
Sequencer supplied with UPS (uninterruptible power supply)	no	no	no
Electrical connection required for sequencer	90–264 VAC at 47–63 Hz	100–240 VAC at 50–60 Hz	100–240 VAC at 50–60 Hz
List price of entire sequencer and necessary components	\$19,900	\$49,500	\$99,000
Purchase options	purchase	purchase, lease, reagent rental	purchase, lease, reagent rental
Warranties offered	first year included with purchase; extended warranty available	first year included with purchase; extended warranty available	first year included with purchase; extended warranty available
Training included/Total time for basic training per operator	no (customer installable)/<1 day	yes/<1 day	yes/<1 day
Training location/Follow-up training available	at customer site/yes (extra charge)	at customer site/yes (extra charge)	at customer site/yes (extra charge)
Maximum No. of samples amplified in a single amplification event	384 samples (>384 samples with custom barcodes)	384 samples (>384 samples with custom barcodes)	384 samples (>384 samples with custom barcodes)
Read length/Percent bases >Q30	2 x 150 bp/80%	2 x 150 bp/80%	2 x 300 bp/70%
Paired-end capability/Tag lengths/Spans	yes/2 x 150 bp/—	yes/2 x 150 bp/—	yes/2 x 300 bp/—
Fragment/Tag lengths/Spans	yes/2 x 150 bp/—	yes/2 x 150 bp/—	yes/2 x 300 bp/—
Mate pair/Tag lengths/Spans	yes/2 x 150 bp/—	yes/2 x 150 bp/—	yes/2 x 150 bp/—
Single end/Tag lengths/Spans	yes/1 x 300 bp/—	yes/1 x 300 bp/—	yes/1 x 300 bp/—
RNA sequencing/Tag lengths/Spans	yes/2 x 150 bp/—	yes/2 x 150 bp/—	yes/2 x 300 bp/—
ChIP sequencing/Tag lengths/Spans	yes/2 x 150 bp/—	yes/2 x 150 bp/—	yes/2 x 300 bp/—
Bisulfite sequencing/Tag lengths/Spans	yes/2 x 150 bp/—	yes/2 x 150 bp/—	yes/2 x 300 bp/—
Maximum No. of reads or fragments sequenced per single-end run	>4 million	up to 25 million	up to 25 million
Maximum No. of reads or fragments sequenced per paired-end run	>8 million	up to 50 million	up to 50 million
Total No. of nucleotides (bases) sequenced per run	up to 1.2 Gb	up to 7.5 Gb	up to 15 Gb
Wet lab bench time for sequencing preparation	10 minutes	10 minutes	10 minutes
Sequencing run time	<19 hours	~5–24 hours	~5–56 hours
Total time for generating standard gDNA library	<3.5 hours (with Illumina DNA Prep)	<3.5 hours (with Illumina DNA Prep)	<3.5 hours (with Illumina DNA Prep)
• Paired end	<3.5 hours (with Illumina DNA Prep)	<3.5 hours (with Illumina DNA Prep)	<3.5 hours (with Illumina DNA Prep)
• Fragment	<7 hours (with AmpliSeq for Illumina); <6.5 hours (with Illumina DNA Prep with Enrichment)	<7 hours (with AmpliSeq for Illumina); <6.5 hours (with Illumina DNA Prep with Enrichment)	<7 hours (with AmpliSeq for Illumina); <6.5 hours (with Illumina DNA Prep with Enrichment)
• Mate pair	—	—	—
• Single end	<1 day (with TruSeq Small RNA)	<1 day (with TruSeq Small RNA)	<1 day (with TruSeq Small RNA)
• RNA sequencing	<9 hours	<9 hours	<9 hours
• ChIP sequencing	<1.5 days (with TruSeq ChIP)	<1.5 days (with TruSeq ChIP)	<1.5 days (with TruSeq ChIP)
• Bisulfite sequencing	—	—	—
Hands-on time for the following:			
• Paired end	<1.5 hours	<1.5 hours	<1.5 hours
• Fragment	<1.5 hours (with AmpliSeq for Illumina); <2 hours (with Illumina DNA Prep with Enrichment)	<1.5 hours (with AmpliSeq for Illumina); <2 hours (with Illumina DNA Prep with Enrichment)	<1.5 hours (with AmpliSeq for Illumina); <2 hours (with Illumina DNA Prep with Enrichment)
• Mate pair	—	—	—
• Single end	<4 hours	<4 hours	<4 hours
• RNA sequencing	<3 hours	<3 hours	<3 hours
• ChIP sequencing	—	—	—
• Bisulfite sequencing	—	—	—
Cost of sequencing reagents per run	\$569 (pricing based on iSeq 8-pack reagent kit)	\$717–\$2,012	\$378–\$1,989
Reagent tracking method	RFID	RFID	RFID
• Type of reagent information tracked	serial number, expiration date, lot and part numbers, number of cycles	serial number, expiration date, lot and part numbers, number of cycles	serial number, expiration date, lot and part numbers, number of cycles
Shipping conditions for amplification/sequencing reagents	—/dry ice	—/dry ice	—/dry ice
Storage conditions for amplification/sequencing reagents	—/cartridge: -15°– -25°C; flow cell: 2°–8°C	—/cartridge: -15°– -25°C; flow cell: 2°–8°C	—/cartridge: -15°– -25°C; flow cell: 2°–8°C
Shelf life of amplification/sequencing reagents	—/guaranteed 3 months	—/guaranteed 3 months	—/guaranteed 3 months
System requires a control sample on sequencing run	optional	optional	optional
• Company offers a sequencing control	yes (additional charge)	yes (additional charge)	yes (additional charge)
Sequencing system control software and devices to start run/for data analysis	iSeq Control Software/Local Run Manager, BaseSpace	MiniSeq Control Software/Local Run Manager, BaseSpace	MiSeq Control Software/Local Run Manager, MiSeq Reporter, BaseSpace
Complete walkaway automation for amplification, sequencing, and variant calling	yes	yes	yes
Remote system monitoring	yes	yes	yes
Total time required for setup of amplification, sequencing, and variant calling steps	5 minutes	10 minutes	10 minutes
Maximum No. of libraries sequenced in a single run	384 samples (>384 samples with custom barcodes)	384 samples (>384 samples with custom barcodes)	384 samples (>384 samples with custom barcodes)
System includes secondary data-analysis software developed by company	yes (Local Run Manager, BaseSpace)	yes (Local Run Manager, BaseSpace)	yes (Local Run Manager, BaseSpace)
System includes post-sequencing data-analysis software	yes (included with purchase: Local Run Manager)	yes (included with purchase: BaseSpace)	yes (included with purchase: BaseSpace)
Mutations detectable via data-analysis software	substitutions, indels, copy number changes	substitutions, indels, copy number changes	substitutions, indels, copy number changes
System can generate a variant report	no	no	no
Types of maintenance plans available/mean time between failures	Advanced Exchange Service Plan/—	parts only, bronze, silver, gold, dedicated on site/—	parts only, bronze, silver, gold, dedicated on site/—
No. of field application scientists and engineers based in U.S.	>500	>500	>500
Maintenance required:			
• Weekly	—	—	—
• Monthly	system check with provided cartridge	system check with provided cartridge	system check with provided cartridge
• Pre-run	—	—	—
Distinguishing features of NGS system (supplied by company)	<ul style="list-style-type: none"> low capital cost to obtain highly accurate results with sequencing-by-synthesis technology small instrument footprint, clustering and sequencing all in one, analysis onboard or in the cloud; 19-hour run time for overnight results dry box—optics on the flow cell and fluidics in the cartridge 	<ul style="list-style-type: none"> affordable to acquire, cost-efficient to run, even with low numbers of samples push-button operation and simple data analysis 	<ul style="list-style-type: none"> quality scores with >70% of bases higher than Q30 at 2 x 300 bp and >85% bases higher than Q30 at 2 x 75 bp simple, streamlined workflow with as little as 30 minutes hands-on time from sample to answer

Note: a dash in lieu of an answer means company did not answer question or question is not applicable

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Name of system	MiSeqDx System	NextSeq 550Dx System	NextSeq 1000 System
System application/FDA cleared or approved	in vitro diagnostic and research use/yes	in vitro diagnostic and research use/yes	research use/not required
Country where designed/Manufactured	U.S./U.S.	U.S./Singapore	U.S./Singapore
First year sold in U.S./First year installed in U.S.	2013/2013	2017/2017	2020/2020
System sold internationally	yes	yes	yes
Dimensions of sequencer (H x W x D)/Footprint of sequencer	20.6 x 27 x 22.2 in./4.2 sq. ft.	23 x 21 x 25 in./3.6 sq. ft.	23.6 x 23.6 x 25.6 in./3.9 sq. ft.
Accessory equipment supplied with sequencer at no cost/Total footprint with accessory equipment	—	—	keyboard/—
Type of computer supplied with sequencer	computer for analysis and operations combined	computer for analysis and operations combined	computer for analysis and operations combined
Analysis options provided with sequencer	onboard, cloud based	onboard, cloud based	onboard, cloud based, on-premise server
Where library preparation is performed	wet bench	wet bench	wet bench
Bioinformatics tools provided with sequencer	Local Run Manager, MiSeq Reporter, BaseSpace	Local Run Manager, BaseSpace	DRAGEN BIO-IT platform, BaseSpace
Sequencer supplied with UPS (uninterruptible power supply)	yes (extra charge)	no	yes (extra charge)
Electrical connection required for sequencer	100–240 VAC at 50–60 Hz, 10 A, 400 W	100–120 VAC at 50–60 Hz	100–240 VAC at 50–60 Hz
List price of entire sequencer and necessary components	\$125,000	\$347,000	\$210,000
Purchase options	purchase, lease, reagent rental	purchase, lease, reagent rental	purchase, lease, reagent rental
Warranties offered	first year included with purchase; extended warranty available	first year included with purchase; extended warranty available	first year included with purchase; extended warranty available
Training included/Total time for basic training per operator	yes/<1 day	yes/2 days	yes/1–2 days
Training location/Follow-up training available	at customer site/yes (extra charge)	at customer site/yes (extra charge)	at customer site/yes (extra charge)
Maximum No. of samples amplified in a single amplification event	384 samples (>384 samples with custom barcodes)	384 samples (>384 samples with custom barcodes)	384 samples (>384 samples with custom barcodes)
Read length/Percent bases >Q30	up to 2 x 300 bp/80% (for 2 x 150 bp)	up to 2 x 150 bp/75%	up to 2 x 300 bp/85–90%
Paired-end capability/Tag lengths/Spans	yes/up to 2 x 300 bp/up to 550 bp	yes/up to 2 x 150 bp/up to 350 bp	yes/2 x 300 bp/—
Fragment/Tag lengths/Spans	yes/up to 2 x 300 bp/up to 550 bp	yes/up to 2 x 150 bp/up to 350 bp	yes/2 x 300 bp/—
Mate pair/Tag lengths/Spans	yes/up to 2 x 150 bp/2–12 kb	yes/up to 2 x 150 bp/2–12 kb	yes/2 x 300 bp/—
Single end/Tag lengths/Spans	yes/up to 1 x 300 bp/up to 300 bp	yes/up to 1 x 300 bp/up to 300 bp	yes/2 x 300 bp/—
RNA sequencing/Tag lengths/Spans	yes/up to 2 x 300 bp/up to 550 bp	yes/up to 2 x 150 bp/up to 350 bp	yes/2 x 300 bp/—
ChIP sequencing/Tag lengths/Spans	yes/up to 2 x 300 bp/up to 550 bp	yes/up to 2 x 150 bp/up to 350 bp	yes/2 x 300 bp/—
Bisulfite sequencing/Tag lengths/Spans	yes/up to 2 x 300 bp/up to 550 bp	yes/up to 2 x 150 bp/up to 350 bp	yes/2 x 300 bp/—
Maximum No. of reads or fragments sequenced per single-end run	>15 million	>300 million	up to 400 million
Maximum No. of reads or fragments sequenced per paired-end run	>30 million	>600 million	up to 800 million
Total No. of nucleotides (bases) sequenced per run	up to 7.5 Gb	up to 120 Gb	up to 240 Gb
Wet lab bench time for sequencing preparation	10 minutes	10 minutes	10 minutes
Sequencing run time	<28 hours	<36 hours	~8–42 hours
Total time for generating standard gDNA library	<3.5 hours (with Illumina DNA Prep)	<3.5 hours (with Illumina DNA Prep)	<3.5 hours (with Illumina DNA Prep)
• Paired end	<3.5 hours (with Illumina DNA Prep)	<3.5 hours (with Illumina DNA Prep)	<3.5 hours (with Illumina DNA Prep)
• Fragment	<7 hours (with AmpliSeq for Illumina); <6.5 hours (with Illumina DNA Prep with Enrichment)	<7 hours (with AmpliSeq for Illumina); <6.5 hours (with Illumina DNA Prep with Enrichment)	<7 hours (with AmpliSeq for Illumina); <6.5 hours (with Illumina DNA Prep with Enrichment)
• Mate pair	—	—	—
• Single end	<1 day (with TruSeq Small RNA)	<1 day (with TruSeq Small RNA)	<1 day (with TruSeq Small RNA)
• RNA sequencing	<9 hours	<9 hours	<9 hours
• ChIP sequencing	<1.5 days (with TruSeq ChIP)	<1.5 days (with TruSeq ChIP)	<1.5 days (with TruSeq ChIP)
• Bisulfite sequencing	—	—	—
Hands-on time for the following:			
• Paired end	<1.5 hours (with Illumina DNA Prep)	<1.5 hours (with Illumina DNA Prep)	<1.5 hours (with Illumina DNA Prep)
• Fragment	<1.5 hours (with AmpliSeq for Illumina); <2 hours (with Illumina DNA Prep with Enrichment)	<1.5 hours (with AmpliSeq for Illumina); <2 hours (with Illumina DNA Prep with Enrichment)	<1.5 hours (with AmpliSeq for Illumina); <2 hours (with Illumina DNA Prep with Enrichment)
• Mate pair	—	—	—
• Single end	<4 hours (with TruSeq Small RNA)	<4 hours (with TruSeq Small RNA)	<4 hours (with TruSeq Small RNA)
• RNA sequencing	<3 hours	<3 hours	<3 hours
• ChIP sequencing	—	—	—
• Bisulfite sequencing	—	—	—
Cost of sequencing reagents per run	\$2,440	\$2,370–\$6,841	\$720–\$2,963
Reagent tracking method	RFID	RFID	RFID
• Type of reagent information tracked	serial number, expiration date, lot and part numbers, number of cycles	serial number, expiration date, lot and part numbers, number of cycles	serial number, expiration date, lot and part numbers, number of cycles
Shipping conditions for amplification/sequencing reagents	—/box 1: dry ice; box 2: gel pack	—/dry ice, gel pack, ambient (variable based on product)	—/dry ice, gel pack, ambient (variable based on product)
Storage conditions for amplification/sequencing reagents	—/box 1: -15°–-25°C; box 2: 2°–8°C	—/reagent cartridge, HT1 buffer: -15°– -25°C; flow cell: 2°–8°C; buffer cartridge: 15°–30°C	—/reagent cartridge: -15°– -25°C; flow cell and resuspension buffer tube: 2°–8°C
Shelf life of amplification/sequencing reagents	—/guaranteed 6 months	—/guaranteed 6 months	—/guaranteed 6 months
System requires a control sample on sequencing run	optional	yes	no
• Company offers a sequencing control	yes (additional charge)	yes (additional charge)	yes (additional charge)
Sequencing system control software and devices to start run/for data analysis	MiSeq Control Software/Local Run Manager, MiSeq Reporter, BaseSpace	NextSeq 550Dx Control Software and Operating Software/Local Run Manager, BaseSpace	NextSeq Control Software/BaseSpace, DRAGEN
Complete walkaway automation for amplification, sequencing, and variant calling	yes	yes	yes
Remote system monitoring	yes	yes	yes
Total time required for setup of amplification, sequencing, and variant calling steps	10 minutes	10 minutes	~15 hours
Maximum No. of libraries sequenced in a single run	384 samples (>384 samples with custom barcodes)	384 samples (>384 samples with custom barcodes)	384 samples (>384 samples with custom barcodes)
System includes secondary data-analysis software developed by company	yes (MiSeq Reporter, Local Run Manager, BaseSpace)	yes (BaseSpace)	yes (DRAGEN, BaseSpace Sequence Hub)
System includes post-sequencing data-analysis software	—	yes (included with purchase)	yes (included with purchase: DRAGEN, BaseSpace Sequence Hub)
Mutations detectable via data-analysis software	substitutions, indels, copy number changes	substitutions, indels, copy number changes	substitutions, indels, copy number changes
System can generate a variant report	yes	yes	yes
Types of maintenance plans available/mean time between failures	parts only, bronze, silver, gold, Dx, dedicated on site/—	parts only, bronze, silver, gold, Dx, dedicated on site/—	parts only, bronze, silver, gold, Dx, dedicated on site/—
No. of field application scientists and engineers based in U.S.	>500	>500	>500
Maintenance required:			
• Weekly	none (manual wash if instrument idle for 7 days)	none (manual wash if instrument idle for 2 weeks)	none
• Monthly	maintenance wash	none	none
• Pre-run	none (post-run wash required after every run)	none (automatic wash completed after every run)	none
Distinguishing features of NGS system (supplied by company)	<ul style="list-style-type: none"> FDA-regulated NGS platform allows clinical diagnostics in Dx mode and clinical research applications in research mode FDA-regulated content includes MiSeqDx cystic fibrosis 139-variant assay, MiSeqDx cystic fibrosis clinical sequencing assay leverages proven MiSeq technology 	<ul style="list-style-type: none"> FDA-regulated NGS platform allows clinical diagnostics in Dx mode and clinical research applications in research mode FDA-regulated content includes NextSeq 550Dx high-output reagent kit v2.5, Illumina DNA Prep with Enrichment Dx kit flexible output for sample multiplexing and different research applications, from targeted panels to whole genome 	<ul style="list-style-type: none"> offers the flexibility of seven flow-cell configurations across multiple outputs and read lengths up to 2 x 300 for choice of cost-efficient configurations integrated reagent cartridge design eliminates need for maintenance wash between runs DRAGEN onboard allows the user to seamlessly integrate sequencing and analysis in run setup
<p><i>Note: a dash in lieu of an answer means company did not answer question or question is not applicable</i></p>			

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Name of system	NextSeq 2000 System	NovaSeq 6000	NovaSeq 6000Dx
System application/FDA cleared or approved	research use/not required	research use/not required	in vitro diagnostic and research use/yes
Country where designed/Manufactured	U.S./Singapore	U.S./U.S.	U.S./U.S.
First year sold in U.S./First year installed in U.S.	2020/2020	2017/2017	2022/2022
System sold internationally	yes	yes	yes (in EU)
Dimensions of sequencer (H x W x D)/Footprint of sequencer	23.6 x 23.6 x 25.6 in./3.9 sq. ft.	65.2 x 31.5 x 37.2 in./8.2 sq. ft.	31.5 x 37.2 x 65.2 in. (includes monitor)/8.2 sq. ft.
Accessory equipment supplied with sequencer at no cost/Total footprint with accessory equipment	keyboard/—	—	Illumina DRAGEN server for NovaSeq 6000Dx/11.8 sq. ft.
Type of computer supplied with sequencer	computer for analysis and operations combined	computer for analysis and operations combined	computer for analysis and operations combined
Analysis options provided with sequencer	onboard, cloud based, on-premise server	onboard, cloud based	onboard, cluster based, cloud based
Where library preparation is performed	wet bench	—	accessory equipment, wet bench
Bioinformatics tools provided with sequencer	DRAGEN BIO-IT platform, BaseSpace	BaseSpace	DRAGEN BIO-IT platform, Illumina Run Manager, BaseSpace Sequence Hub
Sequencer supplied with UPS (uninterruptible power supply)	yes (no extra charge)	yes (no extra charge)	yes (no extra charge)
Electrical connection required for sequencer	100–240 VAC at 50–60 Hz	200–240 VAC at 50–60 Hz	200–240 VAC at 50–60 Hz, 16A, single phase, 2500 W
List price of entire sequencer and necessary components	\$335,000	\$985,000	\$850,000
Purchase options	purchase, lease, reagent rental	purchase, lease, reagent rental	purchase, lease, reagent rental
Warranties offered	first year included with purchase; extended warranty available	first year included with purchase; extended warranty available	first year included with purchase; extended warranty available
Training included/Total time for basic training per operator	yes/1–2 days	yes/2 days	yes/2 hours
Training location/Follow-up training available	at customer site/yes (extra charge)	at customer site/yes (extra charge)	at customer site/yes (extra charge)
Maximum No. of samples amplified in a single amplification event	384 samples (>384 samples with custom barcodes)	384 samples (>384 samples with custom barcodes)	384 samples (>384 samples with custom barcodes)
Read length/Percent bases >Q30	up to 2 x 300 bp/85–90%	up to 2 x 250 bp/75%	up to 2 x 250 bp/85%
Paired-end capability/Tag lengths/Spans	yes/2 x 300 bp/—	yes/up to 2 x 250 bp/up to 550 bp	yes/up to 2 x 250 bp/up to 550 bp
Fragment/Tag lengths/Spans	yes/2 x 300 bp/—	yes/up to 2 x 250 bp/up to 550 bp	yes/up to 2 x 250 bp/up to 550 bp
Mate pair/Tag lengths/Spans	yes/2 x 300 bp/—	yes/up to 2 x 150 bp/2–12 kb	yes/up to 2 x 150 bp/2–12 kb
Single end/Tag lengths/Spans	yes/2 x 300 bp/—	yes/up to 1 x 300 bp/up to 350 bp	yes/up to 1 x 300 bp/up to 350 bp
RNA sequencing/Tag lengths/Spans	yes/2 x 300 bp/—	yes/up to 2 x 250 bp/up to 500 bp	yes/up to 2 x 250 bp/up to 500 bp
ChIP sequencing/Tag lengths/Spans	yes/2 x 300 bp/—	yes/up to 2 x 250 bp/up to 550 bp	yes/up to 2 x 250 bp/up to 550 bp
Bisulfite sequencing/Tag lengths/Spans	yes/2 x 300 bp/—	yes/up to 2 x 250 bp/up to 550 bp	yes/up to 2 x 250 bp/up to 550 bp
Maximum No. of reads or fragments sequenced per single-end run	up to 1.8 billion	up to 20 billion	up to 20 billion
Maximum No. of reads or fragments sequenced per paired-end run	up to 3.6 billion	up to 40 billion	up to 40 billion
Total No. of nucleotides (bases) sequenced per run	up to 540 Gb	up to 3,000 Gb	up to 6,000 Gb per run, 3,000 Gb per flow cell
Wet lab bench time for sequencing preparation	10 minutes	10 minutes	10 minutes
Sequencing run time	~8–44 hours	~13–44 hours	>45 hours
Total time for generating standard gDNA library	<3.5 hours (with Illumina DNA Prep)	<3.5 hours (with Illumina DNA Prep)	<3.5 hours (with Illumina DNA Prep)
• Paired end	<3.5 hours (with Illumina DNA Prep)	<3.5 hours (with Illumina DNA Prep)	<3.5 hours (with Illumina DNA Prep)
• Fragment	<7 hours (with AmpliSeq for Illumina); <6.5 hours (with Illumina DNA Prep with Enrichment)	<7 hours (with AmpliSeq for Illumina); <6.5 hours (with Illumina DNA Prep with Enrichment)	<7 hours (with AmpliSeq for Illumina); <6.5 hours (with Illumina DNA Prep with Enrichment)
• Mate pair	—	—	—
• Single end	<1 day (with TruSeq Small RNA)	<1 day (with TruSeq Small RNA)	<1 day (with TruSeq Small RNA)
• RNA sequencing	<9 hours	<9 hours	<9 hours
• ChIP sequencing	<1.5 days (with TruSeq ChIP)	<1.5 days (with TruSeq ChIP)	<1.5 days (with TruSeq ChIP)
• Bisulfite sequencing	—	—	—
Hands-on time for the following:			
• Paired end	<1.5 hours (with Illumina DNA Prep)	<1.5 hours (with Illumina DNA Prep)	<1.5 hours (with Illumina DNA Prep)
• Fragment	<1.5 hours (with AmpliSeq for Illumina); <2 hours (with Illumina DNA Prep with Enrichment)	<1.5 hours (with AmpliSeq for Illumina); <2 hours (with Illumina DNA Prep with Enrichment)	<1.5 hours (with AmpliSeq for Illumina); <2 hours (with Illumina DNA Prep with Enrichment)
• Mate pair	—	—	—
• Single end	<4 hours (with TruSeq Small RNA)	<4 hours (with TruSeq Small RNA)	<4 hours (with TruSeq Small RNA)
• RNA sequencing	<3 hours	<3 hours	<3 hours
• ChIP sequencing	—	—	—
• Bisulfite sequencing	—	—	—
Cost of sequencing reagents per run	\$720–\$4,860	\$2,417–\$16,578	\$8,976 –\$13,876
Reagent tracking method	RFID	RFID	RFID
• Type of reagent information tracked	serial number, expiration date, lot and part numbers, number of cycles	serial number, expiration date, lot and part numbers, number of cycles	serial number, expiration date, lot and part numbers, number of cycles
Shipping conditions for amplification/sequencing reagents	—/dry ice, gel pack, ambient (variable based on product)	—/dry ice, gel pack, ambient (variable based on product)	—/dry ice, gel pack, ambient (variable based on product)
Storage conditions for amplification/sequencing reagents	—/reagent cartridge: -15°– -25°C; flow cell and resuspension buffer tube: 2°–8°C	—/cluster, SBS cartridges: -15°– -25°C; flow cell: 2°–8°C; buffer cartridge: 15°–30°C	—/cluster, SBS cartridges: -15°– -25°C; flow cell: 2°–8°C; buffer cartridge: 15°–30°C
Shelf life of amplification/sequencing reagents	—/guaranteed 6 months	—/guaranteed 6 months	—/guaranteed 6 months
System requires a control sample on sequencing run	no	optional	no
• Company offers a sequencing control	yes (additional charge)	yes (additional charge)	no
Sequencing system control software and devices to start run/for data analysis	NextSeq Control Software/BaseSpace, DRAGEN	NovaSeq Control Software/BaseSpace	—
Complete walkaway automation for amplification, sequencing, and variant calling	yes	yes	yes
Remote system monitoring	yes	yes	yes
Total time required for setup of amplification, sequencing, and variant calling steps	~15 hours	5–30 minutes	5–30 minutes
Maximum No. of libraries sequenced in a single run	384 samples (>384 samples with custom barcodes)	384 samples (>384 samples with custom barcodes)	384 samples (>384 samples with custom barcodes)
System includes secondary data-analysis software developed by company	yes (DRAGEN, BaseSpace Sequence Hub)	yes (BaseSpace Sequence Hub)	yes (Illumina Run Manager)
System includes post-sequencing data-analysis software	yes (included with purchase)	—	yes (included with purchase: Illumina Run Manager)
Mutations detectable via data-analysis software	substitutions, indels, copy number changes	substitutions, indels, copy number changes	substitutions, indels, copy number changes
System can generate a variant report	yes	no	yes
Types of maintenance plans available/mean time between failures	parts only, bronze, silver, gold, dedicated on site/—	parts only, bronze, silver, gold, dedicated on site/—	bronze, silver, gold/—
No. of field application scientists and engineers based in U.S.	>500	>500	>500
Maintenance required:			
• Weekly	none	none (manual wash if instrument idle for 2 weeks)	none (maintenance wash required every 2 weeks)
• Monthly	none	none	—
• Pre-run	none	none (automatic wash completed after every run)	—
Distinguishing features of NGS system (supplied by company)	<ul style="list-style-type: none"> offers the flexibility of 14 flow-cell configurations across multiple outputs and read lengths up to 2x300 for choice of cost-efficient configurations integrated reagent cartridge design eliminates need for maintenance wash between runs cost-efficient from instrument selection to tunable outputs 	<ul style="list-style-type: none"> match data output, time to results, and price per sample to study needs configure sequencing method, flow cell type, and read length to support a broad range of applications increase lab efficiency with a simplified workflow and reduced hands-on time 	<ul style="list-style-type: none"> more samples and deeper sequencing from diagnostic testing to clinical research; flexible RUO and IVD modes with scalable sequencing power accurate, efficient data analysis; high-quality data with a paired, dedicated DRAGEN server reduce time to answer; re-imagined user interface with a simple workflow

Note: a dash in lieu of an answer means company did not answer question or question is not applicable

Part 4 of 4	Illumina info@illumina.com San Diego, CA 858-202-4500 www.illumina.com	Thermo Fisher Scientific customercare@thermofisher.com Carlsbad, CA 800-955-6288 www.thermofisher.com/genestudio	Thermo Fisher Scientific customercare@thermofisher.com Carlsbad, CA 800-955-6288 www.thermofisher.com/genexus
Name of system	NovaSeq X Plus	Ion GeneStudio S5 System	Ion Torrent Genexus Integrated Sequencer;
System application/FDA cleared or approved	research use/not required	research use/not required	Genexus Dx Integrated Sequencer Genexus: research use/not required; Dx: in vitro diagnostic and research use/underway
Country where designed/Manufactured	U.S./U.S.	U.S./Singapore	U.S./Singapore
First year sold in U.S./First year installed in U.S.	2022/2023	2018/2018	Genexus: 2019/2019; Dx: —
System sold internationally	yes (worldwide)	yes (worldwide)	Genexus: yes (worldwide); Dx: yes (in multiple countries)
Dimensions of sequencer (H x W x D)/Footprint of sequencer	62.5 x 34.0 x 36.7 in./8.7 sq. ft.	21.3 x 31.7 x 20 in./—	open: 81.1 x 58.5 x 43.5 in.; closed: 66.1 x 41.9 x 32.1 in./ open: 17.67 sq. ft.; closed: 9.36 sq. ft.
Accessory equipment supplied with sequencer at no cost/Total footprint with accessory equipment	—	—	—
Type of computer supplied with sequencer	computer for analysis and operations combined	computer for analysis and operations combined	computer for analysis and operations combined
Analysis options provided with sequencer	onboard, cluster based, cloud based	onboard, cloud based, local server	onboard, cloud based, local server
Where library preparation is performed	wet bench	accessory equipment	sequencer
Bioinformatics tools provided with sequencer	Illumina Run Manager, DRAGEN BIO-IT platform, BaseSpace Sequence Hub	Torrent Suite (optional: Ion Reporter, OncoPrint Reporter)	Ion Torrent Genexus Software (optional: Ion Reporter, OncoPrint Reporter)
Sequencer supplied with UPS (uninterruptible power supply)	yes (no extra charge)	no	no
Electrical connection required for sequencer	200–240 VAC at 50–60 Hz	100–240 VAC at 50–60 Hz, 6.5–14.5 A	100–240 VAC
List price of entire sequencer and necessary components	\$1,250,000	—	—
Purchase options	purchase, lease, reagent rental	purchase, trade-in, lease, finance	purchase, trade-in, lease, finance
Warranties offered	first year included with purchase; extended warranty available	first year included with purchase; extended warranty available	first year included with purchase; extended warranty available
Training included/Total time for basic training per operator	yes/2 days	yes/1 day	yes/2 days
Training location/Follow-up training available	at customer site/yes (extra charge)	at vendor office or customer site/yes (extra charge)	at vendor office or customer site/yes (extra charge)
Maximum No. of samples amplified in a single amplification event	384 samples (>384 samples with custom barcodes)	384 samples (with custom barcodes)	48 samples on system, 96 samples off instr. (for library prep)
Read length/Percent bases >Q30	up to 2 x 150 bp/85–90%	up to 600 bp/—	up to 400 bp/—
Paired-end capability/Tag lengths/Spans	yes/2 x 150 bp/—	—	—
Fragment/Tag lengths/Spans	yes/2 x 150 bp/—	yes/—/up to 600 bp	yes/—/—
Mate pair/Tag lengths/Spans	yes/2 x 150 bp/—	—	—
Single end/Tag lengths/Spans	yes/2 x 150 bp/—	yes/—/up to 400 bp	—
RNA sequencing/Tag lengths/Spans	yes/2 x 150 bp/—	yes/—/up to 400 bp	—
ChIP sequencing/Tag lengths/Spans	yes/2 x 150 bp/—	—	—
Bisulfite sequencing/Tag lengths/Spans	yes/2 x 150 bp/—	yes/—/up to 400 bp	—
Maximum No. of reads or fragments sequenced per single-end run	up to 52 billion	2–130 million	48–60 million at 200–400 bp
Maximum No. of reads or fragments sequenced per paired-end run	up to 104 billion	—	—
Total No. of nucleotides (bases) sequenced per run	up to 16,000 Gb	20–25 Gb (Ion 550); 10–15 Gb (Ion 540); 3–4 Gb (Ion 530); 0.6–1 Gb (Ion 520); 0.3–0.5 Gb (Ion 510 chip)	9.6–12 Gb at 200 bp
Wet lab bench time for sequencing preparation	10 minutes	<45 minutes	10 minutes
Sequencing run time	~13–48 hours	2.5–4 hours	19–24 hours (includes automated library prep)
Total time for generating standard gDNA library	<3.5 hours (with Illumina DNA Prep)	—	—
• Paired end	<3.5 hours (with Illumina DNA Prep)	—	—
• Fragment	<7 hours (with AmpliSeq for Illumina); <6.5 hours (with Illumina DNA Prep with Enrichment)	4–6 hours	—
• Mate pair	—	—	—
• Single end	<1 day (with TruSeq Small RNA)	5–7 hours	—
• RNA sequencing	<9 hours	<6 hours	—
• ChIP sequencing	<1.5 days (with TruSeq ChIP)	—	—
• Bisulfite sequencing	—	—	—
Hands-on time for the following:			
• Paired end	<1.5 hours (with Illumina DNA Prep)	—	—
• Fragment	<1.5 hours (with AmpliSeq for Illumina); <2 hours (with Illumina DNA Prep with Enrichment)	1 hour	—
• Mate pair	—	<1 hour	—
• Single end	<4 hours (with TruSeq Small RNA)	15 minutes	—
• RNA sequencing	<3 hours	1 hour (with Ion AmpliSeq Transcriptome)	—
• ChIP sequencing	—	—	—
• Bisulfite sequencing	—	15 minutes	—
Cost of sequencing reagents per run	\$1,900–\$16,000	—	—
Reagent tracking method	RFID	RFID	RFID, barcode reader
• Type of reagent information tracked	serial no., expiration date, lot and part nos., no. of cycles	expiration date, lot and part numbers	expiration date, lot and part numbers, placement
Shipping conditions for amplification/sequencing reagents	—/ambient	-20°C, 4°C, ambient (both variable based on product)	-20°C, 4°C, ambient (both variable based on product)
Storage conditions for amplification/sequencing reagents	—/reagent cartridge, pre-load buffer, lyo insert: -15°– -25°C; flow cell: 2°– 8°C; library tube strip, buffer cartridge: 15°– 30°C	-20°C, 4°C, ambient (both variable based on product)	-20°C, 4°C, ambient (both variable based on product)
Shelf life of amplification/sequencing reagents	—/guaranteed 3 months	12–36 months from manufacture date (both variable based on product)	12–36 months from manufacture date (both variable based on product)
System requires a control sample on sequencing run	optional	yes	yes
• Company offers a sequencing control	yes (additional charge)	yes (included at no charge)	yes (included at no charge)
Sequencing system control software and devices to start run/for data analysis	NovaSeq X Plus Control Software/BaseSpace Sequence Hub, DRAGEN	Torrent Suite/Ion Reporter, OncoPrint Reporter	Ion Torrent Genexus Software/Ion Reporter, OncoPrint Reporter
Complete walkaway automation for amplification, sequencing, and variant calling	yes	—	yes
Remote system monitoring	yes	—	yes
Total time required for setup of amplification, sequencing, and variant calling steps	5–30 minutes	<30 minutes	10 minutes
Maximum No. of libraries sequenced in a single run	384 samples (>384 samples with custom barcodes)	384 samples	48 samples or 96 libraries
System includes secondary data-analysis software developed by company	yes (DRAGEN, BaseSpace Sequence Hub)	yes (Ion Reporter, OncoPrint Reporter)	yes (Ion Reporter, OncoPrint Reporter)
System includes post-sequencing data-analysis software	yes (included with purchase: DRAGEN)	yes	yes
Mutations detectable via data-analysis software	substitutions, indels, copy number changes	substitutions, indels, copy number changes	substitutions, indels, copy number changes, fusions
System can generate a variant report	yes	yes	yes
Types of maintenance plans available/mean time between failures	parts only, bronze, silver, gold, dedicated on site/—	AB Assurance/—	AB Assurance, AB Platinum NGS/—
No. of field application scientists and engineers based in U.S.	>500	450	450
Maintenance required:			
• Weekly	none (manual wash required every 2 weeks)	—	—
• Monthly	none	—	—
• Pre-run	none	—	—
Distinguishing features of NGS system (supplied by company)	<ul style="list-style-type: none"> automated onboard cluster generation and secondary analysis ambient shipping of sequencing consumables configure sequencing method, flow cell type, and read length to support a broad range of applications 	<ul style="list-style-type: none"> end-to-end NGS solution from library to report with fast turnaround time (<24 hours) and minimal hands-on time (<45 minutes) start with as little as 1 ng of input DNA flexible sequencing depth and sample number throughput 	<ul style="list-style-type: none"> Dx sequencer is CE-IVD marked; walkaway automation of NGS workflow, incl. library prep, sequencing, analysis, reporting start with as little as 1 ng of input DNA scalable plug-and-play reagent architecture allows for cost-efficient sequencing of small and large batches
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