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	MiSeq Dx	MiSeq i100	MiSeq i100 Plus
System application/FDA cleared or approved	in vitro diagnostic and research use/yes	research use/not required	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	2025/2025	2024/2024
System sold internationally	yes (worldwide)	yes (worldwide)	yes (worldwide)
Dimensions of sequencer (H × W × D)/Footprint of sequencer	20.6 × 27 × 22.2 in./4.2 sq. ft.	25.6 × 15.8 × 17.6 in./1.9 sq. ft.	25.6 × 15.8 × 17.6 in./1.9 sq. ft.
Accessory equipment supplied with sequencer at no cost	—	—	—
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, MiSeq Reporter, BaseSpace Sequence Hub	DRAGEN Bio-IT, BaseSpace Sequence Hub, Illumina Connected Analytics	DRAGEN Bio-IT, BaseSpace Sequence Hub, Illumina Connected Analytics
Sequencer supplied with UPS (uninterruptible power supply)	yes (extra charge)	no	no
Electrical connection required for sequencer	100–240 VAC at 50/60 Hz, 10 A, 400 W	100–240 at VAC 50/60 Hz, 300 W, single phase	100–240 at VAC 50/60 Hz, 300 W, single phase
List price of entire sequencer and necessary components	$125,000	$49,900	$109,900
Purchase options	purchase, lease, reagent rental	purchase, lease, reagent rental	purchase
Warranties offered	first year included with purchase; extended warranty available	—	—
Training included/Total time for basic training per operator	yes/<1 day	no/2 days	no/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	384 samples
Read length/Percent bases >Q30	up to 2 × 300 bp/80% (for 2 × 150 bp)	up to 2 × 300 bp/85% (for 2 × 300 bp)	up to 2 × 300 bp/85% (for 2 × 300 bp)
Paired-end capability/Tag lengths/Spans	yes/up to 2 × 300 bp/up to 550 bp	yes/up to 2 × 500 bp/950 bp	yes/up to 2 × 500 bp/950 bp
Fragment/Tag lengths/Spans	yes/up to 2 × 300 bp/up to 550 bp	yes/up to 2 × 300 bp/—	yes/up to 2 × 300 bp/—
Mate pair/Tag lengths/Spans	yes/up to 2 × 150 bp/2–12 kb	yes/up to 2 × 150 bp/—	yes/up to 2 × 150 bp/—
Single end/Tag lengths/Spans	yes/up to 1 × 300 bp/up to 300 bp	yes/up to 1 × 300 bp/—	yes/up to 1 × 300 bp/—
RNA sequencing/Tag lengths/Spans	yes/up to 2 × 300 bp/up to 550 bp	yes/up to 2 × 300 bp/—	yes/up to 2 × 300 bp/—
ChIP sequencing/Tag lengths/Spans	yes/up to 2 × 300 bp/up to 550 bp	yes/up to 2 × 300 bp/—	yes/up to 2 × 300 bp/—
Bisulfite sequencing/Tag lengths/Spans	yes/up to 2 × 300 bp/up to 550 bp	yes/up to 2 × 300 bp/—	yes/up to 2 × 300 bp/—
Maximum No. of reads or fragments sequenced per single-end run	>15 million	25 million	100 million
Maximum No. of reads or fragments sequenced per paired-end run	>30 million	50 million	200 million
Total No. of nucleotides (bases) sequenced per run	up to 7.5 Gb	25 Gb	30 Gb
Wet lab bench time for sequencing preparation	10 minutes	10 minutes	10 minutes
Sequencing run time	<28 hours	~4–24 hours	~4–24 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	—	—	—
Library preparation integrated in system as standard offering	no	no	no
Library preparation offered separately for additional charge	yes	yes	yes
Cost of sequencing reagents per run	$2,440	$420–$1,700	$420–$1,700
Reagent tracking method	RFID	RFID	RFID
• Type of reagent information tracked	serial No., expiration date, lot and part Nos., No. of cycles	serial No., expiration date, lot and part Nos., No. of cycles	serial No., expiration date, lot and part Nos., No. of cycles
Shipping conditions for amplification/sequencing reagents	box 1: dry ice; box 2: gel pack/box 1: dry ice; box 2: gel pack	room temperature/room temperature	room temperature/room temperature
Storage conditions for amplification/sequencing reagents	box 1: -15°– -25°C; box 2: 2°–8°C/box 1: -15°– -25°C; box 2: 2°–8°C	room temperature/room temperature	room temperature/room temperature
Shelf life of amplification/sequencing reagents	guaranteed 6 months/guaranteed 6 months	guaranteed 3 months/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	MiSeq Control Manager/Local Run Manager, MiSeq Reporter, BaseSpace Sequence Hub	MiSeq i100 Control Software/BaseSpace Sequence Hub, DRAGEN secondary analysis	MiSeq i100 Control Software/BaseSpace Sequence Hub, DRAGEN secondary analysis
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	10 minutes
Maximum No. of libraries sequenced in a single run	384 samples (>384 samples with custom barcodes)	384 samples	384 samples
System includes secondary data-analysis software developed by company	yes (MiSeq Reporter, Local Run Manager, BaseSpace Sequence Hub)	yes (DRAGEN, BaseSpace Sequence Hub)	yes (DRAGEN, BaseSpace Sequence Hub)
System includes post-sequencing data-analysis software	yes (MiSeq Reporter, Local Run Manager, BaseSpace Sequence Hub)	yes (DRAGEN)	yes (DRAGEN)
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	none
• Monthly	maintenance wash	none	none
• Pre-run	none (post-run wash after every run)	none	none
Distinguishing features of NGS system (supplied by company)	• 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	• room temperature shipping and storage of sequencing consumables • automated onboard flow-cell denaturation, onboard cluster generation, no post-run washing • simplified data analysis with access to preconfigured DRAGEN pipelines onboard or in the cloud, minimizing the need for bioinformatics expertise	• room temperature shipping and storage of sequencing consumables • automated onboard flow-cell denaturation, onboard cluster generation, no post-run washing • simplified data analysis with access to preconfigured DRAGEN pipelines onboard or in the cloud, minimizing the need for bioinformatics expertise

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

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NEXT-GENERATION SEQUENCING SYSTEMS

Part 2 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	NextSeq 550Dx	NextSeq 1000; NextSeq 2000	NovaSeq 6000
System application/FDA cleared or approved	in vitro diagnostic and research use/yes	research use/not required	research use/not required
Country where designed/Manufactured	U.S./Singapore	U.S./Singapore	U.S./U.S.
First year sold in U.S./First year installed in U.S.	2017/2017	2020/2020	2017/2017
System sold internationally	yes (Canada, Europe, Greater China, Asia Pacific, more)	yes (worldwide)	yes (worldwide)
Dimensions of sequencer (H × W × D)/Footprint of sequencer	—	23.6 × 23.6 × 25.6 in./3.9 sq. ft.	65.2 × 31.5 × 37.2 in./8.2 sq. ft.
Accessory equipment supplied with sequencer at no cost	—	keyboard	—
Type of computer supplied with sequencer	computer for analysis and operations combined	computer for analysis and operations combined	operating computer
Analysis options provided with sequencer	onboard, cloud based	onboard, cloud based, on-premises server	cloud based
Where library preparation is performed	accessory equipment, wet bench	wet bench	wet bench
Bioinformatics tools provided with sequencer	BaseSpace Sequence Hub, Local Run Manager, VeriSeq Onsite Server v2, VeriSeq Onsite Server upgraded to v2	DRAGEN Bio-IT, BaseSpace Sequence Hub	BaseSpace Sequence Hub
Sequencer supplied with UPS (uninterruptible power supply)	no	yes (no extra charge)	yes (no extra charge)
Electrical connection required for sequencer	100–120 VAC at 50/60 Hz	100–240 VAC at 50/60 Hz	200–240 VAC at 50/60 Hz
List price of entire sequencer and necessary components	$347,000	NextSeq 1000: $210,000; NextSeq 2000: $335,000	$985,000
Purchase options	purchase, trade in, lease, reagent rental	purchase, lease, reagent rental	purchase, trade in, 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/2 days	yes/1–2 days	yes/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 × 150 bp/75%	up to 2 × 300 bp/85–90%	up to 2 × 250 bp/75–90%
Paired-end capability/Tag lengths/Spans	yes/2 × 150 bp/up to 350 bp	yes/2 × 300 bp/—	yes/up to 2 × 250 bp/up to 550 bp
Fragment/Tag lengths/Spans	yes/2 × 150 bp/up to 350 bp	yes/2 × 300 bp/—	yes/up to 2 × 250 bp/up to 550 bp
Mate pair/Tag lengths/Spans	yes/2 × 150 bp/2–12 kb	yes/2 × 300 bp/—	yes/up to 2 × 250 bp/2–12 Kb
Single end/Tag lengths/Spans	yes/up to 1 × 300 bp/up to 300 bp	yes/2 × 300 bp/—	yes/up to 1 × 300 bp/up to 350 bp
RNA sequencing/Tag lengths/Spans	yes/up to 2 × 150 bp/up to 350 bp	yes/2 × 300 bp/—	yes/up to 2 × 250 bp/up to 500 bp
ChIP sequencing/Tag lengths/Spans	yes/up to 2 × 150 bp/up to 350 bp	yes/2 × 300 bp/—	yes/up to 2 × 250 bp/up to 550 bp
Bisulfite sequencing/Tag lengths/Spans	yes/up to 2 × 150 bp/up to 350 bp	yes/2 × 300 bp/—	yes/up to 2 × 250 bp/up to 550 bp
Maximum No. of reads or fragments sequenced per single-end run	>300 million	up to 400 M (NextSeq 1000); up to 1.8 B (NextSeq 2000)	up to 20 billion
Maximum No. of reads or fragments sequenced per paired-end run	>600 million	up to 800 M (NextSeq 1000); up to 3.6 B (NextSeq 2000)	up to 40 billion
Total No. of nucleotides (bases) sequenced per run	up to 120 gb	up to 240 Gb (NextSeq 1000); up to 540 Gb (NextSeq 2000)	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	<36 hours	8–42 hours (NextSeq 1000); 8–44 hours (NextSeq 2000)	~13–44 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	<4 hours (with TruSeq Small RNA)	<1 day (with TruSeq Small RNA)	<1 day (with TruSeq Small RNA)
• RNA sequencing	<3 hours	<9 hours	<9 hours
• ChIP sequencing	—	<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	—	—	—
Library preparation integrated in system as standard offering	no	no	no
Library preparation offered separately for additional charge	no	yes	yes
Cost of sequencing reagents per run	—	$720–$2,963 (NextSeq 1000); $720–$4,860 (NextSeq 2000)	$2,500–$17,300
Reagent tracking method	RFID	RFID	RFID
• Type of reagent information tracked	serial No., expiration date, lot and part Nos., No. of cycles	serial No., expiration date, lot and part Nos., No. of cycles	serial No., expiration date, lot and part Nos., No. 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)	—/ice, dry ice, room temperature (variable based on product)
Storage conditions for amplification/sequencing reagents	—/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/reagent cartridge: -15°– -25°C; flow cell and resuspension buffer tube: 2°–8°C	—/cluster, SBS cartridges: -20°C; flow cell: 4°C; buffer cartridge: room temperature
Shelf life of amplification/sequencing reagents	guaranteed 3 months/guaranteed 3 months	guaranteed 6 months/guaranteed 6 months	—/guaranteed 6 months
System requires a control sample on sequencing run	yes	no	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	NextSeq 550Dx Control Software and Operating Software/ Local Run Manager, BaseSpace Sequence Hub	NextSeq Control Software, BaseSpace Sequence Hub/ DRAGEN	NovaSeq 6000 Control Software/BaseSpace Sequence Hub
Complete walkaway automation for amplification, sequencing, and variant calling	yes	yes	no
Remote system monitoring	yes	yes	yes
Total time required for setup of amplification, sequencing, and variant calling steps	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 (BaseSpace Sequence Hub)	yes (DRAGEN, BaseSpace Sequence Hub)	yes (BaseSpace Sequence Hub)
System includes post-sequencing data-analysis software	yes	yes (DRAGEN, BaseSpace Sequence Hub)	no
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	no
Types of maintenance plans available/mean time between failures	parts only, bronze, silver, gold, Dx, dedicated on-site/—	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	none (manual wash if instrument idle for 2 weeks)	none	—
• Monthly	none	none	none (maintenance or 4-lane post-run wash every 2 wks.)
• Pre-run	none (automatic wash completed after every run)	none	inspect and clean flow cell, flow-cell holder for debris; empty waste container
Distinguishing features of NGS system (supplied by company)	• analyzes solid tumors using minimal tissue with TruSight Oncology Comprehensive, a reimbursable, validated, FDA-cleared test for in vitro diagnostics • runs IVD assays and laboratory-developed tests • 21 CFR part 11 compliant software	• offers flexibility of multiple flow-cell configurations across different outputs and read lengths up to 2 × 300 bp 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	• ability to run individual libraries in each lane with Xp workflow • configure flow-cell type and read length to support a broad range of applications • increase lab efficiency with a simplified wokflow and reduced hands-on time

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

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Part 3 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	**Thermo Fisher Scientific** customercare@thermofisher.com **Carlsbad, CA** **800-955-6288** www.thermofisher.com/genestudio
Name of system	NovaSeq 6000Dx	NovaSeq X; NovaSeq X Plus	Ion GeneStudio S5 System
System application/FDA cleared or approved	in vitro diagnostic and research use/yes	research use/not required	research use/not required
Country where designed/Manufactured	U.S./U.S.	U.S./U.S.	U.S./Singapore
First year sold in U.S./First year installed in U.S.	2022/2022	2022/2023	2018/2018
System sold internationally	yes (worldwide)	yes (worldwide)	yes (worldwide)
Dimensions of sequencer (H × W × D)/Footprint of sequencer	65.2 × 31.5 × 37.2 in./8.2 sq. ft.	62.5 × 34 × 36.7 in./8.7 sq. ft.	62.5 × 34.0 × 36.7 in./8.7 sq. ft.
Accessory equipment supplied with sequencer at no cost	Illumina DRAGEN server for NovaSeq 6000Dx	—	—
Type of computer supplied with sequencer	computer for analysis and operations combined	computer for analysis and operations combined	operating computer
Analysis options provided with sequencer	onboard, cluster based, cloud based	onboard, cluster based, cloud based	onboard, cloud based, local server
Where library preparation is performed	wet bench	wet bench	accessory equipment
Bioinformatics tools provided with sequencer	DRAGEN Bio-IT platform, Illumina Run Manager, BaseSpace Sequence Hub	DRAGEN Bio-IT platform, Illumina Run Manager, BaseSpace Sequence Hub	Torrent Suite (optional: Ion Reporter, Oncomine Reporter)
Sequencer supplied with UPS (uninterruptible power supply)	yes (no extra charge)	yes (no extra charge)	no
Electrical connection required for sequencer	200–240 VAC at 50/60 Hz, 16 A, single phase, 2500 W	200–240 VAC at 50/60 Hz	100–240 VAC at 50/60 Hz, 6.5–14.5 A
List price of entire sequencer and necessary components	$850,000	NovaSeq X: $985,000; NovaSeq X Plus: $1,250,000	—
Purchase options	purchase, lease, reagent rental	purchase, trade in, lease, reagent rental	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/2 days	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	1 × 35–2 × 250 bp/90% (1 × 35 bp, 2 × 50 bp); 85% (2 × 200 bp, 2 × 150 bp); 75% (2 × 250 bp)	up to 2 × 300 bp/85–90%	up to 600 bp/—
Paired-end capability/Tag lengths/Spans	yes/up to 2 × 250 bp/up to 550 bp	yes/up to 2 × 300 bp/—	—
Fragment/Tag lengths/Spans	yes/up to 2 × 250 bp/up to 550 bp	yes/2 × 150 bp/—	yes/—/up to 600 bp
Mate pair/Tag lengths/Spans	yes/up to 2 × 250 bp/2–12 kb	yes/2 × 150 bp/—	—
Single end/Tag lengths/Spans	yes/up to 1 × 300 bp/up to 350 bp	yes/2 × 150 bp/—	yes/—/up to 400 bp
RNA sequencing/Tag lengths/Spans	yes/up to 2 × 250 bp/up to 500 bp	yes/2 × 150 bp/—	yes/—/up to 400 bp
ChIP sequencing/Tag lengths/Spans	yes/up to 2 × 250 bp/up to 550 bp	yes/2 × 150 bp/—	—
Bisulfite sequencing/Tag lengths/Spans	yes/up to 2 × 250 bp/up to 550 bp	yes/2 × 150 bp/—	yes/—/up to 400 bp
Maximum No. of reads or fragments sequenced per single-end run	up to 20 billion	~52–70 billion	2–130 million
Maximum No. of reads or fragments sequenced per paired-end run	up to 40 billion	~104–140 billion	—
Total No. of nucleotides (bases) sequenced per run	up to 6,000 Gb per run, 3,000 Gb per flow cell	~8,000–21,000 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)
Wet lab bench time for sequencing preparation	10 minutes	10 minutes	<45 minutes
Sequencing run time	<45 hours	~13–48 hours	2.5–4 hours
Total time for generating standard gDNA library	<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)	—
• 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)	4–6 hours
• Mate pair	—	—	—
• Single end	<1 day (with TruSeq Small RNA)	<1 day (with TruSeq Small RNA)	5–7 hours
• RNA sequencing	<9 hours	<9 hours	<6 hours
• ChIP sequencing	<1.5 days (with TruSeq ChIP)	<1.5 days (with TruSeq ChIP)	—
• Bisulfite sequencing	—	—	5.5 hours
Hands-on time for the following:			
• Paired end	<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 hour
• Mate pair	—	—	<1 hour
• Single end	<4 hours (with TruSeq Small RNA)	<4 hours (with TruSeq Small RNA)	15 minutes
• RNA sequencing	<3 hours	<3 hours	1 hour (with Ion AmpliSeq Transcriptome)
• ChIP sequencing	—	—	—
• Bisulfite sequencing	—	—	30 minutes
Library preparation integrated in system as standard offering	no	no	no (performed on Ion Chef)
Library preparation offered separately for additional charge	yes	yes	yes (Ion AmpliSeq kit for Chef DL8)
Cost of sequencing reagents per run	$2,490–$17,324	$2,006–$16,892	—
Reagent tracking method	RFID	RFID	RFID
• Type of reagent information tracked	serial No., expiration date, lot and part Nos., No. of cycles	serial No., expiration date, lot and part Nos., No. of cycles	expiration date, lot and part Nos.
Shipping conditions for amplification/sequencing reagents	—/dry ice, gel pack, ambient (variable based on product)	—/ambient	-20°C, 4°C, ambient (variable based on product)/ -20°C, 4°C, ambient (variable based on product)
Storage conditions for amplification/sequencing reagents	—/cluster, SBS cartridges: -15°– -25°C; flow cell: 2°– 8°C; buffer cartridge: 15°– 30°C	—/reagent cartridge, preload buffer, lyo insert: -15°– -25°C; flow cell: 2°–8°C; library tube strip, buffer cartridge: 15°– 30°C	-20°C, 4°C, ambient (variable based on product)/ -20°C, 4°C, ambient (variable based on product)
Shelf life of amplification/sequencing reagents	—/up to 24 months	—/guaranteed 3 months	12–36 months from manufacture date (variable based on product)/12–36 months from manufacture date (variable based on product)
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	—/BaseSpace Sequence Hub, DRAGEN	NovaSeq X, X Plus Control Software/BaseSpace Sequence Hub, DRAGEN	Torrent Suite/Ion Reporter
Complete walkaway automation for amplification, sequencing, and variant calling	yes	yes	no (walkaway automation for sequencing, variant calling)
Remote system monitoring	yes	yes	—
Total time required for setup of amplification, sequencing, and variant calling steps	5–30 minutes	5–30 minutes	<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
System includes secondary data-analysis software developed by company	yes (Illumina Run Manager)	yes (DRAGEN, BaseSpace Sequence Hub)	yes (Torrent Suite, Ion Reporter)
System includes post-sequencing data-analysis software	yes (Illumina Run Manager)	yes (DRAGEN)	yes (Torrent Suite, Ion Reporter)
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	gold, silver, bronze/—	parts only, bronze, silver, gold, dedicated on-site/—	AB Assurance/—
No. of field application scientists and engineers based in U.S.	>500	>500	450
Maintenance required:			
• Weekly	none (maintenance wash every 2 weeks)	none (maintenance wash every 2 weeks)	—
• Monthly	—	none	—
• Pre-run	—	none	—
Distinguishing features of NGS system (supplied by company)	• 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; reimagined user interface with a simple workflow	• automated onboard cluster generation and secondary anlaysis with DRAGEN • ambient shipping of sequencing consumables • configurable sequencing method, flow-cell type, and read length to support a broad range of applications	• scalable, flexible, end-to-end NGS solution from library to report with turnaround time of <24 hours and <45 minutes of hands-on time • start with as little as 1 ng of input DNA or RNA • flexible sequencing depth and sample number throughput
Note: a dash in lieu of an answer means company did not answer question or question is not applicable			

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Part 4 of 4	**Thermo Fisher Scientific** customercare@thermofisher.com **Carlsbad, CA** www.thermofisher.com/genexus **800-955-6288** www.thermofisher.com/genexusdx
Name of system	Ion Torrent Genexus Integrated Sequencer; Ion Torrent Genexus Dx Integrated Sequencer
System application/FDA cleared or approved	Genexus: research use; Genexus Dx: in vitro diagnostic and research use/not required
Country where designed/Manufactured	U.S./Singapore
First year sold in U.S./First year installed in U.S.	Genexus: 2019/2019; Genexus Dx: 2025/2025
System sold internationally	Genexus: yes (worldwide); Genexus Dx: yes (multiple countries)
Dimensions of sequencer (H × W × D)/Footprint of sequencer	open: 81.1 × 58.5 × 43.5 in.; closed: 66.1 × 41.9 × 32.1 in./ open: 17.67 sq. ft.; closed: 9.36 sq. ft.
Accessory equipment supplied with sequencer at no cost	none
Type of computer supplied with sequencer	computer for analysis
Analysis options provided with sequencer	onboard, cloud based
Where library preparation is performed	sequencer
Bioinformatics tools provided with sequencer	Ion Torrent Genexus Software (optional: Oncomine Reporter)
Sequencer supplied with UPS (uninterruptible power supply)	no
Electrical connection required for sequencer	100–240 VAC
List price of entire sequencer and necessary components	—
Purchase options	purchase, trade in, lease, reagent rental, finance
Warranties offered	first year included with purchase; extended warranty avail.
Training included/Total time for basic training per operator	yes/2 days
Training location/Follow-up training available	at customer site/yes (extra charge)
Maximum No. of samples amplified in a single amplification event	48 samples on system, 96 samples off instr. (for library prep)
Read length/Percent bases >Q30	up to 400 bp/—
Paired-end capability/Tag lengths/Spans	—
Fragment/Tag lengths/Spans	—
Mate pair/Tag lengths/Spans	—
Single end/Tag lengths/Spans	yes/—/up to 400 bp
RNA sequencing/Tag lengths/Spans	—
ChIP sequencing/Tag lengths/Spans	—
Bisulfite sequencing/Tag lengths/Spans	—
Maximum No. of reads or fragments sequenced per single-end run	48–60 million at 200–400 bp (GX5, GX5 Dx); 80–100 million at 200 bp (GX7)
Maximum No. of reads or fragments sequenced per paired-end run	—
Total No. of nucleotides (bases) sequenced per run	9.6–12 Gb at 200 bp (GX5, GX5 Dx); 16–20 Gb at 200 bp (GX7)
Wet lab bench time for sequencing preparation	10 minutes
Sequencing run time	19–24 hours (includes automated library prep)
Total time for generating standard gDNA library	—
• Paired end	—
• Fragment	—
• Mate pair	—
• Single end	—
• RNA sequencing	—
• ChIP sequencing	—
• Bisulfite sequencing	—
Hands-on time for the following:	
• Paired end	—
• Fragment	—
• Mate pair	—
• Single end	—
• RNA sequencing	—
• ChIP sequencing	—
• Bisulfite sequencing	—
Library preparation integrated in system as standard offering	yes (AmpliSeq, AmpliSeq HD)
Library preparation offered separately for additional charge	no
Cost of sequencing reagents per run	—
Reagent tracking method	RFID, barcode reader
• Type of reagent information tracked	expiration date, lot and part Nos., placement
Shipping conditions for amplification/sequencing reagents	-20°C, 4°C, ambient (variable based on product)/-20°C, 4°C, ambient (variable based on product)
Storage conditions for amplification/sequencing reagents	-20°C, 4°C, ambient (variable based on product)/-20°C, 4°C, ambient (variable based on product)
Shelf life of amplification/sequencing reagents	12–36 months from manufacture date (variable based on product)/12–36 months from manufacture date (variable based on product)
System requires a control sample on sequencing run	optional
• Company offers a sequencing control	yes (additional charge)
Sequencing system control software and devices to start run/ for data analysis	Ion Torrent Genexus Software/Genexus Software, Oncomine Reporter
Complete walkaway automation for amplification, sequencing, and variant calling	yes
Remote system monitoring	yes
Total time required for setup of amplification, sequencing, and variant calling steps	10 minutes
Maximum No. of libraries sequenced in a single run	48 samples or 96 libraries
System includes secondary data-analysis software developed by company	yes (Ion Reporter, Oncomine Reporter)
System includes post-sequencing data-analysis software	yes (Genexus: Genexus Software, Oncomine Reporter; Genexus Dx: Genexus Dx Software, Oncomine Reporter)
Mutations detectable via data-analysis software	substitutions, indels, copy number changes, fusions
System can generate a variant report	yes
Types of maintenance plans available/mean time between failures	AB Assurance, AB Platinum NGS (Dx plans also avail.)/—
No. of field application scientists and engineers based in U.S.	450
Maintenance required:	
• Weekly	none
• Monthly	none
• Pre-run	none
Distinguishing features of NGS system (supplied by company)	• Dx sequencer is a CE-IVD-marked, FDA-listed class II IVD medical device; walkaway automation of NGS workflow, incl. library prep, sequencing, analysis, reporting • start with as little as 1 ng of input DNA or RNA • scalable plug-and-play reagent architecture allows for cost-efficient sequencing of small and large batches
Note: a dash in lieu of an answer means company did not answer question or question is not applicable	

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