



Brilliant Performance

Philips Brilliance CT 64-channel with Essence technology

Brilliance CT 64-channel with Essence technology delivers value, dependability and performance proven to meet your demanding standards. We're committed to providing you with the solutions and services that will take you where you need to go in a rapidly evolving healthcare environment now and in the future.

The unique Essence technology is at the core of the Brilliance CT 64-channel scanner. Consisting of industry exclusive X-ray tube, detector and reconstruction advancements to deliver excellent image quality, Essence technology provides the inherent design features that enable new levels of clinical performance.

PHILIPS
sense and simplicity

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1. Essence technology

The Brilliance CT 64-channel scanner utilizes Essence technology to provide the image quality enhancements required by clinicians to support high levels of patient care. Essence technology is an excellent combination of X-ray tube, detector, and reconstruction innovations.



X-ray tube

1.1 X-ray tube features	Clinical value
Spiral Groove Bearing	Precise anode rotation stability for a virtually motion-free focal spot and for better image quality
Segmented Anode	12 individual anode segments compensate for heating and cooling cycles for higher reliability
Smart Focal Spot	Dynamic focal spot motion doubles the number of projections and improves in-plane spatial resolution



NanoPanel Detectors

1.2 NanoPanel Detector features	Clinical value
TACH 2 Detector Electronics	Second generation of TACH technology further reduces the electronic noise enabling improved image quality at low radiation doses
Ultra High Resolution (up to 24 Lp/cm spatial resolution)	High spatial resolution means better definition of small structures



RapidView reconstruction with Quad Core processors

1.3 RapidView Reconstruction features	Clinical value
3D Cone Beam Reconstruction Algorithm (COBRA)	COBRA provides high image quality without cone beam artifacts
Adaptive Multicycle Reconstruction	Part of the Rate Response CV Toolkit for cardiac CT imaging, these features optimize every voxel for the optimal temporal resolution
Ultra High Resolution Matrices	768 ² and 1024 ² reconstruction matrices take advantage of high resolution imaging
Quad Core processors	Philips utilizes innovations in computer technology to continuously improve reconstruction performance

1. Essence technology

1.4 Clearly different ClearRay reconstruction

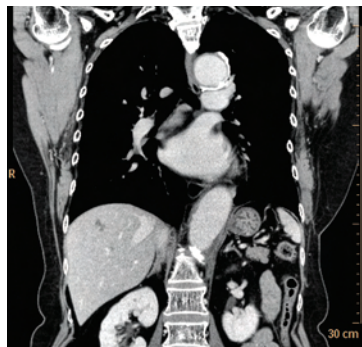
Philips ClearRay reconstruction offers improvements in image quality, due to Philips proprietary technology to remove the effects of scatter.

Scatter computation is an extremely complex problem. In fact, using conventional methods, it would take 20 days to compute results. Eight years of development at Philips premier research center produced ClearRay collimation, which quickly adapts to each individual patient and scan geometry, minimizing the effects of scatter. With improved image quality, especially in large patients, this new technology enables further opportunity to lower dose.

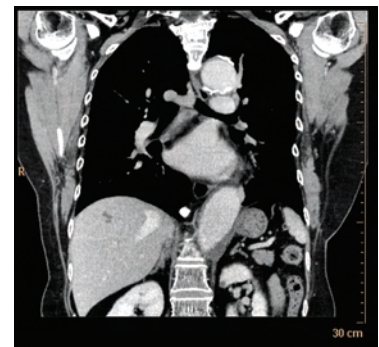


1.5 Why iDose is ideal

Philips iDose enables up to an 80% reduction in dose while maintaining diagnostic image quality. Our goal is always enhanced image quality and reconstruction speeds to get you the views and information you need, quickly and efficiently.



Filtered Back Projection (FBP) CTA of chest



With iDose reconstruction

iDose overcomes limitations (image noise) of conventional FBP reconstruction.

Images courtesy of Asahikawa City Hospital

2. The CT user environment

Brilliance is a flexible, scalable CT work environment for planning, scanning, visualization, and archiving. The Brilliance Workspace offers a range of clinical applications at the scanner console. The Extended Brilliance Workspace* delivers advanced clinical applications to a dedicated PC. And finally, the Brilliance Workspace Portal* makes it possible for users to work efficiently with extremely large data sets from a typical laptop or home computer, wherever they are.



* Optional

3. Console

The console runs Brilliance Workspace on a Dell PC with dual monitors (1,280 x 1,024 Flat Panel LCD each). An optional slave monitor can display the images from the main console at a remote location, such as the radiology reading room.



Standard applications
CT Viewer
MPR
SSD 3D
MIP
Volume Rendering
CT Endoscopy
Q-CTA
Test Injection
Combine Images
Scan Tools Pro:
DICOM Modality Worklist
Split Study
Prefetch Study
Automatic Procedure Selection
Bolus Tracking
Spiral Auto Start

Optional applications	
Virtual Colonoscopy	CT/MR Image
AVA-Stenosis	Dental Planning
AVA-Stent Planning	Cardiac Viewer
CT Perfusion	Heartbeat-CS
Advanced Brain Perfusion	Cardiac CT Angio
Lung Nodule Assessment	LV/RV Analysis
Lung Emphysema	EP Planning
CT Reporting	Stereotaxis

4. Gantry and table

4.1 Gantry

Feature	Specification
X-ray tube and Detectors Architecture	Third generation; Rotate-rotate
Rotation times	0.4*, 0.5, 0.75, 1, 1.5, 2 seconds for full 360° scans 0.28*, 0.33, seconds for partial angle 240° scans
Gantry aperture, mm	700 mm
Intercom system	Two-way connection between the gantry and console areas
Gantry tilt, degrees	-30° to +30° with 0.5° increments
Controls located on Gantry (left and right, front and back)	Tilt, Couch In/Out, Couch Up/Down, Emergency Stop, X-Ray Indicator
Controls located at Operator's Console	Tilt, Couch In/Out, Couch Up/Down, Emergency Stop, X-Ray Indicator, Start Scan, Pause
Focus-detector distance	1040 mm
Focus-isocenter distance	570 mm

4.2 AutoVoice

A standard set of commands for patient communication before, during, and after scanning is available in the following languages:

- English
- French
- Spanish
- Italian
- Japanese
- Hebrew
- Arabic
- Russian
- Georgian
- Turkish
- German
- Danish
- Swedish
- Chinese
- Portuguese

Customized messages can also be created.

4.3 Patient table

Feature	Specification
Vertical range, mm	578 to 1028 mm with 1.0 mm increment
Manual longitudinal stroke, mm	1900 mm
Scannable range, mm	1750 mm
Z-position accuracy	±0.25 mm
Longitudinal speed, mm/s	0.5 – 143 mm/s
Max Load Capacity with Accuracy, lb	450 lbs (204 kg) with 0.25 mm Z-axis accuracy 650 lbs (295 kg) with 0.25 mm Z-axis accuracy on Bariatric Patient Support*
Floating tabletop	Carbon-fiber table top with foot pedal and hand control for easy positioning and quick release.

* Optional

5. Accessories

5.1 Standard accessories



Patient restraint kit



Elevated head holder

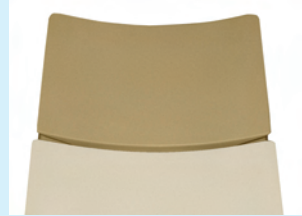


Table extension



IV poles



Table pad



Cushions and pads



Arm rests

5.2 Optional accessories



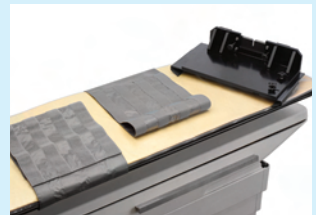
Infant cradle



Therapy table top



Flat head holder



Radiology Flat Top Kit



Load and unload foot pedals



Interventional couch controls



Coronal head holder – supine

6. Scan and image acquisition

6.1 Generator

Feature	Specification
Output capacity	60 kW
kV	80, 120, 140 kVp
mA	20-500 mA; 1 mA increments

6.2 X-ray tube

Feature	Specification
Anode storage capacity	8 MHU
Anode max cooling rate	1608 kHU/min
Focal spot (IEC)	Large: 1.0 mm x 1.0 mm Small: 0.5 mm x 1.0 mm
Anode diameter	200 mm
Anode rotation speed	105 Hz (6300rpm)
Target angle	7°
Maximum On-Time (@ maximum power, 120kV, Large Focal Spot)	23 sec @ 500 mA

6.3 Detector

Feature	Specification
Material	Solid-State GOS with 43,008 elements
Dynamic range	1,000,000:1
Slip ring	Optical - 5.3 Gbps transfer rate
Data sampling rate	Up to 4640 views/revolution/element
Slice collimations available	64 x 0.625 mm, 40 x 0.625 mm, 32 x 1.25 mm, 16 x 2.5 mm, 2 x 0.5 mm
Slice thickness (Spiral mode)	0.55 - 7.5 mm variable
Slice thickness (Axial mode)	0.5 - 12 mm
Scan angles	240°, 360°, 420°
Scan field of view	250 mm, 500 mm

6.4 Image quality

Feature	Specification
Spatial Resolution	Cut-off 2% 10% 50%
Ultra High mode (lp/cm)	24.0 23 16 8
High mode (lp/cm)	16.0 15 12 6
Standard mode (lp/cm)	13.0 12 9 5
Noise	0.27% [120kVp, 250mAs, 10 mm, 0.75 sec, 250 mm FOV, UA Filter, 21.6cm water equivalent phantom]
Low-contrast resolution	4.0 mm @ 0.3% [120kVp, 250mAs, 10 mm, 0.75 sec, 250 mm FOV, UB Filter, 27mGy at surface of CATPHAN phantom]
Absorption range	-1024 to +3072 Hounsfield units

7. Scanning modes

7.1 Spiral scanning

- Multiple contiguous slices acquired simultaneously with continuous table movement during scans
- Multiple, bidirectional acquisitions
- Spiral exposure: Up to 100 seconds
- Spiral pitch: 0.13 to 1.5 (user-selectable)

7.2 Axial scanning

- Multiple-slice scan with up to 64 contiguous slices acquired simultaneously with incremental table movement between scans
- Fused modes for reconstructing thick slices from thin slice acquisitions

8. Clinical enhancements

8.1 Bolus tracking

An automated injection planning technique to monitor actual contrast enhancement and initiate scanning at a predetermined level.

8.2 Spiral Auto Start (SAS)

Spiral Auto Start integrates the injector with the scanner, allowing the technologist to monitor the contrast injection and to start and stop the scan (with the predetermined delay) while in the scan room.

8.3 Patient Centering on Surview

Centering the patient properly is one of the most important factors in getting good image quality. Traditionally, patients are centered using the gantry laser lights; with this new feature it is now possible to improve patient centering using the lateral surview with real time feedback.

8.4 Options

Rate Responsive CV Toolkit

Enables cardiac imaging and includes an ECG monitor, Retrospective Tagging, Prospective Gating, the Cardiac Viewer, Heartbeat-CS and CT Reporting. Uses the Philips Adaptive Multicycle Reconstruction to optimize the temporal resolution.

Step & Shoot Cardiac

Enables low dose, high quality cardiac CT imaging. This axial prospective ECG-gated acquisition technique achieves full heart coverage with sub-millimeter, isotropic resolution within a short breath-hold. Includes automatic arrhythmia detection and handling.

Heartbeat CS Pro

Includes ECG Prospective Gating. The scanner automatically triggers axial multislice scan acquisitions using an ECG signal. Philips patented Beat-to-Beat Variable Delay Algorithm enables accurate and reproducible calcium scoring studies.

Continuous CT (CCT)

This application provides visual guidance for interventional procedures using a foot pedal and a remote monitor. Exposures, taken once per rotation in either single or continuous mode, are limited to a 240 degree axial centered beneath the patient to shield the clinician's hands from direct X-ray exposure.

CT Fluoroscopy Package

This application provides near real-time guidance for interventional procedures (up to 8 fps) using a foot pedal and a remote monitor. The Fluoro mode is particularly useful in complicated procedures involving breathing and abdomen motion.

Jog Scan

Jog Scan provides up to 80 mm of imaging area for perfusion studies. The scanner acquires two 40 mm volumes of interest by translating the couch back and forth – doubling the standard perfusion coverage.

Pulmonary Toolkit

Pulmonary Toolkit enables the user to trigger a scan at a particular breath level (axial and/or spiral prospective gating), minimizing artifacts caused by respiratory motion. This allows better chest imaging of patients who cannot hold their breath.

Pulmonary Toolkit Oncology

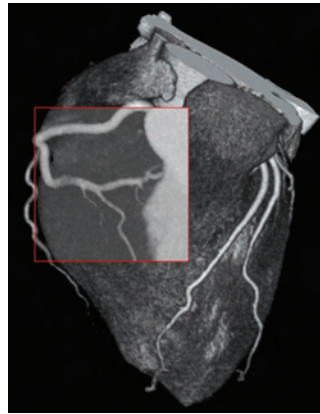
Pulmonary Toolkit Oncology includes the Pulmonary Toolkit features plus Retrospective Spiral (4D CT). This feature results in the ability to generate multiple phases allowing for visualization of motion during the respiratory cycle and delineating a target volume.

9. Clinical examples

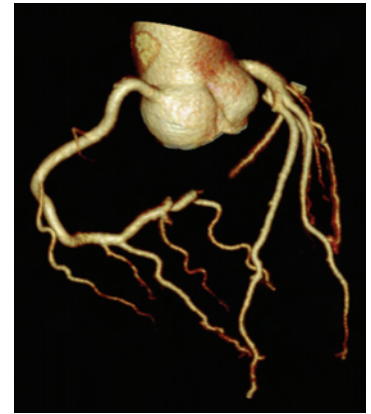
Protocol	Collimation	Rotation (sec)	Pitch	Slice width (mm)	Scan coverage (mm)
CTA Runoff	64x0.625	0.75	0.9	2.0	1304
Optional					
Coronary CTA	64x0.625	0.4	0.2	0.9	120
Brain Perfusion with Jog Scan	32x1.25	0.5	-	10	80
Step & Shoot Cardiac	64x0.625	0.4	-	0.9	128



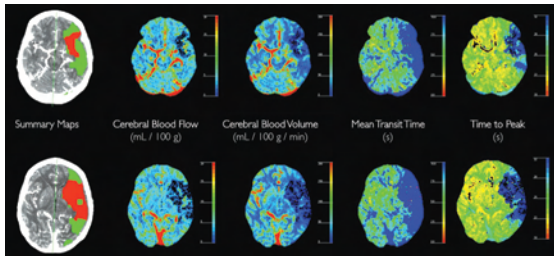
A CT coronary angiogram that demonstrates a stent in the left anterior descending (LAD) artery.



A volume rendering of the cardiac anatomy that demonstrates the utility of Magic Glass.



A volume rendering of the coronary arterial tree.



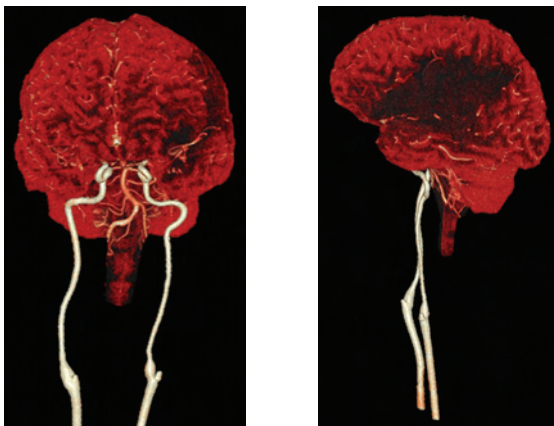
Brain perfusion. Images demonstrate ischemia and potential infarct in the left middle cerebral artery (MCA) territory.



A volume rendering of the abdominal aorta, the superior femoral arteries and their major branches.



A curved multiplanar reformatted (MPR) image that demonstrates a stent in the right iliac artery.



Two volume renderings of the carotid arteries and brain that demonstrate a marked decrease of perfused blood volume in the left middle cerebral artery (MCA) territory.

10. Dose management

DoseWise is a philosophy, a set of principles and practices, focused on lowering radiation dose for patients and staff. Philips focuses on system design optimization, current (mA) optimization and increasing dosage awareness to reduce the cumulative risk of radiation while obtaining high-quality images.

10.1 DoseRight ACS (Automatic Current Selection)

Optimizes the dose for each patient based on the planned scan by suggesting the lowest possible mAs settings to maintain constant image quality at low dose throughout the exam.

10.2 DoseRight D-DOM (Dynamic Dose Modulation)

Automatically controls the tube current rotationally, increasing the signal over areas of higher attenuation (lateral) and decreasing signal over area of less attenuation (AP).

10.3 DoseRight Z-DOM (Longitudinal Dose Modulation)

Automatically controls the tube current, adjusting the signal along the length of the scan, increasing the signal over regions of higher attenuation (shoulders, pelvis) and decreasing the signal over regions of less attenuation (neck, legs).

10.4 Dedicated pediatric protocols

Developed in collaboration with top children's hospitals, Brilliance age and weight-based infant and pediatric protocols optimize image quality with low dose.

10.5 Dose Summary Table

Captures, per patient, dose information for each individual series acquired and report the total dose for the entire study. The Dose Summary Table can be sent to PACS or a workstation along with the study for easy review by the radiologist.

10.6 Dose warning messages

For Brain Perfusion a warning message is presented if the CTDIvol exceeds 250mGy.

10.7 Locking Protocols

Consistency is critical to establishing a high standard of care and this consistency begins with ensuring the correct scanning protocols are used. With Locking Protocols, it is now possible to prevent unapproved modification of your scanning protocols by password protecting them.

10.8 Dose performance data

CTDI vol	Measurement
Head	11.0 mGy / 100 mAs
Body	5.6 mGy / 100 mAs

Using IEC standard phantoms

11. Reconstruction

RapidView Reconstruction generates up to 20 images per second using a 512² matrix.

11.1 Reconstruction Field of View

- 50 to 500 mm continuous
- 25 to 250 mm (Ultra High mode)

11.2 Image Matrix

- 512², 768² and 1,024²

11.3 Cone Beam Reconstruction

Philips patented Cone Beam Reconstruction Algorithm (COBRA) enables true three-dimensional data acquisition and reconstruction in spiral scanning.

11.4 ClearRay Reconstruction

A revolutionary solution to beam hardening and scatter artifact, new modeling and simulation technology pre-computes and stores beam hardening and scatter corrections in database that is later referenced to create a correction that is tailored to each individual patient. As a fully three-dimensional technique, contrast scale stability is preserved across different patient sizes, image uniformity is improved, and organ boundaries are better visualized.

11.5 Adaptive Filtering

Adaptive filters reduce pattern noise (streaks) in non-homogenous bodies, improving overall image quality.

11.6 Evolving Reconstruction

Real-time 256² matrix image reconstruction and display in step with spiral acquisition or off-line. Images can be modified for window width and level, zoom and pan prior to larger matrix reconstruction. At the end of the acquisition, all images are updated with the desired viewing settings.

11.7 Off-Line Reconstruction

Off-Line (batch) background image reconstruction of user-defined groups of raw data files with automatic image storage.

11.8 Networking

The Brilliance CT supports 10/100/1000 Mbps (10/100/1000BaseT) network speeds. For optimal performance, Philips recommends a minimum of 100Mbps network speed (1Gbps preferred) and for the CT network to be segmented from the rest of the hospital network.

11.9 Archiving

The full implementation of the DICOM 3.0 communications protocol in the Brilliance Workspace allows connectivity to DICOM 3.0 compliant scanners, workstations, and printers; supports IHE requirements for DICOM Connectivity.

Type	Hard drive	DVD RAM ¹	EOD ¹	CD
Capacity	292 GB	4.7 GB	9.1 GB	700 MB
Images	500,000 ²	15,000 ³	15,000 ²	1200 ²
Patients ⁴	1,667	50	50	4

¹Either DVD-RAM or EOD is standard, dependent on selected options

²512² matrix uncompressed

³512² matrix compressed

⁴Based on 300 images per study

11.10 DICOM CD Writer

A DICOM CD Writer option stores DICOM images and associated image viewing software on very low cost CD media. Images on these CDs can be viewed and manipulated on PCs meeting the minimum specifications. Ideally suited for individual result storage and referring physician support.

11. Reconstruction

11.11 Filming

This function allows the user to set up and store filming parameters. Pre-stored protocols can be set to include auto-filming. The operator can film immediately after each image, at the end of a series, or film after the end of a study and review images before printing. The operator can also automatically film the study at three different windows and incorporate “Combine Images” functionality to manage large datasets. Basic monochrome and color DICOM print capability are supported.

11.12 DICOM

Brilliance Workspace supports IHE requirements for DICOM connectivity and can work with DICOM 3.0-compliant PACS, scanners, workstations, and printers. It supports IHE requirements for scheduled workflow and other integration profiles as defined in IHE Statement. Brilliance Workspace includes DICOM service classes to communicate with the following modalities:

- CT
- MR
- Nuclear Medicine including PET/CT
- Computed Radiography
- Radiography & Fluoroscopy (R&F)

Brilliance Workspace includes the following DICOM functionality:

- Service Class User & Provider (CT, MR, NM, Secondary Capture)
- DICOM Print
- DICOM Modality Worklist User
- Query/Retrieve User and Provider
- Modality Performed Procedure Step User
- Storage Commitment User
- Removable Media

Optional

11.13 Adaptive Multicycle Reconstruction

(Part of Rate Responsive CV Toolkit)

Image data can be prospectively gated or retrospectively tagged. COBRA automatically delivers the best temporal resolution possible (as low as 53mseconds).

11.14 iDose

Philips iDose enables up to 80% reduction in dose while maintaining diagnostic image quality and fast reconstruction times. iDose overcomes limitations, such as image noise of conventional filtered back projection (FBP) reconstruction.

12. Site planning

Contact the Philips Site Planning department for specific requirements pertaining to optional imaging/viewing/power equipment, floorspace and electrical, mechanical, structural or environmental specifications.

12.1 Power requirements

- 200/208/240/380/400/415/480/500 VAC
50/60 Hz 100kVA
- Three-phase distribution source computer, reconstruction, and monitors.

Optional

12.2 Console Uninterrupted Power Supply (UPS)

Provides up to 30 minutes of backup power for host

12.3 Environmental requirements

Temperature:

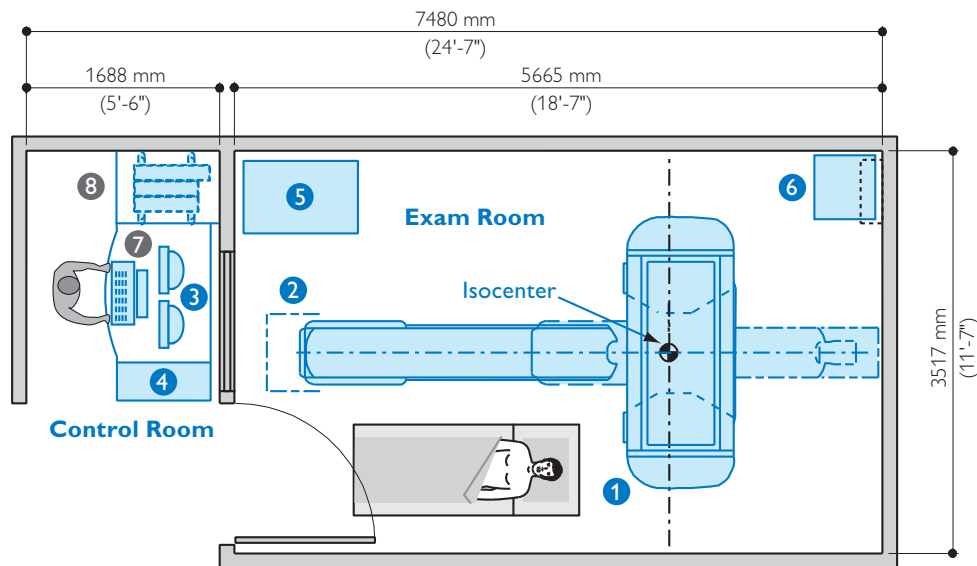
- Gantry room: 18° to 24° C (64° to 75° F)
- Control room: 15° to 24° C (59° to 75° F)
- Storage/Transport: -5° to +35° C (23 ° F to 95° F)

Humidity:

- Gantry/Control: 35% to 70% non-condensing
- Storage/Transport: 10% to 90% non-condensing

Heat dissipation:

- Gantry: 18,000 BTU/hr
- Computer: 2,559 BTU/hr
- Reconstruction: 5,293 BTU/hr



12.4 Dimensions and weights

	Weight	Height	Width	Depth
1 Gantry	1941 kg (4280 lbs.)	203 cm (80")	239 cm (94")	94 cm (37")
2 Patient table	385 kg (850 lbs.)	101 cm (40")	69 cm (27")	249 cm (98")
3 LCD monitor*	10 kg (22 lbs.)	49 cm (19")	49 cm (19")	22 cm (9")
4 Computer cabinet	118 kg (260 lbs.)	76 cm (30")	33 cm (13")	90 cm (36")
5 Recon cabinet	151 kg (332 lbs.)	76 cm (30")	64 cm (25")	90 cm (36")
6 Transformer (xfmr)	271 kg (598 lbs.)	112 cm (44")	56 cm (22")	53 cm (21")
Optional				
7 Console table	56 kg (125 lbs.)	76 cm (30")	119 cm (47")	91 cm (36")
8 Console UPS	130 kg (286 lbs.)	46 cm (18")	63 cm (25")	66 cm (26")

* Dimensions and weights for one unit

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