

# ICEBOX® SAS Serie

Enterprise SAS RAID Lösungen „Made in Germany“

Cost efficient memory for database environments and server virtualization

Being able to use SAS and/or SATA hard disks, the ICEBOX® SAS series can be applied in diverse areas.

No matter whether as memory expansion with SAS hard disks for database applications and central storage for server virtualization or for quick memory expansion with inexpensive SATA hard disks for file and backup servers.

Because of their excellent performance values, ICEBOX® systems are also excellently suited for all applications requiring consistent high speed, such as when streaming video and audio data.

With the option of expanding existing ICEBOX® units with up to 4 external ICEBOX® SAS JBODs, existing configurations can be expanded conveniently and very large capacities up to 160 TByte gross can be implemented quickly and inexpensively.

The ICEBOX® SAS series thus offers outstanding investment protection combined with highest quality standards.

The use of a highly efficient power supply also ensures a very low energy requirement of the ICEBOX® systems even under high loads.

ICEBOX® SAS systems are available with 8 or 16 hard disk channels and can be delivered with these external interfaces:

- ICEBOX® SQS : 2 x SAS Host Interface
- ICEBOX® iSQS: 4 x 1 GbE iSCSI Host Interface
- ICEBOX® FQS: 2 x FC 4 GBit Host Interface
- ICEBOX® JQS: SAS JBOD for expanding all ICEBOX® SAS systems

Thus, the ICEBOX® SAS can be used as Direct Attached Storage (DAS) or as mass storage for Storage Area Network (SAN) environments.



## Special features of the ICEBOX® series

- Vertical arrangement reduces mutual building up of hard disks
- Spring-mounted storage of hard disks as protection against vibrations
- Especially high-quality and reliable, highly efficient power units (> 80%)
- Analog alarm relay for LAN-independent notification
- 2 GB ECC cache
- Extremely reliable fans
- Wireless backplane design
- Sturdy stainless steel housing with ideal EMC properties
- The use of plastic parts has been omitted to a great extent
- Central locking as protection against unauthorized hard disk access
- Development and production in Germany in accordance with a certified quality and environment management (DIN EN ISO 9001:2008 und DIN EN ISO 14001:2005)



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## Greatest reliability:

The S.M.A.R.T. Correction technology includes Disk Self Test, Disk Scrubbing (integrity test of data with detection of faulty sectors and correction of parity faults) and Disk Cloning (periodic check of hard disks, data are swapped to hot spare drives in case of faults).

To guarantee data consistency in the event of unexpected power failure, the Controller Cache of the ICEBOX® SAS products can be backed up with a Battery Backup Unit.



Hot plug disk Carrier

## Excellent mechanical design:

The sturdy industrial design made of high-quality stainless steel is distinguished by its superb EMC properties and excellent thermal behaviour.

The individual hard disks are mounted on springs and arranged vertically. This protects them from vibrations and mutual build up (rotational vibration).



Hot swap,  
High efficiency power  
unit 2x500W

## Highest speed:

Because of the very powerful Intel® XScale® 64-bit RISC microprocessors, the ICEBOX® SAS systems are numbered among the fastest SAS and SATA RAID solutions ever.

The systems are also equipped with a maximum of 2,048 MB cach

Unit	Größe	RG	Status	Gesundheit	Verwendung	Vorkiefer	Serial#	Typ	Write Cache	Standby	Readahead	Command queuing
1	300GB	001	test	Online	Erfolgreich	RAID-Leafwerk	WDC-WA9LTV9363607	SATA2	Aktiviert	Deaktiviert	Aktiviert	Aktiviert
2	300GB	001	test	Online	Erfolgreich	RAID-Leafwerk	WDC-WCAG11020263	SATA2	Aktiviert	Deaktiviert	Aktiviert	Aktiviert
3	300GB	001	test	Online	Erfolgreich	RAID-Leafwerk	WDC-WCAG1104006	SATA2	Aktiviert	Deaktiviert	Aktiviert	Aktiviert
4	300GB	001	test	Online	Erfolgreich	RAID-Leafwerk	WDC-WCAG1104032	SATA2	Aktiviert	Deaktiviert	Aktiviert	Aktiviert
5	300GB	001	test	Online	Erfolgreich	RAID-Leafwerk	WDC-WCAG1104019	SATA2	Aktiviert	Deaktiviert	Aktiviert	Aktiviert
6	300GB	001	test	Online	Erfolgreich	RAID-Leafwerk	WDC-WCAG1103855	SATA2	Aktiviert	Deaktiviert	Aktiviert	Aktiviert
7	300GB	001	test	Online	Erfolgreich	RAID-Leafwerk	WDC-WCAG1104006	SATA2	Aktiviert	Deaktiviert	Aktiviert	Aktiviert
8	300GB	001	test	Online	Erfolgreich	RAID-Leafwerk	WDC-WCAG1104008	SATA2	Aktiviert	Deaktiviert	Aktiviert	Aktiviert
9	300GB	001	test	Online	Erfolgreich	RAID-Leafwerk	WDC-WCAG1104047	SATA2	Aktiviert	Deaktiviert	Aktiviert	Aktiviert
10	300GB	001	test	Online	Erfolgreich	RAID-Leafwerk	WDC-WCAG1104115	SATA2	Aktiviert	Deaktiviert	Aktiviert	Aktiviert
11	300GB	001	test	Online	Erfolgreich	RAID-Leafwerk	WDC-WCAG1107187	SATA2	Aktiviert	Deaktiviert	Aktiviert	Aktiviert
12	300GB	001	test	Online	Erfolgreich	RAID-Leafwerk	WDC-WCAG1104004	SATA2	Aktiviert	Deaktiviert	Aktiviert	Aktiviert
13	300GB	001	test	Online	Erfolgreich	RAID-Leafwerk	WDC-WCAG1104041	SATA2	Aktiviert	Deaktiviert	Aktiviert	Aktiviert
14	300GB	001	test	Online	Erfolgreich	RAID-Leafwerk	WDC-WCAG1103739	SATA2	Aktiviert	Deaktiviert	Aktiviert	Aktiviert
15	300GB	001	test	Online	Erfolgreich	RAID-Leafwerk	WDC-WCAG1104091	SATA2	Aktiviert	Deaktiviert	Aktiviert	Aktiviert
16	300GB	001	test	Online	Erfolgreich	RAID-Leafwerk	WDC-WCAG1103718	SATA2	Aktiviert	Deaktiviert	Aktiviert	Aktiviert

Configuration via Web Browser

## Easiest handling:

The ICEBOX® SAS systems are administrated via the Web and are thus independent of operating system and platform. A software installation is not necessary.

As a further configuration option, the ICEBOX® SAS provides access via terminal emulation (RS232), SSH or the front control panel with display (password protected).

All system-critical components and parameters are monitored. In case of a fault, notification occurs via SNMP Trap, email (SMTP), Win PopUp (net send) or by the network-independent alarm relay interface.



Hot plug fan



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## Best scalability:

ICEBOX® SAS products can house up to 16 SAS or SATA2 hard disks. A mixed assembly of both disk types is just as possible. The SAS Extension Port can expand the system by up to four additional SAS JBODs.

It is possible to configure up to 8 RAID arrays and up to 128 partitions (slices, UDV) per box.

LUN addressing occurs independent of Host. Dynamic RAID expansion (online expansion) and migration to a higher RAID level is possible. Automatic rebuilds are also supported.

The FC product (ICEBOX® FQS) supports Dual Loop as well as utilisation in a Switched Fabric (with SAN Masking) environment, iSCSI systems (ICEBOX® iSQS) and MPIO (multipathing)



ICEBOX-iSQS with 4 ICEBOX-JQS  
maximum 80 disk drives  
maximum 160 TByte gross

The RAID controller is on a cold swap rack and can be exchanged quickly and easily at need.



ICEBOX-FQS rear view

## Technical specifications short form:





Host interface:	2x SAS, 2x FC 4 GBit or 4x iSCSI
Disk interface:	SAS- and SATA II, 3,5", up to 15.000 rpm disk drives
Number of disk drives:	8 or 16, with JQS extension up to 80 disk drives
Max. gross capacity per unit:	32,0 TByte (using 16 x 2.0 TByte SATA drives) per unit
Extension:	via SAS expansion Port max. 4 JBOD units, up to 160 TByte gross
Backplane design:	Passive single backplane
Event notification:	SMTP, SNMP and „Win-Popup“ (netsend), Analogue alarm interface relais for LAN independent notification
RAID:	<ul style="list-style-type: none"><li>• up to 16 SAS or SATA II disk drives</li><li>• up to 8 RAID arrays at same time, 16 User Data Volumes per array</li><li>• RAID Level 0,1,0+1,3,5,6,10,30,50, 60 and JBOD</li><li>• automatic rebuild</li><li>• online expansion, RAID- and volume migration</li><li>• Hotplug of fans, power supplies, disk drives</li><li>• Administration via WebBrowser, RS232, SSH</li></ul>



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# ICEBOX® SAS Serie

## Technical data

	ICEBOX-SQS	ICEBOX-iSQS8	ICEBOX-iSQS	ICEBOX-FQS	ICEBOX-JQS
					
<b>Operating system</b>	independent from OS and host transparent				
<b>CPU</b>	Intel XScale IOP341 64Bit RISC	Intel XScale IOP342 64Bit DC RISC	Intel XScale IOP341 64Bit RISC		--
<b>Host interface</b>	2x SAS	4x GbE iSCSI (1000BaseTX)	2x FC 4 Gbit		2x SAS
<b>SAS expansion port</b>	yes, fo a maximum of 4 JBOD units (Daisy chained)				1
<b>Disk interface</b>	optional SAS and/ or SATA2, mixed mode is possible				
<b>Disk channels</b>	16	8	16	16	16
<b>cache</b>	2048 MB				--
<b>RAID level</b>	0, 1, 0+1, 3, 5, 6, 10, 30, 50, 60 and JBOD				
<b>Hot spare</b>	Global and dedicated				
<b>Hot swap</b>	disk drives, power supplies, fans				
<b>Online expansion</b>	yes				
<b>RAID migration</b>	yes				
<b>Stripe size</b>	variable 4k, 8k, 16k, 32k, 64k				
<b>Write option</b>	write through, write back				
<b>Remote management</b>	Web Browser, SSH, RS232 serial connection				
<b>Remote alarm</b>	SNMP, SMTP, Win Popup (netsend)				
<b>Analogue alarm interface</b>	yes				
<b>Access control</b>	Key lock, password				
<b>Fans</b>	4x 80 mm ebmpapst				
<b>Power unit</b>	2x500W high efficiency 80+				
<b>Voltage input</b>	Voltage: 90 ~ 264 VAC Full Range, Frequency: 47 ~ 63 Hz, Inrush current: 25A MAX. FOR 110 VAC , 50A max. for 220 VAC (at 25 degree C ambient cold start) PFC: up to the target of 95% @110V, full load				
<b>Power consumption</b>	start up ~ 470 W, idle ~ 175W, full load ~ 215 W, (each with 16 SATA2 disk drives)				
<b>Environment</b>	Temperature 0° C ~ 40° C, humidity 20% ~ 75% non condensing				
<b>MTBF</b>	ca. 121.421h				
<b>Dimensions in mm</b>	W 482 x H 177(4U) x D 530				
<b>Weight (without HDD)</b>	22 kg				