



Ji2, Inc.
11235 Knott Ave., Suite. #C, Cypress, CA 90630
phone: (562) 597-1482 fax: (714) 895-7300

To Procure the Rack System

White Paper

Total Cost of Ownership Analysis:

www.hdd.ji2.com

Table of Contents

- 1. Executive Summary..... 3
- 2. Key Benefits..... 3
- 3. Summary of differences from other competitors: 4
- 4. Comparison Chart: Hardware vs. Software based system..... 5
- 5. Fully Customizable System..... 7
- 6. Hardware Solution Technical Advantage 9
- 7. About Ji2 10

1. Executive Summary

Many enterprise customers today are using HDD hardware solutions over software or software-hardware hybrid solutions because of the TCO* (Total Cost Ownership). We, Ji2, understand the upcoming hard drive industry's needs due to our ongoing relationships with many of the largest HDD manufacturers and its recycling companies worldwide. Our hardware Testing/Recycling/Duplicating solutions are reliable and flexible with absolutely MINIMUM TCO.

* TCO offers a statement on the financial impact of deploying an information technology product over its life cycle.

$$\text{TCO} = [\text{Hardware and programs}] + [\text{Operation expenses}] + [\text{Long term expenses}]$$

2. Key Benefits

Hardware and programs

- Quick and Easy Installation
- 12 month Warranty
- NO License, Usage or Renewal Fees
- Build Quality
- Low Maintenance Costs

Operation expenses

- Space Efficiency
- Minimal Training Required
- Higher Output in Less Time
- Free Lifetime Technical Support
- Minimal Management Involvement

Long term expenses

- Low Repair Costs
- Low Upgrade Costs

Full Control:

The operator has complete control of the system. Custom parameters can be set. Custom operations can be created. There are no limits to how much the system can be customized.

Get them up to speed:

Fast is the only speed your customers will ever know. Rack System can produce speeds up to 7GB per minute. (Max 133MB/s)

Independent Port Control:

Independent port control allows for the operator to run any combination of drives (brand, capacity, interface type, etc) and for errors on one channel to not affect

Adaptability:

Unlike software solutions, the Rack System offers several types of customization to meet any business needs.

Maintenance:

Less than \$500 average out-of-warranty repair costs over 3 years.

Automation:

Being a Push-button solution means less manpower is required because multiple tasks can be run automatically at the push of a single button.

Quality:

Customers have experienced up to 9,000 insertions without failure due to the high quality cables, adapters, and boards used in YEC products.

3. Summary of differences from other competitors:

What you get is real quality and real value.

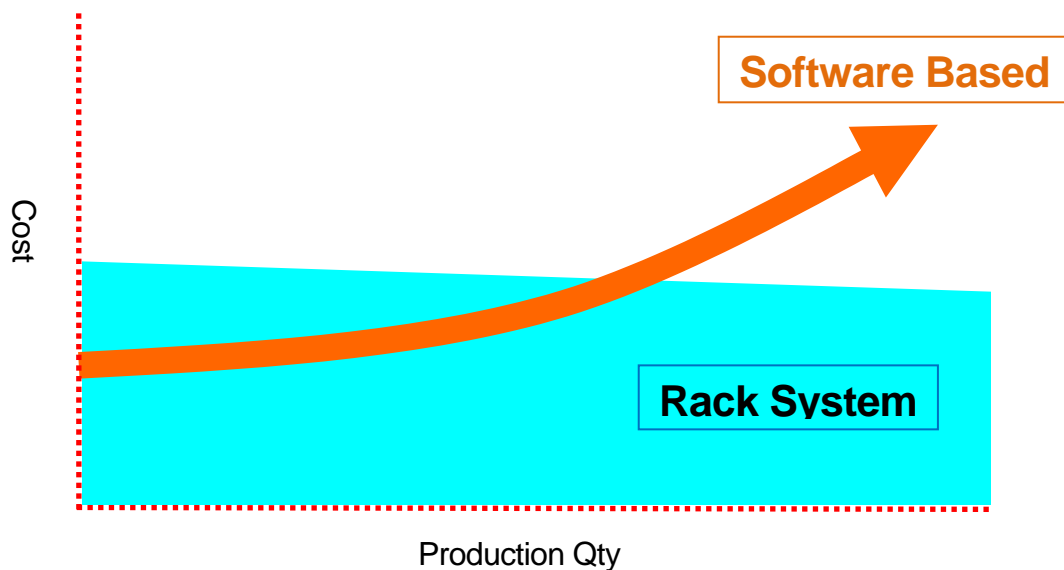
The hardware-based Rack System is a top of the line, premium investment and it may not be the ideal solution for some smaller operations. If you have the business volume, what you are really getting from the Rack System is a reliable return of investment. The key is [**Less Manpower + Fast Processing Speed + Low Maintenance + Low Return Ratio = PROFIT**]. A less robust solution can ultimately affect your company's profitability as your business grows

Hardware technology is the way of the future! Standard features like **UNLIMITED COMMAND CUSTOMIZATION CAPABILITY** allow the user to have complete control of the ultra-fast hardware technology and generate more revenue because of higher output and simple automation. Looking at it as a long term investment, software solutions can increase costs and affect your margin. The Rack System solution's initial fix cost will decrease over time while your profit continues to increase.

Key Index for Hardware Solutions:

- ◆ **Test & Recycling Cost per HDD:** [\\$0.65](#)
- ◆ **Output capability:** [Average 450 per day](#)
(14 Work Hour - 250GB SATA)
- ◆ **Control your test/recycling/duplicating operations:** [Linear Control](#) vs. Step Control
- ◆ **Detail data comparisons:** [Integrate with any Database systems](#)

Bottom Line: Hardware Technology is better solution if you have Volume to process



4. Comparison Chart: Hardware vs. Software based system

You want to make the right decision and provide your company with the solution that best fits your needs for today and the future. The comparison chart below is from information we have gathered from customers' experience with both the hardware-based Rack System and competing software solutions.

	Rack System	Competitor (Software)	Competitor (Hardware/ Software Hybrid)
40 Port Unit Cost	\$62,000 (Software/hardware cost)	\$40,000 (Software/hardware cost by manufacture)	\$75,000
Price Per Port	\$1,550	\$1,000	\$1,875
Cost Per Drives	65 cents * (36month amortized)	Starting at \$3 per drive on PAYG Plan	N/A
Test Features	Unlimited	Limited	Unlimited
Process Capability	10,000 ** HDD/month	4,500	N/A
Manpower required to operate	0.5	2	1.5
Customization	Unlimited	Limited	Limited
Data Speed	Average 4-6GB per min.	Average 1GB per min	Average 4-6GB per min
Warranty	1 Year	90 day, PAYG or Self Support	90 day
Maintenance	\$1,800 per year	\$1,500 per year	Base on contact
Support	Free lifetime	Contract, PAYG or Self Support	Base on Contract
Size & Weight	300lbs Aluminum Frame	500+ Lbs Bulky Storage Server Design	1000 – 2200lbs.
Good for	Data Center, Recycling, RMA	Data Center, Recycling	Manufacturing

***Cost Per Drives Calculation: (3 years amortization plan)**

$$\{[\text{Unit+ Maintenance fee: } \$67,400] + [\text{Labor: } \$4,620 \times 36]\} \div [\text{Output: } 10,000 \times 36] = \mathbf{65 \text{ cents}}$$

****Process Capability Calculation:**

**Cycle Time = 69min,
Output = 10,000 HDDs per month**

	Rack System 1 Cycle Time (Basic Script)
Load/Unload 40 Ports	300 sec.
Power On	15 sec.
Secure Erase	63 min.
Test Time	11 sec.
Functions	Test, Wipe, Repair, ATA Command Control
Total:	69 min

	Rack System Output Capability
40-Port	1
Total hours of operation per Month (14 hours a day x 22 days)	308
Manpower Cost (1 Staff for each 7 working hours \$15/hr x 2)	\$4,620
Output Per Month (455 drives each day x 22 Days)	10,000

40 Port Unit Cost:

Rack System averages 15% more in landing cost. The extra cost is one time vs. software solutions which added PAYG Plan (Pay-as-you-Go) that can add up quickly over time.

Price per Port:

Initial System total cost divided by the number of ports. Rack System support multiple connection types, where Software System only has single FIXED connection type.

Cost Per Drives:

Almost the same price.

Test Features:

Software solutions lack customizable Test features.

Customization:

Rack System offers multiple customizations vs. software solutions, which just offer plain linear pass or fail with very limited details of the procedure.

Data Speed:

Rack System hardware based technology can produce speeds of up to 4GB per min.

Warranty:

Rack System offers 1 year warranty with lifetime technical support. Software solution's warranties are very short and support contract prices are often very high. Also, with software, if you use your own hardware, then the support is not fully covered.

Maintenance:

Rack System parts (cables/adaptor) can handle up to 9000 insertions. Based on high volume output of 488 drives a day, the average cost for Rack System wear and tear parts will average \$1,800 a year. Software System will average \$1,500 a year for PC parts plus wear and tear parts.

Support:

Free lifetime technical support for Rack System. Software system offer limited or very expensive support contacts

Size & Weight:

Rack System is built on a light-weight aluminum frame with few moving parts.

5. Fully Customizable System

Why is customization GOOD?

Customization allows for complete control of every aspect of the Rack System, including operations run on the system, output rates/percentages and reporting. Because the Rack System is fully customizable, it's able to detect very **WEAK hard drives** that may not be detected on traditional software-based systems.

Timeouts	Allow drives longer time to be recognized and/or respond to commands
Retry Counts	Allows damaged/unstable drives more attempts to read/write data successfully
Read Area	Customize the area that will be part of a Read Test
Write Area	Customize the area that will be overwritten or part of a Write Test
Seek Count	Customize the number of sectors to seek as part of the Random Seek Test
Combine Any	Any operation that can be run individually can be run combined with another script
Sector Skip	Enable or disable the skipping of sectors during Test, Wipe or Repair operations
Interface	Systems are custom built with ATA, ATA/SATA, or ATA/SATA/SCSI configurations
Log Files	Customizable columns for CSV report file
Logging Location	Store log files in any location (network or local)

Unlike the Software solution, the Rack System is a fully customizable system, which allows for customization of all HDD operations such as timeouts, retry counts and other testing procedures. This allows the user to create operations that fit their business' needs. Operations can be made very stringent to minimize the percentage of RMAs or made less strict to produce a higher yield of passed disks. You will experience a rise in productivity like never before.

Figure 2.3 – Configure and set your own parameters linearly. There are no limits on how much control you want for the output ratio. Find a common balance between how much risk you are willing to take for Quality vs. Return (RMA) issue.

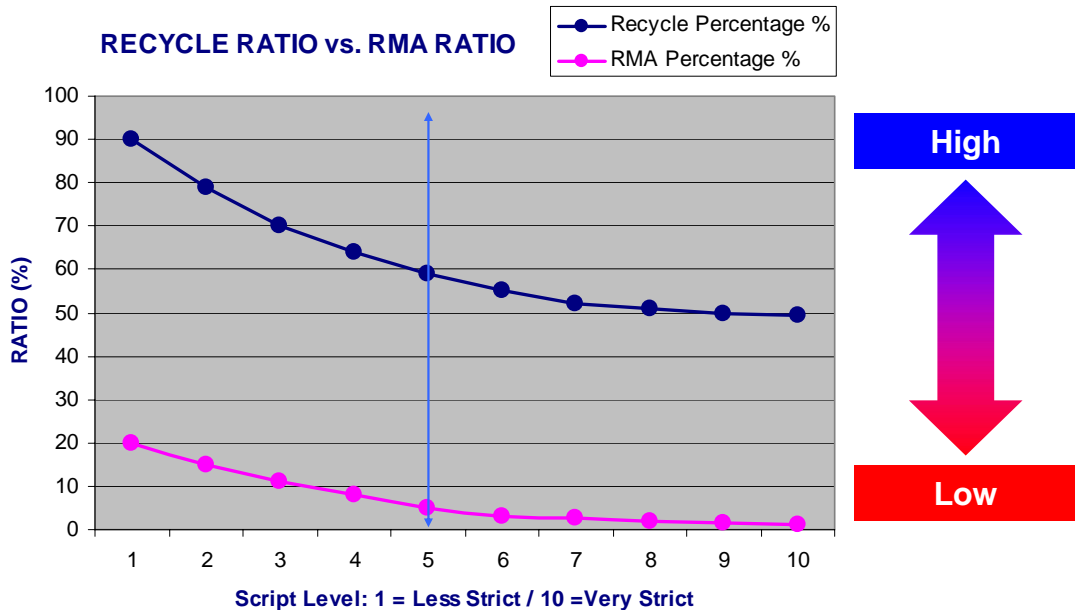


Figure 2.4 - Rack System offers multiple customizations that you can set the level of control you want.

Recycle %	RMA %	Script Level	Script Level
90%	20%	1	Less Strict
79%	15%	2	
70%	11%	3	
64%	8%	4	
59%	5%	5	Standard Script
55%	3%	6	
52%	2.5%	7	
51%	1.9%	8	
50%	1.5%	9	
49.5%	1.3%	10	Very Strict

Less Script (top) / Very Strict (bottom)

6. Hardware Solution Technical Advantage

The hardware-based Rack System is a fully customizable system that can meet any customer's needs, with respect to number of ports, interface types, operations, RMA ratio, etc. Compared to similar systems, the Rack System provides the most flexibility and the best return of investment. There are three main cost savings factors to consider with the Rack System: **configurability**, **reliability**, and **detection**.

Configurability

There are several areas of the Rack System that are customizable, which can dramatically increase productivity and save costs compared to alternate solutions. Examples of customizable areas include:

- **Timeouts and Retry Counts** — Allows for complete control of the timeouts and retry counts for any operation allowing operators to use custom thresholds appropriate for their application. Values can be set lower to decrease RMA ratio or higher to increase disk output: it's completely up to the operator.
- **Operations** — Custom operations can easily be created to run any combination of available functions (Test, Repair, Erase, Write, Read, Read Compare, Self-Test, etc). This allows for operations that would previously have required multiple different scripts to be run to run automatically at the touch of a single button. Operations can also have custom Read, Write, Read Compare areas to minimize the time to process a drive, instead of being limited to running it over the entire disk, which can take several hours on newer, large capacity disks.
- **Interface Types** — The interface type selected on one port does not affect another. A SCSI script can be run on Port 1, a SATA script run on Port 2, and an ATA script on Port 3. After those drives are finished, different interface types can be connected to the same ports without a system restart. The Rack System is also custom built for every order, so it can be configured with any combination of ATA, SATA, and SCSI ports.
- **Reporting** — Log files are automatically created for every operation run on the Rack System and the location the log files are stored is an option. This allows the operator to store log files automatically onto the local machine, a USB drive, or even a network share. The fields recorded in the CSV version of the log file are also easily customizable by the operator.

Reliability

Because the Rack System is a custom built hardware-based system, it's very reliable. With minimal moving parts, very few items become damaged over time. In most cases, only wear items, such as interface and power cables, need to be replaced, which greatly reduces costly downtime.

Detection

Unlike software solutions, the Rack System does not rely on a PC BIOS to detect connected hard drives. Without relying on the BIOS, the operator is able to customize timeouts, retry counts, and other identification parameters to allow weak and unstable hard drives more time to be detected, which is not possible in software solutions. A higher detection rate results in more drives being able to be processed and a higher output ratio.

7. About Ji2

Ji2 Inc. is your direct source, outside of Japan, for high-end hard drive management products manufactured by YEC. We offer a wide range of hard drive solutions for HDD duplication, test, wipe, repair, computer forensics, and data recovery. We specialize in industrial grade fixtures for consumer electronics production and HDD recycling, with dedicated departments with expertise in data recovery, forensic computer investigations, and HDD analysis. Ji2 works hard to provide customers with access to the best tools available in the global market. Our goal is to maximize our customers' return of investment by providing value from the end user's perspective.

Ji2, Inc.
11235 Knott Avenue, Suite C
Cypress, California 90630
U.S.A.

Phone: (562) 597-1482
Fax: (714) 895-7300
Sales Inquiries: info@ji2.com
Technical Support: support@ji2.com
Business Hours: Mon-Fri 9AM to 5PM (PST)