



Crossroads Systems, Inc.

Putting a New Face on Tape Data Storage

Research Re-Initiation | June 1, 2012

SEEING VALUE OTHERS DO NOT. CREATING VALUE OTHERS CAN NOT.



Headquarters

Austin, TX

Employees

Approximately 100

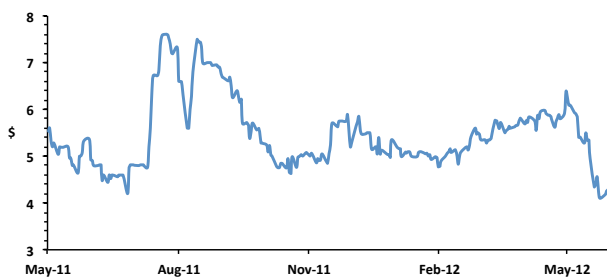
Fiscal Year End

October 31

Listing

CRDS (NASDAQCM)

Price Performance



	YTD	3m	6m	12m
Return	-17.73%	-20.19%	-17.88%	-20.34%

Last Price	\$4.27
Date of Price	5/31/12
52-week Range	\$3.25 - \$8.00
Shares Outstanding (mm)	7.59

ANALYST INFORMATION

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Please read the disclosures beginning on page 37 for important required information, including analyst certification.

We are re-initiating coverage of Crossroads Systems, Inc. (“Crossroads,” or the “Company”). Crossroads provides solutions and services for effective data archival, management, protection and recovery based on a new tape format that could disrupt the data storage industry.

Growing Market

The rapid growth in digital information is driving demand for archive digital storage solutions across multiple markets. IT professionals are becoming more concerned about their ability to meet this storage need with their existing levels of capacity; in a recent survey, nearly half of all IT professionals ranked data growth as one of their top 3 challenges.

Disruptive Technology

Crossroads’ StrongBox solution leverages the benefits of the newest generation of the Linear Tape-Open (“LTO”) standard to archive data on tape. StrongBox significantly improves upon the other offerings that utilize the LTO standard by offering faster file retrieval speeds, more user-friendly navigation, and the enhanced monitoring capabilities of Crossroads’ proprietary RVA software.

Strong Intellectual Property Position

Crossroads has historically earned a large part of its revenues by licensing its intellectual property (“IP”). Crossroads has thoroughly protected both its existing and emerging product portfolio through patents and continues to make consistent progress in developing, patenting and monetizing its legacy technologies.

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Background

Crossroads has significant experience and leadership in data storage systems and software, and has successfully licensed its proprietary technology to large information technology players.

The company currently offers three main products: StrongBox, the ReadVerify Appliance, and SPHiNX.

History

Founded in 1996, Crossroads' original product suite included a line of data routing solutions/devices for Storage Area Networks ("SANs") that reduced the complexity and overhead involved in managing new and existing storage architectures. As the storage hardware business began to become commoditized, Crossroads shifted its focus to developing innovative solutions in storage software.

Crossroads had a successful IPO in 1999 and a secondary equity offering in 2010. In 2007, Crossroads acquired Grau Data Storage's FileMigrator Agent technology, which automatically moves rarely-accessed data to cheaper storage media.

Crossroads has generated significant revenues to finance its growth and product development efforts by licensing its technology to large information technology players such as Fujitsu, Symantec, QLogic, and Dot Hill. The Company primarily licenses 8 patents (the "972 Patent Family"), which cover technology that is foundational to connecting workstations to data storage devices of During its last fiscal year, Crossroads generated approximately \$5.1 million from licensing its IP.

Crossroads has approximately 100 employees. Its headquarters are in Austin, Texas.

Products

Throughout its history, Crossroads has developed several different products, including an industry-leading router solution. It currently sells three main product lines, along with associated maintenance for fixing issues and providing software updates.

StrongBox

Recently, Crossroads has focused most of its development efforts on its StrongBox appliance, which is a solution for archiving, managing, protecting, and recovering data utilizing LTO technology. (See "LTO," below, for a longer discussion of LTO.)

StrongBox is an appliance, which means it is both hardware and software; this is distinct from an application, which is only a piece of software. (An appliance is an actual box that fits into the physical data center.) StrongBox connects to a library containing LTO tapes and makes the data in that library appear just like data in any other shared drive to an end user. This is not currently possible with traditional tape storage libraries, and has significant benefits to enterprises and their employees in terms of cost, speed, reliability, and data accessibility over solutions based on traditional tape libraries, disk arrays, or other LTO offerings.

As StrongBox was very recently introduced to the marketplace, it does not currently generate meaningful revenues. Based on management guidance, we estimate sales of StrongBox represent approximately 10% of Crossroads' product revenues. However, we believe that the technology underlying StrongBox is currently the strongest in the LTO management market, and is potentially disruptive to the growing data storage market.

Background

ReadVerify Appliance

Crossroads' ReadVerify Appliance ("RVA") provides real-time monitoring and error correction to an entire data storage system. RVA helps data storage managers determine whether or not they have the right amount of storage, whether their storage media is failing, how often users utilize their storage, and other reports on the health of their data storage systems.

Historically, Crossroads has sold RVA as a stand-alone appliance to customers who want a view of the health of their entire storage environment, which is typically comprised of various tape and disk solutions that do not communicate with one another effectively. However, the Company has integrated the functionality of RVA into StrongBox, so going forward, Crossroads intends to generate revenue from RVA by selling StrongBox. RVA sales currently account for approximately 40% of Crossroads' product revenues.

SPHiNX

Crossroads SPHiNX appliance is a backup management tool. (Backing up data is distinct from archiving it, in that archiving is the practice of storing rarely accessed data, while backing up is the practice of making redundant copies of commonly accessed

data to ensure that it will be available in the event of drive failure, software bugs, or hacker attacks.)

SPHiNX replicates backup files remotely by synchronizing data copies between physical storage (either tape libraries or disk arrays) and one or more host servers. Crossroads sells SPHiNX as an add-on to midrange IBM servers. In addition, Crossroads sells a white label version of SPHiNX to Hewlett-Packard ("HP"), which re-sells the product with HP branding.

We estimate that SPHiNX sales account for approximately 50% of Crossroads' product revenues, of which approximately 75% is sold under HP branding.

Fibre Channel Storage Bridges and Routers

Crossroads sells Fibre Channel ("FC") Storage Bridges and Routers based on its proprietary router-management interface technology. Though sales of these products do not contribute significant revenue to the Company, the technology underlying them—which is protected by the 972 patent family—is the source of much of its licensing revenue.

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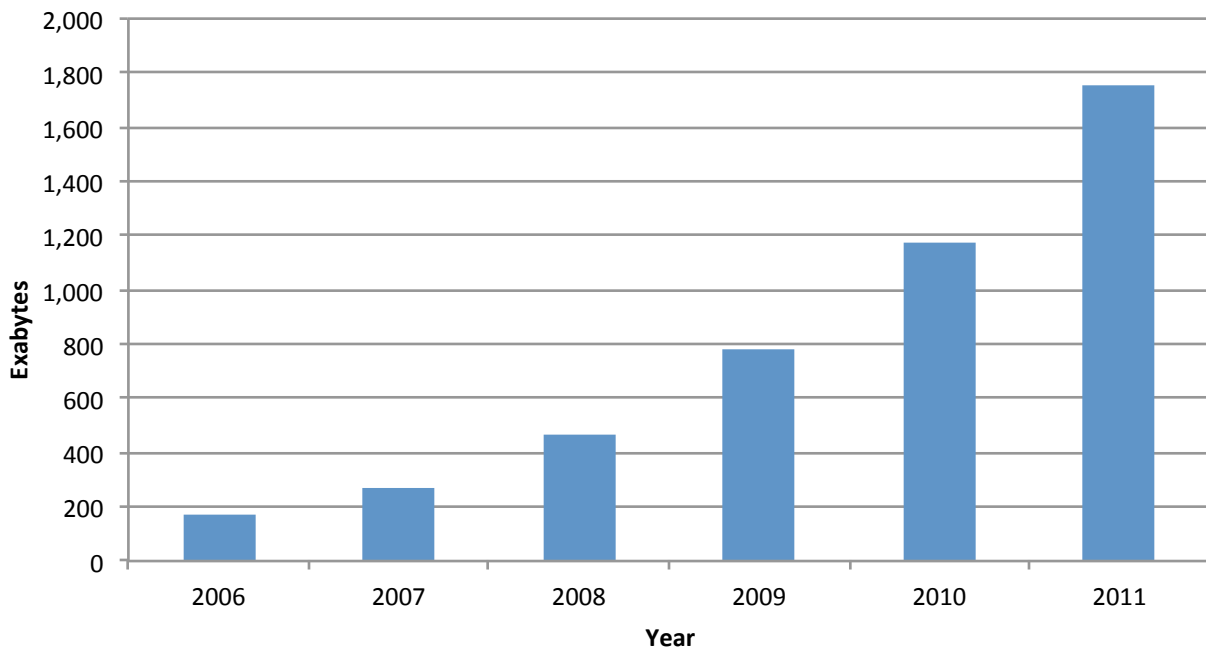
Digital information storage needs are growing rapidly, which is creating a gap between storage supply and demand.

Problems with existing data storage solutions prompted the development of LTO, a new tape standard that improves on the performance of the incumbent tape and disk technologies.

Growth

The trend in the industry is that enterprises are storing significantly more data with each passing year. According to estimates from storage industry analysts International Data Corporation (“IDC”), global data storage needs have increased eightfold over the past five years, for a compound annual growth rate of over 50%. (See Figure 1.) The growth in data shows no signs of abating; according to a 2011 IDC report, the amount of stored data will grow still 44 times larger by 2020.

Figure 1: Digital Information Growth



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Pain Point: Storage Gap

The rapid growth in digital storage needs will make it difficult for storage availability to keep pace. Industry experts foresee a large gap between storage supply and demand. (See Figure 2.)

There are several reasons for this rapid growth in data storage.

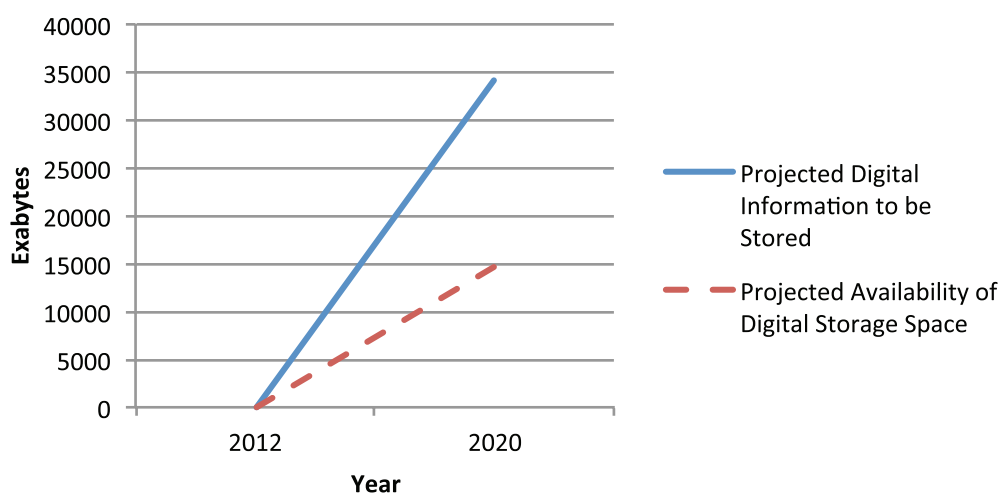
Processing Power Growth

As computing power continues to advance, users can create “rich media” files with clearer and more detailed image, audio, and video content. Those files are orders of magnitude larger than the traditional, text-based files that dominated the enterprise landscape just a short while ago. These files provide an

opportunity to perform analytics that were previously impossible.

The medical imaging industry provides an example of this trend. According to the National Institutes of Health, an average mammogram study is based on four different image slices that total 200 MB in size; by contrast, an amateur photograph from a digital camera might be approximately 2.5 MB. As imaging technology becomes more sophisticated, the density and quality of the images it produces will increase, which will translate into larger file sizes. In addition, the Obama administration has outlined a plan to move to computerized health records by 2015; this will make storage of these large image files more widespread, which will continue to spur growth in the sector.

Figure 2: Emerging Digital Storage Gap



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Compliance

Both the United States and foreign governments have passed regulations creating new business requirements for data storage. Among others, Sarbanes-Oxley, the Health Insurance Portability and Accountability Act and new eDiscovery laws all impose data retention requirements. The court system has also begun to expect that businesses will retain data. In one recent decision concerning a slip-and-fall at a supermarket, a US court ruled that the supermarket’s policy of retaining surveillance footage for “only” a few weeks “shock[ed] the conscience of the Court” and created a presumption that the supermarket was acting fraudulently.

The video surveillance industry has experienced rapid growth due to increasing security concerns on the part of corporations. The file sizes they can produce with the rise of high-definition video are some six times the size of standard video files. As retention standards for these large files grow to longer durations, they will drive data storage needs accordingly.

Monetization

Finally, businesses are realizing that they can monetize archival data. In particular, the entertainment and media industry prioritizes the sale and repackaging of its archival video, audio, and image data. In the media industry, the data is the product, and archive data is inventory that can be repackaged and reused to generate future revenues.

Trend Towards Tiered Storage

This rapid expansion of storage needs has not escaped the attention of IT buyers. According to a 2010 Gartner survey of information technology professionals, data growth is the biggest data center hardware infrastructure challenge for large enterprises, with almost half of all respondents ranking data growth as one of their top 3 challenges.

Though enterprises are likely to continue to increase the amount of data they store, the reality is that in most businesses, archival data is not likely to be referenced again. According to a University of California-Santa Cruz study, more than 90 percent of stored data was never accessed again, and another 6.5 percent was only accessed once. (See Figure 3.)

Figure 3: Data Aging and Accesses

Age in Days	Probability of Re-reference
1	70-80%
3	40-60%
7	20-25%
30	1-5%
90+	Near 0%

Source: University of California-Santa Cruz

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Because of this, industry analysts have long argued that the best practice is to put infrequently accessed data on a cheaper form of storage media than active data. (This practice, called “Tiered Storage,” is conceptually similar to keeping a tax return you are actively completing on your desk, while keeping previous years’ returns in your garage.)

In a tiered storage model, IT administrators set policies to govern where to store particular types of data. These rules are often time-based; i.e., “If a file has not been modified in 5 days, move from Tier 1 to Tier 2.” Analysts also define data tiers from the storage technology side; i.e. “Tier 0 is the data that is stored on solid state drives.” (See Figure 4.)

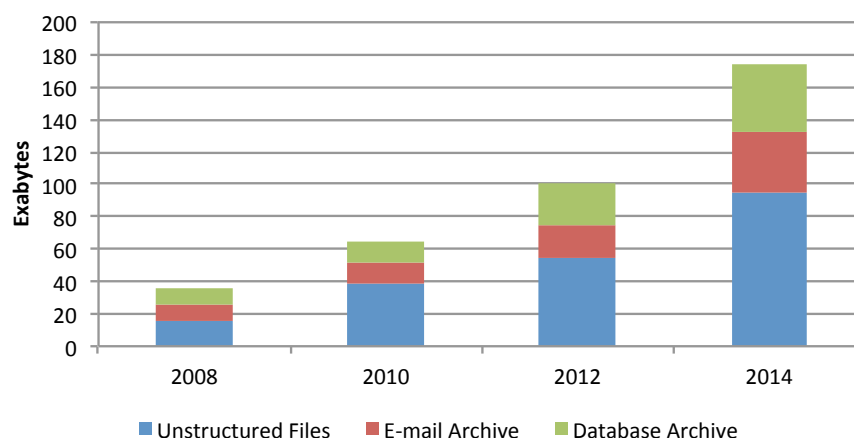
Figure 4: Data Tier Definitions

	Average Date Distribution	Types of data	Availability	Type of Technology
Tier 0	1-3%	Emerging for ultra-high performance applications	99.999+	DRAM SSD, flash HDD
Tier 1	12-20%	Mission-critical, revenue generating, high performance	99.999+	Enterprise-class HDD, RAID, mirrors, replication
Tier 2	20-25%	Backup/recovery applications, reference data, vital and sensitive data	99.99%	Midrange HDD, SATA, virtual tape, MAID, integrated virtual tape libraries
Tier 3	> 43-60%	Fixed content, archive, compliance, long term retention, green storage applications	99.9%	High capacity tape, MAID, manual tape, shelf storage

Source: University of California Santa Cruz

The bottom tier, or Tier 3, is growing at a very fast pace, primarily as the result of the factors described above. (See Figure 5.) This growth has prompted storage companies to develop solutions to address emerging data storage needs.

Figure 5: Tier 3 Data Growth and Composition



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Industry Response: LTO

In 1997, IBM, HP and Quantum, which were among the largest players in the tape library industry, began to notice that, as a result of the difficulties that tape storage was posing to their enterprise customers, tape storage was ceding ground to HDD-based storage in the archival and backup markets. As a reaction to this trend, these tape storage players founded the LTO Consortium, which set out to develop a new standard to address many of the pain points inherent to tape storage. In so doing, the consortium addressed many of the pain points inherent to disk storage as well.

Benefits Over Traditional Tape Solutions

LTO-5 presents significant benefits over traditional tape libraries, which still make up the majority of the data archive market.

- **Non-proprietary**

Perhaps the foremost flaw with traditional tape libraries is that they have been proprietary in nature, which means that in order to access the data stored in a traditional tape library, an IT manager has to use the software that came bundled with the library hardware. This may not be an issue when an organization has all of its archival storage in one software environment, but in practice this is not often the case; typically, for one reason or another, a business will have several legacy tape systems it is supporting at once.

Maintaining these systems causes pain for IT professionals (who typically have input in the enterprises' purchasing decision of these systems). In addition, the proprietary nature of these traditional tape systems constrained vendor

choice, meaning that these enterprises were limited in their ability to comparison shop for new solutions as emerging players reached the market.

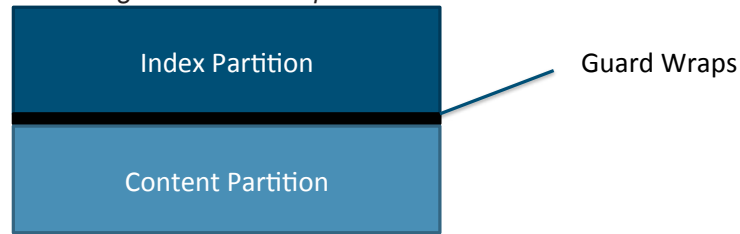
One of the most relevant benefits of the LTO standard over traditional tape is that it is non-proprietary, meaning that any brand of LTO library can read LTO tapes. This cuts down on the number of legacy environments an IT manager has to maintain an enterprise's archive. (IT managers will, however, continue to need to manage different generations of LTO itself, since, as the standard is upgraded, new versions of LTO tape will not work with older versions of LTO drives.)

- **Self-describing**

Another key issue with traditional tape is that it is not self-describing. To understand the concept of self-description, consider audiocassette tapes: in order to know what is on the tape, one has to refer to a separate log (like the track listing on an audio cassette). If that log is not available, one must read all of the data on the tape to see if the relevant file (a song, on an audiocassette) is there. This is because the tape does not have a file directory that can describe itself to the drive.

A major feature introduced in LTO-5 was the Linear Tape File System ("LTFS"). LTFS makes it possible for users to view the contents of a tape not the opaque way they would view the content of an audiocassette, but the same transparent way they would view the contents of a USB thumb drive—when the tape is in the drive, a user can see the index of everything that is on the tape. LTO-5 accomplishes this by partitioning the tape into an index partition (where the index of the

Figure 6: LTO-5 Tape Partitions.



Note: Image not to scale

tape is stored) and a content partition (where the underlying data is stored). (See Figure 6.)

Previously, tape users had to keep an offline index of what was on each tape; with the advent of LTFS, those indices are less necessary.

However, we note that, just as with a USB thumb drive, most LTO-based solutions do not offer a persistent view of the files, which means that once the tape is ejected from the drive, the files on it are no longer visible to the end user.

- **Reduces manual interactions**

IDC projects that over the next decade, the number of servers (virtual and physical) worldwide will grow by a factor of 10, the amount of information managed by enterprise datacenters will grow by a factor of 50, and the number of files the datacenter will have to deal with will grow by a factor of 75, at least. Meanwhile, the number of IT professionals in the world will grow by less than a factor of 1.5.

These trends imply that IT professionals will need significant automation to be able to serve the data storage needs of the future. To that end, we note that enterprise IT managers have struggled with the lack of self-description in traditional tape. When users need to find files on traditional tape archives, they must ask the help of IT or records departments, since they keep the log of which file is on which tape. Paging those files is a manual process: it requires a person to search the log,

find the tape, and then manually input that tape into a drive for upload to the user. Depending on the staffing level of an IT department, this process can take several days to complete.

Because LTO has a file system associated with it, an end user can view files archived to a network-attached LTO storage library and page the file without the help of an IT professional.

- **Benefits Over Disk-based Solutions**

Historically, enterprises have archived data to tape media, though over the past decade hard disk drive (“HDD”) arrays have taken significant archive market share from traditional tape libraries. LTO-based libraries demonstrate certain key advantages over disk-based solutions.

- **Cost**

The main problem with using HDD arrays as archival storage media is the cost. The biggest factor that makes HDDs more expensive than LTO-based libraries is the hardware; not only are HDD arrays more expensive than LTO libraries to being with, but the fact that they are constantly spinning frequently leads to mechanical errors that necessitate HDD replacement. There are other factors that make the total cost of ownership of an HDD array higher than an LTO-based library. In general, disk storage media is more expensive per GB of storage than tape media; and, because HDDs must spin constantly,

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they require more electricity to operate and cool than tape drives.

However, there are two factors that make it difficult to determine exactly how much more expensive an HDD archive library is than a tape-based solution.

Bias: Studies comparing these costs are often commissioned by vendors of tape or disk libraries for use in marketing materials, which throws the studies' conclusions into question. The fact that these vendors can configure storage solutions in hundreds of ways makes direct comparison difficult to make and misleading conclusions difficult to avoid.

Projection Error: In addition, the preferred method of measuring the cost of an archiving solution is in terms of the total cost of ownership ("TCO") of a solution. This requires several assumptions regarding highly variable factors, including energy costs, drive replacement rates, and costs of the expected headcount needed to manage the systems. The difficulty in assuming the impact of technological advancements in these industries exacerbates the problem; for example, the potential impacts of the recent push towards data deduplication (which saves space by deleting some redundant data from the archive) can vary widely.

After reviewing several studies, we are persuaded that the TCO of an LTO-based solution will, for most enterprise applications, be significantly less than that of an HDD solution. Estimates by independent organizations such as the Clipper Group, the Enterprise Strategy Group, Qualstar Corporation, and Brad Johns Consulting estimate the TCO savings from an LTO solution

at anywhere from 50% to 80% over 10 years. Even after discounting those estimates to account for the factors we described above, we believe the cost difference between the two archival platforms is likely to be fairly significant.

- **Security**

Another key problem with HDD-based solutions is that, because they are always online, they are prone to failure from software bugs, viruses, and hacker attacks. This can pose a challenge, if the backup is also on HDD systems. In March 2011, some Google users experienced an error resulting from a software bug that wiped out all of their Gmail messages. At the official Gmail blog, Ben Treynor (Google VP Engineering and Site Reliability Czar) explained:

How could this happen if we have multiple copies of your data, in multiple data centers? Well, in some rare instances software bugs can affect several copies of the data... To protect your information from these unusual bugs, we also back it up to tape. Since the tapes are offline, they're protected from such software bugs.

To be clear, the Google issue relates to data backup, which is distinct from archiving. However, because most HDD-based archival solutions are also always online, the same risk of data loss due to software bug, virus, or hacker attack is present in the archival market as well. By contrast, since LTO-based archive solutions are primarily offline (because when the tape is not in the drive, it is not connected to the system), they are less vulnerable to hacker and data corruption risks.

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- **Throughput speed**

One way to fix problems like the one Google experienced would be to take HDD-based data offline, by putting it in a different physical location than the rest of the data center. However, this poses challenges as well. Since hard disks are not removable from most HDD solutions, the only way to transfer data from HDD solutions is to use network connections. Unfortunately, network connections are still fairly slow.

According to George Crump of Storage Switzerland, a leading storage industry analyst, these network connections are so slow that, if an enterprise wanted to transfer as little as 3 TB of data offline, “in many cases overnight delivery of (a removable tape) cartridge would be faster than transferring... across a (network)” [emphasis ours].

Enterprise level buyers typically will have far more than 3 TB of data to transfer, making offsite backup and archive of HDD-based data a very time-consuming process. LTO-based solutions offer much faster throughput speed at enterprise data scale levels.

- **Read-write error rates**

After writing data to an LTO tape or HDD, the respective systems check to make sure the data was written correctly. This check is done using a checksum, which essentially computes a numerical value specific to a block of data; by comparing the checksums of the source data and the as-copied data, the system can determine whether the two data blocks are identical. If they are not, a system will attempt to correct the write-error. Based on independent studies of both technologies, uncorrectable bit error rates can be as much as 4 orders of magnitude worse for HDD arrays than LTO-5.

Drawbacks of LTO

Though LTO tapes offer many advantages over traditional tape and HDD based solutions, they still have some drawbacks.

- **Retrieval speed**

Tape is a serial medium, which means that before a user can access a file on a tape, the tape must spool to the correct position. This process can take a few minutes to complete. Based on estimates from the LTO Consortium, the average load time for a file archived to an LTO library should be approximately 90 seconds; considering that the reason the files are in the archive in the first place is that they are not very commonly accessed, most users should find that performance acceptable. In no event, however, will LTO-based solutions be able to compete with HDD arrays, since disk is a direct-access medium and does not need to spool to the data a user is requesting.

Although a user may be willing to wait the 90 seconds it takes on average for LTO libraries to retrieve a file, applications may not be so patient. When an application (like MS Word) is expecting a file to open, it “times out” when that file does not open as quickly as the application expects. The user sees an error message and has to employ a workaround to access the file.

- **Error checking**

This concept is distinct from the read-write errors we discussed above—it refers to data loss due to media degradation, a concept commonly called “silent failure.” Because HDDs are always online, it is easy for a system to notice when they are failing, and to take the appropriate backup action to preserve the data on them. LTO tapes, by contrast, are not always online, so they can, long

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after capturing the data accurately, develop errors that can lead to the loss of valuable data.

- **Manual archiving**

As discussed, most IT departments would deploy LTO solutions as the lowest tier in their data archive. However, most LTO solutions require IT

managers to manually transfer that data to the archive, which is difficult and time-consuming. Because of this pain, IT managers have tended to simply expand the amount of data they store to disk, which (as discussed) is needlessly expensive and exposes data to security risk.

StrongBox achieves faster file access speeds than most LTO management solutions by integrating a disk array as its front end.

In addition to faster file access speeds, StrongBox differentiates itself from other LTO management solutions by offering enhanced error checking, active archiving, persistent file structures, and better virtualization than existing LTO solutions.

Target industry verticals for the initial deployment of StrongBox include media and entertainment, video surveillance, and healthcare.

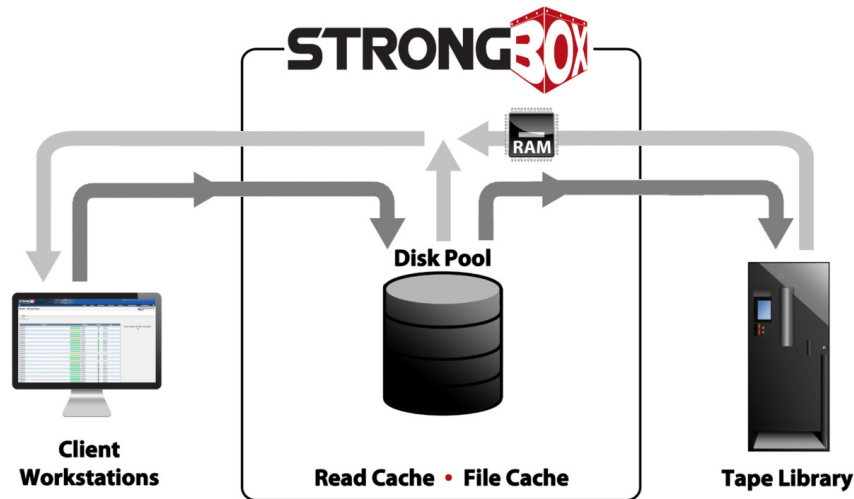
Design and Features

StrongBox leverages all of the benefits of the LTO standard and provides industry-leading technology to mitigate some of the drawbacks of the standard.

One of StrongBox’s distinguishing features is that it uses an HDD cache as its front end. In other words, StrongBox first saves to-be-archived data to disk, where it “stubs” the file, saving a piece of it to disk permanently and moving the rest of the file to the LTO library that sits at its back end. (See Figure 7.)

Crossroads has also programmed RVA functionality within StrongBox.

Figure 7: StrongBox Design Features



File Access Speed

As discussed, one of the major downsides to LTO library based archive solutions is that they can take some time to access files, since the drive must spool to the file’s position on the tape. In addition to creating user frustration, this time delay will cause applications to time out.

With StrongBox, however, when a user requests access to a file, StrongBox will deliver the “stub”

first, then stream the rest of the file from the tape. In so doing, StrongBox can achieve significantly faster file access speeds than other LTO-based solutions.

In addition, StrongBox manages application timeouts by communicating with the application to inform it that the file requested is coming from an LTO library, which extends the amount of time the application will wait before returning a time out error.

Error Checking

As discussed, the possibility of silent failure is a compelling reason for IT professionals to select against LTO solutions. StrongBox solves this problem by utilizing its RVA functionality to check the integrity and utilization of the LTO library.

Active Archiving

StrongBox also addresses the problem of manual archiving by supporting an active archiving system, in which StrongBox learns the rules and policies IT managers set for migrating data, and then automatically migrates the data to a lower tier of storage for them.

Persistence of File Structure

Although all LTO tapes are self-describing, they can still pose a challenge in that once a tape is no longer in the drive, the file structure associated with that tape vanishes. In this sense, LTO tapes are once again similar to USB thumb drives, whose contents are not visible when the drive is not mounted to a computer. By stubbing files from the entire library, StrongBox allows a user to have a full view of the contents of the archive. This provides the user a persistent view of the contents of the library, and reduces still further the reliance a user has on manual intervention by IT departments.

Virtualization

A basic LTO library will display files based on where they are stored. For instance, suppose an archive contains 2 TB of video and 1 TB of audio. As the capacity of an LTO tape is 1.5 TB, the archive would consist of one tape with 1.5 TB of video, and one tape with 500 GB of video and 1 TB of audio.

The standard LTO deployment would show that library in exactly that way: “Tape 1” and “Tape 2”. However, that is not a very user-friendly way to present information. A user who is browsing for an archived file is not likely to know which specific tape it is on.

StrongBox addresses this problem by presenting a virtualized view of the files. In other words, StrongBox would show the user two folders (“Video” and “Audio”) to provide a more user-friendly experience with the archive.

Product Strategy

Crossroads has decided to go to market with StrongBox primarily using a direct sales model targeting industry verticals. Crossroads chose these verticals based on a number of different criteria. First, it looked for industries that have a history of prioritizing the value of their archives. Second, it looked for industries that have rich content that does not compress easily, such as video or medical images. Finally, it wanted to ensure that the targets did not have specific internal data formatting standards, in order to avoid having to spend significant resources customizing StrongBox to fit with these formatting standards

Based on these criteria, Crossroads has identified three key industry verticals to target for the initial deployment of StrongBox: the media and entertainment market (to which it presented at the National Association of Broadcasters (“NAB”) Conference), the video surveillance market, and the healthcare market.

Competition

Crossroads faces competition primarily from enterprise level application and appliance providers such as Quantum, HP, and IBM.

Crossroads faces competitors from other application and appliance providers. As mentioned above, the Crossroads StrongBox offering is an appliance, which combines both hardware and software to create their solution. This differs from an application, which is only a software layer.

Enterprise Level Providers

Quantum

The major competitor facing Crossroads is Quantum. As a founding member of the LTO consortium, they are intimately familiar with the technology and have strong industry connections. On April 16th 2012, at the NAB Conference, Quantum released its direct competitor to StrongBox, known as Scalar LTFS. Quantum markets this offering as being very similar to StrongBox, and also as being NAS capable.

Quantum may present a significant challenge to Crossroads. As an enterprise-level tape library provider, it already has critical customer relationships. As a large player in the space, Quantum should be able to reassure its potential customers that it will be around to provide support for its solutions for quite some time. Furthermore, Quantum offers a variety of other products, such as StorNext (storage management software), to further buttress its product offering.

However, industry experts we spoke with at NAB indicated they believed that Crossroads had a technology advantage over Quantum, because StrongBox virtualizes the archive and allows a persistent view of the files. We also note that Crossroads management does not believe Quantum's marketing materials paint an accurate picture of the

functionality of Scalar LTFS. As more features of the Scalar LTFS appliance become public, we will continue to monitor this situation.

Other Major Players

All other enterprise level LTO library manufacturers offer some application-level solutions as well; these players include such major names as Oracle, HP, and IBM. These players do not currently offer fully integrated hardware/software appliance solutions. Currently, these players provide software to manage individual tape drives for free, and charge for the application at the tape library level. Because they do not contain disk caching or any other hardware features, these application layers are at a significant technological disadvantage to both StrongBox and the Scalar LTFS module Quantum recently introduced.

Smaller Providers

There are a variety of other small players that offer LTO compatible appliances and applications. Cache-A, XenData, and 1Beyond all offer appliances to manage LTO libraries, and all have some significant background in the fast-growing media and entertainment industry vertical. This background helps these players design their software products to match media industry workflow requirements.

However, each of these players has yet to achieve the market credibility to be able to strike out into other industry verticals. In addition, all of the smaller players we reviewed had certain key technological disadvantages when compared to StrongBox, in that they could not appear to an end user as typical network-attached storage, did not cache files to disk to speed up file access times, and could not offer the monitoring that RVA could. In general, we do not view the smaller providers in this space as a threat to Crossroads' technological primacy in the LTO archive library management space.

Intellectual Property Position

Crossroads has a strong IP position characterized by solid protection of its existing product portfolio and consistent progress in developing, patenting, and monetizing on its technologies.

Crossroads has historically been a very strong developer and filer of intellectual property. By querying MDB Capital’s proprietary PatentVest™ database (“PatentVest”), we have mapped Crossroads’ patent filings to gain an understanding of their patent position, as well as the landscape of the overall LTO and LTFs storage industry.

IP Capability Matrix

Criteria

We measure corporate capability with respect to intellectual property goals on two dimensions: the ability to protect the Company’s existing product portfolio, and the ability to generate future licensing revenues from related technologies.

In order to develop appropriate benchmarks for these dimensions, we consider which phase of its lifecycle a company is in. We broadly categorize technology growth companies as falling into three phases:

- **Development**
Marked by advanced prototypes, as well as the beginning of third party validation of its technology.
- **Validation**
Marked by OEM or channel partner agreements, as well as joint development agreements.
- **Commercialization**
Marked by product launch, as well as rapid revenue growth.

Our assessment is that Crossroads is currently at the end of the “Development” phase of its lifecycle, and it is quickly moving into the “Validation” phase.

We then develop qualitative scores across these dimensions using data from PatentVest. In particular, we consider the relative age of a company’s intellectual property portfolio and the breadth of the technology focus, as measured by the distribution of a company’s innovations across a number of USPTO primary classifications.

At the “Validation” phase, we would expect to see companies score a 5 along the “Protect Existing Product Portfolio” dimension, and a 2 along the “Develop Strategic Intellectual Property” dimension.

Scoring

We rate Crossroads as ahead of the typical development stage company on both dimensions. (See Figure 8.)

- **Protect Existing Product Portfolio**
On this dimension, we measure the progress of the Company in ensuring that it is effectively protecting its technology from infringers. Companies can achieve that by exhaustively considering every patentable dimension of their innovations, including all materials, processes, logic, and applications.

We rate Crossroads an 8 out of 10 on this dimension. The Company has prioritized protecting its StrongBox product offering; publicly available documents indicate that it has 59 patents issued and 7 more filed that cover StrongBox and its components (SPHiNX, RVA, and Tape Environment Services).

Intellectual Property Position

- **Develop Strategic Intellectual Property**

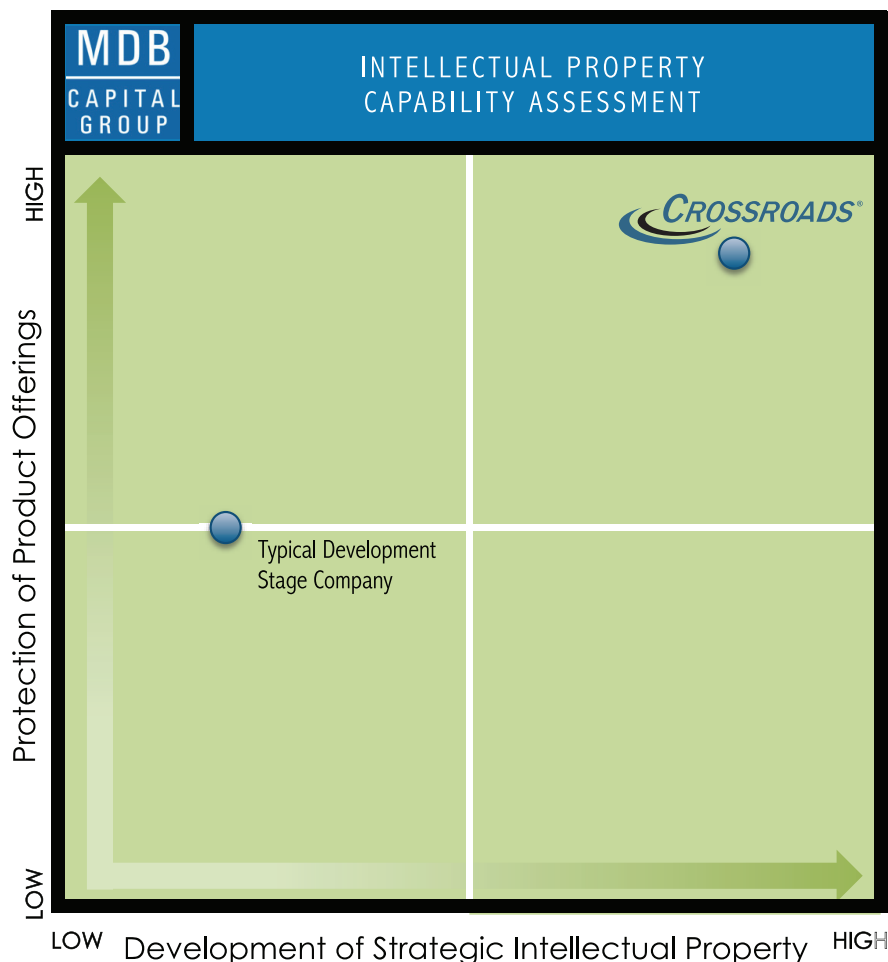
On this dimension, we measure the progress of the Company in patenting ancillary technologies that may not relate directly to its own key products, but may have value within a broader eco-system. IP of this sort may have licensing or transactional value separate and apart from the core business.

Perhaps the pre-eminent example of a firm that has effectively used this capability is IBM, which generates over \$2 billion in IP licensing revenue per year, and recently was capable of transacting

several thousand patents to companies with significant IP needs, including Facebook and Google.

We rate Crossroads an 8 out of 10 on this dimension as well. Crossroads has already made significant revenues from its 972 patent family (over \$5 million over the past fiscal year), which covers its Fibre Channel product offering. In fact, Crossroads continues to innovate in that business, which we view as an effort towards further securing strategic licensing revenues.

Figure 8: Capability Assessment



Intellectual Property Position

IP Landscape

In order to determine the intellectual property landscape in the LTO and LTFS space, we performed a search using PatentVest. We found that only six companies had either been granted or filed public applications for patents that reference the keywords “Linear Tape Open” or “Linear Tape File System”:

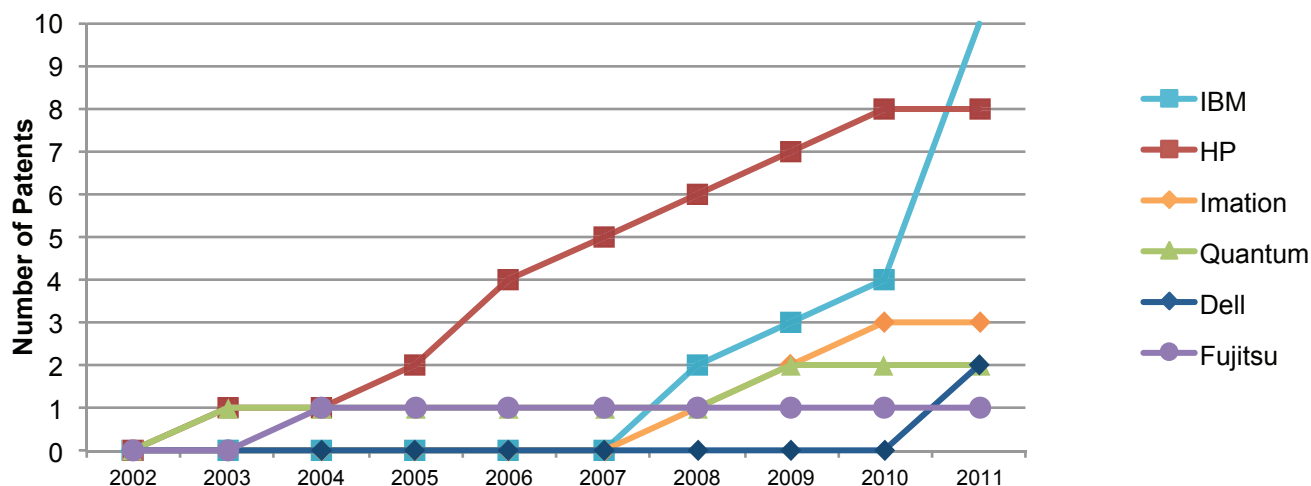
IBM, HP, Imation, Quantum, Dell, and Fujitsu. This is what we would expect, since all of these firms have businesses in selling either LTO libraries or the LTO tapes themselves. (Please note that all keyword searches are by their nature incomplete, since often patents may extend to cover complementary standards, products, or even industries.)

These six competitors have over 20 patents in this space. We have reviewed all of these patents, and have found that they refer mainly to error correction.

We have not found anything that covers file management of multiple tape drive systems, which is the focus of the StrongBox appliance. Thus, we believe that Crossroads has ample “white space” in which to develop and protect its intellectual property with respect to StrongBox.

For years, HP has held the most patents relating to LTO and LTFS, though recently IBM has ramped up its patent activity to take an overall lead in the number of patents held. (See Figure 9.) As mentioned above, IBM is a very strong patenting force in all of its business lines, in part because it patents innovation along the whole value chain in its businesses. Therefore, we expect that IBM will continue that practice in this space as well, which could eventually pose a challenge for Crossroads.

Figure 9: Patents Granted or Publicly Applied-for Referencing LTO or LTFS over the Past 10 Years (cumulative)



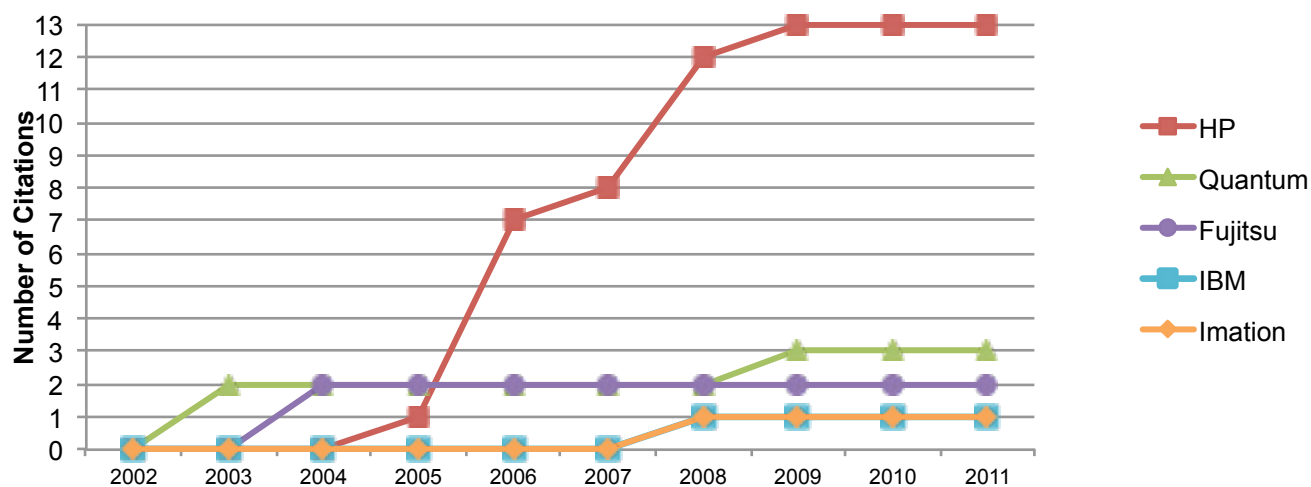
Intellectual Property Position

Another way to view the IP landscape of the space is to see how many times other patent applications have cited the LTO/LTFS patents we mentioned. A patent with many citations may be a “foundational” patent that is critical to the industry space it is in. Patent citations are also, however, an indication of the age of a patent.

An analysis done using PatentVest indicates that HP has the most-cited portfolio in the space. (See Figure 10.) This is not surprising, since IBM has only recently

begun to ramp up its patent activity around LTO and LTFS, as noted above. We found only one patent that had as many as four citations (HP’s patent number 7,333,291, which protects a system for reducing tracking noise in a tape drive), and that patent is not foundational to the design of StrongBox. This indicates that there is not likely to be a foundational patent that Crossroads would have to license in order to continue developing and commercializing StrongBox.

Figure 10: Citations to Patents Granted Referencing LTO or LTFS over the Past 10 Years (cumulative)



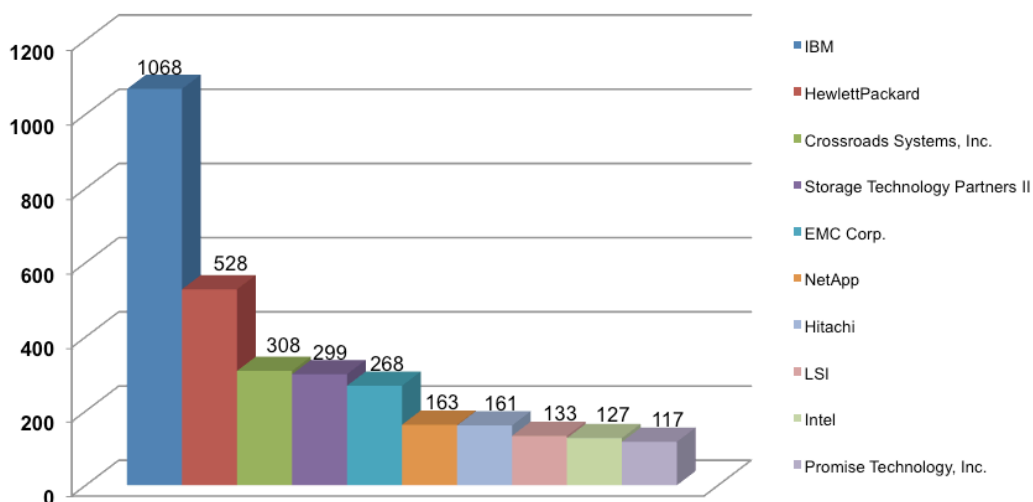
Intellectual Property Position

IP/Product Strategy

The companies Crossroads itself cites most often in its patents are IBM and Hewlett Packard. This is not surprising, since IBM and HP are industry leaders in tape storage. Thus, this factor indicates that Crossroads is working towards customizing its product to work with the industry leaders in tape storage. (See Figure 11.)

To date, we have not been able to develop a complete picture of Crossroads' prospective IP strategy in terms of specific feature functionality; the Company is understandably reluctant to share its plans on future product offerings and developments. That said, Crossroads is clearly a company with IP in its blood, so we will continue to monitor its patent filing progress closely.

Figure 11: Companies Cited Most by Crossroads (Overall Patent Portfolio)



Competencies

Crossroads is an industry leader in research and development.

The Company is continuing to develop its sales, marketing, order management, and customer support capabilities.

Research and Development

Crossroads has been an industry leader in several different segments of the storage industry, from its roots in the router business to its new position as a technological leader of the LTO-5 archiving industry. We regard Crossroads as a world-class research and development organization.

Although StrongBox is already a market-leading product, Crossroads continues to innovate and develop the product to bring still more features to the market. Crossroads is working on adding delete functionality to StrongBox; though typically this function is not necessary, since the intent of most archives is to hold data forever, certain industries (such as the healthcare industry that is one of Crossroads' key targets) may have compliance-based reasons for needing to delete certain data from their archives. In addition, Crossroads is working to allow StrongBox to support multiple libraries at once, which no LTO archive management solution in the marketplace can currently do.

Crossroads' top three patent holders (Geoffrey Hoese, Jeffry Russel, and John Tyndal) are all still with the Company and actively innovating—each of them filed their most recent patents in 2011.

Manufacturing

Crossroads does not currently undertake significant manufacturing operations for StrongBox. Their current production process is done mainly for

testing units, and entails assembling piece parts manufactured by (mainly foreign) component suppliers. If it needs to assemble StrongBox at commercial scale, we have no doubt the Company can outsource the assembly to a third party.

Marketing

Crossroads has focused its marketing efforts on commissioning white papers illustrating the specific benefits of StrongBox relative to HDD solutions. However, StrongBox is still a new product, and its go-to-market strategy is still somewhat in flux; indeed, the Company is still determining how many different price points at which it should offer StrongBox. In addition, Crossroads does not yet have a significant capability to differentiate StrongBox from other LTO management solutions in the marketplace. This is a critical capability for the Company to develop, because the value of Crossroads' technological advantage diminishes if it cannot educate its target customers on the benefits of that advantage.

Sales

Until recently, Crossroads had been planning on selling StrongBox through value-added resellers ("VARs"). Recently, however, the Company determined that it wanted to pursue a vertical-specific strategy, focusing on the media/entertainment, video surveillance, and healthcare verticals, and determined that there was no VAR that could provide strong inroads to those verticals. Consequently, the Company shifted its focus to selling StrongBox directly. As this decision was made recently, Crossroads has not yet had time to staff, train, and deploy its sales force, so we would currently characterize the Company as not possessing significant capabilities with respect to direct product sales. We will monitor the Company's growth in this area closely.

Order Fulfillment

Crossroads has successfully fulfilled large orders relating to RVA, SPHiNX, and its legacy router business through resellers. However, the Company has not yet demonstrated that it can fulfill orders through the direct channel it has identified for StrongBox. We will also continue to monitor its progress in this area closely.

Customer Support

There are two major components of support with respect to IT solutions: Ability to provide updates to the software / hardware, and ability to advise on how to fix broken solutions.

Updates: From its experience providing enhancements to RVA, SPHiNX, and its legacy router business, Crossroads has demonstrated that it has significant ability to provide upgrades to the products it sells to its customers.

Break/Fix: Since most of its business has historically been through resellers, the Company has not yet demonstrated that it can efficiently deploy fixes to direct customers. Again, we will continue to monitor its progress in this area closely.

Recent Developments

StrongBox was selected as the storage component in both Fujitsu's and Fujifilm's cloud based storage services.

Industry experts and analysts attending the NAB Conference confirmed StrongBox is the leading technology in the LTO market space.

Crossroads has begun to commercialize StrongBox, and recognized its first revenues from the product in Q2 2012.

The Company made a major sale of RVA to a large telecommunications firm, validating a key component of StrongBox

Key Channel Partnerships

In February 2012, Crossroads announced that Fujitsu had selected StrongBox as the storage component of its NuVola Private Cloud Platform. Fujitsu is the world's third-largest IT services provider, behind only IBM and HP. NuVola is Fujitsu's offering to enterprise-level customers for a cloud exclusive to that enterprise.

In order to credibly offer such a product, Fujitsu must be able to offer a wide range of functionality: it must be able to offer a solution for storing massive amounts of data, managing that data, securing the data from hackers, and making that data searchable. Fujitsu has chosen partners to provide much of this functionality, and markets NuVola as an appliance that merges all of the "best of breed" solutions in the industry.

Similarly, in April 2012, Crossroads announced that Fujifilm had selected StrongBox as the storage component of its Permivault cloud based storage

service, which is similar to NuVola. Fujifilm also markets its solution as containing "best of breed" components.

We view the fact that Fujitsu chose StrongBox for use in its NuVola appliance as a strong validation of Crossroads' technology. In addition, we anticipate that, as enterprises become more comfortable with managing private clouds from a security perspective, these product offerings will generate material incremental sales.

NAB Conference

In April 2012, Crossroads attended the NAB conference in Las Vegas, which hosts 90,000+ media and entertainment professionals and 1500+ presenting companies. We attended as well, and our interviews with several leading industry experts and analysts confirmed our assessment that StrongBox was the leading technology in the LTO market space. Many of Crossroads' partners co-marketed StrongBox in their own booths at NAB, including HP, Fujitsu, and Hitachi Data Systems.

Start of Commercialization

In April 2012, Crossroads announced that ProductionFor, a video production and post-production company, selected StrongBox to create an archive of digital assets. The company was able to time this announcement to coincide with the NAB conference, where the attendees presumably were in a good position to understand and relate to the storage and workflow needs of a video production and post-production company.

During its Q2 2012 conference call, the Company announced that it recognized revenue from multiple StrongBox shipments to several customers, meaning

it has achieved several product wins to date. We will continue to pay close attention to Crossroads' progress in this regard.

Major RVA Sale

In May 2012, Crossroads announced that it had made a major sale of RVA to what management described as "the largest telco in the world."

(We assume that means AT&T, which is the world's largest telecommunications company by revenue.)

This sale had a major impact on the Company's revenues and was primarily responsible for year-over-year product revenue growth in Q2 2012 of 74%.

Besides the obvious positive impact to the Company's financial position, we also view this as a bullish sign for the Company because it represents a validation of the RVA technology, and by extension StrongBox (since RVA is a critical component of the StrongBox offering).

Financial Position

IP licensing and royalties generate approximately 66% of Crossroads' current revenues; the remaining 34% is from product sales. Crossroads has always generated very strong gross margins on its product sales.

Projected increases in sales and marketing headcount may require Crossroads to raise additional capital within the next year.

Since a significant portion of StrongBox revenues will come from software licensing, we expect product gross margins to be above 80%.

As we do not project significant EBITDA for the near term, we believe the principal drivers of the stock price will be announcements relating to customer wins and other key milestones.

Revenues

Over the past 4 fiscal quarters, Crossroads has generated approximately 66% of its approximately \$15 million in revenue from IP licensing and royalty arrangements. (Since the timing of those revenues tends to be erratic, all the figures we present here will be cumulative over the past 4 fiscal quarters.) Over that same period, product sales (primarily of Sphinx, RVA, and its legacy routers) have accounted for the remaining 34% of revenue.

Crossroads is not currently generating profits, having incurred a net loss of approximately \$8.2 million over its past 4 fiscal quarters.

Cash Position

Crossroads has had a cash outflow of approximately \$5.3 million over its past 4 fiscal quarters (this considers cash flow from operations and capital expenditures; it does not consider the impact of

purchase and sale of investments or cash flows from financing). At April 30, 2012, the Company had approximately \$9.5 million in cash on hand. We do not believe that Crossroads will need to significantly increase its level of capital expenditures to support the growing StrongBox business. However, it will need to significantly increase its operating expenses, most relevantly with respect to headcount related to building a direct sales force. We anticipate that the Company's sales and marketing expense, which averaged approximately \$1.4 million over the past 4 fiscal quarters, will grow to \$4.2 million by Q1 2013, as the Company scales from 5-6 sales people to a global team of 30 (including sales engineers).

For this reason, and because we do not anticipate significant sales of StrongBox until at least Q3 2012 (or growth in sales of its other products or licenses), we believe that Crossroads may need to raise additional capital within the next year to finance the growth of StrongBox. Management has indicated it will try to find that capital by selling the 972 patent family. In addition, we believe that Crossroads' product positioning may make it an attractive candidate for a strategic equity investment, which we explore in "Significant Channel Partnerships or Strategic Investment" below.

Pricing and Margins

Crossroads has not yet finalized its pricing structure, as it is still determining how many versions of StrongBox to offer and what the precise feature sets of those versions might be. Structurally, StrongBox revenues will come in three forms: a hardware component priced at approximately \$26,000 for an entry level device; a recurring software license (the bulk of the revenue), which will cost users progressively more as they ask the product to manage more data; and a maintenance revenue stream, which management has indicated will be approximately 12-18% of the software license fee.

Financial Position

Crossroads is currently able to achieve gross margins of over 90% on its product offerings. This is because most of the revenue from the product comes from the highly-scalable license of software. This same condition holds true for StrongBox, since the hardware components utilized in the device are largely off-the-shelf. We anticipate that gross margins for StrongBox should be higher than 80%.

Management has not been able to provide estimates of total StrongBox revenue per customer. Based on our estimates and management guidance, StrongBox sales accounted for approximately 10% (or about \$190K) of StrongBox's total revenues, though of course that total would not include the recurring software license and maintenance revenue we described above. According to management, this revenue came from "multiple shipments of StrongBox to several customers." These facts provide an incomplete picture of how we should model the revenue growth of StrongBox; we will continue to watch StrongBox's revenue growth closely to develop an approach to do so.

Drivers of Stock Price

Because we do not consider it likely the Company will generate significant positive earnings within the next 12 months, we believe that Crossroads needs to make positive, milestone-based announcements to significantly move its stock price.

Beachhead Customer Wins

We view the enterprise storage industry as one in which success begets success; if a vendor is able to sell to one major buyer, it gains significant credibility with other players in the industry. If Crossroads is able to announce that it has won a major customer for StrongBox in one of its three targeted industry verticals, it should reduce the risk premium investors currently place on its revenues.

Sale of IP

As discussed, Crossroads is considering selling its lucrative 972 patent family, among other key pieces of foundational IP. If Crossroads is able to report a strong purchase price for this IP, that announcement would reduce the financial risk of the Company.

Significant Channel Partnerships or Strategic Investment

Crossroads has worked with several of the major players in the tape library industry for years; IBM sells RVA in its midrange servers, and HP sells SPHiNX under its own branding. If Crossroads were able to announce a major joint sales agreement with one of these players, or even a strategic investment or acquisition, investors should reduce the risk premium placed on the Company's ability to build a sales force and effectively market the product.

We believe there is strong reason for IBM or HP to make such a move. These players compete with Quantum to sell LTO libraries, and Quantum has just upgraded its offering to include an archive management system that exceeds the current functionality of the IBM or HP libraries. It is possible that one of these players may choose to partner with Crossroads to provide that rather than build that functionality in-house.

Finally, we note that Crossroads' recent announcements regarding Fujitsu and Fujifilm provide still more opportunity for strategic investment; now that these companies are marketing high-profile product offerings using the StrongBox name, they both have an incentive to invest in the continued financial health of Crossroads.

Litigation Win

Crossroads is currently the plaintiff in two separate patent lawsuits. A positive result in either one might result in a lucrative licensing deal or cash settlement that would enhance the Company's financial outlook.

Management Team



Crossroads has an experienced management team, led by CEO Rob Sims. (See Figure 12.) Mr. Sims is a recognized industry thought leader and recipient of Network Products Guide’s Most Valuable Performer award.

Figure 12: Biographies of Key Management

<p>Robert C. Sims President & CEO, Board Member</p>	<ul style="list-style-type: none"> Leads Crossroads’ corporate vision and growth strategy Data storage, management and protection expert Recipient of Network Products Guide’s Most Valuable Performers Award Managed advanced manufacturing and product test organizations at Kentek Corporation Managed manufacturing, engineering and quality organizations at Exabyte B.S. in Electrical Engineering from Colorado State University
<p>Brian Bianchi COO</p>	<ul style="list-style-type: none"> Manages development and maintenance of Crossroads’ solutions Held operational and product development roles at Hewlett-Packard and Convex Computer Corporation B.A. in Computer Science from The University of Texas at Austin
<p>Jennifer Crane CFO</p>	<ul style="list-style-type: none"> Leads Crossroads’ financial and legal teams Held senior positions at Deloitte & Touche LLP and Price Waterhouse Coopers LLP Active member of the Financial Executive Institute and the American Institute of Certified Public Accountants Bachelor of Business Administration from The University of Texas at Austin
<p>David Cerf Exec. VP Business & Corporate Development</p>	<ul style="list-style-type: none"> Leads global efforts to expand Crossroads’ solutions VP of Sales & Business Development at NexQL Co-founder of 360World, a national provider of video imaging solutions Founder and Managing Director of the Dallas Business Incubator
<p>Bernd R. Krieger GM, Europe</p>	<ul style="list-style-type: none"> More than 30 years’ experience in data storage and backup industry GM, Sales and Marketing at Data Global GmbH CEO of Entire Software AG Director of International Sales at Grau (ADIC)
<p>Heather Painter VP Channel Sales & Marketing</p>	<ul style="list-style-type: none"> Leads Crossroads’ channel sales and marketing Began her Crossroads career in 1999 as Western Regional and International Sales Manager National Account Manager for Kingston Technology B.A. from California State Polytechnic University - Pomona

Management Team

Chairman Steven Ledger leads Crossroads' Board of Directors. (See Figure 13.) Mr. Ledger has extensive experience in both the financial services and venture capital industries.

Figure 13: Biographies of Board of Directors

<p>Steven Ledger Chm. of the Board, Chm. of the Nominating & Corporate Governance Committee</p>	<ul style="list-style-type: none"> • More than 26 years of experience in the financial services industry • Founder and Managing Partner of eCompanies Venture Group • Served as Managing Partner and Portfolio Manager at San Francisco Investment Group and Kayne Anderson Investment Management • Began his career at Fidelity Management and Research as an Equity Research Analyst and Portfolio Manager • Graduate of the University of Connecticut
<p>Elliott Brackett Board Member, Chm. of the Compensation Committee</p>	<ul style="list-style-type: none"> • More than 20 years of experience in new product funding, marketing, acquisitions and turnarounds • In 1988 rescued Lifetime Automotive Products from bankruptcy turning it into an overnight success • Co-founder of Encrypto Inc. and a key founder of NexQL • Consultant for SCA Promotions and Davis Technologies International • BBA from Southern Methodist University
<p>Joseph J. Hartnett Board Member, Chm. Of the Audit Committee</p>	<ul style="list-style-type: none"> • Currently serves as director of Sparton Corporation • Held positions of President, CEO and COO at Ingenient Technologies, Inc. • Held positions of Chairman of Board, President, CEO and CFO at U.S. Robotics Corporation • Served for over 20 years and was partner at Grant Thornton LLP • CPA and Bachelor's in Accounting from the University of Illinois at Chicago
<p>Don Pearce Board Member</p>	<ul style="list-style-type: none"> • Currently serves as VP Texas division of Alliance Technology Group and as member of the Advisory Board for the Computer Science Engineering Department at Southern Methodist University • Began his career in systems and sales in IBM • Served for more than 20 years at Amdahl Corp. • Held sales executive positions at Tarantella, Storage Tek and Sun Microsystems • B.S. in Mathematics from Southern Methodist University and M.S. in Mathematics from Louisiana State University
<p>Robert C. Sims Board Member, President & CEO</p>	<ul style="list-style-type: none"> • Leads Crossroads' corporate vision and growth strategy • Data storage, management and protection expert • Recipient of the technology industry's Most Valuable Performers Award • Managed advanced manufacturing and product test organizations at Kentek Corporation • Managed manufacturing, engineering and quality organizations at Exabyte • B.S. in Electrical Engineering from Colorado State University

Risk Factors

As a small company with mostly licensing revenue, Crossroads faces significant market, technology, and litigation risk.

Crossroads has a market capitalization of approximately \$50 million. The Company currently generates 70% of revenues from licensing; it is not generating earnings. We strongly recommend that investors evaluate their risk profile before deciding whether or not to invest in Crossroads.

Within that context, we believe the primary risks to investing in Crossroads are:

Strong Competition

The data storage market is very competitive, with large enterprise level players and smaller providers in both tape-based and disk-based storage solutions, working to develop and enhance new technologies. Significant technological advances by a competitive technology platform pose a risk to the future profitability of StrongBox.

Although we believe Crossroads has a technological advantage over its competitors in the LTO archive library management space, we also note that this technological advantage may not be enough to lead the Company to large profits. StrongBox was first to market in the space, but has only very recently begun commercialization and now faces direct competition from Quantum’s Scalar LTFs product. As a large player in the storage market, Quantum’s strong industry connections, customer relationships, and complementary product offerings may be a significant threat to Crossroads.

Customer Acquisition

Enterprise customers may be reluctant to award a major contract to a company as small as Crossroads.

Crossroads’ recent channel partnerships with Fujitsu and Fujifilm mitigate this risk somewhat, however, by putting the face of a larger, more established company on Crossroads’ technology.

Marketing Risk

Crossroads is still adjusting its StrongBox pricing structure and go-to-market strategy. In addition, the Company is developing its capability to differentiate StrongBox from other LTO management solutions. If the Company is unable to educate its target customers on the benefits of its technological advantage, the value of that advantage may diminish.

Sales Risk

Crossroads recently determined to pursue a vertical-specific sales strategy focused on direct sales of StrongBox and does not yet possess a sales force for this effort. If the Company is unable to adequately staff, train, and deploy this sales force in a timely manner, this would undermine its ability to sell StrongBox in the near term.

Financing Risk

Though the Company may not need to significantly increase its capital expenditures to support the growth of StrongBox, it will need to significantly increase operating expenses with respect to headcount to build its direct sales force. As a result, there is the possibility that the Company will require additional financing in the coming year to fund this growth.

Management Risk

The Company’s management has demonstrated its strength in the development phase of its technology. However, investors should note the risks inherent in transitory management focus from development to commercialization.

Risk Factors

Market Perception Risk

Though the LTO-5 standard has attempted to solve many of the problems IT managers have had with traditional tape solutions, many IT managers may have lingering bad memories about tape that will discourage them from choosing any sort of tape solution in the future. Our interviews with IT professionals have shown that the debate between tape and disk as an archive solution has produced zealots on both sides, so it may be difficult to convince disk zealots—who mainly think of tape as a dying medium—that any tape solution (even one based on StrongBox and LTO-5) will be appropriate for their needs. These preconceived notions may limit the market opportunity for StrongBox.

Intellectual Property Risk

Though Crossroads has positioned itself as an IP innovator, we do not have a complete picture of the Company's prospective IP strategy in terms of specific feature functionality. We view the patent portfolio as the most important driver of the Company's long-term value, so we believe that investors should pay special attention to the impact of this risk.

Licensing Risk

The Company possesses key data storage patents for its legacy products (the 972 patent family) and has successfully licensed this technology to date. Crossroads is currently involved as plaintiff in two separate patent lawsuits regarding the 972 patent family. A negative judgment in these lawsuits may diminish its ability to further secure licensing revenues and impair the future sale of the 972 patent family.

Customer Risk

A significant portion of Crossroads' current revenue comes from HP. Sales to HP accounted for 71.3% of the Company's revenues in fiscal 2011; approximately half of that revenue comes from IP licensing and

royalties for Crossroads' legacy router technology, and the other half comes from sales of white-label SPHiNX boxes that are branded with HP logos. If HP discontinues either of these businesses, Crossroads' financial position could suffer. The fact that the thrust of Crossroads' business going forward will be on StrongBox mitigates this risk somewhat.

New Technology Risk

Although Crossroads has developed a strong solution to the current data storage problem based on LTO-5, emerging technologies may still disrupt the industry. In particular, cloud storage may disrupt the current space, since the providers of cloud storage (e.g., Amazon) will choose what storage medium they want to use in their data centers. As cloud storage gains market share, the choices those cloud providers make could have a massive impact on the market.

Also, a massive reduction in the price of solid-state disk storage (which is currently far too expensive per byte to use it for archiving solution) would have major implications on the attractiveness of tape as a storage solution. Since it does not have any moving parts, solid state storage is less prone to many of the pitfalls (drive failure, energy costs) that reduce the attractiveness of spinning HDD arrays.

Finally, emerging technologies such as holographic storage might change the rules of the storage industry altogether. By this, we do not mean to imply that a major innovation in holographic storage is imminent (in some ways, holographic is the storage industry equivalent of cold fusion), though companies such as hVault have made strides recently. We are merely suggesting that the archive industry is attractive enough that innovators will continue to attack it.

Exhibits

Crossroads Systems Inc.: Historical Income Statement

Crossroads Systems Inc.: Historical Balance Sheet

Crossroads Systems Inc.: Historical Statement of Cash Flows

Crossroads Systems, Inc: Historical Income Statement

(\$ in thousands, except per share data)	1Q09A	2Q09A	3Q09	4Q09	FY09	1Q10	2Q10	3Q10	4Q10	FY10	1Q11	2Q11	3Q11	4Q11	FY11	1Q12	2Q12
Total Revenue	3,246	3,737	3,861	6,004	16,848	2,722	5,043	3,159	5,444	16,368	3,601	2,577	2,577	6,232	14,987	2,579	3,453
Cost of Revenue	653	572	594	848	2,667	265	1,071	429	727	2,492	503	367	297	1,498	2,665	317	392
Gross Profit	2,593	3,165	3,267	5,156	14,181	2,457	3,972	2,730	4,717	13,876	3,098	2,210	2,280	4,734	12,322	2,262	3,061
Sales and marketing	1,564	1,453	1,164	1,210	5,391	1,323	1,322	1,217	1,409	5,271	1,215	1,175	1,295	1,533	5,218	1,409	1,534
Research and development	2,487	2,267	2,320	2,309	9,383	2,280	2,185	2,129	2,312	8,906	2,117	2,820	2,917	2,847	10,701	2,757	2,662
General and administrative	233	559	460	572	1,824	662	570	579	812	2,923	647	835	665	1,010	3,157	762	833
FAS 123R and stock based compensation	283	118	191	-	592	-	-	-	-	-	-	-	-	-	-	-	-
Business restructuring expense	217	-	-	-	217	-	-	-	-	-	-	-	-	-	-	-	-
Amortization of intangibles	284	265	265	265	1,079	312	312	312	312	1,248	312	224	47	48	631	47	47
Total Operating Expenses	5,068	4,662	4,400	4,356	18,486	4,577	4,389	4,237	4,845	18,048	4,291	5,054	4,924	5,438	19,707	4,975	5,076
Operating Income (Loss)	(2,475)	(1,497)	(1,133)	800	(4,305)	(2,120)	(417)	(1,507)	(128)	(4,172)	(1,193)	(2,844)	(2,644)	(704)	(7,385)	(2,713)	(2,015)
Interest income (expense), net	(22)	(48)	(7)	(25)	(102)	(24)	(23)	(24)	(42)	(113)	(31)	(24)	(29)	(20)	(104)	(50)	(53)
Other income (expense)	-	-	-	(0)	(0)	-	-	-	(1)	(1)	(7)	-	-	1	(6)	14	1
Income (Loss) before income taxes	(2,497)	(1,545)	(1,140)	775	(4,407)	(2,144)	(440)	(1,531)	(171)	(4,286)	(1,231)	(2,868)	(2,673)	(723)	(7,495)	(2,749)	(2,067)
Provision for (benefit from) income taxes	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Net Income (Loss)	(2,497)	(1,545)	(1,140)	775	(4,407)	(2,144)	(440)	(1,531)	(171)	(4,286)	(1,231)	(2,868)	(2,673)	(723)	(7,495)	(2,749)	(2,067)
EPS diluted	(\$0.35)	(\$0.21)	(\$0.16)	\$0.11	(\$0.61)	(\$0.29)	(\$0.06)	(\$0.20)	(\$0.02)	(\$0.56)	(\$0.12)	(\$0.27)	(\$0.25)	(\$0.07)	(\$0.69)	(\$0.25)	(\$0.19)
Weighted Average Shares fully diluted	7,198	7,242	7,276	7,349	7,258	7,300	7,533	7,607	7,834	7,586	10,669	10,711	10,868	10,908	10,820	10,974	11,048

Crossroads Systems, Inc.: Historical Balance Sheet														
(\$ in thousands)	1Q09	2Q09	3Q09	4Q09	1Q10	2Q10	3Q10	4Q10	1Q11	2Q11	3Q11	4Q11	1Q12	2Q12
Assets														
Cash & Near Cash Items	5,888	5,285	5,623	5,297	5,851	6,588	6,152	13,811	14,703	8,513	4,591	7,336	7,227	9,544
Short term Investments	-	-	-	-	-	-	-	-	-	4,200	4,864	3,385	1,992	350
Accounts & Notes Receivable	4,173	3,758	3,480	5,124	2,124	2,452	2,817	5,607	2,953	2,840	2,599	2,659	2,943	2,343
Net Inventories	252	155	147	111	91	106	68	93	167	164	287	188	350	284
Other Current Assets	257	350	262	423	424	299	304	293	227	1,286	872	297	272	310
Total Current Assets	10,570	9,548	9,512	10,955	8,490	9,425	9,341	19,804	18,050	17,003	13,213	13,865	12,784	12,831
Net Fixed Assets	1,283	1,107	986	830	723	653	596	575	610	1,188	1,262	1,320	1,274	1,474
Net Intangible Assets	2,297	2,032	1,767	1,502	1,237	972	707	739	427	204	157	110	63	16
Investment in Subsidiaries	968	968	940	940	940	940	940	-	-	-	-	-	-	-
Other Long-Term Assets	75	69	69	69	57	56	57	60	55	57	64	56	34	38
Total Long-Term Assets	4,623	4,176	3,762	3,341	2,957	2,621	2,300	1,374	1,092	1,449	1,483	1,486	1,371	1,528
Total Assets	15,193	13,724	13,274	14,296	11,447	12,046	11,641	21,178	19,142	18,452	14,696	15,351	14,155	14,359
Liabilities & Shareholders' Equity														
Accounts Payable	889	864	1,030	1,036	550	1,073	884	990	663	1,803	1,128	2,228	821	1,060
Accrued Expenses	1,381	1,264	1,629	1,877	1,209	1,436	1,459	2,271	1,617	1,524	1,612	2,156	1,675	2,579
Accrued Warranty Costs	30	28	22	18	16	19	28	-	-	-	-	-	-	-
Deferred Revenue	261	362	333	199	185	307	1,510	1,517	1,250	2,315	1,567	1,009	1,528	1,437
Other Short-Term Liabilities	2,024	2,024	1,973	1,973	1,973	1,973	1,973	1,973	1,973	1,973	1,973	1,973	2,597	2,927
Total Current Liabilities	4,585	4,542	4,987	5,103	3,933	4,808	5,854	6,751	5,503	7,615	6,280	7,366	6,621	8,003
Long-Term Liabilities	-	43	81	59	110	105	88	103	112	35	127	126	1,629	2,134
Total Long-Term Liabilities	45	43	81	59	110	105	88	103	112	35	127	126	1,629	2,134
Total Liabilities	4,630	4,585	5,068	5,162	4,043	4,913	5,942	6,854	5,615	7,650	6,407	7,492	8,250	10,137
Total Equity	10,563	9,139	8,206	9,134	7,404	7,133	5,699	14,324	13,527	10,802	8,289	7,859	5,905	4,222
Total Liabilities & Equity	15,193	13,724	13,274	14,296	11,447	12,046	11,641	21,178	19,142	18,452	14,696	15,351	14,155	14,359

Crossroads Systems, Inc.: Historical Statement of Cash Flows

(\$ in thousands, except per share data)	1009	2009	3009	4009	FY09	1010	2010	3010	4010	FY10	1011	2011	3011	4011	FY11	1012	2012
Cash From Operating Activities																	
Net Income	(2,497)	(1,545)	(1,140)	775	(4,407)	(2,144)	(440)	(1,531)	(171)	(4,286)	(1,231)	(2,868)	(2,673)	(724)	(7,496)	(2,749)	(2,067)
Depreciation & Amortization	232	224	202	181	839	163	148	127	115	553	100	127	149	159	535	161	175
Business restructuring expenses	217	-	-	(217)	-	-	-	-	-	-	-	-	-	-	-	-	-
Amortization of intangible assets	284	265	265	265	1,079	312	312	312	312	1,248	312	224	46	48	630	47	47
Loss (gain) on disposal of fixed assets	-	-	1	-	1	-	-	-	-	-	6	-	-	-	6	(15)	-
Stock based compensation	283	119	190	124	716	392	124	55	193	764	82	83	137	575	877	763	416
Provision for doubtful accounts receivable	1	1	-	(72)	(70)	(12)	(2)	(2)	-	(16)	-	1	-	(9)	(8)	33	(3)
Provision for excess and obsolete inventory	24	32	51	1	108	(2)	(4)	28	(2)	20	-	(3)	4	4	5	-	-
Changes in Non Cash Capital	380	250	704	(1,569)	(235)	2,174	748	729	(2,113)	1,538	1,856	707	(558)	1,564	3,569	(1,480)	1,539
Cash From Operations	(1,076)	(654)	273	(512)	(1,969)	883	886	(282)	(1,666)	(179)	1,125	(1,729)	(2,895)	1,617	(1,882)	(3,240)	107
Cash From Investing Activities																	
Purchase of Property and Equipment	(71)	(53)	(79)	(13)	(216)	(85)	(78)	(69)	(88)	(320)	(142)	(702)	(223)	(222)	(1,289)	(119)	(371)
Purchase of held-to-maturity investments	-	-	-	-	-	-	-	-	-	-	-	(4,511)	(2,159)	-	(6,970)	(185)	-
Maturity of held-to-maturity investments	-	-	-	-	-	-	-	-	-	-	-	311	1,495	1,478	3,284	1,578	1,642
Cash From Investing Activities	(71)	(53)	(79)	(13)	(216)	(85)	(78)	(69)	(88)	(320)	(142)	(4,902)	(887)	1,256	(4,675)	1,274	1,271
Cash from Financing Activities																	
Proceeds from issuance of common stock	1	-	-	-	1	-	-	-	9,178	9,178	1	58	3	82	144	34	107
Proceeds from borrowing on term loan	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2,000	1,000
Paydown of Line of Credit	-	-	(51)	-	(51)	-	-	-	-	-	-	-	-	-	-	-	-
Cash from Financing Activities	1	-	(51)	-	(50)	-	-	-	9,178	9,178	1	58	3	82	144	2,034	910
Effect of exchange rate on cash	(52)	104	195	198	445	(244)	(92)	(64)	235	(165)	(92)	383	(144)	(210)	(63)	(177)	29
Net Changes in Cash	(1,198)	(603)	338	(327)	(1,790)	554	716	(415)	7,659	8,514	892	(6,190)	(3,923)	2,745	(6,476)	(109)	2,317

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