6 Things you need to know when buying mobile computers.

AML

6 Things You Need to Know When Buying Mobile Computers for Industrial Applications

If your company has tasked you with the responsibility of sourcing new **barcode-scanning mobile computers**, and you would consider your work environment to be "industrial", there is a short list of things you need to know to make your job a little easier and will help you make the right decision.

1 Choose rugged devices over consumer-grade, every time.

Don't overlook the significance of the word "industrial". If you work in a warehouse, distribution center, a manufacturing plant, or any place with a concrete floor for that matter, there's a good chance it would be considered "industrial". You need a handheld computer that can withstand the rigors of that environment, not the least of which will be dropping that mobile computer onto the concrete floor. In addition, it will likely be used almost constantly, and in some cases across multiple shifts.

Tip No. 1 - Look for mobile computers that, at the very least, publish a "drop rating" of 6 feet (1.8 meters) or higher. You may end up with a device that's a little heavier and bulkier than you had hoped, but these "barcode scanners on steroids" will represent a significant financial investment on your part so durability and survive-ability of these devices are crucially important.

Tip No. 2 - Don't walk, but run away from the idea of using "consumer-grade" devices such as smartphones or tablets. Sure, you can buy a heavy-duty case, or "sled" to put them in, and some even come with add-on batteries and barcode scanners. However, that doesn't take away from the fact that at the heart of that "franken-phone" you just created, is still a consumer-grade device made with consumer grade components. Consumer grade Wi-Fi radios are not intended to be used on enterprise networks and the devices themselves have little or no thermal management. They were simply never designed to be used all day, every day. When they fail, and they will fail, there is only a limited amount of service that can be done so often times they are simply thrown away. The batteries can't be "hot-swapped" so when the battery dies it has to go back on the charger nullifying its use as a multi-shift device. Also, the models of consumer-grade devices change so quickly

that, chances are, the devices you bought last year won't be available next year. It's simply a bad idea from the outset. That enticing price tag and short-term savings on the front end will be erased many times over during the life of the device, albeit a short one. Learn from the mistakes of others and just don't go down that road.

2 Keypad or Touchscreen?

There is a push to move towards "keypad-less" devices that depend on capacitive touchscreens to manually enter data such as quantities, item numbers, locations, etc. Unfortunately, the idea that data entry on a touchscreen is faster and more reliable than a conventional tactile keypad is a huge misconception. In fact, the opposite is true. Touchscreens don't allow the user to feel the separation between the keys and there is no tactile feedback that a key was pressed. Touchscreens are, in fact, more error-prone, and having to make frequent stops to backspace, correct errors, and carefully review data, is time-consuming to say the least.

The fact that "auto-correct" software was developed for smartphones and tablets is a testament to the reality that touchscreens are more susceptible to errors.

If touchscreens were better, why would this software even be necessary? The problem is that auto-correct software depends on a predictable vocabulary, which does not include part numbers and quantities. In addition, capacitive touchscreens won't work reliably with conventional gloves and those gloves with capacitive "fingertips" typically don't come in designs suitable for industrial environments. Regardless, any glove's fingertip will generally be too bulky and awkward to work reliably on a touchscreen.

Environments that require a fair amount of keyed data require mobile computers with tactile keypads to ensure maximum efficiency and minimum errors.

3 Making sense of battery specifications.

The life of the battery is crucial when it comes to keeping a mobile computer in operation. Having to stop and swap a battery takes time and oftentimes occurs at the most inopportune moment. Battery life is a question that should be near the top of the list when shopping for mobile devices. But here's the problem. Every salesperson will always tell you the battery will last 8 hours. It's a canned answer. It's what they are trained to do and it's what it says right there on the data sheet. But the reality is no one knows exactly

how long a battery will last. Every user environment is different and battery life is dictated by the "duty cycle", or the frequency the device is being used. When the mobile computer is turned on, but not being used, it consumes the least amount of power from the battery. When the user is actively keying data and the Wi-Fi radio is on and transmitting, the device consumes a little more power. Even more power is consumed when you pull the trigger or push the scan button to turn on the barcode scanner.

How often the device gets used, or its duty cycle, is what ultimately determines how long the battery will last. Other factors will affect the battery life as well. The age of the battery for example. Li-Ion batteries lose capacity over time. Operating the device or storing its batteries in extreme temperatures, hot or cold, will also cause the capacity of the batteries to degrade.

So, what to do? When sourcing a mobile computer, consider the battery capacity specifications as an important factor. But again, be careful because it's easy to misinterpret the battery information presented by device manufacturers. Without getting too technical, batteries are commonly presented with two different ratings, voltage and current, or more specifically "volts" and "milliamp hours". You may hear one vendor say their battery is 7.4 volts while their competitors use a 3.7-volt battery…so vendor number 1 wins, right? Well, not necessarily. You also have to consider the current rating, or "milliamp hours". So, if vendor 2 says their battery is rated at 4,000 milliamp hours, and vendor 1 says their battery is rated at 2,800 milliamp hours, then vendor 2 wins, right? Again, not necessarily. The truth is you have to consider BOTH parameters, which is the overall power measured in "watts" or "watt-hours", in order to determine which battery has the highest capacity. To do this, multiply the voltage times the milliamp hours. Then divide that by 1,000 to get "watt-hours". For example:

Vendor #1

2800 milliamps (mA)
x 7.4 volts (V)
20,720 divided by 1,000 = 20.72 watt hours

Vendor #2

4000 milliamps (mA)
x 3.7 volts (V)
14,800 divided by 1,000 = 14.8 watt hours

Vendor 1 wins. Their battery provides the most total power overall. So, assuming the two competing mobile computers are comparably equipped, their battery will last longer before needing a recharge.

The takeaway from all this is, that no vendor can tell you how long their battery will last because they don't know what duty cycle you will put their battery through. Therefore, the only true measurement to consider when comparing batteries is "watt-hours". If the vendor can't provide it, now you can do the math yourself.

4 Future-proofing your purchase.

Keeping up with Android™

A lot has changed in just a few years when it comes to industrial mobile computers. In the early days, or the "dinosaur era" of mobile computers, the operating system of choice was "DOS". Microsoft® DOS to be more specific. A purely text-based operating system with no graphics. Fairly quickly that gave way to Microsoft CE and then Microsoft mobile. In those days, wireless security wasn't really a thing yet and so there was rarely a need to stay on the latest version of OS firmware. In fact, it was pretty common to "lock down" a device and allow no changes to it at all. Once the combination of the Windows operating system and the application software were working together correctly, many people captured that as a "golden image", forever to remain unaltered. It works, so don't mess with it. Ever. Sometimes, upgrading the OS would "break" the application software or vice-versa. Then all heck broke loose. Everything stops until someone can figure out what broke what and how to fix it or roll it back to get it to work again. This was pretty standard practice until nefarious people started hacking into Wi-Fi networks and mobile computers became a vulnerable node in the security plan. As operating systems began supporting more and more stringent wireless security protocols, it became vital to keep mobile computers up-to-date with the latest versions and patches. This forced software developers to up their game, making sure their software applications are kept current and compatible with the latest OS versions.

Things got even more complicated when the Android operating system entered the game. It didn't take long before Microsoft backed out of the mobile operating system space entirely and left it to Apple and Google. Apple's operating system, iOS, only runs on Apple devices, so other device manufacturers were left with the Android operating system as their only choice. In many ways, it was a good thing. There are no license fees and its open source, making life much easier for software developers. But on the downside, Google rolls out a new version of Android every year, and every version seems to take a little more processing power than the one before. So, a mobile computer that has enough power to operate Android 12 today, but not adequate for Android 17. It's not possible to simply upgrade the processing power on a mobile computer. If making sure your devices can run the most current version of Android, be prepared to replace them every 3 to 4 years.

Wi-Fi Connectivity

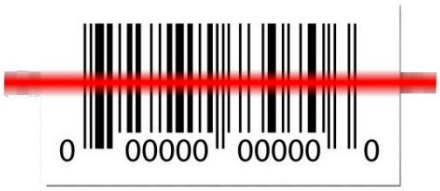
Another area worth looking at for future proofing is Wi-Fi-connectivity. Just like operating systems, Wi-Fi protocols are constantly on the move, improving security

and performance characteristics. One can't help but notice all the lower-case letters that keep getting added to the IEEE published standard for wireless local networks called "802.11", or what we call Wi-Fi. Over the years that list of letters has grown : 802.11b,a,g,n,ac,ax. No doubt the list will continue to grow. The good thing is that new Wi-Fi radios are generally backwards compatible so newer mobile computers will work on older Wi-Fi networks but will be missing out on some of the newer functionality and improvements. As of this writing, Wi-Fi 6E is the latest standard for industrial applications. What makes it superior is that it opens up an entirely new frequency band of 6 GHz. Earlier standards utilized first the 2.4 GHz band then later added the 5 GHz band. Wi-Fi 6 GHz opens a third frequency with much broader band width. This means faster throughput, less latency, and fewer problems. It makes sense to purchase mobile computers equipped with Wi-Fi 6E radios, even if the WLAN network is still operating on an older standard. The Wi-Fi 6E radio is backwards compatible so it will still work, and most importantly, when it comes time to upgrade the Wi-Fi network, the mobile devices will be good-to-go. Future-proofed and ready for action.

5 Selecting the right barcode scanning technology.

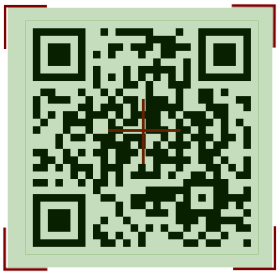
An industrial handheld computer without a barcode scanner wouldn't be very practical in a warehouse. Scanning barcodes is the fastest and most efficient way to enter data. There's a lot to consider when selecting the right barcode-scanning mobile computer to make sure that it will not only work for you today, but into the future as well.

There are essentially two different types of technology deployed in today's industrial mobile computers: Laser technology and Imaging technology. Laser technology is the "original" technology developed to scan barcodes. It emits a beam of laser light which is rapidly moved from side to side, across the barcode. This creates a visible line called a raster, which is what "scans" the barcode. Because the raster cuts across the barcode in only one position, it can only read what are called "1D" barcodes, the most recognizable example of which would be UPC or EAN



barcodes that we see on consumer products. The raster has to cut across ALL of the bars of the barcode so in order for it to scan, it has to be in proper alignment with the barcode. Laser technology is fast and can scan from very far distances under the right circumstances. However, it is older technology, it contains moving parts to create the raster line, and theoretically more dangerous as a laser can cause eye damage.

The alternative technology is called "imaging". These imaging barcode scanners differ in that they essentially take a picture of the barcode and then process the image to decode the barcode. What the user sees is light emitting from the scanner illuminating the barcode. Some imaging scanners have "light dots" or "crosshairs" that allow the user to aim the device. This type of technology was developed to scan what are called "2D Barcodes", a good example being a QR code. One of the many advantages of imaging technology is that it does not require the user to orient the scan pattern in any particular reference to the barcode. Because it is capturing the entire image of the barcode, orientation is irrelevant. In addition, it can not only read 2D barcodes, but it can read 1D barcodes as well.



Improvements in imaging technology have brought the cost of these devices down and the performance up. Early on, imaging technology could only scan very short distances, maybe just a few inches. Today, some imaging-based scanners can scan 50 feet or more. The other advantage that imaging technology offers is that it has no moving parts, as opposed to laser scanners which utilize an internal motor to rapidly move its mirror back and forth, producing its raster effect.

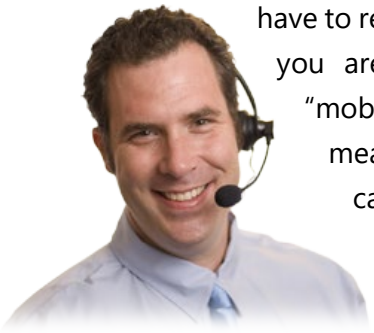
For future-proofing, even if you only need to scan 1-dimensional barcodes, it makes sense to go ahead purchase barcode scanners equipped with 2-D Imagers. The cost difference is insignificant, and you never know when your operations might find value in utilizing 2D barcodes somewhere in the process.

Once you decide to go 2D, the only real consideration is how far you will need to scan because scan distance capability does have an impact on the investment cost. Most "standard" or near-range 2D imagers can scan barcodes reliably up to as far as 2 feet away (60cm), and maybe more for larger barcodes. But there are 2D imagers that can scan not only close-up, but far away as well. In some cases, these "near/far" imagers can scan up to 50 feet or more. They can do this because they in fact have two sets of optics. One for close-up scanning and the other for distance scanning. So it comes as no surprise that there is a steep premium to be paid for these "near/far" scanners because you're getting two scanners in one. Note that the size and quality of the printed barcode has a huge impact on the distance and reliability of scanning. Don't assume that you'll be able to read a UPC barcode from 30 feet away. You won't. Carefully check the specifications of the models you are considering.

6 Extended Warranty?

Every mobile device manufacturer offers, at the very least, a factory warranty that will

cover the parts and labor for the device, typically for a period of one year. On the surface that may seem like adequate coverage, but in reality, it simply isn't. You have to remember that what you are purchasing is a "mobile" device, which means it's going to get carried, which means it's going to get dropped. And kicked. And wedged in a door. Let's face it, your mobile device is more likely to get treated like a box knife than a computer, and despite the best efforts of the manufacturer, it's simply impossible to ensure that a device will never succumb to the rigors of use and abuse. Someday it will break and will need to be repaired.



The factory warranty that covers parts and labor won't cover catastrophic failures resulting from use or abuse. Most manufacturers have a flat-rate they charge for repairs. However, these manufacturers also offer warranties that go beyond just parts and labor. Some will cover "wear and tear" and abuse regardless of how it came to be damaged. In most cases, the cost of one of these "comprehensive" warranties is less than the cost of the flat rate repair fee.

Manufacturers are banking on the probability that if a facility has ten devices under a comprehensive warranty, not all of them will need to be repaired during the warranty period. Therefore, they can take a chance and make the warranty cost lower than the flat-rate repair. It's a risk that sometimes pays off and sometimes backfires on the manufacturer. But for the device owner, it is almost always more advantageous to place a comprehensive warranty on the device because, in addition to locking in your repair costs, these comprehensive warranties often include other "perks" such as faster turnaround time and free shipping. All things considered, the comprehensive coverage is a good value for mobile devices.

Conclusion

While there are certainly other questions that might need to be raised for your specific application requirements, these six questions are fairly universal for mobile computers that will be deployed in installations where they will be exposed to heavy use and environments that are challenging for electronic devices. In addition to buying the appropriate device with adequate warranty protection, user education is paramount to ensuring that your company's investment in technology is both reliable and effective. Picking the "right tool for the job" is an old adage, but one that is highly appropriate still today.

About AML

AML was founded in 1983 and for more than 40 years we have been developing and producing barcode-centric products for data collection applications across a wide array of industries. We engineer and manufacture our products in Fort Worth, Texas, which means our knowledge base is here, not halfway around the world.

Our 40+ years of experience has culminated in the development of our flagship product, the **StrikerX Mobile Computer**. Born as an Android device, the StrikerX features a 4" display in addition to a tactile keypad. It offers a variety of barcode scanning options which means it can be tailored to specific application requirements. The features of StrikerX include Wi-Fi/Bluetooth capability, audio output, integrated flashlight, a 24.3 watt-hour battery, and an optional 13MP camera with flash. StrikerX was specifically designed for challenging environments without sacrificing ergonomic comfort. Its performance and versatility is matched only by its durability and reliability.

StrikerX

- **Powered by Android™ 13+**
- **Qualcomm® QCS6490 Octa-Core processor**
- **4" LCD with capacitive touchscreen**
- **47-key or 58-key keypad options**
- **2D Imager, Near/Far 2D Imager**
- **Wi-Fi 6E, BLE 5.2**
- **Integrated flashlight**
- **Optional camera**
- **24.3 watt-hour battery**

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