

## UNDER THE HOOD

How service providers use advanced technology to improve and expedite vehicle and heavy equipment maintenance and repair



# The evolution of service bay diagnostics and repair

Large vehicles and heavy equipment are at the center of the construction, transportation and agricultural industries and keeping these key assets in optimal condition is vital for business success. When a large vehicle fails, a company can't afford to wait days for repairs. Unexpected breakdowns mean lost productivity, project delays and substantial monetary losses. The pressure is on for diagnostic and repair service providers to get the equipment operational as quickly as possible.

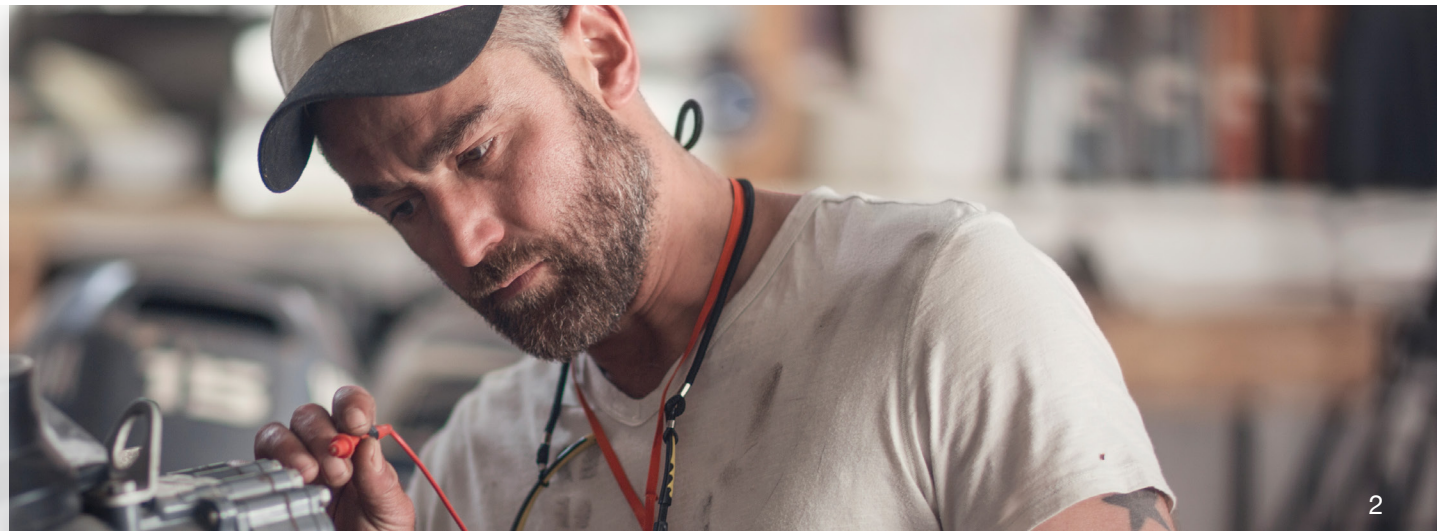
In the past, vehicle and heavy equipment providers relied heavily on a mechanic's innate knowledge and experience to determine what was wrong with a vehicle, often applying an Occam's Razor mindset to diagnostics — the most obvious problem is probably

the right one. A correct diagnosis is essential for efficient (and effective) repairs. Diagnostics have come a long way in recent years, especially since most vehicles and heavy equipment now use electronic control systems that make manual diagnostic processes inefficient.

Diagnosing problems requires an ability to read data from sensors as much as it does knowledge about the machine itself. Today, effective diagnostics has become a profit center for service bays, with 78.3 percent of heavy-duty repair shops now charging for diagnostic operations.<sup>1</sup>

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# Getting under the hood

To effectively compete and provide a high level of service in today's equipment and vehicle repair markets, service bays must provide technicians with advanced, rugged mobile technology that will allow them to diagnose problems correctly, whether in the shop or in the field. In addition, mobile technology can give technicians access to the real-time information they need to make repairs correctly or perform maintenance in a single visit, decreasing downtime and getting both people and equipment back to work.

While automotive and equipment diagnostics have become more technologically sophisticated, digital capabilities in the service bay haven't always kept pace. For many shops, diagnostic and repair processes still rely heavily on manual operations and technicians don't always know what they're dealing with until they've gotten under the hood. Even then, repairs often come down to trial and error until something works, which can take more time, drive up repair costs and negatively impact customer relationships.

Using mobile solutions enables technicians to work with increasingly computerized vehicles and equipment built with advanced technologies and sensors — wherever they're working. Access to diagnostics and repair solutions powered by artificial intelligence (AI) help them work more productively. Internet of Things (IoT) and analytics-powered preventive maintenance capabilities help service providers develop improved preventive maintenance schedules and enable them to proactively service vehicles before a breakdown

even occurs. These capabilities reduce unexpected downtime, lessen the need for emergency repairs, and ensure that heavy equipment and vehicle operators can do their jobs.



# Overcoming key service bay and maintenance challenges

Technicians need mobile solutions to help efficiently diagnose maintenance problems, make the right repairs the first time, and reach their customers out in the field. Mobile technologies also help reduce costs and equipment downtime; improve employee training and retention; and keep end customers happy. Unfortunately, consumer-grade technology isn't always up to these challenges.

Using rugged mobile solutions and the “3C” framework — complaint, cause, and correction — technicians know they're performing the right diagnostic and repair service processes.

Mobile computers read codes from onboard vehicle and engine computers, for example, then help determine the problem and advise on necessary repairs. This is critical for equipment that can't be brought into a service bay and must be maintained or repaired at the job site.

Mobile devices can also be used to present training videos, access repair manuals, and display schematics. Current employees can view these materials right in service bays or while working from remote locations, and new hires can use them to get up and running quickly in their positions.

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Executive Account Manager at Panasonic Connect North America



Some of the key ways mobile technology helps enhance the vehicle service and maintenance process include:



**Speeding up repair cycle times.** In the past, manual diagnostics often require disassembling machine components in search of a problem. Today, real-time diagnostic software communicates with sensors within the machine to determine the root cause of the problem. Analytics can determine failure rates (mean time between failures or MTBF) and help develop a profile and service history, which in turn allows for the order and stocking of key components, speeding up supply chain issues. Mobile diagnostic solutions address the 3C's starting with the complaint, then identifying the cause, and finally initiating the correction.



**Ensuring correct repairs, the first time.** Mobile technology eliminates the need for trial-and-error diagnostics. Access to real-time diagnostic software ensures that technicians get the right diagnosis from the start, eliminating the cost of extraneous repairs or extra trips to the shop.



**Improving end customer satisfaction.** Mobility tools that enhance efficiency can help improve customer satisfaction. This, in turn, helps to build long-term trusted relationships between shops and equipment owners.



**Enhancing profitability.** Many shops waste labor hours on manual diagnostics, only for customers to back out of the repair. Mobile diagnostics technology allows techs to perform quick and reliable assessments, eliminating wasted

labor. Additionally, shops can charge for the convenience and efficiency of mobile diagnostics to generate an additional revenue stream.



**Increasing accuracy of maintenance records.** Using mobile devices, technicians can document their repairs and maintenance activities as they go. This enables more accurate billing and creates an accurate service history of the equipment that can be referenced next time it comes into the shop. In addition, because the service history documents MTBF, mechanics know when new service is required or when they should change out high-failure parts during planned machine downtime, keeping operations flowing.



**Facilitating real-time inventory access.** With a real-time view into the shop's parts inventory, mechanics can ensure they have what they need on site before beginning a repair — or order it for immediate delivery if they don't. This decreases potential delays in the overall supply chain and parts inventory.



**Extending on-staff experience and expertise.** Like most industries, heavy equipment and vehicle repair faces a shortage of experienced mechanics. Mobile solutions allow for collaboration and communications over vast distances. This way less-experienced technicians can communicate from the field with more experienced team members if they run into a complex problem.

# Devices that work anytime, from anywhere

Professional mechanics rely heavily on their tools and are equally as discerning when it comes to their mobile solutions. Devices must be reliable and connect dependably even in remote areas. Capabilities like long battery life, powerful wireless connectivity, viewability, touchscreens, and glove touch all play important roles in helping these professionals do their jobs accurately, safely, and quickly, regardless of where the work takes place.



Time is money for heavy equipment fleet operators, and companies simply can't afford excessive downtime — especially if it's caused by the device or the computer. In a world where mechanics no longer have paper-based schematics and manuals to work with, the device has to work from anywhere.

- **JASON LEWIS,**

National Sales Manager, Panasonic Connect North America

Mechanics need to ensure they can focus on repairing the assigned equipment, without worrying about the devices they rely on. As such, device selection matters. Technicians need a computer that can provide:

- Quick access to diagnostic codes and reliable connections to repair procedures.
- Flexibility during service calls to access work orders, repair resources, parts inventories or customer service histories— whatever the job calls for.
- Battery power that lasts across multiple shifts or long jobs.
- Reliable connectivity in an extended coverage range or in urban areas where buildings can block signals.
- The ability to stand up to harsh environments, including weather, rough handling, dirt, dust, grease and grime.
- Reliability and flawless performance during diagnostics and service processes, where any tech-related issues translate into time and revenue losses.



## PANASONIC CONNECT OFFERS COMPLETE MOBILE SOLUTIONS FOR VEHICLE AND HEAVY EQUIPMENT DIAGNOSTIC AND REPAIR SERVICES

Panasonic Connect supports an “operate from anywhere” work environment — from the service bay to remote locations and all points in between. By partnering with Panasonic Connect, diagnostic and service providers can leverage and benefit from complete mobile solutions that include:

- Solutions from Panasonic Connect and partnerships with industry-leading software partners
- Panasonic TOUGHBOOK® rugged mobile devices with purpose-built capabilities
- A variety of value-added professional services

Thoughtful incorporation of TOUGHBOOK mobile solutions from Panasonic Connect into diagnostic and repair processes can increase revenue and profit for service and repair centers. For example, manufacturer dealerships can specify that diagnostic software for other vehicle makes is included on their TOUGHBOOK devices to allow diagnostics on not only the manufacturer’s cars, but also on models from other brands. This capability helps dealerships serve a wider customer base and accurately diagnose and repair trade-ins, ultimately increasing revenue.

Similarly, heavy equipment shops can ensure they have the most up-to-date diagnostics software and manuals to service any brand or type of equipment. This can help to expand a shop’s service portfolio and gain more business per customer.

## SOFTWARE DESIGNED TO WORK WITH TOUGHBOOK RUGGED DEVICES

Panasonic ProServices can help diagnostic and repair providers take full advantage of their TOUGHBOOK solutions by providing software that helps IT manage their mobile fleet more efficiently, including:

- A variety of value-added professional services  
**TOUGHBOOK Smart Essentials** – A cloud-based software tool that provides real-time information about how each mobile device is operating. Smart Essentials monitors battery health, identifies underutilized devices, and singles out those that aren't operating well.

Speaking about Smart Essentials, Berger says, “We know what's going on with the device at all times and can conduct preventative maintenance before anything happens to it.” In some cases, he adds, the devices are self-healing. For example, a TOUGHBOOK 40 or 55 knows when to order its own replacement battery.

- **CORE Asset Management** – A web solution from Panasonic Connect and provided at no additional cost that enables service providers to manage all their fleet assets (not just mobile devices) in real time. It provides visibility into assets and related data in a single place and offers broad feature customizability so they can manage assets per their preference.







## THE TOUGHBOOK ADVANTAGE

TOUGHBOOK rugged devices are ideal for field work. Each rugged device is engineered to withstand harsh environmental conditions, provide long battery life (typically with an option for a second, hot-swappable battery) and offer outdoor viewable displays with patented rain mode and glove-touch functionality. Rock-solid and durable, Panasonic TOUGHBOOK laptops are exceptionally reliable, boasting a failure rate of 3.5%, which is four times lower than other rugged competitors and seven times lower than equivalent consumer devices.<sup>2</sup>

In addition, TOUGHBOOK rugged devices provide strong wireless connectivity across services and in remote locations via 4G, 5G (supporting Sub-6 and mmWave) or Wi-Fi. The TOUGHBOOK embedded antenna technology enables higher connectivity rates even in rural areas where standard mobile devices may lose service or in areas where signals can be blocked. A dedicated team of wireless engineers at Panasonic tests the antenna modules in one of the industry's largest anechoic testing chambers.

## ENHANCED SERVICE DIAGNOSTICS IN THE FIELD

A combine breaks down in the middle of a rural cornfield. The office calls a mechanic, who comes out to the site and hooks up diagnostic equipment to the combine. The mechanic gets a diagnostic code, but quickly realizes they also have no signal and can't get the information they need to identify the problem without going back to the office for access to Wi-Fi.

For a busy farming operation, this single breakdown can slow down or halt an entire harvesting process for the time it takes to fix the combine. Every trip back and forth from the field in search of internet access increases that downtime. The repair technician faces extreme pressure to get the job done fast as the lack of connectivity continually frustrates all parties involved.

“When a \$500,000 combine goes down in the middle of Iowa’s corn-harvesting season and the farmer can’t harvest the fields, the company may wind up losing crops as result,” says Jason Lewis, National Sales Manager for Panasonic Connect North America. “The subsequent trickle-down effect can be disastrous for the farm, its customers, and its end consumers, all of whom indirectly rely on that combine to function properly.”

In another scenario, perhaps the combine completed its job without issue, but the trucking company never showed up to pick up the corn because the truck broke down enroute and the technician went through a similar set of problems.



Every maintenance issue that generates unexpected downtime results in snowballing costs for every hour the equipment doesn't operate.

Don't leave your repair techs standing in the middle of a field trying to find a bar of service. Mobile diagnostics technologies can mitigate much of the impact of these potential interruptions by ensuring that combines, trucks, or other heavy equipment get up and running as quickly as possible.

## PROFESSIONAL SERVICES THAT ADD VALUE

Panasonic ProServices can help diagnostic and repair providers streamline deployment, enhance usability and increase IT productivity.

ProServices include:



**Kitting and deployment** services that can get your TOUGHBOOK mobile devices into the field quickly, packaged and configured to work right out of the box and with third-party accessories such as network adaptors, barcode scanners, straps/holsters and expansion modules. Panasonic kitting services also align with green strategies because they reduce the number of packing boxes and overall waste.



**Installation and mounting** of TOUGHBOOK devices on-site for fast, simple in-vehicle deployments that maximize your team's productivity. You'll save your organization time, money, and potential headaches down the road.



**Mobile Device Management** empowers your IT staff to remotely monitor, manage and update mobile systems. Your team can also install security and software updates and remove unauthorized software – all without having to physically touch a device.



**Security apps** that defend your TOUGHBOOK devices against risk of cyberattacks with secure, third-party software for device and data protection.



**The Ultimate Care Warranty** will cover any hardware failures occurring due to accidental damage of the product, with a total loss replacement limit of a maximum of 2% of the total number of products deployed for a specific customer.



**Wearable accessories for TOUGHBOOK devices** include hand straps, shoulder straps and harnesses that make it easy to use devices in highly active environments.

With ProServices, shops and dealerships can keep their focus where it belongs: Getting vehicles and heavy equipment back into service quickly.



# PANASONIC TOUGHBOOK RUGGED DEVICES FOR VEHICLE AND HEAVY EQUIPMENT SERVICE

Panasonic Connect offers three rugged device options ideal for use by automotive and heavy equipment service providers:



## TOUGHBOOK 40

- Maximum flexibility during service calls
- Up to 19 hours of battery life (or 38 hours with optional second battery) and the ability to hot swap
- Modular design features eight user-upgradeable areas that provide over 6,000 combinations
- Supports Wi-Fi, Bluetooth®, optional GPS, optional 4G (speeds up to 2 Gbps) and 5G (speeds up to 4.4 Gbps supporting sub-6 + mmWave) to help seamlessly connect to the best available network without disruption

## TOUGHBOOK 55

- The same long battery life as the TOUGHBOOK 40
- Modular design features seven user-upgradeable areas
- Optimized connectivity in the field via advanced wireless antenna technology, amounting to more bars even in remote locations); choice of Wi-Fi, Bluetooth®, optional 4G, optional GPS

## TOUGHBOOK G2

- Groundbreaking, modular fully rugged 2-in-1 tablet. Modular design features three user-upgradeable areas.
- An 18.5-hour hot-swappable battery aimed at professionals who need a rugged yet versatile device they can rely on in challenging work environments
- Network capabilities enhanced with cellular options of 4G LTE or 5G supports Sub-6 and mmWave

With the combination of rugged devices and support from ProServices, Panasonic Connect ensures diagnostic and service providers have everything they need for service bay or field repair operations.

# TOUGHBOOK for service bay diagnostics

Panasonic Connect helps service providers repair right the first time, improve technician efficiencies, reduce costs, increase service bay throughput, and raise profitability. For more information, visit [TOUGHBOOK mobile solutions](https://www.panasonic.com/us/toughbook).

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## SOURCES

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