



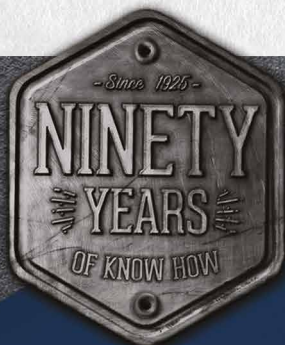
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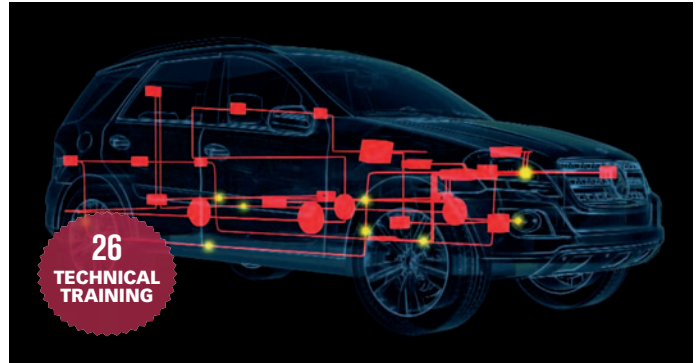
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SUPPLIER TRAINING EXPO attendees could interact with WORLDPAC suppliers at the trade exhibit, held after classes.

BREAKING NEWS

SUPPLIERS

NGK FOCUSES ON SUPPLIER RELATIONSHIPS



CANTON — NGK reiterated with its

suppliers its focus on four key areas — relationships, growth, value and innovation — at its annual Supplier Conference.

Hosted at the Glenmoor Country Club in Canton, Ohio, NGK welcomed its supplier partners May 22-23 to the event aimed at networking, relationship building and sharing what is to come within NGK going forward. NGK executives shared information with their supplier partners on how they can improve their business going forward, and what to expect from NGK in the future.

NGK President Yoshitaka Narita spoke to attendees on the company's history and values, and what has brought it successfully through to 2018 and beyond, while Larry Carpenter, Safety & Environmental Manager,

>> **NGK CONTINUES ON PAGE 6**

TRAINING

TECHS, SHOP OWNERS CONVERGE FOR WORLD-CLASS TRAINING

PETE MEIER // Technical Editor



GRAPEVINE, TEXAS — WORLDPAC, with help from their new teammates at Advance Auto Parts, held its fifth bi-annual Supplier Training Expo (STX 2018) this past May (May 3 - 6) at the Gaylord Texan Resort, just outside of Dallas. The three-day event featured 167 different instructor-led technical training and business courses, a supplier expo with 200+ parts manufacturers and more than 2,000 people in attendance.

"We are passionate about serving our customers. Our goal at WORLDPAC and Advance is to provide automotive professionals with management train-

ing to help them grow their businesses and world-class technical training to meet the demands of today's advanced vehicles. Delivering the automotive industry's most robust training program through the close collaboration between WORLDPAC Training Institute (WTI) and Carquest Technical Institute (CTI) is a pivotal focus of STX. We also strongly believe events such as STX 2018 continue to reinforce the industry's growth and career opportunities," said Bob Cushing, Executive Vice President, Advance Professional.

The seminars offered were led by a cross section of talent from the indus-

>> **EXPO CONTINUES ON PAGE 6**

TRENDING

GABRIEL, BENDIX LAUNCH NEW REWARDS, TRAINING PROGRAM

Gabriel has announced the launch of Gabriel and Bendix Answer Garage, a rewards, promotions, training and business tools program for service professionals.

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IDENTIFY BOTTLENECKS IN THE REPAIR PROCESS AND FIX THEM

In most shops, back-ups can happen in the repair process. To maintain productivity, repair shops must identify and remove the issues causing the bottleneck.

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AAPEX, PARTNERS TO PROVIDE TOP QUALITY TRAINING

AAPEX 2018 is partnering with 10 leading organizations to deliver the most robust education program to date to ensure professionals are up to speed in today's market.

MOTORAGE.COM/18TRAIN

WIN CASH BY SHARING YOUR INDUSTRY KNOWLEDGE

CARDONE Industries announced a new video competition for technicians to share their installation skills and enter to win \$5,000. Videos must be submitted by Oct. 15.

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>> EXPO CONTINUED FROM PAGE 6

Instructors from both WTI and CTI were joined by OEM representatives like Motorcraft's Jay Klamer and top independent trainers like John Thornton, Bernie Thompson, G. Jerry Truglia and many more. When classes were over, the host resort had plenty of activities for attendees to enjoy. Many brought their families and made it a working vacation, traveling from all over the country to attend.

Continuing education in the automotive field is vitally important and the organizers of STX 2018 did everything possible to provide a variety of educational opportunities to their guests, covering technical topics that included the latest diagnostic challenges, import-specific and domestic technologies, engine and transmission products, and software solutions. Management training featured the perspective of professionals sharing real-life experiences

on topics from creating a culture of service readiness to selling diagnostics. Also heavily covered was growing the automotive workforce of the future, with more than 100 local high school and college students in attendance to see the exciting opportunities for careers in the automotive field.

If you want to learn more about WORLDPAAC's Supplier Training Expo, contact your local WORLDPAAC representative. 

>> NGK CONTINUED FROM PAGE 4

discussed the importance of a safety program and ensuring all employees understand their role in creating and maintaining a healthy and safe workplace.

Enhancing efficiencies was a main focus of the event, with Gary Casto, Materials Manager, encouraging all to take a deep dive into their business models to see where processes can be improved and cost reduction strategies can be implemented.

NGK's Quality Circle teams participated in a competition

to see which supplier — in partnership with NGK — was able to identify and implement a significant efficiency improvement in their business. HK Metalcraft discussed changes made to their packaging department, while Sanko Electrica Mexico discussed the changes made to their quality control inspection process.


NGK also announced its suppliers of the year award winners:

- Akers Packaging Solutions
- Ainak Inc.
- Nissei Electric Company
- Kurabe America Corp.
- Hinchcliff Lumber Company
- Neff Packaging
- Veritiv Corporation

An overall market update picture was presented by Kent Howard, Senior Vice President of the OEM Division. Howard touched on developments in the more than \$17 billion industry, new trends including significant growth in the SUV and CUV market and NGK-OEM customer relationship news and updates. Brian Norko, Vice President Aftermarket, delved into the aftermarket specifically, reviewing light vehicle sales trends and the changing market.

NGK plans to have three major product launches this summer, with a new spark plug coming at the end of May and a new vehicle electronics line and sensor line in June.

Innovation remains a main company focus, and Rich Sullivan, Senior Vice President of NTK Technologies, discussed the joint NGK-NTK Innovation Center in Santa Clara, Calif., and how it encourages both idea and risk sharing among business partners. The center is slated for a soft opening in January 2019, with the official opening in April.

NGK's philanthropy efforts benefit the Ignite a Better World Foundation, and Dr. Stefan Maxwell, a neonatologist, presented on how the donations from NGK and the Supplier Conference attendees — totaling more than \$150,000 since 2012 — are put to use at the Women and Children's Hospital in Charleston, WV. 

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MARKETING TO A DISTRACTED AUDIENCE



How to make your message stand out amid all the noise

RON IPACH // Contributing Editor

Believe it or not, scientists have figured out that goldfish have the attention span of 9 seconds. Aside from wondering how the heck they figured that out (or even why), you'd probably agree that 9 seconds isn't very long, right?

I bring that up because the same scientific community that brought that amazing fact to light has also figured out that the attention span of the average person (aka your potential custom-

ers) is only 8 seconds according to a study in 2015 — a full second less than that slimy little goldfish. Crazy, right?

Thanks in large part to digital devices within arm's reach that give us instant access to the internet, email, texts, video, games, online shopping, newsfeeds, music, social media and more, we're constantly bombarded with the "what else is happening?" phenomenon. How often do you find yourself watching TV while searching the internet on your phone? Going through email while talking on the

phone? How about texting while carrying on a conversation with someone across the table from you? We're not immune — neither are your customers.

You've no doubt realized that attracting more car count to your shop has become a lot more difficult, too. What used to be a highly effective marketing message now seems to be falling on deaf ears. And it might as well be. Your marketplace may be hearing it, but among all the noise, clutter and short attention spans out there, it's being totally ignored.

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Not long ago, your advertising choices were pretty limited. Yellow pages, newspaper and direct mail made up the bulk of media being used by shops. But now, there are literally hundreds of choices to choose from to get your message out there — email, text, Facebook, video, blogs, podcasts and more — which is causing even more distraction because the marketplace is being bombarded (and continually numbed) with a constant barrage of advertisements selling everything from ab workouts to Zombie Apocalypse Survival Kits. According to many studies, the average person is exposed to more than 4,000 advertising messages per day — and that number is now growing by leaps and bounds.

So how do you get noticed among all the noise and clutter? I teach dozens of attention-grabbing strategies, but due to space limitations, I'd like to cover the four most important ones here.

Be the familiar face

Have you ever been in a room full of people and among all the chaos, you heard someone mention your name? It immediately caught your attention and you zeroed in on the person that spoke it? Or maybe you walked into that same crowded room full of strangers and saw someone you sort-of recognized and were drawn towards them because it made you feel more at ease?

You can use this phenomenon to your advantage by focusing your marketing efforts toward your current and past customers. Your logo, shop name and maybe even your own name will be the familiar face in the crowd for them. Whenever possible, use your prior relationship with them to your advantage by personalizing your message with their name, vehicle, and any other relevant information you have about them to help them zero in on your message.

MORE TO HELP YOUR SHOP MARKETING

NACE Automechanika 2018 comes to the Georgia World Congress Center in Atlanta Aug. 8-10, offering training from industry-renowned experts, trainers and skilled technicians with the collective goal of continuing to better the education and skills of the aftermarket. Looking to further improve your shop marketing? Here are two courses you should check out:

Make marketing fun

Marketing can be fun when you learn how to recognize the missed opportunities that are right in front of you. How things such as community involvement, local outreach and sponsorship opportunities can brand you as a trusted local business, make your name be remembered and recognized as a community advocate and a local business that cares about the community, and the causes that they care about. Not all of our marketing

ideas are done to make money, some create loyal customers that trust us and would not think of going to the competition. Megan Williams, director of marketing for Lefler Collision & Glass Repair Centers, an MSO operating out of Southern Indiana and Kentucky, will share what has returned outstanding results in her business.

Get your shop noticed with an effective internet and social media strategy

Have you ever spent a lot of money on expensive advertising that didn't get you the traffic you deserve? Traditional advertising methods are becoming more expensive and less effective. In this session, Matt Winslow of the Automotive Training Institute shares cutting edge tips to drive cars to your bays and profits to your pockets by using the internet and social media effectively.

Stand out in the crowd

Same is lame. In a fast-paced, action-packed environment, blending in is the last thing you want to do. Yet in the follow-the-leader world of marketing, the media is filled with ads that do little more than just blend into the landscape.

Just like you'll notice a building for the very first time after it has been freshly painted with a bright new color (even though you pass by it every day on the way to the shop), or a man that's wearing lederhosen and standing in a sea of suit-wearing businessmen, your eye is naturally drawn to what is different.

I've been experimenting a lot with Facebook ads recently and, by far, my most successful ad to date is a video I recorded while escaping from a straightjacket. Among the thousands of look-alike posts, videos, pictures and advertisements you'll see every day, seeing a guy writhing around in a straightjacket is very likely to stop you in your tracks and make you take notice, wouldn't you agree?

Use video

Every minute, a whopping 300 hours of video are uploaded to YouTube and almost 5 billion videos are being watched every single day. Video is a

media that continues to explode. You can no longer ignore it as a key strategy when attracting more car count to your shop, because your prospective customers are more likely to watch a video than to read anything you send to them. As a mentor once told me, the easiest way to attract attention is to find where the stampede is heading — and then stand in front of it.

Video also has the distinct advantage of making your prospects feel as if they already know you; therefore, they are more likely to pay attention to you the next time they see your videos. I recently spoke at a conference and had a half dozen shop owners walk up and start chatting with me as if we were lifelong friends. I thought that either I had lost my mind and didn't recognize these old friends, or that I was somehow wearing a T-shirt with my name scrawled across my chest. It wasn't until the sixth guy told me how much he enjoys watching my Car Count Daily videos that I finally realized why I was such a familiar friend to them.

Market to their pocket

Ninety-five percent of your marketplace now carries a cell phone with them at all times. We've become so dependent on them that a new term for the irrational fear of being without a mobile phone has been coined called "Nomophobia." (Okay, I'll admit it. I've turned my car around more than a few times after realizing I left my phone on the nightstand. How about you?)

These phones are probably the major cause of distraction because they are constantly ringing, buzzing and ding-ding with alerts. When these alerts happen, we can't help but stop whatever we're doing to check them out — and this is where you can use this to your advantage by sending them an offer via text message.

Here are a few stats that show just

how well text messaging cuts through the clutter and distraction and why you should consider adding text to your marketing arsenal:

- 98 percent of texts are opened
- 95 percent of texts will be read within 3 minutes of being sent
- The average response time for a text is only 90 seconds

Now once you have their attention, your job isn't over. Nope, not by a long shot. Remember you're dealing with a market that has an attention span of less than a goldfish, so once you've caught their attention, it's important to get them to act RIGHT NOW — before the next text, phone call or Kardashian tweet yanks their attention away from you. Here are a few powerful ways to do it.

Be the obvious choice

Before making a decision to come to your shop, 91 percent of folks are going to check you out online first. Thanks to those tablets, smart phones and desktop computers that are within arm's reach at all times, finding the dirt on you has never been quicker and easier. If you have a poor reputation, or star rating, it's going to be a deterrent to any prospective customers who are considering using your services. (We've developed a unique — and free — online reputation tool that will show how your shop rates in your marketplace and will give you tips on how to improve your score. Simply go to www.Soapboxx.io to check it out.)

Have an attractive offer

By all means, I'm not saying you need to give away the store, but you've got to put together an attractive enough offer to grab their attention. Keep in mind that you have zero chance of making money off a vehicle that's not in your shop, so do whatever you need to do to put together an offer


that gets the phone ringing.

Use scarcity

A great offer will help grab their attention, but combining it with a limited time and/or quantity will get them to respond right now.

Make it easy to respond

You've just accomplished the Herculean task of cutting through all the noise, then grabbed their attention, given them an attractive offer and gotten them to respond immediately — now don't blow it by asking them to jump through hoops to make an appointment. Allow them to make an appointment online by clicking a link if they wish. If they are going to call your shop during business hours, the call must be answered by a human. If they call after business hours, forward the call to your cell, or hire an answering service. That answering machine that you may be using is costing you more money than you can imagine!

Customers are the lifeblood of your business because without them, you're doomed. Attracting more car count can often be an exercise in futility, especially if you're blending into the scenery and not getting noticed. If you'd like more tips, tricks and tactics on attracting more car count, I invite you to check out my free Car Count Daily videos on Youtube or subscribe and have them delivered to your email every week by going to www.CarCountDaily.com. 



RON IPACH, aka Captain Car Count, is the president of Repair Shop Coach and has specialized in helping over 6,567 repair shop owners to attract and then keep all the top-quality car count that they can handle. He also hosts a daily Car Count video blog. To sign up for these free videos, go to www.carcountdaily.com

Your future is based on growing your own

Use employee reviews as a tool to gauge goals, growth and performance

Many times when you have a lack of accountability or performance in an employee, you want to blame them first. There is a good chance you could have done something different to change that outcome. If you really believe there is a technician/service advisor shortage, you better start growing the ones you have already hired. ATI Coach Kim Hickey says most of the lack of employee growth is coming from lack of regular employee reviews. Let's listen to what she has discovered as typical with even great shop owners and managers.

What is an employee review? It is not something only corporations need to do. It is not something that you are "too small" to do. It's also not something you do only when you want to terminate an employee and need documentation. A review is a retrospective view or survey, and/or an act of carefully looking at or examining the quality or condition of something or someone.

When you hired your employees, hopefully you gave them a clear understanding of your expectations as well as

what they should expect from you. Many business owners boast that their employees know exactly what is expected of them. That assumption could not be any more false. Luckily there are several tools in your toolbox that will remedy that situation — and one of the most underutilized is the quarterly employee review.

For the purpose of this article, I am going to assume that when you hired your employees, you set up clear performance goals, provided standards for their behavior, supplied an employment manual that outlined attendance,

continued education expectations, informed your employees that they would be receiving scheduled reviews, and that new hires have already received their 30, 60 and 90 day reviews before receiving their nonprobationary status.

Why?

A review provides a benchmark by which you can measure for productivity, performance and any other goals you set. While a review is one of your best tools for developing an employee, if necessary it can lay the groundwork for nonperforming employees so you can take action steps for reprimand or termination. A scheduled reoccurring standardized review sets the stage for nonemotional feedback.

When I first have the "review" discussion with my clients, the first thing they tell me is "I don't need to do reviews; I have an open door policy, and my employees can come to me any time." An open door policy is not a real policy. How approachable do you really think you and your "open door" are? When you are rushing in, sitting in your office or running around the shop, vendors are waiting to speak to you, customers need to speak with you — do you really think that your employees look at that environment and say to themselves "Bob has an open door policy, so I am going to interrupt him right now and share with him how I am feeling?"

When?

So just how often should you be looking at the quality or condition of your employees? The timetable that I see the

HAVING YOUR REVIEWS SCHEDULED SETS THE STAGE FOR A NONEMOTIONAL DISCUSSION. YOU HAVE A VEHICLE IN WHICH YOU CAN SPEAK TO YOUR EMPLOYEE WITH A CLEAR HEAD AND EVEN TEMPERAMENT.



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best results with is the quarterly review. The time period allows a short enough time between reviews so that if a major course correction has to be made, it can be done in a timely manner; and it is long enough between reviews to implement any changes and track results. By performing reviews quarterly, you can address low efficiency and other issues at a quicker pace.

Having your reviews scheduled for the year and posted on your calendar for everyone to see does a few things. Some of the things it does are:

- It holds both you and your employees accountable. If it is on the schedule, you are much less likely to put it off or not do it.
- It gives your employees a set time that they know they can speak with you and have your undivided attention.
- It sets the stage for a nonemotional discussion. Instead of losing it with an employee because you let stuff build, you can speak with a clear head and even temperament.

Be prepared

Don't come to the meeting unprepared. Prior to the meeting, gather whatever data is needed and review it yourself first. Have a list of what you want to cover and know how long you are going to spend on each item. Prior to the meeting, give your employees the same review form you are going to use and ask them to complete it on themselves. Ask them to take time and thought into filling it out, and you do the same. During the review, lay both review forms on the table side by side for comparison. If you are doing your job as a leader correctly, the forms should be almost identical. If the employee has scored themselves higher than you scored them, then you have a problem. If the employee scored themselves lower than you scored them, then you have a problem. Make no mistake, if an employee does not think they are doing as well of a job as you do, that is as much of an indication of poor leadership as if they scored themselves higher than you did.

Follow up and make it effective

After the review, supply a constant stream of feedback. Follow-up should be ongoing throughout the entire year, not just at the quarterly review. The goals for the next quarter can't be out of sight, out of mind. Set dates, track progress and/or lack of it. If your employee stays on track, make sure you acknowledge that fact. If your employee does not progress as planned, you need to acknowledge that as well — in writing.

Figure out what makes your employees tick

Find out what really motivates them. Tie in sales/hours goals with how they can earn more money to reach their goals. Figure out what resources you have available that you can use to help them achieve their goals.

What types of things should we measure?

- How many hours of continued education they logged
- Comebacks for the quarter
- Productivity
- Percent of Courtesy Checks
- Attendance, tardiness, excessive time off, patterns of certain days missed (example Monday Flu)
- ARO, LHPT, hours billed versus labor inventory, sales
- CSI scores

The items listed above are just some examples of what you could be measuring, setting goals and tracking progress for. To get sample forms and our webinar on how to perform a quarterly review, for a limited time you can simply go to www.atonline-training.com/2018-07. *TLZ*



CHRIS "CHUBBY" FREDERICK is the CEO and founder of the Automotive Training Institute. ATI's 130 full-time associates train and coach more than 1,500 shop owners every week across North America to drive profits and dreams home to their families. Our full-time coaches have helped our members earn over 1 BILLION DOLLARS in a return on their coaching investment since ATI was founded. This month's article was written with the help of ATI Coach Kim Hickey. chubby@autotraining.net



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Disciplined financial measuring now a necessity

As a shop owner, do you spend all your time working “in” their business or “on” the business? There really is a difference. One method is well known as working hard, and the other method is known as working smart.

Each month, a good operator will sit in his/her office and really analyze their business. This time spent will make the shop money if the information is prepared in a fashion so the owner/manager can compare the operation to targets set to maximize the net profit of the shop.

The question that many people are asking these days is what should I be measuring now in order to ensure I am maximizing productivity and profits in my shop? Times have changed and measurements have changed. So many measurements still being embraced by shop owners, quite frankly, just do not work anymore. They are outdated, and the old business measurement method is broken. The new aftermarket requires specific measurements that allow management to focus in on the right area to grow the business and build net income.

The following is a start to an up-to-date list of items for consideration to be measured each week in some cases and definitely every month. Keep in mind what I have said many times before: if you can't measure it, you can't manage it. Get focused, measure your business properly so you can make competent management decisions to move forward and achieve what you want to achieve.

Total shop gross profit percentage (monthly)

What total GP percent (total gross

profit dollars divided by total sales dollars) are you achieving for the shop when all commodities and all labor is accounted for? Are you meeting the required standard?

Total labor sold to total wage package ratio (weekly and monthly)

What are you really achieving in your total labor sold to total wage package paid? The wage package includes management wages at a professional pay scale, all technicians, service advisors and administration wages, as well as state payroll taxes, workers compensation and staff benefits totals. Divide that total into total labor sold. Are you measuring “activity” or true “productivity” in your business?

Total maintenance hours billed per day and per month

Are you achieving the right number of billed hours per technician in your shop? Are all vehicle inspections being professionally done?

Total diagnostic hours billed per day and per month

Based on your vehicle mix, are you capturing the right number of diagnostic hours available and billing it accurately?

Total re-flash hours billed per day and per month

Are the front counter processes in place to ensure re-flash opportunities are captured and the professional service is being performed on behalf of the client?

Site efficiency (weekly and monthly)

Many shops are measuring proficiency, which is the measurement of an individual, but are you measuring your entire team collectively working together? Are you achieving the correct site efficiency number that drives net profit and allows the shop to pay above average wages to the team?

THE QUESTION MANY ASK IS ‘WHAT SHOULD I BE MEASURING NOW IN ORDER TO ENSURE I AM MAXIMIZING PRODUCTIVITY AND PROFITS IN MY SHOP?’ THE NEW AFTERMARKET REQUIRES SPECIFIC MEASUREMENTS THAT ALLOW BUSINESS MANAGEMENT TO FOCUS IN ON THE RIGHT AREA TO GROW THE BUSINESS AND BUILD NET INCOME.

Total average billed hours per R/O (weekly and monthly)

Based on your vehicle mix, are you achieving the correct average billed hours per R/O which tells you that you actually are professionally serving your clientele?

Number of R/Os per day and per month

Based on your average billed hours per R/O, are you booking correctly the num-

ber of vehicles to service each day or are you over booking the shop, which forces the team to rush and therefore not have the time to properly inspect the vehicle and serve the client?

Average minimum labor dollars sold per technician (weekly and monthly)

Do you calculate how much labor dollars each technician should be billed for each day and each month? Is each technician meeting the correct total labor dollars sold each day and each month based on their competency?

Cost per billed hour (monthly)

Do you calculate the true cost per billed hour per month always using year-to-date numbers and make sure that the service advisor is given that number each month and understands how to use it before an R/O is closed off? Are you still using old methodology and measuring average sales per R/O or are you now measuring average net profit per R/O?

Cost to turn the key in the morning (monthly)

This is a critical number to know and should be calculated each month using year-to-date facts and based on the actual days the shop is open.

Maintenance labor rate

What is the correct maintenance labor rate for your shop based on your shop's facts? In the new aftermarket, this rate is a percentage of your cost per billed hour. If you are inefficient, your cost per billed hour will be high, which can cause you to price your labor rate out of the market and if you don't know how to use the cost per billed hour you may have too low of a labor rate, which means you will only be creating activity instead of profitable productivity that creates NET profit.

Diagnostic labor rate

Have you got the right diagnostic rate for your shop? This also is now a percentage of your cost per billed hour. But it is a different percentage than the maintenance rate.

Re-flash labor rate


Is the right re-flash rate in place for your shop? This is a different percentage of your cost per billed hour than the diagnostic rate.

Average door rate (monthly)

This is an important measurement to see if the shop is achieving every labor hour available at the right labor rate. Is your shop's average labor rate slowly increasing every month, and based on your opportunities what should your average labor rate objective be?

These are a sample of the key mea-

surements that must be embraced in this new profession. The new aftermarket is exciting and the amount of income that can now be made is greater than the last 10 to 20 years, and the future looks even brighter. Are you on top of your business or are you one of the many shops who do not embrace an ongoing learning culture?


Have you bought yourself a job, or are you enjoying a fantastic career? 



BOB GREENWOOD, AMAM, is president and CEO of Automotive Aftermarket E-Learning Centre Ltd. (AAEC), which provides business management resources for

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Towing the line

Husband and wife team looking for success over the next 50+ years

ROBERT BRAVENDER // Contributing Editor

➔ If you were to tool around the little town of Lake Mills, Wis., you'd probably notice the name "Topel" on at least two automotive businesses: Topel Truck Center and Topel's Service Center, Inc., the latter also known as Topel's Towing and Repair. They're only connected tangentially but are about two miles apart, so there's little chance of confusion, right?

"Actually there's a lot of confusion," laughs Tara Topel, who as Secretary-Treasurer of Topel's Service Center has seen her share. "We just try to work together as best as possible; we refer them, they refer us, then we joke and say sometimes we get confused too."

So let's clear up some of this perplexity: while the Truck Center deals almost exclusively with towing and recovering heavy-duty vehicles like semis, Tara's Topel's Service Center is light- to medium-duty towing and service. Both grew out of a service station founded by family patriarch Chris Topel back in 1948. "He's 94 years old," she reports. "Up until just a couple weeks ago he was coming in every day, even on the weekends."

It was Chris who originally expanded into heavy-duty towing and recovery after noting that Lake Mills, despite being a rural town, was situated halfway between Milwaukee, Wisconsin's biggest city, and Madison, the state capitol; the I-94 corridor would have lots of semis driving down it. But as Chris approached retirement, he turned these duties over to his nephew Shawn, who eventually split this part of the business off in 2000 as his own Truck Center. Dan Topel, Chris's son and Tara's husband, would take over the Service Center in 2003.

And now even the duties of this enterprise have been split. "I read a long time ago that if you chase two rabbits, they'll both escape," Tara relates, "so we try to have Dan focus more on the towing and me on the service center. I wear a lot of hats; I do the accounting, the HR, and the marketing. I have somebody who helps me with [the former two], but I oversee all of those operations, and I'm acting as the service advisor as well."

What Tara brought to the Topel table was a major in communications with an emphasis on public relations, a study she put into practice soon after she started dating Dan. Racing stock cars as a hobby, one night Dan won a race after his pit crew left. Tara happened to be in attendance and took pity on his solo effort to get the car cleared through tech. "I stepped in and helped," she laughs. "After that I helped him find sponsors



TOPEL'S SERVICE CENTER, INC.

Lake Mills, WI // www.topels.com

Dan & Tara Topel

Owners

6

No. of bays

1

No. of shops

26

No. of customer vehicles per week

70

Years in business

6

No. of employees

3,500

Total square footage of shop

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and create those relationships so he could race."

Later they would marry and Tara would follow Dan into the industry but found herself in unfamiliar territory. "(My dad) was a really big influence on my life, and if I wanted to spend time with him, it was out in the garage," she recalls. "I think that helps me now, but it's been a sharp learning curve — just from where the industry was to where it is now; it's exponential, with constant learning."

But there was more than just education; Tara realized she needed to rethink her very relationship to the industry. "Up until (fairly recently) I saw my role in the business as just serving my husband," Tara explains. "It's not necessarily (a job) I chose; it was just what I felt was right for our family, so I didn't always do it to the best of my abilities."

“But it came to a point where I realized that I had a choice: to go work somewhere else or stay with the business,” she continues. “And if I worked somewhere else I would give it my all — I would do everything I could possibly do to be the best at what I did — and I needed to do the same thing with this business. So I wanted to be more professional and to learn more about the industry and stay on top of things.”

Among other things, Tara joined the group Women in Auto Care. “I didn’t really know what I was getting into,” she states, “but being around successful women in the industry has really helped me feel like I wasn’t all by myself, like there were a lot of other people who were in similar situations. I am on the marketing committee for Women in Auto Care, and that’s helped a lot, too.”

“That’s the part I enjoy the most, the marketing,” she explains. “I work really hard at staying No. 1 on Google. It’s their sandbox, and if you want to play in it then you’re going to have to figure out what they want, whether it’s reviews from customers, certain words (in the copy), or lots of pictures. The more that you do those things, the more they’ll bump you up to the top.”

Like the press they got when Topel’s Service Center offered free rides to partygoers on New Year’s Eve. “It’s definitely community involvement and good will,” says Tara. “We take the stance of ‘hey, we don’t want to have to tow you home, we’d rather give you a ride,’ and keep everybody safe. Basically, people around here

didn’t go out on New Year’s, so it helps create good camaraderie and support for local business people all the way around.”

Amazingly, the Service Center still occupies the same building Chris Topel built back in ’48, but the facility has limitations. “It’s very tiny and we haven’t been able to do a whole lot of upgrades or improvements due to lack of plumbing and

infrastructure,” reports Tara. “(However) the state government is coming through and redoing the main highway, so in 2019 we’re looking at building a new facility. We have two different properties right next to each other. We will temporarily relocate here in town and then build the new building. We’re positioning ourselves for the future — for the next 70 years.” 

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ROBERT BRAVENDER

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Data access is the new information availability

ASA encourages data access for repairers

Why should repairers be interested in what's going on with autonomous vehicle policy, data access and cybersecurity? Because having the right tools and information to repair vehicles is critical to the longevity of a successful automotive repair business.

This applies to both mechanical and collision repairers. Without access to important data, repairers will struggle to provide consumers the level of service necessary to sustain their businesses.

At the center of the 1990 Clean Air Act Amendments (CAAA) legislative debate was the issue of service information, or better known as "information availability." The Automotive Service Association (ASA) worked diligently to get language into the CAAA that required "manufacturers to provide promptly to any person engaged in the repairing or servicing of motor vehicle engines...including instructions for making emission related diagnosis and repairs. No such information may be withheld...if that information is provided (directly or indirectly) by the manufacturer to franchised dealers or other persons engaged in the repair, diagnosing or servicing of motor vehicles or motor vehicle engines."

It took several attempts by the U.S. Environmental Protection Agency to get a workable information availability regulation and an industry agreement to assure new OEM websites included nonemissions information. Most agree that the current process works for the independent repair industry.

With new vehicle technologies and much public policy focus on autonomous vehicles (AV), repairers are again at a critical juncture for the future. The term in the early 1990s was "information availability," but today's terminology is "data access." ASA is an active member of multiple coalitions addressing new vehicle technologies, data access and cybersecurity, including: Ad Hoc HAV Data Access Coalition; Aftermarket Telematics Task Force; Coalition for Future Mobility; and



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Several states have moved quickly to address research and deployment policy for AVs. Although the National Highway Traffic Safety Administration (NHTSA) has issued guidelines for states and the industry, Congress has yet to finalize any legislation in these same policy areas. The House unanimously passed House Resolution (H.R.) 3388, the SELF DRIVE Act, which clarified state and federal roles in the AV policy arena. However, the SELF DRIVE Act did not address the data access issue for independent repairers.

The Senate Commerce Committee did address data access in its AV START Act, S. 1885. Sen. James Inhofe, R-Okla., offered an amendment, which was agreed to. The Inhofe Amendment establishes an HAV Data Access Advisory Committee at NHTSA. The Federal Trade Commission (FTC), which has shown much interest in the vehicle cybersecurity policy area, was also included in the advisory committee at NHTSA. This stakeholder committee provides for automotive industry participation, including "independent vehicle repairers."

The Senate bill has not been considered on the floor to date. It is important for independent repairers that the Inhofe Amendment be included in the final AV legislation sent to the President. If the Senate does not approve S. 1885 by the August break, it will be increasingly difficult for final passage before Congress adjourns for the year.

As important as information availability was to the repair industry, data access is taking an even larger public-policy role. This issue does not have to be contentious and hopefully will be resolved by the automotive industry. ASA will continue to be part of this conversation. *ZZ*

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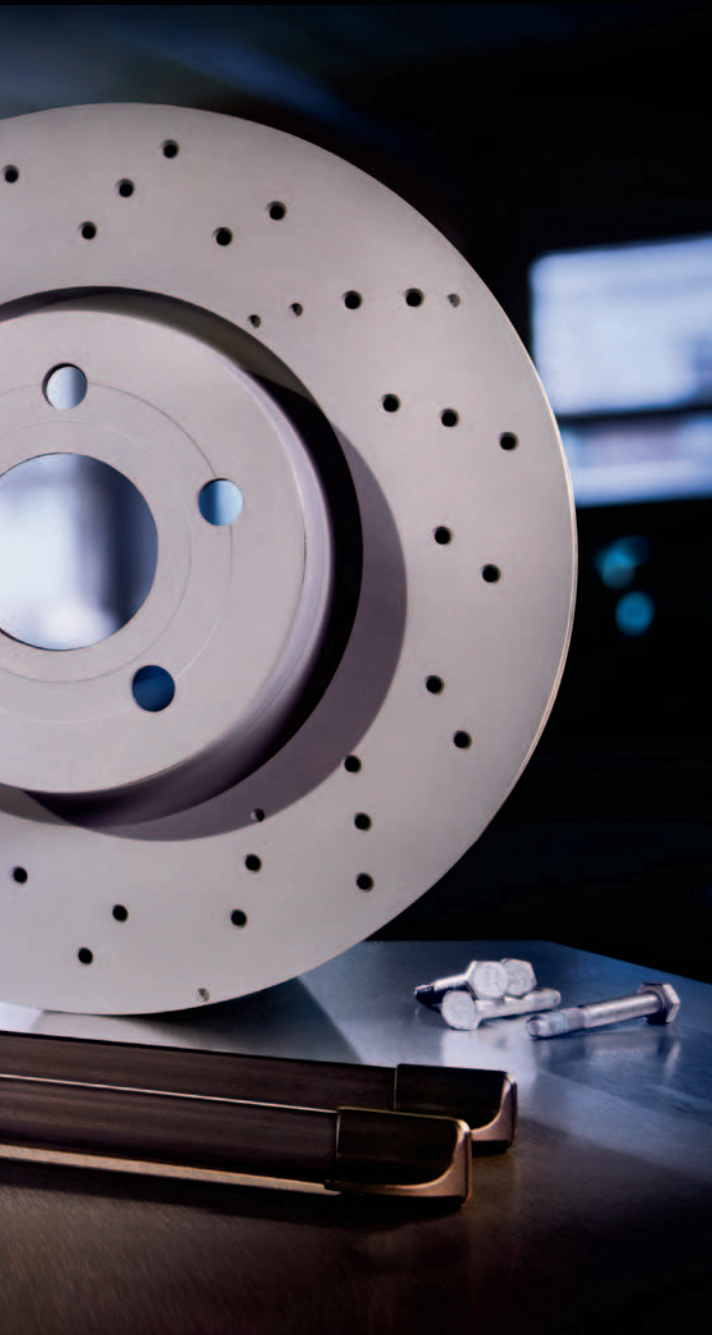
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Six tips to help your shop generate more repeat business

IN A COMPETITIVE MARKET, YOU NEED TO KEEP CUSTOMERS COMING BACK TO YOU

BOB COOPER // Contributing Editor

In the world of auto repair, one thing is for certain: Every shop in your community has their eye on your customers. So in order to keep your customers, there are a number of things you will need to do. Here are 6 tips that will bring you amazing results:

No. 1: Meet expectations

Make sure that you deliver on the customer's expectations, and whenever possible, that you exceed those expectations. Simply put, fix the car right the first time, make the experience as pleasant as possible, help your customers see the value in your services, and over-deliver at every opportunity.

No. 2: Go beyond

At the point of car delivery, go well beyond what your competitors do. You need to resell the customer on their decision, assure them that their problem has been solved, and review their repair order in detail. During the "sales process" you need to put the focus on the benefits of the service rather than the price, but at the time of car delivery you need to ensure that they

understand what they bought, and how much they paid for the services. You then need to offer them the opportunity to inspect their old parts (or return their old parts back to them), review the warranty, discuss anything they will need to monitor or do once they leave, schedule their next appointment, and thank them for their trust in you.

No. 3: Set the schedule

When scheduling the next appointment, rather than asking when they would like to schedule it, be presumptive and tentatively set the date and time for them. If and when they tell you they are unsure if they will be available on that date, just tell them "No worries, Mr. Smith. We'll be sending you a reminder card the week before, and we'll give you a reminder call as well. If you need to reschedule, it'll be no problem at all — we can simply reschedule the appointment for you at that time. The benefit of doing it this way is that there's nothing you'll need to remember, because we'll remember for you."

No. 4: Explain the value

Sell the benefits of the next service at the time of car delivery. Rather than just telling the customer that they'll be due for a cooling system service in 6 months, help them see the value by explaining how that service will save them money, time, etc. If they feel the only reason to return is because you told them they need to,

you'll see far fewer returning customers, because they will feel they will be spending money, and getting little, if anything, in return.

No. 5: Build relationships

Regardless of how well you build value in their next visit, customers will be far more prone to returning to your shop if they feel there is someone there they will enjoy seeing again. Remember the Elite rule: When people buy a product, they will always remember the product, but when they buy a service, they will always remember the people that provided the service.

No. 6: Stay in touch

Beyond a customer follow-up program, you need to ensure your customers are exposed to your brand on a continual basis. This means you need to invest in your brand building campaigns and be integrated into your community in every way that you can.

In closing, all the reward programs and slick marketing gimmicks will always pale in comparison to one simple business philosophy: Provide a great service at a competitive price, build relationships with every customer, and live by the principle of never putting money ahead of people. **ZZ**



BOB COOPER is the president of Elite, a company that offers coaching and training from the industry's top shop owners. contact@eliteworldwide.com



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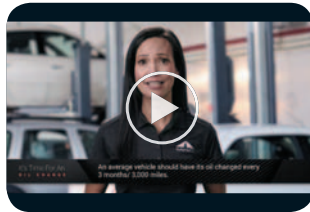


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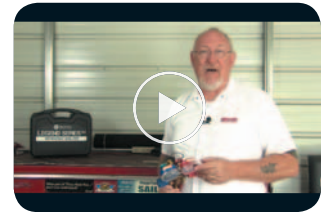
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MAXIMA HAS NUMEROUS DTCs — LOOSE CHANGE THE CAUSE

VEHICLE: 2005 Nissan Maxima, V6-3.5L, Automatic Transmission

MILEAGE: 172,098

PROBLEM: This vehicle had erratic gauge and warning light operation and the HVAC controls only worked intermittently. The Malfunction Indicator Light (MIL) was on as well as the ABS, TCS and Security lights. Additionally, the fuel level gauge was inoperative.

DETAILS: The tech found multiple DTCs: U1000; U1001; U1610; P1574; P0462; P0463 and P1212. The symptoms all were in line with the DTCs found. The technician researched each of the DTCs and found them to be related through the same network. At this point, he called ALLDATA Tech-Assist for some guidance.

CONFIRMED REPAIR: Based on

previous experience with Nissan Maxima vehicles, the ALLDATA Tech-Assist consultant advised the tech to remove the A/C amplifier for inspection. After removing the cover, the technician discovered two coins inside. Upon further inspection, he found a burned area on the circuit board where the coins had shorted out and burned a circuit board component.

He replaced the A/C amplifier, cleared the DTCs and went on a test drive. Fixed!

This tech tip and others come from ALLDATA Tech-Assist, a diagnostic hotline of ASE-Certified Master Technicians. Whatever technicians need — from creating alternative diagnostic strategies to providing step-by-step repair assistance — the Tech-Assist Team can deliver.

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Automotive Training Institute: Eight essential skills for auto repair shop success

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AUGUST 8-20

NACE Automechanika 2018

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Atlanta, Georgia

SEPTEMBER 6

ASA-Midwest Lawrence/Topeka Chapter meeting: Six month goals

Comfort Inn & Suites, Jayhawk Room
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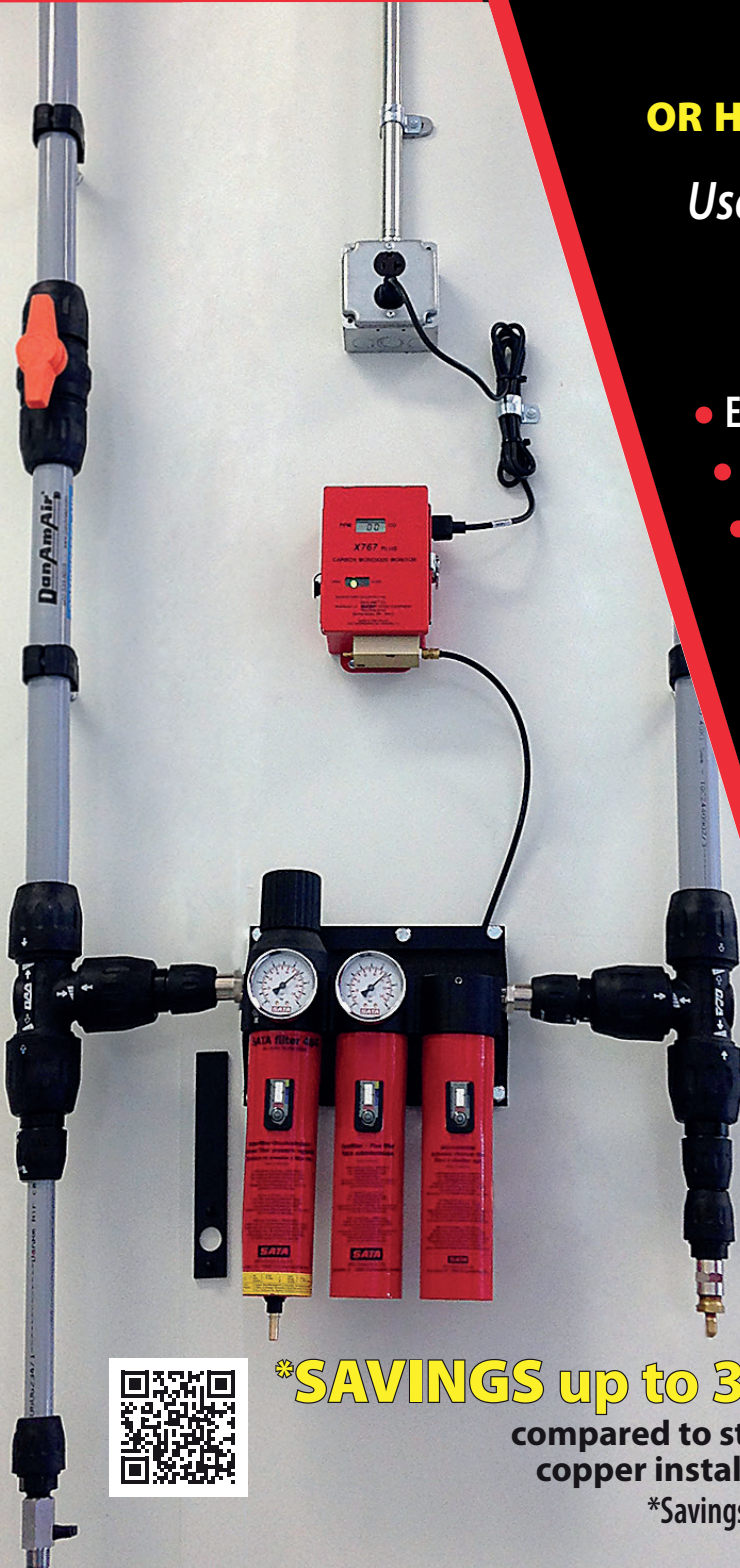
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A LOOK AT J2534

TODAY'S CARS ARE ROLLING COMPUTER NETWORKS AND OFTEN REQUIRE SOFTWARE UPDATES TO FIX A VARIETY OF ISSUES.

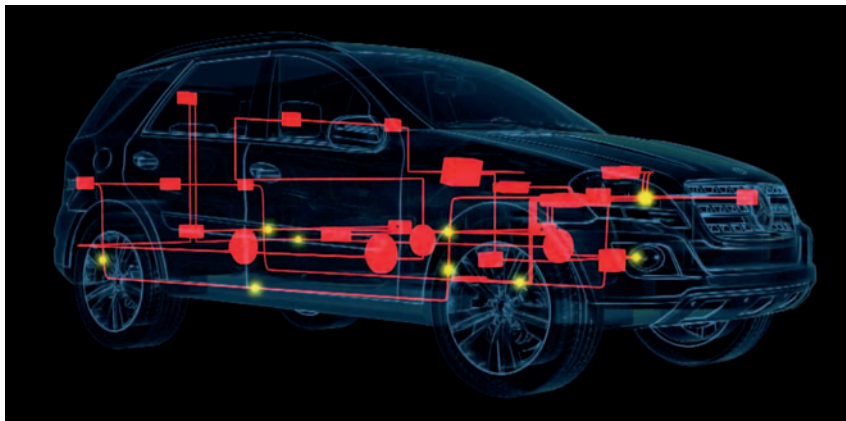
CLINT FLOWER // Contributing Editor

The rate at which technology is changing personal transportation accelerates every year. While this is a challenge for technicians now, imagine what interesting experiences still lay ahead of us.

It's a known fact that throughout the automotive industry, vehicles are becoming more and more complex, with almost every device in the modern car operated via an electronic control module. These ECMs are connected via communication networks that allow for data transfer between each other. If we strip away the mechanicals, the modern vehicle is essentially a rolling computer, using both hardware and software. Just like your home PC or laptop, the vehicle's computers struggle with software issues and often require updates to ensure they continue to meet emission regulations as well as addressing product quality concerns.

Some vehicle manufacturers use the same engine control module or hardware across their various models — they simply change the software to suit different operating conditions or engine and driveline configurations. This process of common hardware and network architecture has spread throughout most vehicle manufacturers and has given rise to the concept of the “Global Car.”

The idea of a global car has many advantages, as the manufacturer can “tune” the vehicle to suit its geographical location.



CARS HAVE BECOME ROLLING COMPUTER NETWORKS with more lines of code than even the most sophisticated combat aircraft.

J2534 programming

Reprogramming a vehicle's control module (that is, updating its software, also commonly referred to as “flashing” the control module) has typically been left to an OEM dealer. One reason is that each brand has their own specific diagnostic tool for analyzing, coding and reprogramming. These tools are very expensive and can often be hard to navigate. There was also a distinct lack of training in this field outside of OEM dealerships, as access to OEM data and information had generally only been available to the dealer.

With the introduction of “Pass Thru” flash programming, independent repairers now had a way of performing the same analyzing, coding and reprogramming tasks as an OEM, albeit with some limitations. Pass Thru is a method used to transfer data between a vehicle's control module and a laptop or scan tool. A Pass Thru device or VCI (Vehicle Communication Interface) is used for this data transfer. The VCI acts as



SOFTWARE UPDATES ARE “FLASHED” to a vehicle's control module to correct shortfalls or improve product quality.

a translator or interpreter between the PC and the vehicle's communication network, due to the different languages or programming code used.

You may have heard of a VCI referred to as a J2534 device. J2534 is in fact, an interface standard designed by the Society of Automotive Engineers. The standard requests that all manufacturers use conventional methods of data communication, and allow indepen-

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dent repairers the ability to re-flash emission-related vehicle control units. All OBD-II compliant vehicles must use one of the SAE-specified protocols.

This simply means that only one interface tool is needed for programming multiple vehicle makes and models.

There are two parts to this standard: J2534-1 and J2534-2. J2534-1 was originally developed to allow independent vehicle repairers the ability to reprogram, update and configure emission-related control modules only, without the need for an OEM-specific tool. J2534-2 may be used for diagnostics, reprogramming and updating on all OEM-supported control modules and not just emission related.

Communication protocols

One of the many hurdles that independent repairers face is the growing number and complexity of vehicle communication networks. Even basic models with very few product options can have several control modules connected to one of its networks, with high series vehicles constructed with up to five separate communication networks and 50 separate control modules. Standard J2534 dictates that any Pass Thru device must be able to communicate with all protocols used by these networks.

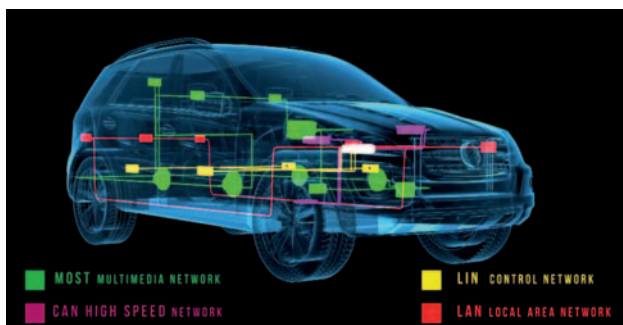
Keyword, KWP2000 or K line, use the UART (universal asynchronous receive and transmit) language. UART has a very slow data transfer rate. This is around 10.4 kilo bytes per second, with data transfer through terminals 7 and 15 in the vehicle's DLC. UART is now an older language and not readily used in current vehicles due to its low speed.

Another language or protocol is J1850. There are two versions of this protocol. Both use PWM (pulse width modulation) for data transfer, but J1850 VPW is able to vary its transfer speed. It's four times faster than UART and much more common. J1850 uses pins 2 and 10 to communicate with the VCI.

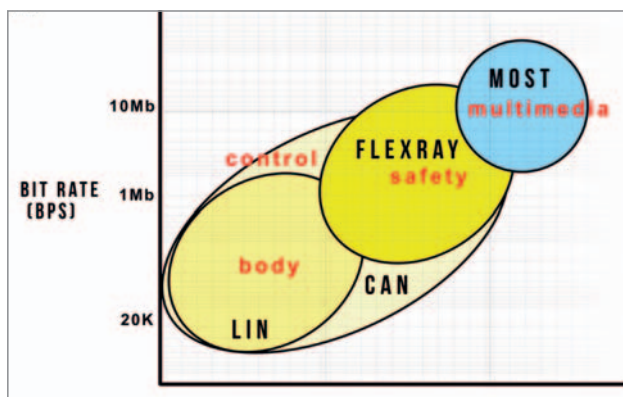
LIN (Local Interconnect Network) is a broadcast serial network, comprising of one leader and typically up to 15 servants. All messages are initiated by the leader — with at least one servant replying to a given message. LIN devices are generally not connected to the DLC, but can be accessed via a network gateway. In most cases this will be the vehicle's body control module.

LAN (Local Area Network) is a single wire network, used for systems that do not require a high data transfer rate. This network is perfect for comfort and convenience systems. The LAN network is accessed by terminal 1 in the vehicle's DLC. Data transfer speeds are in the vicinity of 33 kb/sec using voltages from zero to five.

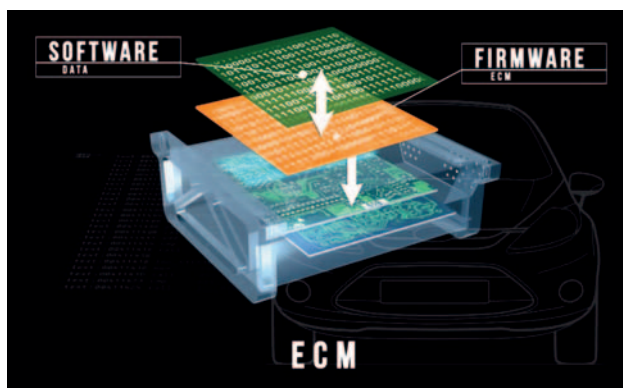
CAN (Controller Area Network) is available in medium or high speed, with data transfer rates of 250 kb/ sec and 500 kb/s respectively. The power train network is connected to pins 6 and 14 of the DLC. Different manufacturers may use



UNLIKE YOUR WINDOWS OR APPLE PC, the vehicle computers may interact on various networks, all speaking different computer "languages."



DIFFERENT NETWORKS ALSO SEND AND RECEIVE DATA at different speeds, further complicating updates.



FIRMWARE IS THE PLATFORM between the control module and the software. Think of Windows, for example.

different names and voltages for CAN, but they all derive from BOSCH. CAN is perfect for real time data exchange and pass thru programming.

MOST (Media Oriented System Transport) data bus is specifically designed for the transmission of audio and video data. MOST commonly uses fiber optic technology, transmitting at speeds up to 150 megabytes per second. This network is not connected to the DLC but can be accessed via the communication gateway.

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FlexRay is utilized for advanced stability control and safety systems. This area demands higher speed communication than any current or existing Controller Area Network (CAN) bus can provide. FlexRay is an alternative to adding multiple CAN bus systems to a vehicle. Due to the data transfer rate of around 10 megabits per second (FlexRay), congestion on the network is no longer a problem.

All J2534-compliant Pass Thru devices must be able to recognize the vehicle's designated protocols, and interface with the vehicles communication network for data transfer.

What is API?

Performing Pass Thru programming with a J2534 device requires the use of an Application Program Interface (API) that will need to be downloaded to either a personal computer, laptop or even a quality scan tool.

It's the responsibility of each OEM to maintain and update these portals and keep current applications available for download. If you need to access these portals, a fee set by the OEM will apply. These charges will vary between manufacturers.

There are two main types of vehicle reprogramming events we can perform with a Pass Thru device and the OEM application. These are known as a software calibration and a firmware calibration.

Firmware is the control modules' interface, which sits on a platform between the software calibration files and

the control module hardware. Think about how Windows operates on your PC. The PC operating system (Windows), is similar to the vehicle control module firmware.

Windows is required to access the files and programs on your PC. If Windows has a problem, you may not be able to access your programs. Vehicle control module firmware is the same. A calibration or update to the firmware will mean a complete erasure and reprogram of the control module's memory. This may be needed to overcome an embedded problem within the module.

Pass Thru programming and system requirements

A high-speed and reliable internet connection is a necessity when re-programming a control module, as the OEM application needs to be connected and communicating with its server (wherever in the world it is physically located), throughout the entire process.

Make sure that you have the laptop or scan tool connected to the router via an Ethernet cable and hard wired to the vehicle when downloading any calibration files.

It's not recommended by any OEM to perform wireless downloads and re-programming. It is far too easy for the data transfer to be interrupted or even corrupted. This is both time consuming and frustrating, as the process must be restarted from the beginning. On some newer Euro vehicles, it's not uncommon for the vehicle

control units to cycle through all their functions as part of the re-programming operation. The current draw on the vehicle's battery may climb to be as high as 70 amps.

A 10-minute re-

programming event with this much drain would cause the battery voltage to drop to critical levels. This would be disastrous to the module receiving the update or new calibration file. A programming power supply capable supplying a constant 70 to 100 amps must be connected to the vehicle when performing these tasks. The power supply must also provide "clean" voltage with little to no AC "ripple" present. That means that using your shop's battery charger is not going to work — you'll need a battery "maintainer" designed for this task.

Installing/uploading the program

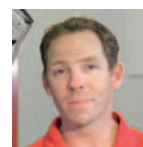
Control module coding has many different names and as many different ways to be performed but is essentially the same across all OEMs. When the new software is installed to a control module, it needs to be relinked or initialized and reconfigured with the rest of the vehicle's network.

This "hand shake" might reinstall the security parameters to the module, record the Vehicle Identification Number, perform RPO or variant configurations, or even perform relearn procedures.

Using a VCI and an OEM application interface is not a hard task to master. The challenge for independent repairers will be having access to the OEM information and data platforms needed for re-flashing operations. Don't be afraid to charge the customer for this service or your knowledge. **TL**



A CLEAN SUPPLY OF POWER IS ESSENTIAL to a successful flash, and that's something a typical shop battery charger can't deliver.



CLINT FLOWER is an Automotive Technical Trainer/Presenter with an Australian Based company AutoMate Training. For the last

four years he has overseen the production and authenticity of all technical content. Not only does he present high-quality training modules, Clint is also tasked with simplifying complex automotive test procedures for AutoMate subscribers.

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AN ANTI-THEFT THAT REFUSED TO LEARN

**THE MASTER
IGNITION KEY** in the
lock cylinder

AFTER REPLACING AN ECM, THERE IS ONLY ONE PROBLEM — IT DECIDES IT DOESN'T WANT TO MAKE NICE WITH THE OWNER'S KEYS

JAIME LAZARUS // Contributing Editor

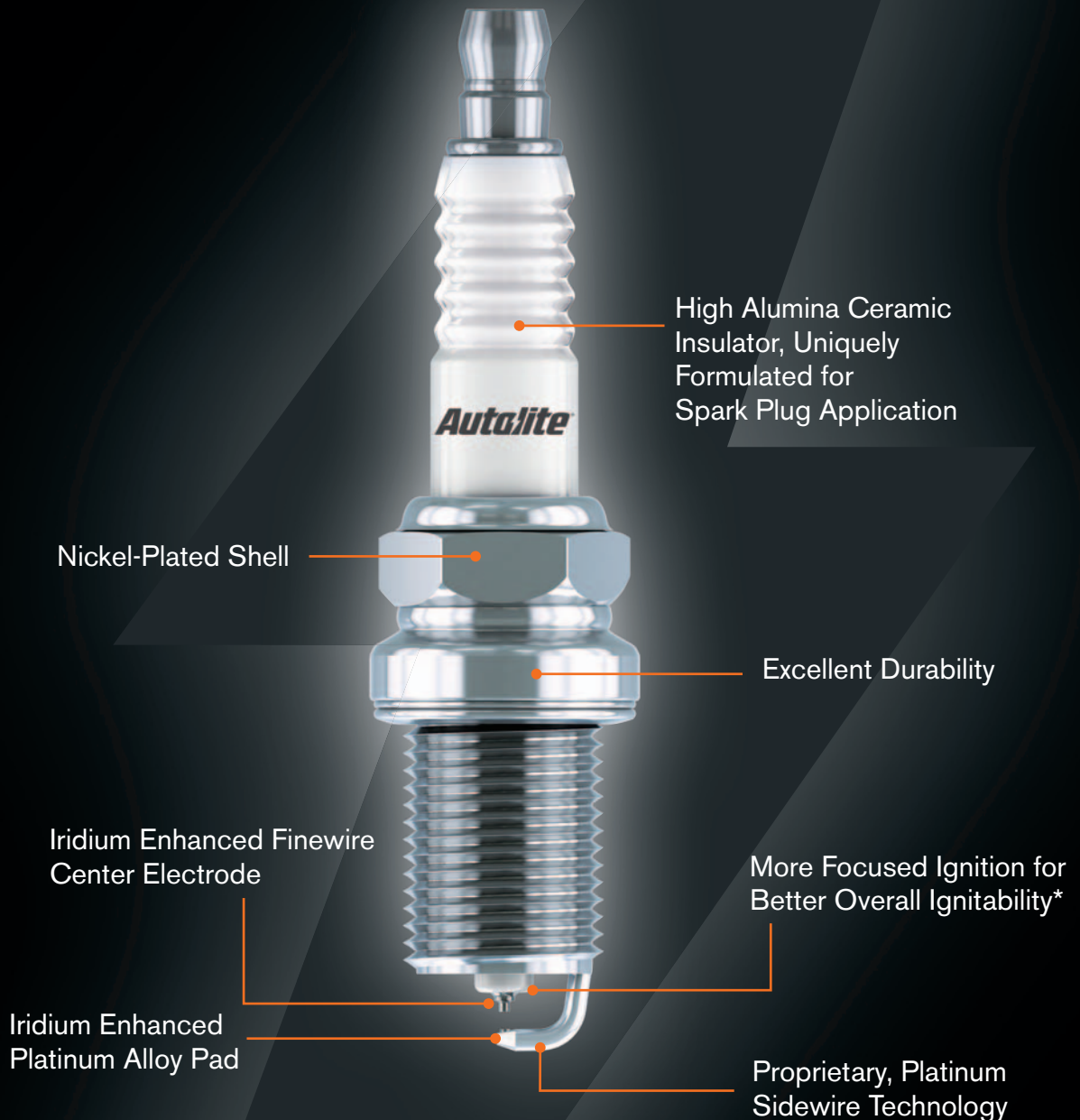
Have you ever heard the saying, “Fool me once, shame on you. Fool me twice, shame on me?” or “Sometimes I’m my own worst enemy?” I’m sure we can all relate to having said

both of those at one time or another. I had reason recently to have to use each saying while working on a 2004 Cadillac CTS (DM). Actually, it was the **SECOND** time working on the same car, with a similar problem each time, where I screwed up the most. I promise there will **NOT** be a third time, and I’ll share

with you my experience so that hopefully, you won’t be using those sayings in the future.

As a preface, when an ECM is replaced on almost every GM vehicle built since 1990, the replacement module will have to be programmed. In most cases, after module program-

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ming, there will be a need to perform additional functions in order to make the new module work correctly in the vehicle in which it was installed. One of those functions may be VTD (Vehicle Theft Deterrent) Relearn, where a module or the ignition key(s) will be registered to work in this vehicle. Over the years GM has developed several different types of VTD systems, but if we have the factory tools for the vehicles on which we work and if needed, a Locksmith's Identification (LSID) certification, there should be nothing that would be a problem for us to do.

I assumed this time would be no different than the last, or the last 10. I had done so many similar jobs — so many times before — that the procedure had become almost second nature and required very little thinking, or so I wanted to believe! I thought, "I have everything I need to complete the job, what could go wrong?" It is because I am guilty of sometimes rushing through a job without researching proper procedures that I am forced to re-learn lessons. In this case, however, even if I'd reviewed the published materials, I'd have still gotten into trouble.

Patience is a virtue

It seems problems are more likely to occur if you are in a hurry. Taking time to research an anti-theft relearn on a GM would use up valuable time when it was already late on a Friday afternoon. Besides, I thought, this car is no different than all the rest in this same year range, so it should be a piece of cake! Yes, I jinxed myself again.

I had worked with the shop owner and his tech over the phone during the previous week in an effort to help them determine what the cause of the engine misfire was. The ECM had failed to drive the fuel injector in cylinder number four, which necessitated replacement of the module. The shop



THE FRONT OF THE CAR

owner knew the replacement needed to be programmed and asked what my schedule looked like. Initially he was ecstatic to learn that he might be able to ship the car before the weekend.

By 6 p.m. that day, my laptop's battery was running low and so was my patience! The programming of the "new" ECM went smoothly, without any problems. Afterwards, I tried to perform the VTD Relearn — several times, using several different methods — and still the starter would not crank the engine. There was a displayed message on the Driver Information Center (DIC): "Starting Disabled Remove Key,"

indicating the ignition key being used was incorrect as well as the notorious P1631 DTC present in the ECM. Apologetically, I left the car right where it was and promised the shop owner that I would do research over the weekend to determine what I could have been doing wrong or determine what else may be causing the problem.

When I was unable to get the car started so they could ensure there were no other problems related to the customer complaint, it was disappointing for them as well as for me. They had to make the call to the vehicle owner, I had to leave empty handed (and with a bit



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less pride) and I now had a freshly-modified schedule for my weekend plans.

Like you probably do when confronted with similar situations, I decided now would be a good time to (re) read up on the procedure that applies to this specific vehicle, just to see what may be different from the procedures I've already attempted. Skimming the pages I felt indignant, firmly believing I was doing everything I was supposed to be doing! I read more carefully the next time, and the time after that, yet still did not see anything different in the procedure to relearn VTD on this car! Determined to get to the bottom of the problem, I rearranged my Monday schedule so I could return to the CTS (and WIN this battle).

Programming theft deterrent system components

GM Service Information (SI) lists three VTD Relearn methods to choose from that may apply to this vehicle. One is performed through the scan tool while connected to the ACDelco Service Programming System (SPS) website — called a 10-minute relearn procedure. Another is performed using the scan tool independently of SPS — also called a 10-minute relearn procedure. The third method is performed without any scan tool and is called the 30-minute relearn procedure.

The correct method to choose is dependent on what part has been replaced on the vehicle, what the engine RPO (Regular Production Order) code is on the label and whether it's a Pass-Key III (PK3) system or not. Therefore, it is vitally important you follow the correct procedure to the letter when performing VTD Relearn(s) after a component replacement. It is also important — so much so that it's printed in red letters in the SI documentation — that you use the correct key the first time you try to do VTD Relearn.



THE REAR OF THE CAR



THE CADILLAC CTS EMBLEM

Thinking I may have been lackadaisical in my procedure the previous Friday, I paid careful attention to every detail on Monday's return visit.

I had printed out the SI procedures for ECM replacement and for VTD Relearn, followed each one step-by-step and with proud bravado after everything was done, announced to everyone within earshot "Hey ya'll! Watch this!" Reaching my arm into the driver's window to turn the ignition key, the ve-

hicle then did absolutely nothing! It was in the same un-learned VTD mode as it was on Friday. How embarrassing! I knew I'd slowed down, not missed any of the steps published, yet this car refused to play by the rules. What would you do, dear readers, at this point if it happened to you?

Step back and regroup

One lesson I learned early in my career was to step away. That's right, when



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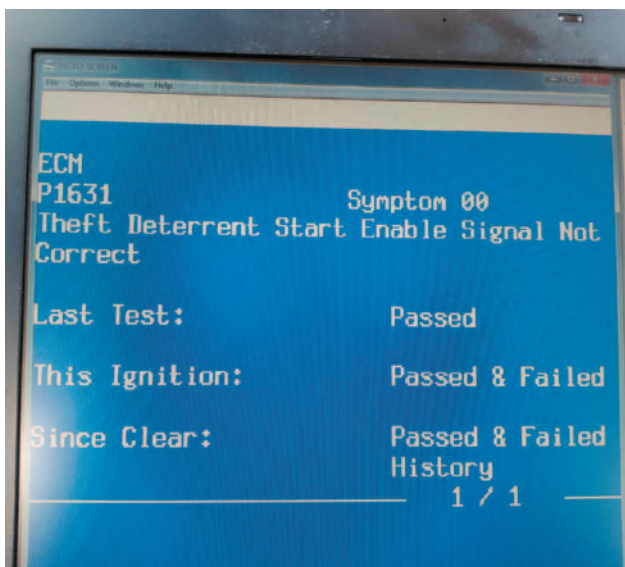
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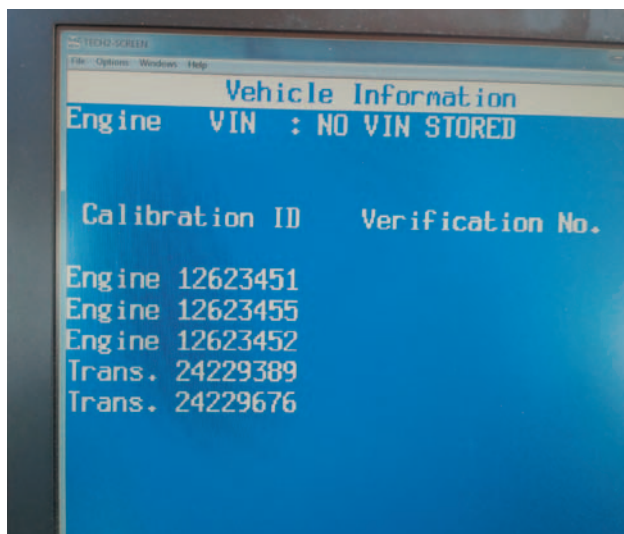
THE ECM WILL STORE THIS DTC the first time the ignition key is rotated to the START position if the VTD is enabled.

you're in so deep that emotions are now affected and your adrenaline is pumping, step away from the problem to clear your head. This technique has proved invaluable to me on numerous occasions. I explained to the shop owner that I'd done everything by the book, precisely as it was written, yet the car still would not crank. I felt it in everyone's best interest that I come back another day with a clear head and start over. He agreed.

Later that week, after I'd researched the problem some more, I returned. This time I had print outs of two GM Technical Service Bulletins (TSBs) that I hoped may contain the solution to the problem. One (Document ID: 799170) detailed the proper procedures to follow when replacing the ECM. While discussing it with the shop owner, we concluded that although certain steps were omitted, those would not have an effect on the VTD Relearn procedure. The steps not taken were regarding documenting current oil life remaining percentages, which needed to be manually entered into the replacement ECM.

The other TSB (Document ID: 879088) titled "Programming Theft Deterrent System Components" detailed the steps to follow for VTD Relearn. It was surprising to me that some of the steps listed weren't in SI, and based on the amount of red ink used in the TSB (about 50 percent of the verbiage), there were very important things to know about this system! I used this document the next time I attempted to perform the relearn — while in the presence of the shop owner — so he could see I was not skipping steps, padding my ticket purposely or delaying the completion of the job for some other reason.

Once I finished, the same message was still displayed on the DIC "Starting Disabled Remove Key" and the same result — no starter engagement — was happening. The shop owner and



THIS "NO VIN STORED" MESSAGE after programming the ECM was a sign that something was amiss (but I can't explain why it displayed the correct calibration IDs).



THIS IS DISPLAYED if the VTD is enabled for any reason.

I shrugged our shoulders at the same time. I said "the gloves are coming off! This fight's going to continue bare knuckled!"

I read and reread the TSB over and over, searching for a clue that would make this car "learn" the keys. I reinstalled the original ECM, programmed it and still had the same result afterwards, indicating the fault wasn't with the new module. In desperation, after reinstalling the "new" module and reprogramming it yet again, I chose to quit following directions! YES, I stopped making the selections the instructions and TSBs said to make and started choosing methods that weren't supposed to apply to this car.

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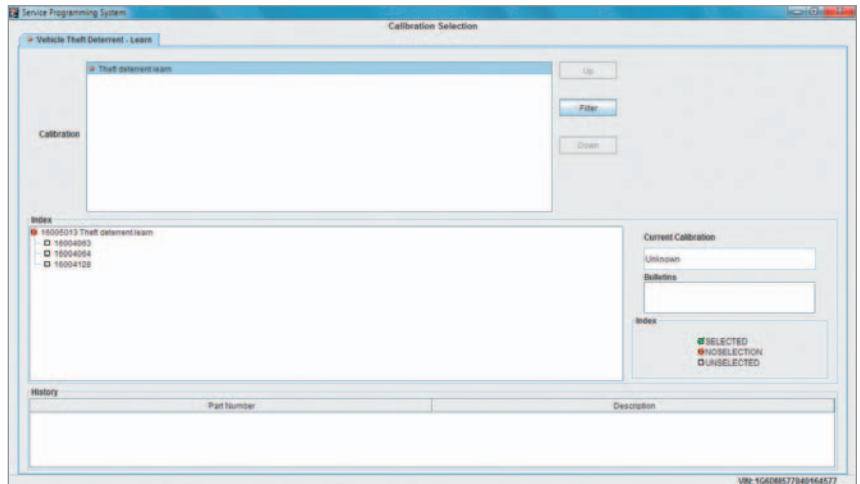
800.572.6112

Believe it or not, THAT worked! Yes, I chose different SPS selections than what the instructions called for and I had to do a step that wasn't listed as "required" and that combination allowed the keys to start the car! I found I had to perform a three-part VTD Relearn: Perform SPS VTD Relearn using 16004063 — for LY7 / LP1 Powertrain systems, then by using 16004064 — for PASSKEY III system, then perform VTD Relearn using "30-minute" method. Afterwards, clear all DTCs from all modules reporting on the network. Then the car started!

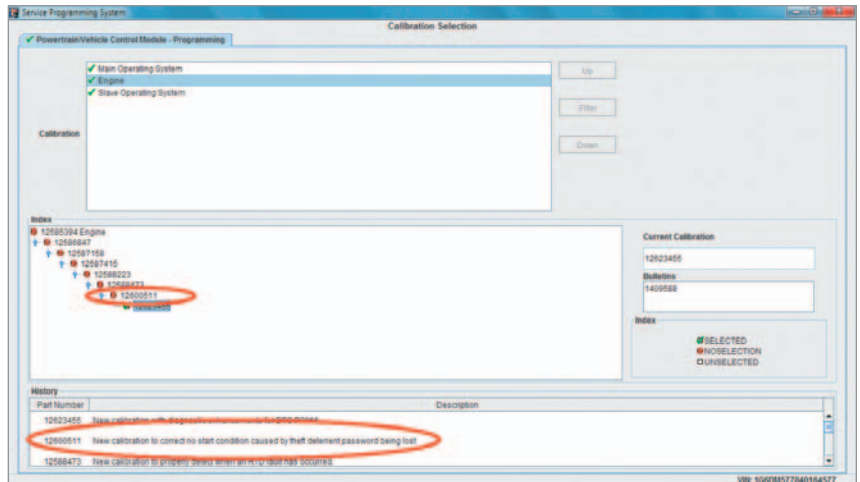
In disbelief I went back through the SI and TSBs, just to see if maybe I'd missed where these three steps were documented but couldn't find them anywhere. I "took a whipping" when it came time to collect for my services but felt this was a hard-earned lesson that would probably end up valuable at some point in the future.

The CTS returns

Fast forward eight months. My life was in turmoil as I was dealing with a complete loss of feelings in both hands due to severed nerves in my neck, we were caring for a terminally ill family member in our home and several other



TYPICALLY, THE TECH IS TO CHOOSE THE ONE that is "most correct" for the vehicle on which they are working. This CTS required TWO of the choices, in a particular order.



I WONDER SOMETIMES, just what fun the engineers have when describing what their programming update addresses!



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things that were weighing heavily on my mind at the same time when the shop owner called to say he needed me to program a replacement ECM on a CTS due to an internal failure this time (P0601). Yup, it was the same shop owner and the same car!

My “free” time was at a premium when this happened. Hurriedly I went to the shop as soon as his tech had installed the new ECM, not knowing when I’d be able to return if I didn’t address this ASAP. Wouldn’t you know I did the SAME procedure again? Yup, the same thing happened again (remember the old saying about fooling me?). Having that sick feeling in my gut, knowing this had been such a miserable experience in the past, I had enough sense to stop after the first VTD Relearn attempt and got permission to review my notes from the last time (which weren’t in my possession at the time), then return.

“I am my own worst enemy.” Don’t you know I could NOT find where I’d saved the information from the first time I worked on this car? I was so frustrated! I knew the shop had a responsibility to get their customer’s car back to them soon, and I had responsibilities that weren’t “work related,” both adding to the stress felt that day. There was so much happening lately, I just couldn’t think straight. So I WALKED AWAY. I got away from the problem. That night I awoke from a sound sleep, walked over to my PC and quickly located the file I couldn’t find the day before. Everything went like clockwork at the shop the next morning.

Quite frankly, it isn’t uncommon anymore when the procedures we have used for years simply don’t work on the vehicle we’re seeing today. Have you come across any vehicles produced with “Mid-Year” changes yet? Cars change so often that even among the same brand, the ways to accomplish something isn’t always done the same way, as evidenced by this Cadillac.

There are several poignant lessons about this case study that I feel are important to emphasize: take the time to review published materials for each job; quit following directions when they do not work; take the blinders off when you can’t see any more options; step away from problems that overwhelm you; and of course, create and maintain reference materials in an organized manner.

Written in loving memory of Mrs. Genevieve Mary DeMatio. 🍷



JAIME LAZARUS has regularly presented technical seminars since 1985. He recently taught instructors at the North American Council of Automotive Teachers conference and the NASCAR Technical Institute.
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CONSCIOUS UNCOUPLING: WHAT TO DO WITH THE DATA?

WITH SO MANY CARS TODAY “CONNECTED” TO THEIR OWNERS, WHAT STEPS SHOULD TECHNICIANS AND SHOP OWNERS KNOW TO TAKE IN ORDER TO PROTECT A CUSTOMER WHO IS TRADING IN THAT CAR?

VANESSA ATTWELL // Contributing Editor

A few years ago, the vehicle manufacturer I was working for was looking for evidence to support their suspicion that a certain employee was taking vehicles home at night without permission.

Sure enough, the GPS system of one particular vehicle had been set to his “Home,” and the “Recently Found” locations stored in the system were places he was known to have visited after work. These two discoveries combined were considered enough to begin “disciplinary proceedings” with the employee.

No doubt, vehicles’ onboard computers have long been able to store data such as operating conditions, vehicle speed, engine data and various driver inputs, all of which are commonly used to diagnose drivability concerns and also assist in accident investigations and reconstruction. But these drivability records generally don’t need to be cleared, reset or managed when the vehicle changes hands, because there’s pretty much no risk to the customer in this stored information when it comes time to sell or trade in the vehicle.

However, the data stored in vehicles from connecting to a customer’s phone, home and online life is another matter. Not managing this data properly can definitely lead to problems down the road, and depending on who crosses paths with the vehicle and what their intentions are, this can lead to big problems indeed — far worse than just suggesting that someone was borrowing a vehicle at night without permission.

Truly “connected”

Many vehicles can and do store sensitive, private information such as passwords for social media sites, voice commands, addresses, phone numbers, photos, music, garage door codes



THOROUGHLY DISCONNECTING A VEHICLE FROM ITS OWNER when it changes hands can prevent problems from occurring and also help avoid unwanted costs.

and even more (depending on the vehicle) — all of which can lead to problems much worse than the problems that come from losing a wallet or cell phone if the data falls into the wrong hands. And some vehicles will copy and store data from devices they connect to without the customer even being aware that the data was ever copied. Yikes!

Fact is, vehicles are now so “connected” to their owners’ lives that they need to be actively disconnected, reset, unsubscribed and wiped clean before they change hands to prevent security problems and surprise fees from developing down the road — and also as a courtesy so the new owner can connect to the vehicle themselves without encountering problems from previously stored data. It’s just a smart thing to do.

And simply trusting that the data will be responsibly removed or managed by the next owner and anyone else involved

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in the resale process (and also assuming that they'll figure out how to do this) just isn't enough to prevent problems. Nowadays techs and shop owners need to know how to "disconnect" owners from vehicles to protect their customers from trouble developing later on.

Fortunately, most customers know they should physically and digitally clear out a vehicle before they part with it, although many are convinced there's no real threat of problems and also that they're not worried about people finding out about their lives and habits. Hopefully they're right and they won't find out the hard way that data can be used for any number of things they may not like. In addition, many owners mistakenly believe that their data is safe so long as their phone isn't actually in the vehicle, which they may learn isn't always the case.

Selling a connected vehicle now can actually be riskier than selling a phone or laptop to a stranger on the internet and should definitely be treated with equal care and caution.

True, in most cases any data left in a vehicle will be erased by the next owner so that they can connect to the vehicle themselves — but the fact remains that leaving any personal details or passwords (or worse) in a vehicle can lead to issues ranging from strangers having access to the garage through stored door codes (and possibly the rest of the house, depending on the house alarm settings) to being billed for subscriptions to radio and cellular services they no longer use, to strangers meddling in their online life or even worse depending on the how the stored data is used or passed along.

Or someone may just accidentally dial a stored contact number and annoy one of the previous owners' friends or contacts. Either way, the smart thing to do is to take the steps to disconnect the vehicle thoroughly.

And it's not hard to do at all.

Disconnecting your customer

Most stored data and settings can be cleared or reset directly through the vehicle by navigating through the vehicle's display screen and selecting the option along the lines of "Settings," "Configurations," "Advanced" or "Options" and then deleting all pairings or data stored. Restoring the factory settings (which erases everything) also works.

There are a few vehicles that clear connections and data by using specific tricks like pressing and holding certain buttons, removing fuses under certain conditions or even by leaving a door open for an extended period of time. Service information or the owners' manual should explain what to do for each specific vehicle you're working on. If the manual is lost or missing (as happens with used vehicles, especially if they've been used as rental or fleet vehicles), searching the



BE SURE TO ERASE ANY BLUETOOTH PAIRINGS. This is one of the pairings left in a Las Vegas rental car — "Kerry's" phone is still paired to the vehicle.



CHECK USB OUTLETS FOR FORGOTTEN DRIVES AND DEVICES — there may be additional ones hidden in the back or in the glove box or consoles — and completely delete any of the materials that may have been copied and stored onboard.

internet for reputable information sites is often a quick way to find time-saving instructions.

Whichever way a disconnect is accomplished, remember that there are usually multiple ways the customer and the vehicle are connected — not just through the digital screen — and it's important to disconnect from all of them before trading in the vehicle. But don't worry, it's nothing you can't handle. It's just a matter of

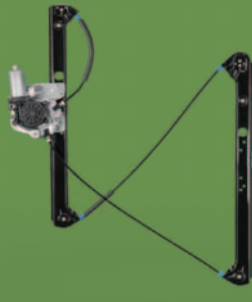


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being thorough and patient to make future problems as unlikely as possible. Here's how to manage some common ones.

Remove Bluetooth pairings and clear phone data

Unpairing any Bluetooth devices and resetting factory settings is usually really easy to do using the vehicle's onboard display. Just scroll through settings and clear all connections and reset to factory settings and remind the customer to delete the pairing from their phones. Clear out any stored phone numbers, dialed numbers, contact lists favorites, etc. Since the contacts list may have been imported into the vehicle, this is a fairly important step to prevent problems.

If you've ever rented a vehicle, it's surprising to see how many people don't do this — just look and see how many folks have paired their phones and not deleted their connection and other synced data.

Also ensure any stored data, files or photos that may have been copied are also deleted. Remind your customer to remove any access granted to the vehicle by the phone or other device. True, many vehicles won't be able to access data if the phone isn't present, but it's still wise to delete everything so that the vehicle appears to have been thoroughly cleared and troublemakers won't be tempted to keep looking for any other data left behind to build a more complete profile. Small steps now can prevent big headaches from developing later on.

Clear GPS data

Resetting the GPS is also usually straightforward, done by navigating through the unit itself and selecting the option to delete or reset data — look under "Settings" and either reset to factory settings or delete everything individually.

This means ensuring any "Favorites," "Home" and "Recently Found" places and personalized settings are indeed deleted and also checking that any other data (like files, photos and images) was also removed so that the customer doesn't let strangers know where they live, hang out and travel to on holiday.

Managing this data correctly can be a bit more serious since in the wrong hands it can provide a path directly to the customer's home (where those paired Bluetooth phones may be) and also to areas where they've recently been staying. One law enforcement officer I know always sets his "home" to be an intersection near his house, not actually at his address just in case someone gets ahold of the data stored in his vehicle.

One further note — if the navigation system's storage has been expanded, remove any cards that may have been used to expand the memory (so long as it doesn't affect the system operation — and if so let the customer know the card is still there). Removing these helps protect your customer's privacy



ENSURE THERE ARE NO MEDIA DEVICES left plugged into the system, especially in the rear seats and consoles.



REMAND THE CUSTOMER TO CANCEL any subscriptions to satellite radio, OnStar — unless they want to keep paying for the next owner's services.



MOST STORED DATA AND SETTINGS CAN BE CLEARED or reset directly by navigating through the display screen and selecting the option something along the lines of "Settings," "Configurations," "Advanced" or "Options" — and then selecting the option to delete pairings or data stored, or even restoring the factory settings (which erases everything). The customer may still need to delete the pairings, permissions and apps from their phones or devices.

and removes the temptation to see what else might be stored and forgotten about in a connected vehicle.

Clear stored garage door codes

Since it's so easy to find out a previous owner's home address (for example, from stored GPS settings), ensure the vehicle's



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garage door opener is reset before the vehicle changes hands. This may need to be performed as a separate step in addition to resetting all other data — in other words, NOT done through the vehicle screen. This is usually easy to do and the steps are listed in the owner's manual (again, a quick internet search usually does the trick too if the manual is missing or damaged).

Letting strangers have access to the garage (and possibly the entire house if it's accessed through the garage) is a bad idea. Clear out the data and keep your customer safe.

Clear all stored media and files

If the vehicle has an integrated hard drive to store music, photos, files and the like, it should definitely be reset and cleared out before the vehicle changes owners. This may be as simple as scrolling through the screen and making a single selection to reset everything, or each item may need to be deleted individually. Either way, it needs to be done. Again, the manual should be able to walk you through it if it's a bit tricky and if the manual is incomplete or missing, the manufacturer websites are often helpful.

This step is important in case any additional files were automatically copied from USB drives, phones, iPods or cards that were plugged into the vehicle at some point, possibly without the customer knowing. This small step can prevent problems and also protect the customer's privacy.

In addition, on vehicles with CD or DVD players, ensure there aren't discs hiding in the unit or in the remote changer (this is actually how I first heard Nine Inch Nails back in the 90s — from a forgotten CD left in the changer of a Buick from an auction sale). And check for any USBs still plugged in to hidden outlets, especially in the rear seats of the vehicle. If so, remove them,



IT'S NOT JUST DIGITAL AND ONLINE DATA that needs to be managed carefully. This rental vehicle has several old contracts stuffed in the glove compartment — with previous renters' names, birth dates, addresses, license numbers and more. Yikes!

clear any stored data from the vehicle and return them to the customer to do with as they wish.

Clear all stored voice recognition data

Be sure to clear any voice recognition pairings, not only as a protective action but also so that new voices can be stored by the new owner. This can sometimes be a bit tricky, so consulting service information is the best way to save time and know the process for sure. Searching the internet for hints can be a big help, too, since a fuse may need to be removed or a door may need to be left open for this to be successful on the first attempt. A five-minute search may save hours of headaches later on.

Remove any driving monitors

Certain vehicles have devices installed to monitor driving habits for fleet or insurance companies (or nervous parents). Be sure to remove them before the vehicle changes hands so that the new owner isn't being watched without their knowledge.

Disconnect from the Cloud, delete WiFi and hotspot passwords and connections

Since the Cloud may contain files that

the customer didn't even know were automatically backed up, it's essential to disconnect the vehicle and clear any log-in data to social networking sites that have been stored in the vehicle, including logging in online or through any apps and making sure the vehicle is no longer allowed to access any of that information. Along those lines, make sure any WiFi data has been deleted, including disabling any hotspots and passwords that have been set up or stored.

Unfortunately, reviewing the owners' manual may not be the easiest way to find out how to do this. It usually takes an online search and looking around in the app itself to find out how to remove pairings and access permissions to disconnect the customer from the vehicle successfully.

Also, your customers will likely need to revoke any access granted to the vehicle through their phones and other online access points, which is usually done through the app itself.

It's wise at this stage to also advise the customer to change their passwords. Better safe than sorry.

Cancel any subscriptions to satellite radio or dealer connection services

In reality, forgetting to cancel OnStar (or

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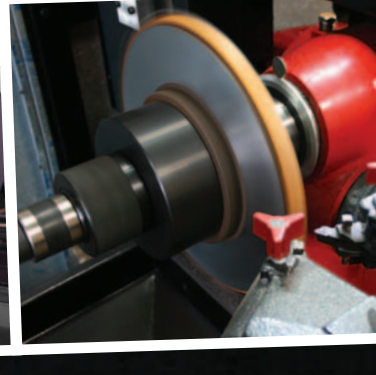
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the like) and any other subscriptions to satellite or WiFi services is almost guaranteed to cause problems since it's so tempting for the new owner (or anyone else using the vehicle) to use the service freely and run up bills that your customer will be on the hook for. Save them the aggravation — remind the customer to contact their provider and stop the services before the vehicle changes hands so they're not still paying for services someone else is using.

Remove any paper trail

Finally, in addition to resetting or deleting all electronic data stored in the vehicle, it's a good idea to ensure there aren't any paper receipts or contracts left behind, especially not hiding behind the glove box or stuck between the seats since, much like digital files, papers may also contain valuable data that should be managed carefully. Hand over anything you may find to the customer to be stored or disposed of as they wish. This may be old-school but it's still relevant — some things haven't changed at all, even for modern, connected vehicles.

Conclusion

I recently overheard a postal clerk begging a customer at the desk not to mail her used cell phone to Nigeria after selling it online. The clerk said, "I've never seen this go well and no matter how well you think you've wiped all the data out of it, you haven't. Please, don't do it." And it's so true — data is almost never completely erased from a device or even from a vehicle.

But it's still important to thoroughly

VANESSA ATTWELL is a Master Technician for two major manufacturers and has also worked on the bench of an independent shop. She has developed and delivered training for both vehicle manufacturers and independents, and helped develop government training and regulations standards.

and carefully disconnect from devices (including vehicles) before they change hands in order to reduce the chances of problems occurring as much as possible.

If you've ever sold a used cell phone or laptop and had to remove all the data, you're probably familiar with wiping out all stored data and

restoring the factory settings. Disconnecting a vehicle from its owner is very similar, but with a few more vehicle-specific steps involved. It's really not that hard, and it can protect customers from problems and aggravations down the road — and keeping customers happy is well worth the effort involved. *MA*



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CONNECTED VERSUS “CONNECTED” VEHICLE

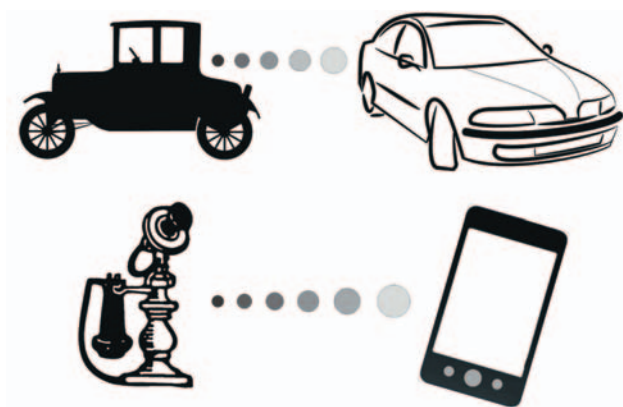
THE TERM “CONNECTED” VEHICLE COVERS A NUMBER OF TOPICS.
LET’S TRY TO MAKE SENSE OF THEM ALL!

TRACY MARTIN // Contributing Editor

A little over 100 years ago (1908 to be exact) Henry Ford’s original Model T was on the road, and by 1913 they were rolling off the first moving assembly line. In 1925, Ford was producing a vehicle every 10 seconds that cost \$290, down from \$850 in 1908. In 1920, 9 million automobiles were registered in the U.S. and by 1929 that figure had risen to 26 million. This rapid adoption and expansion of automotive technology is similar to the way telephones have evolved. In 1881 there were 49,000 telephones; fast-forward to 1980 when 175 million telephones were in use in the U.S. In 2000, the Ericsson R380 was the first widely used mobile phone and it started the transition from land-line based phones to smartphones. Early smartphones were limited in capabilities and relatively expensive when compared to today’s offerings. In 2010, 62 million people were using smartphones in the U.S. and in 2018 that number reached 237 million.

In the past, telephone and automobile technologies did not appear to have much in common, but today the automotive industry is entering a phase of significant innovation similar in scope to the popularization of the automobile as a personal transportation “device” a century ago. Over the next 10 years, automobiles will morph into rolling smartphones that can access, consume and create information. Cars will share this data with drivers, passengers, public infrastructure and other vehicles. The predicted benefits are vast and could include a reduction in accident rates, lower emissions, shorter driving times improving productivity and on-demand, in-vehicle entertainment.

Vehicle connectivity generally comprises functions and capabilities that wirelessly link automobiles to smartphones, services and other vehicles. As such, a Connected Vehicle (CV) generally refers to one that is equipped with technologies and services that transmit and receive data via a wireless internet connection. The Society of Automotive Engineers (SAE) International has anticipated connectivity and auto-



100 YEARS AGO CARS AND TELEPHONES DID NOT HAVE MUCH IN COMMON. Today automobiles and smartphones are morphing into something new — the connected car.

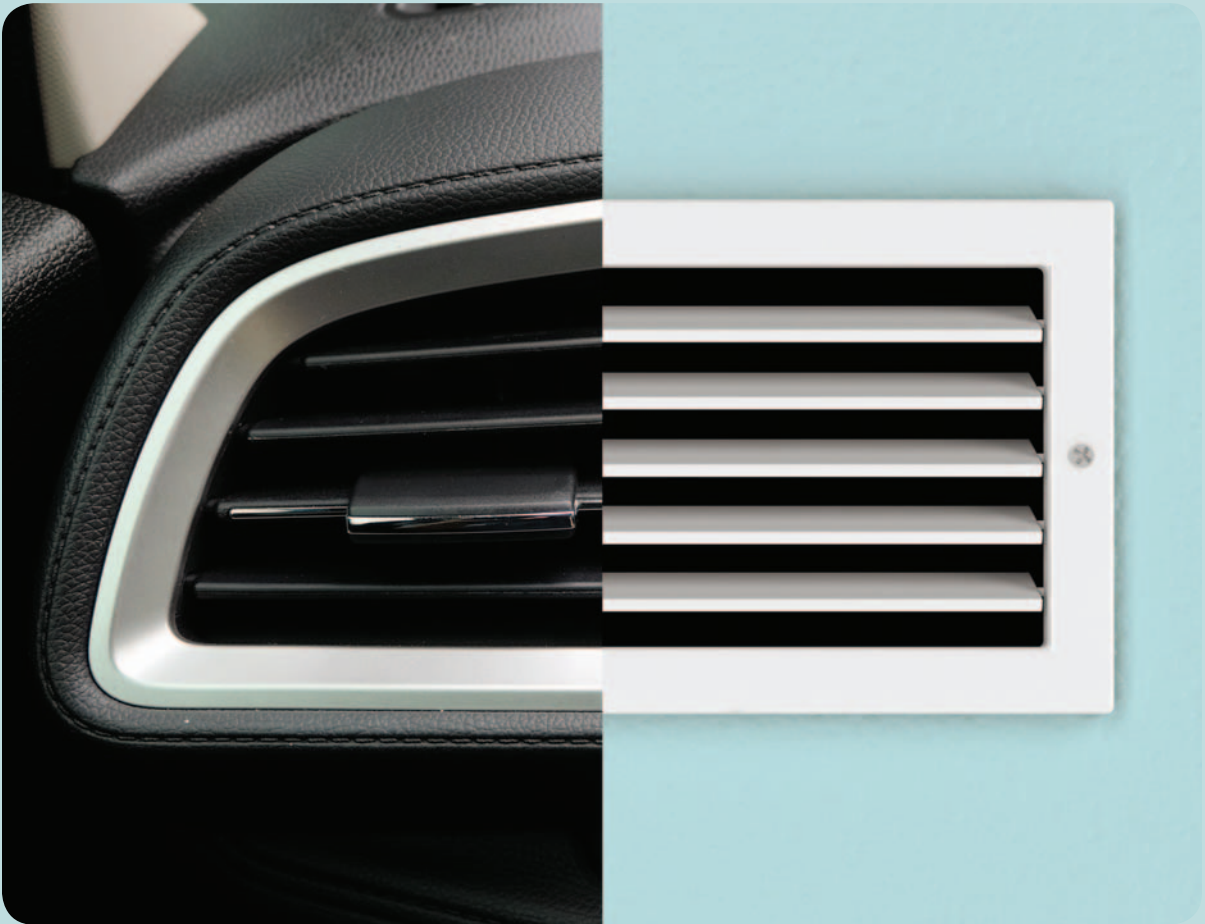
ated driving being deployed along a continuum of functionality and has developed a scale to describe it. In late 2016, the National Highway Traffic Safety Administration (NHTSA) adopted the SAE definition.

The SAE definition divides vehicles into six levels based on “Who Does What, When.” In general:

- At SAE Level 0, the human driver does everything
- At SAE Level 1, an automated system on the vehicle can sometimes assist the human driver to conduct some parts of the driving task
- At SAE Level 2, an automated system on the vehicle can actually conduct some parts of the driving task, while the human continues to monitor the driving environment and performs the rest of the driving tasks
- At SAE Level 3, an automated system can both actually conduct some parts of the driving task and monitor the driving environment in some instances, but the human driver must be ready to take back control when the automated system requests
- At SAE Level 4, an automated system can conduct the driving task and monitor the driving environment, and the human need not take back control, but the automated sys-

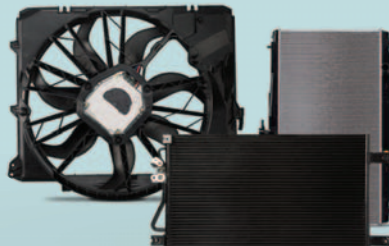


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TECHNICAL UNDERHOOD

tem can operate only in certain environments and under certain conditions

- At SAE Level 5, the automated system can perform all driving tasks, under all conditions that a human driver could perform them

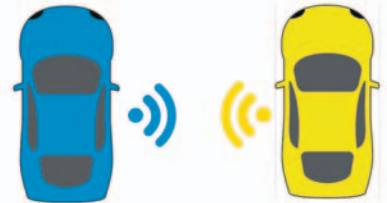
Is data generated from connected vehicles private?

In 2014, Senator Edward J. Markey (D-Mass) released a report called "Tracking & Hacking: Security & Privacy Gaps Put American Drivers at Risk." The report details how 16 major automobile manufacturers responded to questions about how vehicles may be vulnerable to hackers, and how driver information is collected and protected. The responses from the OEMs indicated that many of their vehicles have fully adopted wireless technologies, like Bluetooth and wireless internet access, but have not addressed the real possibilities of hackers infiltrating vehicle information. The report also detailed the widespread collection of driver and vehicle information, without privacy protections regarding how that information is shared and used. "We need to work with the industry and cyber-security experts to establish clear rules of the road to ensure the safety and privacy of 21st-century American drivers," said Senator Markey. For CV technology to function safely, data communicated between vehicles and the infrastructure must be secure.

Most consumers recognize that if cars are connected to operate safely on the road that literally everything that takes place with, or in a vehicle will be captured digitally. Connected technologies will make possible safer, more convenient and entertaining cars but will also amass vast amounts of personal information about drivers. The temptation to track and profile potential customers will be hard to resist by advertisers who are willing to pay for this information.

For example, a driver receives an email form work while driving to the local

V2V (Vehicle-to-Vehicle)



V2i (Vehicle-to-Infrastructure)

FOR A CONNECTED VEHICLE INFRASTRUCTURE TO WORK

VEHICLES will be connected to each other and to traffic lights, intersections, bridges, toll booths, Interstate highways and railroad crossings. Both V2V and V2i types of wireless connections will be necessary to provide vehicle 360-awareness on the highways of the future.

Starbucks. Upon arrival they order a latte from the app on their phone. Work-related communications and credit card information instantly enter and exit the car's computer and is broadcast over the internet where it is hopefully used only by Starbucks and the credit card company.

Depending upon the technology employed, ownership rights to data, and its protection as it passes through or is stored in a CV, implicate issues of personal privacy, corporate proprietary information and data security. These issues effect all connected vehicles that are "connected" in two different ways. The first includes infotainment, health monitoring, navigation, seeing who is ringing your door bell, having your refrigerator tell you that you need to buy milk — basically using the car as a smartphone. The other category is traffic infrastructure.

Traffic infrastructure

Many high-end cars use radar, Light

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Detection and Ranging (Lidar), cameras and proximity sensors to warn drivers of the presence of other vehicles. While these systems work well for line-of-sight scenarios they do not offer the same “situational awareness” as a truly connected vehicle. A vehicle that is connected to traffic infrastructure would have a far greater sensory range than that of cars with on-board equipment only. A connected vehicle can receive alerts of hazardous situations, providing more time to react and/or alert the driver of impending doom. For example, if a vehicle is braking rapidly on the other side of a hill, out of sight of following vehicles, an alert would be sent as well as commands to the following car’s braking and throttle controls to reduce speed. Other examples include a driver about to run a red light as they are nearing an intersection; an oncoming car in the wrong lane in a blind curve and vehicles swerving to avoid a road obstruction — the possibilities for accident avoidance are endless.

Another aspect of CV technology is that it will be less expensive to install per vehicle than radar, Lidar, cameras and sensor-driven on-board systems. A connected vehicle will only need to receive data from the surrounding infrastructure, display driver alerts and interact with on-board braking and engine management systems. Ultimately this technology will become standard equipment on most vehicles.

Currently the U.S. Department of Transportation (USDOT) has a CV program that is working with state and local transportation agencies, vehicle and device manufacturers and the public to test and evaluate technology that will enable cars, buses, trucks, trains, emergency vehicles, roads, smartphones and other infrastructure to “talk” to each other. Vehicles driven on the highway would use short-range radio signals for vehicle-to-vehicle

(V2V) communications and roadside radio repeaters for longer range communications with the overall traffic infrastructure.

Traffic infrastructure

Connected vehicle technology will enable roads, bridges, railroad crossings, traffic lights, stop signs, toll booths, school zones, other infrastructure and smartphones to communicate and share vital transportation data. A networking technology known as Dedicated Short-Range Communications (DSRC) which is similar to WiFi, will be the primary means of sending and receiving information. Many vehicles today are already connected through cellular technology however, DSRC offers fast, secure, and reliable communications that is resistant to interference. Through the use of DSRC, GPS, cellular, Bluetooth and other communications technology, vehicles will attain 360-degree awareness of nearby vehicles and traffic infrastructure. V2V technology will continually transmit a vehicle’s position, direction and speed as well as other information to other nearby vehicles.

Vehicle-to-Infrastructure (V2I) technology specifically provides communications between vehicles and traffic infrastructure and is a major step toward Intelligent Transportation Systems (ITS). Capturing vehicle-generated traffic data, V2I provides drivers with safety, mobility and other traffic-related issues and conditions. State and local municipalities are installing V2I infrastructure integrated with existing ITS equipment. Las Vegas is where Audi chose to be the first manufacturer to launch V2I technology in the U.S. Audi’s 2017/2018 A4 and Q7 models that have the Audi connect PRIME option will be able to communicate with this infrastructure. The vehicles receive real-time traffic signal information from the advanced traffic



APPLE'S CARPLAY USES THE VEHICLE'S IN-DASH DISPLAY to provide a more driver-friendly, less distracting interface than a typical iPhone screen.

management system that monitors traffic lights via an on-board, 4G LTE data connection.

When approaching a connected traffic light, the connect PRIME feature, Traffic Light Information, displays the time remaining until the traffic signal changes on the vehicle’s instrument cluster as well as the head-up-display. This information reduces driver stress by informing them approximately how much time remains before the light changes from red to green. While the time-to-green feature is a first for Audi, in the future it may be possible to integrate additional information from advanced traffic management systems including: vehicle start/stop features, navigation systems to optimize routing and predictive services that could present the driver with speed recommendations designed to maximize the number of green lights that can be made in sequence. These types of services would improve traffic management by reducing driving time.

V2V and V2I technology relies on large numbers of vehicles, roadways, intersections and other traffic infrastructure to be intelligently connected. Audi estimates that more than 1,600 intersections in the U.S. support their Traffic Light Information feature. The system is currently active in Las Vegas, Wash-

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ington D.C., Dallas, Houston, Denver, Portland and Palo Alto California.

Four-wheel smartphones?

With connected and autonomous vehicles at the forefront of automotive technology, the automotive industry, computer hardware and software companies are seeing dollar signs and are willing to collaborate if the result is winning over tech-savvy consumers bent on migrating their smartphone-driven existence into the automobiles they drive.

Automobile information displays have come a long way from the first digital dashboard like the 1978 Cadillac Seville and Chrysler's vacuum florescent display on their Imperial, New Yorker and Fifth Avenue models in the early 1990s. Many of these early displays include a speedometer, trip computer, outdoor temperature and travel direction compass.

While digital displays in cars have certainly improved, they have a tough time competing with technology that most drivers carry in their purse or pocket — the smartphone. Auto manufacturers often have five, or even 10-year production cycles and no matter how advanced their digital display technology is, it is going to look out of date before the model receives its first facelift. OEM on-board display technology is a tough sell to consumers on the showroom floor when the smartphone in their pocket has a better display, more features and costs under \$900 dollars.

Both Apple and Google are determined to be entrenched in the CV marketplace with their apps CarPlay and Android Auto. Powered by a smartphone, these platforms interface with a vehicle's built-in display. The resulting interface will always have an up-to-date look because it's not hard-wired into the car. However they don't merely use the vehicle's display as a screen for a smartphone, but instead are voice-centric in

that they rely on voice commands and are designed to be less distracting than viewing a smartphone screen.

When a smartphone is plugged in, the car's onboard system display is controlled by the Apple or Android app. Technology that integrates these smartphone apps with automotive systems can be found on numerous brands and models of vehicles.

Apple CarPlay

Powered by an iPhone, CarPlay provides a vehicle with an interface that looks like Apple's iOS, but is simplified so it can be safely and legally used while driving. For example, incoming iMessages and WhatsApp messages are spoken by Siri instead of just shown on the display. CarPlay is designed to remove the urge for the user to take a quick look at their iPhone while behind the wheel. The CarPlay app displays the iPhone's interface on the car's dashboard infotainment screen, complete with app icons and a virtual "home" button.

Most vehicles that work with CarPlay require a connection to the phone via a USB port with a Lightning cable, but some newer models (BMW 5-Series) support a wireless connection to CarPlay via the car's Bluetooth.

Currently, there are more than 300 models of automobiles that work with CarPlay either as standard equipment or as an option. Some cars bundle CarPlay with an enhanced sound system or a higher level of cabin trim. The cost for a CarPlay capable vehicle varies. For example, Honda includes CarPlay as standard equipment on some models, but Ford charges around \$1,000 for it to work with Ford's Sync 3 system.

Android Auto

For drivers who don't use Apple products, Android Auto is an alternative to CarPlay. Android Auto allows Google smartphone users to display Google



THE ANDROID AUTO APP INTERFACES with the vehicle's on-board display using the OEM steering wheel controls, touch screen and voice commands.



A CONNECTED CAR PROVIDES the means for tech-savvy consumers to migrate their smartphone-driven existence into the automobiles they drive.

Maps, the gold standard in navigation for the last 10 years. Using Android Auto, the in-dash display of Google Maps goes beyond mere navigation as apps for making phone calls, playing music and sending text messages are all part of the experience. For driving safety, Android Auto provides safe access to everything that's important on a typical smartphone and nothing more. There are some limitations as only Google-approved apps with the necessary driver-safety measures in place can take advantage of the Android Auto user interface. Android Auto interfaces with a vehicle's infotainment display via USB but does not mirror the phone's screen. The vehicle's touch screen, steering wheel controls, buttons and control knobs remain functional. Audio is sent via USB for music with no

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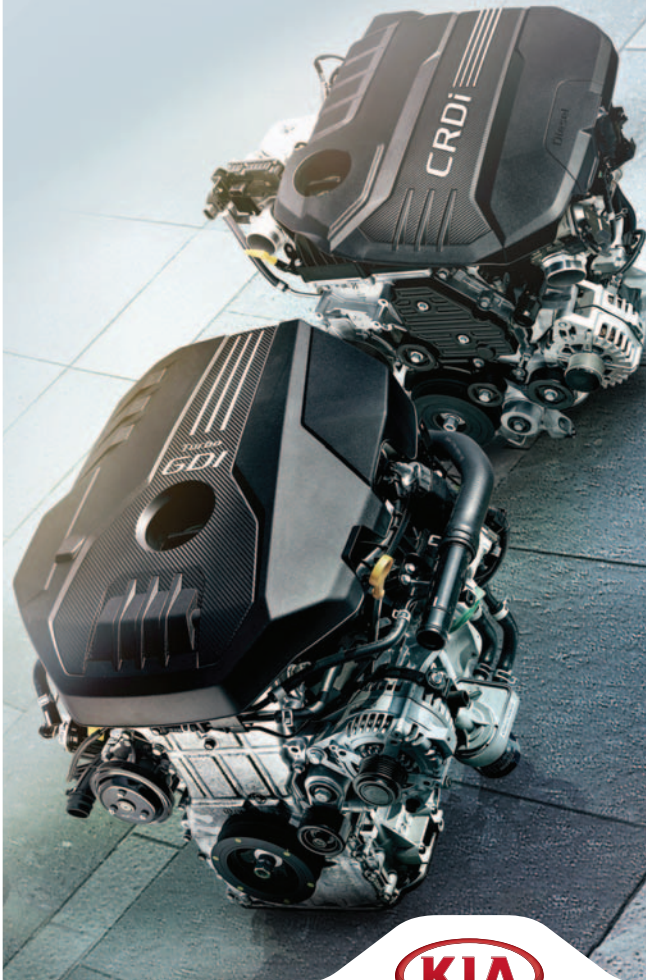
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TECHNICAL UNDERHOOD

loss in sound quality, unlike with Bluetooth audio streaming, and phone calls are handled via Bluetooth hands-free.

Forty automakers are selling new cars world-wide that are compatible with Android Auto. Currently over 400 models offer Android Auto compatibly with more added each year. An update to the Android Auto phone app is available that enables the full Android Auto experience right on the phone itself without needing to be plugged into a compatible car.

Using a dash or windshield-mounted cradle, the Android Auto app is displayed on a smartphone for navigation and infotainment without relying on the in-dash display. Some Google-approved apps offer a heads-up display by laying the phone flat on the dashboard where it projects information on the windshield. This is a practical solution for vehicles that don't offer Android support. Like the in-dash Android Auto experience, the on-phone user interface is simplified and voice-centric, keeping driver distraction to a minimum.

Conclusion

The wide-spread adaption of digital connectivity for vehicles with or without driver assist features are just a precursor to fully autonomous cars, which by design would have to be connected with each other and just about everything else.

With the introduction of airbags and anti-lock brakes, many lives were saved and injuries reduced or eliminated. Connected vehicles can make similar reductions in the number of fatalities and serious injuries caused by accidents by preventing them from happening in the first place. This technology, with its advanced communications data, will also lessen or prevent traffic congestion and will have a significant impact on reducing fuel consumption and vehicle emissions. User interfaces like Android Auto and Apple CarPlay will also contribute to the overall safety of drivers and passengers alike as these apps will keep drivers focused on the road, instead of their smartphones.

Driving a connected car in the near future will be like playing a video game except that no one has to actually "play" to receive the benefits of this technology. The "game" will operate in the background reducing the critical decision workload for the driver; communicate with other vehicles and traffic infrastructure. The benefits of connected vehicle technology will ultimately be a safer, less stressful and more entertaining driving experience. *TM*



TRACY MARTIN has covered the powersports industries since 1998. He is also the author of six Motorbooks Workshop Series books published by the Quarto Publishing Group and is a regular contributor for *Motor Age*.
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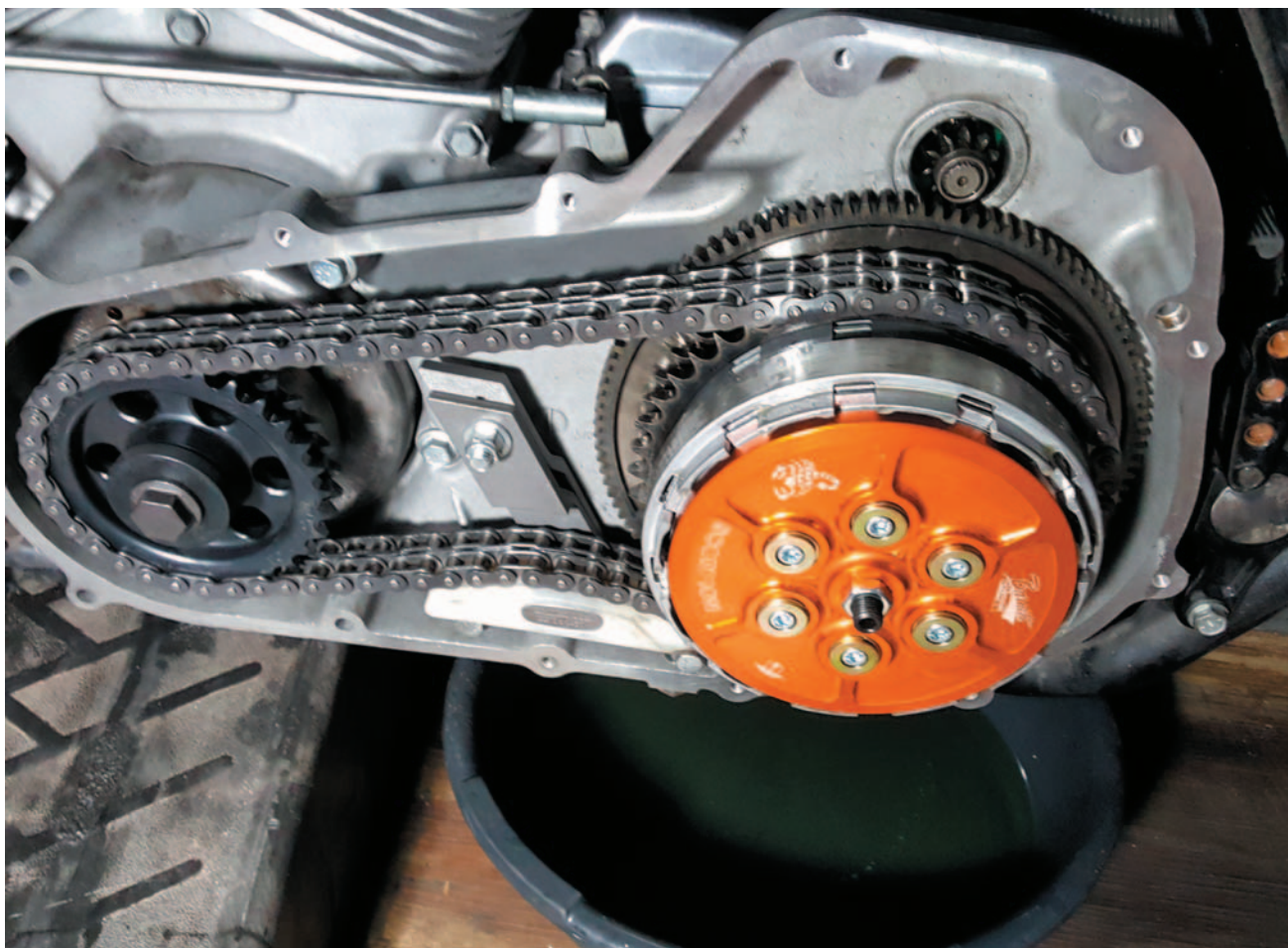
MY VIEW OF THE ADVANTAGES TO BEING AN AUTOMOTIVE TECHNICIAN

PETE MEIER // Technical Editor

My very first job was that of service station attendant way back in the mid-70s. Many of you reading this likely don't even know what that means! This was back in the

day of full-service gas stations, where a customer could pull up to the pump and a smiling young attendant would come out, rain or shine, to service your vehicle. We would pump the gas for you, clean your front and rear glass, check your wipers and underhood fluids and even air up your tires if you asked.

It's also where I began my career as a mechanic (no "technicians" back then), learning by doing while under the watchful eye of my boss and his fulltime wrench. I started off learning basic jobs like oil changes and lube jobs and as my boss gained confidence in me, the complexity of the jobs grew.



THIS IS THE TAIL END of a major transmission job I performed on my Harley. I spent more on the special tools needed than the job would have cost me, but I wanted to make sure it was done right – so I did it.



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FOR YEARS, I WAS DOING MY OWN WORK in a cramped single car garage or worse, in the dirt driveway. At least now I can do my own repairs and maintenance in relative comfort.

Now, keep in mind, at the time I had no intention of doing this kind of work for a living. I was completing my last two years of high school and then it was off to attend college!

It was college's fault

I guess you can blame college for the shift in direction. The school I attended was located in the city and parking was always at a premium. I can't count the times trying to find a place to park made me late to class. One day, I decided to buy a motorcycle and commute to school on it. I had ridden motorcycles since I was 12 or 13, so the transition to a small street bike wasn't hard. The only problem was that I got hooked on riding, and it wasn't long before I

was seeking something with a little more power!

I enjoyed school and was doing well there, but I was becoming increasingly discouraged with the process, continuously asking myself if this was something I was sure I wanted to do. Unable to answer affirmatively at the time, I dropped out after my first year, deciding instead to go to work with my father with the idea of someday taking over the "family business."

Some of you may remember an article I wrote some time ago about my dad. He was (and is still) a master



IT'S AMAZING HOW FAST THE "MAN CAVE" FILLS UP, especially when one half of it is reserved for my wife and her car.

carpenter and I learned a lot about the craft from him, as well as a whole lot more. One piece of advice I remember to this day was, "A man who can work

with his hands will always be able to take care of his family.” That may be true, but I hated carpentry!

I did, however, like working on my bike — performing the needed maintenance and the occasional modifications. In my mind, being able to do THAT for a living would be awesome! So off to motorcycle mechanics school I went, returning four months later to a local Honda dealership. I enjoyed the work very much. The only drawback was the seasonality of the work. After all, not too many people were riding their motorcycles in the winter. The solution? Make the move to four wheels. And, for the most part, I’ve been in the auto repair business ever since.

The advantages of the move

There are some readily apparent benefits to the decisions I made way back then. First, I was working and earning a decent living with no student debt hanging over my head. Second, just as my father had promised, I have never been unemployed and have always been able to provide for my family. And there have been some turbulent economic times since the mid-70s! But there are more, maybe not so apparent, benefits to being an automotive professional.

For example, how many of you take care of your own vehicles? And it’s not just the family car, right? If something breaks on the boat, the motorcycle, the lawn mower or the chain saw, you take care of it. After all, they all run on gasoline and they all have to function more or less the same. Hydraulic brakes on the bike are not that much different than the ones on the front of my wife’s Scion and for the systems that are unique to the job at hand, we’ve all learned how to research what we don’t know and apply what we learn to the problem in front of us.

And we take that for granted, I think. I can’t help but think of the commercial (for a national insurance company) de-

picting a grateful mom and her son. She’s grateful because her car insurance has a roadside assistance option that helped her son with that unfortunate flat in the middle of the night. The scene cuts back to a not-so-fortunate youngster and his partner, who are trying to attempt the change on their own. The first holds up a tool, not a lug wrench, and asks his

buddy if it is a lug wrench — and the second young man looks at him, and replies after a short delay, “Maaayybee..?”

You know what you charge to perform even minor repairs. And you know how many of your current customers couldn’t check their own oil level, let alone change a tire. Think of all the money you’re saving because you can!



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There's a story I've shared when doing presentations in person that fits here. A young man is traveling across the Texas plains, and there is not another living human being around for miles. Suddenly, a strange noise begins to make itself known and it appears to be coming from under the hood. The young man is increasingly worried he may not make it to his final destination and may even be stranded, far from civilization.

But soon, on the horizon, he sees a shape of a building. He prays that the car will hold together long enough for him to make it to what he hopes is a

garage. As he approaches, he sees an old man sitting on a rocker on the front porch of the establishment, enjoying what seems to be a nice, cold lemonade, taking a break from the desert sun.

The young man stops in front of the old mechanic and asks if he can help with the strange noise. The mechanic nods his head and rises from the chair, opens the car's hood and listens for a few minutes before retiring into the darkness of the open garage. He returns with a tiny ball peen hammer in hand.

Leaning over the engine, he locates a precise spot and taps once with the tiny hammer.

The noise instantly stops.

The young man stares in disbelief. "Is that it?" he asks. "Is it fixed?"

"Yes," the old man assures him. "You're all set."

"How much do I owe you?" the young man asks.

"That'll be \$89.99."

"What!" the youngster exclaims. "All you did was tap it with a hammer!"

"That's right, son. I'm charging you 99 cents for the hammer tap — and \$89 for knowing where to tap it."

The moral of the story is this — we have all developed unique skill sets on our road to becoming competent technicians. We've had to learn new systems and technologies and that has, in the process, taught us how to learn. We've had to develop our critical thinking skills, the ability to apply what we've learned, so that we could take that knowledge and use it to overcome situations and circumstances that even the engineers haven't thought of yet! These are all skills that are hard won, and worth what we charge for them.

But we don't just apply these skills on the job, do we? We apply these skills to every aspect of our lives, automatically, because they are now an inherent part of who we are. That makes us better parents, better spouses, better people.

And that's a benefit that overshadows any negatives that I can think of! *TM*

FURTHER DEVELOP YOUR SKILLS IN ATLANTA

NACE Automechanika 2018 comes to the Georgia World Congress Center in Atlanta Aug. 8-10, offering training from industry-renowned experts, trainers and skilled technicians with the collective goal of continuing to better the education and skills of those in the automotive aftermarket. Many of *Motor Age's* own contributors will be leading training courses throughout the three-day schedule. Here are some highlights:

Mastering Voltage Drop

Testing by Jaime Lazarus — This class will focus on teaching one of the most vital electrical testing techniques techs should know: voltage drop testing. Beginning with an overview of what exactly voltage drop is and its effect on today's computerized vehicles, the class will move on to techniques followed by real-world examples that will allow attendees to put their new knowledge to the test.

Using Current Probes to Diagnose Drivability Dilemmas

by Eric Ziegler — Coupling today's probes with the modern DSO or lab scope, they are incredibly powerful diagnostic instruments. Learn about current probe tooling options and techniques, and hear about case studies that will support some interesting approaches to unique diagnostic dilemmas.

The Pressure is On by Bernie Thompson — The use of pressure transducers in automotive service bays saves time and money when diagnosing and repairing vehicles. Novice and expert techs alike can learn how to make transducer diagnostics quick and easy.

Pressure Waveforms — An Analysis from the Inside Out

by Brandon Steckler — You can diagnose a variety of engine mechanical issues through the use of a Digital Storage Oscilloscope. Learn what tooling is needed, how to capture the scope patterns and how to interpret them using a variety of real-world examples.



PETE MEIER is an ASE certified Master Technician with over 35 years of practical experience as a technician and educator, covering a wide variety of

makes and models. He began writing for *Motor Age* as a contributor in 2006 and joined the magazine fulltime as Technical Editor in 2010. Pete believes in the mission of the magazine to "advance the automotive professional" and provides resources to working techs around the country through print, social media and YouTube.

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AUTOMOTIVE IV

IF YOU'VE BEEN AROUND A WHILE, YOU'VE SEEN CASES WHERE FLUIDS WOULD TRAVEL UP WIRING HARNESSSES TO OTHER COMPONENTS – OFTEN WELL AWAY FROM THE SOURCE OF THE FLUID. BET YOU'VE NEVER SEEN ONE LIKE THIS, THOUGH!

JOHN ANELLO // Contributing Editor

I was recently called to a shop on a 2012 BMW X5 with a 3.0 Liter Engine (Figure 1) that needed a new Engine Control Module programmed. The shop had determined that the ECM was internally damaged and needed to be replaced. They purchased a new ECM from the dealer because a used one would not work on this vehicle due to the fact that BMW will not allow it. Most manufacturers have a procedure to overwrite the Vehicle Identification number and realign the module with the onboard Vehicle Security System, but that is not the case with BMW. Their Engine Control Modules are a “One-Time” marriage, and it is required to purchase a new ECM from the dealer only.

When I arrived at the shop, I needed to see for myself how the shop came to the conclusion that the ECM was damaged. This can usually be determined by a visual inspection or by a simple “smell” test for any signs of a burnt circuit board. Just going on an assumption can be VERY costly if you are wrong in your diagnostic process, so I needed to make sure the shop was headed in the right direction. It would be a bad situation if I was hired to program a control module and the vehicle ended up with the same results as the old one. I was hired as a salesman to stuff software and a configuration file into the ECM, and though I wear many hats, my “technician” hat was not the one I was



wearing today. However, I could always be hired later to diagnose the vehicle if needed. So I did as I was told and kept my fingers crossed.

This is new!

The head technician in the shop did assure me of his findings by letting me see

for myself what he had found prior to me starting the programming procedure. He pointed out a pile of damaged components (Figure 2). I was taken back by his findings and the amount of damage involved on this vehicle. This vehicle uses an electric water pump that had failed. It had basically burnt up and took out com-

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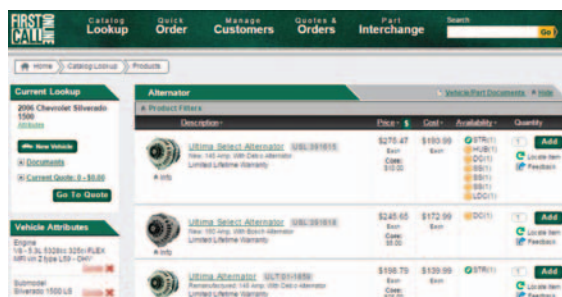
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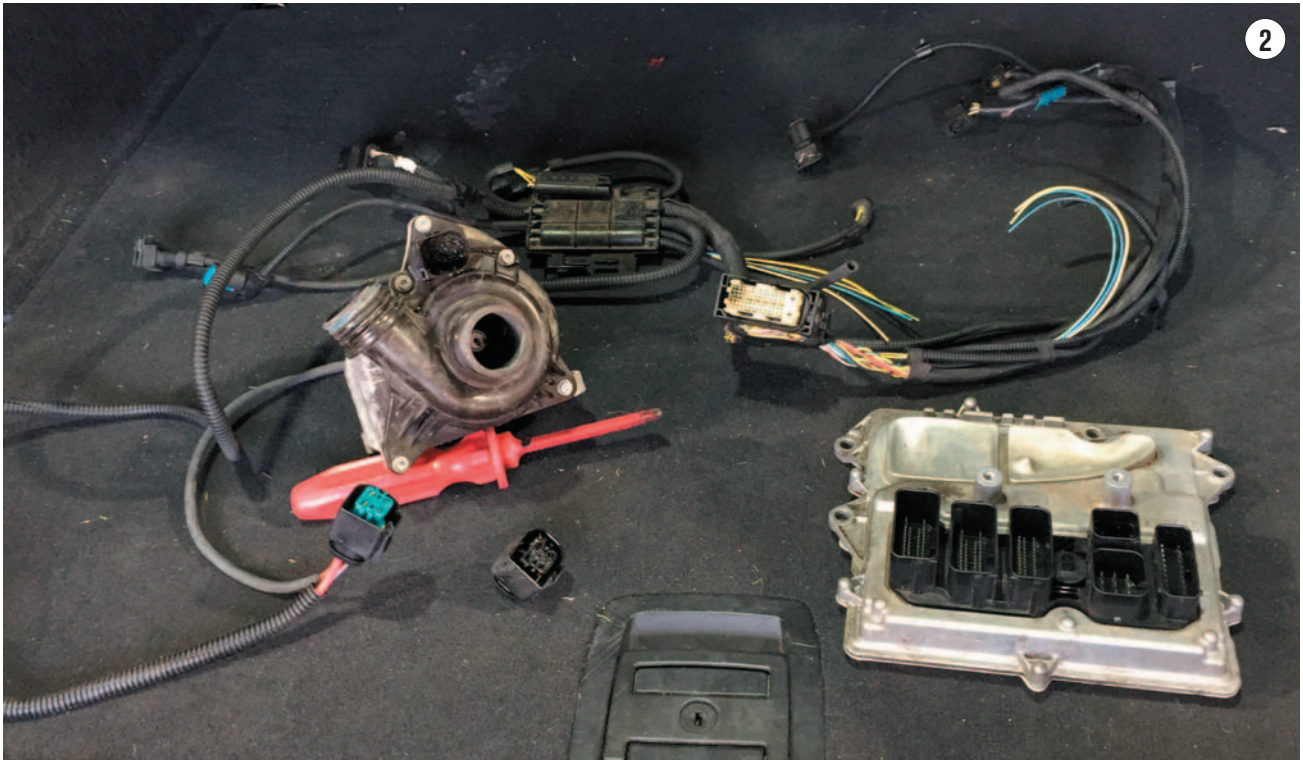
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ponents in its path of destruction. By taking a closer view of the water pump (Figure 3), you can see the damage the water pump caused to the water pump connector.

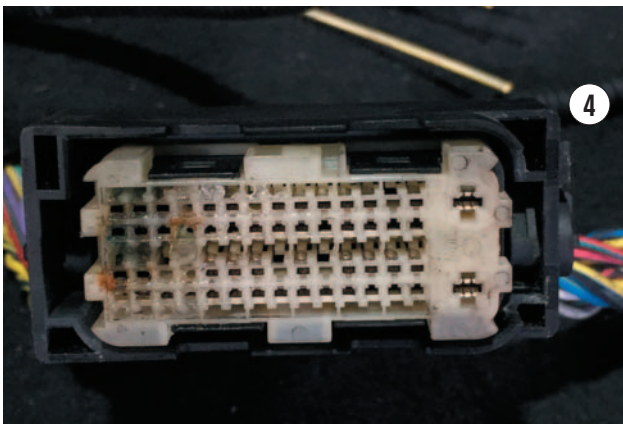
The shop simply replaced the water pump and wired a new connector end to the existing harness, but the vehicle did not run very well and was setting a few running codes for injectors and ignition coils. When the technician did further diagnostics he discovered a burnt connector at the ECM (Figure 4), and he had no other choice but to replace the ECM along with a sub harness for the ECM. What a chain reaction of events for a simple water pump replacement job after the owner of the BMW drove the car to the shop complaining about a CEL lamp on, burning smell from the engine compartment and a vehicle that was not running well.

I liked it better in the old days when a water pump was simply driven by a drivebelt. If the water pump went bad, you could easily remove it from the engine and overhaul it on the bench by replacing a bearing that usually failed. That operation now is no longer practical and requires a complete replacement with a new or rebuilt water pump. Then there is this new wave of technology in which they want to be rid of the engine carrying too much of a load, driving many components so why not an electric water pump that can be controlled by varying speeds of operation or even turned off when not needed? But I always say that there is always a price to pay for new technology until they get it right.

Okay so now I go through the long process of programming the ECM, making sure I maintain a specific charging voltage between 13-14 volts. On most vehicles, if your charging voltage is not maintained within the specification, the operation will self-abort if the voltage is too low or too high. Thus, it is important to use a qualified battery charger that has a programming feature that will maintain the voltage even if a current surge occurs, such as a coolant fan coming on while programming. You don't want to lose the ECM in the process or it will be your responsibility to purchase another ECM if the parts guy is unwilling to cover you on your mistake. Most electrical parts cannot be returned, and it becomes a tug of war with the parts guy who will chastise you to make sure you claim ownership of that part that will end up hanging on your wall as a memory.

Programmed, but not running?

I finally finished my programming task, and I go to start the vehicle and it will not start. This seemed odd to me because I had followed through on all the step-by-step procedures without skipping a beat. The technician was even looking over my shoulder as I was doing the job and we looked at one another in disbelief. Then came these words out of his mouth, "The car was running before with the old ECM." This remark was insinuating that I did not program the ECM properly, but I have done many BMW control module installations and was very careful in the process. So now this vehicle had me second guessing myself. I sat there scratching my head as to why the vehicle would no longer run with the new ECM installed. Now it was time to put on my "technician" hat and



remove the "salesman" hat and go to work.

I scanned the entire vehicle to get a complete overview and recorded the codes in each control module. I then

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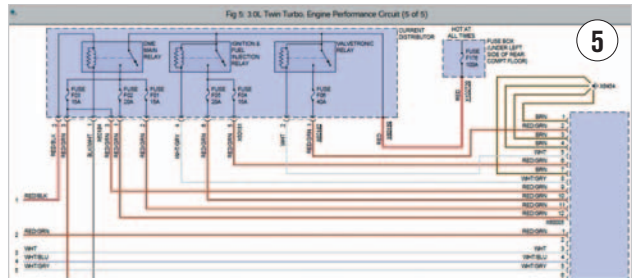
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cleared the entire vehicle to see what codes would reappear. Keep in mind that during the programming process it is normal for many controllers to set codes when the ECM goes offline while being programmed. When I attempted to start the vehicle, it still would not start after a few key cycles and cranking attempts. I proceeded to communicate with the ECM and scan it for any new codes. The good news was that the ECM was alive and well, but it had a few current codes in memory (Figure 5). The ones that caught my attention



1. Engine-DME Motor Electronics — (07)

1.1. 2A61	Relay, ignition and injection system, supply voltage, fuel injection: Line disconnection present
1.2. 387F	Power management: Standby current violation not present
1.3. 332E	Terminal 87_1: No voltage present
1.4. 28D0	Throttle valve, adaptation: Initial adaptation, lower limit position not taught in present
1.5. 28CD	Throttle valve, adaptation: Marginal conditions not met; battery voltage too low present
1.6. 2C3E	Quantity control valve, activation: Short circuit to earth present
1.7. 371E	Relay, ignition and injectors, activation: Line disconnection



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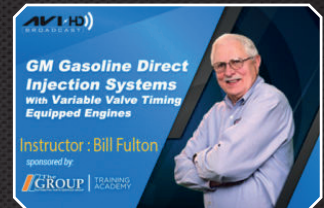
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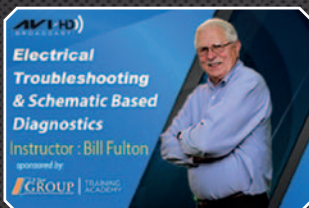
BEYOND PATTERN FAILURES:
SYMPTOMS TO SYSTEMS



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FOR GAS GUYS



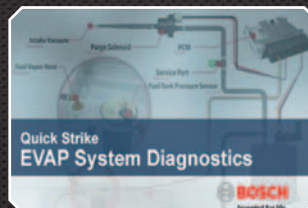
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were codes 2A61 (Relay, Ignition and Injection system, supply voltage, fuel injection: Line disconnection) and 387F (Power management: Standby current violation). Without even having to read documentation on these codes and using my common sense diagnostics, these codes were directing me towards power feed issues for the injectors and ignition coils. I now had to look at wiring diagrams to make sense of it all.

By looking over system diagrams I discovered that these injectors and ignition coils were not fed power directly from a fuse but rather through power drivers internal to the ECM. This Engine Control Module had the ability to control both sides of the injectors and ignition coils, but the ECM was fed power supply for these drivers from an integrated relay module assembly that housed the ECM main,

injection/ignition coil and valvetronic relays (Figure 6). This Integrated Relay Module was not located in an easy-access area, but rather buried deep below the windshield, in the right side cowl under the passenger cabin filters (Figure 7). I'm thinking that this would be a bad location to stick electrical items, especially if any water coming down the windshield would breach its normal travel to the base of the windshield and out the drains provided in the cowl.

I located the Integrated Relay Module at the base of the cowl well (Figure 8), but I needed to remove the module from its location to get better access to test all the wires. By doing this I unfortunately had to unplug all the connectors and move everything up out of the lower cowl. To my surprise, I found that the module connections were all corroded from moisture (Figure 9). This

was probably due to a prior water leak by the looks of all the leaves at the base of the cowl housing. This poor BMW owner was not having much luck with his car — now he was looking at another part that had to be added to the list and hopefully the harness connectors could be salvaged without replacement.

But wait! There's more!

When I removed the module from the vehicle and it was in my hand, my human sensors kicked in. I smelled something that I was accustomed to that had that sweet smell to it. I took a closer whiff at the module, and it smelled like antifreeze — it was not water at all. All of a sudden a light went off in my head and I cracked the case! This vehicle was exposed to "Automotive Intravenous." Something I have not seen in years! When the water pump burnt the con-

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nector, the plastic housing was compromised and allowed coolant under pressure to force antifreeze through the engine harness. The antifreeze worked

its way back to the ECM, which was located under the intake manifold, and caused damage there. Then the antifreeze took another journey down into

the cowl and trashed the Integrated Relay Module. Wow!! What a turn of events!

I basically sat there for a moment because I was mesmerized by this whole situation. You just never know what you will come across in this automotive field of diagnostics and all you can do is keep an open mind and be alert. Don't be the one wearing headphones and listening to tunes while working on a car because you will miss out on all the experiences you gain using the sensors you were given at birth. My only hope is that this article has opened your mind and hit home with some of you techs out there. *ZZ*



JOHN ANELLO owns Auto Tech on Wheels in northern New Jersey, which is a mobile diagnostic service for 1,700 shops, providing technical

assistance and remote programming. He is also a nationally known trainer.

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Commit to training, commit to growth

By **GREG MARCHAND**

You work hard every day for your success; you hire the best people you can find and provide the best work environment you know how. There's always work in the bays, and customers tell you they love your organization. Why does it seem you should be making more money than you are? Why are things never as smooth as they should be? Why does it seem growth has slowed?

An individual business owner cannot do it all. At some point a single person cannot repair the vehicles, answer the phones, order parts, and provide excellent customer service. You recognize the need to hire someone...and then someone else. Eventually you have a business filled with technicians, service advisors and support staff; you find yourself in a position where things are good, maybe really good, but you know it could be better.

As an owner you might spend time in the shop making sure the technicians are doing things properly. Maybe you spend time at the service counter showing your service personnel the best way to write recommendations or handle a tricky customer transaction. You most likely train all the new hires yourself to make sure they do it your way. You want the business to do it the way you did it, because it got you this far. Unfortunately, the things that got you here today cannot take you any further.

You, your people, and your organization have reached a point where you must Commit to Growth and Commit to Training. That means, as an owner,

working on the business rather than in the business. As an employee, this means taking ownership of tasks, making good decisions daily, and growing your skill sets. Everyone must now be more than they have been in the past.

Good people make a good organization. Training makes good people great people, and great people make a great organization. A commitment to growth and a commitment to training will ensure your organization learns how to develop strong culture, great relationships, and finds financial success.

Training does more than just teach skills or ideas; the growth that training brings an organization creates loyal, capable, and empowered individuals. Asking employees to develop existing skills, learn new skills, and become more confident in their abilities to perform their job functions allows your organization to become more efficient. Efficiency equates to increased time available to produce more work, build stronger customer relationships, and ease the burden of the daily race. It also means more time to find the next growth area for the business.

Groups that train together, grow together. The shops with the strongest culture, steadiest growth, and most sustainable future train together. Each class is attended by the shop owners, managers, and employees. No exceptions. The organization sees classes as an opportunity to build culture, solve challenges, and work together on the business. The best shops see training as an opportunity to learn from other shops, form relationships within the industry, and use the time to explore new ways of thinking.

Class time is not just seen as an event to attend, but as an opportunity to improve processes, have conversations around improving specific aspects of the business, and to see the business with a new perspective.

Good training delivers ideas, concepts, and processes that can be implemented and built upon. Great training provides the same, but adds to it consistent, daily engagement of participants, space for individuals to grow ideas, and opportunity to explore different ways of doing things.

Do not just attend training. Commit to Growth, Commit to Training.

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How to spot, repair and avoid brake roughness

Does your vehicle shake during braking? Your first thought may be warped rotors, but technically you may be wrong! Although the expression “warped rotors” is still a common term today used in the brake service community, the real malefactor of the shaking, caused by brake roughness isn’t rotor warping, but actually rotor thickness variation.

Determining the exact cause of brake vibration

The surefire way to detect if this is the root cause of the roughness, is to first drive the vehicle on a smooth surface at highway speeds to make sure the vibration is only felt while the brake is applied. If the vibration is felt without the brakes applied, it is likely not a brake related issue. Brake roughness is often most severe when braking gently from highway speeds. Several light decel stops may be needed to generate the roughness. The roughness is often accompanied by brake pedal pulsa-

tion and steering wheel shake.

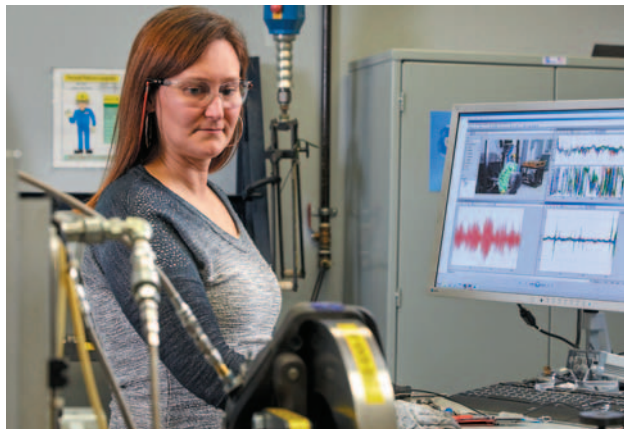
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Modern carbon removal

The modern internal combustion engine has changed dramatically over the years. The fuels and lubricating oils we use today are a far cry from years past. Additionally, these new modern engines are equipped with Gasoline Direct Injection (GDI). These changes have created an engine that rapidly builds carbon deposits within the induction system. These carbon deposits create performance and drivability issues, and can set DTCs in the engine control module. The first DTCs that come to mind would be engine misfires, however, some of the DTCs that may set might surprise you. Would you think carbon deposits would cause a MAF sensor range or performance DTC? This is just one of many DTCs you may not associate with carbon deposits. Almost all newer vehicles are now equipped with GDI systems so no manufacture is exempt from these heavy GDI performance robbing carbon deposits.

What is needed is a modern high-tech approach to removing these carbon deposits from the induction system and combustion chambers of the GDI engine. Prior cleaning methods are out-

dated because they were not specifically designed to deliver cleaning chemistries into the modern automotive engine. Additionally cleaning chemistries are outdated because modern fuels and oils have been re-engineered thus altering the chemical nature of the carbon deposit that accumulates within the induction system.

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Think OE belts and tensioners that stand the test of road and time, and you think of Gates. After all, Gates is a global leader in automotive parts, serving up innovation and quality that meet the needs of both shop and driver. Backed by extensive R&D and a reputation built on more than 100 years of experience, Gates is constantly gearing toward the future, so it comes as no surprise the company is keeping an eye on the long-game, in the bay and on the road, with their drive for more complete repairs.

These complete repairs are what inspired Gates to create the Gates Complete kit series, and most recently the Gates Complete Serpentine Kit. Why a serp kit? Belts, tensioners and even their associated pulleys all wear at about the same rate. In fact, belts and tensioners have the same service life of around 100,000 miles — right about when the other system components like the alternator or water pump will need replacement. That's why Gates has and continues to recommend replacement at 90,000 miles in order to catch worn parts before they fail.

Gates has the future in mind when it comes to kits. Because an alternator, water pump, or even A/C compressor repair (or any repair affecting the serpentine system) requires taking off the belt, Gates promotes the rule of "Remove it, replace it," encouraging all techs and shops to replace any worn part that will be removed in the process of a larger repair. So, rather than re-install a worn part that could put new parts at risk, and will require a



customer to return sooner than later, all parts that go on are new and ready to begin wearing together. "Remove it, replace it" is a guideline that supports the goal of a complete repair, and allows the customer to leave knowing they've received thorough, responsible car care that won't have them back paying for additional and avoidable labor.

But the simple brilliance of the Gates Complete Serpentine Kit comes from one of the most basic benefits: all needed parts are in one box. When worn belt and tensioner are coming off, they can be sourced and replaced at

once (along with a pulley if necessary). It's a time saver for everyone involved, keeping the customer on the road longer with the right tension, and lowering comebacks. Plus, that all-in-one kit comes with a Lifetime Warranty on parts and labor, so while there are physical parts in that box, there's also a lot of confidence too.

A complete repair is the right repair for car, driver, and shop. Go complete with the Gates Complete Serpentine Kit.

For more information on complete repairs and the Gates Complete Serpentine Kit, visit Gates.com/CompleteKits.



DRIVEN BY POSSIBILITY™

Take the guesswork out of trailer inspections

In the modern shop environment, diagnostics are a way of life. Solutions for today's constantly evolving world of diagnostic tools and equipment have proven to be a worthy expenditure for both shops and technicians. These products help techs work more efficiently with far less misdiagnoses when utilized properly. While prevalent in the automotive and heavy-duty world for vehicles, they are relatively unknown for towing and trailer diagnostics. They can prove to be a great value for all shops working on any trailer ranging from small boat trailers to 53 ft. semis.

Although trailers appear to be far simpler than vehicles in terms of wiring and components, they can be harder to troubleshoot due to a lack of integrated OBD feedback and require a full functional test. Because trailers have a greater degree of exposed wiring harness and often sit dormant for long periods of time, you are often left with frequent failures and extensive troubleshooting times. The combination of these variables along with the underlying safety issue of trailers carrying heavy loads has resulted in an increase of inspections and possible citations from the federal government.

Assessing the health of the wiring harness comes with its own set of diagnostic challenges. To inspect trailer functions, the customer's tow vehicle is often used. This not only requires a second tech but also the customer to leave their vehicle. Also, any malfunction found may be present in either the vehicle, trailer, or plug/socket interface. Another method incorporated by many

shops is building crude makeshift testers, which provide basic on/off functionality. However, by implementing the right diagnostic tool and equipment solutions, this process is greatly simplified, the guesswork is removed, and trailer work becomes a one-tech operation.

IPA®, based in Woodstock, NY, has been the leader in professional, diagnostic truck and trailer solutions for over a decade, and offers a full line of cost-effective products to help techs perform more thorough inspections, saving time and money. IPA® addresses the three possible breakdowns in towing electrical problems with a line of vehicle-side socket testers and pin cleaners for most common North American configurations. However, the cornerstone of their line is the MUTT® (Mobile Universal Trailer Tester) series of diagnostic, self-powered trailer testers.

The MUTT®'s take all the guesswork out of trailer inspections and provide a true, one-man process with most units working via wireless remote. A technician can easily power each individual circuit and visually inspect the component for proper function. The micro-processor-controlled diagnostic brain alerts the technician to the presence of any electrical fault on the trailer harness such as short circuits, cross-wired circuits, open circuits or the very common, poor ground. By instantly being notified to the problem at hand, the diagnostic



time is mere seconds and the technician can go straight to repairing the issue. Additionally, the MUTT® series also allows technicians to actuate both electric and air brakes (depending on the model) to make sure all installed components are receiving power and engaging properly.

By implementing a complete package of truck and trailer diagnostics, shops will see an immediate reduction in diagnostic time compared to the alternative, and will be able to spot issues that were previously undetectable. Beyond the obvious efficiency gains, these solutions will yield more satisfied customers and more importantly, safer trailers leaving your facility. For more information from IPA® call 888-786-7899 or visit www.ipatools.com.



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Fix it right the first time

What if you could have a silver bullet in your toolbox that could be applied to every vehicle that comes your way to fix it right the first time?

Repair information. That's it.

Taking advantage of a source that compiles all of the needed information in one place will help set you up for a successful repair. While there is no single tool or piece of equipment that can magically fix every issue you encounter, having the right information in front of you before you start removing parts and replacing pieces is the best way to start every repair.

ProDemand auto repair information from Mitchell 1 has new search engine technology that makes the diagnostic and repair process smoother than ever. ISearch Plus delivers OEM and real-world information together in an exclusive card-style layout that resembles apps on your smartphone. The content is targeted to the vehicle in your bay and organized in the same flow you use when approaching a diagnosis and repair. Best of all, everything you need is just a mouse click away.

So, how does it work? Select your vehicle and type in a search term, such as a DTC or component. ISearch Plus returns a complete set of information, organized into specific cards in a sequence that matches the technician's workflow.

Targeted results = accurate diagnosis

Let's take a look at the cards returned for code P0356 on a 2010 Toyota Camry 3.5L engine. After a search on the P0356, cards are returned with information re-

lating specifically to that DTC and vehicle. TSBs are presented first, since that is the most likely starting point for your diagnosis, letting you know right away any information the OEM has about the issue.

SureTrack real-world diagnostic information follows next, with cards for Real Fixes, Top Repairs and Causes and Fixes. This exclusive content reduces your diagnostic time by providing experience-based information from aftermarket shops and other professional technicians like yourself.

Diving in a bit deeper, let's examine these tools that increase efficiency as well as give you more confidence when building your diagnostic strategy:

- The Real Fixes card connects you to answers for this DTC on this vehicle. For the P0356 on the 2010 Camry, in over 1,000 cases the ignition coil was at fault, verifying that component as the most likely failure. ProDemand also returns 10 other code/component combinations related to the p0356, giving you a full picture of Real Fixes being seen in the aftermarket for this specific vehicle and code.
- The Top Repairs card displays a common repair procedures graph that shows a granular view of when components are most commonly replaced on the selected vehicle, giving you a starting point and clues that can help you with the diagnosis.
- The Causes and Fixes card is an



especially useful tool when you have multiple DTCs. The diagram shows the relationship between components and codes, and allows you to filter down the related components until you arrive at the most likely root cause of the issue.

Once you have developed your diagnostic strategy, you can use the OEM testing procedures, guided component tests, component end views and locations to verify your diagnosis. You also have access to wiring diagrams, specifications, tips from the interactive SureTrack community, and more. After you've confirmed the failed component/s, you can move on to Remove & Replace (step-by-step procedures) and After Repair Info (clearing codes and calibration procedures).

At that point, you've completed the repair with the help of your silver bullet and provided your customer with an accurate repair and positive experience that will bring them back for future service.

**COMMITMENT TO
TRAINING**

Enhance your employees' Know How with NAPA Autotech

Vehicles are becoming more technologically advanced. What used to be an easy repair has suddenly gotten a little more complicated. As a shop owner you are going to need your technicians to be up to date with the latest automotive advancements. To help you accomplish this NAPA Autotech offers the the latest high-tech training. Not only are each three to four-hour class held in the evening, but they cover topics important to your business, such as hybrid maintenance, no code diagnostics, diesel issues, scan tool dynamics, electronic circuit testing and more.

Learn from the best

All NAPA Autotech classes are led by experienced trainers who are certified technicians. They will use their work experience with the latest technologies to provide your technicians with the best training currently available. Their instruction will enhance your technicians' understanding of vehicle systems and increase first-time repair capability, which leads to increased customer satisfaction.

With ClassPass, training doesn't end when class does

NAPA Autotech wants you to have continuing education at your fingertips 24/7. So, after you've completed a course you can access additional information online with ClassPass. When questions come up, just go to napaautotech.com. There your employees sim-



ply enter their ClassPass ID and have unlimited access to supplemental materials, such as slides and notes, step-by-step procedures and common fixes for repair situations.

Autotech helps improve the bottom line

There are a lot of reasons for your employees to go through NAPA Autotech training, but the most important is that it can help make your shop more successful. Shop owners who previously attended classes boasted that it helped their technicians speed up diagnostics testing times and increased employee

productivity, which can help improve your operation's bottom line.

Sign up for a class

NAPA Autotech wants to help keep your employees up to date with the latest automotive advancements. To find out more about the classes being offered, go to napaautotech.com and search for classes in and around your ZIP code. Keep your business running longer, stronger with NAPA KNOW HOW.

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TRAINING**

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Today's clean air requirements are more critical than ever. Air tools, blow driers, HVLP spray guns, and supplied air respirators may require more air volume and better air quality than needed in the past. Not only does clean air affect equipment performance, but it is also critical for paint coatings performance. Dan-Am Air, along with SATA filtration can solve all of these issues.

Dan-Am Air is lightweight, aircraft grade, powder coated aluminum, which provides clean, dry air up to 232 psi. The reinforced composite Nylon fittings have dual seals, which rest on un-scraped pipe, providing a leak free guarantee. Our Press-to-Connect fittings feature a full bore design for turbulence-free air delivery. This quick, instant connection eliminates the need to thread, solder or glue, accounting for far less installation times than traditional copper or black pipe.

We also stock a large array of threaded connectors and adapters, allowing Dan-Am Air to be integrated into existing systems without compromising performance, making DAA perfect for upgrade or expansion projects.

Designed with simplicity in mind, DAA allows you to do-it-yourself. Measure, cut,

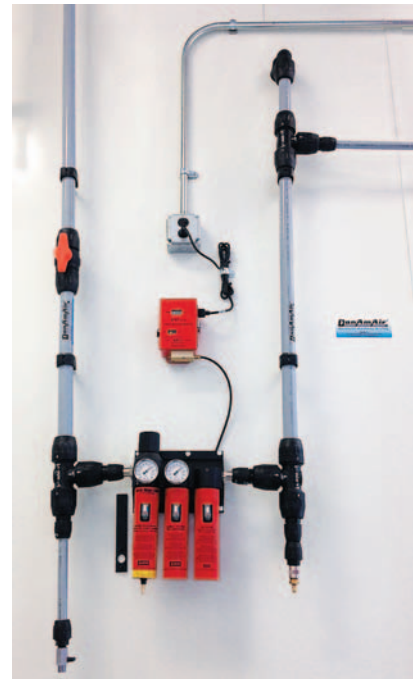
de-burr, then simply Press-to-Connect, equaling lower installation times and cost. All fittings arrive pre-torqued for immediate assembly and pressurization, as well as being interchangeable, allowing for ease of future addition or expansion. This "Press-to-Connect" subject tends to be the most misunderstood instructions in the DAA system. We have all been taught since we were young, to loosen a given item, put it together, then tighten it back up, right? That is wrong with Dan-Am Air. **DO NOT** loosen fitting caps before installation. It really is as simple as push the fitting onto the pipe until it bottoms out. Done. Stop. Move on. The only reason to loosen a fitting cap is to remove the fitting from the pipe. Loosening the cap relieves the pressure on the grip ring, allowing you to gently back out the pipe. To reuse any given fitting, simply re-torque the fitting cap to factory specs (line the arrows up, see figure 1), and "Press-to-Connect." As each cap is individual to its fitting, the arrows are either solid, or hollow respectively. Fitting caps are **NOT** interchangeable.

DAA also allows you to take your investment with you in the case of relocation, as all components are reusable.

Product design and support is readily available from Dan-Am Company. They also have all products on hand and ready to ship, as well as in-house support for quotes and general information.

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www.facebook.com/danamaluminumairline for recent install pics, comments, etc. Both of these have proven to be valuable resources for customers to understand exactly what can be accomplished with SATA and Dan-Am Air combined.



Watch our video to learn more about our easy-to-install system



BRAD GRAVENHOF has been in the automotive industry for over 30 years and serves as DanAm Company's Sales and Technical DanAm Air Specialist.

DanAmAir®



Identifix: Technician training for all-make repairs

Serving over 250,000 customers across North America, Identifix — now part of Solera — is one of the leading software providers to the automotive repair industry. It offers solutions that enable automotive technicians to repair vehicles faster and more accurately: Direct-Hit, Direct-Collision, and Virtual Tech. And provides software that helps shop owners better manage and grow their businesses, Direct-Shop.

Identifix has been in business since 1987 and has locations in Minnesota, California, Utah, and Nevada. Since its inception, Identifix's mission has been to help technicians and shop owners be more efficient and take on more business without sacrificing the quality of their work.

Direct-Hit: Unmatched mechanical repair information

Direct-Hit delivers the most OE and real-world auto repair data to technicians, it's the fastest way for a technician to find exactly what's wrong with a vehicle and how to fix it.

Through Direct-Hit, users have access to more information than any other auto repair software. It offers over 1,000,000 confirmed fixes and shortcut tests gathered from real-world technicians and genuine OEM repair information on over 98 percent of vehicles.

A technician using Direct-Hit can work on more cars in less time and improve the quality and accuracy of their work.

Key features of the Direct-Hit system include:

- 1,000,000 Master Technician Certified Real-World Fixes

- OE Service Manuals
- Remove/Replace Procedures
- Component Locations
- Colored Wiring Diagrams
- Diagnostic Trouble Codes (DTCs)
- Technical Service Bulletins (TSBs)
- Specs and Capacities
- Estimating Tools
- Labor Guides

Virtual Technician Service: Expert mechanical repair advice for the toughest jobs

When there isn't time to puzzle through a tough problem, the Virtual Technician Service has the answer. The Virtual Technician Service is a staff of over 45 OE factory-trained ASE Master, L1 Carline Specialists—ready to help solve the most difficult mechanical issues. The staff is organized into five carline teams, each specializes in a certain group of vehicles.

1. GM
2. Chrysler
3. Ford
4. European
5. Asian

The Identifix Virtual Technician Service, active since 1987, has taken over 4 million calls. No matter the issue, the Virtual Technician Service can help solve it.

Direct-Collision: OE collision repair procedures

Launching this summer, Identifix is now offering software to repair auto body damage. As with Direct-Hit, Direct-Collision will have full OE collision repair procedures for 98 percent of vehicles.

Key Information in Direct-Collision will include:

- Remove and Replace Procedures
- Dimensions and Specs
- Structural Repair Guides
- Vehicle Coatings
- Special Tools Information

Direct-Shop: Management tools for shops small and large

For smaller and mid-size shops, Identifix provides a cloud-based garage management software that can be set up and running within a week. It cuts out the time-consuming paper-based processes and offers a fast and easy way to create estimates, order parts, and invoice customers. It won't force shops to pay for features they won't use.

For larger businesses, Identifix offers Direct-Shop Elite, a premium shop management system designed to maximize productivity and profits. It gives owners and managers a robust set of tools to better run their business, improve vendor connectivity, and boost customer satisfaction. Designed for single or multi-location shops, Direct-Shop Elite offers superior management capabilities, comprehensive parts and labor guides, as well as centralized accounting and inventory management.

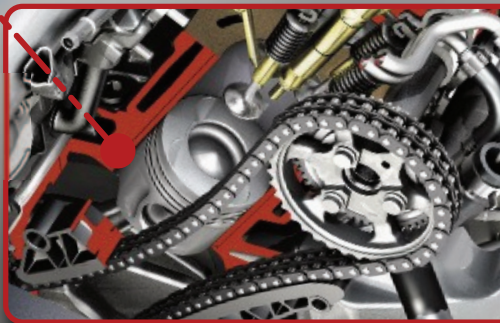
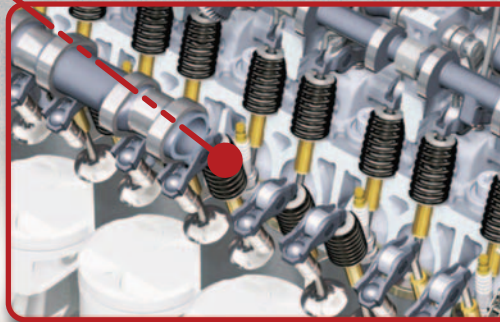
Identifix: A full suite of products for repair shops

Whether you are looking for technical information for mechanical and/or collision repairs or you are looking for tools to help manage and grow your business, Identifix has the solution for your shop.





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The Automotive Aftermarket Products Expo (AAPEX) represents the \$740 billion global automotive aftermarket industry. In 2017, AAPEX featured more than 2,500 exhibitors, 47,700 targeted buyers, and 40 AAPEXedu sessions. AAPEX 2018 will be held October 30 - November 1, 2018 at the Sands Expo in Las Vegas. Register today:

WWW.AAPEXSHOW.COM/REGISTER



SERPENTINE KIT

When it comes to the serpentine system, the right repair is the complete one. The Gates Complete Serpentine Kit contains all the parts you need in one box: belt, tensioner, and even the pulley. They're the parts that wear together, so we've packaged them together, easily sourced and ready for you to replace them together. Learn more at the below website.

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BATTERY COOLING FANS

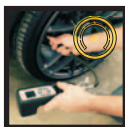
Continental is first to aftermarket with VDO Hybrid Battery Fans for popular hybrid vehicles including Ford C-Max and Fusion, Lexus EX and CT, Lincoln MKZ, and Toyota Avalon, Camry, Prius and Prius V. Formerly an OE dealer-only part, VDO Hybrid Battery Fans restore original battery cooling performance for increased mileage. They are exact replacements for the original fans, featuring identical mounting locations and plug-n-play electrical connections for quick and simple installation

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DEALING WITH TRANSMISSION CONCERNS

HARSH SHIFTS, LATE SHIFTS, EVEN NO SHIFTS — HOW DO YOU APPROACH CUSTOMER CONCERNS RELATED TO TRANSMISSION PERFORMANCE?

PETE MEIER // Technical Editor

Multi-speed automatic transmissions built over the last decade or so share much in common with the engines to which they are paired. Both have been engineered to work more efficiently and last longer than ever. And, just like their engine counterparts, many of the problems that may develop with today's 8-, 9-, or even 10-speed transmissions are related to the electronics that control them.

And that is where troubleshooting a transmission-related complaint gets cloudy. Many of the inputs used by the TCM (Transmission Control Module) are shared with the ECM (Engine Control Module). Many of the same foundational factors that can result in engine performance complaints can also lead to transmission performance complaints. And some drivability problems can mimic transmission problems — and vice versa! Is your customer's concern over shift quality really a fault

of the transmission?

Regardless of the concern, one basic truth remains. By following a logical diagnostic process, you can solve your customer's problem!

Learn what to do before you even start troubleshooting the concern, how to check transmission performance with your scan tool, and what you absolutely need to do after you've made any major changes in the transmission or its related systems. Watch this month's edition of The Trainer! **ZZ**



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