

Marathon Engineering Department

Part II, Electrical & Electronics: High-Tech Systems



The engineering department. Interviewed in this article: Mark Williams, far left; John Randleman, second from left; Dave Dolby, third from left; and Jay Graham, fourth from left.

by Sharleen Nelson

As examined in Part I in the winter issue of *The Maritime*, converting a Prevost bus shell into a luxurious, custom-designed Marathon coach is a complex process that requires systematic advanced planning. Building a coach is a concurrent process throughout: from the beginning when the electrical group generates electrical schematics, the mechanical group works on mechanical components in their “zones,” and the interior designers select fabrics, materials, and design elements; to installation and the actual building of the coach where all the groups converge. In Part II of this topic, we’ll focus primarily on the electrical and audio/video aspects of coach design.

The electrical side of the engineering department is responsible for overseeing the wide range of wiring options, as well as the audio/video components that go into every coach. The electrical engineers generate electrical schematics for the control and power wires. In his position as group leader and lead electri-

cal engineer, one of John Randleman’s primary responsibilities is to ensure that all coaches are built to National Building Code Standards. Currently, each show coach consists of 600 standard operational CAD drawings for 27 models of coaches. “We keep all the different models in our computer system and we build them up so we can take a certain floorplan and say this is going to be the base model that we’re starting with,” John said. For a custom-ordered coach, however, 30 or more additional drawings may be generated. “For a customer coach we produce an ‘unusual items’ list. This list could contain Internet access; it could encompass custom lighting applications, special shower lighting—anything that we don’t normally do,” he said.

With an abundance of systems that must all be integrated, things can get complex really fast. A few of the systems include: heating and air conditioning, information displays, interior and exterior lighting, appliances, audio/visual,

and the low voltage and shore input systems. The complexity and ingenuity of the shore input system alone is amazing, as it directs A/C power to the shore junction box, which distributes the power to the appliances and all other components while allowing the starting and running of the generator, all while the shore power is still on. "All these things have to be instilled in the drawings and in the established electrical building procedures that we have now," said John. "We work with Quality Assurance to ensure that they're built to the National Electric Code Standard, which is very important for both customer satisfaction and safety."

Electrical engineers are also responsible for creating a wire pulls flowchart that shows workers the color and thickness and where the wires go from the ceiling and throughout the coach to the underbelly. "The holes have to be prepped on the floor so the wires can be dropped down and serve functions in the underbelly such as the underbelly TV, water heater, water pumps, the sewer hose system, the shore junction, the generators, the batteries—the list goes on," said John. "There are probably 40 things down below that require holes in certain areas."

But that's just the tip of the iceberg. Pull the panels aside behind the walk-in closet in the back of each coach and you'll find a complex entity of blinking lights and functions, which is the TechLink command center, or heartbeat of the coach. TechLink is the industry's first true intelligent electrical system. With some 300 switches in the coach, its computerized "brain" lets coach owners control the electrical-based systems from any of the fixed or wired or remote controls throughout the coach. "The TechLink software has to have its logical points bound together so when you push a button, something happens," said John. Moreover, TechLink has reduced the amount of wires by half—from six miles of wire to about three. With TechLink, service technicians can also diagnose



John Randleman displays his invention: The Shore-J power control system.

and troubleshoot coach problems remotely and access the vast library of drawings that the engineering department has archived.

John has the distinction of being the electrical department's resident genius, and Marathon's best kept secret. In his 19 years with the company, he has conceived and designed a number of things, including the Shore-J, which allows all of the loads to operate on both sides—all 100 amps of demand factors to operate using 1 cord. He designed the use of a resistor and capacitor, which creates a pulse relay that's used in seven different places on the coach. Most recently, he designed an A/C climate-control system that works in tandem with TechLink. When the engineers designed a faux fireplace for coach #1152, John decided that if you're going to have a fireplace, you need the sound of a crackling fire to go with it. "I found a crackler. It's a device that sounds like a fire crackling. I put it in the fireplace and whenever you turned the fireplace on, it crackled," he said. "As it turned out, the crackler wasn't loud enough so I integrated it into the stereo system to amplify it." John says he doesn't lose any sleep at night thinking about inventions. They don't come to him in a dream, he usually comes up with his ingenious ideas during his commute. "I've had

With a push of a button, the Crestron control system closes the blinds, dims the lights, drops the TV down, and turns it on.



some of my best ideas while I'm driving," he said. "It's a 40-minute drive, so I use that time to think about things."

Like the mechanical department, most things are standard, but can change due to customer requests. For instance, if a customer wants to place something such as the microwave or a stacked washer/dryer on an alternate side, a completely different wiring structure is required. "A customer might want three rotating antennas on top, so the roof elements have to be scooted around to match where they can go," John said.

In the past, customers have requested bedrooms in the underbelly, which requires a separate thermostat-controlled environment with a free flow of air, and an individual heating system. Likewise, for a designer's choice coach, the interior designers might choose options that are not standard. Sometimes those options can create a new set of challenges for an electrical engineer to resolve. Lighting is a good example. Frequently, the electrical engineer must do things differently to accommodate a smaller, moving space. For instance, a pendant light over a table might have to be reinforced with tubing so it won't swing when the coach is in motion. A light in a residence may have plenty of room to expand and throw heat out, but in a coach it might be too large for a cabinet. "You have to come up with a design that allows that light to be installed by cutting holes in the ceiling to let it evaporate into the air conditioner and be cooled directly, yet still maintain a visually appealing look," said John.

Not only are the electrical engineers required to come up with creative solutions, they also have to continually ask the question, "what will be the effect of doing this?" "Every coach is a challenge because of all these little details," he said. "It's our job to make sure every item is installed correctly and safely."

Perhaps the biggest leap in terms of complex change in engineering has been in audio/video technology. Dave Dolby, electrical engineering's audio/video designer and lead Crestron programmer, designs the stereo and video systems, specifies the equipment, generates the AutoCAD drawings of that system, writes the audio/video wire pulls, and programs the automation system and the remotes to work with multiple systems. When Dave started with the company 11 years ago, a coach had only half a dozen cables going from the front of the coach to the back and a couple of TVs, a VCR, and the factory remote controls. "This has changed dramatically," said Dave. "It's not just one style of hookup anymore. Now we're dealing with multiple types of connections and multiple types of cables."

Just as we've seen our homes become propagated with a tangle of wires and cables for a sophisticated cache of DVDs, stereo surround-sound equipment, flat-panel TVs, iPods, battery chargers, wireless hubs, and computer workstations, so too have Marathon coaches. As little as 5 years ago, there were as many as 14 remote controls that customers had to navigate through. "We've seen a large increase in the number of people who use their coach not only for recreation, but also to conduct business out of," said Engineering Department Manager Jay Graham. "Technology—it's where the coaches have gone and continue to go. And now it's all about how to do it lighter and faster and have more options."

Thus in 2003, the company transitioned to the Crestron system. "The whole idea behind Crestron is that it has a central brain or processor that can be programmed to talk to multiple systems or devices such as TVs and DVD players," Dave said. "The overall brain process of making things turn on at a certain time and go to the proper inputs is done for the customer so they don't have to think about it. If the cus-



tomer wants to watch a DVD in the salon all they have to do is press two buttons on the control, salon and DVD, and everything that's supposed to happen, happens." Crestron also works in tandem with TechLink. With a push of a button, customers can display vital on-screen information about tank levels, generator power, and inverters. "The Crestron control is the Cadillac of systems. It's the gold standard of how you run an A/V system," said Project Manager Mark Williams. "But it also creates a much more complex package for all the programming and the additional pieces that are involved, so it takes more room, and all that gear has to be ventilated to work properly."

Moreover, throwing something custom into the mix requires even more wiring space. Examples of custom items have included the installation of a liquid crystal TV and speakers behind glass in the shower, which required a specific type of product designed to withstand steam. Customers have also requested that certain electronics brands and models be used, which often requires research and development to accomplish. "We have certain products that we like to use because we know they interface well," Dave said. "My job is to take all of the A/V components and all the various brands and models, and make all them work seamlessly as one unit. Every time we change a model, we usually have 16 hours of R&D integration time."

With technology in constant flux, Dave attends trade shows to stay on top of emerging electronics trends. "Some of our customers also find a way into some of these trade-only shows because they're interested in this stuff. And if they see something at a show, we can say that we saw it, too."

Two Marathon coaches that have been equipped with high-tech gear include NASCAR

legend Richard Petty's coach and Brian Greene Productions' HDMC-1 mobile production coach. Special race telemetry devices were installed in the Petty coach. The technology allows access to the NASCAR scoring system, a board in the pit area that the crew chiefs work from. The Pettys are able to view stats on their TV screen about how many laps have been run, how fast drivers are running, and what position they're in. Brian Greene had Marathon custom design its HDMC-1, a mobile, high-definition production vehicle that features a complete editing suite with a 56-channel audio mixer to provide mobile post-production capability for everything from rock concerts to television series. "We worked in conjunction with them to put the system together," Dave said. "Most of those kinds of projects are built on a semi-truck platform, but what they were looking for was a niche that they could go into smaller venues to broadcast in HDTV and not have to bring a truck and trailer in." Dave said he envisions Marathon building even more "high-tech" coaches in the future. "I've advocated doing something like a sports-related coach, kind of like the ESPN zone; coaches that have multiple screens for sporting events or tailgating," he said.

Technology is constant and unpredictable, but like everyone in Marathon's engineering department, both John and Dave have not only adapted to change, but embraced it. "We're always looking for smaller, lighter, better quality, and ease of integration," said Dave, "but if customers request something new, we're going to do what it takes to get it there for them."

If you'd like to learn more about Marathon's engineering department, or see how a coach is made, Marathon's Coburg, Oregon facility offers factory tours Monday through Friday beginning at 11:30 a.m. •