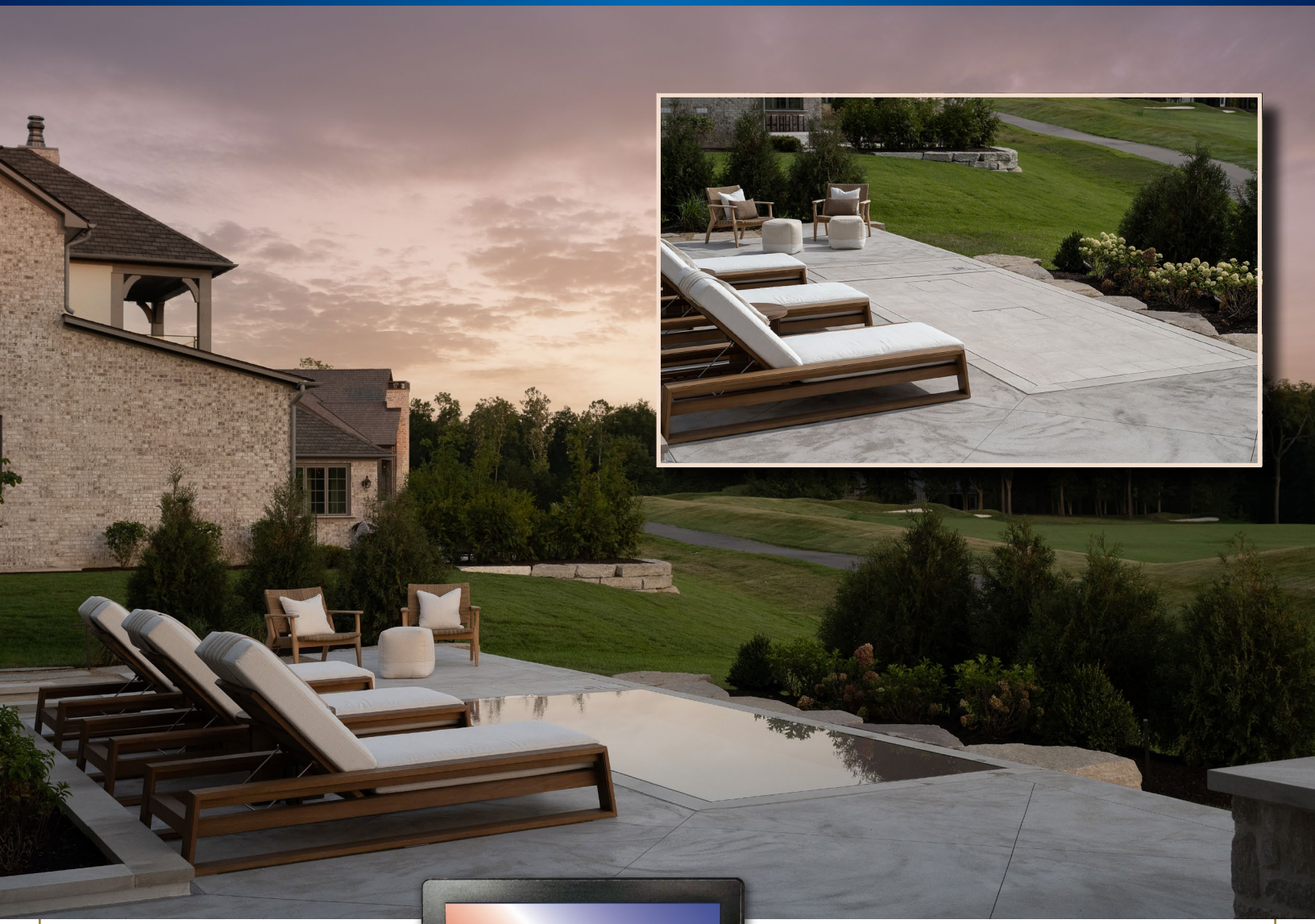


TRESSS and
Horner Automation's X10 & OCS-I/O

HORNER AUTOMATION GROUP

TRESSS™ AQUATECTURAL DESIGNS

A Workhorse that had to Look Like a Race Horse.

TRESSS Aquatectural Designs, Indianapolis, Indiana

BACKGROUND / HISTORY

TRESSS Aquatectural Designs is the U.S. designer and manufacturer of Movable Pool Floors and Smart Plunge Pools — architectural systems that transform a luxury pool into a structural patio at the touch of a button. Founded by Andrew Heard, a 25-year veteran of IndyCar, Indy 500, Formula 1, and NASCAR engineering, and led by Cecilia Alvarez-Heard as President, TRESSS installations now appear in homes and estates from Indianapolis to Aspen, New Jersey to Florida.

Behind every TRESSS installation is a control problem that does not fit cleanly into any single category in the controls industry. It is part motion control, part functional safety, part process automation, and part luxury HMI — and the customer experience demands that all four converge into a single 10-inch touchscreen that looks like it belongs on the patio of an Aspen retreat, not the wall of a wastewater plant.

TRESSS came to Horner Automation with that challenge. Horner agreed to take it on and modified specific aspects of the platform to meet the architectural fit-and-finish standard the application demanded, and delivered a control solution that hit the engineering target without forcing TRESSS into a one-off custom controller program. The result is a system that is genuinely industrial under the hood and genuinely luxurious on the surface — and one that did not break the bank.

HISTORY / CHALLENGE

"Industrial equipment can't be beautiful and functional."

That sentence — spoken often, taken for granted, but almost never examined — is a common misconception that every industrial controls company has been working against for half a century. Controls live in mechanical rooms. Operator interfaces are gray boxes with green buttons. Anywhere the equipment ends up visible to a homeowner, it gets boxed in, cabineted, hidden behind a louvered door or apologized for.

TRESSS Aquatectural Designs walked into Horner Automation with a different proposition. They were building a luxury, residential, ASTM-certified, year-round, motion-controlled, chemically-managed body of water that disappears under a structural deck at the touch of a button. They needed industrial-grade controls behind it...but the controller could not look industrial.

Luxury residential design and industrial-grade control are not opposites. With the right partner, the right architecture, and the willingness to modify the things that need modifying, the workhorse and the race horse are the same animal.

24V - Electric Drive System

ASTM - Certified Safety

R-30 - Thermal Envelope

SOLUTION

From the outside, a TRESSS installation looks like architecture. The patio sits flush. The water sits below. A single touch on the wall-mounted screen converts one into the other. From a control engineering point of view, that single button hides four very different problem domains, each of which would normally justify its own dedicated controller in a conventional industrial architecture.

In a conventional plant, four problem domains is four control panels and four trade specialists. In a luxury residential context, four control panels is impossible. The customer never sees a panel. They see a screen on the wall and a deck that becomes a pool. Every part of the process above has to live inside that single device.

Industrial controls and luxury residential design pull in opposite directions on almost every dimension. Industrial wants serviceable; luxury wants invisible. Industrial wants vented enclosures and standard mounting hardware; luxury wants flush installation and a continuous architectural surface. Industrial wants generous bezels and large, gloved-finger-friendly buttons; luxury wants edge-to-edge glass and a graphical UI that respects the home's interior design palette.

TRESSS refused to compromise on reliability or safety. The control system had to come from the industrial side — because of ASTM, because of motion safety, because of the duty cycle, because the cost of a failure on a moving structural floor with people on it is unacceptable. And the industrial controller had to be modified, on the cosmetic and integration axes, to meet the architectural standard. The conclusion was: keep the workhorse, change what it looks like.

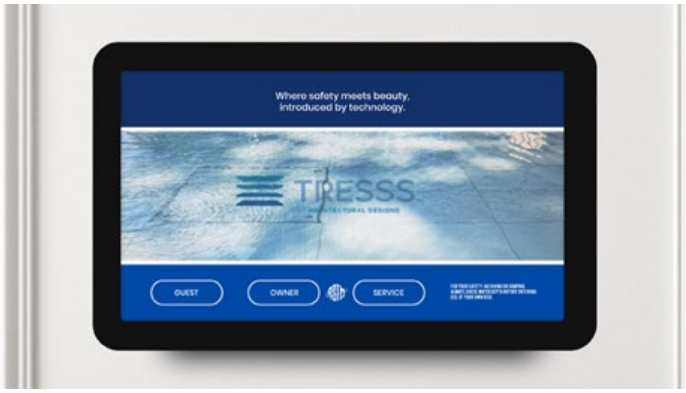
Cover Level	Coordinated multi-winch motion lowers the floating floor to a selectable depth, anywhere from deck-flush to full pool. Position must be precise, repeatable, and synchronized across multiple lift points so the deck stays planar. Pneumatic seals engage on arrival to lock the floor in place.
Safety	ASTM-certified safety logic governs every motion. Presence sensing, soft-stop, anti-pinch, e-stop, and verified-state interlocks must execute deterministically and survive component failure. Safety is not a layer on top of motion; it is interwoven with it.
Filtration	Pump cycling, flow monitoring, backwash sequencing, and skimmer management run continuously in the background. The filtration controller must coordinate with floor position — some operations are valid only at certain floor depths, and the system must enforce those interlocks without pestering the homeowner.
Chemical	Sanitizer dosing, pH balancing, ORP monitoring, and temperature control hold water chemistry inside a tight band that residential users will never tolerate seeing as alarms. The chemistry loop runs slow and quietly, with audit trails for service technicians.

ONE DEVICE - FOUR DOMAINS - ONE PROGRAMMING ENVIRONMENT

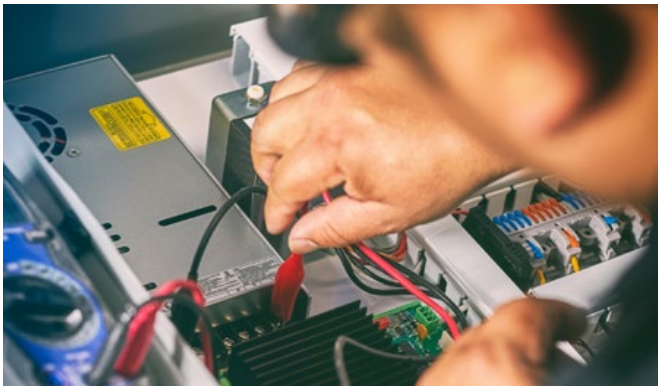
TRESSS came to Horner APG for their OCS family of controllers — the company's integrated PLC-plus-HMI all-in-one platform — collapses the four-controller problem into a one-controller problem. The single Horner X10 OCS unit carries the PLC logic, the motion sequencing, the safety interlocks, the analog process loops for chemistry and temperature, and the operator-facing touchscreen, all programmed in a single unified environment. OCS-I/O was also added to strategically expand the built-in I/O capabilities of the X10.

The architectural significance of that consolidation is easy to underestimate. In a conventional build, the wall-mounted touch-screen is a separate device talking to the PLC over a network protocol, with its own development tool, its own firmware lifecycle, and its own security vulnerabilities. In the Horner model, the touchscreen is integrated into the PLC. There is no network seam, no protocol gateway, no second engineering tool. Cscape — Horner's programming environment — is one tool for the ladder logic, the screen designer, the alarm system, the recipe handler, and the cloud connectivity.

For a small, focused engineering team like the one TRESSS built around Mr. Heard's motorsport methodology, a single-tool, single-device architecture is the difference between a project that has success and a project that becomes a multi-vendor integration nightmare. TRESSS did not have to commission a custom controller program; instead, they leveraged Horner's platform with targeted modifications.



Horner's X10A All-in-One OCS



HORNER CUSTOMIZATION

An off-the-shelf industrial controller, even a well-designed one, is not built to live on the wall of a luxury patio. Achieving the TRESSS fit-and-finish standard required Horner to modify specific aspects of the X10 OCS. The team approached this not as a custom one-off but as a set of targeted adaptations to an existing production product. Modifications fell into four categories:

Mechanical and Cosmetic Integration

The controller had to mount flush, with a continuous bezel-to-wall transition that reads as architectural rather than industrial. Horner adapted the mounting profile and finish to support the recessed, edge-aligned installation that TRESSS' architectural details required. The unit ships looking like a piece of the wall, not a piece of equipment.

Display Optics for Indoor/Outdoor Service

A 10-inch touchscreen visible to a homeowner in direct sunlight at midday, and to a designer reviewing the system at dusk, has to perform across a wide luminance range. The display package was tuned for the indoor/outdoor duty cycle that TRESSS installations see, including ambient temperature swings well outside the comfort range of consumer-grade tablets.

HMI Styling Capability

TRESSS' brand identity — deep navy, teal accent, high-contrast typography, generous whitespace, no clutter — needed to be conveyed inside the controller's native screen designer. The team worked through the styling capabilities of the X10A HMI to ensure custom imagery, typography, and color treatment would render at the architectural standard, not the industrial-default standard.

Safety, Motion, and Process Blending Together

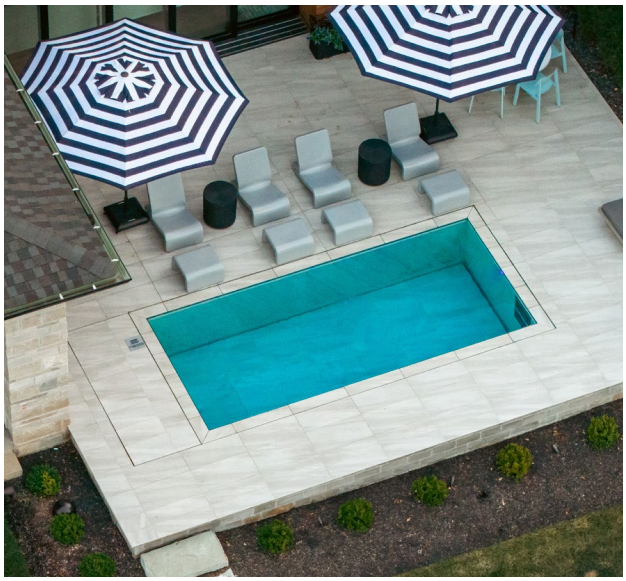
Combining ASTM-certified safety logic, multi-axis winch coordination for the moving floor, and the slow analog loops of pool chemistry, all inside one device, required deliberately structured programming. Horner's contribution here was less about hard-ware modification and more about confirming the X10's ability to carry the full application envelope, and then supporting TRESSS' engineering team in laying it out cleanly. The mechanical heritage Mr. Heard brought from motorsports — disciplined sequencing, deterministic timing, designed-in failure modes — all mapped onto Horner's controller in a way that felt native.

WHAT THE HOMEOWNER SEES ~ AND WHAT THEY DON'T SEE

The customer-facing object is a 10-inch indoor/outdoor built-in touchscreen, set flush into the wall of the home, that controls everything: the depth of the pool floor, the chemistry, the temperature, the lighting, the filtration cycles, and the safety state of the system. A single touch raises the floor and the patio reappears. A different touch lowers it and the pool returns. Nothing on the screen suggests that, three layers down, ASTM-certified safety logic is supervising every millimeter of motion and a chemistry loop is holding the water inside a tight pH and ORP band on a slow controller cycle.

Three things are simultaneously true about the resulting system...
It is genuinely industrial - not residential-grade gear styled to look serious. The same class of controller carrying motion, safety, and process for the TRESSS installation also runs in factories, water treatment plants, packaging lines, and energy systems around the world. The reliability, the safety certification, the duty cycle, and the lifetime expectations are industrial.
It is genuinely beautiful - not industrial gear disguised behind a cabinet door. The wall-mounted control surface is a piece of the architecture - the graphics are designed and the bezel disappears. A guest who has never seen a TRESSS installation before walks across the deck without realizing there is a pool underneath, and uses the screen without realizing they are operating an industrial controller.
It did not break the budget - The X10 controller is an existing platform with targeted modifications, not a custom build. The development environment is Horner's standard tool. The lifecycle support is Horner's standard support. TRESSS carries no orphaned firmware, no in-house controller program, no single-source dependency on a custom integrator. Every project ships on the same controlled platform, which means manufacturing, service, and field support all scale linearly with installations.

You don't have to choose between the workhorse and the race horse. You find a partner willing to do the modifications that your application requires, on a platform that already carries the engineering load and utilizes one programming environment. That is what TRESSS found at Horner Automation. That is what made the TRESSS control system possible at the price point that lets the company keep growing across the country.



TESTIMONIAL

"We value our relationship with Horner Automation very much. Their products are top notch, and the support, both via the extensive library of on-line webinars and directly from their employees is second to none. We have particularly enjoyed working with the Horner Solutions Engineers to push the envelope of what their PLC can achieve in our application and are thrilled with the end result.

We recommend Horner to all and are excited to continue to grow our business with their support."

~ Andrew Heard, TRESSS Aquatectural Designs, Indianapolis, IN

TRESSS™
AQUATECTURAL DESIGNS