

A Systematic Approach to an Avionics Upgrade

Part 2 – Before, During, and After Installation

By Kevin Crozier

Part 1 of this series appeared in the October 2025 ABS Magazine.

Once you've defined your goals and selected the right avionics for your Bonanza or Baron, the next step is turning that plan into a successful installation. This stage is where many projects stumble—not because of bad equipment, but because important details get overlooked before, during, or after the work. A systematic approach can help ensure that the final product meets your expectations and functions reliably from the outset.

Preparing before the drop-off

Panel layout is one of the most personal and impactful parts of an avionics upgrade, and it's not something to leave entirely in the hands of the shop. Only you know how you fly—where your hand naturally falls for the autopilot controls, where your eyes look for gear lights, or which side of the panel you prefer for USB power. That's why it pays to be directly involved in the design. You can sketch your own ideas or work with a panel fabricator such as Superior Aircraft Components (superioraircraftcomponents.com) to bring your vision to life, then refine it in collaboration with your installer.

As you work through this process, think beyond the “big boxes.” Small details, such as the location of tip tank transfer switches, flap position indicators, annunciator lights, headset jacks, LEMO plugs [push-pull connectors], and gear repeater lights, can make the difference between a design that feels natural and one that frustrates you on every flight. Plan on several iterations, keeping what works and adjusting what doesn't.

Placards deserve just as much attention. Every airplane requires a specific set of placards on the panel—propeller RPM restrictions, cargo door limits, and airspeed limitations are common examples. If you don't plan for them, the shop may have no choice but to apply adhesive stickers across your freshly finished panel. A little foresight ensures they're cleanly integrated into the design from the start.

Once you have settled on a panel design and you have an installation date, document your expectations for the installer. A

simple spreadsheet or Word document can prevent misunderstandings later. Clearly note if you would like old wiring removed, new coax installed, or if you have a preferred location for antennas. The more detailed you are, the smoother the process will be—and the closer the final panel will match your vision.

At drop-off

When the time comes to drop off the airplane, arrive prepared. Bring your current POH along with any applicable STC and AFMS [*Airplane Flight Manual* Supplements] documents so that engine and flight instrument markings can be set correctly. Provide your most recent weight and balance, as well as your current equipment list—these will need to be updated once the work is complete. If you have STCs that supersede the factory limitations, such as a Tornado Alley Turbo system that alters manifold pressure or fuel flow limits, ensure your installer is aware of them. A few minutes spent sharing this information up front helps ensure the finished configuration reflects the specific requirements of your airplane.

During the installation

Once work is underway, don't disappear. Periodic visits to the shop are important—not to micromanage, but to stay engaged. Checking in every week or two allows you to see progress, ask questions, and catch small issues before they become large, expensive problems. Even something as simple as a misplaced switch or overlooked indicator is far easier to correct during installation than after the airplane is closed up.

While the shop is working on your airplane, it's also the perfect time to prepare yourself. Start by reading the manuals for your new avionics and systems so the terminology and logic feel familiar. Download iPad simulators from the avionics manufacturer and practice entering flight plans to become familiar with the various controls and user interface. Supplement this with online content—there are excellent manufacturer-produced videos as well as YouTube demonstrations from other aircraft owners. If you want to go further, consider a structured training course. Garmin, for instance, offers both online and in-person instruction tailored to its avionics systems.

Completing this training now ensures that by the time your airplane is ready for pick-up, you'll already know how to navigate

menus, set up core functions, and avoid being overwhelmed by your new panel. This investment in your own preparation is every bit as important as the shop's work—it's what ensures you can take full advantage of your upgrade from the very first flight.

Pick-up and first flights

Pick-up day is always exciting, but it's also one of the easiest times to miss details. The thrill of seeing a brand-new panel often overshadows the small but important checks that protect you from headaches later. If you're not experienced with the equipment, bring along someone who is—an instructor, a fellow ABS member, or another trusted pilot who has gone through a similar upgrade.

Start with the basics before you even think about flying. Confirm that the installer has provided:

- All pilot guides and supplements
- AFMS documents, and confirm they are in the POH
- Updated weight and balance and equipment list
- Logbook entries
- Updated Pitot-Static and Transponder checks (if required)
- Form 337s and applicable STCs

With the airplane on a GPU [ground power unit], power up the panel and run a thorough ground check. Verify that software versions are current, database subscriptions are loaded, and that airspeed and engine gauge markings match your POH and AFMSs. Connect your iPad or tablet to confirm flight plan transfers, as well as traffic and weather display functions. Any discrepancies should be addressed immediately—don't accept "we'll fix it later." It's much easier to correct problems before the test flight than after.

When it's time to fly, remember that your first sortie is a test flight, not a transportation mission. Thoroughly preflight the aircraft to ensure that all of the inspection panels are reinstalled, wiring is secured, and the controls are free and correct. Bring a second pilot so one person can concentrate on flying the airplane while the other evaluates the avionics. Approach the flight with a written plan and methodically test each system:

- **Flight display:** Airspeed, attitude, altitude, CDI switching, weather and traffic display, and annunciations from the GPS and autopilot
- **GPS:** Flight plans, weather and traffic display, CDI auto-switching, VNAV guidance, and approaches
- **Autopilot:** All modes including GPS, VOR, ILS, TO/GA, ESP, and Smart Glide; confirm proper engagement and disconnect behavior
- **Traffic and weather:** Verify ADS-B and Sirius/XM data flow to all expected displays
- **Audio panel:** Intercom positions, communication radios, navigation radios, all PTTs, and cabin speaker functions
- **Engine instruments:** Fuel flow, fuel quantity, and temperature readings that make sense and align with your experience

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Keep a running squawk list during the flight, then sit down with the installer afterward to resolve issues. Expect that you'll find a few additional quirks after a week or two of flying—nearly every avionics project requires at least one follow-up visit for final adjustments and software tweaks. That's a normal part of the process, not a sign that something went wrong.

Learning the new airplane

Even with the installation complete and the first flights behind you, the real learning process has just begun. Modern avionics suites are deep, layered systems, and Bonanzas and Barons are particularly well-suited to using their full capabilities—but only if the pilot is trained to match. In many ways it's a new airplane. The best investment you can make after an upgrade is structured time with a CFI who knows the equipment well.

Approach training in deliberate steps. Start with understanding the foundations:

- **PFD/MFD basics**—flight director, autopilot bugs, HSI functionality, and failure modes
 - **Engine monitoring**—interpreting fuel flows, CHTs, EGTs, and alerts
 - **Basic navigation**—direct-to, simple flight plans, and CDI switching
- Once you're comfortable, expand into:
- Using the MFD functionality to look up airport weather and load frequencies
 - Loading and flying GPS procedures (i.e.: when to push the APPR button, and what it does)
 - Understanding advanced autopilot modes like IAS and VNAV and how to use them effectively

The temptation to “try everything” in one flight is strong, but it's a recipe for overload. Take small bites and give yourself time to practice until each step becomes second nature.

And remember: the airplane always comes first. If something doesn't look right, disconnect the autopilot and fly the airplane. The cockpit is no place to troubleshoot an unfamiliar function when you're 500 feet off the ground and pointing nose down.



Conclusion

A panel upgrade doesn't end when the shop closes up the airplane or when the first test flight goes smoothly. It's an ongoing process of preparation, verification, and education. By staying engaged before drop-off, being methodical at pick-up, and committing to training afterward, you'll set yourself up for success and maximize the benefits from your investment.

To assist with the avionics upgrade process, Garmin has developed an aircraft delivery checklist that addresses many of the topics discussed in this article. It can be found on the web here: https://static.garmin.com/pumac/190-03194-00_02.pdf.

While this checklist is focused on Garmin avionics, it can still be used and tailored to your specific avionics upgrade project, even if you installed Aspen, Avidyne, or STEC systems.

In Part 3, we'll take this journey a step further by exploring the real-world challenges that surface only after flying with new equipment, including misconfigurations, hidden integration quirks, and lessons learned from other ABS members who have gone through the upgrade process.



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