

You are not expected to be a Garmin systems engineer for this exam. You *are* expected to know the layout, what each screen shows, where the engine indications live, and — the part the examiner really wants — how the autopilot behaves and which failures knock it out. Keep it at that level and this chapter is straightforward.

6.1 The integrated glass cockpit

The DA-42 NG is built around an integrated avionics suite: a Primary Flight Display (PFD), a Multi-Function Display (MFD), an audio panel, an Attitude and Heading Reference System (AHRS) and an Air Data Computer (ADC), all sharing information. Inside it are dual GPS receivers, dual VOR/ILS receivers, dual VHF communication radios and a transponder — full redundancy in the navigation and communication kit.

The PFD — your flying picture

The PFD in front of you presents airspeed, attitude, altitude and heading in the familiar tape-and-ball layout. Slip is shown as a trapezoid under the bank pointer, turn rate on the scale above the compass, and short magenta "trend" lines predict where speed and altitude are heading. Crucially, the PFD also carries the crew-alerting messages. If the displays misbehave, pressing DISPLAY BACKUP puts the PFD into a composite "reversionary" mode that keeps attitude and alerting alive.

The MFD — everything else

The MFD carries the engine instruments, the moving map, terrain, traffic and the flight plan — and it also holds the autopilot controls. When an engine parameter leaves its normal band, its readout turns yellow for caution and red-and-flashing for warning, so the engine display doubles as an alerting system.

AHRS, ADC and the standby

The AHRS blends GPS, rate sensors, air data and magnetic variation to produce attitude and heading; it will align while taxiing but aligns faster if you keep the wings level. The ADC supplies airspeed, altitude, vertical speed and air temperature. Behind both sits an independent standby attitude module showing attitude, altitude, airspeed and slip — powered by its own emergency

battery for at least **1.5 hours** in a total electrical failure. That is your last-ditch instrument, and it owes nothing to the glass panel.

6.2 The GFC 700 autopilot

The autopilot and flight director is the GFC 700 — a three-axis system (pitch, roll and yaw damper) with a flight director. Its lateral and vertical modes are the ones to know:

Type	Modes
Lateral	HDG (heading), NAV/GPS (course tracking), APR (approach), plus a basic roll mode
Vertical	ALT (altitude hold), VS (vertical speed), FLC (flight level change / airspeed hold), plus go-around
Third axis	YD (yaw damper)

On the display, **green** means a mode is active and **white** means it is armed. The autopilot and manual electric trim will not engage until a preflight self-test completes after power-up, so never rush that test on start.

6.3 Autopilot disconnects — the exam's favourite

The autopilot will **automatically** disconnect on any of: electrical power failure, an internal autopilot fault, an AHRS malfunction, or loss of air-data information. You can disconnect it **manually** in several ways: the red AP DISC button on the control stick, moving the manual electric trim switch, the AP button on the mode controller, the go-around button on the power lever, pulling the AUTOPILOT breaker, or switching off the AVIONICS MASTER or ELECT. MASTER.

HOW G1000 FAILURES AFFECT THE AUTOPILOT

- Lose the **AHRS** → autopilot disconnects (no attitude reference to fly by).
- Lose the **PFD** → autopilot disconnects.
- Lose the **ADC** (air data) → autopilot disconnects; the flight director stays available except for the air-data modes (ALT, VS, FLC).

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- Lose the **MFD** → the autopilot keeps flying with reduced function, but once it disconnects you cannot re-engage it.

The pattern to remember: anything that removes the autopilot's *attitude or air-data source* drops the autopilot; losing the MFD only limits it.

REMEMBER FOR THE EXAM

PFD flies, MFD holds engine + map + autopilot controls · standby attitude module runs 1.5 h on its own battery · GFC 700 is 3-axis · green = active, white = armed · autopilot auto-disconnects on electrical failure, internal fault, AHRS loss or air-data loss.

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