



# Bonanza Panel Upgrade

San Diego  
Flying Club



Ken Campbell 8/22/2022



# Panel Avionics

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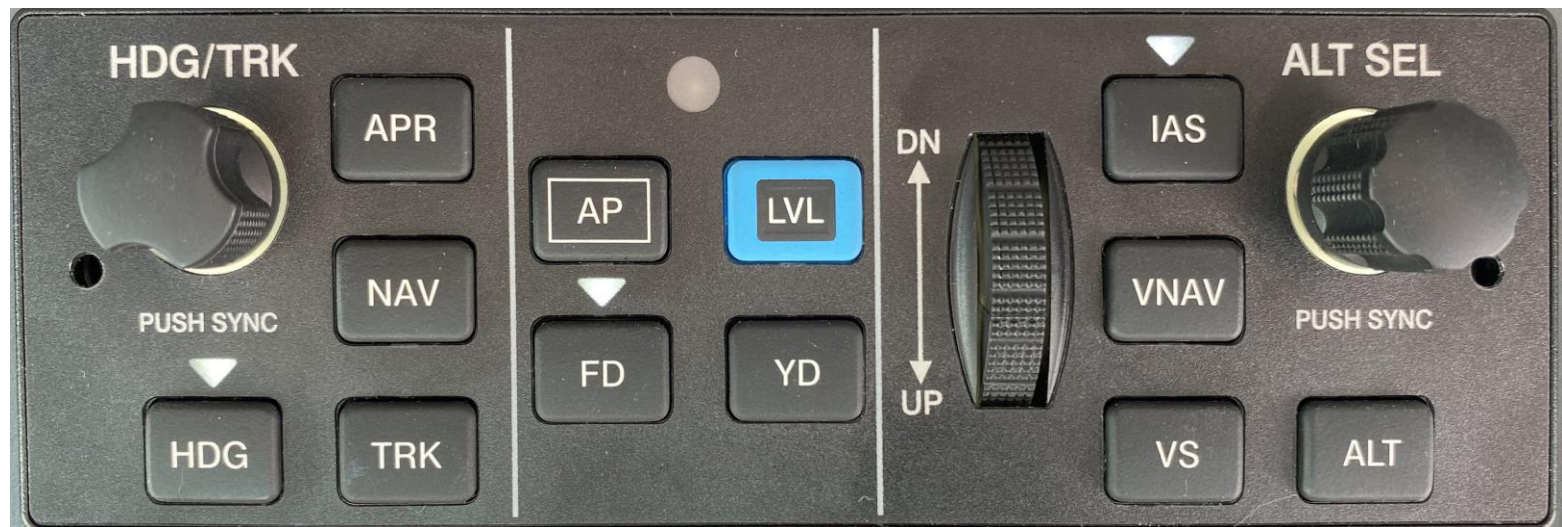
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- **Multifunction Backup – GI 275**
- **Primary Flight Display – G500 TXi**
- **Autopilot – GFC 500**
- **Navigator/Comms - GTN 750Xi**
- **Comm/Nav #2 – GNC 255**
- **Engine Information System – TXi EIS**
- **Transponder – GTX 345**



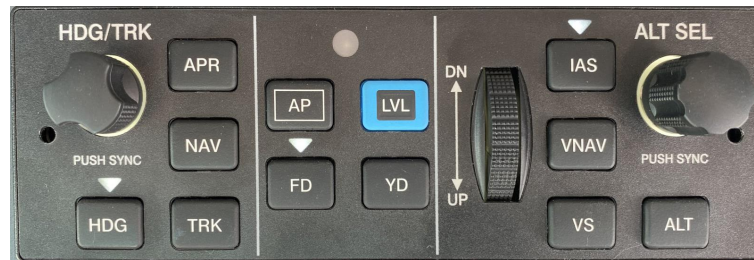
# GFC 500 Autopilot Control Head

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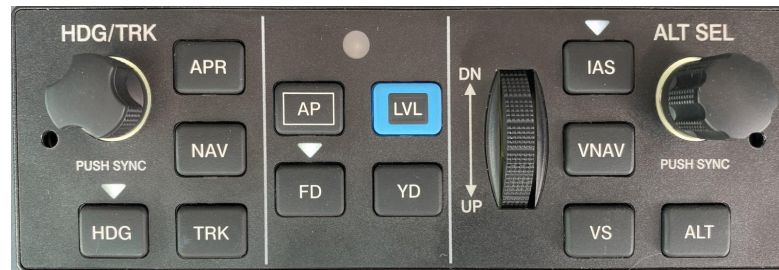


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- **Lateral control on the left**
  - HDG, TRK, NAV, APR
    - For NAV, think GPSS
  - Dedicated HDG/TRK knob, push to sync to current heading
- **Vertical control on the right**
  - IAS, VNAV, VS, ALT
  - Dedicated ALT SEL knob, push to sync to current altitude
  - Thumb wheel (aka vertical mode wheel) to adjust: IAS ( $\pm 1$  kt), VS  $\pm 100$  ft/min, ALT ( $\pm 10$  ft), or pitch ( $\pm 1/2$  degree)
    - Think of it as a trim wheel
- **Control section in the center**
  - AP, FD, LVL (sorry, no YD)
  - Pressing the Blue LVL button will immediately activate the autopilot and put the aircraft in straight and level flight





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- All buttons are toggle... press to toggle function on, press again to toggle function off
- White indicator triangles announce ABOVE buttons
- Default or reversionary modes
  - These default modes do not show on the autopilot control head, but do show on the PFD
    - Roll mode for lateral control (ROL shows on the PFD)
    - Pitch mode for vertical control (PIT shows on the PFD)
  - When making any changes to the autopilot, **ALWAYS** cross check and verify on the PFD
- To kill the autopilot...
  - Press the kill button on the yolk
    - Press it again to stop the beeping
  - Run the trim buttons on the yolk
  - Press the AP button on the control head

- **HDG mode, AP active, IAS 120 kts... all in green, which means all active**
- **ALTS (Altitude Target Select) in white, which means standby mode**
- **ALT SEL has been set to 4,000 ft, so aircraft will level off at 4,000 ft**



# Autopilot Status Bar on PFD

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- ROL mode, PIT mod, both in green, which means both active
- FD will be only diamond illuminated on autopilot control head
  - Note no FD on status bar
- ALTS (Altitude Target Select) is in white, which means standby mode
- ALT SEL has been set to 3,000 ft





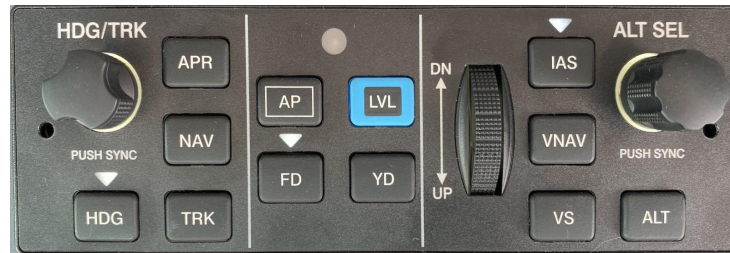
# Autopilot Status Bar on PFD

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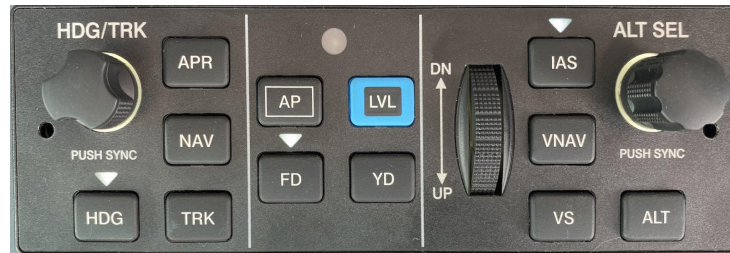
- Pilot has pressed the Blue LVL button on the autopilot, so the aircraft immediately goes to straight and level flight
- Blue LVL button works irregardless of any previous autopilot mode or condition





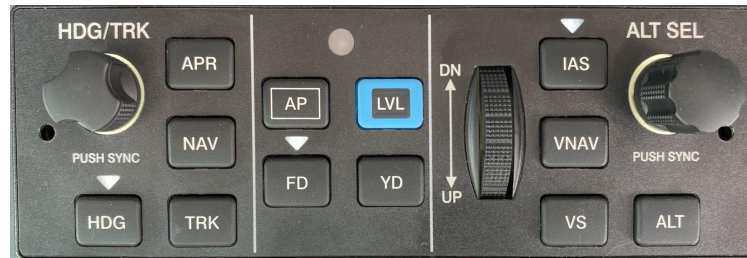
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- So you're happily hand-flying along and you want George to take over on the present heading and altitude...
  - Press the HDG/TRK button to sync to your current heading
    - HDG/TRK diamond illuminates
    - FD diamond illuminates
    - FD command bars now appear on the PFD
  - Press the ALT SEL button to sync to your current altitude
    - ALT diamond illuminates
  - Press AP... this is the ONLY way to activate the autopilot
  - Verify that HDG, AP, and ALT all indicate in green on the PFD autopilot status bar
- George is now flying the plane



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- **You're on the autopilot at 8,000 ft flying your flight plan, and ATC says 'descend and maintain 6,000'...**
  - **Set the ALT SEL knob to 6,000 ft**
  - **Set desired VS value using the thumbwheel**
  - **Press VS**
    - **VS diamond illuminates**
  - **Verify that NAV, AP, and VS all indicate in green on the PFD autopilot status bar, and that ALTS is in white, on the PFD autopilot status bar**
  - **Approaching 6,000 ft...**
    - **VS diamond will extinguish**
    - **ALT diamond will illuminate**
    - **Aircraft will level off at 6,000 ft**
  - **Verify you're at 6,000 ft and that NAV, AP, and ALT all indicate in green on the PFD autopilot status bar**



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- **ATC has you on a heading and says 'intercept V186, resume own nav'...**
  - **Press the NAV button**
    - **HDG diamond will remain on**
    - **NAV diamond will also light on the control head**
  - **On PFD note that the autopilot status bar indicates...**
    - **HDG in green, indicating it is the active mode**
    - **NAV in white, indicating it is in the standby mode**
  - **When the CDI on the PFD starts to center...**
    - **HDG diamond will extinguish on control head**
    - **NAV annunciation on PFD will change from white to green**
    - **Aircraft will turn and track V186**
  - **Verify that NAV, AP, and ALT all indicate in green on the PFD autopilot status bar**



# Miscellaneous Notes

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- **Miscellaneous notes**
    - Use IAS mode for climb, VS mode for descent
    - If you're in a climb or descent, and ATC tells you to level off, just press ALT twice. Autopilot will capture the current altitude.
    - Autopilot will adjust to a new BARO
    - Not legal to activate the autopilot below 800 ft AGL.
      - But OK to use on approaches down to 200 ft AGL.
    - Operational description of the GFC 500 can be found in the GI 275 Pilot's Guide, and POH supplement
  - **For next time... Autopilot Part 2**
    - Flying approaches using the autopilot
    - The TOGA button
    - VNAV operation
    - More lessons-learned that we're still discovering





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**Back up Slides**

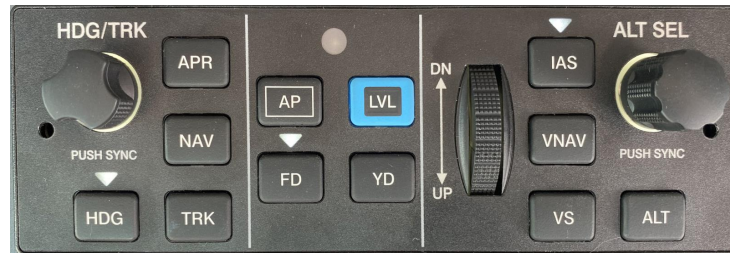


# Flight Director Activation

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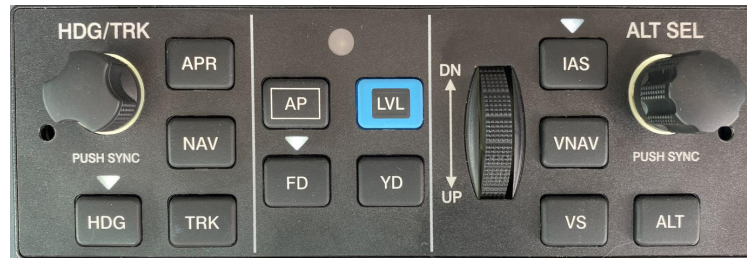
**Table 3-4 Flight Director Activation (GMC 507)**

Control Pressed	Modes Selected			
	Lateral		Vertical	
<b>FD</b> Key	Roll Hold (default)	ROL	Pitch Hold (default)	PIT
<b>AP</b> Key	Roll Hold (default)	ROL	Pitch Hold (default)	PIT
<b>GA</b> Button	Takeoff (on-ground) Go Around (in-air)	TO GA	Takeoff (on-ground) Go Around (in-air)	TO GA
<b>ALT</b> Key	Roll Hold (default)	ROL	Altitude Hold	ALT
<b>VS</b> Key	Roll Hold (default)	ROL	Vertical Speed	VS
<b>VNAV</b> Key	Roll Hold (default)	ROL	Vertical Navigation*	VNAV
<b>IAS</b> Key	Roll Hold (default)	ROL	Indicated Airspeed	IAS
<b>APR</b> Key	Approach**	GPS/VOR/ LOC/ILS	Pitch Hold (default)	PIT
<b>NAV</b> Key	Navigation**	GPS/VOR/ LOC	Pitch Hold (default)	PIT
<b>HDG</b> Key	Heading Select	HDG	Pitch Hold (default)	PIT
<b>TRK</b> Key	Track Select	TRK	Pitch Hold (default)	PIT
<b>LVL</b> Key	Level Hold	LVL	Level Hold	LVL



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- If you simply press the FD button while flying along, then...
  - FD command bars will come up and capture the current ROL and PIT conditions (remember, these are the default modes)
    - If roll is less than 6 degrees, FD will go wings level
    - If roll is greater than 6 degrees, FD will hold that bank
    - PIT can be adjusted by thumb wheel ( $\pm 1/2$  degree/click)
  - ROL and PIT will annunciate in green on the PFD
  - Remember we only turned on the FD. If we want the autopilot to fly the plane, need to press AP... this is the ONLY way to activate the autopilot.



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- **Departure scenario from MYF...**
  - **At the run up, press HDG and set the HDG/TRK knob to 281 degrees (reads on PFD). That will bring up the FD command bars.**
  - **Adjust the thumb wheel to indicate plus 7 degrees PIT on the attitude indicator.**
  - **Set the desired climb out altitude, eg 6,500 ft**
  - **The PFD will annunciate HDG and PIT in green**
  - **Now you have the flight director guiding you on the runway heading, climbing out at 7 degrees.**
  - **At 800 ft AGL...**
    - **Now can press AP - so the autopilot is flying the plane**
    - **Press IAS – which activates the IAS mode and captures the aircraft's current IAS value. Adjust to desired value, eg 120 kts.**
    - **Heading can still be adjusted using the HDG/TRK knob.**
  - **Approaching 6,500 ft, the plane will enter level flight.**