



World Leader in Professional UAS Autopilots



MP2128^{3X}

Triple Redundant UAV Autopilot

Triple redundancy (3X) gives autopilot technology the reliability necessary to safely carry out sensitive flight missions and transport valuable payloads. A triple redundant arrangement is comprised of three similar software and hardware systems. If any one of the three systems fails, the remaining two take over, offering a double redundancy arrangement. If one of the other two systems should fail, the third takes over. An additional mechanism is also included to oversee these three systems. Triple redundant systems are highly tolerant of autopilot hardware failures.

- Fly both fixed-wing and heli UAVs
- Multiple communication links for onboard devices such as cameras, and aircraft transponders
- Redundant datalinks to ground control station.
- Configuration, state, and waypoint synchronization among all three autopilots
- Eleven serial ports including RS232 and RS485
- Sixteen independently-generated servo signals
- Eight high current drivers controlled independently by each autopilot
- Pass or fail voting logic reliably selects the appropriate autopilot
- HORIZON^{mp} ground control station software with built-in software in the loop simulator
- Feedback loop synchronization ensures smooth transition when switching autopilots



MicroPilot

The choice of over 850 clients in 70 countries



Front





Triple redundant autopilots are not new. Military aircrafts such as the RAF's Trident fleet, used a triple redundant autoland system in the early 1960's. Ten years later, the Aérospatiale-BAC Concorde took advantage of 3X technology in its flight control system. Presently, triple redundancy is used in several manned military and commercial aircrafts.

Although triple redundant technology is established within the aviation industry, triple redundant autopilots are a relatively new addition to unmanned aerial vehicles (UAVs). MicroPilot, the leading UAV autopilot manufacturer, is setting the benchmark for triple redundancy UAV autopilots. MicroPilot, based in Canada, has been designing autopilots for fixed-wing, transitional and helicopter UAVs since 1994. In 2006 MicroPilot started designing a triple redundancy autopilot for heli and fixed wing UAVs.

The MP2128^{3X} is comprised of three MicroPilot MP2128^{HELI2} autopilots, mounted on an adapter board, or redundancy board. The three MP2128^{HELI2}'s are prioritized. At the start, the autopilot in position one flies the airframe. If this autopilot should fail, the MP2128^{HELI2} in position two takes over, and so on. The redundancy board provides several input/output (I/O) ports. The board also includes two RS232 serial ports designed to communicate with a ground control system via radio modems. As a result of this design, users never need to work directly with bare circuit boards. Additionally, the autopilots do not have individual casing, keeping overall weight to a bare minimum. However, the entire redundancy board is enclosed to protect the system.

MP2128^{3X} Ultimate Reliability Measures

In addition to the three MP2128^{HELI2}'s incorporated into the MP2128^{3X}, MicroPilot's triple redundant autopilots provide even more backup components. These include provisions for multiple communication links, backup high current drivers, backup power supplies, and independently generated servo signals. Two different types of global positioning systems are also used to improve reliability.

Supporting Products

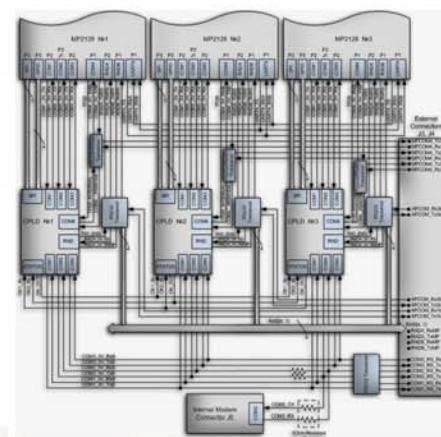
MicroPilot's UAV autopilots are available with a complete suite of development tools. MicroPilot modified several of its auxiliary products to support the MP2128^{3X}. For example, its update program was simplified to more efficiently renew data stored in three separate autopilots. Horizon^{mp} and in-the-loop simulator programs are also members of MicroPilot's suite of MP2128^{3X} development tools.

- HORIZON^{mp}
- qHWIL Simulator
- trueHWIL Simulator

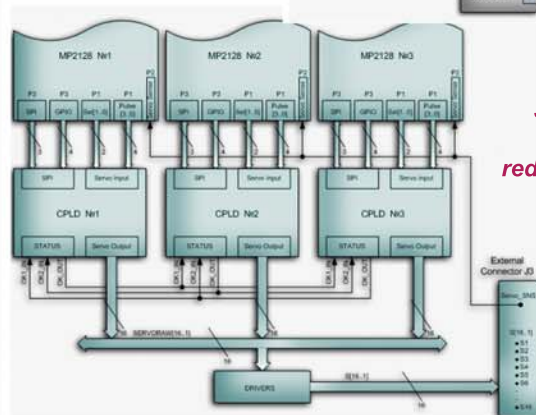
Multiple Communication Links

The MP2128^{3X} acts as the UAV's communication hub. Two radio modems can be installed, which offers two independent lines of communication between the autopilot and the ground control station. Devices such as pan tilt zoom cameras (PTZ) and aircraft transponders (which enable ground control to identify the UAV) can also be connected to the autopilot. The MP2128^{3X}'s redundant datalink between the UAV and the ground control station insures the UAV operator can continue to monitor and control the UAV as well as other important on-board equipment even if one radio link fails. The MP2128^{3X} switches communication links when flight operation is transferred from one autopilot to another autopilot. This ensures the operator on the ground is always monitoring and controlling the autopilot flying the UAV.

Serial communication architecture in MP2128^{3X} redundancy board.



Servo signals in the MP2128^{3X} redundancy board.



Physical Characteristics

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| Weight | : 859g (30 oz) (not including GPS antenna) |
| Power (typical) | : 750mA @ 12V |
| Supply Voltage | : 9 ~ 27V |
| Size - Length | : 227 mm (8.938in) |
| Size - Width | : 127 mm (5.031in) |
| Size - Height | : 54 mm (2.125in) |
| Software upgradable in the field | : Yes |
| Autopilot | : MP2128 ^{HELI2} |
| GPS Receiver | : 1x Novatel, 2x Ublox |

