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General Electric F110

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The **General Electric F110** is an afterburning turbofan jet engine produced by GE Aviation. The F110 engine uses the same engine core design as the General Electric F101. The **F118** is a non-afterburning variant.

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F-14

The F-14A entered service with the United States Navy in 1973 powered by Pratt & Whitney TF30s. By the end of the decade, following numerous problems with the original engine (and similar problems with Pratt & Whitney F100 on the F-15 and F-16), the DoD began procuring the upgraded TF30-P-414As. While these engines solved the serviceability problems, the fuel consumption and thrust was comparable to the initial model - considerably less than what the F-14 had been designed for.

In 1979, a derivative of the GE F101 turbofan called the F101-X was selected to power the F-14 and was later designated the F110-GE-400. The primary difference between the F110-GE-400 and the F110-GE-100 is length - the F110-GE-400 has a 50-inch tailpipe extension to suit the F-14 airframe, which is fitted downstream of the augmentor. The new engine provided 23,100 lbf (103 kN) of thrust (can go up to 27,600 lbf max augmented thrust if authorised and or if the situation dictates) compared to the TF30s maximum thrust of 20,900 lbf (93 kN). These upgraded jets were known as F-14Bs, as were production aircraft powered by the F110. The same engine also powers the final variant of the aircraft, the F-14D.

F-15

Two F110-GE-129 engines, with 29,400 lbf (131 kN) of thrust, will power the F-15K fleet of South Korea. This is the first time production F-15s will be powered by a GE engine, since all previous F-15 models were powered by Pratt and Whitney. The GE engines will be manufactured through a joint licensing agreement with Samsung Techwin Company. It has also been chosen by the Republic of Singapore Air Force (RSAF) to power its F-15SG.

F110 / F118



A F110-GE turbofan engine to be used in an F-16, c.1986

Type	Turbofan
National origin	United States
Manufacturer	General Electric
First run	1980s
Major applications	F110: F-14 Tomcat F-15E Strike Eagle F-16 Fighting Falcon F118: B-2 Spirit Lockheed U-2
Developed from	General Electric F101

F-16

The F-16 Fighting Falcon entered service powered by the Pratt & Whitney F100 afterburning turbofan. Seeking a way to drive unit costs down the USAF implemented the Alternative Fighter Engine (AFE) program in 1984, under which the engine contract would be awarded through competition. The F110 currently powers 86% of the USAF F-16C/Ds.

The F110-GE-100 provides around 4,000 lbf (17.8 kN) more thrust than the F100-PW-200 and requires more air, which led to the increase in the area of the engine intake. The F-16C/D Block 30/32s were the first to be built with this larger intake and a common engine bay, able to accept both engines.

Initial orders were for the F110-GE-100 rated at 28,000 lbf (125 kN). Later versions of the F110 include the F110-GE-129 delivering 29,000 lbf (129 kN) thrust and the F110-GE-132 delivering 32,000 lbf (142 kN)



An F110-GE engine undergoes performance testing at the Air Force's Arnold Engineering Development Center.

F118

The **F118** is a non-afterburning derivative of the F110 specially developed for the B-2 Spirit stealth bomber. A single stage HP turbine drives the 9 stage HP compressor, whilst a 2 stage LP turbine drives the 3 stage fan. The combustor is annular. In 1998, the USAF's Lockheed U-2 fleet was fitted with a modified version of the F118.

Specifications

F110

General characteristics

- **Type:** Afterburning turbofan
- **Length:** 182.3 - 232.3 in (463 - 590 cm)
- **Diameter:** 46.5 in (118 cm)
- **Dry weight:** 3,920 - 4,400 lb (1,778 - 1,996 kg)

Components

- **Compressor:** 3 fan and 9 compressor stages
- **Turbine:** 2 low-pressure and 1 high-pressure stages

Performance

- **Thrust:** 27,000 - 28,000 lbf (120 - 125 kN)
- **Overall pressure ratio:** 29.9:1 - 30.4:1
- **Thrust-to-weight ratio:** 6.36:1

Source:F110-100/-400 (<http://www.geae.com/engines/military/f110/f110-100-400.html>)

F118



An F110-GE viewed through exhaust nozzle of an F-14D.

General characteristics

- **Type:** Turbofan
- **Length:**
- **Diameter:**
- **Dry weight:**

Components

- **Compressor:** 9 compressor stages

Performance

- **Thrust:** 17,000 - 19,000 lbf (75.6 - 84.5 kN)
- **Overall pressure ratio:** 35:1
- **Specific fuel consumption:** 0.67 lb/h/lbf
- **Power-to-weight ratio:**

Source: GE F118 page (<http://www.geae.com/engines/military/f118/index.html>)

External links

- GE Aviation (<http://www.geae.com/engines/military/f110/index.html>) - The F110 Engine Family
- Aircraft Engine Historical Society (<http://www.enginehistory.org/f110ge100.htm>) - F110-GE-100 Gallery
- Global Security (<http://www.globalsecurity.org/military/systems/aircraft/systems/f110.htm>) - F110

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Categories: Low-bypass turbofan engines

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