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Casio-F-91W - iconic quartz watch : weekend die-shot

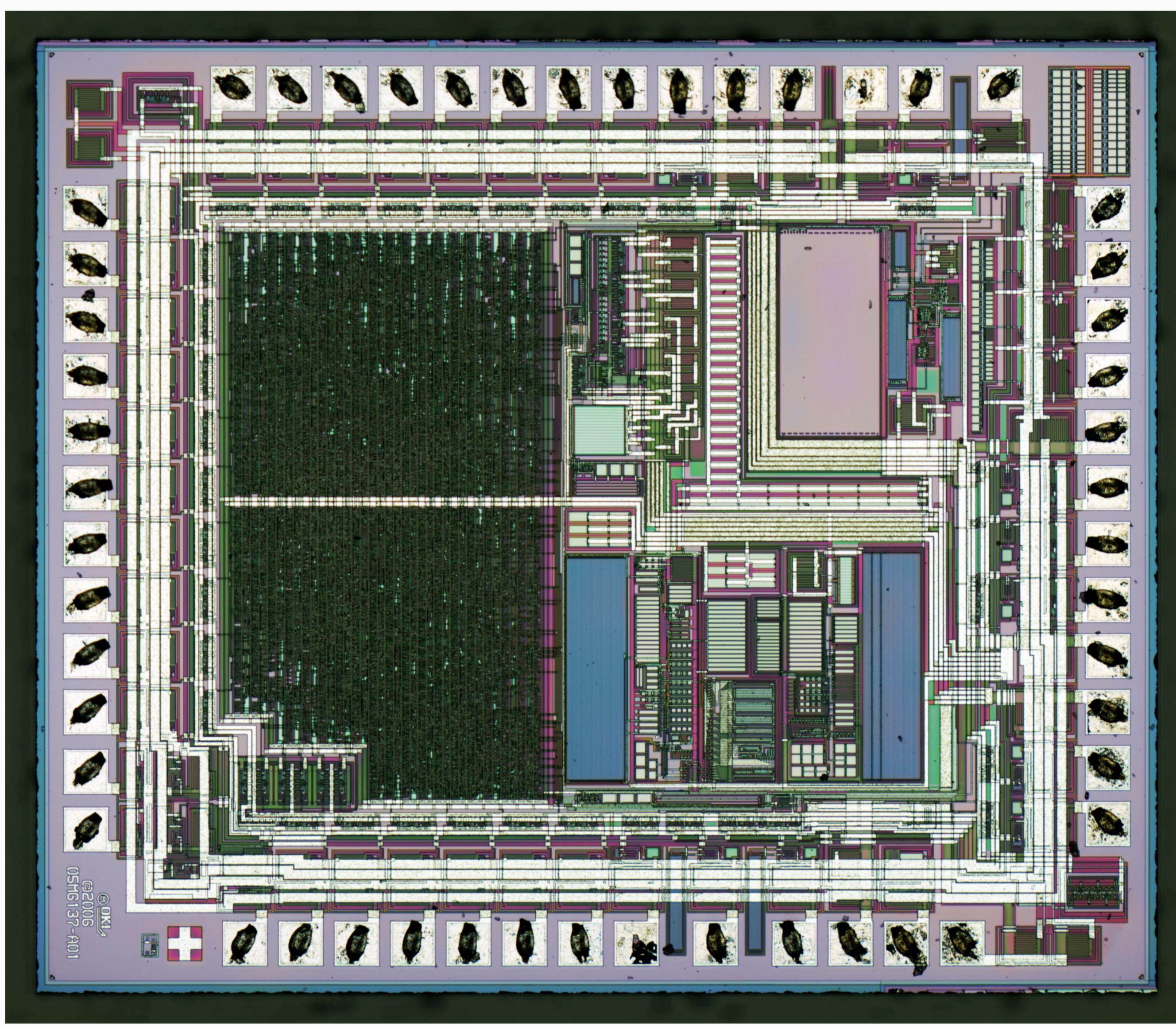
Casio F-91W is an iconic watch worn (among others) by Barack Obama and Osama bin Laden. While working on precision watch firmware (with quartz temperature compensation, aiming for error of under 10 seconds per year) for [SensorWatch](#) which is built around F-91W - I was curious to see how original chip looked like.

Surprisingly, chip is more complicated than I anticipated and digital part is less than ~50% of the die area. F-91W has trim jumpers on the PCB to adjust part-to-part variability of the quartz crystal. Looking at die complexity - it might be that they use capacitive tuning of frequency rather than skipping/adding ticks. Also, it might happen that they even have coarse/cost-efficient temperature compensation. Casio specify accuracy of 30 seconds per month, but some F-91W watches are within 6 seconds per month which requires good adjustment & luck for non-temperature compensated watch.

Latest versions of the watch work 7-10 years on a single battery, while early versions lasted "only" 2 years. While original F-91W was introduced in 1989, this die is designed in 2006. If someone has original version from 1989/early 1990's - it would be interesting to compare if it's a "die shrink" or re-design with improved performance.

You can compare die complexity to [Luch quartz watch](#). It's not a digital watch, but see how much less analog circuitry was there.

Die size 2990x2541 μm



Pinout suggested by Joey Castillo:

