

1030. Electronics

1031. Equipment, Assemblies and Components

Notes

1. The embargo status of equipment, devices and components described in 1031., other than those described in 1031.1.a.3. to 10. or 1031.1.a.12., which are specially designed for or which have the same functional characteristics as other equipment is determined by the embargo status of the other equipment.
2. The embargo status of integrated circuits described in 1031.1.a.3. to 9. or 1031.1.a.12. which are unalterably programmed or designed for a specific function for another equipment is determined by the embargo status of the other equipment.

N.B.:

When the manufacturer or applicant cannot determine the embargo status of the other equipment, the embargo status of the integrated circuits is determined in 1031.1.a.3. to 9. or 1031.1.a.12.

If the integrated circuit is a silicon-based "microcomputer microcircuit" or microcontroller microcircuit described in 1031.1.a.3. having an operand (data) word length of 8 bit or less, the embargo status of the integrated circuit is determined in 1031.1.a.3.

1. Electronic devices and components:
 - a. General purpose integrated circuits, as follows:

Notes

1. The embargo status of wafers (finished or unfinished), in which the function has been determined, is to be evaluated against the parameters of 1031.1.a.
2. Integrated circuits include the following types:
 - "Monolithic integrated circuits";
 - "Hybrid integrated circuits";
 - "Multichip integrated circuits";
 - "Film type integrated circuits", including silicon-on-sapphire integrated circuits;
 - "Optical integrated circuits".

1. Integrated circuits, designed or rated as radiation hardened to withstand either of the following:
 - a. A total dose of 5×10^5 Rads (Si) or higher; **or**
 - b. A dose rate upset of 5×10^8 Rads (Si)/s or higher;
2. Integrated circuits described in 1031.1.a.3 to 10. or 1031.1.a.12., as follows:
 - a. Rated for operation at an ambient temperature above 398 K (+125°C);
 - b. Rated for operation at an ambient temperature below 218 K (-55°C); **or**
 - c. Rated for operation over the entire ambient temperature range from 218 K (-55°C) to 398 K (+125°C);

Note

1031.1.a.2. does not apply to integrated circuits for civil automobile or railway train applications.

3. "Microprocessor microcircuits", "microcomputer microcircuits" and microcontroller microcircuits, having any of the following:

Note

1031.1.a.3. includes digital signal processors, digital array processors and digital coprocessors.

- a. An arithmetic logic unit with an access width of 32 bit or more and a "composite theoretical performance" ("CTP") of 80 million theoretical operations per second (Mtops) or more;
 - b. Manufactured from a compound semiconductor and operating at a clock frequency exceeding 40 MHz; **or**
 - c. More than one data or instruction bus or serial communication port for external interconnection in a parallel processor with a transfer rate exceeding 2.5 Mbyte/s;
4. Electrically erasable programmable read-only memories (EEPROMs), static random-access memories (SRAMs); **and** storage integrated circuits manufactured from a compound semiconductor, as follows:
 - a. EEPROMs with a storage capacity:

1. Exceeding 16 Mbit per package for flash memory types; **or**
 2. Exceeding either of the following limits for all other EEPROM types:
 - a. 4 Mbit per package; **or**
 - b. 1 Mbit per package and having a maximum access time of less than 80 ns;
 - b. SRAMs with a storage capacity:
 1. Exceeding 4 Mbit per package; **or**
 2. Exceeding 1 Mbit per package and having a maximum access time of less than 20 ns;
 - c. Storage integrated circuits manufactured from a compound semiconductor;
5. Analogue-to-digital and digital-to-analogue converter integrated circuits, as follows:
 - a. Analogue-to-digital converters having any of the following:
 1. A resolution of 8 bit or more, but less than 12 bit, with a total conversion time to maximum resolution of less than 10 ns;
 2. A resolution of 12 bit with a total conversion time to maximum resolution of less than 200 ns; **or**
 3. A resolution of more than 12 bit with a total conversion time to maximum resolution of less than 2 µs;
 - b. Digital-to-analogue converters with a resolution of 12 bit or more, and a "settling time" of less than 10 ns;
 6. Electro-optical and "optical integrated circuits" for "signal processing" having all of the following:
 - a. One or more internal "laser" diodes;
 - b. One or more internal light detecting elements; **and**
 - c. Optical waveguides;
 7. Field programmable gate arrays having either of the following:
 - a. An equivalent usable gate count of more than 30,000 (2 input gates); **or**
 - b. A typical "basic gate propagation delay time" of less than 0.4 ns;
 8. Field programmable logic arrays having either of the following:
 - a. An equivalent usable gate count of more than 30,000 (2 input gates); **or**
 - b. A toggle frequency exceeding 133 MHz;
 9. Neural network integrated circuits;
 10. Custom integrated circuits for which either the function is unknown, or the embargo status of the equipment in which the integrated circuits will be used is unknown to the manufacturer, having any of the following:
 - a. More than 144 terminals;
 - b. A typical "basic gate propagation delay time" of less than 0.4 ns; **or**
 - c. An operating frequency exceeding 3 GHz;
 11. Digital integrated circuits, other than those described in 1031.1.a.3 to 10. or 1031.1.a.12., based upon any compound semiconductor and having either of the following:
 - a. An equivalent gate count of more than 300 (2 input gates); **or**
 - b. A toggle frequency exceeding 1.2 GHz;
 12. Fast Fourier Transform (FFT) processors having any of the following:
 - a. A rated execution time for a 1,024-point complex FFT of less than 1 ms;
 - b. A rated execution time for an N-point complex FFT of other than $1,024 \log_2 N / 10,240$ ms, where N is the number of points; **or**
 - c. A butterfly throughput of more than 5.12 MHz;
- b. Microwave or millimetre wave devices:
 1. Electronic vacuum tubes and cathodes, as follows:

(For frequency agile magnetron tubes, see Item 2011 on the Munitions List.)

Note

1031.1.b.1. does not embargo tubes designed or rated to operate in the Standard Civil Telecommunications Bands at frequencies not exceeding 31 GHz.