With the advent of accurate, inexpensive stepper motors and highly capable, low cost control systems, creating or machining your own high-quality prototype parts has become something anyone can do. CNC (Computer Numerical Control) machines that can perform cutting, carving, machining, and milling along with 3D printers have ushered in a new age of low cost prototyping and manufacturing for hobbyists and businesses, both large and small. It is estimated that by 2022, the 3D printer market will exceed $34B allowing people to print anything from jet engine parts to living tissue replacement prosthetics. To support this burgeoning market, compact, easy to use control systems, like those based on the OSD335x System-in-Package (SiP) family of devices, are necessary.

At its core, a CNC machine or 3D printer converts a CAD (Computer Aided Design) file into a series of instructions that control stepper motors. These motors allow the CNC machine or 3D printer to position the head correctly within 3-dimensional space so that the appropriate material can either be removed or added to the component. Software frameworks like LinuxCNC and MachineKit provide the base functionality that allow CNC machines and 3D printers to operate. Beyond the motor control aspects, it is also important for CNC machines and 3D printers to provide connectivity, such as USB, WiFi or Ethernet, and a user interface, like a touch-screen LCD display, just like a traditional ink or laser printer. Through its power, performance and broad peripheral set, the OSD335x family of devices can provide everything needed for your CNC machine or 3D printer.
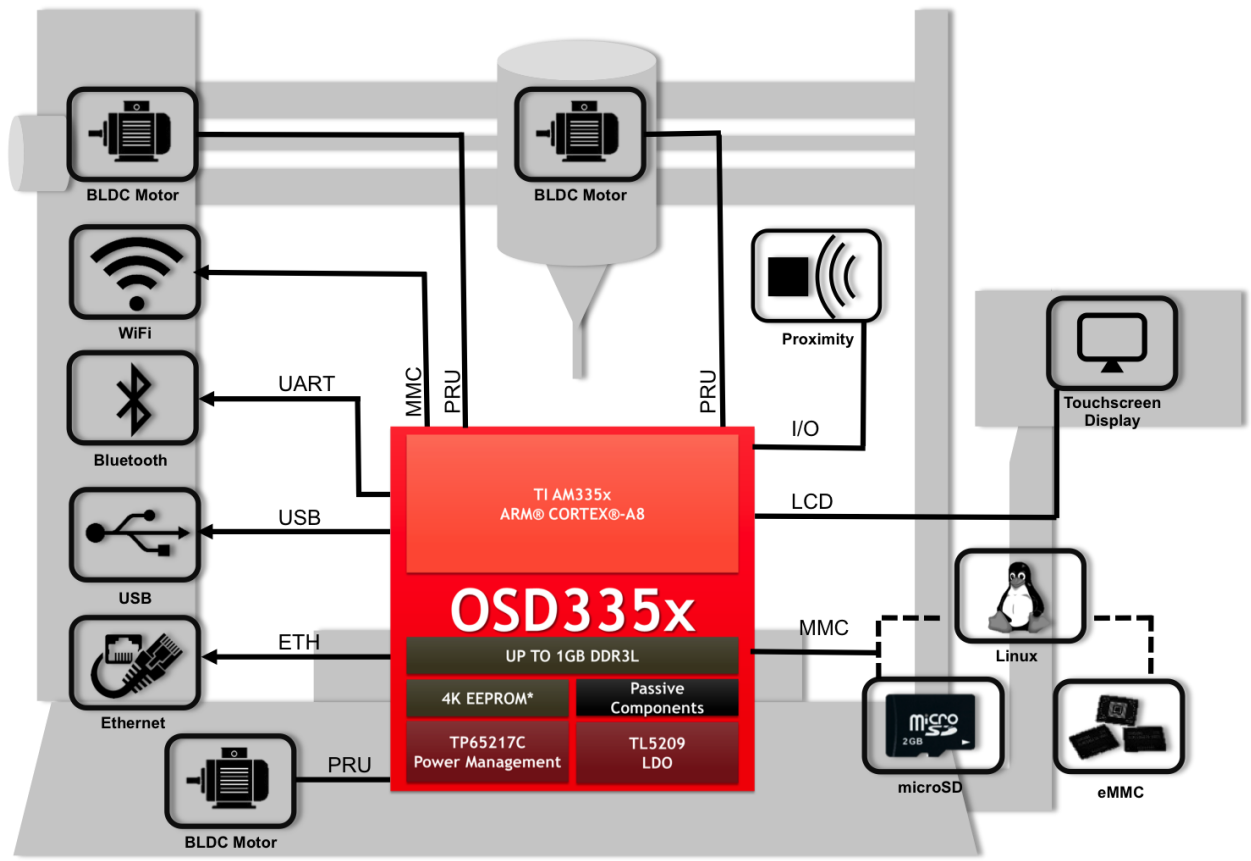
- **Processor:**
  The 1GHz ARM® Cortex®-A8 AM335x processor from Texas Instruments integrated in OSD335x combines great performance, power efficiency with a wide range of peripherals suited for CNC machines or 3D printers:

Peripheral	# Available
UART	6
MMC	3
USB 2.0 HS OTG	2
Ethernet 10/100/1000	2

- **Real Time Motor Control**:
  The OSD335x also integrates 2 Programmable Real-time-Units (PRUs) for real time motor control and custom applications. These 200Mhz microcontrollers provide real-time, high throughput custom control and feedback data processing.

- **Display**:
  OSD335x SiP devices have a touch screen capable LCD interface, which can provide user interfaces for monitoring performance and easy control of CNC machines or 3D printers. The Linux capable OSD335x makes building UIs easy with support for graphic frameworks including QT.

- **Connectivity**:
  Whether it is Bluetooth, WiFi, USB, Ethernet, or some other communication protocol, you need to get your data to your CNC or 3D printer. The OSD335x family easily supports them all.

- **Integration and Ease of Design**:
  The OSD335x simplifies solar inverter gateway development. Its integration allows system

designers to skip the tedious parts of hardware design and debug. Like a microcontroller, designing a board is simply connecting a few signals which reduces design effort, manufacturing costs, and time to market by 2x.

- **Linux Support and Software Resources**:
  There are many Linux distributions available for the OSD335x family of devices. The OSD3358-BAS can be found on the popular open source single board computers BeagleBone® Blue and BeagleBone® Black Wireless from BeagleBoard.org®. The [BeagleBoard.org® Foundation](#) is a US-based 501 c3 non-profit existing to provide education in and collaboration around the design and use of open-source software and hardware in embedded computing. This community is active with software updates to Debian Linux images in conjunction with Linux kernel development. This allows for up-to-date base Linux distributions that can be used for development. Abundant resources on the Buildroot and Yocto build systems are also available to make building your own Linux distribution smooth. Additionally, images that include MachineKit are also published.

- **Get Started Today:**
  Begin developing today. There are a number of opensource development platforms available. We recommend looking at the [BeagleBoard.org® BeagleBone® Blue](#) or the [BeagleBoard.org® BeagleBone® Black Wireless,](#) as starting points for CNC machines or 3D printers.