

## Control System Q+A

## ➡ Answers to questions:

1. The purpose of a CNC machine control system is to process and execute all instructions provided in the form of a part program and various control settings, with the single goal to produce a desired machined part, as specified in the engineering drawing.
2. **Control Panel** (that is supplied by the control manufacturer) and **Operation Panel** (that is supplied by the machine manufacturer) serve as the main setup and information platform in operating a CNC machine tool.
3. **Manual Pulse Generator** is a trade name of Fanuc, for - what most operators call - **a handle**. This 'handle' is used for setup purposes only, not during automatic program processing.
4. Use **Formula 3** - the answer is 7874 characters
5. M-S-T lock - this is a ON/OFF switch that allows Miscellaneous functions (M), Spindle function (S), and Tool function (T) to be ignored when a CNC program is being verified. **Note** - some M-functions will still be functioning, for example, M30.
6. This question asks specifically about **control** options, **not machine** options. Optional features **do** vary with the control manufacturer, but some typical options include helical interpolation, polar coordinates, scaling function, coordinate rotation, special cutting cycles, local coordinate system, datum shift, stored stroke limits, various graphic displays, such as animation, and several others, depending on the make of the control and the marketing strategies of the vendor.
7. Rapid traverse rate - Feedrate - Spindle speed rate - Continuous program processing - Coolant - others may apply, depending on the control
8. System parameters store various machine/control data from the manufacturer, as well as some user data.
9. The main purpose of softkeys is to minimize the menu area of the display monitor. If every available control function had to have its own menu entry, there would have to be unrealistic number of selection keys on the control panel. Softkeys are used to navigate the menu but they do not have a fixed meaning. Their actual meaning is tied up to the current selection of other keys. By the way, **softkey** does not refer to its soft rubbery surface but the fact that they are **software** controlled.
10. The **Dry Run** feature is used to test integrity of a loaded CNC program at processing speeds higher than cutting speeds. Typically, **Dry Run** is used with no part mounted - and no coolant - to test an unproven program.
11. Single Block - Optional Stop - Dry Run - Block Skip - MST Lock - Z-axis Neglect - Machine Lock - Coolant ...
12. There are three editing options - ALTER - INSERT - DELETE. They are used to modify an existing part program stored in CNC memory.

13. The TAPE mode selection had traditionally been associated with the paper tape that contained the program data punched on a paper tape. Although the TAPE mode still exists on many non-tape controls, its meaning today is very simple - the TAPE mode is nothing more than a setting mode that allows an external data input (just like the old tape used be). The most typical modern external data input is running the CNC program from a Personal Compute (PC), rather than the control memory, using appropriate communications software.
14. There are usually three - **not two** - modes of coolant setting available from the operation panel:
 

Coolant ON	Coolant pump will always be turned ON
Coolant OFF	Coolant pump will always be turned OFF
Coolant AUTO	Coolant pump will be operated by program instructions
15. In **Single Block** mode, the whole program can be executed one block at a time. The CNC operator selects this mode, and activates each program instruction by pressing the **Cycle Start** button. Single block mode is used strictly for testing purposes, never for production.
16. System defaults are factory settings that are part of the control system, when the CNC machine tool has been first installed. System defaults are stored as **parameters** of the control system and they can be overridden by the machine operator or programmer. Original parameters should always been stored for safekeeping.
17. The SELECT MODE area of the control panel typically utilizes a rotary switch that usually has eight positions:
 

MANUAL mode:	Home - Handle - Jog - Rapid
AUTO mode:	MDI - Tape - Memory - Edit

The order of the switches will vary from control to control.
18. **Emergency Stop** switch should always be used for the purpose written in its name - **an emergency**. Life or health threatening situations are obvious situations where using this switch is justified. Other common uses include possible damage to the cutting tool, the part, or the machine itself. Use with caution!
19. There are numerous settings that are controlled by system parameters - for example:  
Parameters related to: setting, coordinate system, tool offset, spindle, fixed cycles, input/output, programs, feedrate, and many others.
20. The purpose of the FEEDHOLD button is to stop the feed of the machine axes. The axis 'feed' can be a rapid motion or a cutting motion. When this button is pressed, all machine motion will stop, until the **Cycle Start** button is pressed, but no other activity is canceled. Feedhold can be used for various testing purposes and other applications. In threading and tapping modes, this switch is ineffective.