–Input/Reader unit:
The tape reader is an electromechanical device for winding and reading the punched tape containing the program of instructions.

–Data Buffeer:
The data contained on the tape are read into the data buffer.
The purpose of this device is to store the input instructions in logical blocks of information. A block of information usually represents one complete step in the sequence of processing elements.

–Processor/Controller:
The tape reader is actuated to read data into the buffer from the tape, signals are sent to and from the machine tool, and so on. These types of operations must be synchronized and this is the function of the sequence controls.

–Output channels and actuators:
The signal output channels are connected to the servomotors and other controls in the machine tool. Through these channels, the instructions are sent to the machine tool from the controller unit.

–Control Panel: It permits the operator to interface the m/c opn manually. The control panel or control console contains the dials and switches by which the machine operator runs the NC system. It may also contain data displays to provide information to the operator.

–Feedback channels and transducers:

To make certain that the instructions have been properly executed by the machine, feedback data are sent back to the controller via the feedback channels.

The most important function of this return loop is to assure that the table and work part have been properly located with respect to the tool.

–3 Machine tools or other controlled process :

– It is the part of the NC System which performs useful work.

– He m/c tool consists of the worktable and spindle, motors and controls necessary to drive them.

– It also includes cutting tools, work fixtures and other auxillary equipment needed in the machining operation.

The NC machining center was first introduced in the late l95Os.

First, a machining center is capable of performing a variety of different operations: drilling, tapping, reaming, milling, and boring. Second, it has the capacity to change tools automatically under tape command.

A third capability of the NC machining center is work piece positioning.

a fourth feature possessed by some machining centers is the presence of two tables or pallets on which the work piece can be fixtured. This improves machine tool utilization because the machine does not have to stand idle during loading and unloading of the work parts.

APPLICATIONS OF NUMERICAL CONTROL :

Milling

Drilling and related processes

Boring

Turning

Grinding

Sawing

Punching

Welding

Filament winding

Wire processing

Knitting

Textile cutting

Spark erosion

Electron beam

Laser tool

Rivetting

Inspection

Stretch forming

Ultrasonic testing

Tube bending

NC contour mill

Laser cutting, Flame cutting, Plasma arc cutting

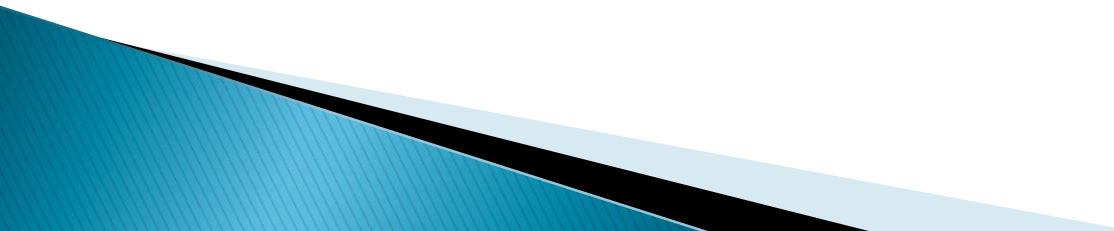Laser drilling, Automatic drafting, Assembly machines

Advantages of NC:

Following are the advantages of numerical control when it is utilized in the type of production jobs described.

1. Reduced nonproductive time:
2. Reduced fixturing:
3. Reduced manufacturing lead time:
4. Greater manufacturing flexibility:
5. Improved quality control:
6. *Reduced floor space requirements*.

Disadvantages of NC :

Along with the advantages of NC, there are several features about NC which must be considered disadvantages:

1. Higher investment cost.
2. Higher maintenance cost.
3. Finding and/or training NC personnel.
4. Higher per hour operating cost than traditional m/c tool
5. Uneconomical for job production.

Problems with conventional NC :
The problems arise in the conventional NC systems are the following:

l. Part programming mistake:
2. Punched tape:
3. Tape reader:
4. Controller:
5. Nonoptimal speeds and feeds:
6. Management information: