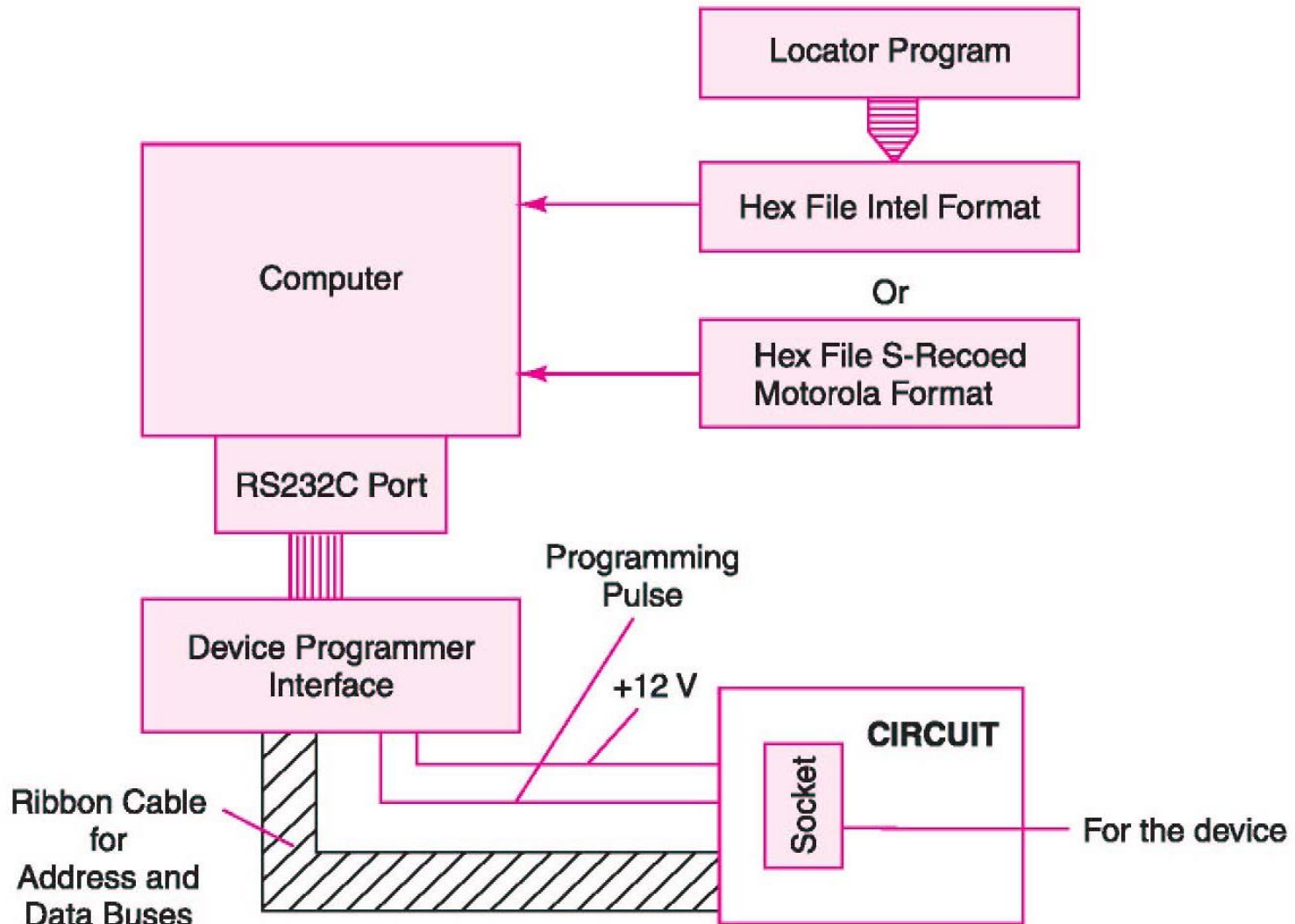


# **Embedded Software development Process and Tools:**

## **Lesson-5**

# **Getting Embedded Software into the Target System using Device Programmer**

# Burning in of the application software codes, data and tables using a device programmer



# 1. Device PROM or Flash Programmer

# Device programmer

- Also called laboratory programmer
- A programming system for a device
- Device selectable
- PROM or EPROM chip or a flash or a unit in a microcontroller or PLA, GAL or PLC

# Device programmer

- Socket for device
- Programmed (burned the codes) by transfer of the bytes for each address using the software at the host

# Software of device programmer

- Runs at a host system
- The system interconnects with the socket and device programmer circuit usually through a serial port (UART or USB).

# Software of device programmer...

- Running at the host uses an input file containing the from the locator software output records
- File reflecting the final design
- Boot program

# Software of device programmer...

- Bootstrap program is the program to start up a system.
- An IDE incorporates the device programmer within it



## 2. Use of Device Programmer for Downloading the Finalized Codes into PROM or flash

# Burning

- A process that places the codes.
- Codes downloaded, according to ROM image (*locator* output)
- Burning done in the laboratory using a device programmer into an erased EPROM or EEPROM or PROM or flash

# 3. Use of Device Programmer for Downloading the Finalized Codes into PROM or flash

# Programming Method of the Device Programmer

- A device cell array (at the address defined by A0 to A19 signals) stores the '0's as per 0s at D0 to D7 when a strobe pulse of a few microseconds duration applied in the presence of a high voltage of 12V by the device programmer circuit.

# Programming Steps of the Device Programmer

- (i) Applies the A0 to A19 bits as needed at a selected address input of the array of cells.
- (ii) Applies as inputs, the D0 to D7 bits that are meant for that address.

# Programming Steps of the Device Programmer...

- (iii) Applies a high voltage to make programming feasible for the needed duration in microseconds.
- (iv) Applies a programming pulse for a sufficient duration to cause fusing of the desired links in the array, to convert a '1' to '0'.
- (v) Switches off high voltage

## Programming Steps of the Device Programmer...

- (vi) Applies a next higher address than the previous one.
- (vii) Repeats the above steps (ii) to (iv) for writing (converting) the logic states of the D0 to D7 bits at the current instance at the new address, and
- (viii) Continues till a cell array at the last desired address programmed.

# Summary



## We learnt

- Device programmer used to burn the binary image of the codes from the locator created files of Intel Hex or Motorola S format

# **End of Lesson-5 of chapter 14 on Getting Embedded Software into the Target System using Device Programmer**