

2010 SkillsUSA Michigan Championships
Task & Material List
Robotics and Automation Technology

Competition Task to be Performed:

Using the description of a manufacturing process, you are to layout a production system and develop a robot program to complete the required task. Documentation of the project needs to include a sketch of the layout with equipment placement, a flow chart of the program, input/output assignments, and a copy of the robot program. Teams will not be allowed to borrow items from other contestants and points will be deducted for items not provided. Teams may provide standard tools or items not listed below to accommodate their specific equipment. The judges are aware of the similarities between this year's and past year's challenges. Use of hard copies or software from previous years is strictly prohibited and will result in elimination from this competition. All computers are to be left on, with software booted up, for review of date, time stamps and recently accessed programs by the judging staff.

Required Materials:

Robotics and Automation Technical Committee Provides:

- Task assignments
- Templates for storage area and bad part placement
- Production parts (2" x 2" blocks)

Team Provides:

- Single page resume for each person (professional format)
- Robot and Controller (Scorbot ER-4pc)
- Computer / cables / printer with Scorbse software
- Means to secure robot to the table
- Multimeter (w jumper leads) for troubleshooting
- Experimental box with:
 - 1 light
 - 1 buzzer
 - 4 micro switches
 - 1 proximity switch
- Parts feeder with presents sensing capability
- Wire (approx 100 of 20-24AWG) for interface connections
- Tools
 - Needle nose pliers
 - Screw drivers
 - Wire strippers / side cutters
 - 12" ruler
- Power capability
 - Extension cord (25' min.)
 - Power strip (approx. 6 outlets)

- Circuit breaker protection
- SAFETY GLASSES
- Pencils (#2 lead) and sharpener
- Variety of tape
 - Electrical
 - Double sided for securing equipment
 - General application

Points will be deducted for items not provided by the team. (2 points per item)
You will not be permitted to borrow from other contestants

Additional contest information will be available at www.michiganrobot.com in March 2010.

Revised 2/15/10

Testing Criteria:

Upon completion, the team will request the next available judge for review of the work cell. Test running your cell is strongly recommended, prior to contacting the judging officials. Points will be subtracted for each incorrect run during the evaluation.

You will be evaluated on the efficiency of your system. Locations of the equipment, cycle time, operator prompts, workmanship, documentation, and time required to accomplish this task are some of the factors being considered.

The documentation must be prepared prior to evaluation of the cell. The team will need to provide a sketch of the equipment layout, a flow chart of the process, I/O assignments, and a copy of the robot program.

Task 1 Evaluation

Prior to parts being loaded:

- Program prompts operator to push start button
- Start button activates work cell active light (stays on)
- Start button causes robot to move
- Program prompts operator to load the chute

System loaded with blocks:

- Loading chute prompts operator to push start button
- Start button (or chute loaded) causes robot to pick block
- Robotic operation manipulates part through stamp
- Stamp is functionally operational
- Block 1 placed correctly
- Block 2 placed correctly
- Block 3 placed correctly
- Block 4 placed correctly
- Robot returns to home or safe location after final block
- Work cell active light goes off

Safety test:

- Stop button halts robot motion
- System alarm activates to signify stop condition
- Restart button returns robot to operation
- Robot returns to correct point in program
- Work cell active goes off during stop condition

Equipment setup:

- Workmanship of cell
- I/O devices labeled
- Part flow path optimized
- Tool evaluation

Documentation:

- System layout sketch reflects actual cell

- Flow chart defines decisions associated with
 - Start push button
 - Reset push button
 - Stop push button
 - Stamping operation
 - Palletizing process
- I/O legend includes
 - All push buttons
 - Work cell active light
 - System alarm buzzer
 - Stamp operation

Time task completed _____

Cycle time _____

Deductions for incorrect run attempts _____

Task 3 Evaluation

System function:

- Over flow basket use is identified by 2 second audible alarm
- Program prompts operator when pallet is full
- Program prompt displays number of over flow parts

Equipment setup:

- Workmanship of cell
- I/O devices labeled (pallet full and over flow)
- Part flow path optimized
- Fork truck access allowed for rack swap

Documentation:

- System layout reflects changes to cell
- Flow chart defines decisions associated with
 - Full pallet condition
 - Over flow condition
 - Over flow counter
- Changes for light and alarm use
- I/O legend includes
 - Change of light use
 - Change of alarm use

Time task completed _____

Cycle time _____

Deductions for incorrect run attempts _____

