

实训项目五 工件弧焊仿真

- 1、在 ROBOTSTUDIO 中进行机器人及周边设备的合理布局。
- 2、机器人 IO 信号的设定与链接
- 3、事件管理器的使用
- 4、Smart 组件的基本使用
- 5、机器人轨迹的创建
- 6、仿真的调试。

机器人工作站的布局

所有的部件已包含在打包文件中。双击打开打包文件后，请按照以下的图 1 中所示进行布局。

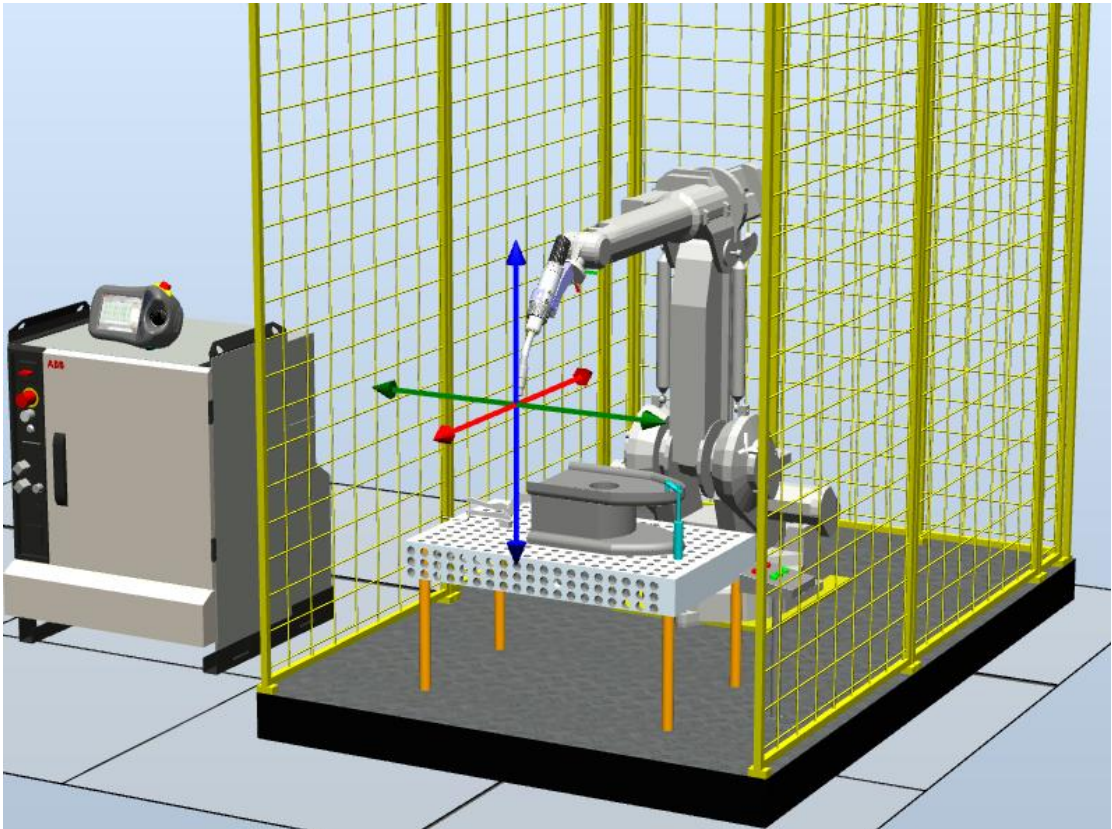


图 1 机器人工作站的布局示意

要注意的问题：

1、机器人与周边的部件的位置要合理，周边部件应在机器人的工作范围的中间位置为佳。

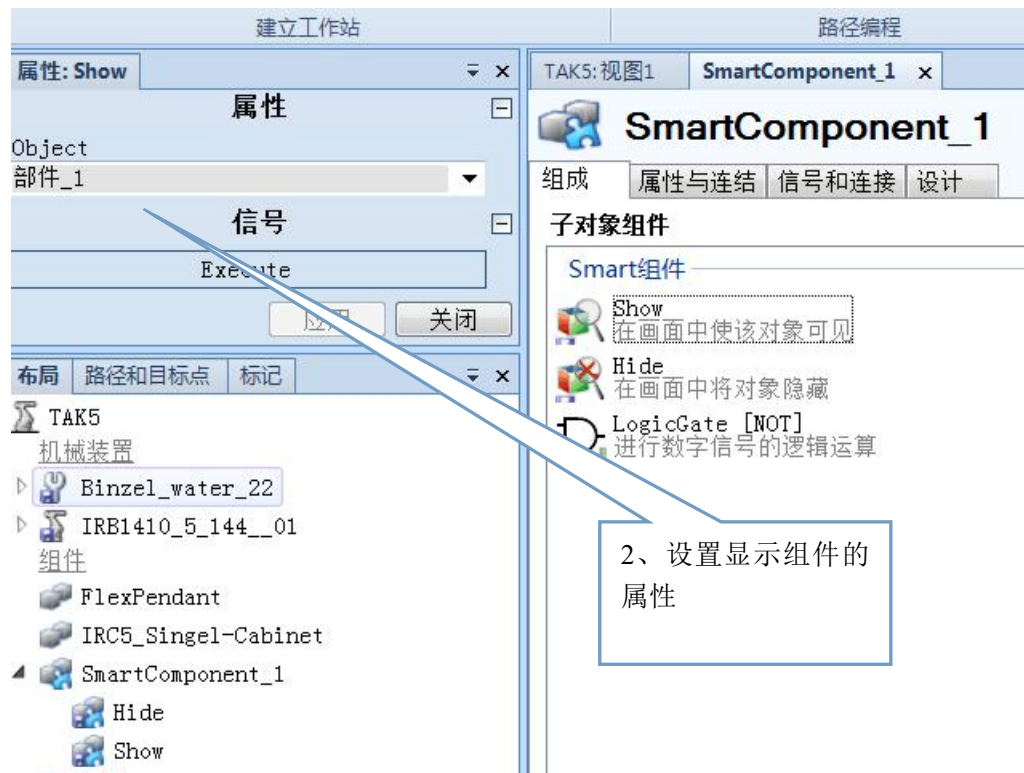
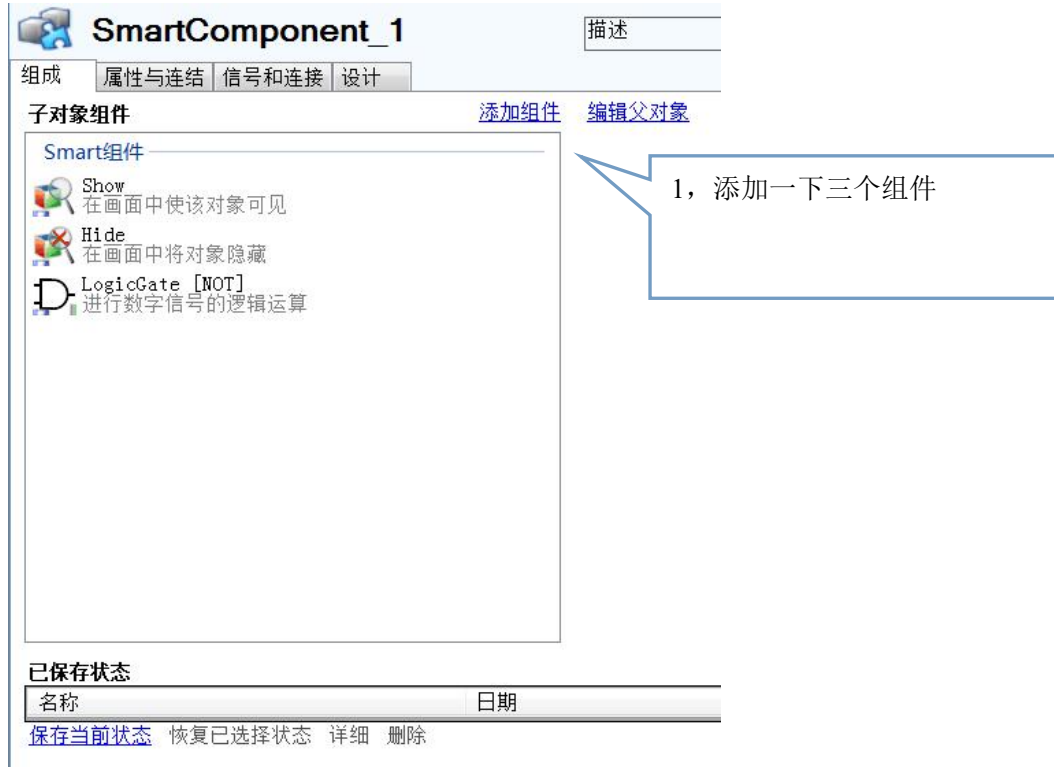
2、可以对机器人的操作，以确认机器人可以到达要取、放的最远端是可以顺利到达的，否则以后再调整就会很麻烦了。

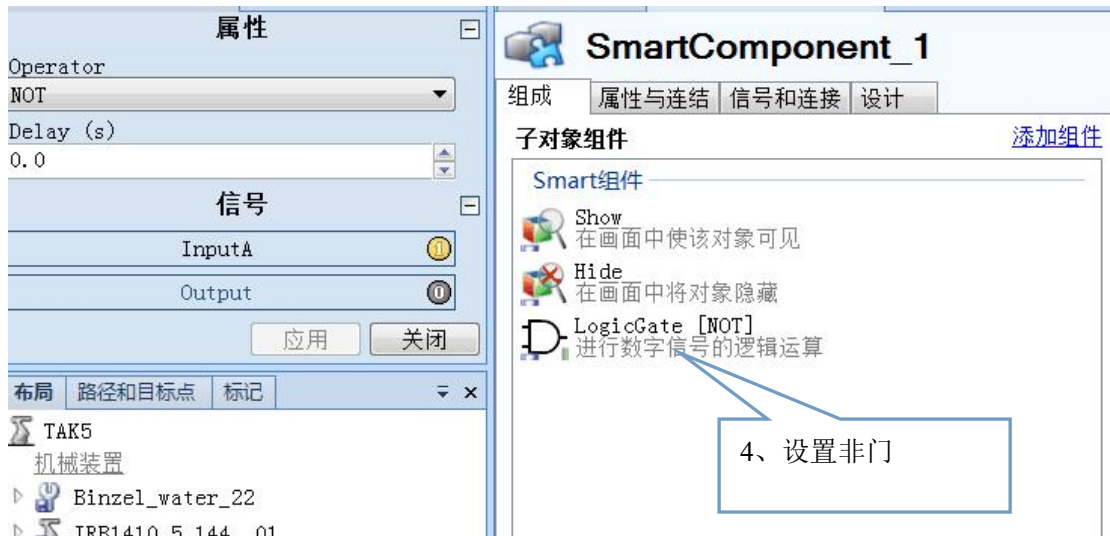
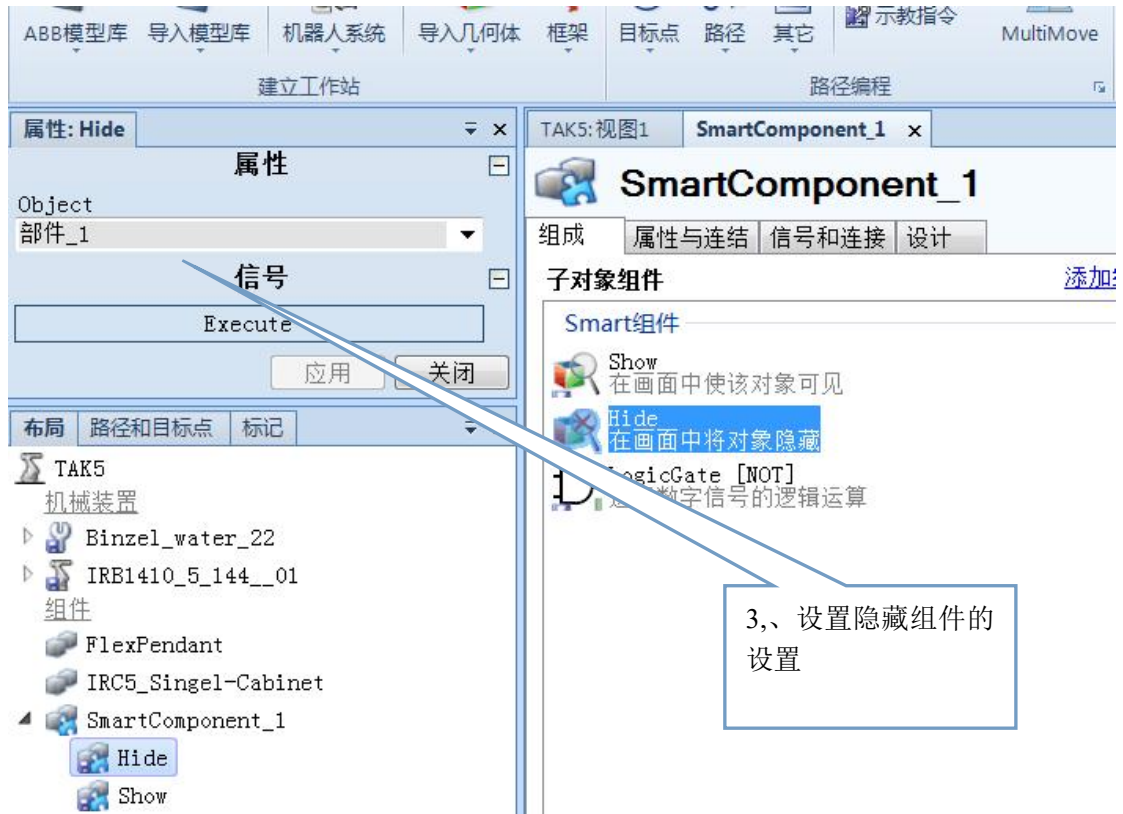
事件管理器的使用：

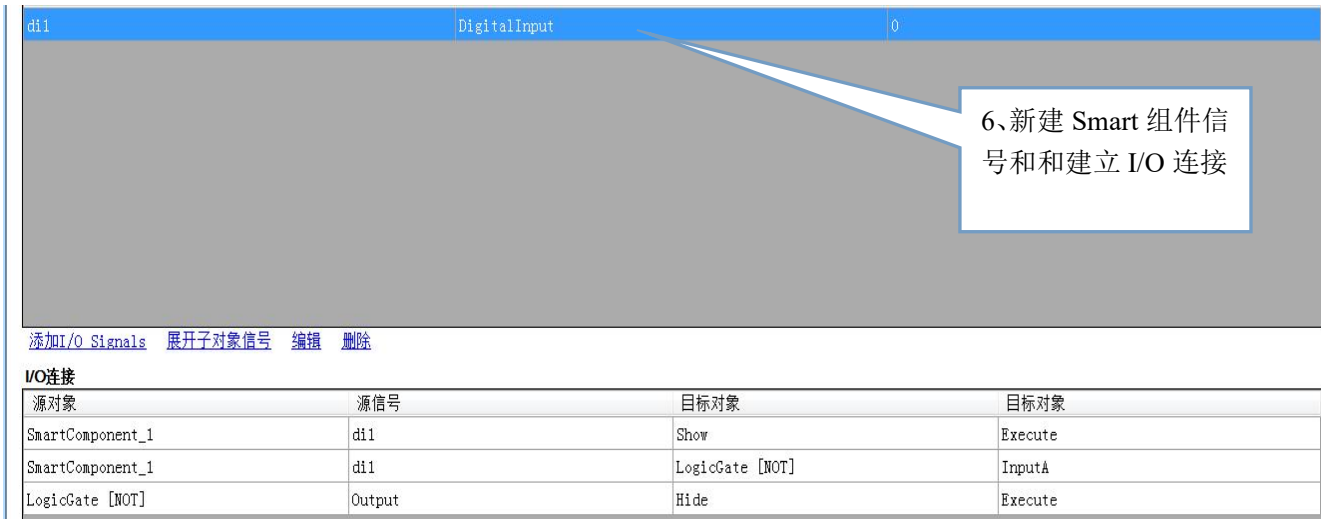
操作：仿真---配置---事件管理器---添加，步骤如下。详情看视频

Smart 组件的基本使用

smart 组件创建操作：建模---smart 组件---添加组件，建立如下表组件，详情看视频。







6、新建 Smart 组件信号和和建立 I/O 连接

添加I/O Signals 展开子对象信号 编辑 删除

| 源对象 | 源信号 | 目标对象 | 目标对象 |
|------------------|--------|-----------------|---------|
| SmartComponent_1 | di1 | Show | Execute |
| SmartComponent_1 | di1 | LogicGate [NOT] | InputA |
| LogicGate [NOT] | Output | Hide | Execute |

机器人 IO 的设定

为了实现真夹具动作的夹/放的动作控制，为了至少需要设定一个虚拟的数字输出信号，这个信号只用于虚拟仿真的作用，并没有与实际的总线或 IO 板进行关联。

数字输出信号的设定菜单操作为：控制器---配置编辑器---IO SYSTEM---SIGNAL。然后将信号设定为以下的表 1 的参数：

实例编辑器

| 名称 | 值 | 信息 |
|-----------------------------|------------------|----|
| Name | do1 | |
| Type of Signal | Digital Output | |
| Assigned to Device | | |
| Signal Identification Label | | |
| Category | | |
| Access Level | Default | |
| Default Value | 0 | |
| Safe Level | DefaultSafeLevel | |

机器人轨迹的创建

机器人的动作是从左侧的码垛盘存放处搬运到右边的的方形的码垛盘处。

具体的操作方法如下：

1、设置正确的工件坐标与工具，如下图所示：



2、根据具体的情况，设定正确的机器人运动指令的参数，如下图所示：

MoveJ ▾ * v1000 ▾ z1 ▾ tWeldGun ▾ \WObj:=Workobject_1 ▾ 选择方式 ▾

3、根据动作的要求通过示教指令的方法，创建对应的轨迹程序，程序样板如下图所示：

```

MODULE Module1
  CONST robtarget
  pHOME:=[[2215.51991703,748.5,859.587698216],[0.156434341,0,0.98768836,0],[0,0,0,0],[9E9,9E9,9E9,9E9,9E9,9E9]];
  CONST robtarget
  Target_10:=[[2097.842847551,748.5,578.294914386],[0.13756039,0,-0.990493382,0],[0,0,0,0],[9E9,9E9,9E9,9E9,9E9,9E9]];
  CONST robtarget
  Target_20:=[[1949.074131765,642.384320983,440.670769049],[0.413762442,-0.00000007,-0.910384887,0.000000365],[-1,-1,-1,0],[9E9,9E9,9E9,9E9,9E9,9E9]];
  CONST robtarget
  Target_30:=[[1949.074359323,747.854004354,440.670753408],[0.413762437,-0.000000374,-0.910384889,0.000000192],[-1,-1,-1,0],[9E9,9E9,9E9,9E9,9E9,9E9]];
  CONST robtarget
  Target_40:=[[1949.074206433,753.885158678,440.670601603],[0.413762578,-0.000000802,-0.910384825,-0.000000043],[0,0,0,0],[9E9,9E9,9E9,9E9,9E9,9E9]];
  CONST robtarget
  Target_50:=[[1949.074781123,854.87022443,440.670502325],[0.413762559,-0.00001267,-0.910384833,-0.000000475],[0,0,0,0],[9E9,9E9,9E9,9E9,9E9,9E9]];
  CONST robtarget
  Target_501:=[[2071.855853773,854.870191438,553.582952881],[0.413762449,-0.000001603,-0.910384883,-0.000000657],[0,0,0,0],[9E9,9E9,9E9,9E9,9E9,9E9]];
  CONST robtarget
  Target_502:=[[1931.739636467,854.869788104,680.042275282],[0.045302736,0.00001344,0.998973304,0.000001576],[0,-1,0,0],[9E9,9E9,9E9,9E9,9E9,9E9]];
  CONST robtarget
  Target_60:=[[1950.244340195,748.5,578.294918312],[0.030478298,0,0.999535429,0],[0,0,0,0],[9E9,9E9,9E9,9E9,9E9,9E9]];
  CONST robtarget
  Target_70:=[[1967.553683056,652.105761342,569.327772932],[0.351372259,-0.000000421,0.936235833,-0.000000217],[-1,-1,0,0],[9E9,9E9,9E9,9E9,9E9,9E9]];
  CONST robtarget
  Target_80:=[[1967.554004265,742.157375484,569.328020224],[0.351372331,-0.000000476,0.936235806,-0.000000229],[-1,-1,0,0],[9E9,9E9,9E9,9E9,9E9,9E9]];
  CONST robtarget
  Target_90:=[[1967.554038937,755.615676704,569.328617144],[0.351372642,-0.00000058,0.93623569,-0.000000286],[0,0,-1,0],[9E9,9E9,9E9,9E9,9E9,9E9]];
  CONST robtarget
  Target_100:=[[1967.553944685,854.575966106,569.328811319],[0.351372607,-0.000000649,0.936235703,-0.000000359],[0,0,-1,0],[9E9,9E9,9E9,9E9,9E9,9E9]];
  CONST robtarget

```


Target_110:=[[1967.554074563,854.576052763,680.73483348],[0.351372687,-0.000000402,0.936235673,0.000000049],[0,0,-1,0],[9E9,9E9,9E9,9E9,9E9,9E9]];

CONST robtarget

Target_120:=[[1848.758012003,748.5,686.057612846],[0.051621022,0,-0.998666746,0],[0,0,0,0],[9E9,9E9,9E9,9E9,9E9,9E9]];

CONST robtarget

Target_130:=[[1757.691852315,646.703745379,619.716180313],[0.2127177,0.000001017,-0.977113699,-0.000000161],[-1,0,-1,0],[9E9,9E9,9E9,9E9,9E9,9E9]];

CONST robtarget

Target_140:=[[1741.301067112,646.704022517,559.330637525],[0.289640583,-0.00000148,-0.957135483,-0.000000869],[-1,0,-1,0],[9E9,9E9,9E9,9E9,9E9,9E9]];

CONST robtarget

Target_150:=[[1741.300996926,742.331939797,559.330447778],[0.289640567,-0.00000435,-0.957135488,-0.000000916],[-1,0,-1,0],[9E9,9E9,9E9,9E9,9E9,9E9]];

CONST robtarget

Target_160:=[[1741.301112724,855.448588002,559.33023969],[0.289640732,-0.00000604,-0.957135438,-0.000000745],[0,-1,0,0],[9E9,9E9,9E9,9E9,9E9,9E9]];

CONST robtarget

Target_170:=[[1741.301018251,855.44876707,693.176292806],[0.289640708,-0.00000705,-0.957135445,-0.000000966],[0,-1,0,0],[9E9,9E9,9E9,9E9,9E9,9E9]];

PROC Path_10()

MoveJ pHOME,v200,z1,tWeldGun\WObj:=Workobject_1;

MoveJ Target_10,v200,z1,tWeldGun\WObj:=Workobject_1;

MoveL Target_20,v200,fine,tWeldGun\WObj:=Workobject_1;

Set do2;

MoveL Target_30,v200,z1,tWeldGun\WObj:=Workobject_1;

MoveL Target_40,v200,fine,tWeldGun\WObj:=Workobject_1;

Set do1;

Reset do1;

MoveL Target_50,v200,fine,tWeldGun\WObj:=Workobject_1;

Reset do2;

Set do1;

Reset do1;

MoveJ Target_501,v200,z1,tWeldGun\WObj:=Workobject_1;

MoveJ Target_502,v200,z1,tWeldGun\WObj:=Workobject_1;

MoveJ Target_60,v200,z1,tWeldGun\WObj:=Workobject_1;

MoveJ Target_70,v200,fine,tWeldGun\WObj:=Workobject_1;

Set do2;

MoveL Target_80,v200,z0,tWeldGun\WObj:=Workobject_1;

MoveL Target_90,v200,fine,tWeldGun\WObj:=Workobject_1;

Set do1;

Reset do1;

MoveL Target_100,v200,fine,tWeldGun\WObj:=Workobject_1;

Set do1;

```

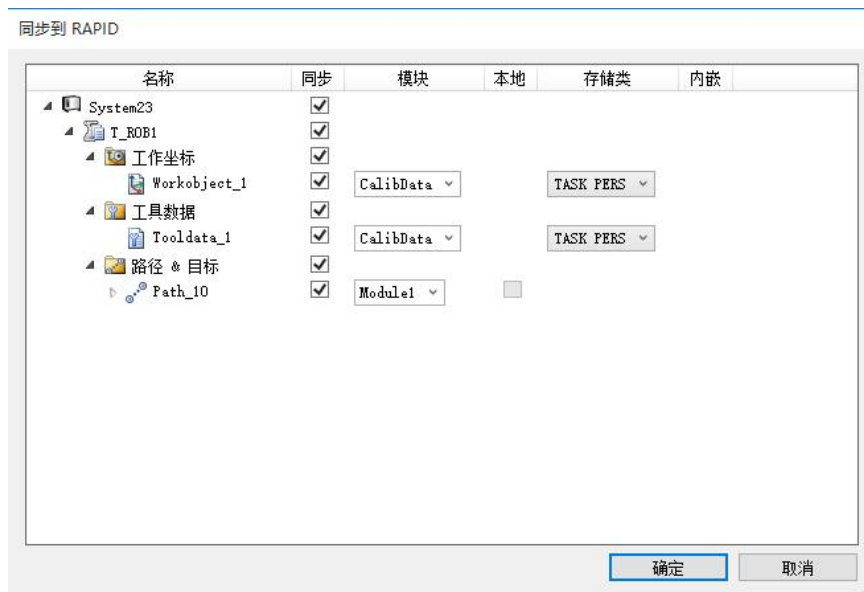
Reset do1;
Reset do2;
MoveJ Target_110,v200,z1,tWeldGun\WObj:=Workobject_1;
MoveJ Target_120,v200,z1,tWeldGun\WObj:=Workobject_1;
MoveJ Target_130,v200,z1,tWeldGun\WObj:=Workobject_1;
MoveL Target_140,v200,fine,tWeldGun\WObj:=Workobject_1;
Set do2;
MoveL Target_150,v200,fine,tWeldGun\WObj:=Workobject_1;
Set do1;
Reset do1;
MoveL Target_150,v200,z0,tWeldGun\WObj:=Workobject_1;
MoveL Target_160,v200,fine,tWeldGun\WObj:=Workobject_1;
Set do1;
Reset do1;
Reset do2;
MoveJ Target_170,v200,z1,tWeldGun\WObj:=Workobject_1;
MoveJ pHOME,v1000,z1,tWeldGun\WObj:=Workobject_1;

```

ENDPROC

ENDMODULE

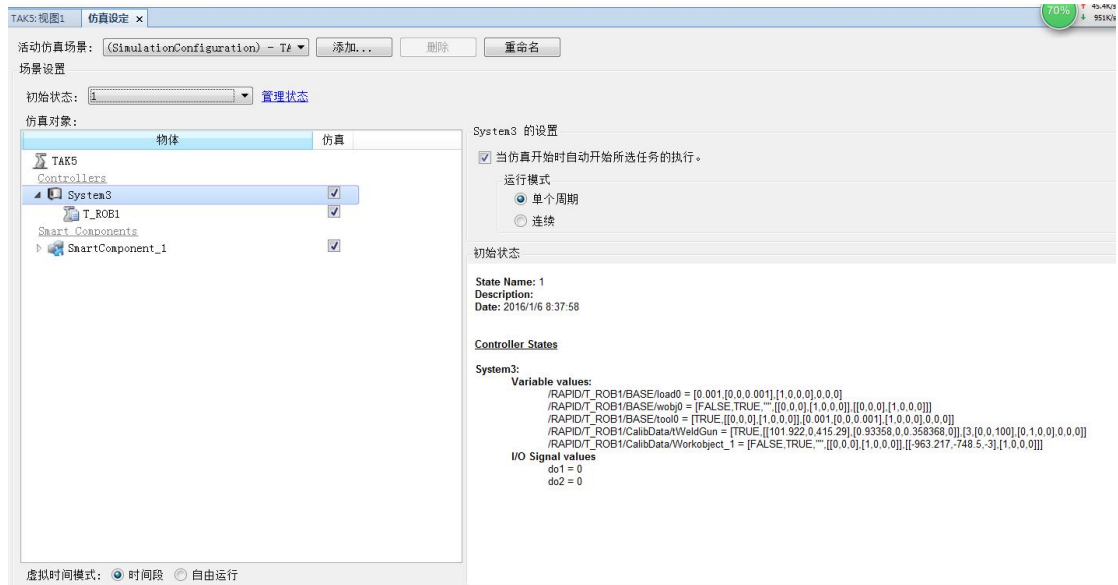
将写好的程序同步到RAPID，菜单操作：基本---同步---同步到RAPID，如下图所示：



仿真的调试

在完成了设置与编程以后，先保存初始状态，接着下来就是要验证一下仿真动画的结果了，具体的操作如下：

1、设定要运行的 RAPID 子程序，在本项目中是 PATH10，菜单操作如下：仿真---仿真设定---指定 PATH10，如下图所示：



2、点击仿真菜单中的“播放”就可以看到动画效果了。动画结束后，点击“重置”，恢复到原来的状态。