EtherCAT 接口描述

设备结构描述：

EtherCAT device 1

EtherCAT device 2

EtherCAT device n

……

EtherCAT device

digital IO

analog IO

Robot 0

Robot n

……

addition 0

addition n

……

axis 1

axis n

axis 1

axis n

Name:\*\*\*

Name:\*\*\*/ dio

Name:\*\*\*/ aio

Name:\*\*\*/ robot0

Name:\*\*\*/ robotn

Name:\*\*\*/ additionaxis0

Name:\*\*\*/ additionaxisn

device

subset

接口：

/\*creat EtherCAT device

\* ecName: device name

\*

\* return 0:rigtht; other: wrong

\* \*/

**int** **createEC\_device**(**char**\* ecName);

/\*creat EtherCAT device

\* ecName: device name

\* \_wrsize\_name: data size name

\* \_variable\_name: variable name

\* \_fd\_ecat\_in\_name:in name

\* \_fd\_ecat\_out\_name: out name

\* inipath: configure file path

\* ininame: configure file name

\*

\* return 0:rigtht; other: wrong

\* \*/

**int** **createEC\_device2**(**char**\* ecName, **char**\* \_wrsize\_name,**char**\* \_variable\_name,**char**\* \_fd\_ecat\_in\_name,**char**\* \_fd\_ecat\_out\_name, **char**\* inipath, **char**\* ininame);

/\*destroy EtherCAT device

\* ecName: device name

\*

\* return 0:rigtht; other: wrong

\* \*/

**int** **destroyEC\_device**(**char**\* ecName);

/\*get EtherCAT device data

\* ecName: device name

\*

\* return NULL: wrong; otherwise: device data

\* \*/

EC\_device\* **getEC\_device**(**char**\* ecName);

/\*get EtherCAT device data

\* index: device index

\*

\* return NULL: wrong; otherwise: device data

\* \*/

EC\_device\* **getEC\_device\_index**(**int** index);

/\*get subset handle in EtherCAT device

\* ecHName: subset name

\*

\* return NULL: wrong; otherwise: subset data

\* \*/

EC\_device\_handle\* **getEC\_device\_handle**(**char**\* ecHName);

/\*get subset handle in EtherCAT device

\* ecName: device name

\* index: subset index

\*

\* return NULL: wrong; otherwise: subset data

\* \*/

EC\_device\_handle\* **getEC\_device\_index\_handle**(**int** index, **char**\* HName);

/\*get EtherCAT device number

\*

\* return device number, <0:wrong

\* \*/

**int** **getEC\_deviceNum**();

/\*get EtherCAT device name

\* index: device index

\* name: return device name

\*

\* return name pointer;NULL: wrong

\* \*/

**char**\* **getEC\_deviceName**(**int** index,**char**\* name);

/\*get digital IO subset number

\* ecName: EtherCAT device name

\*

\* return subset number, <0: wrong

\* \*/

**int** **hasNumber\_dioEC\_deviceHandle\_c**(**char**\* ecName);

/\*get analogs IO subset number

\* ecName: EtherCAT device name

\*

\* return subset number, <0: wrong

\* \*/

**int** **hasNumber\_aioEC\_deviceHandle\_c**(**char**\* ecName);

/\*get addition axissubset number

\* ecName: EtherCAT device name

\*

\* return subset number, <0: wrong

\* \*/

**int** **hasNumber\_additionaxisEC\_deviceHandle\_c**(**char**\* ecName);

/\*get robotsubset number

\* ecName: EtherCAT device name

\*

\* return subset number, <0: wrong

\* \*/

**int** **hasNumber\_robotEC\_deviceHandle\_c**(**char**\* ecName);

/\*get digital IO subset name

\* ecName: EtherCAT device name

\*

\* return subset name, NULL: wrong

\* \*/

**char**\* **get\_name\_dioEC\_deviceHandle\_c**(**char**\* ecName);

/\*get analog IO subset name

\* ecName: EtherCAT device name

\*

\* return subset name, NULL: wrong

\* \*/

**char**\* **get\_name\_aioEC\_deviceHandle\_c**(**char**\* ecName);

/\*get addition axis subset name

\* ecName: EtherCAT device name

\*\_index:addition axis subset index

\*

\* return subset name, NULL: wrong

\* \*/

**char**\* **get\_name\_additionaxisEC\_deviceHandle\_c**(**char**\* ecName, **int** \_index);

/\*get robot subset name

\* ecName: EtherCAT device name

\*\_index:robot subset index

\*

\* return subset name, NULL: wrong

\* \*/

**char**\* **get\_name\_robotEC\_deviceHandle\_c**(**char**\* ecName, **int** \_index);

////////////////////////////////////////////////////////////////////////////////////////////////////////////////////////////////////////////////

/\*interface 1

\* usage:

\* createEC\_device("\*\*\*\*\*\*");//create a ethercat device use name "\*\*\*\*\*\*", this ethercat device is global, can be use anywhere.

\*

\* robot\_getposition\_c ("\*\*\*\*\*\* /robot0", pos);//It can be used like this, other similar

or

robot\_getposition\_c(get\_name\_robotEC\_deviceHandle\_c("\*\*\*\*\*\*", 0), pos);

\* \*/

//====================================axis====================================

/\*power for one axis

\* ecHName: subset name

\* axis\_ID: axis index

\*

\* return: 0:right; other:wrong

\* \*/

**int** **axis\_power\_c**(**char**\* ecHName,**int** axis\_ID);

/\*poweroff for one axis

\* ecHName: subset name

\* axis\_ID: axis index

\*

\* return: 0:right; other:wrong

\* \*/

**int** **axis\_poweroff\_c**(**char**\* ecHName,**int** axis\_ID);

/\*set mode for one axis

\* ecHName: subset name

\* mode: actuator mode

\* axis\_ID: axis index

\*

\* return: 0:right; other:wrong

\* \*/

**int** **axis\_setmode\_c**(**char**\* ecHName,**signed** **char** mode,**int** axis\_ID);

/\*set control word for one axis

\* ecHName: subset name

\* control: actuator control word

\* axis\_ID: axis index

\*

\* return: 0:right; other:wrong

\* \*/

**int** **axis\_setcontrol\_c**(**char**\* ecHName,**unsigned** **short** control,**int** axis\_ID);

/\*get status word for one axis

\* ecHName: subset name

\* axis\_ID: axis index

\*

\* return: status word; <0:wrong

\* \*/

**unsigned** **short** **axis\_getstatus\_c**(**char**\* ecHName,**int** axis\_ID);

/\*get position for one axis

\* ecHName: subset name

\* axis\_ID: axis index

\*

\* return position

\* \*/

**int** **axis\_getposition\_c**(**char**\* ecHName,**int** axis\_ID);

/\*get target position for one axis

\* ecHName: subset name

\* axis\_ID: axis ID

\*

\* return position

\* \*/

**int** **axis\_getposition\_target\_c**(**char**\* ecHName,**int** axis\_ID);

/\*get velocity for one axis

\* ecHName: subset name

\* axis\_ID: axis index

\*

\* return velocity

\* \*/

**int** **axis\_getvelocity\_c**(**char**\* ecHName,**int** axis\_ID);

/\*get torque for one axis

\* ecHName: subset name

\* axis\_ID: axis index

\*

\* return torque

\* \*/

**short** **axis\_gettorque\_c**(**char**\* ecHName,**int** axis\_ID);

/\*get current for one axis

\* ecHName: subset name

\* axis\_ID: axis index

\*

\* return current

\* \*/

**short** **axis\_getcurrent\_c**(**char**\* ecHName,**int** axis\_ID);

/\*set position for one axis

\* ecHName: subset name

\* pos: target position

\* axis\_ID: axis index

\*

\* return 0:wrong; other: wrong

\* \*/

**int** **axis\_setposition\_c**(**char**\* ecHName,**int** pos,**int** axis\_ID);

/\*set velocity for one axis

\* ecHName: subset name

\* vel: target velocity

\* axis\_ID: axis index

\*

\* return 0:wrong; other: wrong

\* \*/

**int** **axis\_setvelocity\_c**(**char**\* ecHName,**int** vel,**int** axis\_ID);

/\*set torque for one axis

\* ecHName: subset name

\* tor: target torque

\* axis\_ID: axis index

\*

\* return 0:wrong; other: wrong

\* \*/

**int** **axis\_settorque\_c**(**char**\* ecHName,**short** tor,**int** axis\_ID);

/\*set digital IO

\* ecHName: subset name

\* id\_index: digital IO index

\* flag: IO value,0 or 1

\*

\* return 0:wrong; other: wrong

\* \*/

**int** **setdo\_c**(**char**\* ecHName, **int** id\_index,**int** flag);

/\*get digital IO

\* ecHName: subset name

\* id\_index: digital IO index

\* flag: return IO value,0 or 1

\*

\* return 0:wrong; other: wrong

\* \*/

**int** **getdi\_c**(**char**\* ecHName,**int** id\_index, **int**\* flag);

//====================================robot====================================

/\*get subset number

\* ecName: EhterCAT device name

\*

\* return: subset number;

\* \*/

**int** **get\_EC\_deviceHandeNum\_c**(**char**\* ecName);

/\*get subset data array head

\* ecName: EhterCAT device name

\*

\* return: subset array head pointer

\* \*/

EC\_device\_handle\* **get\_EC\_deviceHande\_head\_c**(**char**\* ecName);

/\*get EtherCAT communication cycle (ns)

\* ecName: EhterCAT device name

\*

\* return EtherCAT communication cycle(ns)

\* \*/

**int** **get\_BusyTs\_c**(**char**\* ecName);

/\*printf EtherCAT device data

\* ecName: EtherCAT device name

\* \*/

**void** **EC\_device\_printf\_c**(**char**\* ecName);

//-----------------------------------------------------------------------

/\*get robot or addition axis dof

\* ecHName: robot subset name

\*

\* return robot dof

\* \*/

**int** **getRobotDOF\_c**(**char**\* ecHName);

/\*power for robot or addition axis

\* ecHName: robot subset name

\*

\* return 0: right; other: wrong

\* \*/

**int** **robot\_power\_c**(**char**\* ecHName);

/\*poweroff for robot or addition axis

\* ecHName: robot subset name

\*

\* return 0: right; other: wrong

\* \*/

**int** **robot\_poweroff\_c**(**char**\* ecHName);

/\*set mode for robot or addition axis

\* ecHName: robot subset name

\* mode: actuator mode

\*

\* return 0: right; other: wrong

\* \*/

**void** **robot\_setmode\_c**(**char**\* ecHName,**signed** **char**\* mode);

/\*get positon for robot or addition axis

\* ecHName: robot subset name

\* pos: return poition

\* \*/

**void** **robot\_getposition\_c**(**char**\* ecHName,**int**\* pos);

/\*get target positon for robot or addition axis

\* ecHName: robot subset name

\* pos: return target poition

\* \*/

**void** **robot\_getposition\_target\_c**(**char**\* ecHName,**int**\* pos);

/\*get velocity for robot or addition axis

\* ecHName: robot subset name

\* vel: return velocity

\* \*/

**void** **robot\_getvelocity\_c**(**char**\* ecHName,**int**\* vel);

/\*get torque for robot or addition axis

\* ecHName: robot subset name

\* tor: return torque

\* \*/

**void** **robot\_gettorque\_c**(**char**\* ecHName,**short**\* tor);

/\*get current for robot or addition axis

\* ecHName: robot subset name

\* cur: return current

\* \*/

**void** **robot\_getcurrent\_c**(**char**\* ecHName,**short**\* cur);

/\*set positon for robot or addition axis

\* ecHName: robot subset name

\* pos: target poition

\* \*/

**void** **robot\_setposition\_c**(**char**\* ecHName,**int**\* pos);

/\*set velocity for robot or addition axis

\* ecHName: robot subset name

\* vel target velocity

\* \*/

**void** **robot\_setvelocity\_c**(**char**\* ecHName,**int**\* vel);

/\*set torque for robot or addition axis

\* ecHName: robot subset name

\* tor: target torque

\* \*/

**void** **robot\_settorque\_c**(**char**\* ecHName,**short**\* tor);

//=======under interface include transform, must initialize transform data=========

/\*get robot or addition axis angle for one axis

\* ecHName: subset name

\* axis\_ID: subset axis index

\*

\* return angle (rad)

\* \*/

**double** **axis\_getposition\_angle**(**char**\* ecHName,**int** axis\_ID);

/\*get robot or addition axis target angle for one axis

\* ecHName: subset name

\* axis\_ID: subset axis index

\*

\* return angle (rad)

\* \*/

**double** **axis\_getposition\_angle\_target**(**char**\* ecHName,**int** axis\_ID);

/\*get robot or addition axis velocity for one axis

\* ecHName: subset name

\* axis\_ID: subset axis index

\*

\* return velocity (rad/s)

\* \*/

**double** **axis\_getvelocity\_angular**(**char**\* ecHName,**int** axis\_ID);

/\*get robot or addition axis torque for one axis

\* ecHName: subset name

\* axis\_ID: subset axis index

\*

\* return torque

\* \*/

**double** **axis\_gettorque\_torque**(**char**\* ecHName,**int** axis\_ID);

/\*set robot or addition axis angle for one axis

\* ecHName: subset name

\* q: target angle(rad)

\* axis\_ID: subset axis index

\* \*/

**void** **axis\_setposition\_angle**(**char**\* ecHName, **double** q, **int** axis\_ID);

/\*set robot or addition axis velocity for one axis

\* ecHName: subset name

\* qv: target velocity(rad/s)

\* axis\_ID: subset axis index

\* \*/

**void** **axis\_setvelocity\_angular**(**char**\* ecHName, **double** qv, **int** axis\_ID);

/\*set robot or addition axis torque for one axis

\* ecHName: subset name

\* tor: target torque

\* axis\_ID: subset axis index

\* \*/

**void** **axis\_settorque\_torque**(**char**\* ecHName, **double** tor, **int** axis\_ID);

//====================================robot====================================

/\*get robot or addition axis angle

\* ecHName: subset name

\* angle: return angle(rad)

\* \*/

**void** **robot\_getposition\_angle**(**char**\* ecHName, **double**\* angle);

/\*get robot or addition axis tartet angle

\* ecHName: subset name

\* angle: return target angle(rad)

\* \*/

**void** **robot\_getposition\_angle\_target**(**char**\* ecHName, **double**\* angle);

/\*get robot or addition axis velocity

\* ecHName: subset name

\* angular: return velocity(rad/s)

\* \*/

**void** **robot\_getvelocity\_angular**(**char**\* ecHName, **double**\* angular);

/\*get robot or addition axis torque

\* ecHName: subset name

\* torque: return torque

\* \*/

**void** **robot\_gettorque\_torque**(**char**\* ecHName, **double**\* torque);

/\*set robot or addition axis target angle

\* ecHName: subset name

\* angle: target angle(rad)

\* \*/

**void** **robot\_setposition\_angle**(**char**\* ecHName, **double**\* angle);

/\*set robot or addition axis target velocity

\* ecHName: subset name

\* angular: target velocity(rad/s)

\* \*/

**void** **robot\_setvelocity\_angular**(**char**\* ecHName, **double**\* angular);

/\*set robot or addition axis target torque

\* ecHName: subset name

\* angle: target torque

\* \*/

**void** **robot\_settorque\_torque**(**char**\* ecHName, **double**\* torque);

/\*set robot pos and pose

\* ecHName: subset name

\* R7\_KINE: pos and pose

\* \*/

**void** **robot\_getPosKps**(**char**\* ecHName, R7\_KINE\* rkine);