Ev3Dev

0.1.1

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1.1 Class Hierarchy

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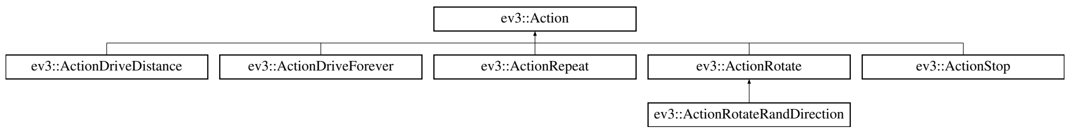
Class Documentation

4.1 ev3::Action Class Reference

Base class for all Action controlling classes.

```
#include <Action.h>
```

Inheritance diagram for ev3::Action:



Public Types

- enum ActionType {
  NOP, REPEAT, DRIVE_DISTANCE, ROTATE,
  ROTATE_RANDOM_DIR, STOP, DRIVE_FOREVER }

    Type of Action.
- typedef std::function< bool(void) > EndCondition

    Type for lambda functions to store end of Action condition.

Public Member Functions

- Action (CommandsVector commands, ActionType type)

    Constructor with CommandsVector and ActionType parameters.
- Action (CommandsVector commands)

    Constructor with CommandsVector parameter.
- Action (ActionType type)

    Constructor with ActionType parameter.
- virtual ∼Action ()

    Default destructor.
- virtual void execute ()

    Executes stored Commands in a sequence.

- virtual bool isFinished ()

  Check if Action condition is fullfilled.
- virtual bool isExecuted ()

  Check if action was executed.
- virtual std::string getActionPrototype ()

  Generate std::string prototype for Action.
- virtual std::string getString ()

  Get human-readable Action name.
- void setCommands (CommandsVector commands)

  Set Commands to be executed.
- void setEndCondition (EndCondition condition)

  Set end condition for Action.
- ActionType getType ()

  Get current Action type.

Static Public Attributes

- static const std::string EMPTY_PROTO

  String for empty Action prototype.

Protected Attributes

- ActionType _type

  Action type.
- CommandsVector _commands

  Vector of Commands.
- EndCondition _endCondition

  Lambda function defining Action end condition.
- bool _isExecuted = false

  True if action is already executed, false otherwise.

4.1.1 Detailed Description

Base class for all Action controlling classes.

Each Action contains of a sequence of many Commands and all of them are executed immediately, one after another. Action is valid, until specific Event occurs or its endCondition function returns true.

Action objects are instantiated accordingly to Robot model that uses them. Actions are predefined and cannot be dynamically created.

4.1.2 Member Enumeration Documentation

4.1.2.1 enum ev3::Action::ActionType

Type of Action.

It directly points to derived class being used.

See also

Robot::AvailableActions

Enumerator

NOP No operation.

REPEAT Repeats execution of other Actions.

DRIVE_DISTANCE Power Motor to reach certain distance.

ROTATE Rotate Robot for given angle.

ROTATE_RANDOM_DIR Rotate for given angle, clockwise or counterclockwise at random.

STOP Stop all active motors.

DRIVE_FOREVER Drive forward or backward infinetely.

4.1.3 Constructor & Destructor Documentation

4.1.3.1 Action::Action (**CommandsVector** ***commands,*** **ActionType** ***type***)

Constructor with CommandsVector and ActionType parameters.

Parameters

commands	Commands stored within this Action.
type	Type of Action used.

4.1.3.2 Action::Action (**CommandsVector** ***commands***)

Constructor with CommandsVector parameter.

Action type is set to Action::NOP .

Parameters

commands	Commands stored within this Action.

4.1.3.3 Action::Action (**ActionType** ***type***)

Constructor with ActionType parameter.

Parameters

type	Type of Action used.

4.1.4 Member Function Documentation

4.1.4.1 std::string Action::getActionPrototype ( ) [virtual]

Generate std::string prototype for Action.

Returns

Encoded Action data into std::string.

Reimplemented in ev3::ActionDriveForever, ev3::ActionStop, ev3::ActionRotateRandDirection, ev3::ActionRotate, and ev3::ActionDriveDistance.

4.1.4.2 std::string Action::getString ( ) [virtual]

Get human-readable Action name.

Returns

String containing Action name.

Reimplemented in ev3::ActionDriveForever, ev3::ActionStop, ev3::ActionRotateRandDirection, ev3::ActionRotate, ev3::ActionDriveDistance, and ev3::ActionRepeat.

4.1.4.3 Action::ActionType Action::getType ( )

Get current Action type.

Returns

ActionType value.

4.1.4.4 bool Action::isExecuted ( ) [virtual]

Check if action was executed.

Returns

True if actcion was already executed, false otherwise.

4.1.4.5 bool Action::isFinished ( ) [virtual]

Check if Action condition is fullfilled.

Returns

Value returned from Action::_endCondition.

4.1.4.6 void Action::setCommands (CommandsVector *commands*)

Set Commands to be executed.

Parameters

commands	CommandsVector with pointers to commands.

4.1.4.7 void Action::setEndCondition (EndCondition *condition*)

Set end condition for Action.

Parameters

condition	Lambda function returning bool value.

4.1.5 Member Data Documentation

4.1.5.1 EndCondition ev3::Action::_endCondition [protected]

Initial value:

```
= []()
        {
            return true;
        }
```

Lambda function defining Action end condition.

The documentation for this class was generated from the following files:

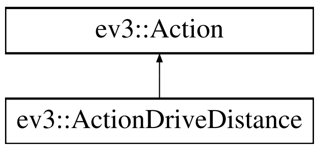
- /home/panda/Dokumenty/Repos/Ev3Dev/include/action/Action.h
- /home/panda/Dokumenty/Repos/Ev3Dev/src/action/Action.cpp

4.2 ev3::ActionDriveDistance Class Reference

Implements Robot simple task to drive straight for a given distance.

```
#include <Action.h>
```

Inheritance diagram for ev3::ActionDriveDistance:



Public Member Functions

- ActionDriveDistance (int distance)

  Constructor with distance parameter.
- ActionDriveDistance (CommandsVector commands, int distance)

  Constructor with CommandsVector and distance parameters.
- int getDistance ()

  Get distance the Robot has to drive.
- virtual std::string getActionPrototype ()

  Get ActionDriveDistance encoded name and its parameters.
- virtual std::string getString () override

  Get ActionDriveDistance human-readable name.

Private Attributes

- int _distance

  Distance for the robot to drive in units.

Additional Inherited Members

4.2.1 Detailed Description

Implements Robot simple task to drive straight for a given distance.

4.2.2 Constructor & Destructor Documentation

4.2.2.1 ActionDriveDistance::ActionDriveDistance (int *distance*)

Constructor with distance parameter.

Parameters

distance	Integer value in Robot units to be driven.

4.2.2.2 ActionDriveDistance::ActionDriveDistance (CommandsVector *commands,* int *distance*)

Constructor with CommandsVector and distance parameters.

Parameters

commands	Sequence of commands to be executed.
distance	Integer value in Robot units to be driven.

4.2.3 Member Function Documentation

4.2.3.1 std::string ActionDriveDistance::getActionPrototype ( ) [virtual]

Get ActionDriveDistance encoded name and its parameters.

Returns

String with encoded name and parameters.

Reimplemented from ev3::Action.

4.2.3.2 int ActionDriveDistance::getDistance ( )

Get distance the Robot has to drive.

Returns

Integer value in Robot units.

4.2.3.3 std::string ActionDriveDistance::getString ( ) [override], [virtual]

Get ActionDriveDistance human-readable name.

Returns

String with name and parameters

Reimplemented from ev3::Action.

The documentation for this class was generated from the following files:

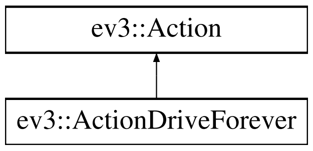
- /home/panda/Dokumenty/Repos/Ev3Dev/include/action/Action.h
- /home/panda/Dokumenty/Repos/Ev3Dev/src/action/Action.cpp

4.3 ev3::ActionDriveForever Class Reference

Implements Robot simple task to drive straight forever.

```
#include <Action.h>
```

Inheritance diagram for ev3::ActionDriveForever:



Public Member Functions

- ActionDriveForever (bool forward=true)

    Constructor with direction parameter.
- ActionDriveForever (CommandsVector commands, bool forward=true)

    Constructor with CommandsVector and direction parameter.
- virtual std::string getActionPrototype ()

    Get ActionDriveForever encoded name and its parameters.
- virtual std::string getString () override

    Get ActionDriveForever human-readable name.
- bool isForward ()

    Return specified direction.

Private Attributes

- bool _isForward

    Direction of driving. Either forward (true) or backward (false).

Additional Inherited Members

4.3.1 Detailed Description

Implements Robot simple task to drive straight forever.

4.3.2 Constructor & Destructor Documentation

4.3.2.1 ActionDriveForever::ActionDriveForever (bool *forward* = `true`)

Constructor with direction parameter.

Parameters

forward	True to drive forward, false otherwise.

4.3.2.2 ActionDriveForever::ActionDriveForever (**CommandsVector** *commands*, bool *forward* = `true`)

Constructor with CommandsVector and direction parameter.

Parameters

commands	Sequence of commands to be executed.
forward	True to drive forward, false otherwise.

4.3.3 Member Function Documentation

4.3.3.1 std::string ActionDriveForever::getActionPrototype ( ) [virtual]

Get ActionDriveForever encoded name and its parameters.

Returns

String with encoded name and parameters.

Reimplemented from ev3::Action.

4.3.3.2 std::string ActionDriveForever::getString ( ) [override], [virtual]

Get ActionDriveForever human-readable name.

Returns

String with name and parameters

Reimplemented from ev3::Action.

4.3.3.3 bool ActionDriveForever::isForward ( )

Return specified direction.

Returns

True for forward, false for backward.

The documentation for this class was generated from the following files:

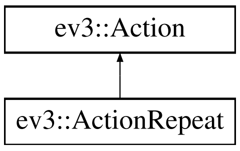
- /home/panda/Dokumenty/Repos/Ev3Dev/include/action/Action.h
- /home/panda/Dokumenty/Repos/Ev3Dev/src/action/Action.cpp

4.4 ev3::ActionRepeat Class Reference

Stores many Actions in a vector and executes them in loop.

```
#include <Action.h>
```

Inheritance diagram for ev3::ActionRepeat:



Public Member Functions

- ActionRepeat (StoredActions actions, unsigned int n)

  Constructor with StoredActions and iterations parameters.
- virtual void execute ()

  Continue with executing stored Actions.
- virtual std::string getString ()

  Return human-readable ActionRepeat name.

Private Attributes

- StoredActions _actions

  Vector of stored Actions to be executed.
- unsigned int _n

  Number of iterations.
- unsigned int _currentIteration = 0

  Keeps track of iterations already passed.
- unsigned int _currentAction = 0

  Keeps track of which Action is currently in progress.

Additional Inherited Members

4.4.1 Detailed Description

Stores many Actions in a vector and executes them in loop.

Number of iterations is given and may be infinite.

4.4.2 Constructor & Destructor Documentation

4.4.2.1 ActionRepeat::ActionRepeat (StoredActions *actions*, unsigned int *n*)

Constructor with StoredActions and iterations parameters.

Parameters

actions	Vector of Actions to be executed in a loop.
n	Number of iterations. If 0 is given, loop will be infinite.

4.4.3 Member Function Documentation

4.4.3.1 std::string ActionRepeat::getString ( ) [virtual]

Return human-readable ActionRepeat name.

Returns

String containing Action name.

Reimplemented from ev3::Action.

The documentation for this class was generated from the following files:

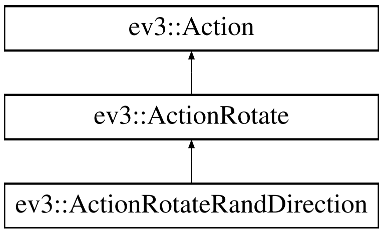
- /home/panda/Dokumenty/Repos/Ev3Dev/include/action/Action.h
- /home/panda/Dokumenty/Repos/Ev3Dev/src/action/Action.cpp

4.5 ev3::ActionRotate Class Reference

Implements Robot simple task to rotate a given angle, while not driving.

```
#include <Action.h>
```

Inheritance diagram for ev3::ActionRotate:



Public Member Functions

- ActionRotate (int rotation)
  Constructor with rotation parameter in degrees.
- ActionRotate (CommandsVector commands, int rotation)
  Constructor with CommandsVector and rotation parameters.
- int getRotation ()
  Get Robot rotation.
- virtual std::string getActionPrototype ()
  Get ActionRotate encoded name and its parameters.
- virtual std::string getString () override
  Get ActionRotate human-readable name.

Protected Attributes

- int _rotation
  Angle of rotation in degrees for the Robot.

Additional Inherited Members

4.5.1 Detailed Description

Implements Robot simple task to rotate a given angle, while not driving.

Rotation is made in place.

4.5.2 Constructor & Destructor Documentation

4.5.2.1 ActionRotate::ActionRotate (int *rotation*)

Constructor with rotation parameter in degrees.

Parameters

rotation	Number of degrees to rotate. Positive value rotates clockwise.

4.5.2.2 ActionRotate::ActionRotate (CommandsVector *commands,* int *rotation*)

Constructor with CommandsVector and rotation parameters.

Parameters

commands	Sequence of commands to be executed.
rotation	Integer value of Robot rotation in degrees.

4.5.3 Member Function Documentation

4.5.3.1 std::string ActionRotate::getActionPrototype ( ) [virtual]

Get ActionRotate encoded name and its parameters.

Returns

String with encoded name and parameters.

Reimplemented from ev3::Action.

Reimplemented in ev3::ActionRotateRandDirection.

4.5.3.2 int ActionRotate::getRotation ( )

Get Robot rotation.

Returns

Integer value of rotation in degrees.

4.5.3.3 std::string ActionRotate::getString ( ) `[override], [virtual]`

Get ActionRotate human-readable name.

Returns

String with name and parameters

Reimplemented from ev3::Action.

Reimplemented in ev3::ActionRotateRandDirection.

The documentation for this class was generated from the following files:

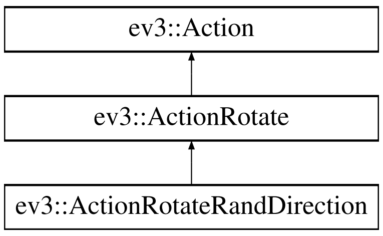
- /home/panda/Dokumenty/Repos/Ev3Dev/include/action/Action.h
- /home/panda/Dokumenty/Repos/Ev3Dev/src/action/Action.cpp

4.6 ev3::ActionRotateRandDirection Class Reference

Implements Robot simple task to rotate a random angle.

`#include <Action.h>`

Inheritance diagram for ev3::ActionRotateRandDirection:



Public Member Functions

- ActionRotateRandDirection (int rotation)

    Constructor with rotation parameter in degrees.
- ActionRotateRandDirection (CommandsVector commands, int rotation)

    Constructor with CommandsVector and rotation parameters.
- virtual std::string getActionPrototype ()

    Get ActionRotateRandDirection encoded name and its parameters.
- virtual std::string getString () override

    Get ActionRotateRandDirection human-readable name.
- virtual void execute () override

Additional Inherited Members

4.6.1 Detailed Description

Implements Robot simple task to rotate a random angle.

Rotation is performed in place. Maximum angle in degrees is passed via constructor argument.

4.6.2 Constructor & Destructor Documentation

4.6.2.1 ActionRotateRandDirection::ActionRotateRandDirection (int *rotation*)

Constructor with rotation parameter in degrees.

Parameters

rotation	Upper limit of degrees to rotate randomly. Positive value rotates clockwise.

4.6.2.2 ActionRotateRandDirection::ActionRotateRandDirection (CommandsVector *commands*, int *rotation*)

Constructor with CommandsVector and rotation parameters.

Parameters

commands	Sequence of commands to be executed.
rotation	Upper limit of degrees to rotate randomly. Positive value rotates clockwise.

4.6.3 Member Function Documentation

4.6.3.1 void ActionRotateRandDirection::execute ( ) `[override]`, `[virtual]`

See also

Action::execute

Reimplemented from ev3::Action.

4.6.3.2 std::string ActionRotateRandDirection::getActionPrototype ( ) `[virtual]`

Get ActionRotateRandDirection encoded name and its parameters.

Returns

String with encoded name and parameters.

Reimplemented from ev3::ActionRotate.

4.6.3.3 std::string ActionRotateRandDirection::getString ( ) `[override]`, `[virtual]`

Get ActionRotateRandDirection human-readable name.

Returns

String with name and parameters

Reimplemented from ev3::ActionRotate.

The documentation for this class was generated from the following files:

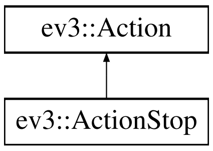
- /home/panda/Dokumenty/Repos/Ev3Dev/include/action/Action.h
- /home/panda/Dokumenty/Repos/Ev3Dev/src/action/Action.cpp

4.7 ev3::ActionStop Class Reference

Implements Robot simple task to stop all active motors.

```
#include <Action.h>
```

Inheritance diagram for ev3::ActionStop:



Public Member Functions

- ActionStop ()

  Default constructor.
- ActionStop (CommandsVector commands)

  Constructor with CommandsVector parameter.
- virtual std::string getActionPrototype ()

  Get ActionStop encoded name and its parameters.
- virtual std::string getString () override

  Get ActionStop human-readable name.

Additional Inherited Members

4.7.1 Detailed Description

Implements Robot simple task to stop all active motors.

4.7.2 Constructor & Destructor Documentation

4.7.2.1 ActionStop::ActionStop (**CommandsVector** *commands*)

Constructor with CommandsVector parameter.

Parameters

commands	Sequence of commands to be executed.

4.7.3 Member Function Documentation

4.7.3.1 std::string ActionStop::getActionPrototype ( ) `[virtual]`

Get ActionStop encoded name and its parameters.

Returns

String with encoded name and parameters.

Reimplemented from ev3::Action.

4.7.3.2 std::string ActionStop::getString ( ) `[override], [virtual]`

Get ActionStop human-readable name.

Returns

String with name and parameters

Reimplemented from ev3::Action.

The documentation for this class was generated from the following files:

- /home/panda/Dokumenty/Repos/Ev3Dev/include/action/Action.h
- /home/panda/Dokumenty/Repos/Ev3Dev/src/action/Action.cpp

4.8 ev3::Agent Class Reference

Master-side representative of a robot unit.

```
#include <Agent.h>
```

Public Member Functions

- unsigned int getId ()

  Agent id getter.
- void setId (const unsigned int id)

  Agent id setter.
- unsigned int getCommId ()

  Current communication id getter.
- void setCommId (const unsigned int commId)

  Communication id setter.
- void processMessage (Message ∗message, Message ∗retMessage)

  Process received Message to produce response.
- void updateLastMessage (Message ∗message)

  Update data concerning last message sent.
- void setBehaviour (SharedPtrBehaviour behaviour)

  Set currently executing Behaviour.
- void setMeasurement (Measurements measurements)

  Set measurements that must be done on corresponding Robot.

Private Attributes

- SharedPtrBehaviour _currentBehaviour

  Currently active Behaviour.
- Measurements _measurements

  Vector with Sensor types.
- RobotState::States _state = RobotState::IDLE

  Current state of the corresponding Robot.
- unsigned int _id

  Assigned Agent id.
- unsigned int _commId = 0

  Message id.
- Message::MessageType _lastMessageType

  Type of the last Message sent.

4.8.1 Detailed Description

Master-side representative of a robot unit.

Lacks all device references and action execution.

4.8.2 Member Function Documentation

4.8.2.1 unsigned int Agent::getCommId ( )

Current communication id getter.

Returns

Id of Message id synchronised between Agent and Robot.

4.8.2.2 unsigned int Agent::getId ( )

Agent id getter.

Returns

Id given by Master.

4.8.2.3 void Agent::processMessage (Message ∗ *message*, Message ∗ *retMessage*)

Process received Message to produce response.

Parameters

message	Message to be analyzed.
retMessage	Modified Message to be sent to Robot.

4.8.2.4 void Agent::setBehaviour (**SharedPtrBehaviour** *behaviour*)

Set currently executing Behaviour.

Parameters

behaviour	Behaviour shared_ptr object.

4.8.2.5 void Agent::setCommId (const unsigned int *commId*)

Communication id setter.

Parameters

comm↩ Id	New communication id.

4.8.2.6 void Agent::setId (const unsigned int *id*)

Agent id setter.

Parameters

id	New id for this Agent.

4.8.2.7 void Agent::setMeasurement (**Measurements** *measurements*)

Set measurements that must be done on corresponding Robot.

Parameters

measurements	Vector of Sensor types.

4.8.2.8 void Agent::updateLastMessage (**Message** ∗ *message*)

Update data concerning last message sent.

Parameters

message	Last Message sent to corresponding Robot.

4.8.3 Member Data Documentation

4.8.3.1 Measurements ev3::Agent::_measurements [private]

Vector with Sensor types.

These Sensors measure values that are sent to the master.

The documentation for this class was generated from the following files:

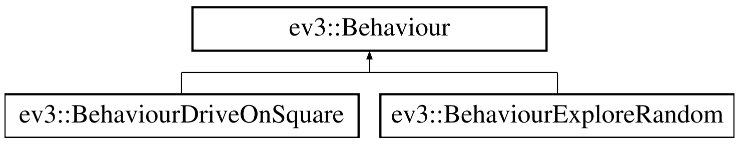
- /home/panda/Dokumenty/Repos/Ev3Dev/include/master/Agent.h
- /home/panda/Dokumenty/Repos/Ev3Dev/src/master/Agent.cpp

4.9 ev3::Behaviour Class Reference

Base class for all defined behaviours.

```
#include <Behaviour.h>
```

Inheritance diagram for ev3::Behaviour:



Public Types

- enum BehaviourType { CUSTOM, DRIVE_ON_SQUARE, EXPLORE_RANDOM }

  Type of Behaviour.

Public Member Functions

- Behaviour ()=default

  Default constructor.
- Behaviour (BehaviourType type, BehaviourStates states)

  Constructor with type and states vector parameters.
- Behaviour (BehaviourType type)

  Constructor with behaviour type.
- void setStates (BehaviourStates states)

  Available states setter.
- void setReactionStates (BehaviourStates reactionStates)

  Special reaction states which occur when event is fired.
- void setStopState (BehaviourState state)

  Special stop state, used mainly to get precise sensor measurements.
- void setMeasurements (Measurements measurements)

  Sensor which measurements will be required.
- virtual StringVector getPrototype ()

  Get Behaviour encoded name and its parameters.

- virtual std::string getString ()

  Get Behaviour human-readable name.
- virtual void process ()

  Updates behaviour in every iteration.
- void stop ()

  Stops Behaviour execution definetely.
- void pause ()

  Pauses Behaviour execution until it's resumed.
- void resume ()

  Resumes paused Behaviour.
- void start ()

  Starts Behaviour execution.
- void react (Event::EventType type)

  Performs special actions based on Event passed.

Protected Attributes

- BehaviourType _type

  Type of Behaviour.
- BehaviourState _currentState

  Currently processed Behaviour.
- BehaviourState _stopState

  Special stop state for measurements and accurate action execution.
- BehaviourStates _states

  Vector with all Behaviour available states.
- BehaviourStates _reactionStates

  Vector with all reaction states, occuring after specific events.
- Measurements _measurements

  Vector of all Sensor ids that will be measured.
- bool _active = false

  Specified whether Behaviour is currently active or not.

4.9.1 Detailed Description

Base class for all defined behaviours.

It's responsible for maintaining active actions in a form of a state machine as well as keep track of sensors' measurements.

4.9.2 Member Enumeration Documentation

4.9.2.1 enum ev3::Behaviour::BehaviourType

Type of Behaviour.

Enumerator

CUSTOM	Custom, user-defined behaviour.
DRIVE_ON_SQUARE	Follow square-shaped route.
EXPLORE_RANDOM	Drive in a direction and rotate randomly.

4.9.3 Constructor & Destructor Documentation

4.9.3.1 Behaviour::Behaviour (**BehaviourType** *type*, **BehaviourStates** *states*)

Constructor with type and states vector parameters.

Parameters

type	Behaviour type.
states	Vector of available Behaviour states.

4.9.3.2 Behaviour::Behaviour (**BehaviourType** *type*)

Constructor with behaviour type.

Parameters

type	Behaviour type.

4.9.4 Member Function Documentation

4.9.4.1 StringVector Behaviour::getPrototype ( ) `[virtual]`

Get Behaviour encoded name and its parameters.

Returns

StringVector with encoded name and parameters as its members.

Reimplemented in ev3::BehaviourExploreRandom, and ev3::BehaviourDriveOnSquare.

4.9.4.2 std::string Behaviour::getString ( ) `[virtual]`

Get Behaviour human-readable name.

Returns

String with name and parameters

Reimplemented in ev3::BehaviourExploreRandom, and ev3::BehaviourDriveOnSquare.

4.9.4.3 void Behaviour::react (**Event::EventType** *type*)

Performs special actions based on Event passed.

Parameters

type	Event type that will be processed.

4.9.4.4 void Behaviour::setMeasurements (Measurements *measurements*)

Sensor which measurements will be required.

Parameters

measurements	Vector of sensor types.

4.9.4.5 void Behaviour::setReactionStates (BehaviourStates *reactionStates*)

Special reaction states which occur when event is fired.

Parameters

reactionStates	Vector of reaction states for this Behaviour.

4.9.4.6 void Behaviour::setStates (BehaviourStates *states*)

Available states setter.

Parameters

states	Vector of states for this Behaviour.

4.9.4.7 void Behaviour::setStopState (BehaviourState *state*)

Special stop state, used mainly to get precise sensor measurements.

Parameters

state	BehaviourState object for stop state.

The documentation for this class was generated from the following files:

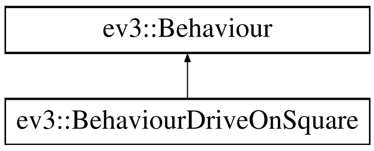
- /home/panda/Dokumenty/Repos/Ev3Dev/include/action/Behaviour.h
- /home/panda/Dokumenty/Repos/Ev3Dev/src/action/Behaviour.cpp

4.10 ev3::BehaviourDriveOnSquare Class Reference

Implements complex behaviour of driving on a square-shaped route.

```
#include <Behaviour.h>
```

Inheritance diagram for ev3::BehaviourDriveOnSquare:



Public Member Functions

- BehaviourDriveOnSquare (unsigned int side, bool turningRight)
  Constructor with square side and direction (either left or right).
- BehaviourDriveOnSquare (BehaviourStates states, unsigned int side, bool turningRight)
  Constructor with Behaviour states and driving parameters.
- virtual StringVector getPrototype ()
  Get BehaviourDriveOnSquare encoded name and its parameters.
- virtual std::string getString ()
  Get BehaviourDriveOnSquare human-readable name.

Private Attributes

- unsigned int _squareSide
  Length of square side in units.
- bool _isTurningRight
  Drive direction. True for turning right, false otherwise.

Additional Inherited Members

4.10.1 Detailed Description

Implements complex behaviour of driving on a square-shaped route.

Square side and direction (right/left) can be implicitly defined.

4.10.2 Constructor & Destructor Documentation

4.10.2.1 BehaviourDriveOnSquare::BehaviourDriveOnSquare (unsigned int *side*, bool *turningRight*)

Constructor with square side and direction (either left or right).

Parameters

side	Length of square side in units.
turningRight	True for turning right, false otherwise.

4.10.2.2 BehaviourDriveOnSquare::BehaviourDriveOnSquare (BehaviourStates *states,* unsigned int *side,* bool *turningRight*)

Constructor with Behaviour states and driving parameters.

Parameters

states	Vector of Behaviour states to be processed.
side	Length of square side in units.
turningRight	True for turning right, false otherwise.

4.10.3 Member Function Documentation

4.10.3.1 StringVector BehaviourDriveOnSquare::getPrototype ( ) [virtual]

Get BehaviourDriveOnSquare encoded name and its parameters.

Returns

StringVector with encoded name and parameters as its members.

Reimplemented from ev3::Behaviour.

4.10.3.2 std::string BehaviourDriveOnSquare::getString ( ) [virtual]

Get BehaviourDriveOnSquare human-readable name.

Returns

String with name and parameters

Reimplemented from ev3::Behaviour.

The documentation for this class was generated from the following files:

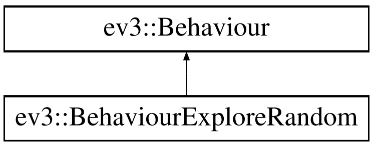
- /home/panda/Dokumenty/Repos/Ev3Dev/include/action/Behaviour.h
- /home/panda/Dokumenty/Repos/Ev3Dev/src/action/Behaviour.cpp

4.11 ev3::BehaviourExploreRandom Class Reference

Implements complex behaviour of exploring the surrounding with random rotation.

`#include <Behaviour.h>`

Inheritance diagram for ev3::BehaviourExploreRandom:



Public Member Functions

- BehaviourExploreRandom ()
  Default constructor.
- BehaviourExploreRandom (BehaviourStates states)
  Constructor with Behaviour states parameter.
- virtual StringVector getPrototype ()
  Get BehaviourExploreRandom encoded name and its parameters.
- virtual std::string getString ()
  Get BehaviourExploreRandom human-readable name.

Additional Inherited Members

4.11.1 Detailed Description

Implements complex behaviour of exploring the surrounding with random rotation.

4.11.2 Constructor & Destructor Documentation

4.11.2.1 BehaviourExploreRandom::BehaviourExploreRandom (**BehaviourStates** *states*)

Constructor with Behaviour states parameter.

Parameters

states	Vector of available Behaviour states.

4.11.3 Member Function Documentation

4.11.3.1 StringVector BehaviourExploreRandom::getPrototype ( ) `[virtual]`

Get BehaviourExploreRandom encoded name and its parameters.

Returns

StringVector with encoded name and parameters as its members.

Reimplemented from ev3::Behaviour.

4.11.3.2 std::string BehaviourExploreRandom::getString ( ) [virtual]

Get BehaviourExploreRandom human-readable name.

Returns

String with name and parameters

Reimplemented from ev3::Behaviour.

The documentation for this class was generated from the following files:

- /home/panda/Dokumenty/Repos/Ev3Dev/include/action/Behaviour.h
- /home/panda/Dokumenty/Repos/Ev3Dev/src/action/Behaviour.cpp

4.12 ev3::BehaviourState Class Reference

Encapsulates action and other information in a form of a state.

```
#include <BehaviourState.h>
```

Public Member Functions

- BehaviourState ()=default

  Default constructor.
- BehaviourState (const BehaviourState &other)=default

  Default copy constructor.
- BehaviourState (SharedPtrAction action, unsigned int nextState, bool isStopState=false)

  Constructor with action, next state id and stop state flag.
- BehaviourState (SharedPtrAction action, unsigned int nextState, ReactionsTransitions reactions)

  Constructor with action, next state id and event-state map.
- unsigned int process ()

  Process state in every iteration.
- SharedPtrAction getAction ()

  State's Action getter.
- void setNextState (const unsigned int next)

  Next state id setter.
- bool isStopState ()

  Stop flag getter.
- void setReactions (ReactionsTransitions reactions)

  Reactions setter.
- int getReaction (Event::EventType type)

  Reaction getter.

Private Attributes

- SharedPtrAction _action = nullptr

  Encapsulated action.
- bool _isExecuted = false

  True if state was executed, false otherwise.
- bool _isStopState = false

  Stop flag.
- unsigned int _nextStateId

  Id of the next state.
- ReactionsTransitions _reactions

  Map of event-triggered transitions.

4.12.1 Detailed Description

Encapsulates action and other information in a form of a state.

It can contain reactions to different events.

4.12.2 Constructor & Destructor Documentation

4.12.2.1 ev3::BehaviourState::BehaviourState (const **BehaviourState** & *other*) `[default]`

Default copy constructor.

Parameters

other	Other BehaviourState object.

4.12.2.2 BehaviourState::BehaviourState (**SharedPtrAction** *action,* unsigned int *nextState,* bool *isStopState* = `false`)

Constructor with action, next state id and stop state flag.

Parameters

action	Action object to be executed within this state.
nextState	Id of the next state that will replace this one.
isStopState	Flag defining this state as a in-between, stopping state.

4.12.2.3 BehaviourState::BehaviourState (**SharedPtrAction** *action,* unsigned int *nextState,* **ReactionsTransitions** *reactions*)

Constructor with action, next state id and event-state map.

Parameters

action	Action object to be executed within this state,
nextState	Id of the next state that will replace this one.
reactions	Map containing event-state pairs describing reactions.

4.12.3 Member Function Documentation

4.12.3.1 SharedPtrAction BehaviourState::getAction ( )

State's Action getter.

Returns

Action shared_ptr object.

4.12.3.2 int BehaviourState::getReaction (Event::EventType *type*)

Reaction getter.

Parameters

type	EventType to which reaction occurs.

Returns

Id of the reaction state.

4.12.3.3 bool BehaviourState::isStopState ( )

Stop flag getter.

Returns

True if state is flagged as a stop state, false otherwise.

4.12.3.4 unsigned int BehaviourState::process ( )

Process state in every iteration.

Returns

Id of the next state.

4.12.3.5 void BehaviourState::setNextState (const unsigned int *next*)

Next state id setter.

Parameters

next	Integer defining next state id.

4.12.3.6 void BehaviourState::setReactions (ReactionsTransitions *reactions*)

Reactions setter.

Parameters

reactions	Map with Event-State pair.

The documentation for this class was generated from the following files:

- /home/panda/Dokumenty/Repos/Ev3Dev/include/action/BehaviourState.h
- /home/panda/Dokumenty/Repos/Ev3Dev/src/action/BehaviourState.cpp

4.13 ev3::CommUtils::Buffer Struct Reference

Contains buffer and its size.

Public Attributes

- void ∗ buffer

  Pointer to allocated buffer.
- size_t size

  Size of bytes allocated.

4.13.1 Detailed Description

Contains buffer and its size.

Used by low-level methods.

The documentation for this struct was generated from the following file:

- /home/panda/Dokumenty/Repos/Ev3Dev/include/communication/CommUtils.h

4.14 ev3dev::button Class Reference

Classes

- struct file_descriptor

Public Member Functions

- **button** (int bit)
- bool **pressed** () const
- bool **process** ()

Static Public Member Functions

- static bool **process_all** ()

Public Attributes

- std::function< void(bool)> **onclick**

Static Public Attributes

- static button **back**
- static button **left**
- static button **right**
- static button **up**
- static button **down**
- static button **enter**

Private Attributes

- int **_bit**
- bool **_state** = false
- std::vector< unsigned long > **_buf**
- std::shared_ptr< file_descriptor > **_fd**

The documentation for this class was generated from the following files:

- /home/panda/Dokumenty/Repos/Ev3Dev/include/ev3dev/ev3dev.h
- /home/panda/Dokumenty/Repos/Ev3Dev/src/ev3dev/ev3dev.cpp

4.15 ev3::CircularBuffer< T > Class Template Reference

Template class for storing N objects of a particular class.

```
#include <CircularBuffer.h>
```

Public Member Functions

- CircularBuffer ()=delete

  No default constructor.
- CircularBuffer (unsigned int limit)

  Constructor with limit parameter.
- void push (T object)

  Put object into the buffer.
- bool contain (T object)

  Get information about certain object.

Private Attributes

- std::vector< T > _buffer

  The actual buffer implemented as a vector.
- unsigned int _index = 0

  Current insertion position.
- unsigned int _limit

  Upper limit for the buffer.

4.15.1 Detailed Description

template<class T>
class ev3::CircularBuffer< T >

Template class for storing N objects of a particular class.

Replaces old objects if limit is exceeded.

4.15.2 Constructor & Destructor Documentation

4.15.2.1 template<class T > ev3::CircularBuffer< T >::CircularBuffer (unsigned int *limit*)

Constructor with limit parameter.

Parameters

limit	Positive integer defining upper buffer limit.

4.15.3 Member Function Documentation

4.15.3.1 template<class T> bool ev3::CircularBuffer< T >::contain (T *object*)

Get information about certain object.

Parameters

object	Object to be found in buffer.

Returns

True if found, false otherwise.

4.15.3.2 template<class T> void **ev3::CircularBuffer**< T >::push (T *object*)

Put object into the buffer.

Replace old ones if limit is reached.

Parameters

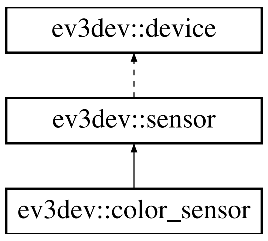
object	Template object to be put into the buffer.

The documentation for this class was generated from the following file:

- /home/panda/Dokumenty/Repos/Ev3Dev/include/utils/CircularBuffer.h

4.16 ev3dev::color_sensor Class Reference

Inheritance diagram for ev3dev::color_sensor:



Public Member Functions

- **color_sensor** (address_type address=INPUT_AUTO)
- int **reflected_light_intensity** ()
- int **ambient_light_intensity** ()
- int **color** ()
- int **red** ()
- int **green** ()
- int **blue** ()

Static Public Attributes

- static const std::string **mode_col_reflect** { "COL-REFLECT" }
- static const std::string **mode_col_ambient** { "COL-AMBIENT" }
- static const std::string **mode_col_color** { "COL-COLOR" }
- static const std::string **mode_ref_raw** { "REF-RAW" }
- static const std::string **mode_rgb_raw** { "RGB-RAW" }

Additional Inherited Members

The documentation for this class was generated from the following files:

- /home/panda/Dokumenty/Repos/Ev3Dev/include/ev3dev/ev3dev.h
- /home/panda/Dokumenty/Repos/Ev3Dev/src/ev3dev/ev3dev.cpp

4.17 ev3::ColorUtils Class Reference

Stores all available color escape codes.

```
#include <ColorUtils.h>
```

Public Types

- typedef std::string colorCode

  Type for storing color names.

Static Public Member Functions

- static void printColorTest ()

  Print "TEST" in all available colors.

Static Public Attributes

- static const colorCode BLACK {"\033[30m"}

  BLACK color code.
- static const colorCode RED {"\033[31m"}

  RED color code.
- static const colorCode GREEN {"\033[32m"}

  GREEN color code.
- static const colorCode YELLOW {"\033[33m"}

  YELLOW color code.
- static const colorCode BLUE {"\033[34m"}

  BLUE color code.
- static const colorCode MAGENTA {"\033[35m"}

  MAGENTA color code.
- static const colorCode CYAN {"\033[36m"}

CYAN color code.

- static const colorCode WHITE {"\033[37m"}

  WHITE color code.
- static const colorCode BLACK_BOLD {"\033[30;1m"}

  BLACK_BOLD color code.
- static const colorCode RED_BOLD {"\033[31;1m"}

  RED_BOLD color code.
- static const colorCode GREEN_BOLD {"\033[32;1m"}

  GREEN_BOLD color code.
- static const colorCode YELLOW_BOLD {"\033[33;1m"}

  YELLOW_BOLD color code.
- static const colorCode BLUE_BOLD {"\033[34;1m"}

  BLUE_BOLD color code.
- static const colorCode MAGENTA_BOLD {"\033[35;1m"}

  MAGENTA_BOLD color code.
- static const colorCode CYAN_BOLD {"\033[36;1m"}

  CYAN_BOLD color code.
- static const colorCode WHITE_BOLD {"\033[37;1m"}

  WHITE_BOLD color code.
- static const colorCode BLACK_FAINT {"\033[30;2m"}

  BLACK_FAINT color code.
- static const colorCode RED_FAINT {"\033[31;2m"}

  RED_FAINT color code.
- static const colorCode GREEN_FAINT {"\033[32;2m"}

  GREEN_FAINT color code.
- static const colorCode YELLOW_FAINT {"\033[33;2m"}

  YELLOW_FAINT color code.
- static const colorCode BLUE_FAINT {"\033[34;2m"}

  BLUE_FAINT color code.
- static const colorCode MAGENTA_FAINT {"\033[35;2m"}

  MAGENTA_FAINT color code.
- static const colorCode CYAN_FAINT {"\033[36;2m"}

  CYAN_FAINT color code.
- static const colorCode WHITE_FAINT {"\033[37;2m"}

  WHITE_FAINT color code.
- static const colorCode RESET {"\033[39;0m"}

  RESET color.

4.17.1 Detailed Description

Stores all available color escape codes.

The documentation for this class was generated from the following files:

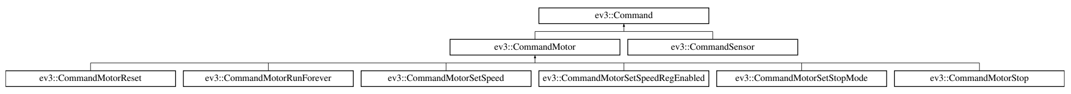
- /home/panda/Dokumenty/Repos/Ev3Dev/include/utils/ColorUtils.h
- /home/panda/Dokumenty/Repos/Ev3Dev/src/utils/ColorUtils.cpp

4.18 ev3::Command Class Reference

Base class for all command controlling classes.

`#include <Command.h>`

Inheritance diagram for ev3::Command:


ev3::Command
ev3::CommandMotor
ev3::CommandSensor
ev3::CommandMotorReset
ev3::CommandMotorRunForever
ev3::CommandMotorSetSpeed
ev3::CommandMotorSetSpeedRegEnabled
ev3::CommandMotorSetStopMode
ev3::CommandMotorStop

Public Member Functions

- Command ()

  Default constructor.
- virtual void execute ()

  Execute device specific command.
- virtual std::string getString ()

  Return Command's name.

Protected Attributes

- std::string _debugInfo = ""

  String containing Command's name.

4.18.1 Detailed Description

Base class for all command controlling classes.

Each Command class encapsulates basic motor or sensor operation.

4.18.2 Member Function Documentation

4.18.2.1 std::string Command::getString ( ) `[virtual]`

Return Command's name.

Returns

The documentation for this class was generated from the following files:

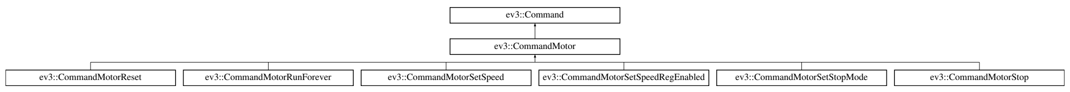
- /home/panda/Dokumenty/Repos/Ev3Dev/include/action/Command.h
- /home/panda/Dokumenty/Repos/Ev3Dev/src/action/Command.cpp

4.19 ev3::CommandMotor Class Reference

Base class for all motor controlling commands.

```
#include <CommandMotor.h>
```

Inheritance diagram for ev3::CommandMotor:


ev3::Command
ev3::CommandMotor
ev3::CommandMotorReset
ev3::CommandMotorRunForever
ev3::CommandMotorSetSpeed
ev3::CommandMotorSetSpeedRegEnabled
ev3::CommandMotorSetStopMode
ev3::CommandMotorStop

Public Member Functions

- CommandMotor (Motor &motor)

  Constructor with ev3dev::motor parameter.
- Motor getMotor ()

  Get motor associated with Command.

Protected Attributes

- const std::string SPEED_REGULATION_ON = "on"

  Command parameter to turn speed regulation on a Motor on.
- const std::string SPEED_REGULATION_OFF = "off"

  Command parameter to turn speed regulation on a Motor off.
- Motor _motor

  Motor on which this CommandMotor will be executed.

4.19.1 Detailed Description

Base class for all motor controlling commands.

See also

ev3dev::motor

4.19.2 Constructor & Destructor Documentation

4.19.2.1 CommandMotor::CommandMotor (**Motor** & *motor*)

Constructor with ev3dev::motor parameter.

Parameters

motor	Motor to execute CommandMotor on.

4.19.3 Member Function Documentation

4.19.3.1 Motor CommandMotor::getMotor ( )

Get motor associated with Command.

Returns

Motor class object.

The documentation for this class was generated from the following files:

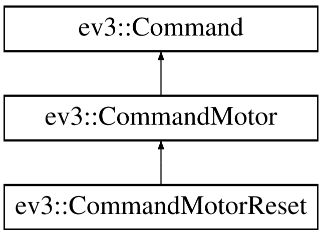
- /home/panda/Dokumenty/Repos/Ev3Dev/include/action/CommandMotor.h
- /home/panda/Dokumenty/Repos/Ev3Dev/src/action/CommandMotor.cpp

4.20 ev3::CommandMotorReset Class Reference

Calls `reset()` method of containing Motor.

`#include <CommandMotor.h>`

Inheritance diagram for ev3::CommandMotorReset:



Public Member Functions

- CommandMotorReset (Motor &motor)

  Constructor with ev3dev::motor parameter.
- void execute () override

  Perform `reset()` method on Motor.

Additional Inherited Members

4.20.1 Detailed Description

Calls `reset()` method of containing Motor.

4.20.2 Constructor & Destructor Documentation

4.20.2.1 CommandMotorReset::CommandMotorReset (Motor & *motor*)

Constructor with ev3dev::motor parameter.

Parameters

motor	Motor to execute CommandMotor on.

The documentation for this class was generated from the following files:

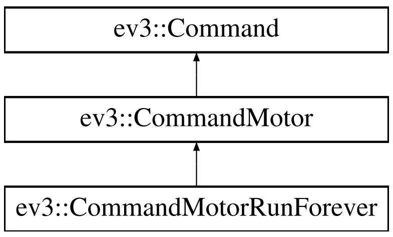
- /home/panda/Dokumenty/Repos/Ev3Dev/include/action/CommandMotor.h
- /home/panda/Dokumenty/Repos/Ev3Dev/src/action/CommandMotor.cpp

4.21 ev3::CommandMotorRunForever Class Reference

Calls `run_forever()` method of containing Motor.

`#include <CommandMotor.h>`

Inheritance diagram for ev3::CommandMotorRunForever:



Public Member Functions

- CommandMotorRunForever (Motor &motor)

  Constructor with ev3dev::motor parameter.
- void execute () override

  Perform `run_forever()` method on Motor.

Additional Inherited Members

4.21.1 Detailed Description

Calls `run_forever()` method of containing Motor.

4.21.2 Constructor & Destructor Documentation

4.21.2.1 CommandMotorRunForever::CommandMotorRunForever (Motor & *motor*)

Constructor with ev3dev::motor parameter.

Parameters

motor	Motor to execute CommandMotor on.

The documentation for this class was generated from the following files:

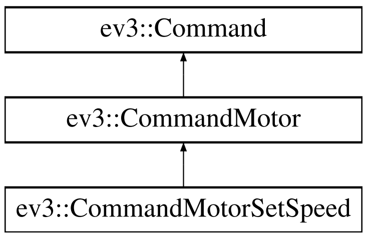
- /home/panda/Dokumenty/Repos/Ev3Dev/include/action/CommandMotor.h
- /home/panda/Dokumenty/Repos/Ev3Dev/src/action/CommandMotor.cpp

4.22 ev3::CommandMotorSetSpeed Class Reference

Call `set_speed_sp()` method of containing Motor.

`#include <CommandMotor.h>`

Inheritance diagram for ev3::CommandMotorSetSpeed:



Public Member Functions

- CommandMotorSetSpeed (Motor &motor, int value)

  Constructor with ev3dev::motor parameter.
- void execute () override

  Perform `set_speed_sp()` method on Motor.

Private Attributes

- int _value

  Speed value in tacho pulses per second.

Additional Inherited Members

4.22.1 Detailed Description

Call `set_speed_sp()` method of containing Motor.

4.22.2 Constructor & Destructor Documentation

4.22.2.1 CommandMotorSetSpeed::CommandMotorSetSpeed (Motor & *motor*, int *value*)

Constructor with ev3dev::motor parameter.

Parameters

motor	Motor to execute CommandMotor on.
value	Speed value in tacho pulses per second.

Warning

Speed regulation must be turned on for this to take effect.

See also

CommandMotorSetSpeedRegEnabled

The documentation for this class was generated from the following files:

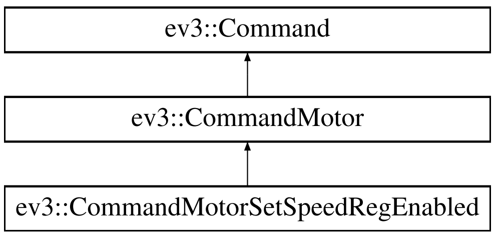
- /home/panda/Dokumenty/Repos/Ev3Dev/include/action/CommandMotor.h
- /home/panda/Dokumenty/Repos/Ev3Dev/src/action/CommandMotor.cpp

4.23 ev3::CommandMotorSetSpeedRegEnabled Class Reference

Calls `set_speed_regulation_enabled()` method of containing Motor.

`#include <CommandMotor.h>`

Inheritance diagram for ev3::CommandMotorSetSpeedRegEnabled:



Public Member Functions

- CommandMotorSetSpeedRegEnabled (Motor &motor, bool value)

  Constructor with ev3dev::motor parameter.
- void execute () override

  Perform `set_speed_regulation_enabled()` on Motor.

Private Attributes

- bool _value

  True value sets speed regulation enabled, false disables it.

Additional Inherited Members

4.23.1 Detailed Description

Calls `set_speed_regulation_enabled()` method of containing Motor.

4.23.2 Constructor & Destructor Documentation

4.23.2.1 CommandMotorSetSpeedRegEnabled::CommandMotorSetSpeedRegEnabled (Motor & *motor,* bool *value*)

Constructor with ev3dev::motor parameter.

Parameters

motor	Motor to execute CommandMotor on.
value	If true, turn speed regulation on, false to turn it off.

The documentation for this class was generated from the following files:

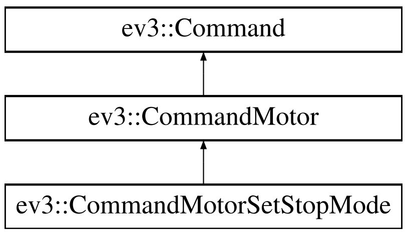
- /home/panda/Dokumenty/Repos/Ev3Dev/include/action/CommandMotor.h
- /home/panda/Dokumenty/Repos/Ev3Dev/src/action/CommandMotor.cpp

4.24 ev3::CommandMotorSetStopMode Class Reference

Calls `set_stop_command()` method of containing Motor.

```
#include <CommandMotor.h>
```

Inheritance diagram for ev3::CommandMotorSetStopMode:



Public Types

- enum StopMode { COAST, BRAKE, HOLD }

  Stop modes for motors.

Public Member Functions

- CommandMotorSetStopMode (Motor &motor, StopMode mode)

    Constructor with ev3dev::motor parameter.
- void execute () override

    Perform `set_stop_command()` method on Motor.

Private Attributes

- StopMode _mode

    Mode chosen to be selected on Motor when exeuted.

Additional Inherited Members

4.24.1 Detailed Description

Calls `set_stop_command()` method of containing Motor.

4.24.2 Member Enumeration Documentation

4.24.2.1 enum ev3::CommandMotorSetStopMode::StopMode

Stop modes for motors.

Enumerator

COAST	No voltage. Motor slowly stops.
BRAKE	Passive braking. Motor stops faster.
HOLD	Active braking. Hardly prevent motor from any movement.

4.24.3 Constructor & Destructor Documentation

4.24.3.1 CommandMotorSetStopMode::CommandMotorSetStopMode (Motor & *motor,* StopMode *mode*)

Constructor with ev3dev::motor parameter.

Parameters

motor	Motor to execute CommandMotor on.
mode	Stop mode chosen from StopMode.

The documentation for this class was generated from the following files:

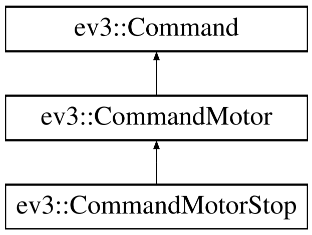
- /home/panda/Dokumenty/Repos/Ev3Dev/include/action/CommandMotor.h
- /home/panda/Dokumenty/Repos/Ev3Dev/src/action/CommandMotor.cpp

4.25 ev3::CommandMotorStop Class Reference

Calls `stop()` method of containing Motor.

`#include <CommandMotor.h>`

Inheritance diagram for ev3::CommandMotorStop:



Public Member Functions

- CommandMotorStop (Motor &motor)

    Constructor with ev3dev::motor parameter.
- void execute () override

    Perform `stop()` method on Motor.

Additional Inherited Members

4.25.1 Detailed Description

Calls `stop()` method of containing Motor.

4.25.2 Constructor & Destructor Documentation

4.25.2.1 CommandMotorStop::CommandMotorStop (Motor & *motor*)

Constructor with ev3dev::motor parameter.

Parameters

motor	Motor to execute CommandMotor on.

The documentation for this class was generated from the following files:

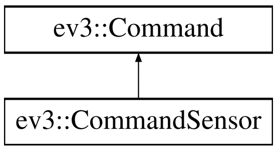
- /home/panda/Dokumenty/Repos/Ev3Dev/include/action/CommandMotor.h
- /home/panda/Dokumenty/Repos/Ev3Dev/src/action/CommandMotor.cpp

4.26 ev3::CommandSensor Class Reference

Base class for all sensor controlling commands.

```
#include <CommandSensor.h>
```

Inheritance diagram for ev3::CommandSensor:



Public Member Functions

- CommandSensor (Sensor &sensor)

  Constructor with ev3dev::sensor parameter.
- Sensor getSensor ()

  Get sensor associated with Command.

Protected Attributes

- Sensor _sensor

  Sensor on which this CommandSensor will be executed.

4.26.1 Detailed Description

Base class for all sensor controlling commands.

See also

ev3dev::sensor

4.26.2 Constructor & Destructor Documentation

4.26.2.1 CommandSensor::CommandSensor (Sensor & *sensor*)

Constructor with ev3dev::sensor parameter.

Parameters

sensor	Sensor to execute CommandSensor on.

4.26.3 Member Function Documentation

4.26.3.1 Sensor CommandSensor::getSensor ( )

Get sensor associated with Command.

Returns

Sensor class object.

The documentation for this class was generated from the following files:

- /home/panda/Dokumenty/Repos/Ev3Dev/include/action/CommandSensor.h
- /home/panda/Dokumenty/Repos/Ev3Dev/src/action/CommandSensor.cpp

4.27 ev3::Communication Class Reference

Encapsulates low-level communication and adds logic concerning sending and receiving Message queueing.

```
#include <Communication.h>
```

Public Member Functions

- Communication ()

  Default constructor.
- std::thread createThread (Queue< Message > ∗sendQueue, Queue< Message > ∗receiveQueue, bool isMaster=false)

  Thread creation method (insted of running Communication in the main thread).
- void run (Queue< Message > ∗sendQueue, Queue< Message > ∗receiveQueue, bool isMaster=false)

  Starts Communication procedures.

Private Member Functions

- void receive ()

  Looped Message receiving.
- void send ()

  Looped Message sending.

Private Attributes

- bool _isMaster = false

  True if Communication is synchronized with master, false otherwise.
- Queue< Message > ∗ _sendQueue

  Out Message queue.
- Queue< Message > ∗ _receiveQueue

  In Message queue.
- CommUtils _commUtils

  Low-level object performing the actual sending/receiving.
- unsigned int _socket

  Assigned socket id.
- unsigned int _port = DEFAULT_PORT

  Chosen port number.

4.27.1 Detailed Description

Encapsulates low-level communication and adds logic concerning sending and receiving Message queueing.

4.27.2 Member Function Documentation

4.27.2.1 std::thread Communication::createThread (Queue$<$ Message $>$ $*$ *sendQueue*, Queue$<$ Message $>$ $*$ *receiveQueue*, bool *isMaster* = `false`)

Thread creation method (insted of running Communication in the main thread).

Parameters

sendQueue	Out Message queue.
receiveQueue	In Message queue.
isMaster	True if queue is synchronized with master, false otherwise.

Returns

New std::thread object with Communication class active.

4.27.2.2 void Communication::run (Queue$<$ Message $>$ $*$ *sendQueue*, Queue$<$ Message $>$ $*$ *receiveQueue*, bool *isMaster* = `false`)

Starts Communication procedures.

Parameters

sendQueue	Out Message queue.
receiveQueue	In Message queue.
isMaster	True if queue is synchronized with master, false otherwise.

The documentation for this class was generated from the following files:

- /home/panda/Dokumenty/Repos/Ev3Dev/include/communication/Communication.h
- /home/panda/Dokumenty/Repos/Ev3Dev/src/communication/Communication.cpp

4.28 ev3::CommUtils Class Reference

Responsible for low-level communication.

```
#include <CommUtils.h>
```

Classes

- struct Buffer

  Contains buffer and its size.
- struct NetworkNode

  Stores information about a particular node in the network.

Public Member Functions

- CommUtils ()

  Default constructor.
- int preparePassiveSocket (unsigned int portNumber)

  Prepares socket for transmission on given port.
- int sendMessage (unsigned int socket, unsigned int port, Message &message, std::string &proto, bool is↩ Master, unsigned int repeat=SENT_MESSAGE_COPIES)

  General method for sending messages.
- int receiveMessage (unsigned int socket, Message &message, NetworkNode &sender)

  General receive method.
- int receiveMessageDelay (unsigned int socket, Message &message, NetworkNode &sender, unsigned int msDelay=DEFAULT_RECEIVE_DELAY)

  General receive method with waiting delay.

Private Member Functions

- int sendBroadcastMessage (unsigned int socket, unsigned int port, std::string message)

  Send message to all recipients in current network.
- int sendMessageTo (unsigned int socket, std::string ipAddress, unsigned int destinationPort, std::string message)

  Send message to specific ipv4 address.
- int makeSockAddr (std::string ipAddress, int portNumber, struct sockaddr_in ∗sockaddr)

  Prepares sockaddr_in structure.
- Buffer getBufferFromString (const std::string message)

  Converts Message prototype to Buffer structure.
- std::string getStringFromBuffer (const Buffer buffer)

  Converts Buffer structure into Message prototype.

Private Attributes

- std::map< unsigned int, NetworkNode > _remotes

  Map used to register all acquired nodes in the network.
- std::queue< NetworkNode > _unregisteredRemotes

  Queue storing temporal information about not yet registered remotes (agents).
- CircularBuffer< std::string > _packetBuffer

  Circular buffer used to store limited number of previous Message prototypes received.

4.28.1 Detailed Description

Responsible for low-level communication.

Uses socket API and UNIX sending and receiving methods.

4.28.2 Member Function Documentation

4.28.2.1 CommUtils::Buffer CommUtils::getBufferFromString (const std::string *message*) [private]

Converts Message prototype to Buffer structure.

Parameters

message	String prototype to be converted.

Returns

Buffer object after memory allocation.

4.28.2.2 std::string CommUtils::getStringFromBuffer (const Buffer *buffer*) [private]

Converts Buffer structure into Message prototype.

Parameters

buffer	Structure with allocated memory with data.

Returns

String with Message prototype.

4.28.2.3 int CommUtils::makeSockAddr (std::string *ipAddress*, int *portNumber*, struct sockaddr_in ∗ *sockaddr*) [private]

Prepares sockaddr_in structure.

Parameters

ipAddress	String containing ipv4 address.
portNumber	Number of port to communicate.
sockaddr	Structure to be set after calling.

Returns

Error code.

4.28.2.4 int CommUtils::preparePassiveSocket (unsigned int *portNumber*)

Prepares socket for transmission on given port.

Parameters

portNumber	Port number to assign socket to.

Returns

Id of the socket assigned.

4.28.2.5 int CommUtils::receiveMessage (unsigned int *socket,* Message & *message,* NetworkNode & *sender*)

General receive method.

Parameters

socket	Previously prepared socket.
message	Message reference to be set after receiving.
sender	NetworkNode to be set after receiving.

Returns

Error code or positive integer with number of bytes received.

4.28.2.6 int CommUtils::receiveMessageDelay (unsigned int *socket,* Message & *message,* NetworkNode & *sender,* unsigned int *msDelay* = `DEFAULT_RECEIVE_DELAY`)

General receive method with waiting delay.

Parameters

socket	Previously prepared socket.
message	Message reference to be set after receiving.
sender	NetworkNode to be set after receiving.
msDelay	Maximum time in milliseconds to wait for message.

Returns

Error code or positive integer with number of bytes received.

4.28.2.7 int CommUtils::sendBroadcastMessage (unsigned int *socket,* unsigned int *port,* std::string *message*) `[private]`

Send message to all recipients in current network.

Parameters

socket	Previously prepared socket.
port	Number of port to communicate through.
message	Message to be sent.

Returns

Error code or positive integer with number of bytes sent.

4.28.2.8 int CommUtils::sendMessage (unsigned int *socket*, unsigned int *port*, Message & *message*, std::string & *proto*, bool *isMaster*, unsigned int *repeat* = `SENT_MESSAGE_COPIES`)

General method for sending messages.

Parameters

socket	Previously prepared socket.
port	Number of port to communicate through.
message	Message to be sent.
proto	Message prototype passed to avoid its multiple encoding.
isMaster	Flag from Communication class. True if master is the sender.
repeat	Number of copies to be sent.

Returns

Error code or positive integer with number of bytes sent.

4.28.2.9 int CommUtils::sendMessageTo (unsigned int *socket*, std::string *ipAddress*, unsigned int *destinationPort*, std::string *message*) `[private]`

Send message to specific ipv4 address.

Parameters

socket	Previously prepared socket.
ipAddress	String containing ipv4 address.
destinationPort	Number of recipient port.
message	Message to be sent.

Returns

Error code or positive integer with number of bytes sent.

4.28.3 Member Data Documentation

4.28.3.1 CircularBuffer<std::string> ev3::CommUtils::_packetBuffer `[private]`

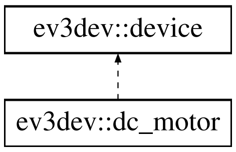
Circular buffer used to store limited number of previous Message prototypes received.

The documentation for this class was generated from the following files:

- /home/panda/Dokumenty/Repos/Ev3Dev/include/communication/CommUtils.h
- /home/panda/Dokumenty/Repos/Ev3Dev/src/communication/CommUtils.cpp

4.29 ev3dev::dc_motor Class Reference

Inheritance diagram for ev3dev::dc_motor:



Public Member Functions

- **dc_motor** (address_type address=OUTPUT_AUTO)
- auto **set_command** (std::string v) -> decltype(∗this)
- mode_set **commands** () const
- std::string **driver_name** () const
- int **duty_cycle** () const
- int **duty_cycle_sp** () const
- auto **set_duty_cycle_sp** (int v) -> decltype(∗this)
- std::string **polarity** () const
- auto **set_polarity** (std::string v) -> decltype(∗this)
- std::string **address** () const
- int **ramp_down_sp** () const
- auto **set_ramp_down_sp** (int v) -> decltype(∗this)
- int **ramp_up_sp** () const
- auto **set_ramp_up_sp** (int v) -> decltype(∗this)
- mode_set **state** () const
- auto **set_stop_command** (std::string v) -> decltype(∗this)
- mode_set **stop_commands** () const
- int **time_sp** () const
- auto **set_time_sp** (int v) -> decltype(∗this)
- void **run_forever** ()
- void **run_timed** ()
- void **run_direct** ()
- void **stop** ()

Static Public Attributes

- static const std::string **command_run_forever** { "run-forever" }
- static const std::string **command_run_timed** { "run-timed" }
- static const std::string **command_run_direct** { "run-direct" }
- static const std::string **command_stop** { "stop" }
- static const std::string **polarity_normal** { "normal" }
- static const std::string **polarity_inversed** { "inversed" }
- static const std::string **stop_command_coast** { "coast" }
- static const std::string **stop_command_brake** { "brake" }

Protected Attributes

- std::string **_port_name**

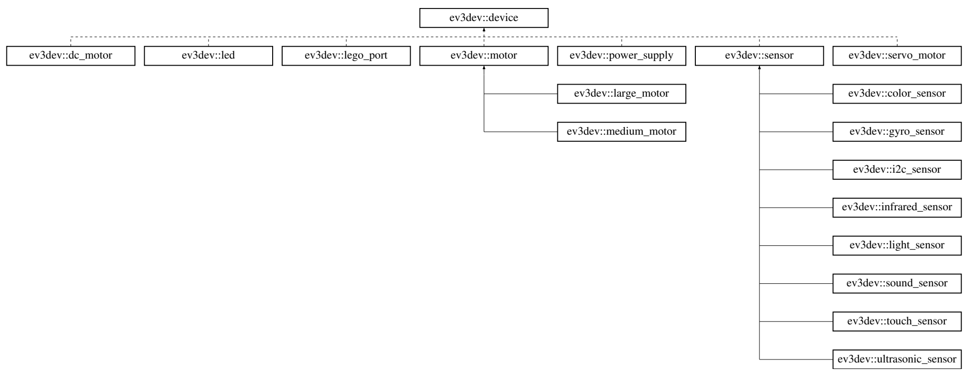
Additional Inherited Members

The documentation for this class was generated from the following files:

- /home/panda/Dokumenty/Repos/Ev3Dev/include/ev3dev/ev3dev.h
- /home/panda/Dokumenty/Repos/Ev3Dev/src/ev3dev/ev3dev.cpp

4.30 ev3dev::device Class Reference

Inheritance diagram for ev3dev::device:



Public Member Functions

- bool **connect** (const std::string &dir, const std::string &pattern, const std::map< std::string, std::set< std↩ ::string >> &match) noexcept
- bool **connected** () const
- int **device_index** () const
- int **get_attr_int** (const std::string &name) const
- void **set_attr_int** (const std::string &name, int value)
- std::string **get_attr_string** (const std::string &name) const
- void **set_attr_string** (const std::string &name, const std::string &value)
- std::string **get_attr_line** (const std::string &name) const
- mode_set **get_attr_set** (const std::string &name, std::string ∗pCur=nullptr) const
- std::string **get_attr_from_set** (const std::string &name) const

Protected Attributes

- std::string **_path**
- int **_device_index** = -1

The documentation for this class was generated from the following files:

- /home/panda/Dokumenty/Repos/Ev3Dev/include/ev3dev/ev3dev.h
- /home/panda/Dokumenty/Repos/Ev3Dev/src/ev3dev/ev3dev.cpp

4.31 ev3::Devices Class Reference

Singleton class responsible for managing devices connected to the robot.

`#include <Devices.h>`

Public Types

- typedef std::map< ev3dev::port_type, Motor > MotorsVector

  Type for mapping Motor objects to their assigned ports.
- typedef std::map< ev3dev::port_type, Sensor > SensorsVector

  Type for mapping Sensor objects to their assigned ports.
- typedef std::vector< std::pair< ev3dev::port_type, ev3dev::device_type > > RequiredDevices

  Vector of pairs mapping port to required device.
- typedef std::map< ev3dev::port_type, SensorValue > SensorStatus

  Map containing pairs port-values for all sensors.

Public Member Functions

- bool checkDevices (RequiredDevices &devices)

  Check connected devices and requirements.
- void update ()

  Performs update on measuring values.
- void addListener (Sensor::SensorType type)

  Add listener for given Sensor type.
- void removeListener (Sensor::SensorType type)

  Remove listener for given Sensor type.
- Motor getMotor (ev3dev::port_type port)

  Motor getter.
- Sensor getSensor (ev3dev::port_type port)

  Sensor getter.
- void setSafetyTouchSensor (ev3dev::port_type port)

  Specify port on which touch sensor that detects collisions is.
- void setProximitySensor (ev3dev::port_type port)

  Specify port on which proximity sensor that detects obstacles is.
- void stopAllDevices ()

  Stops all Motors.

Static Public Member Functions

- static Devices ∗ getInstance ()

  Instance getter.
- static void destroy ()

  Deallocate instance.

Static Public Attributes

- static const ev3dev::port_type PORT_ANY {"any"}

  Can be used to define that device port is irrelevant.

Protected Member Functions

- Devices ()

  Default protected constructor (preventing object construction).
- Devices (const Devices &other)

  Default protected copy constructor (preventing object construction by copying).
- Devices & operator= (const Devices &other)

  Protected assignment operator (preventing object assignment).
- ∼Devices ()

  Default protected destructor (preventing object unwanted destruction).

Protected Attributes

- std::map< Sensor::SensorType, bool > _listeners

  Sensor listeners.
- std::map< ev3dev::port_type, int > _safetyTouchSensors

  Touch sensor for detecting collisions.
- std::map< ev3dev::port_type, int > _proximitySensors

  Proximity sensors for detecting obstacles.
- MotorsVector _motors

  Stored Motor objects.
- SensorsVector _sensors

  Stored Sensor objects.
- SensorStatus _status

  Sensors' status with all values.

Static Protected Attributes

- static Devices ∗ _instance = nullptr

  Instance of Devices singleton class.

4.31.1 Detailed Description

Singleton class responsible for managing devices connected to the robot.

4.31.2 Constructor & Destructor Documentation

4.31.2.1 ev3::Devices::Devices (const Devices & *other*) `[protected]`

Default protected copy constructor (preventing object construction by copying).

Parameters

other	Other Devices object.

4.31.3 Member Function Documentation

4.31.3.1 void Devices::addListener (Sensor::SensorType *type*)

Add listener for given Sensor type.

Parameters

type	Type of Sensor for which value to watch.

4.31.3.2 bool Devices::checkDevices (RequiredDevices & *devices*)

Check connected devices and requirements.

Parameters

devices	Vector of required devices.

Returns

True if everything is connected properly, false otherwise.

4.31.3.3 Devices ∗ Devices::getInstance ( ) [static]

Instance getter.

Returns

Create previously or new instance of class Devices.

4.31.3.4 Motor Devices::getMotor (ev3dev::port_type *port*)

Motor getter.

Parameters

port	Port id on which the Motor is.

Returns

Motor object assigned to specified port.

4.31.3.5 Sensor Devices::getSensor (ev3dev::port_type *port*)

Sensor getter.

Parameters

port	Port id on which the Sensor is.

Returns

Sensor object assigned to specified port.

4.31.3.6 Devices& ev3::Devices::operator= (const Devices & *other*) `[protected]`

Protected assignment operator (preventing object assignment).

Parameters

other	Other Devices object.

Returns

Copy of passed object.

4.31.3.7 void Devices::removeListener (Sensor::SensorType *type*)

Remove listener for given Sensor type.

Parameters

type	Type of Sensor for which value not to watch anymore.

4.31.3.8 void Devices::setProximitySensor (ev3dev::port_type *port*)

Specify port on which proximity sensor that detects obstacles is.

Parameters

port	Port for proximity sensor.

4.31.3.9 void Devices::setSafetyTouchSensor (ev3dev::port_type *port*)

Specify port on which touch sensor that detects collisions is.

Parameters

port	Port for safety touch sensor.

The documentation for this class was generated from the following files:

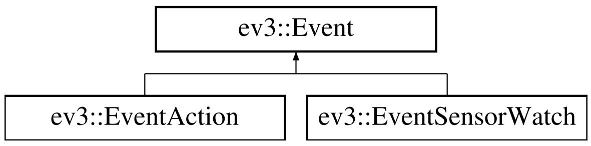
- /home/panda/Dokumenty/Repos/Ev3Dev/include/robot/Devices.h
- /home/panda/Dokumenty/Repos/Ev3Dev/src/robot/Devices.cpp

4.32 ev3::Event Class Reference

Base class for all Event classes.

```
#include <Event.h>
```

Inheritance diagram for ev3::Event:



Public Types

- enum EventType {
  EMPTY, BEHAVIOUR_START, BEHAVIOUR_STOP, SENSOR_WATCH,
  OBSTACLE_DETECTED, PROXIMITY_ALERT, ACTION_FINISHED, ACTION_INTERR }

  Event type.

Public Member Functions

- Event ()

  Default constructor.
- Event (EventType type)

  Constructor with Event type parameter.
- EventType getType ()

  Event type getter.
- std::string getStringType ()

  Get human-readable Event name.

Private Attributes

- EventType _type

  Event type value.

4.32.1 Detailed Description

Base class for all Event classes.

Triggered when certain events occur during the robot's main loop execution.

4.32.2 Member Enumeration Documentation

4.32.2.1 enum **ev3::Event::EventType**

Event type.

Enumerator

EMPTY Empty event, no meaning.

BEHAVIOUR_START Behaviour was started.

BEHAVIOUR_STOP Behaviour was stopped.

SENSOR_WATCH Value was measured from sensor.

OBSTACLE_DETECTED Robot hit an obstacle.

PROXIMITY_ALERT Distance sensor triggered alert.

ACTION_FINISHED Triggered when action was properly executed.

ACTION_INTERR Triggered when action was interrupted.

4.32.3 Constructor & Destructor Documentation

4.32.3.1 Event::Event (**EventType** *type*)

Constructor with Event type parameter.

Parameters

type	Type of the event triggered.

4.32.4 Member Function Documentation

4.32.4.1 std::string Event::getStringType ( )

Get human-readable Event name.

Returns

String with Event name.

4.32.4.2 **Event::EventType** Event::getType ( )

Event type getter.

Returns

EventType value.

The documentation for this class was generated from the following files:

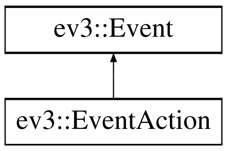
- /home/panda/Dokumenty/Repos/Ev3Dev/include/communication/Event.h
- /home/panda/Dokumenty/Repos/Ev3Dev/src/communication/Event.cpp

4.33 ev3::EventAction Class Reference

Event class triggered when something happened with Action.

```
#include <Event.h>
```

Inheritance diagram for ev3::EventAction:



Public Member Functions

- EventAction (EventType eventType, Action::ActionType actionType)

  Constructor with Event type and Action type.
- Action::ActionType getActionType ()

  Action type getter.

Private Attributes

- Action::ActionType _actionType

  Stored Action type.

Additional Inherited Members

4.33.1 Detailed Description

Event class triggered when something happened with Action.

4.33.2 Constructor & Destructor Documentation

4.33.2.1 EventAction::EventAction (**EventType** *eventType*, **Action::ActionType** *actionType*)

Constructor with Event type and Action type.

Parameters

eventType	One of Event types concerning actions.
actionType	Type of Action this event concerns.

4.33.3 Member Function Documentation

4.33.3.1 Action::ActionType EventAction::getActionType ( )

Action type getter.

Returns

Stored type of Action.

The documentation for this class was generated from the following files:

- /home/panda/Dokumenty/Repos/Ev3Dev/include/communication/Event.h
- /home/panda/Dokumenty/Repos/Ev3Dev/src/communication/Event.cpp

4.34 ev3::EventQueue Class Reference

Singleton class responsible for managing Event objects.

```
#include <EventQueue.h>
```

Public Member Functions

- void push (SharedPtrEvent event)

  Insert new Event object to the queue.
- SharedPtrEvent pop ()

  Removes first object from the queue.
- bool empty ()

  Check whether queue is empty.
- unsigned int size ()

  Queue size getter.

Static Public Member Functions

- static EventQueue ∗ getInstance ()

  Instance getter.
- static void destroy ()

  Deallocate instance.

Protected Member Functions

- EventQueue ()

  Default protected constructor (preventing object construction).
- EventQueue (const EventQueue &other)

  Default protected copy constructor (preventing object construction by copying).
- EventQueue & operator= (const EventQueue &other)

  Protected assignment operator (preventing object assignment).
- ∼EventQueue ()

  Default protected destructor (preventing object unwanted destruction).

Protected Attributes

- std::queue< SharedPtrEvent > _queue

    The actual queue implemented as std::queue.
- std::mutex _mutex

    Synchronization mutex.

Static Protected Attributes

- static EventQueue $*$ _instance = nullptr

    Instance of EventQueue singleton class.

4.34.1 Detailed Description

Singleton class responsible for managing Event objects.

Instance is shared between many classes and threads.

4.34.2 Constructor & Destructor Documentation

4.34.2.1 ev3::EventQueue::EventQueue (const **EventQueue** & *other*) [protected]

Default protected copy constructor (preventing object construction by copying).

Parameters

other	Other EventQueue object.

4.34.3 Member Function Documentation

4.34.3.1 bool EventQueue::empty ( )

Check whether queue is empty.

Returns

True if queue is empty, false otherwise.

4.34.3.2 **EventQueue** $*$ EventQueue::getInstance ( ) [static]

Instance getter.

Returns

Create previously or new instance of class EventQueue.

4.34.3.3 EventQueue& ev3::EventQueue::operator= (const EventQueue & *other*) [protected]

Protected assignment operator (preventing object assignment).

Parameters

other	Other EventQueue object.

Returns

Copy of passed object.

4.34.3.4 SharedPtrEvent EventQueue::pop ( )

Removes first object from the queue.

Returns

Copy of removed object.

4.34.3.5 void EventQueue::push (SharedPtrEvent *event*)

Insert new Event object to the queue.

Parameters

event	Event object to be inserted.

4.34.3.6 unsigned int EventQueue::size ( )

Queue size getter.

Returns

Number of elements stored in queue.

The documentation for this class was generated from the following files:

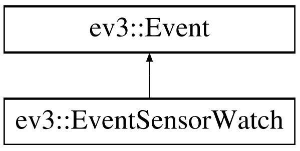
- /home/panda/Dokumenty/Repos/Ev3Dev/include/utils/EventQueue.h
- /home/panda/Dokumenty/Repos/Ev3Dev/src/utils/EventQueue.cpp

4.35 ev3::EventSensorWatch Class Reference

Triggered when measurement of certain Sensor occured.

`#include <Event.h>`

Inheritance diagram for ev3::EventSensorWatch:



Public Member Functions

- EventSensorWatch (Sensor::SensorType type, SensorValue value)

    Constructor with sensor type and measured value.
- SensorValue getValue ()

    Stored sensor value getter.
- Sensor::SensorType getType ()

    Stored Sensor type getter.

Private Attributes

- Sensor::SensorType _sensorType

    Sensor type this event concerns.
- SensorValue _sensorValue

    Measured values.

Additional Inherited Members

4.35.1 Detailed Description

Triggered when measurement of certain Sensor occured.

4.35.2 Constructor & Destructor Documentation

4.35.2.1 EventSensorWatch::EventSensorWatch (Sensor::SensorType *type*, SensorValue *value*)

Constructor with sensor type and measured value.

Parameters

type	Value identifying sensor type.
value	Vector with all measurements.

4.35.3 Member Function Documentation

4.35.3.1 Sensor::SensorType EventSensorWatch::getType ( )

Stored Sensor type getter.

Returns

Sensor type value.

4.35.3.2 SensorValue EventSensorWatch::getValue ( )

Stored sensor value getter.

Returns

Vector with certain Sensor measurements.

The documentation for this class was generated from the following files:

- /home/panda/Dokumenty/Repos/Ev3Dev/include/communication/Event.h
- /home/panda/Dokumenty/Repos/Ev3Dev/src/communication/Event.cpp

4.36 ev3dev::button::file_descriptor Struct Reference

Public Member Functions

- **file_descriptor** (const char ∗path, int flags)
- **operator int** ()

Public Attributes

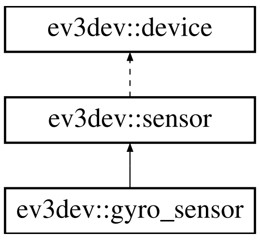
- int **_fd**

The documentation for this struct was generated from the following files:

- /home/panda/Dokumenty/Repos/Ev3Dev/include/ev3dev/ev3dev.h
- /home/panda/Dokumenty/Repos/Ev3Dev/src/ev3dev/ev3dev.cpp

4.37 ev3dev::gyro_sensor Class Reference

Inheritance diagram for ev3dev::gyro_sensor:



Public Member Functions

- **gyro_sensor** (address_type address=INPUT_AUTO)
- int **angle** ()
- int **rate** ()

Static Public Attributes

- static const std::string **mode_gyro_ang** { "GYRO-ANG" }
- static const std::string **mode_gyro_rate** { "GYRO-RATE" }
- static const std::string **mode_gyro_fas** { "GYRO-FAS" }
- static const std::string **mode_gyro_g_a** { "GYRO-G&A" }
- static const std::string **mode_gyro_cal** { "GYRO-CAL" }

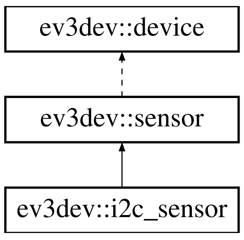
Additional Inherited Members

The documentation for this class was generated from the following files:

- /home/panda/Dokumenty/Repos/Ev3Dev/include/ev3dev/ev3dev.h
- /home/panda/Dokumenty/Repos/Ev3Dev/src/ev3dev/ev3dev.cpp

4.38 ev3dev::i2c_sensor Class Reference

Inheritance diagram for ev3dev::i2c_sensor:



Public Member Functions

- **i2c_sensor** (address_type address=INPUT_AUTO)
- std::string **fw_version** () const
- int **poll_ms** () const
- auto **set_poll_ms** (int v) -> decltype(∗this)

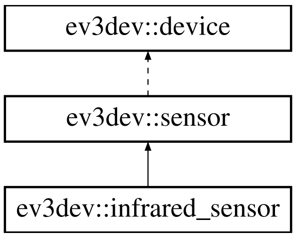
Additional Inherited Members

The documentation for this class was generated from the following files:

- /home/panda/Dokumenty/Repos/Ev3Dev/include/ev3dev/ev3dev.h
- /home/panda/Dokumenty/Repos/Ev3Dev/src/ev3dev/ev3dev.cpp

4.39 ev3dev::infrared_sensor Class Reference

Inheritance diagram for ev3dev::infrared_sensor:



Public Member Functions

- **infrared_sensor** (address_type address=INPUT_AUTO)
- int **proximity** ()

Static Public Attributes

- static const std::string **mode_ir_prox** { "IR-PROX" }
- static const std::string **mode_ir_seek** { "IR-SEEK" }
- static const std::string **mode_ir_remote** { "IR-REMOTE" }
- static const std::string **mode_ir_rem_a** { "IR-REM-A" }
- static const std::string **mode_ir_cal** { "IR-CAL" }

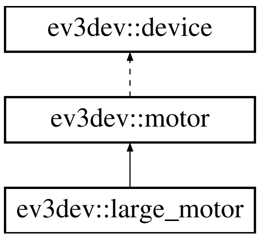
Additional Inherited Members

The documentation for this class was generated from the following files:

- /home/panda/Dokumenty/Repos/Ev3Dev/include/ev3dev/ev3dev.h
- /home/panda/Dokumenty/Repos/Ev3Dev/src/ev3dev/ev3dev.cpp

4.40 ev3dev::large_motor Class Reference

Inheritance diagram for ev3dev::large_motor:



Public Member Functions

- **large_motor** (address_type address=OUTPUT_AUTO)

Additional Inherited Members

The documentation for this class was generated from the following files:

- /home/panda/Dokumenty/Repos/Ev3Dev/include/ev3dev/ev3dev.h
- /home/panda/Dokumenty/Repos/Ev3Dev/src/ev3dev/ev3dev.cpp

4.41 ev3dev::lcd Class Reference

Public Member Functions

- bool **available** () const
- uint32_t **resolution_x** () const
- uint32_t **resolution_y** () const
- uint32_t **bits_per_pixel** () const
- uint32_t **frame_buffer_size** () const
- uint32_t **line_length** () const
- unsigned char ∗ **frame_buffer** ()
- void **fill** (unsigned char pixel)

Protected Member Functions

- void **init** ()
- void **deinit** ()

Private Attributes

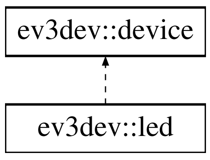
- unsigned char ∗ **_fb**
- uint32_t **_fbsize**
- uint32_t **_llength**
- uint32_t **_xres**
- uint32_t **_yres**
- uint32_t **_bpp**

The documentation for this class was generated from the following files:

- /home/panda/Dokumenty/Repos/Ev3Dev/include/ev3dev/ev3dev.h
- /home/panda/Dokumenty/Repos/Ev3Dev/src/ev3dev/ev3dev.cpp

4.42 ev3dev::led Class Reference

Inheritance diagram for ev3dev::led:



Public Member Functions

- **led** (std::string name)
- int **max_brightness** () const
- int **brightness** () const
- auto **set_brightness** (int v) -> decltype(∗this)
- mode_set **triggers** () const
- std::string **trigger** () const
- auto **set_trigger** (std::string v) -> decltype(∗this)
- int **delay_on** () const
- auto **set_delay_on** (int v) -> decltype(∗this)
- int **delay_off** () const
- auto **set_delay_off** (int v) -> decltype(∗this)
- float **brightness_pct** () const
- auto **set_brightness_pct** (float v) -> decltype(∗this)
- void **on** ()
- void **off** ()
- void **flash** (unsigned on_ms, unsigned off_ms)

Static Public Member Functions

- static void **set_color** (const std::vector< led ∗ > &group, const std::vector< float > &color)
- static void **all_off** ()

Static Public Attributes

- static led **red_left** {"ev3:left:red:ev3dev"}
- static led **red_right** {"ev3:right:red:ev3dev"}
- static led **green_left** {"ev3:left:green:ev3dev"}
- static led **green_right** {"ev3:right:green:ev3dev"}
- static std::vector< led ∗ > **left** { &led::red_left, &led::green_left }
- static std::vector< led ∗ > **right** { &led::red_right, &led::green_right }
- static std::vector< float > **red** { static_cast<float>(1), static_cast<float>(0) }
- static std::vector< float > **green** { static_cast<float>(0), static_cast<float>(1) }
- static std::vector< float > **amber** { static_cast<float>(1), static_cast<float>(1) }
- static std::vector< float > **orange** { static_cast<float>(1), static_cast<float>(0.5) }
- static std::vector< float > **yellow** { static_cast<float>(0.5), static_cast<float>(1) }

Protected Attributes

- int **_max_brightness** = 0

Additional Inherited Members

The documentation for this class was generated from the following files:

- /home/panda/Dokumenty/Repos/Ev3Dev/include/ev3dev/ev3dev.h
- /home/panda/Dokumenty/Repos/Ev3Dev/src/ev3dev/ev3dev.cpp

4.43 ev3::LedControl Class Reference

Class specifically designed to eliminate ev3dev library limitations of controlling LED panel.

```
#include <LedControl.h>
```

Public Types

- enum LedType {
  RED_L = 1, RED_R = 1 << 1, GREEN_L = 1 << 2, GREEN_R = 1 << 3,
  RED_ALL = RED_L | RED_R, GREEN_ALL = GREEN_L | GREEN_R, ALL = RED_ALL | GREEN_ALL }

  Type of LED diode.
- enum LedColors { RED, AMBER, YELLOW, GREEN }

  Predefined colors, that particular combination of diodes can represent.

Public Member Functions

- virtual ∼LedControl ()

  Default destructor.
- void on (unsigned int leds=LedType::ALL, unsigned int brightness=MAX_BRIGHTNESS)

  Turn the specified diodes on.
- void onExclusive (unsigned int leds=LedType::ALL, unsigned int brightness=MAX_BRIGHTNESS)

  Turn the specified diodes on and also turn off the other ones.
- void off (unsigned int leds=LedType::ALL)

  Turn the specified diodes off.
- void setColor (LedColors color)

  Set diodes to match particular color.
- void reset ()

  Ends flashing and turns all diodes off.
- void flash (unsigned int leds, unsigned int msInterval, unsigned int repeat=1, unsigned int brightnessRed=M←
  AX_BRIGHTNESS, unsigned int brightnessGreen=MAX_BRIGHTNESS)

  Orders diodes to flash with given interval.
- void flashColor (LedColors color, unsigned int msInterval, unsigned int repeat=1)

  Orders dioded to flash a particular color with given interval.
- void endFlashing ()

  Stops flashing.

Static Public Attributes

- static const unsigned int MAX_BRIGHTNESS = 255

  Maximum value of brightness.

Private Attributes

- std::thread _flashThread

  Parallel thread responsible for flashing.
- bool _isFlashingEnded

  Synchronization variable indicating, when the flash has to end.

4.43.1 Detailed Description

Class specifically designed to eliminate ev3dev library limitations of controlling LED panel.

4.43.2 Member Enumeration Documentation

4.43.2.1 enum **ev3::LedControl::LedColors**

Predefined colors, that particular combination of diodes can represent.

Enumerator

RED Only red diode.

AMBER Red with a little bit of green.

YELLOW Little red and full green.

GREEN Only green diode.

4.43.2.2 enum **ev3::LedControl::LedType**

Type of LED diode.

Enumerator

RED_L Red left diode.

RED_R Red right diode.

GREEN_L Green left diode.

GREEN_R Green right diode.

RED_ALL Both red diodes.

GREEN_ALL Both green diodes.

ALL All four diodes.

4.43.3 Member Function Documentation

4.43.3.1 void LedControl::flash (unsigned int *leds*, unsigned int *msInterval*, unsigned int *repeat* = `1`, unsigned int *brightnessRed* = MAX_BRIGHTNESS, unsigned int *brightnessGreen* = MAX_BRIGHTNESS)

Orders diodes to flash with given interval.

Parameters

leds	Combination of LedControl::LedType values.
msInterval	Flash interval in milliseconds.
repeat	Number of iterations or 0 for infinite flashing.
brightnessRed	Brightness of the red diodes.
brightnessGreen	Brightness of the green diodes.

4.43.3.2 void LedControl::flashColor (LedColors *color*, unsigned int *msInterval*, unsigned int *repeat* = `1`)

Orders dioded to flash a particular color with given interval.

Parameters

color	Type of color to be displayed.
msInterval	Flash interval in milliseconds.
repeat	Number of iterations or 0 for infinite flashing.

4.43.3.3 void LedControl::off (unsigned int *leds* = `LedType::ALL`)

Turn the specified diodes off.

Parameters

leds	Combination of LedControl::LedType values.

4.43.3.4 void LedControl::on (unsigned int *leds* = `LedType::ALL`, unsigned int *brightness* = MAX_BRIGHTNESS)

Turn the specified diodes on.

Parameters

leds	Combination of LedControl::LedType values.
brightness	Value of brightness to be set.

4.43.3.5 void LedControl::onExclusive (unsigned int *leds* = `LedType::ALL`, unsigned int *brightness* = MAX_BRIGHTNESS)

Turn the specified diodes on and also turn off the other ones.

Parameters

leds	Combination of LedControl::LedType values.
brightness	Value of brightness to be set.

4.43.3.6 void LedControl::setColor (LedColors *color*)

Set diodes to match particular color.

Parameters

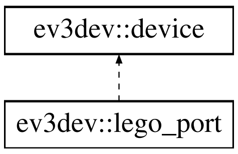
color	Type of to be displayed.

The documentation for this class was generated from the following files:

- /home/panda/Dokumenty/Repos/Ev3Dev/include/control/LedControl.h
- /home/panda/Dokumenty/Repos/Ev3Dev/src/control/LedControl.cpp

4.44 ev3dev::lego_port Class Reference

Inheritance diagram for ev3dev::lego_port:



Public Member Functions

- **lego_port** (address_type)
- std::string **driver_name** () const
- mode_set **modes** () const
- std::string **mode** () const
- auto **set_mode** (std::string v) -> decltype(∗this)
- std::string **address** () const
- auto **set_set_device** (std::string v) -> decltype(∗this)
- std::string **status** () const

Protected Member Functions

- bool **connect** (const std::map< std::string, std::set< std::string >> &) noexcept

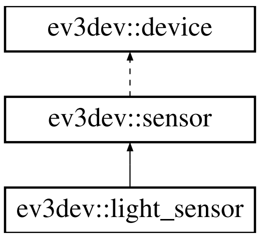
Additional Inherited Members

The documentation for this class was generated from the following files:

- /home/panda/Dokumenty/Repos/Ev3Dev/include/ev3dev/ev3dev.h
- /home/panda/Dokumenty/Repos/Ev3Dev/src/ev3dev/ev3dev.cpp

4.45 ev3dev::light_sensor Class Reference

Inheritance diagram for ev3dev::light_sensor:



Public Member Functions

- **light_sensor** (address_type address=INPUT_AUTO)
- float **reflected_light_intensity** ()
- float **ambient_light_intensity** ()

Static Public Attributes

- static const std::string **mode_reflect** { "REFLECT" }
- static const std::string **mode_ambient** { "AMBIENT" }

Additional Inherited Members

The documentation for this class was generated from the following files:

- /home/panda/Dokumenty/Repos/Ev3Dev/include/ev3dev/ev3dev.h
- /home/panda/Dokumenty/Repos/Ev3Dev/src/ev3dev/ev3dev.cpp

4.46 ev3::Logger Class Reference

Singleton class responsible for displaying information about events, messages, exceptions and executed methods.

```
#include <Logger.h>
```

Public Types

- enum LogLevel {
  DEBUG = 1, VERBOSE = 1 << 1, INFO = 1 << 2, WARNING = 1 << 3,
  ERROR = 1 << 4 }

  Default logging complexity.
- enum LogOutput { STD_OUT = 1, STD_ERR = 1 << 1, FILE = 1 << 2 }

  Desired logging output.

Public Member Functions

- void log (std::string message, LogLevel level, LogOutput output=STD_OUT)

  Print message to a specified output.
- void setLogLevel (LogLevel level)

  Logger level setter.
- void setLogLevel (std::string level)

  Logger level setter by name.
- void setLogOutput (LogOutput output)

  Logger output setter.

Static Public Member Functions

- static Logger ∗ getInstance ()

  Instance getter.
- static void destroy ()

  Deallocate instance.

Private Member Functions

- Logger ()

  Default protected constructor (preventing object construction).
- Logger (const Logger &other)

  Default protected copy constructor (preventing object construction by copying).
- Logger & operator= (const Logger &other)

  Protected assignment operator (preventing object assignment).
- ∼Logger ()

  Default protected destructor (preventing object unwanted destruction).
- std::string getLabel (LogLevel level, LogOutput output)

  Get level label.
- std::string getColor (LogLevel level, LogOutput output)

  Get color for logging level.

Private Attributes

- LogLevel _level = ERROR

  Current Logger level.
- LogOutput _output

  Current Logger output.
- bool _loggerForced = false

  Control flag.

Static Private Attributes

- static Logger ∗ _instance = nullptr

  Instance of Logger singleton class.

4.46.1 Detailed Description

Singleton class responsible for displaying information about events, messages, exceptions and executed methods.

4.46.2 Member Enumeration Documentation

4.46.2.1 enum ev3::Logger::LogLevel

Default logging complexity.

For a particular level, everything above will be printed as well.

Enumerator

DEBUG Print objects and methods information.

VERBOSE Print communication and states specifics.

INFO Print information for the user.

WARNING Print all warnings.

ERROR Print all errors.

4.46.2.2 enum ev3::Logger::LogOutput

Desired logging output.

Enumerator

STD_OUT Standard output.

STD_ERR Standard error output.

FILE File output.

4.46.3 Constructor & Destructor Documentation

4.46.3.1 ev3::Logger::Logger (const Logger & *other*) `[private]`

Default protected copy constructor (preventing object construction by copying).

Parameters

other	Other Logger object.

4.46.4 Member Function Documentation

4.46.4.1 std::string Logger::getColor (LogLevel *level,* LogOutput *output*) `[private]`

Get color for logging level.

Parameters

level	Logging level to get color for.
output	Logging output to match color on.

Returns

String with color code.

4.46.4.2 Logger ∗ Logger::getInstance ( ) [static]

Instance getter.

Returns

Create previously or new instance of class Logger.

4.46.4.3 std::string Logger::getLabel (LogLevel *level,* LogOutput *output*) [private]

Get level label.

Parameters

level	Logging level to get label for.
output	Desired message output.

Returns

String with formatted label.

4.46.4.4 void Logger::log (std::string *message,* LogLevel *level,* LogOutput *output* = STD_OUT)

Print message to a specified output.

Parameters

message	String containing message.
level	Logging level (used to choose color for the level label).
output	Type of output to be used,

4.46.4.5 Logger& ev3::Logger::operator= (const Logger & *other*) [private]

Protected assignment operator (preventing object assignment).

Parameters

other	Other Logger object.

Returns

Copy of passed object.

4.46.4.6 void Logger::setLogLevel (LogLevel *level*)

Logger level setter.

Parameters

level	LogLevel enum value.

4.46.4.7 void Logger::setLogLevel (std::string *level*)

Logger level setter by name.

Parameters

level	String with name of the level.

4.46.4.8 void Logger::setLogOutput (LogOutput *output*)

Logger output setter.

Parameters

output	Type of output to be used as default.

4.46.5 Member Data Documentation

4.46.5.1 bool ev3::Logger::_loggerForced = false [private]

Control flag.

Checked when device should not produce any Logger output.

The documentation for this class was generated from the following files:

- /home/panda/Dokumenty/Repos/Ev3Dev/include/utils/Logger.h
- /home/panda/Dokumenty/Repos/Ev3Dev/src/utils/Logger.cpp

4.47 ev3::Master Class Reference

Controls the whole system and knows about every Agent.

```
#include <Master.h>
```

Public Types

- typedef std::map< unsigned int, Agent > AgentMap

  Type for mapping Agents to their ids.

Public Member Functions

- std::thread createThread (Queue< Message > ∗sendQueue, Queue< Message > ∗receiveQueue)

  Creates thread instead of running Master in the main thread.
- void run (Queue< Message > ∗sendQueue, Queue< Message > ∗receiveQueue)

  Starts Master procedures.
- void send (Message message, bool recordMessage=true)

  Sending method assigning id to the message.
- void stop ()

  Stop Master main loop and exit.

Private Attributes

- AgentMap _agents

  Map of all active Agents.
- Queue< Message > ∗ _sendQueue

  Out Message Queue.
- Queue< Message > ∗ _receiveQueue

  In Message Queue.
- SharedPtrBehaviour _currentBehaviour

  Currently active Behaviour for all Agents.
- unsigned int _agentId = MASTER_ID

  Incremented variable used to assign ids to new Agents.
- Measurements _measurements

  Types of Sensors which values are interesting and must be gathered.

4.47.1 Detailed Description

Controls the whole system and knows about every Agent.

Initiates Behaviour and receives values from sensor.

4.47.2 Member Function Documentation

4.47.2.1 std::thread Master::createThread (**Queue< Message > ∗** *sendQueue,* **Queue< Message > ∗** *receiveQueue*)

Creates thread instead of running Master in the main thread.

Parameters

sendQueue	Out Message queue.
receiveQueue	In Message queue.

Returns

New std::thread object with active Master class.)

4.47.2.2 void Master::run (Queue< Message > * *sendQueue*, Queue< Message > * *receiveQueue*)

Starts Master procedures.

Parameters

sendQueue	
receiveQueue	

4.47.2.3 void Master::send (Message *message*, bool *recordMessage* = `true`)

Sending method assigning id to the message.

Parameters

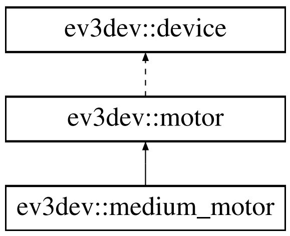
message	Message to be passed to Communication thread via sendQueue.
recordMessage	True if information about message should be saved for further purposes, false otherwise.

The documentation for this class was generated from the following files:

- /home/panda/Dokumenty/Repos/Ev3Dev/include/master/Master.h
- /home/panda/Dokumenty/Repos/Ev3Dev/src/master/Master.cpp

4.48 ev3dev::medium_motor Class Reference

Inheritance diagram for ev3dev::medium_motor:



Public Member Functions

- **medium_motor** (address_type address=OUTPUT_AUTO)

Additional Inherited Members

The documentation for this class was generated from the following files:

- /home/panda/Dokumenty/Repos/Ev3Dev/include/ev3dev/ev3dev.h
- /home/panda/Dokumenty/Repos/Ev3Dev/src/ev3dev/ev3dev.cpp

4.49 ev3::Message Class Reference

Stores information passed between physical system units (another robots or master).

```
#include <Message.h>
```

Public Types

- enum MessageType {
  EMPTY, ACK, NOT, AGENT,
  MASTER, MASTER_OVER, PING, PONG,
  AGENT_OVER, ABORT, BEHAVIOUR, START,
  RESUME, PAUSE, ACTION_OK, ACTION_INTERR,
  SENSOR_VALUE, MEASURE }

  Messge Type.

Public Member Functions

- Message ()

  Default constructor.
- Message (unsigned int senderId, unsigned int receiverId, unsigned int messageId, MessageType type, StringVector parameters={})

  Full message constructor.
- unsigned int getSenderId ()

  Sender id getter.
- unsigned int getReceiverId ()

  Receiver id getter.
- unsigned int getMessageId ()

  Consequently incremented integer id getter.
- MessageType getType ()

  Message type getter.
- StringVector getParameters ()

  Message parameters getter.
- void setSenderId (unsigned int id)

  Sender id setter.
- void setReceiverId (unsigned int id)

  Receiver id setter.
- void setMessageId (unsigned int id)

  Consequently incremented integer id setter.
- void setType (MessageType type)

  Message type setter.

- void setParameters (StringVector parameters)

    Message parameters setter.

- bool empty ()

    Tell whether Message type is EMPTY.

- std::string getString ()

    Human-readable name getter.

- void reset ()

    Reset all values to default ones and type to EMPTY.

Static Public Member Functions

- static std::string encodeMessage (Message &message)

    Encode message data into string.

- static Message decodeMessage (const std::string message)

    Decode string into Message object.

Private Member Functions

- std::string getStringType ()

    Human-readable Message type name (mainly for logging).

Private Attributes

- unsigned int _id

    Message id.

- unsigned int _sender

    Message sender id.

- unsigned int _receiver

    Message receiver id.

- MessageType _type = EMPTY

    Message type.

- StringVector _parameters

    Vector with all optional parameters.

4.49.1 Detailed Description

Stores information passed between physical system units (another robots or master).

4.49.2 Member Enumeration Documentation

4.49.2.1 enum **ev3::Message::MessageType**

Messge Type.

Enumerator

EMPTY	Empty message, no meaning.
ACK	Accept previously received request.
NOT	Deny previously received request.
AGENT	Agent side synchronization.
MASTER	Master side synchronization.
MASTER_OVER	Master work finished.
PING	Connection sustain request.
PONG	Connection sustain answer.
AGENT_OVER	Agent work finished.
ABORT	Exit processing now.
BEHAVIOUR	Behaviour definition received.
START	Behaviour start.
RESUME	Behaviour resume.
PAUSE	Behaviour pause.
ACTION_OK	Action finished correctly.
ACTION_INTERR	Action interrupted.
SENSOR_VALUE	Sensor measurement occured.
MEASURE	Instructions what to measure.

4.49.3 Constructor & Destructor Documentation

4.49.3.1 Message::Message (unsigned int *senderId,* unsigned int *receiverId,* unsigned int *messageId,* **MessageType** *type,* StringVector *parameters* = { })

Full message constructor.

Parameters

senderId	Id of the sender (given by master).
receiverId	Id of the receiver.
message↩ Id	Consequently incremented message id.
type	Predefined Message type.
parameters	Vector of additional, optional string parameters.

4.49.4 Member Function Documentation

4.49.4.1 Message Message::decodeMessage (const std::string *message*) [static]

Decode string into Message object.

Parameters

message	String value to be decoded.

Returns

Message object decoded, if processed successfully.

4.49.4.2 bool Message::empty ( )

Tell whether Message type is EMPTY.

Returns

True if Messge is EMPTY, false otherwise.

4.49.4.3 std::string Message::encodeMessage (Message & *message*) [static]

Encode message data into string.

Parameters

message	Reference to message object to be encoded.

Returns

String with encoded data of the message.

4.49.4.4 unsigned int Message::getMessageId ( )

Consequently incremented integer id getter.

Returns

Id of the message.

4.49.4.5 StringVector Message::getParameters ( )

Message parameters getter.

Returns

String vector with all optional parameters.

4.49.4.6 unsigned int Message::getReceiverId ( )

Receiver id getter.

Returns

Id of the message receiver.

4.49.4.7 unsigned int Message::getSenderId ( )

Sender id getter.

Returns

Id of the message sender (should be set to the value of the main class executing this method).

4.49.4.8 std::string Message::getString ( )

Human-readable name getter.

Returns

Formatted string containing name and all parameters.

4.49.4.9 std::string Message::getStringType ( ) `[private]`

Human-readable Message type name (mainly for logging).

Returns

String with Message type name.

4.49.4.10 Message::MessageType Message::getType ( )

Message type getter.

Returns

Enum value with Message type.

4.49.4.11 void Message::setMessageId (unsigned int *id*)

Consequently incremented integer id setter.

Parameters

id	Id of the message.

4.49.4.12 void Message::setParameters (StringVector *parameters*)

Message parameters setter.

Parameters

parameters	String vector with all optional parameters.

4.49.4.13 void Message::setReceiverId (unsigned int *id*)

Receiver id setter.

Parameters

id	Id of the message receiver.

4.49.4.14 void Message::setSenderId (unsigned int *id*)

Sender id setter.

Parameters

id	Id of the message sender (should be set to the value of the main class executing this method).

4.49.4.15 void Message::setType (MessageType *type*)

Message type setter.

Parameters

type	Enum value with Message type.

The documentation for this class was generated from the following files:

- /home/panda/Dokumenty/Repos/Ev3Dev/include/communication/Message.h
- /home/panda/Dokumenty/Repos/Ev3Dev/src/communication/Message.cpp

4.50 ev3::Motor Class Reference

Encapsulates ev3dev::motor.

```
#include <Motor.h>
```

Public Member Functions

- Motor (ev3dev::motor motor)

    Constructor with Motor.
- ev3dev::motor getMotor ()

    Motor getter.

Private Attributes

- ev3dev::motor _motor

    Stored motor.

4.50.1 Detailed Description

Encapsulates ev3dev::motor.

Can provide additional logic.

4.50.2 Constructor & Destructor Documentation

4.50.2.1 Motor::Motor (ev3dev::motor *motor*)

Constructor with Motor.

Parameters

motor	ev3dev::Motor object.

4.50.3 Member Function Documentation

4.50.3.1 ev3dev::motor Motor::getMotor ( )

Motor getter.

Returns

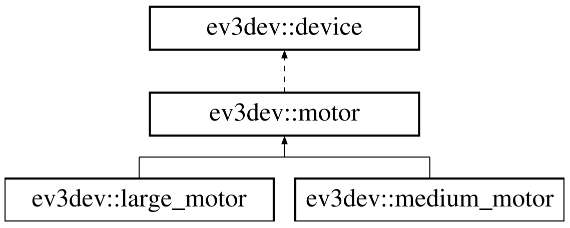
Stored ev3dev::motor object.

The documentation for this class was generated from the following files:

- /home/panda/Dokumenty/Repos/Ev3Dev/include/robot/Motor.h
- /home/panda/Dokumenty/Repos/Ev3Dev/src/robot/Motor.cpp

4.51 ev3dev::motor Class Reference

Inheritance diagram for ev3dev::motor:



Public Types

- typedef device_type **motor_type**

Public Member Functions

- **motor** (address_type)
- **motor** (address_type, const motor_type &)
- auto **set_command** (std::string v) -> decltype(∗this)
- mode_set **commands** () const
- int **count_per_rot** () const
- std::string **driver_name** () const
- int **duty_cycle** () const
- int **duty_cycle_sp** () const
- auto **set_duty_cycle_sp** (int v) -> decltype(∗this)
- std::string **encoder_polarity** () const
- auto **set_encoder_polarity** (std::string v) -> decltype(∗this)
- std::string **polarity** () const
- auto **set_polarity** (std::string v) -> decltype(∗this)
- std::string **address** () const
- int **position** () const
- auto **set_position** (int v) -> decltype(∗this)
- int **position_p** () const
- auto **set_position_p** (int v) -> decltype(∗this)
- int **position_i** () const
- auto **set_position_i** (int v) -> decltype(∗this)
- int **position_d** () const
- auto **set_position_d** (int v) -> decltype(∗this)
- int **position_sp** () const
- auto **set_position_sp** (int v) -> decltype(∗this)
- int **speed** () const
- int **speed_sp** () const
- auto **set_speed_sp** (int v) -> decltype(∗this)
- int **ramp_up_sp** () const
- auto **set_ramp_up_sp** (int v) -> decltype(∗this)
- int **ramp_down_sp** () const
- auto **set_ramp_down_sp** (int v) -> decltype(∗this)
- std::string **speed_regulation_enabled** () const
- auto **set_speed_regulation_enabled** (std::string v) -> decltype(∗this)

- int **speed_regulation_p** () const
- auto **set_speed_regulation_p** (int v) -> decltype(∗this)
- int **speed_regulation_i** () const
- auto **set_speed_regulation_i** (int v) -> decltype(∗this)
- int **speed_regulation_d** () const
- auto **set_speed_regulation_d** (int v) -> decltype(∗this)
- mode_set **state** () const
- std::string **stop_command** () const
- auto **set_stop_command** (std::string v) -> decltype(∗this)
- mode_set **stop_commands** () const
- int **time_sp** () const
- auto **set_time_sp** (int v) -> decltype(∗this)
- void **run_forever** ()
- void **run_to_abs_pos** ()
- void **run_to_rel_pos** ()
- void **run_timed** ()
- void **run_direct** ()
- void **stop** ()
- void **reset** ()
- motor_type **type_name** ()

Static Public Attributes

- static const motor_type **motor_large** { "lego-ev3-l-motor" }
- static const motor_type **motor_medium** { "lego-ev3-m-motor" }
- static const std::string **command_run_forever** { "run-forever" }
- static const std::string **command_run_to_abs_pos** { "run-to-abs-pos" }
- static const std::string **command_run_to_rel_pos** { "run-to-rel-pos" }
- static const std::string **command_run_timed** { "run-timed" }
- static const std::string **command_run_direct** { "run-direct" }
- static const std::string **command_stop** { "stop" }
- static const std::string **command_reset** { "reset" }
- static const std::string **encoder_polarity_normal** { "normal" }
- static const std::string **encoder_polarity_inversed** { "inversed" }
- static const std::string **polarity_normal** { "normal" }
- static const std::string **polarity_inversed** { "inversed" }
- static const std::string **speed_regulation_on** { "on" }
- static const std::string **speed_regulation_off** { "off" }
- static const std::string **stop_command_coast** { "coast" }
- static const std::string **stop_command_brake** { "brake" }
- static const std::string **stop_command_hold** { "hold" }

Protected Member Functions

- bool **connect** (const std::map< std::string, std::set< std::string >> &) noexcept

Private Attributes

- motor_type **_type**

Additional Inherited Members

The documentation for this class was generated from the following files:

- /home/panda/Dokumenty/Repos/Ev3Dev/include/ev3dev/ev3dev.h
- /home/panda/Dokumenty/Repos/Ev3Dev/src/ev3dev/ev3dev.cpp

4.52 ev3::CommUtils::NetworkNode Struct Reference

Stores information about a particular node in the network.

```
#include <CommUtils.h>
```

Public Attributes

- unsigned int port

  Port number.
- std::string ipAddress

  Node's ipv4 address.

4.52.1 Detailed Description

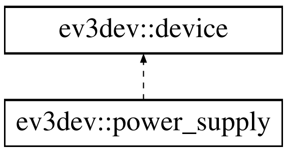
Stores information about a particular node in the network.

The documentation for this struct was generated from the following file:

- /home/panda/Dokumenty/Repos/Ev3Dev/include/communication/CommUtils.h

4.53 ev3dev::power_supply Class Reference

Inheritance diagram for ev3dev::power_supply:



Public Member Functions

- **power_supply** (std::string name)
- int **measured_current** () const
- int **measured_voltage** () const
- int **max_voltage** () const
- int **min_voltage** () const
- std::string **technology** () const
- std::string **type** () const
- float **measured_amps** () const
- float **measured_volts** () const

Static Public Attributes

- static power_supply **battery** { "" }

Additional Inherited Members

The documentation for this class was generated from the following files:

- /home/panda/Dokumenty/Repos/Ev3Dev/include/ev3dev/ev3dev.h
- /home/panda/Dokumenty/Repos/Ev3Dev/src/ev3dev/ev3dev.cpp

4.54 ev3::Queue< T > Class Template Reference

Template class implementing synchronized queue.

```
#include <Queue.h>
```

Public Member Functions

- void push (T element)

  Insert new object to the queue.
- T pop ()

  Removes first object from the queue.
- bool empty ()

  Check whether queue is empty.

Private Attributes

- std::queue< T > _elements

  The actual queue implemented as std::queue.
- std::mutex _mutex

  Synchronization mutex.

4.54.1 Detailed Description

template<class T>
class ev3::Queue< T >

Template class implementing synchronized queue.

All method are guarded by mutex.

4.54.2 Member Function Documentation

4.54.2.1 template< class T > bool **ev3::Queue**< T >::empty ( )

Check whether queue is empty.

Returns

True if queue is empty, false otherwise.

4.54.2.2 template< class T > T **ev3::Queue**< T >::pop ( )

Removes first object from the queue.

Returns

Copy of removed object.

4.54.2.3 template< class T> void **ev3::Queue**< T >::push (T *element*)

Insert new object to the queue.

Parameters

element	Inserted object.

The documentation for this class was generated from the following file:

- /home/panda/Dokumenty/Repos/Ev3Dev/include/utils/Queue.h

4.55 ev3dev::remote_control Class Reference

Public Types

- enum **buttons** {
  red_up = (1 << 0), **red_down** = (1 << 1), **blue_up** = (1 << 2), **blue_down** = (1 << 3),
  beacon = (1 << 4) }

Public Member Functions

- **remote_control** (unsigned channel=1)
- **remote_control** (infrared_sensor &, unsigned channel=1)
- bool **connected** () const
- unsigned **channel** () const
- bool **process** ()

Public Attributes

- std::function< void(bool)> **on_red_up**
- std::function< void(bool)> **on_red_down**
- std::function< void(bool)> **on_blue_up**
- std::function< void(bool)> **on_blue_down**
- std::function< void(bool)> **on_beacon**
- std::function< void(int)> **on_state_change**

Protected Member Functions

- virtual void **on_value_changed** (int value)

Protected Attributes

- infrared_sensor * **_sensor** = nullptr
- bool **_owns_sensor** = false
- unsigned **_channel** = 0
- int **_value** = 0
- int **_state** = 0

The documentation for this class was generated from the following files:

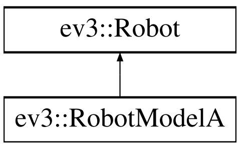
- /home/panda/Dokumenty/Repos/Ev3Dev/include/ev3dev/ev3dev.h
- /home/panda/Dokumenty/Repos/Ev3Dev/src/ev3dev/ev3dev.cpp

4.56 ev3::Robot Class Reference

Main class representing actual robot.

```
#include <Robot.h>
```

Inheritance diagram for ev3::Robot:



Public Types

- typedef std::vector< Action::ActionType > AvailableActions

  Type for specifying all available actions for given Robot model.

Public Member Functions

- Robot ()

  Default constructor.
- Robot (Devices::RequiredDevices devices, AvailableActions actions)

  Constructor with required devices and actions parameters.
- virtual ∼Robot ()

  Default destructor.
- std::thread createThread (Queue< Message > ∗sendQueue, Queue< Message > ∗receiveQueue)

  Thread creation method (instead of running Robot in main thread).
- virtual void run (Queue< Message > ∗sendQueue, Queue< Message > ∗receiveQueue)

  Starts Robot procedures.
- void stop ()

  Immediately stop Robot object and all assigned motors.
- void send (Message message)

  General sending method for logging and assigning id.
- virtual std::string getString ()

  Human-readable Robot name getter.

Protected Member Functions

- virtual SharedPtrBehaviour generateBehaviour (Behaviour::BehaviourType type, StringVector parameters)

  Generate behaviour based on its type and parameters.

Protected Attributes

- unsigned int _id = 0

  This Robot's id assigned by Master.
- unsigned int _commId = 0

  Communication id (assigned to messages).
- float _pulsePerUnitRatio = 1.f

  Number of rotation pulses per one distance unit.
- Devices::RequiredDevices _requiredDevices

  Vector of mapped ports and devices that are required.
- AvailableActions _availableActions

  Vector of executable Action types.
- Queue< Message > ∗ _sendQueue

  Out Message queue.
- Queue< Message > ∗ _receiveQueue

  In Message queue.
- LedControl _ledControl

  Object controlling behaviour of LED diodes.
- RobotState ∗ _state = new RobotStateIdle(&_ledControl)

  Current Robot state.

Private Member Functions

- void processState ()
  Process current Robot's state (which processes Behaviour).
- void processEvents ()
  Process all Event objects from EventQueue.
- void processMessage ()
  Interprets and process received Messages.
- void ping ()
  Sends PING Message to master.

Private Attributes

- bool _behaviourSet = false
  Control flag.
- Message _currentMessage
  Last received Message.
- HighResClock::time_point _masterPingTime = HighResClock::now()
  Time since last PONG Message from Master.
- unsigned int _score
  Score of the Robot.

4.56.1 Detailed Description

Main class representing actual robot.

Base class for all different Robot models. Aggregates RobotState, messages and Behaviour processing as well as information exchange with Communication thread.

4.56.2 Constructor & Destructor Documentation

4.56.2.1 Robot::Robot (**Devices::RequiredDevices** *devices*, **AvailableActions** *actions*)

Constructor with required devices and actions parameters.

Parameters

devices	Vector of mapped ports and devices types.
actions	Vector with Action types executable by a particular robot.

4.56.3 Member Function Documentation

4.56.3.1 std::thread Robot::createThread (**Queue**$<$ **Message** $>*$ *sendQueue*, **Queue**$<$ **Message** $>*$ *receiveQueue*)

Thread creation method (instead of running Robot in main thread).

Parameters

sendQueue	Out Message queue.
receiveQueue	In Message queue.

Returns

New std::thread object with Robot class active.

4.56.3.2 SharedPtrBehaviour Robot::generateBehaviour (Behaviour::BehaviourType *type,* StringVector *parameters*) [protected], [virtual]

Generate behaviour based on its type and parameters.

Parameters

type	Behaviour type.
parameters	Additional parameters required by a particular Behaviour.

Returns

New shared pointer with generated Behaviour object.

Reimplemented in ev3::RobotModelA.

4.56.3.3 std::string Robot::getString ( ) [virtual]

Human-readable Robot name getter.

Returns

String with Robot name.

Reimplemented in ev3::RobotModelA.

4.56.3.4 void Robot::run (Queue< Message > ∗ *sendQueue,* Queue< Message > ∗ *receiveQueue*) [virtual]

Starts Robot procedures.

Parameters

sendQueue	Out Message queue.
receiveQueue	In Message queue.

4.56.3.5 void Robot::send (Message *message*)

General sending method for logging and assigning id.

Parameters

message	Message to be sent to Communication thread.

4.56.4 Member Data Documentation

4.56.4.1 bool ev3::Robot::_behaviourSet = false [private]

Control flag.

True if Robot has any Behaviour assigned, false otherwise.

4.56.4.2 float ev3::Robot::_pulsePerUnitRatio = 1.f [protected]

Number of rotation pulses per one distance unit.

Calculated based on attached wheel circumference.

The documentation for this class was generated from the following files:

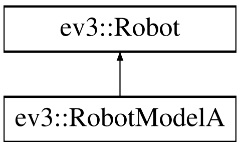
- /home/panda/Dokumenty/Repos/Ev3Dev/include/robot/Robot.h
- /home/panda/Dokumenty/Repos/Ev3Dev/src/robot/Robot.cpp

4.57 ev3::RobotModelA Class Reference

Describes particular Robot construction and its way of implementing actions and running behaviours.

```
#include <RobotModelA.h>
```

Inheritance diagram for ev3::RobotModelA:



Public Member Functions

- RobotModelA ()
  Default constructor.
- virtual std::string getString () override
  Human-readable name getter.

Private Member Functions

- virtual SharedPtrBehaviour generateBehaviour (Behaviour::BehaviourType type, StringVector parameters) override

    Overrides Robot method of Behaviour creation.
- SharedPtrAction generateAction (SharedPtrAction action, Action::ActionType type)

    Generate Action based on its type.

Private Attributes

- float _wheelRadius = 5.75 / 2.f

    This model's wheel radius.

Additional Inherited Members

4.57.1 Detailed Description

Describes particular Robot construction and its way of implementing actions and running behaviours.

4.57.2 Member Function Documentation

4.57.2.1 SharedPtrAction RobotModelA::generateAction (SharedPtrAction *action*, Action::ActionType *type*) [private]

Generate Action based on its type.

Parameters

action	Shared pointer object with Action to be constructed.
type	Action type.

Returns

Copy of the Action object with new data.

4.57.2.2 std::string RobotModelA::getString ( ) [override], [virtual]

Human-readable name getter.

Returns

String with Robot model name.

Reimplemented from ev3::Robot.

The documentation for this class was generated from the following files:

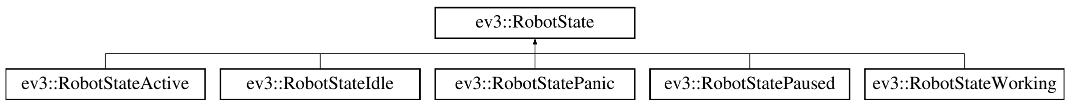
- /home/panda/Dokumenty/Repos/Ev3Dev/include/robot/RobotModelA.h
- /home/panda/Dokumenty/Repos/Ev3Dev/src/robot/RobotModelA.cpp

4.58 ev3::RobotState Class Reference

Base class for all Robot states.

```
#include <RobotState.h>
```

Inheritance diagram for ev3::RobotState:



Public Types

- enum States {
  IDLE, ACTIVE, WORKING, PAUSED,
  PANIC }

  State names (types).
- typedef std::map< Message::MessageType, States > ChangeMap

  Type for defining transitions when particular Messages occur.

Public Member Functions

- RobotState (ChangeMap changes, LedControl ∗led)

  Constructor with transitions map and LED control pointer.
- virtual RobotState ∗ process (Message msg)

  Processes currently assigned state.
- Message::MessageType getPendingMessage ()

  Get Message to be sent to Master.
- void updateTimer ()

  Updates timeouts and pings.
- bool isPendingEnabled ()

  Get information whether state is waiting for response.
- void setBehaviour (SharedPtrBehaviour behaviour)

  Set new Behaviour for this state.
- SharedPtrBehaviour getBehaviour ()

  Behaviour getter.

Static Public Attributes

- static const float MASTER_TIMEOUT = 10.f ∗ 1000

  Default time to enter PANIC state.
- static const float MASTER_PING_TIME = 3.f ∗ 1000

  Time interval for PING-PONG Message exchange.

Protected Member Functions

- RobotState ∗ switchState (Message::MessageType type)

    Normal state changing method.
- RobotState ∗ changeState (States state)

    Force state changing method.

Protected Attributes

- SharedPtrBehaviour _currentBehaviour

    Currently processed Behaviour.
- States _state

    Current state type.
- ChangeMap _changes

    Map of state transitions.
- LedControl ∗ _led

    LED diodes controlling pointer.
- Message::MessageType _pendingMessage = Message::EMPTY

    Type of Message that's going to be forwarded.
- float _pendingTimeout = 0.f

    Time to wait for response.
- HighResClock::time_point _masterTimeout = HighResClock::now()

    Time for measuring master PING response.
- HighResClock::time_point _messageDelay = HighResClock::now()

    Time for measuring master response for a particular Message.

4.58.1 Detailed Description

Base class for all Robot states.

Contains of transitions, timing methods and Behaviour processing.

4.58.2 Member Enumeration Documentation

4.58.2.1 enum ev3::RobotState::States

State names (types).

Enumerator

IDLE Powered, but not connected.

ACTIVE Conected, but no task assigned.

WORKING Processing Behaviour.

PAUSED Behaviour processing paused.

PANIC Lost connection or no connection at all.

4.58.3 Constructor & Destructor Documentation

4.58.3.1 RobotState::RobotState (ChangeMap *changes,* LedControl ∗ *led*)

Constructor with transitions map and LED control pointer.

Parameters

changes	List of available transitions.
led	Pointer to LedControl object for diodes control.

4.58.4 Member Function Documentation

4.58.4.1 **RobotState** ∗ RobotState::changeState (**States** ***state***) `[protected]`

Force state changing method.

Parameters

state	New state to be assigned.

Returns

Pointer to created state.

4.58.4.2 **SharedPtrBehaviour** RobotState::getBehaviour ( )

Behaviour getter.

Returns

Shared pointer with stored Behaviour object.

4.58.4.3 **Message::MessageType** RobotState::getPendingMessage ( )

Get Message to be sent to Master.

Returns

Type of Message that has to be forwarded.

4.58.4.4 bool RobotState::isPendingEnabled ( )

Get information whether state is waiting for response.

Returns

True if new Messages can be sent, false otherwise.

4.58.4.5 **RobotState** ∗ RobotState::process (**Message** ***msg***) `[virtual]`

Processes currently assigned state.

Parameters

msg	Message to be interpreted withing current state.

Returns

Pointer to new state or 'this'.

Reimplemented in ev3::RobotStatePanic, ev3::RobotStatePaused, ev3::RobotStateWorking, ev3::RobotState↩Active, and ev3::RobotStateIdle.

4.58.4.6 void RobotState::setBehaviour (SharedPtrBehaviour *behaviour*)

Set new Behaviour for this state.

Parameters

behaviour	Behaviour shared pointer object.

4.58.4.7 RobotState ∗ RobotState::switchState (Message::MessageType *type*) [protected]

Normal state changing method.

Parameters

type	Messgae type indicating new state to be assigned.

Returns

Pointer to created state.

The documentation for this class was generated from the following files:

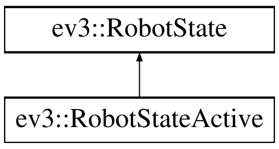
- /home/panda/Dokumenty/Repos/Ev3Dev/include/robot/RobotState.h
- /home/panda/Dokumenty/Repos/Ev3Dev/src/robot/RobotState.cpp

4.59 ev3::RobotStateActive Class Reference

State in which Robot is connected but has no assigned Behaviour.

`#include <RobotState.h>`

Inheritance diagram for ev3::RobotStateActive:



Public Member Functions

- RobotStateActive (LedControl ∗led)

  Constructor with LED controller.
- RobotState ∗ process (Message msg)

  Overriden process method.

Additional Inherited Members

4.59.1 Detailed Description

State in which Robot is connected but has no assigned Behaviour.

4.59.2 Constructor & Destructor Documentation

4.59.2.1 RobotStateActive::RobotStateActive (**LedControl** ∗ *led*)

Constructor with LED controller.

Parameters

led	LedControl pointer.

The documentation for this class was generated from the following files:

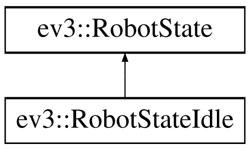
- /home/panda/Dokumenty/Repos/Ev3Dev/include/robot/RobotState.h
- /home/panda/Dokumenty/Repos/Ev3Dev/src/robot/RobotState.cpp

4.60 ev3::RobotStateIdle Class Reference

State in which Robot is powered but not connected to Master.

```
#include <RobotState.h>
```

Inheritance diagram for ev3::RobotStateIdle:



Public Member Functions

- RobotStateIdle (LedControl ∗led)

  Constructor with LED controller.
- RobotState ∗ process (Message msg)

  Overriden process method.

Additional Inherited Members

4.60.1 Detailed Description

State in which Robot is powered but not connected to Master.

4.60.2 Constructor & Destructor Documentation

4.60.2.1 RobotStateIdle::RobotStateIdle (LedControl ∗ *led*)

Constructor with LED controller.

Parameters

led	LedControl pointer.

The documentation for this class was generated from the following files:

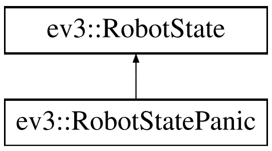
- /home/panda/Dokumenty/Repos/Ev3Dev/include/robot/RobotState.h
- /home/panda/Dokumenty/Repos/Ev3Dev/src/robot/RobotState.cpp

4.61 ev3::RobotStatePanic Class Reference

State in which Robot lost connection with Master or had no connection at all.

```
#include <RobotState.h>
```

Inheritance diagram for ev3::RobotStatePanic:



Public Member Functions

- RobotStatePanic (LedControl ∗led)

  Constructor with LED controller.
- RobotState ∗ process (Message msg)

  Overriden process method.

Additional Inherited Members

4.61.1 Detailed Description

State in which Robot lost connection with Master or had no connection at all.

4.61.2 Constructor & Destructor Documentation

4.61.2.1 RobotStatePanic::RobotStatePanic (**LedControl** ∗ *led*)

Constructor with LED controller.

Parameters

led	LedControl pointer.

The documentation for this class was generated from the following files:

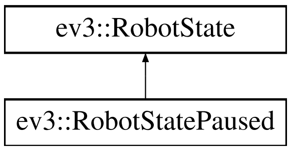
- /home/panda/Dokumenty/Repos/Ev3Dev/include/robot/RobotState.h
- /home/panda/Dokumenty/Repos/Ev3Dev/src/robot/RobotState.cpp

4.62 ev3::RobotStatePaused Class Reference

State in which Robot's Behaviour processing is paused.

`#include <RobotState.h>`

Inheritance diagram for ev3::RobotStatePaused:



Public Member Functions

- RobotStatePaused (LedControl ∗led)
  Constructor with LED controller.
- RobotState ∗ process (Message msg)
  Overriden process method.

Additional Inherited Members

4.62.1 Detailed Description

State in which Robot's Behaviour processing is paused.

4.62.2 Constructor & Destructor Documentation

4.62.2.1 RobotStatePaused::RobotStatePaused (**LedControl** ∗ *led*)

Constructor with LED controller.

Parameters

led	LedControl pointer.

The documentation for this class was generated from the following files:

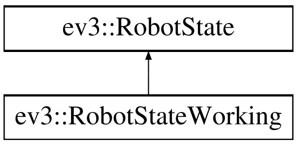
- /home/panda/Dokumenty/Repos/Ev3Dev/include/robot/RobotState.h
- /home/panda/Dokumenty/Repos/Ev3Dev/src/robot/RobotState.cpp

4.63 ev3::RobotStateWorking Class Reference

State in which Robot is processing assigned Behaviour.

```
#include <RobotState.h>
```

Inheritance diagram for ev3::RobotStateWorking:



Public Member Functions

- RobotStateWorking (LedControl ∗led)

  Constructor with LED controller.
- RobotState ∗ process (Message msg)

  Overriden process method.

Additional Inherited Members

4.63.1 Detailed Description

State in which Robot is processing assigned Behaviour.

4.63.2 Constructor & Destructor Documentation

4.63.2.1 RobotStateWorking::RobotStateWorking (**LedControl** ∗ *led*)

Constructor with LED controller.

Parameters

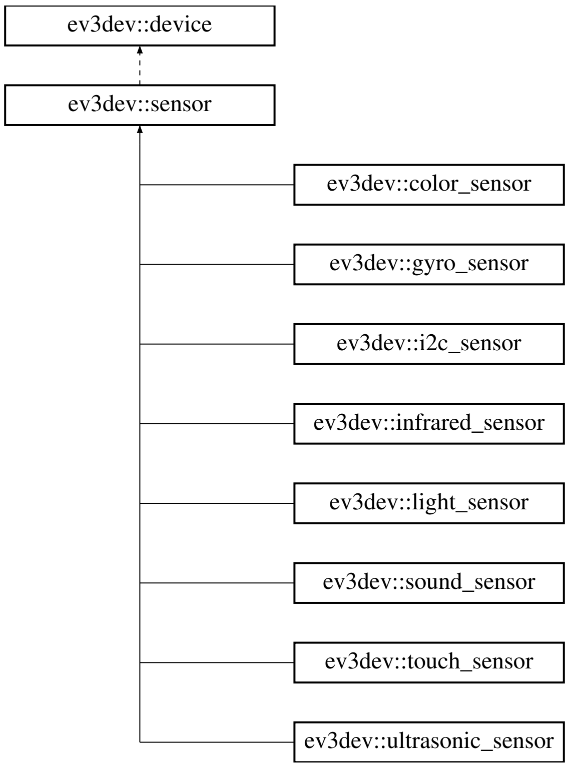
led	LedControl pointer.

The documentation for this class was generated from the following files:

- /home/panda/Dokumenty/Repos/Ev3Dev/include/robot/RobotState.h
- /home/panda/Dokumenty/Repos/Ev3Dev/src/robot/RobotState.cpp

4.64 ev3dev::sensor Class Reference

Inheritance diagram for ev3dev::sensor:



Public Types

- typedef device_type **sensor_type**

Public Member Functions

- **sensor** (address_type)
- **sensor** (address_type, const std::set< sensor_type > &)
- int **value** (unsigned index=0) const
- float **float_value** (unsigned index=0) const
- std::string **type_name** () const
- std::string **bin_data_format** () const
- const std::vector< char > & **bin_data** () const
- template<class T >
  void **bin_data** (T ∗buf) const
- auto **set_command** (std::string v) -> decltype(∗this)
- mode_set **commands** () const

- int **decimals** () const
- std::string **driver_name** () const
- std::string **mode** () const
- auto **set_mode** (std::string v) -> decltype(∗this)
- mode_set **modes** () const
- int **num_values** () const
- std::string **address** () const
- std::string **units** () const

Static Public Attributes

- static const sensor_type **ev3_touch** { "lego-ev3-touch" }
- static const sensor_type **ev3_color** { "lego-ev3-color" }
- static const sensor_type **ev3_ultrasonic** { "lego-ev3-us" }
- static const sensor_type **ev3_gyro** { "lego-ev3-gyro" }
- static const sensor_type **ev3_infrared** { "lego-ev3-ir" }
- static const sensor_type **nxt_touch** { "lego-nxt-touch" }
- static const sensor_type **nxt_light** { "lego-nxt-light" }
- static const sensor_type **nxt_sound** { "lego-nxt-sound" }
- static const sensor_type **nxt_ultrasonic** { "lego-nxt-us" }
- static const sensor_type **nxt_i2c_sensor** { "nxt-i2c-sensor" }
- static const sensor_type **nxt_analog** { "nxt-analog" }

Protected Member Functions

- bool **connect** (const std::map< std::string, std::set< std::string >> &) noexcept

Protected Attributes

- std::vector< char > **_bin_data**

The documentation for this class was generated from the following files:

- /home/panda/Dokumenty/Repos/Ev3Dev/include/ev3dev/ev3dev.h
- /home/panda/Dokumenty/Repos/Ev3Dev/src/ev3dev/ev3dev.cpp

4.65 ev3::Sensor Class Reference

Encapsulates ev3dev::sensor.

```
#include <Sensor.h>
```

Public Types

- enum SensorType {
  TOUCH, COLOR, ULTRASONIC, GYRO,
  INFRARED, SOUND, LIGHT }

  Sensor type.

Public Member Functions

- Sensor (ev3dev::sensor sensor, SensorType type)

    Constructor with sensor object and type.
- ev3dev::sensor getSensor ()

    Sensor getter.
- int getValue (unsigned int n)

    Value getter.
- float getValueF (unsigned int n)

    Float value getter.
- int getDecimals ()

    Number of decimal places getter.
- unsigned int getNumValues ()

    Number of different values getter.
- SensorType getType ()

    Sensor type getter.

Static Public Member Functions

- static StringVector prepareMessage (SensorValue value, SensorType type)

    Prepare vector of parameters for Message object.

Private Attributes

- SensorType _type

    This Sensor type.
- ev3dev::sensor _sensor

    Stored motor.

4.65.1 Detailed Description

Encapsulates ev3dev::sensor.

Can provide additional logic.

4.65.2 Member Enumeration Documentation

4.65.2.1 enum ev3::Sensor::SensorType

Sensor type.

Enumerator

TOUCH	Touch sensor.
COLOR	Color sensor.
ULTRASONIC	Ultrasonic sensor.
GYRO	Gyroscope sensor.
INFRARED	Infrared sensor.
SOUND	Sound sensor.
LIGHT	Light sensor.

4.65.3 Constructor & Destructor Documentation

4.65.3.1 Sensor::Sensor (ev3dev::sensor *sensor*, SensorType *type*)

Constructor with sensor object and type.

Parameters

sensor	ev3dev sensor object.
type	Sensor type value.

4.65.4 Member Function Documentation

4.65.4.1 int Sensor::getDecimals ( )

Number of decimal places getter.

Returns

Integer with number of places that a true Sensor value has.

4.65.4.2 unsigned int Sensor::getNumValues ( )

Number of different values getter.

Returns

Integer with number of different measurements available.

4.65.4.3 ev3dev::sensor Sensor::getSensor ( )

Sensor getter.

Returns

Stored ev3dev::sensor object.

4.65.4.4 Sensor::SensorType Sensor::getType ( )

Sensor type getter.

Returns

SensorType value.

4.65.4.5 int Sensor::getValue (unsigned int *n*)

Value getter.

Parameters

n	Id of the value desired.

Returns

Integer with Sensor's value.

4.65.4.6 float Sensor::getValueF (unsigned int *n*)

Float value getter.

Parameters

n	Id of the value desired.

Returns

Float with Sensor's value.

4.65.4.7 StringVector Sensor::prepareMessage (SensorValue *value,* SensorType *type*) [static]

Prepare vector of parameters for Message object.

Parameters

value	Measured values.
type	Used Sensor type.

Returns

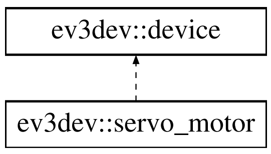
Vector with Sensor values as strings.

The documentation for this class was generated from the following files:

- /home/panda/Dokumenty/Repos/Ev3Dev/include/robot/Sensor.h
- /home/panda/Dokumenty/Repos/Ev3Dev/src/robot/Sensor.cpp

4.66 ev3dev::servo_motor Class Reference

Inheritance diagram for ev3dev::servo_motor:



Public Member Functions

- **servo_motor** (address_type address=OUTPUT_AUTO)
- auto **set_command** (std::string v) -> decltype(∗this)
- std::string **driver_name** () const
- int **max_pulse_sp** () const
- auto **set_max_pulse_sp** (int v) -> decltype(∗this)
- int **mid_pulse_sp** () const
- auto **set_mid_pulse_sp** (int v) -> decltype(∗this)
- int **min_pulse_sp** () const
- auto **set_min_pulse_sp** (int v) -> decltype(∗this)
- std::string **polarity** () const
- auto **set_polarity** (std::string v) -> decltype(∗this)
- std::string **address** () const
- int **position_sp** () const
- auto **set_position_sp** (int v) -> decltype(∗this)
- int **rate_sp** () const
- auto **set_rate_sp** (int v) -> decltype(∗this)
- mode_set **state** () const
- void **run** ()
- void **float_** ()

Static Public Attributes

- static const std::string **command_run** { "run" }
- static const std::string **command_float** { "float" }
- static const std::string **polarity_normal** { "normal" }
- static const std::string **polarity_inversed** { "inversed" }

Additional Inherited Members

The documentation for this class was generated from the following files:

- /home/panda/Dokumenty/Repos/Ev3Dev/include/ev3dev/ev3dev.h
- /home/panda/Dokumenty/Repos/Ev3Dev/src/ev3dev/ev3dev.cpp

4.67 ev3::SignalHandler Class Reference

Simple class catching system signals.

```
#include <SignalHandler.h>
```

Static Public Member Functions

- static void HandleSignal (int signum)

    Main signal catching method.

Static Public Attributes

- static Robot ∗ robot = nullptr

  Pointer to Robot instance.
- static Master ∗ master = nullptr

  Pointer to Master instance.

4.67.1 Detailed Description

Simple class catching system signals.

Stops Robot and Master if break signal is received.

4.67.2 Member Function Documentation

4.67.2.1 void SignalHandler::HandleSignal (int *signum*) [static]

Main signal catching method.

Parameters

signum	Signal code to catch.

The documentation for this class was generated from the following files:

- /home/panda/Dokumenty/Repos/Ev3Dev/include/utils/SignalHandler.h
- /home/panda/Dokumenty/Repos/Ev3Dev/src/utils/SignalHandler.cpp

4.68 ev3dev::sound Class Reference

Static Public Member Functions

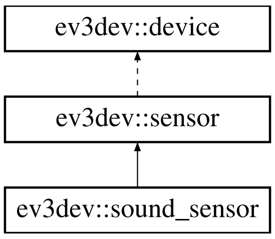
- static void **beep** (const std::string &args="", bool bSynchronous=false)
- static void **tone** (float frequency, float ms, bool bSynchronous=false)
- static void **tone** (const std::vector< std::vector< float > > &sequence, bool bSynchronous=false)
- static void **play** (const std::string &soundfile, bool bSynchronous=false)
- static void **speak** (const std::string &text, bool bSynchronous=false)

The documentation for this class was generated from the following files:

- /home/panda/Dokumenty/Repos/Ev3Dev/include/ev3dev/ev3dev.h
- /home/panda/Dokumenty/Repos/Ev3Dev/src/ev3dev/ev3dev.cpp

4.69 ev3dev::sound_sensor Class Reference

Inheritance diagram for ev3dev::sound_sensor:



Public Member Functions

- **sound_sensor** (address_type address=INPUT_AUTO)
- float **sound_pressure** ()
- float **sound_pressure_low** ()

Static Public Attributes

- static const std::string **mode_db** { "DB" }
- static const std::string **mode_dba** { "DBA" }

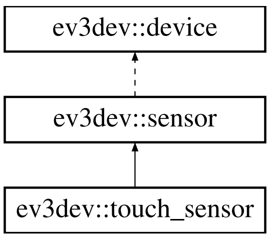
Additional Inherited Members

The documentation for this class was generated from the following files:

- /home/panda/Dokumenty/Repos/Ev3Dev/include/ev3dev/ev3dev.h
- /home/panda/Dokumenty/Repos/Ev3Dev/src/ev3dev/ev3dev.cpp

4.70 ev3dev::touch_sensor Class Reference

Inheritance diagram for ev3dev::touch_sensor:



Public Member Functions

- **touch_sensor** (address_type address=INPUT_AUTO)
- bool **is_pressed** ()

Static Public Attributes

- static const std::string **mode_touch** { "TOUCH" }

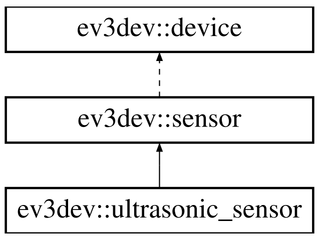
Additional Inherited Members

The documentation for this class was generated from the following files:

- /home/panda/Dokumenty/Repos/Ev3Dev/include/ev3dev/ev3dev.h
- /home/panda/Dokumenty/Repos/Ev3Dev/src/ev3dev/ev3dev.cpp

4.71 ev3dev::ultrasonic_sensor Class Reference

Inheritance diagram for ev3dev::ultrasonic_sensor:



Public Member Functions

- **ultrasonic_sensor** (address_type address=INPUT_AUTO)
- float **distance_centimeters** ()
- float **distance_inches** ()
- bool **other_sensor_present** ()

Static Public Attributes

- static const std::string **mode_us_dist_cm** { "US-DIST-CM" }
- static const std::string **mode_us_dist_in** { "US-DIST-IN" }
- static const std::string **mode_us_listen** { "US-LISTEN" }
- static const std::string **mode_us_si_cm** { "US-SI-CM" }
- static const std::string **mode_us_si_in** { "US-SI-IN" }

Additional Inherited Members

The documentation for this class was generated from the following files:

- /home/panda/Dokumenty/Repos/Ev3Dev/include/ev3dev/ev3dev.h
- /home/panda/Dokumenty/Repos/Ev3Dev/src/ev3dev/ev3dev.cpp

Chapter 5

File Documentation

5.1 /home/panda/Dokumenty/Repos/Ev3Dev/include/action/Action.h File Reference

Contains all Action classes.

```
#include "CommandMotor.h"
#include <memory>
```

Classes

- class ev3::Action

    Base class for all Action controlling classes.
- class ev3::ActionRepeat

    Stores many Actions in a vector and executes them in loop.
- class ev3::ActionDriveDistance

    Implements Robot simple task to drive straight for a given distance.
- class ev3::ActionRotate

    Implements Robot simple task to rotate a given angle, while not driving.
- class ev3::ActionRotateRandDirection

    Implements Robot simple task to rotate a random angle.
- class ev3::ActionStop

    Implements Robot simple task to stop all active motors.
- class ev3::ActionDriveForever

    Implements Robot simple task to drive straight forever.

Typedefs

- typedef std::shared_ptr< Action > ev3::SharedPtrAction

    Type for Action shared_ptr.
- typedef std::vector< SharedPtrAction > ev3::StoredActions

    Type for storing many Actions in one container.
- typedef std::shared_ptr< Command > ev3::SharedPtrCommand

    Type for Command shared_ptr.
- typedef std::vector< SharedPtrCommand > ev3::CommandsVector

    Type for containing associated Command pointers.

5.1.1 Detailed Description

Contains all Action classes.

5.1.2 Typedef Documentation

5.1.2.1 typedef std::vector< SharedPtrAction > ev3::StoredActions

Type for storing many Actions in one container.

See also

ActionRepeat

5.2 /home/panda/Dokumenty/Repos/Ev3Dev/include/action/Behaviour.h File Reference

Contains all Behaviour classes.

```
#include "Action.h"
#include "Utils.h"
#include "Sensor.h"
#include "Event.h"
#include "BehaviourState.h"
#include <unistd.h>
#include <string>
```

Classes

- class ev3::Behaviour

  Base class for all defined behaviours.
- class ev3::BehaviourDriveOnSquare

  Implements complex behaviour of driving on a square-shaped route.
- class ev3::BehaviourExploreRandom

  Implements complex behaviour of exploring the surrounding with random rotation.

Typedefs

- typedef std::shared_ptr< Behaviour > ev3::SharedPtrBehaviour

  Type for Behaviour shared_ptr.
- typedef std::vector< BehaviourState > ev3::BehaviourStates

  Type for storing Behaviour states in one container.
- typedef std::vector< Sensor::SensorType > ev3::Measurements

  Type for storing sensors' desired measurements in one container.

5.2.1 Detailed Description

Contains all Behaviour classes.

5.3 /home/panda/Dokumenty/Repos/Ev3Dev/include/action/BehaviourState.h File Reference

Contains BehaviourState class.

```
#include "Action.h"
#include "Event.h"
```

Classes

- class ev3::BehaviourState

  Encapsulates action and other information in a form of a state.

Typedefs

- typedef std::map< Event::EventType, unsigned int > ev3::ReactionsTransitions

  Type for storing Event-State pairs defining special transitions.

5.3.1 Detailed Description

Contains BehaviourState class.

5.4 /home/panda/Dokumenty/Repos/Ev3Dev/include/communication/Communication.h File Reference

Contains Communication class.

```
#include "Queue.h"
#include "CommUtils.h"
#include <thread>
```

Classes

- class ev3::Communication

  Encapsulates low-level communication and adds logic concerning sending and receiving Message queueing.

Variables

- static const unsigned int ev3::MAX_COMM_ITERATIONS = 10

  Default maximum number of one time communication thread iterations.
- static const unsigned int ev3::SEND_RETRIES = 3

  Default number of subsequent attempts to send a message.

5.4.1 Detailed Description

Contains Communication class.

5.5 /home/panda/Dokumenty/Repos/Ev3Dev/include/communication/CommUtils.h File Reference

Contains CommUtils class.

```
#include "Message.h"
#include "CircularBuffer.h"
#include <string>
#include <netinet/in.h>
#include <map>
#include <queue>
```

Classes

- class ev3::CommUtils

  Responsible for low-level communication.
- struct ev3::CommUtils::NetworkNode

  Stores information about a particular node in the network.
- struct ev3::CommUtils::Buffer

  Contains buffer and its size.

Variables

- static const unsigned int ev3::DEFAULT_PORT = 12345

  Default port number.
- static const unsigned int ev3::MAX_PACKET_LENGTH = 4096

  Maximum packet size in bytes.
- static const unsigned int ev3::DEFAULT_RECEIVE_DELAY = 1

  Default time in milliseconds to wait for message (used by non-blocking receive method).
- static const unsigned int ev3::MASTER_ID = 1

  Default master id.
- static const unsigned int ev3::SENT_MESSAGE_COPIES = 5

  Default number of copies to be sent every time (preventing packet loss).
- static const unsigned int ev3::DEFAULT_PACKET_BUFFER_LIMIT = 50

  Maximum number of stored message prototypes (preventing duplicates).

5.5.1 Detailed Description

Contains CommUtils class.

5.6 /home/panda/Dokumenty/Repos/Ev3Dev/include/communication/Message.h File Reference

Contains Message class.

```
#include "Utils.h"
#include <vector>
#include <string>
```

Classes

- class ev3::Message
  Stores information passed between physical system units (another robots or master).

Variables

- static const char ev3::MESSAGE_DELIM = ':'
  Default Message delimiter between parts of encoded message string.

5.6.1 Detailed Description

Contains Message class.

5.7 /home/panda/Dokumenty/Repos/Ev3Dev/include/robot/Devices.h File Reference

Contains Devices classes.

```
#include "ev3dev.h"
#include "Motor.h"
#include "Sensor.h"
#include "Utils.h"
```

Classes

- class ev3::Devices
  Singleton class responsible for managing devices connected to the robot.

Variables

- const std::vector< ev3dev::port_type > ev3::INPUTS = {ev3dev::INPUT_1, ev3dev::INPUT_2, ev3dev::IN↩ PUT_3, ev3dev::INPUT_4}

  Type for storing all available Sensor inputs.
- const std::vector< ev3dev::port_type > ev3::OUTPUTS = {ev3dev::OUTPUT_A, ev3dev::OUTPUT_B, ev3dev::OUTPUT_C, ev3dev::OUTPUT_D}

  Type for storing all available Motor outpus.

5.7.1 Detailed Description

Contains Devices classes.

5.8 /home/panda/Dokumenty/Repos/Ev3Dev/include/utils/EventQueue.h File Reference

Contains EventQueue class.

```
#include "Event.h"
#include <queue>
#include <mutex>
```

Classes

- class ev3::EventQueue

  Singleton class responsible for managing Event objects.

Typedefs

- typedef std::shared_ptr< Event > ev3::SharedPtrEvent

  Type for Event shared_ptr.

5.8.1 Detailed Description

Contains EventQueue class.

Index