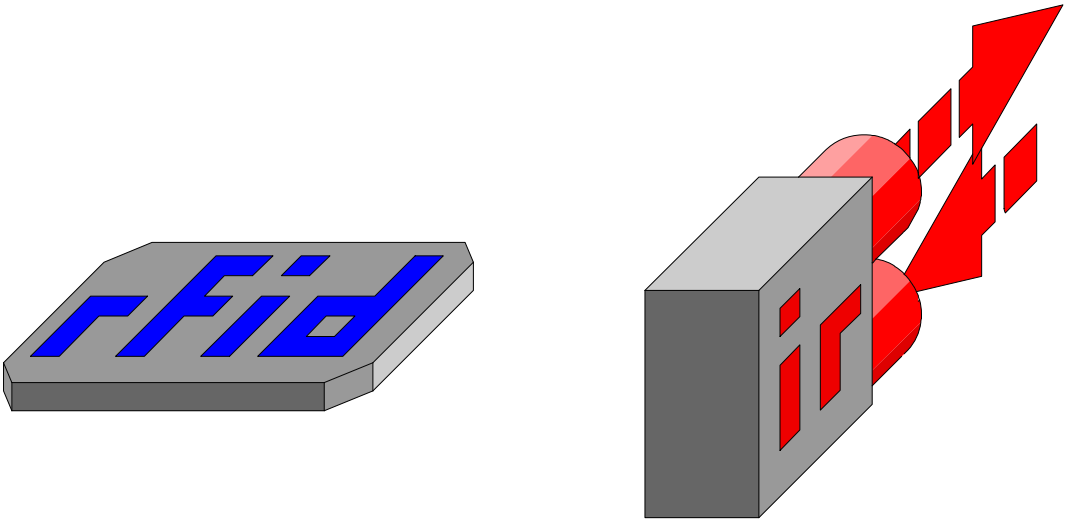
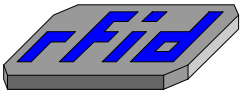
Gallerydrive: Signals and Conditions

Niklas Roy, 25.8.2006



In the Galleryzone proposal PDF, I already mentioned "signals" - which are sent via an infrared transmitter to the gallerydrive car, and I also wrote about different "conditions", that the Gallerydrive car can have. In this PDF, I want to explain this more deeply.



Conditions:

The Gallerydrive parcours can set the Galerydrive car into different conditions. This always works via RFID-tags, adhered next to the track. The car drives with its internal RFID transponder over the tag, it reads the tag's number, and in an internal database it looks for the condition, assigned to the tag's number. Then, the car will set itself into this condition.
If the car has done everything, it had to do in this condition (eg. "wait for go" - and it receives a "go" signal), it can set itself into another condition (eg. "drive")

Each car has always one condition, but never more than one condition at the same time.

New RFID-tags always overwrite the last condition of the car - except of in one special case:
It is possible to adhere RFID-tags, which only influence the actions of one special car. Then, the databases of the other cars would assign the number of this tag with an "ignore", which means, that they would stay in the condition, that they had before.

What conditions can do:

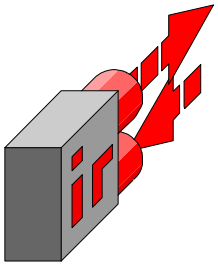
In the Galleryzone proposal PDF, I already explained three conditions: "wait for go", "queue" and "enter". These are standard conditions to let the ride run safely. Other conditions will be used to change the text on the screen of each Gallerydrive car, or to change the track, played by the cars internal MP3-player, or to change the speed, with which the car drives, according to the position, where the car is located in the drive. If the car has special functions like for instance massage, or additional motors to move the seat, conditions will be used, to control those functions.

- Conditions are always fixed to a location in the ride.
- Conditions can change parameters of the following devices:
drive controller, display, MP3-player

As the condition system is a part of the maincontrollers firmware, I will explain, how this will work in the code:

"Condition" will be a variable, so every condition gets a number ("drive"=0, "wait for go"=1, "queue"=2, "enter"=3, ...). One time per program loop, the program will branch to a subroutine, assigned to the current condition. If the car drives for instance over a RFID-tag, which should change the content of the display, the car would read the number of the tag. Then, it would look for the assigned condition number (eg. "12"). Then, it would branch to subroutine #12. This subroutine would change the display content, to the content stored in this subroutine. At the end of the subroutine, the program would change the condition into condition "0" for driving. For the visitor, the result is, that the car just drove over the tag, without stopping, but the display changed its content, according to the artwork he drives towards.

There can also be stored more complex code in the subroutine, assigned to the condition. It would be possible, for instance, to let the car stop for a certain time and let it go afterwards, or to let it stop until the current track of the MP3 player has finished,...



Signals:

As conditions always call a fixed subroutine in the Gallerydrive car, they can't be used to transmit variable content from the Gallerydrive parcours to the car. The car always behaves like described in the assigned subroutine, when it drives over a RFID-tag. There might be situations, where the car has to behave according to what the Gallerydrive parcours wants in that particular situation. These situations need more than conditions, they require the transmission of signals.

Let's think about the following example:

At a certain position in the parcours, the Gallerydrive wants the car to play one certain track out of a pool of five tracks, stored in its internal MP3 player. A RFID-tag could tell the car to play a certain song, it could also tell the car to play one out of those five tracks by random, but it can't tell the car, to play a particular track #x. For that, there has to be a signal transmission between Gallerydrive parcours and Gallerydrive car. This signal transmission works via infrared communication.

The setup, that solves the task, described in the example above, would look like this: There is a RFID-tag and a IR transmitter at the same position of the track. The RFID-tag would set the car into a condition, where the car "listens" to its infrared input. It would receive a number (transmission of 0-127 is possible with the cheapest PICAXE chips, 08M for about 5 Euros per chip). Then, it would be part of the condition to play the track, assigned to the number, the car has received.

I already described the "wait for go" condition in the Galleryzone PDF. There, the setup is quite similar. It is also one RFID-tag, which sets the car into a condition, where it "listens" to its IR receiver. If it receives a "go" signal (which will be a defined number between 0 and 127), it will go on with driving. If it doesn't receive anything, it will stop and go on with "listening", until it receives this particular number.

The signals itself have no particular function. They are nothing else than numbers. Just the combination - condition and signal - will execute a variable action.

The advantage of this system is, that the ride is more safe. We will use a lot of infrared communication at one venue. If all cars would always listen to their IR receivers and if they would receive a reflecting signal, which is not meant for them, there could happen unexpected actions quite fast. This is why the cars should only "listen" at particular positions, close to the next IR transmitter.

Bidirectional signals:

As the cars can also receive information from the visitor, who sits in the car, via two buttons next to the display, there must be a way to transmit this information to the Gallerydrive parcours in order to install interactive installations, which uses these informations.

So, an infrared communication from the car to the Gallerydrive parcours is also needed. This signal transmission works in the same way, as the IR communication from the parcours to the car works: The car will be set via RFID-tag into a condition, where it sends IR signals. The process is similar to the process the other way round. The signals are numbers between 0 and 127. What the numbers mean, is defined in the condition (at the car side) and in the artwork controller (at the parcours side).