**Pacemaker Documentation**

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# Pacemaker GUI User Manual

## To Register:

If you haven’t logged in yet, you first need to register. Follow the steps below:

1. Press the Register button.

A picture containing graphical user interface

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1. Create a username and password.
2. Press the blue Register button.

Graphical user interface, application

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1. You should see “Registration Confirmed, Please Log In”. You have now registered and can close the Register tab.

Graphical user interface, application

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Note: If the username you have chosen has been taken, an error tab will appear stating this.

Graphical user interface, application

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## To Login:

After you have registered, you can now login. Follow the steps below:

1. Press the Login button.

A picture containing graphical user interface

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1. Enter your username and password.
2. Press the Login button.

Graphical user interface, application

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1. Two tabs should appear: a Pacing Modes tab and a Login Success tab. You have now successfully logged in.

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Graphical user interface, application

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Note: If your username or password is invalid, an error tab will appear stating this.

Graphical user interface, application

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## To Connect to Pacemaker Device:

After logging in, you should have a Pacing Modes tab. Follow the steps below:

1. Press the Connect Device button to connect the GUI to the Pacemaker.

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1. Afterwards, the Connect Device button should change to the Disconnect Device button.



## To Change Pacing Modes:

After logging in, you should have a Pacing Modes tab. This tab should display all 8 possible modes that the Pacemaker can be in. There should also be a logout button and a connect device button. Follow the steps below:

1. Press a pacing mode button to change modes.

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1. A new tab should appear with the mode’s programmable parameters.

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## To Change Pacing Mode Programmable Parameters:

After selecting a mode, a tab with all the programmable parameters should appear. Follow the steps below:

1. Depending on the parameter, there are different ways to change the values of these parameters. For example, there can be a slider or a dropdown menu. Change the parameter to your desired value.

Graphical user interface, application

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1. Press the Update Parameter button. The value you chose should appear below the button.

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Note: If the Upper Rate Limit [ppm] value you chose is less than the Lower Rate Limit [ppm] value, the parameter will not update due to safety reasons.

1. Press the Push to Pacemaker button to make these changes in the pacemaker as well.



Note: Please ensure that you press the Update Parameter button for every parameter you change before you press the Push to Pacemaker button to make sure all changes are sent to the Pacemaker.

## To Disconnect from the Pacemaker Device:

After logging in, you should have a Pacing Modes tab. Follow the steps below:

1. Press the Disconnect Device button to disconnect the GUI from the Pacemaker.

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1. Afterwards, the Disconnect Device button should change to the Connect Device button.



## To Logout:

After logging in, you should have a Pacing Modes tab. Follow the steps below:

1. Press the Logout button at the top of the tab. A Logout Success tab should appear. You have logged out!

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# Programmable Parameters: DCM Origin, Implementation and Data Type Choice

## Parameter DCM Origin

Initially, the programmable parameters were hardcoded in the DCM implementation. Then it was adapted to include user input so that the parameters could be changed dynamically in the GUI.

## Parameter Implementation in Pacemaker

The stateflow used for serial communication contains a state that echoes the received parameters from the DCM back to DCM. This is done to ensure that the parameters have been changed dynamically in the GUI by the user and that the pacemaker has received the correct values.

## Parameter Data Type Choice

|  |  |  |
| --- | --- | --- |
| Parameter | Data Type | Reason |
| Ventricular/Atrium Refractory Period | Double | The ventricle refractory period is a time value so it can have decimal places and is thus type double. |
| Ventricle/Atrium Pulse Width | Int 16 | Pulse width can only be from 1-30 seconds and increment by integer values thus it is int 16. |
| Upper/Lower Rate Limit | Double | Upper/lower rate limits are both converted to LRI and URI which are time values and thus both values are of type double. |
| Mode | Int 16 | There are only 9 modes to choose from (initial, VOO, VVI, AOO, AAI, VOOR, VVIR, AOOR, AAIR) represented by 9 integer values. |
| Ventricular/Atrium Pace Amplitude | Double | The amplitude is measured in mV which can have decimal places and is thus type double. |
| Recovery Time | Double | Recovery time is a time value and can have decimal places, so it should be type double. |
| Response Factor | Double | The response factor does not have decimal values, but it is used in calculations with other values of type double and thus needed to also be of type double. |
| Reaction Time | Double | Reaction time is a time value and can have decimal places, so it should be type double. |
| Activity Threshold | Double | Activity Threshold is used in calculations with other values of type double and thus had to also be of type double. |
| MSR | Double | MSR is used in calculations with other values of type double and thus had to also be of type double. |
| Ventricle/Atrium Sensitivity | Double | The ventricle/atrium sensitivity values can be decimal numbers and thus had to be of type double. |