



The Power Config Advanced 7 (PCA7) quick start guide leads you through the first steps of connecting the Adaptive Control Unit (ACU) to a computer and how to configure the necessary parameters.

It also shows you some of the most used functions available in PCA7, to give you a starting point to enter.

PCA7 Overview

PCA7 allows you to configure your ACU system. As the ACU system is a modular system, PCA7 follows the same strategy. Each connected hardware module is represented by its own software Module Form in PCA7. You can add or remove ACU Module Forms to

your Configuration File to match your ACU System Setup.

After you did this you can save your Configuration File. Every power converter will have its own Configuration File matching its System Setup and also including information about the power converter.

PCA7 offers you a large number of configuration possibilities. Just to mention a few there is powerful signal routing, very flexible controller configuration, as well as diagnosis tools like an internal scope, real time interlock monitoring or environmental data information - and also helpful tools like the internal function generator.

Note: PCA7 is under ongoing development. It is possible that details differ from this guide.

abstract concept

ACU	-	Adaptive Control Unit
PCA7	-	Power Config Advanced 7 software
MFU SE	-	Multi Function Unit 2 nd Edition
System Setup	-	ACU with all connected ACU Modules
Configuration File	-	PCA7 file, representing a System Setup
ACU Module	-	ACU hardware module
Module Form	-	Software window in PCA7, representing an ACU Module
Software	-	PCA7, running on your computer
Firmware	-	Firmware running inside your ACU Modules FPGAs



Go through the first five points to establish communication between your ACU System and PCA7.

1 Connect your ACU to your computer

1st Step

- Install PCA7 on your PC using the setup routine

2nd Step

- Connect all your ACU Modules via USI connections to the ACU Rack
- Connect the ACU rack (MFU USB B jack, lower one) via USB cable to your computer
- Power up the ACU system

3rd Step

- Run PCA 7
- Connection between the ACU System and PCA7 is automatically established

In case you already have a PCA7 configuration file (.xpc7) for your system, open it with PCA7 and continue with '2 - Load a Configuration File'.*

If not, you have to create a new configuration file. Continue with '3- Create a new Configuration File'.

2 Load a Configuration File

If you have a configuration file for your System Setup select 'File -> open file'. Be aware that the content of your Configuration File is not automatically sent to the ACU System.

Please check that your Configuration File matches your System Setup (see point 4 - Compare your Configuration File with your System Setup) before you send parameters to the ACU System (see 7 - Send parameters to the ACU System).

3 Create a new Configuration File

If you don't have a configuration file for your system, please create a new one with the following steps:

- Open a new Multifunction Unit (MFU) form by clicking on 'Tools' -> 'Open MFU SE form'
- Answer the dialogue if you want to automatically create a configuration file by the connected modules with yes.
- Now all your connected ACU Modules should be detected and set to the according USI channels

4 Compare your Configuration File with your System Setup

If you just loaded or created a configuration file please make sure the System Setup matches the Configuration File:

- Now you see the MFU form, USI configuration page
Please check if you find all your connected ACU Modules and check that they are ok (green)
- If a module appears red, it is not connected properly to the system. In that case please read the information given in the textbox and check if...

- Selected / detected Module Form is matching the connected ACU Module.
- ACU Module it powered.
- ACU Module is connected to the right USI channel.
- ACU Module firmware is 7.0 or higher.

Please see point '14 - Add / remove Module Forms from / to your Configuration File' if you need or want to change the Module Forms of your Configuration File.

5 Save your Configuration File

Save your PCA7 Configuration File as 'YourFilename.XPC7'. As every power converter will have its own Configuration File it makes sense to name it by the power converter nomenclature (if known) or by the device type of the power converter.



From now you are able to communicate with your ACU Modules. The following points will show you some basic functionalities of PCA7. From now you don't have to go through in line.

6 Module Forms

You can access the Module Forms by clicking on their names in the fast access bar of PCA7, directly under the standard save, open...buttons.

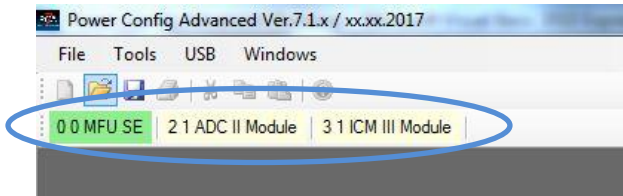


Figure 1: Module Forms fast access bar

Each Module Form represents its ACU Module. All Module Forms have a certain number of tab pages. Here you find in groups information and parameters of the ACU Module.

If you want to see real time values like thresholds, PCB temperatures, supply voltages, actual ADC value, interlock and all other kinds of values you have to select 'Refreshing gaugeable values' on the page you are interested in.

Green indicates that parameters of this Module Form will be sent to the ACU System. The parameters of yellow Module Forms will not be sent. Please see point '7 - Send parameters to the ACU System'.

7 Send parameters to the ACU System

If you edit parameters on the Module Forms you can send them to the ACU System after you finished your modification.

If you click on 'Write configuration to RAM' only the parameters of the active tab page are sent to the ACU System. They will be stored in the RAM, which means parameters are only valid until the next ACU System power up.

If you want to store parameters permanently in the ACU System - or you want to send all parameters of all Module Forms you have to do the following steps:

1st step

- Activate on the Module Forms you want to send the 'add configuration button' on the 'environment data' tab page

2nd step

go (via fast access bar) to Module Form 'MFU_SE', tab 'controller configuration'.

There are two possibilities:

1. 'Write parameters to RAM': Parameters will be sent to ACU System, but not be stored permanently. After the next ACU System power up, the old parameters from the FLASH will be loaded
2. 'Write parameters to FLASH': Parameters will be sent to ACU System and permanently stored

8 Add power converter information to your Configuration File

- Go to 'MFU_SE' form -> tab 'PSU data' (PSU = Power Supply Unit)
- Important: Most values are for information only. But for the correct DCCT scaling you need to enter 'Imax positive' and please make sure your 'Act value factor' is set to 1,0 (this values are marked with an asterisk)

9 Enter / edit interlock texts

If your Module Form has an interlock configuration tab you can edit the interlock texts in order to get plain text information on the MFU display in case of an interlock.

- Select your Module using the fast access bar
- On the Module Form select tab 'Interlock configuration'
- Select the interlock you want to edit

- Enter the text you want to see on the MFU display in the textbox ‘Displayed interlock name on TFT’.
- Click ‘Save changes’
- Repeat those steps for all your interlock signals
- Go to MFU ‘Module Form’, tab ‘Controller configuration’ and click ‘Write interlock texts into MFU flash’

On this tab page you will also see pending interlocks in real time, if you have the refresh set to active.

10 Interlock configuration

On this tab page you can configure your interlock texts and configuration dependent on the interlock type.

11 Controller configuration

If your module includes a PI controller, you can configure its parameters, input values and much more here.

12 Internal scope

On the internal scope (MFU Module Form) you can easily track internal signals.

13 Signal Routing

On many tab pages of the Module Forms you can choose with multiplexers the input and output signals of many blocks and to change the signal routes.

14 Add / remove Module Forms from / to your Configuration File

The ACU System is not a “plug & play” system. You have to define which ACU Module is connected to which USI channel. You can perform a hardware scan or build your Configuration File manually.

14.1 hardware rescan

You can perform a hardware rescan to automatically scan all USI chains and set the detected ACU Modules to your Configuration File.

- Use the fast access bar and go to ‘MFU_SE’, tab ‘USI configuration’.
- Make sure all your ACU Modules are connected and powered.
- Click ‘Start USI rescan on MFU’

14.2 manually add / remove Module Forms

If you want to manually add or remove ACU Modules from or to your configuration file please follow those steps:

- Use the fast access bar and go to ‘MFU_SE’, tab ‘USI configuration’
- Click ‘Enable USI connection setup’
- Browse in the list to the module you are looking for, or choose ‘Disabled’ if you want to remove a module from your setup
- Now click on the USI channel you connected the module to, or the module you want to remove from your setup
- When adding a module to a USI channel, it always has to be the first or next one in the channel chain. There must not be free positions in a USI channel chain
- Repeat this until your Configuration File matches the System Setup
- Click ‘Disable USI connection setup’

15 Hints

- You can also run PCA7 in ‘offline mode’, means without any ACU System connected. Use the offline mode to prepare your Configuration Files or just to explore the different ACU Modules and their possibilities. Of course features like ‘USI rescan’ and real time values are not available – but you can build a Configuration File manually to use it later on.
- If you made changes to an existing Configuration File and you are not sure if those changes will meet your expectations – or you just want to make a temporary change in the ACUs parametrization – then just send your Configuration File to the RAM. After the next power up of the ACU System the last parameters will be loaded from the FLASH memory.
- You want to test your power converter with ramps or pulses and you don’t have a control system to set the according values? Use the function generator of PCA7 (‘MFU_SE’ Module Form, tab page ‘Function generator’).
 - Add your values.
 - Go to ‘MFU_SE’ Module Form, page ‘Controller configuration’
 - Select ‘Function generator’ as input value of your PI controller
 - Send all parameters to your ACU System (see point 7)
 - Turn on your power converter