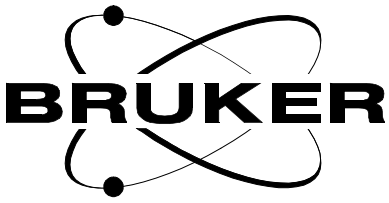

RF Amplifier

User Manual
EDACB

Version 001

BRUKER

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Contents

Contents 3

Index 5

1 Description 7

1.1 EdACB : limitation parameters for RF-amplifiers 7
1.2 Starting EdACB 9
1.3 EdACB : the Graphical User Interface guide 10
The main window 10
Setting parameters 11
Saving parameters into a file 12
Loading parameters from a file 12
Saving parameters into the current file 13
Getting software information 13
1.4 EdACB : the no-GUI mode 14

Figures 15

Tables 17

Contents

Index

Index

Description 1

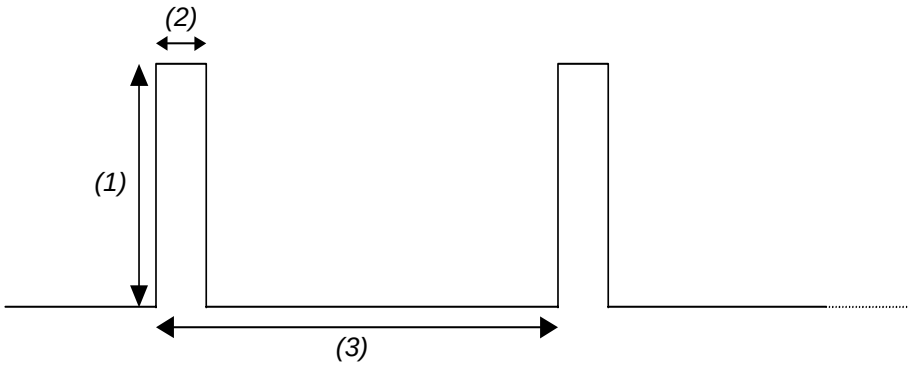
EdACB : limitation parameters for RF-amplifiers 1.1

In order to prevent amplifiers from damaging the probes with energy overflows, XWinNMR provides a tool that allows the user to limit energy supplies. This tool is named **EdACB**.

EdACB communicates its hardware settings via the **A**mplifier **C**ontrol **B**oard to the BLA (Bruker Linear Amplifier) board whose role is to control the amplifier behaviour : if limits are exceeded, the power emission is switched off.

EdACB is able to limit the following parameters:

- the *pulse power* is the power level generated by the amplifier
- the *pulse width* is the lapse time during which a pulse power is applied
- the *duty cycle* is the ratio between the pulse width and the period of the signal
- the *reflected power* is the part of the power that is not forwarded to the probe



1. the pulse power
2. the pulse width
3. the period – the duty cycle is equal to (2)/(3)

Important note :
Pulse width and duty cycle limits are set for nominal power.

Examples :

A pulse width limit set to 3ms means that the nominal power can be applied during 3ms max. In other words, if the pulse power is set to half the nominal power (for the same pulse width limit), it can be applied for 6ms.

A duty cycle limit set to 10% means that if the signal period is 100ms, the nominal power can be applied during 10ms. In other words, if the pulse power is set to half the nominal power (for the same duty cycle limit and the same signal period), it can be applied for 20ms.

Starting EdACB *1.2*

To start the EdACB Graphical User Interface, either enter **edacb** in the XWinNMR command line, or click on the <**Amplifier Protection Limits**> item in the menu **Acquire->Interface Control** of XWinNMR.

While initialising, EdACB gets the current selected probehead identification, the current amplifiers configuration (type, limits max., limits ranges...) and their current applied limits. After a few seconds, it displays the interface (see ***Figure 1.1. page 9***).

Figure 1.1.

The information displayed are :

- the identification of the current probe head :

- for each connected amplifier, its current limits :

The information concerning the amplifier identification are :

- its ACB address (here, 2)
- the nucleus (here, H)
- its frequencies range (here, from 470 to 600 MHz)

For each limit, you can see its authorised range. The current limit value is always expressed in its specific unit (Watts, milliseconds,…) but when modifying it, two units are available (except for the duty cycle, which accepts only percent values) : you can choose its specific unit (by adding W or w for Watts, M or m for milliseconds, …), or a rate (by adding %).

Important notes :

- If no unit is added, the specific one is chosen as default.
- A percentage of the pulse power or the reflected power is a rate of the nominal power, while a percentage of the pulse width is a rate of its maximal limit.

Examples :

If the amplifier nominal power is 100W, setting a pulse power limit of 50W is entering either 50W or 50% (even if its maximal limit is 200W, that is to say 200%).

If the amplifier nominal power is 300W, setting a reflected power limit of 30W is entering either 30W or 10% (even if its maximal limit is 150W, that is to say 50%).

If the pulse width maximal limit is 10ms, setting a limit of 2ms is entering 2m (or 2000u or 0.002s) or 20%.

The available actions are :

Set Parameters	apply the modified limits to the hardware (§***"Setting parameters" on page 11***)
Save as ...	save the current limits in a (new) file - which becomes the current file - (§***"Saving parameters into a file" on page 12***)
Load from ...	load limits from a file - which becomes the current file - (§***"Loading parameters from a file" on page 12***)
Save	save the current limits in the current file (§***"Saving parameters into the current file" on page 13***)
About ...	display information about the program (§***"Getting software information" on page 13***)
Quit	exit the program

Setting parameters *1.3.2*

When activating the <Set Parameters> button, the current limits are applied. If it's the first time, you will be asked to enter the XWinNMR super-user password (see ***Figure 1.2. page 11***).

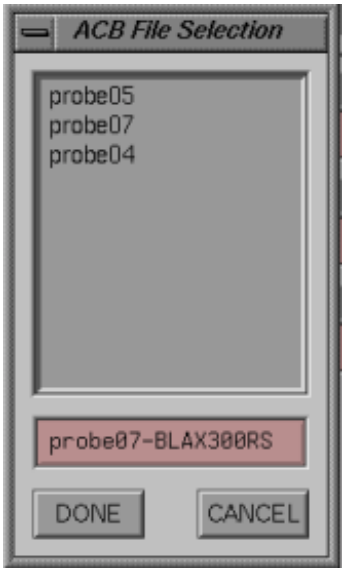
Figure 1.2.

Saving parameters into a file *1.3.3*

When activating the <Save as …> button, you will be prompted to choose or create a file located in the *…/conf/instr/spect/acbpar* directory (see ***Figure 1.3. page 12***). If it's the first time, you will be asked to enter the XWinNMR super-user password (see ***Figure 1.2. page 11***). The current limits are then saved into the file. Note that additional information are saved too : the current probehead identification and the current maximal limits of each amplifier.

When the limits are saved, the file name is displayed in the title bar of the window and the <Save> button becomes enabled.

Figure 1.3.

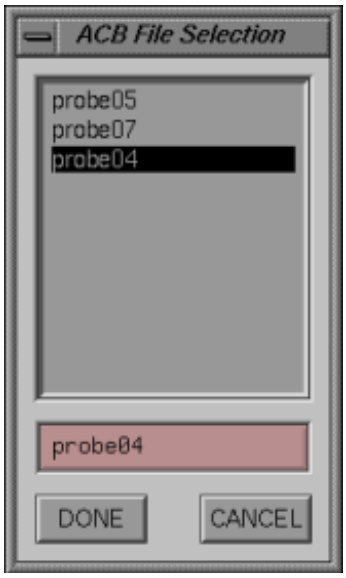


Loading parameters from a file *1.3.4*

When activating the <Load from …> button, you will be prompted to choose a file located in the *…/conf/instr/spect/acbpar* directory (see ***Figure 1.4. page 13***). While loading, the program checks if the current probehead identification and the current maximal limits of each amplifier fit with those from the file. If not, you will be warned and asked to cancel or confirm the loading.

When the limits are loaded, the file name is displayed in the title bar of the window and the <Save> button becomes enabled.

Figure 1.4.



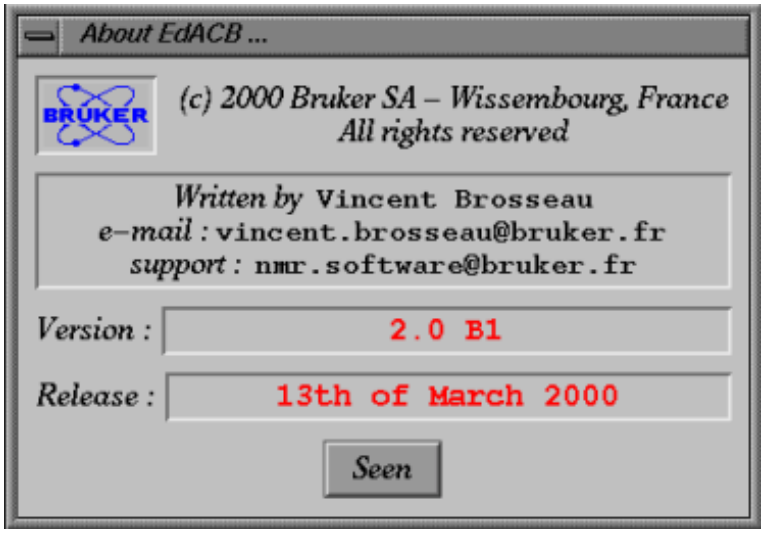
Saving parameters into the current file *1.3.5*

The <Save> button has the same behaviour as the <Save as…> button, except that you will not be asked to choose a file : the parameters are saved into the current file (the one whose the name is displayed in the title bar of the window).

Getting software information *1.3.6*

When activating the <About …> button, a window that contains support and software version information is shown (see ***Figure 1.5. page 13***).

Figure 1.5.



EdACB : the no-GUI mode *1.4*

You can set limits by the command *edacb* and a file name as argument : **edacb <file name>**.

The file is read as it would be by the <Load from …> action, and then the loaded limits are set as they would be by the <Set Parameters> action.

Figures

1 Description 7

Figure 1.1. 9
Figure 1.2. 11
Figure 1.3. 12
Figure 1.4. 13
Figure 1.5. 13

Figures

Tables

1 Description *7*

Tables