

Using the BCF2000 and BCR2000 with SONAR

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1. Introduction

This document describes various methods of using Behringer's BCF2000 and BCR2000 MIDI controllers with Cakewalk SONAR.

The procedures described in this document work with SONAR X3 Producer on Windows 7 64-bit. I haven't yet checked to which extent these procedures still work with later versions of Windows and/or the latest SONAR versions (Artist, Professional and Platinum).

In all cases, the BCF2000 and BCR2000 are supposed to be connected to the computer via their USB cables, with Operating Mode set to U-1.

2. BCF2000 in Mackie emulation mode

With the BCF2000 in the Mackie emulation mode for Sonar ('MCSO'), you can control basic SONAR functions (like play, record and stop) and audio/MIDI track controls (like volume, panning, mute and solo). However, as far as I know, you can't control VST or VSTi plugins this way. Note that the BCR2000 doesn't offer any emulation modes, so this set-up is not available for the BCR2000.

Procedure:

1. Switch on the BCF2000 in emulation mode 'Mackie Control Mapping for Sonar 3'.
If the BCF was already in this mode the last time you used it, you can simply switch on the unit by pressing the POWER button at the back. If not, you have to hold the fourth button in the top row while pressing the POWER button.
In either case, the display should settle at 'MCSO'.
2. Start SONAR. (If you wish, you can immediately open an existing project or create a new one, but in this procedure I'll be assuming you don't open/create any project yet.)
3. Open the Preferences dialog box, e.g. by pressing P.
4. On the MIDI ⇒ Devices page, enable the input and output devices related to the BCF2000 and click the Apply button.
5. On the MIDI ⇒ Control Surfaces page, click the yellow icon in the top right corner (with hint 'Add new Controller/Surface').
A dialog box 'Controller/Surface Settings' pops up.
Under 'Controller/Surface', select 'Mackie Control'. Under Input and Output Port, select the input and output devices related to the BCF2000, and click OK.
The corresponding new item should appear in the list under 'Connected Controller/Surfaces', with the checkbox in the WAI (= 'Where Am I') column checked.
6. Close the Preferences dialog box by clicking the Close button.

To test that things are now working as intended:

1. Create a new project by pressing Ctrl+N and insert a track (Insert ⇒ Audio/MIDI Track). The BCF2000's fader 1 should automatically move to the position corresponding to the position of the fader in SONAR's Console view.
2. Verify that moving the BCF2000's fader 1 automatically updates the on-screen fader, and (vice versa) moving the on-screen fader automatically updates the BCF2000's fader 1.

Some useful control options that are now available:

- The colored bar at the bottom of the Console view indicates to which tracks the BCF2000 is currently linked. If your project has more than eight tracks, you can select the range of linked tracks by dragging this bar: the faders on the BCF2000 should automatically get repositioned accordingly.
- A track's panning can be controlled via the corresponding BCF2000 encoder.
- A track's mute setting can be toggled via the corresponding button in the top row of the BCF2000. To toggle the solo setting, hold the BCF2000's Encoder Group 1 button while pressing the same button.
- Pressing the button in the right bottom corner of the BCF2000 should trigger Play: stop by pressing the button next to it.
- Because the BCF2000 is in an emulation mode (MCSO), it cannot be customized in any way; for instance, it can't 'learn' anything. However, you *can* customize some of SONAR's behavior via the window that pops up when you click the 'Controller/Surface Properties' button on the ACT Module panel. For instance, if 'Disable fader movements' is checked, SONAR doesn't update

the BCF's fader when you change the position of the corresponding on-screen fader.

For further information on the available control options, please refer to the following documents:

- http://www.behringerdownload.de/BCF2000/BCF2000_Emulation_modes.pdf (in particular the graphic for MCS0 mode on page 5)
- http://www.rockinrob.co.uk/Files/BCF_Sonar_Mackie_Mode_Guide.pdf

3. ACT

With a BCF2000 or BCR2000 set up via SONAR's ACT, you can control basic SONAR functions (like play, record and stop), audio/MIDI track controls (like volume, panning, mute and solo) and plugin parameters.

However, ACT has two drawbacks:

1. ACT doesn't offer parameter feedback, a.k.a full-duplex mode. That is: the BCF/BCR controls SONAR, but SONAR does not control the BCF/BCR. When you change a SONAR parameter on-screen, the corresponding button, encoder or fader on the BCF/BCR does not get updated.
2. Customizing ACT is very complicated.

For these reasons I recommend not using ACT.

However, if you do want to try it, here is how to get started:

1. Switch on the B-Control (BCF2000 or BCR2000).
If you're using a BCF2000, you must make sure it is in standard B-Control mode, not an emulation mode: if it was in an emulation mode the last time you used it, you have to hold the fourth button in the top row while pressing the POWER button.
In all cases, the display should settle at a preset, for instance 'P- 1'.
2. Start SONAR. (If you wish, you can immediately open an existing project or create a new one, but in this procedure I'll be assuming you don't open/create any project yet.)
3. Open the Preferences dialog box, e.g. by pressing P.
4. On the MIDI ⇒ Devices page, enable the input and output devices related to the B-Control and click the Apply button.
5. On the MIDI ⇒ Control Surfaces page, click the yellow icon in the top right corner (with hint 'Add new Controller/Surface').
A dialog box 'Controller/Surface Settings' pops up.
Under 'Controller/Surface', select 'ACT MIDI Controller' (in fact this is the default). Under Input and Output Port, select the input and output devices related to the B-Control, and click OK.
The corresponding new item should appear in the list under 'Connected Controller/Surfaces', with the checkboxes in the ACT and WAI (= 'Where Am I') columns checked.
6. Close the Preferences dialog box by clicking the Close button.
7. Open a project or create a new one via Ctrl+N. [This seems to be essential for the Send operation performed in step 9 below.]
8. Open the ACT window via Utilities ⇒ 'ACT MIDI Controller - 1' in SONAR's main menu.
9. In the Presets drop-down list, for a BCF2000 select 'Behringer BCF2000 (Custom)', for a BCR2000 'Behringer BCR2000 (Custom)'.
10. Select the Options tab and click Send in the MIDI Initialization Messages box. This makes SONAR set up the B-Control's buttons, encoders and faders. The B-Control's display starts 'spinning'; wait for this to stop.
(Note: if I'm not mistaken, this only modifies the B-Control's 'temporary' preset; it doesn't overwrite any memory preset, even though the text in SONAR's Comments box suggests it overwrites preset 1.)

You should now be able to control various SONAR parameters from the B-Control, as indicated in the ACT MIDI Controller window. For instance, moving fader 1 on the BCF2000 or turning the leftmost encoder in the BCR2000's bottom row should change track 1's volume.

As you can see, the ACT MIDI Controller window offers lots of configuration options, so you should try out several things to figure out what works best for you.

4. BCR2000 Control Surface

With A.J. Mayo's BCR2000 Control Surface plugin, you can control basic SONAR functions (like play, record and stop), audio/MIDI track controls (like volume, panning, mute and solo) and plugin parameters, all bidirectionally (a.k.a. in full-duplex mode).

In 2011 someone calling himself Eric ('Efesta' in the Cakewalk forum) released a modified version of BCR2000 Control that gave full access to SONAR's ProChannel (instead of only ProChannel's first module). However, as of SONAR X2 these modifications no longer work, so Eric's version no longer has any added value. (As far as I know, the only way to edit a ProChannel module is again to temporarily drag this module to the top.) Therefore I will simply be dealing with Mayo's original plugin here.

The BCR2000 Control Surface plugin was only intended to be used with the BCR2000. However, it is very simple to make it work reasonably well with a BCF2000 too.

To install the BCR2000 Control plugin:

1. Download [BCR2000Control_MU.zip](#) from the B-Control user file section at the Mountain Utilities website: <http://mountainutilities.eu/userfiles/b-control>; subsection DAWs ⇒ SONAR. This zip file contains the following files:
 - bcr2000control-x86.dll: A.J. Mayo's BCR2000 Control Surface plugin for 32-bit SONAR
 - bcr2000control-x64.dll: A.J. Mayo's BCR2000 Control Surface plugin for 64-bit SONAR
 - MSCOMCTL.OCX: 32-bit Visual Basic library (needed for the console window)
 - prjbcr2000console.exe: A.J. Mayo's BCR2000 Control Surface console window
 - release_notes_bcr2000_v120.rtf: a document (written by A.J. Mayo) with info about various aspects of the plugin
 - BCR2000Control.bcr: the BCR2000 preset (written by A.J. Mayo, tweaked by me) to be used with BCR2000 Control Surface
 - BCR2000Control.bcf: the BCF2000 preset (written by me) to be used with BCR2000 Control Surface
 - InstallBCR2000Control.bat: a batch file (written by me) that installs BCR2000 Control Surface
 - UninstallBCR2000Control.bat: a batch file (written by me) that uninstalls BCR2000 Control Surface
2. Extract all files from [BCR2000Control_MU.zip](#) to any folder.
3. Run [InstallBCR2000Control.bat](#) with administrator rights.
On a 32-bit version of Windows, this (naturally) only installs the 32-bit version of the control surface. On a 64-bit Windows version, this installs both the 32-bit and the 64-bit versions of the control surface.

To use the BCR2000 Control Surface plugin in SONAR (32-bit or 64-bit):

1. Switch on your BCR2000 or BCF2000.
If you're using a BCF2000, you must make sure it is in standard B-Control mode, not an emulation mode: if it was in an emulation mode the last time you used it, you have to hold the fourth button in the top row while pressing the POWER button.
In all cases, the display should settle at a preset, for instance 'P- 1'.
2. Start BC Manager, for a BCR import [BCR2000Control.bcr](#) , for a BCF [BCR2000Control.bcf](#), and send the temporary preset ('preset 0') to the BCR or BCF. (If you don't know exactly how to do this, please consult the BC Manager manual.) It's a good idea to copy this preset to a *memory* preset on the BCR or BCF.
3. Start SONAR. (If you wish, you can immediately open an existing project or create a new one, but in this procedure I'll be assuming you don't open/create any project yet.)

4. Open the Preferences dialog box, e.g. by pressing P.
5. On the MIDI ⇒ Devices page, enable the input and output devices related to the BCR or BCF and click the Apply button.
6. On the MIDI ⇒ Control Surfaces page, click the yellow icon in the top right corner (with hint 'Add new Controller/Surface').
A dialog box 'Controller/Surface Settings' pops up.
Under 'Controller/Surface', select 'bcr2000control'. (If this item does not exist, installation of the plugin has probably failed.) Under Input and Output Port, select the input and output devices related to the BCR or BCF, and click OK.
The corresponding new item should appear in the list under 'Connected Controller/Surfaces'.
7. Close the Preferences dialog box by clicking the Close button.
8. Open a project or create a new one via Ctrl+N.

Usage tips:

- SONAR's standard property window of the BCR2000 Control Surface plugin can be opened via 'bcr2000control - 1' in SONAR's Utilities pull-down menu or the 'Controller/Surface Properties' button on the ACT Module panel). However, this window merely states the plugin's author and version number.
- On a BCR, if you press the Encoder Group 4 button ('SHIFT') twice in succession, a window pops up in the shape of a graphical representation of the BCR. This window shows you exactly what the various buttons and encoders do.
Another important feature: you can cycle through the available pages via the PAGE button.
However, on a BCF the button assignments are rather different: the Encoder Group buttons are used to switch between encoder groups 1 to 3 (which harbor the 24 FX parameters), so the BANK-, BANK+, PAGE and SHIFT functions have been relocated to the STORE/LEARN/EDIT/EXIT button group.
See the tables on the next pages for overviews of all assignments, and please consult [release notes bcr2000 v120.rtf](#) (written by A.J. Mayo) for further tips on working with this plugin.
- A small tip: you can just about see the current number of the leftmost track in Sonar X3's ACT Module panel!
- Unfortunately the BCR2000 Control Surface cannot access the parameters of a VSTi (i.e. instrument) plugin that has been loaded *as a soft synth*. However, the plugin does provide access to the first 120 host automation parameters of any VST or VSTi plugin in an *FX bin*. So if you want to control a VSTi plugin via your B-Control, you can temporarily move the plugin to the FX bin. However, the signal flow is of course weird in this situation. Moreover, in my experience the BCR2000 Control Surface plugin gets rather clumsy for VST or VSTi plugins with lots of parameters in FX bins. So it may sometimes be more convenient to simply connect a VSTi plugin as a soft synth after all, and direct the output from the BCF or BCR to the MIDI input of that soft synth, although this of course offers no parameter feedback from SONAR to the BCF or BCR.
- A limitation of BCR2000 Control Surface is that it doesn't function well if you run more than one instance of it (e.g. one connected to a BCR, another to a BCF).
Therefore, if you for instance have one BCF and one BCR (as I do), it seems natural to use the BCF in Mackie mode for SONAR's mixer and transport functions, and the BCR with BCR2000 Control Surface for individual effects and instruments. However, in this set-up the BCF and the BCR in fact *duplicate* SONAR's basic functionality (mixer and transport). So it may be better to connect one of the two B-Controls directly to a MIDI track functioning as the input of a soft synth.
- You can tweak the BCR and BCF presets as much as you like. For instance, for the BCR you could move the BANK, PAGE and SHIFT functions to the STORE/LEARN/EDIT/EXIT group,

just as I've done for the BCF; just remember that this will create visual mismatches with the control surface's console window, which will keep displaying these functions on its Encoder Group buttons.

BCR2000 Control Surface with a BCR2000

BANK- = Encoder Group 1 button

BANK+ = Encoder Group 2 button

PAGE = Encoder Group 3 button

SHIFT = Encoder Group 4 button

Function	Hold	Further action
Show/hide BCR2000 window		SHIFT SHIFT
Go to previous 8 tracks		BANK-
Go to next 8 tracks		BANK+
Go to previous track	SHIFT	BANK-
Go to next track	SHIFT	BANK+
Volume 1-8		Turn Push Encoder 1-8
Record Arm 1-8		Press Push Encoder 1-8
Mute 1-8		Button Upper Row 1-8
Solo 1-8		Button Lower Row 1-8
Select track	SHIFT	Button Upper Row 1-8
Make track leftmost	SHIFT	Button Lower Row 1-8
Next Page (1-7)		PAGE
Previous Page (1-7)	SHIFT	PAGE
Parameter 1-24 of leftmost track		Encoder Top/Middle/Bottom Row
Fine-tune parameter 1-24	SHIFT	Encoder Top/Middle/Bottom Row
Play		User 1 [in my mod also Footsw 1]
Rewind		User 2
Record		User 3 [in my mod also Footsw 2]
Forward		User 4
Go to Previous Marker	SHIFT	User 1
Go to Previous Measure	SHIFT	User 2
Go to Next Marker	SHIFT	User 3
Go to Next Measure	SHIFT	User 4
Scrub (enc. 1=fine; enc. 8=coarse)	SHIFT	Turn Push Encoder 1-8

BCR2000 Control Surface with a BCF2000

BANK- = STORE button

BANK+ = LEARN button

PAGE = EDIT button

SHIFT = EXIT button

Function	Enc. Group	Hold	Further action
Show/hide BCR2000 window			SHIFT SHIFT
Go to previous 8 tracks			BANK-
Go to next 8 tracks			BANK+
Go to previous track		SHIFT	BANK-
Go to next track		SHIFT	BANK+
Volume 1-8			Move Fader 1-8
Record Arm 1-8	4		Press Push Encoder 1-8
Mute 1-8			Button Upper Row 1-8
Solo 1-8			Button Lower Row 1-8
Select track		SHIFT	Button Upper Row 1-8
Make track leftmost		SHIFT	Button Lower Row 1-8
Next Page (1-7)			PAGE
Previous Page (1-7)		SHIFT	PAGE
Parameter 1-8 of leftmost track	1		Turn Push Encoder 1-8
Parameter 9-16 of leftmost track	2		Turn Push Encoder 1-8
Parameter 17-24 of leftmost track	3		Turn Push Encoder 1-8
Fine-tune parameter 1-8	1	SHIFT	Turn Push Encoder 1-8
Fine-tune parameter 9-16	2	SHIFT	Turn Push Encoder 1-8
Fine-tune parameter 17-24	3	SHIFT	Turn Push Encoder 1-8
Play			User 1 [in my mod also Footsw]
Rewind			User 2
Record			User 3
Forward			User 4
Go to Previous Marker		SHIFT	User 1
Go to Previous Measure		SHIFT	User 2
Go to Next Marker		SHIFT	User 3
Go to Next Measure		SHIFT	User 4
Scrub (enc. 1=fine; enc. 8=coarse)		SHIFT	Turn Push Encoder 1-8

5. Controlling a soft synth or effect via its MIDI input

You can send MIDI messages from any external MIDI controller (e.g. a BCF2000 or BCR2000) to the MIDI input of any DirectX or VSTi soft synth, or to any VST audio effect having a MIDI input. This allows you to control these soft synths and effects directly.

Procedure:

1. a. For a Direct X or VSTi soft synth:
Create the soft synth, for instance via Insert ⇒ Soft Synth from SONAR's main window. In the 'Insert Soft Synth Options' dialog box, check either 'Simple Instrument Track' (the default) or 'MIDI Source'. Alternatively you can leave both unchecked, and create a MIDI track whose output you send to the soft synth.
- b. For a VST audio effect:
Insert the effect in the FX bin of an audio track.
Open the effect's property window, click on 'VST2' or 'VST3' (on the top bar) and check 'Enable MIDI input'. If 'Enable MIDI input' is grayed out, this particular effect doesn't offer a MIDI input.
When you check 'Enable MIDI input', the effect gets added to the list on the Synth tab of the Browser panel and to every MIDI track's Output drop-down list.
2. Set the Input of the instrument or MIDI track to the external controller (e.g. BCF/BCR2000). Any MIDI message sent from the external controller should now cause the track's input LED bar to light up.
Note that MIDI messages coming from an external controller can be sent to multiple tracks simultaneously.
3. For a MIDI track: set the Output to the soft synth or effect.
(For an instrument track, the MIDI messages received at the Input automatically go to the instrument itself.)

You should now be able to control the soft synth or effect from the external controller.

This type of set-up is very flexible: you can customize the BCF/BCR fully to your liking (e.g. by means of BC Manager).

However, there is one big problem: such a set-up only offers control from the external controller to the plugin (soft synth or effect), not the other way around: the plugin cannot send MIDI messages to the external controller. This has the following consequences:

- The plugin's initial parameters cannot be sent to the external MIDI controller, so you have to set up all controls on the external controller by hand. Alternatively, you can have a BCF or BCR send a snapshot (via EDIT + PRESET <) to the plugin; but obviously this amounts to synchronization in the reverse direction.
- After you have managed to manually synchronize all parameters, you cannot change any parameters in the plugin's window, because this would lead to a mismatch with the external controller and you would still have to update the corresponding control on the external controller manually – which means it would be simpler to do this immediately...

Of course it completely depends on the individual soft synth or effect which MIDI messages actually achieve something. For instance, a traditional soft synth typically responds to Note On/Off messages (which is probably not something you would use a BCF/BCR2000 for), to Pitch Bend messages and to a few types of Control Change messages.

Sending NRPN messages to trigger host automation parameter changes in VST(i) plugins

For VST effects and VSTi soft synths, SONAR offers an interesting (but largely undocumented)

service: unless ‘Do not intercept NRPNs’ in the plugin’s properties dialog box is checked, SONAR intercepts all NRPN messages sent to the plugin and passes them on to the plugin as (non-MIDI) *host automation* messages. (Host automation is the system whereby VST(i) plugins and a DAW like SONAR interchange plugin parameters.)

However, for some incomprehensible reason this service ignores Data Entry LSB messages, so the resolution is just the 7 bits contained in each Data Entry MSB message. In certain cases this leads to the curious situation that you cannot reset a parameter to its exact default position via an NRPN message; for instance, it may be impossible to reset a volume fader to exactly 0 dB.

So to control a host automation parameter from an external controller, proceed as follows:

1. Assign or determine the host automation number of the plugin parameter you want to control. Most plugins simply work with fixed assignments, using integers from zero upward, but there are also plugins that allow you to customize the assignments. (For instance, in Kontakt the host automation parameter list is shown in the Auto ⇨ Host Automation tab in the left panel, and you can make a new assignment by dragging your mouse from a host parameter to a control in the loaded instrument.)

Tip: SONAR displays all parameters available for host automation in the local menu of the Edit Filter button on the Automation Lanes panel of the track.

2. Make a BCF2000 or BCR2000 button, encoder or fader send the corresponding NRPN messages. You can do this very easily in BC Manager: for instance, on the Standard output tab of an encoder dialog box you should set Type to Non-Registered Parameter Number, NRPN to the desired host automation number and Mode to Absolute.