OHIO INFORMATION

Ohio (Small Format Remote IO box) Programming & Configuration Information

Current Ohio Specification (as of 12/8/2010):
Ohio Main app V1.32 (Ohio_MainApp.bin)
Ohio Firmware V3.02 (chip.rbf)
SU5611 (main card within a OHIO unit) – Firmware V1.2 (SU5611_1v2.pof, programmed on board using Quartus)

Remainder of the system needs to be (as of 12/8/2010):
EG5332-2 Hydra interface box 3.0Z
Alpha 2.8a: Control.bin __/__/__, Rack.bin __/__/__, Frontend.jar __/__/__
Sigma 28: Control.bin __/__/__, Rack.bin __/__/__, Frontend.jar __/__/__

HyperTerminal

HyperTerminal can be used to set IP & MAC addresses, to program the box software (Ohio_MainApp.bin), and to program core firmware (chip.rbf). The Hydra remotes utility command set is currently not compatible with Ohio units.

Configure the HyperTerminal connection with the Calrec default values:
Serial port, 115200 Bps, 8 data bits, parity = none, stop bits = 1, flow control = none.
Ensure “echo typed characters locally” is selected from File>Properties>Settings>ASCII setup

HyperTerminal example – Normal boot messaging:

```
**************************************
** Calrec OHIO Bootloader Rev 1.0  **
**************************************
>
Setting primary IP address 192.168.0.50
Setting secondary IP address 192.168.0.150
Local MAC address 1: 0-d-7-7-0-5e
Local MAC address 2: 0-d-7-7-0-5f
Udp connect: Found free udp descriptor 0
Connection made to protocol port 69, physical port 0
Udp connect: Found free udp descriptor 1
Connection made to protocol port 69, physical port 1

**********************************************
*            CALREC AUDIO LTD                *
*          OHIO BOX APPLICATION              *
**********************************************
System started
Initialising ownership
Program mac 0 0x7 index 0
Program mac 1 0x0 index 0
Program mac 2 0x5e index 0
Program mac 0 0x7 index 1
Program mac 1 0x0 index 1
Program mac 2 0x5f index 1
Device open: GBit driver0uild date: Mar  7 2007 Build time: 09:50:11
Device open: GBit driver1
Udp connect: Found free udp descriptor 2
Connection made to protocol port 2000, physical port 0
Udp connect: Found free udp descriptor 3
Connection made to protocol port 2000, physical port 1
Sending boot up command
```

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Setting IP & MAC address

Using HyperTerminal with Calrec default settings, connected to the box via RS232 whilst box running main application (box has booted, not held in bootloader):

Type **i <enter>** to readback the current MAC & IP addresses for the box

To change ONLY the IP address enter:
Ipw A B C (for port 1 only) A = 1st Octet, B = 2nd Octet, C = 3rd Octet

Eg. To program a box as IP Addr = 192.168.2.xxx

Enter: **ipw 192 168 2 <enter>**

To change BOTH the MAC AND the IP enter:
adr <MAC4> <MAC5> <MAC6> <IPbyte1> <IPbyte2> <IPbyte3>
(for port 1 only)

The full command above has to be entered, ie if only changing MAC, IP still needs to be entered and vice versa.
A space should be entered between adr & the first value, and between subsequent values. No "**.**"'s should be entered.
Port 1 IP byte 4 is set by DIP switches on the rear of the unit.
Port 2 IP bytes 1 to 3 are automatically set the same as port 1 IP bytes 1 to 3.
Port 2 IP byte 4 is automatically set as port 1 IP byte 4 + 100

MAC addresses are split into groups of 2 digits. The first 3 pairs are automatically set as 00 0D 07. If the first of the two in a pair is a 0, this is omitted. ie for 04, enter / read 4.
Port 2 MAC is automatically set as Port 1 MAC + 1

Eg, to program a box as MAC1 = 00 0D 07 0<u>0</u> 0<u>4</u> <u>4C</u>, MAC2 = 00 0D 07 00 04 4D, IP <u>192</u>.<u>168</u>.<u>2</u>.x

Enter: **adr 0 4 4C 192 168 2 <enter>**

This will give the following readback:

Local MAC address 1: 0-d-7-0-4-4c
Local MAC address 2: 0-d-7-0-4-4d
Local IP address (primary) 192.168.2.x
Local IP address (secondary) 192.168.2.x

Type **i <enter>** to readback the full address including IP byte 4's.

HyperTerminal example – setting & verifying IP & MAC addresses:

adr 7 0 5e 192 168 0
MAC 1 = 00 0D 07 7 0 5E
IP 1 = 192.168.0.x
MAC 2 = 00 0D 07 7 0 5F
IP 2 = 192.168.0.x

i
Local MAC address 1: 0-d-7-7-0-5e
Local MAC address 2: 0-d-7-7-0-5f
Local IP address (primary) 192.168.0.50
Local IP address (secondary) 192.168.0.150

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Programming Software (Ohio_MainApp.bin)

With HyperTerminal connected via RS232, press the box reset.

When the bootloader message appears, press the **b** key on the Hyperterminal PC keyboard to stop the box booting into its application. (<enter> key does not need to be pressed)

Note;
This needs to be done even if the application is not present and the box does not appear to be booting further than the bootloader.
No readback is provided to confirm unit is held in bootloader and no distinctive “kernel style” LED pattern is displayed

Enter the command **NA <enter>** to prepare the card to receive a new application file. This will be displayed as nNaA with echo setting on.
This command takes approximately 30 – 40 seconds to execute, while the current application is being deleted.

Once deleted, you will be prompted to send the new software application file. The card will be generating the “waiting for file transfer” symbols. (symbol type is dependant upon font setting)
Browse to the correct version **Ohio_MainApp.bin** file from the **Transfer>Send File** menu.
Ensure protocol is set to Xmodem and send the file.

File transfer takes approximately 1:40 minutes. **Do not reset the box when the file transfer is complete. Wait approximately 10 seconds after the file transfer for the “application file programmed”** message to appear.

Reset the box and wait for the “sending bootup” message, then enter **ver <enter>** to confirm the software and core firmware version.

HyperTerminal example – changing software:

```
**************************************
** Calrec OHIO Bootloader Rev 1.0  **
**************************************

>bnNaA
>NA
 Please send application .bin file now... 3018334_____________________
Application file programmed
>
```

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Programming Core Firmware (Chip.rbf)

With HyperTerminal connected via RS232, press the box reset.

When the bootloader message appears, press the **b** key on the Hyperterminal PC keyboard to stop the box booting into its application. (<enter> key does not need to be pressed)

Note:
If the card is still in bootloader from programming software, the firmware file can also be sent without rebooting to bootloader again.
No readback is provided to confirm unit is held in bootloader and no distinctive “kernel style” LED pattern is displayed

Enter the command **NL <enter>** to prepare the card to receive a new logic file. This will be displayed as nNlL with echo setting on.
This command takes approximately 10 seconds to execute, while the current logic file is being deleted.

Once deleted, you will be prompted to send the new logic file. The card will be generating “waiting for file transfer” symbols.
Browse to the correct version **chip.rbf** file from the **Transfer>Send File** menu.
Ensure protocol is set to Xmodem and send the file.

File transfer takes approximately 2.5 minutes. **Do not reset the box when the transfer is complete. Wait approximately 35 seconds for the “logic file programmed”** message to appear.

Reset the box and wait for the “sending bootup” message, then enter **ver <enter>** to confirm the software and core firmware version.

HyperTerminal example – changing core firmware:

```
************************************
** Calrec OHIO Bootloader Rev 1.0  **
************************************

>bnNlL
>NL
Please send logic .rbf file now... 3018334_______
Logic file programmed
>
```

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On board firmware programming notes

SU5611 (main PCB within Ohio box) firmware is programmed using Quartus & bytelblaster2. V1.2 (fixes cold boot problem) is currently provided as a .pof file only.

Programming this device erases the MAC & IP addresses. The unit will still readback the correct MAC & IP but the data will be lost after a reset or power cycle. Therefore it is very important to reprogram the addresses after programming this device and to verify the addresses after a reset.

Program as follows:
Connect programming pod and use the auto-detect function of the Quartus programmer to establish the device chain.
Two devices should be detected. Select by clicking & highlighting the 570 device (EPM570T100) line.
(The chain also shows sub-entries of CFM & UFM under the 570. Only highlight the main line for the 570)
Select the **change file** function and browse to the correct programming file, e.g. SU5611_1v1.pof.
Select the check boxes for Program/Configure and Verify for this device's main entry line (not CFM/UFM lines).
Program & verify as normal for Quartus.

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Programming via IP over Gigabit connection

Ohio box software (Ohio_MainApp.bin) and core firmware (Chip.rbf) can be programmed via the Gigabit network connection from any PC on the network (Console PC or an Engineers laptop connected to the switch & configured with a suitable IP & subnet mask).

File transfer using this method is much quicker than via the serial port, however there is no readback verification to confirm the ID of the unit being programmed, the programming progress / success, that it boots normally after programming, and there is no way to reset the unit after programming (Units need a reset before changes are operative). Therefore this method has not yet been verified by a Calrec service engineer. This method may be preferable when time is limited however it is strongly advised that each box programmed is reset and verified by RS232 for version and normal boot messaging.

Method:
At a DOS prompt enter the following command/s (example's used for IP address and file location, edit as applicable):
TFTP -i 192.168.2.51 put C:\products\Ohio\V1.02\Ohio_MainApp.bin Ohio_MainApp.bin
TFTP -i 192.168.2.51 put C:\products\Ohio\V3.05\Chip.rbf Chip.rbf

Alternatively a shortcut to *Windows\system32\TFTP.exe* can be copied to the *documents and settings\send t*o folder and the shortcut properties>target changed to (example IP used) *C:\WINDOWS\system32\tftp.exe -i 192.168.2.51 put*
The software / firmware file can then be transferred to the device by right clicking on the relevant version of the Ohio_MainApp.bin / Chip.rbf file and selecting the correct shortcut for the IP of the box being programmed. Separate shortcuts need to be created for each IP, therefore this method is only efficient if several changes are expected on the same network, or if all boxes are physically close to hand they can all be set to the same IP by the DIP switches & one shortcut can be used to quickly program all boxes (ensure only one is box is on the network at a time if setting the IP's all the same & ensure IP's set correctly once completed).

Miscellaneous Ohio Notes

Network configuration and operation is the same as with the original Hydra I/O boxes. When creating a new IO box in the net config, options are now available for the box type. SFRIOB units have predefined I/O type and quantity. If using original RIOB's select "Custom" and configure I/O slots as normal.

LED's on SFRIOB's are similar to RIOB's – Port connected LED lit when link detected to another network device (e.g. switch) Active LED should flash in a regular pattern after being connected to a Hydra I/F for a couple of seconds. LED 1 shows unit heartbeat, LED 2 shows sync received, LED 8 on red after box boots.

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