

## Procedure

## A Guide to installing a Bootloader on the PIC on the CDC MC Router.



## Description

A guide on how to install a Bootloader on to the PIC on a CDC MC Router. Plus a guide on upgrading both the PIC and FPGA within the CDC MC Router.

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## Introduction

This document is a guide to installing a Bootloader on to the PIC found on the main board within the CDC MC Router. Once installed, this will allow further updates to the PIC to be done via the front panel Ethernet port.

If the CDC MC Router has V1.2 firmware, or earlier, then this process **must** be followed.

This document also contains the instructions on how to upgrade the PIC and FPGA on the CDC MC Router.

This process **must** be carried out by qualified Cadac representatives.

## Cadac FTP details

You will need to access the Cadac FTP to download the relevant files to update the CDC MC Router:

FTP site: <ftp://www.cadac-sound.com/>

FTP login details:

Login: **customer**

Password: **cadac1968**

## Download the PIC Bootloader File

To install the PIC Bootloader you will need to download the following hex file from the Cadac FTP site:

### Peripherals

#### MC Router

#### MComms Router Pic Bootloader

**MCOMMS\_ROUTER\_PIC\_BT\_LDR\_200115.hex**



### ***Download the PIC Update.exe***

To update the PIC you will need to download this .exe file from the Cadac FTP site:

#### **Peripherals**

**MC Router**

**MComms\_Router\_PIC\_Update.exe**

### ***Download the Hex File***

To update the PIC you will need to download the latest hex files from the Cadac FTP site:

#### **Peripherals**

**MC Router**

**MComms Router Pic Main**

**PIC Main \*\*\*\*\* v\*.\***

**MComms\_ROUTER\_PIC\_MAIN\_\*\*\*\*\*.hex**

### ***Download the FPGA File***

To update the FPGA you will need to download the latest bin files from the Cadac FTP site:

#### **Peripherals**

**MC Router**

**MComms Router FPGA**

**Router FPGA \*\*\*\*\* v\*.\***

**MComms\_ROUTER\_FPGA\_\*\*\*\*\*.bin**

### ***Important Information***

The procedure outlined in this document is for updating the CDC MC Router with PIC firmware V1.2 or earlier pre-installed. Later versions of the firmware allow the update of the PIC firmware and FPGA to be done via the Ethernet port on the front of the unit without the need to use a PICKit3.



## Tools Required

This document has been written using the PICKit3 as the programming tool for the PIC.

A separate document contains detailed information regarding the PICKit3, the Microchip Integrated Programming Environment software (<http://www.microchip.com/pagehandler/en-us/family/mplabx>) and the adaptor kits required to install the Bootloader on the PIC found in the CDC MC Router.

PICKit3



Adaptor kit



A T-10 Torx driver will be needed to remove top panel screws



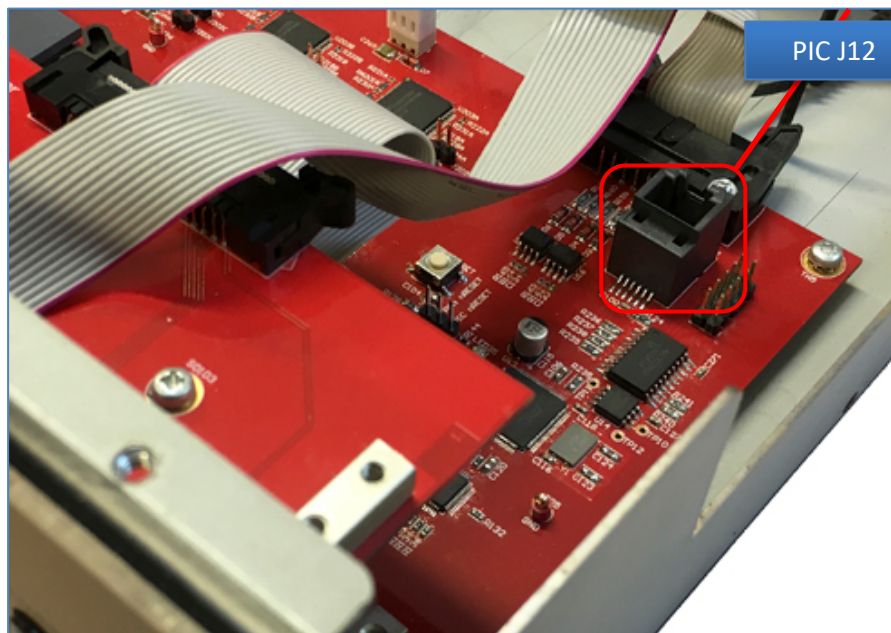
## PIC J12 on the CDC MC Router

To access the **J12 PIC** within the CDC MC Router it will require the unscrewing of all the retaining screws (**T-10 Torx**) on the top panel and the removal of the panel.

The **J12 PIC** is located to the right of the large circuit board mounted at the front of the unit

Below, shows the position of **PIC J12** on the main board.

There is only one **PIC J12** on the CDC MC Router per board.



## Process of Installing a Bootloader on a CDC MC Router

To programme the PIC on the CDC MC Router with a Bootloader you will require:

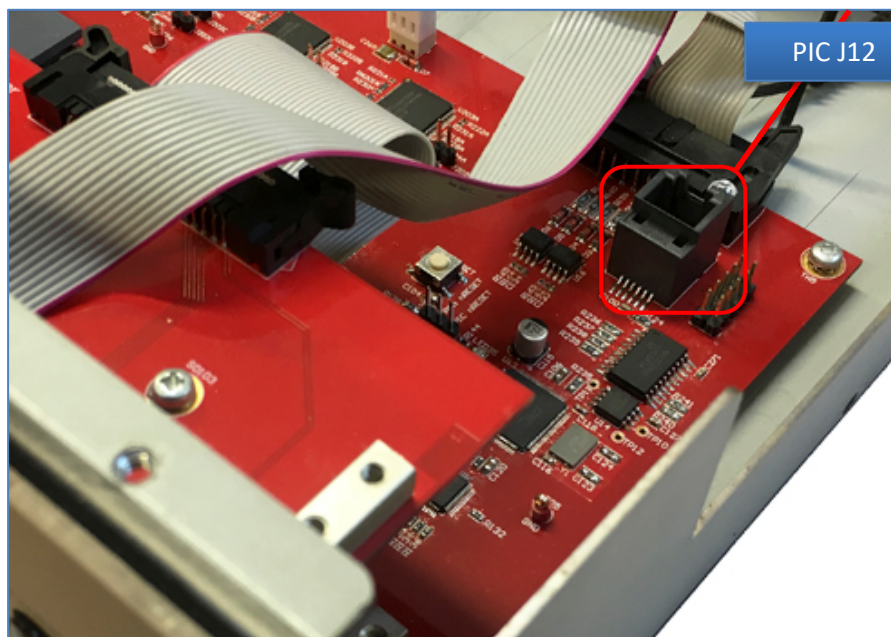
- A PC / laptop installed with the MPLAB Programme which is available from <http://www.microchip.com/pagehandler/en-us/family/mplabx>
- USB cable
- PICKit3

### Process for Reprogramming

- Remove the top panel from the CDC MC Router.

*You will need a T-10 Torx*

- Connect the PICKit3 to the **J12** port on the CDC MC Router via the RJ11 cable  
*It is located on right hand side of the main PCB*



- **Power ON** the CDC MC Router
- Open the **MPLAB IPE** programme on the PC
- From the **Device** drop down menu select: **PIC32MX675F512L**



- The **Tool** drop down menu should display the serial number of the PICKit3 connected to the PC
- Select the **Apply** to select the device
- Select **Connect** and then wait until PIC is discovered

*Wait for the green circle to appear above the "**Connect**" button*

- Select **Erase**

*The Output window should show activity as the device connects then is erased, ending with "**Erase device complete**"*

- In the top right, select **File -> Import -> Hex**
- From the file browser select: **MCOMMS\_ROUTER\_PIC\_BT\_LDR\_200115.hex**
- Select **Program**

*The Output window should show activity as the device connects and is programmed, ending with "**Programming complete**"*

- Select **Verify**

*The Output window should show activity as the device connects and verifies, ending with "**Verification successful**" and "**Verify complete**"*

- Check **LED 35** next to the **PIC J12** is flashing
- Power cycle the CDC MC MADI

*Power off - wait 5 seconds - power on*

Once you have installed the Bootloader on to the PIC, you can upload the **Main PIC** program into the PIC via the Ethernet port on the front of the CDC MC Router by following the instructions in the rest of this document.





## Process for Programming the PIC MAIN on the CDC MC Router

To programme the PIC on the CDC MC Router you will require:

- A PC / laptop with a web browser (this procedure will not work with a Mac)
- Ethernet cable (Cat5 or Cat6)

### Activate Boot Mode

You will need to activate **Boot Mode** on the CDC MC Router to programme the Router via the front panel Ethernet port.

- On the CDC MC Router front panel “**CONFIG**” switch: put dip switch **8 ON (Up)** and all **other switches OFF (down)** and then turn the **Router ON**



- This will activate **Boot Mode**  
*If you are looking at the PCB the PIC LED should be flashing and FPGA LED should be off*



## Process for Reprogramming

- Remove the top panel from the CDC MC Router

*The top panel needs to be removed if you want to check the LED 35 near to the PIC – the LED indicates whether the Bootloader has loaded properly / or has been installed. (With the top panel on the LED is visible through the air vent on the right hand side of the unit).*

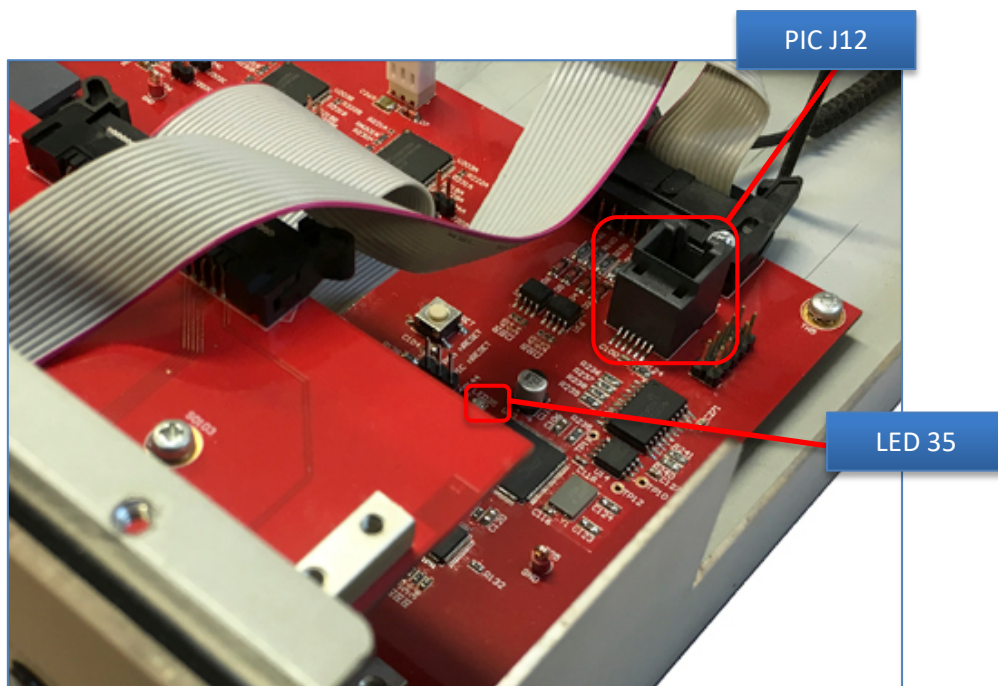
*You will require a Torx T-10 bit to remove the panel*

- Power cycle the CDC MC Router

*Power off - wait 5 seconds - power on*

- Check **LED 35** near to the **PIC J12** is flashing green around **TWICE** a second

*This indicates the Bootloader has loaded correctly. If it fails to do this then the PIC J12 will need to be updated using a PICKit3.*



- Check your laptop static IP address is 169.254.1.2

*This can be done by following the instructions below:*

- Go to the Windows **Start** menu



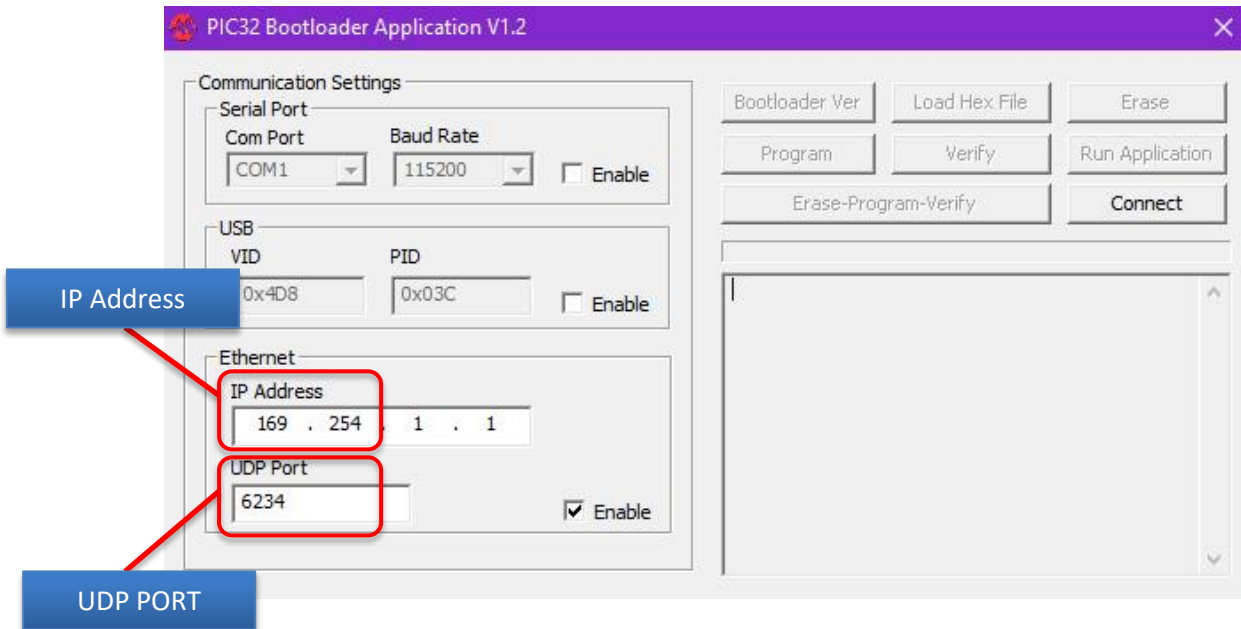
- Select **Control Panel** on the right hand list of programs
  - Select **Network & Internet**
  - Select **Network and Sharing Centre**
  - Select **Change Adapter Settings** window on the top left
  - Double click on **Ethernet icon** on the controller that is connected to the Router
  - Scroll down to **Internet Protocol version 4 (TCP/IPv4)** and double click
  - Select the **Use the following IP address** option
  - Enter IP ADD **169.254.1.2**
  - Enter subnet mask to **255.255.0.0**
  - Leave all other fields blank
  - Click **OK**
  - Your network card is now programmed
- Plug your laptop into **Ethernet port** on CDC MC Router:



- Run the **MComms\_Router\_PIC\_Update.exe** on you PC
- In the Ethernet check box select **Enable**



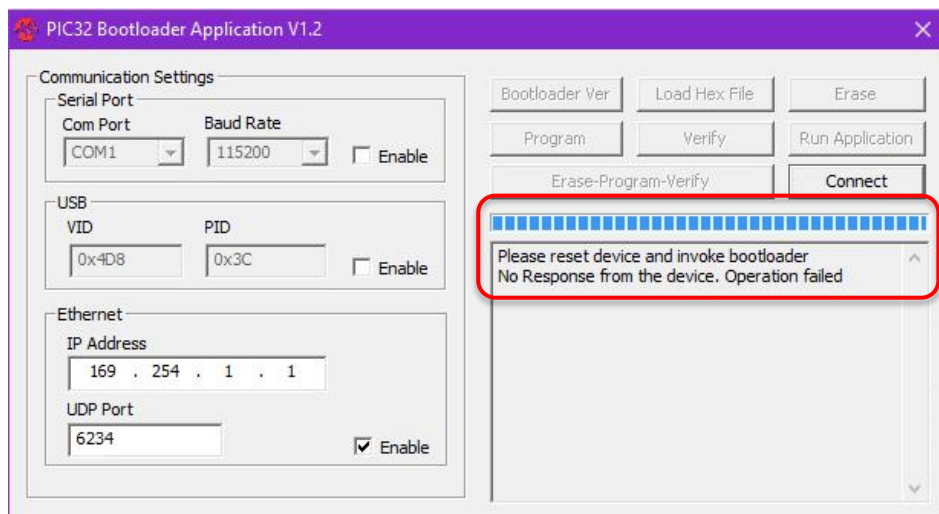
- Set IP Address in programme: **169.254.1.1**



- Make sure **UDP PORT 6234** is displayed
- Select **Connect** on the right

*This initiates communication between the computer and router*

*If the Output window shows a message like the one below then the connection to the CDC MC Router has failed, you will need to double check your connection and settings a gain.*



- Select **Load HEX File**
- Browse to the latest HEX File: **MCOMMS\_ROUTER\_PIC\_MAIN\_XXXXXX.hex**
- After selecting HEX FILE select **Erase program verify**

*The Output window will show the message: **Successful***

- **Power OFF** the CDC MC Router
- Disconnect you PC from the CDC MC Router's Ethernet port
- Turn dip switch **8 OFF (down)**
- **Power ON** the CDC MC Router
- Check **LED 35** next to the **PIC J12** is flashing around **ONCE a second**
- Replace and screw down lid



## Process for Programming the FPGA on the CDC MC Router

To programme the FPGA on the CDC MC Router you will require:

- A PC / laptop with a web browser (this procedure will not work with a Mac)
- Ethernet cable (Cat5 or Cat6)

### Process for Reprogramming

- Set the network card on the PC to IP address **169.254.1.2** and the subnet mask to **255.255.0.0**

*Skip this if you have done it already – if not follow the instructions laid out earlier in this document*

- Power cycle the CDC MC Router - the PIC has been programmed previously

*Power off - wait 5 seconds - power on*

- Connect the PC to the CDC MC Router unit via the Ethernet cable



- Start the web browser on the PC and type "**http://mchpboard/mpfsupload**" into the address bar and hit enter.

*To see what version of FPGA code is running currently on the CDC MC Router type in **http://mchpboard***

- If the browser fails to connect, switch between the following web addresses about once every 2 seconds to connect:

**http://mchpboard**

**http://mchpboard/mpfsupload**

- When the **http://mchpboard/mpfsupload** page loads you should see **MPFS Image Upload\*** and a **Choose File** and **Upload button**.
- Select **Choose File** and a browser window should appear.
- Browse to and open the **MComms\_Router\_FPGA\_XXXXXX.bin** \*.bin file.
- Select **Upload** on the web page.

*Wait for up to 60-90 seconds and **Upload successful** will appear on the page*

- Programming the FPGA is complete

### **Process For When Both the PIC and FPGA Have Been Programmed**

- Power cycle the CDC MC Router

*Power off - wait 5 seconds - power on*

- The CDC MC Router is now fully programmed

