



Connecting radios all over the world

Basic guide describing how to build up your system



V 2.4

Release date Feb 11, 2019

A Mimer SoftRadio system can be configured in many ways. This paper describes the basic configurations for a small system. Please also see the documents “Customer examples” and “Options” for further descriptions of more advanced systems.

All information and many examples of system setups can be found on the web pages: www.lse.se

2 Table of Contents

1	2
2 Table of Contents.....	2
3 What	4
4 How.....	4
5 Radios	4
6 Set Up	5
6.1 Basic Configuration	5
6.2 More than one PC	5
6.3 More than one radio	6
7 Many radios	6
8 Connections both local and over the Internet	6
9 PC layout.....	7
9.1 Speaker buttons	7
9.2 PTT buttons	7
9.3 Resend button / Wait button.....	8
9.4 Small Radio display button.....	8
9.5 Virtual Control Head.....	8
9.6 Radio Name Bar.....	8
9.7 Language	9
10 Network Interface	9
10.1 Network Interface LE.....	10
10.2 Other interfaces	10
11 Special operators	10
11.1 Touch screen	10
11.2 All in one unit	10

11.3	Cord less operator	10
12	Audio units	11
12.1	Audio Card	11
12.2	Using two audio sources	11
12.3	Microphone	11
12.4	Speaker	11
12.5	Handset	11
12.6	Headset	12
13	Set Up Programs	12
13.1	Connections Setup	12
13.2	NetworkInterface Setup	12
14	Future changes.....	13

3 What

The Mimer SoftRadio system consists of software that runs on Windows PC's (Win10). The software works together with one or more Network Interfaces that are connected to two-way radio units. One Network Interface is needed for each radio unit.



The purpose is to remotely control the two-way radio from the PC over a LAN, WAN or the Internet. In this way several operator PC's can share one radio and every operator control several radios.

The operator will for many radio types get a virtual control head mimicking the radio. This gives the operator the same feeling as if he was sitting in front of the radio itself.

4 How

In the Network Interface all audio from the radio and all display information on the radio is digitised and sent as UDP or TCP packets over the IP-network to the PC. The PC's audio card turns the audio back into ordinary sound.

The PC will also digitise microphone audio and key presses from the PC and send them to the Network Interface as UDP or TCP packets. The Network Interface will then control the radio.

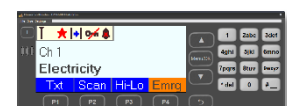
5 Radios

Many types of radios can be accessed using a virtual control head. This gives full control of the radio, everything that is programmed into the radio can be done remotely. The operator has full control of both keypad and display.

Please see the web page for details on radios with full control head: www.lse.se/mimer-softradio/supported-radio-types/

Nearly all other types of radios can also be remotely controlled, connecting to microphone, speaker and PTT on the radio, but without the virtual control head.

Also older base stations with interface for 2 or 4-wireline (600 Ohms, -10dB) can be connected to the network interface.

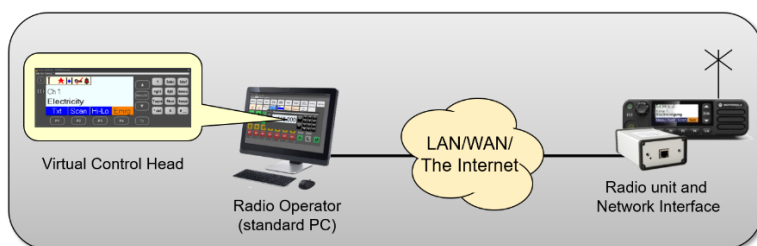


6 Set Up

6.1 Basic Configuration

The smallest system consists of one PC and one radio with its Network Interface.

They can be connected directly via a network cable, via a local LAN or via the Internet.

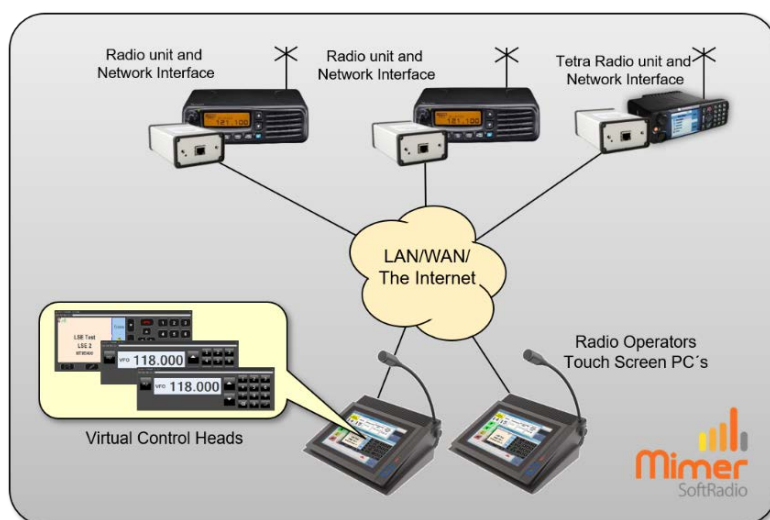


6.2 More than one PC

When connected to a local LAN many PC operators can monitor and control the same radio in parallel. All operators will hear everything and the first operator to hit PTT will get control of the transmitter. The other operators will get a busy indication when another is transmitting. As a standard the maximum number of parallel PC's are 99.

When connected through the Internet only one PC can be connected to the radios Network Interface at any given time. This can be expanded with the help of a Mimer RadioServer, please see the document "RadioServer / NetworkRepeater" for a deeper explanation. You can find it here: www.lse.se/download/technical-downloads/

Connection can be made over the Internet and, in parallel, locally at the same time.



6.3 More than one radio

The software “SoftRadio” handles up to eight radios or other devices at the same time in each PC. These radios can be local radios and/or remote radios in a mix. They can also be a mix of brands and types of radios, i.e. analogue/DMR/Tetra.

The larger software “SoftRadio XL” handles up to 30 radios or other devices.

7 Many radios

As long as the radios are local in the same subnet of the LAN as the operator is, UDP-protocol will be used, and during set up only the IP-addresses of the radios need to be filled in.

A radio in another subnet or on the Internet needs to be accessed via TCP-protocol. Each Network Interface can handle one TCP connection. The setup of the operator is a little more complicated with password and which ports to go through in the network's firewalls. It might be needed to open special ports for Mimer in the company's fire wall. Please contact the people responsible for the IP network before installation.

8 Connections both local and over the Internet

The radios at each operator position can be a mix of local and remote radios.

Please note that if there are more than one operator that wants to access each remote radio there is a need for a server. Read more in the setup guides.

9 PC layout

The rows or columns of buttons on the Mimer SoftRadio control panel will vary depending on how many devices that are connected. The number and type of buttons can also be configured for different purposes and users.

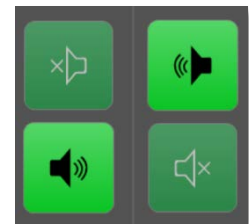
Basically the buttons are made to be easily used on a PC with a touch screen.



9.1 Speaker buttons

Normally there is one button for on/off of the speaker function for each radio that is connected.

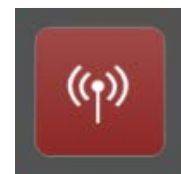
This can be expanded to two buttons per radio, where one is on/off of the right speaker and one is on/off for the left speaker. In this way the operator can choose which radio will be heard in which speaker and more easily distinguish who is speaking. This is extra useful when stereo headsets are used.



Separate volume controls can be selected for each speaker button. The speaker buttons can also be deselected totally and the audio will then always be open.

9.2 PTT buttons

For each radio there is a separate PTT button. There is also a possibility to transmit by pressing the display of the Virtual Control Head, this function is put there in order to have a very large area to press on a touch screen.



The small red arrow to the right in one of the device panels indicates which radio is selected for external PTT. The red arrow is lit on the radio last used by the operator. There are three possible external PTT's; The spacebar on the keyboard, a selectable "Hot-button", i.e. F8, and also an external switch connected to the PC's COM-port, i.e. a foot switch.

There is also an option called "Multiple Hotkeys" that gives the possibility to have separate PTT buttons for each radio.

All PTT functionality can be deselected from user PC's that are only supposed to be used for monitoring of the radio channels.

9.3 Resend button / Wait button

The Resend button will repeat the last transmission made on any radio, on the radio that you push the resend button on.

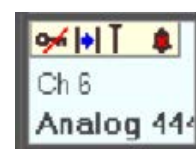
This is practical if the same message needs to be repeated on several radios.

The Resend button can be exchanged for a **Wait button**. The Wait button will send out a tone message on the radio channel. The purpose is to acknowledge to the users that they have been heard, when they are calling the operator, but the operator is busy at the moment. The wait button will stay lit at all parallel operators after use as a reminder to the operators that a user is “on hold”. The button light will shut down when the button is pressed again by an operator or one of the operators presses PTT on that radio.



9.4 Small Radio display button

The small Radio display button shows a part of the radios actual display. Depending on type of radio it can be configured what part is shown. This makes it easier to remember the channel setting on each radio without having the large Virtual Control Head visible on the screen.



Pressing this button will bring forward, or close the radios Virtual Control Head.

9.5 Virtual Control Head

This panel is automatically chosen depending on what type of radio the Network Interface is set up to work with. It works and feels as if you were sitting in front of the radio. On many radios you have access to all the keys and the full display of the radio.

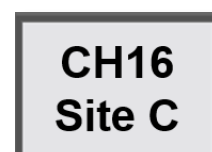


The size of the Virtual Control Head can be chosen in steps.

All keys on the Virtual Control Head are doubled on the computer keypad. This makes entry of channels and selective calls easier. It is important that the radio is programmed in a way that will help the operator to an easy use.

9.6 Radio Name Bar

The radio name comes from a setting in the Network Interface. It is easy to choose a name that the operator will recognize and understand. The radio can for example be named “Hill Top Channel” or “Stockholm” or “Channel 16, Site C”.



The Radio Name Bar will change colour depending on what is happening at the moment:

Grey Not connected to the Network Interface

Yellow Incoming audio

Red I am transmitting

Orange Another operator PC is transmitting

Green A selective call has been received

The yellow indication of incoming audio can be set to hold for a number of seconds after the audio is gone (standard setting is 2 seconds). This is practical in systems with many channels where it might be hard to notice on which radio the audio came in and answer back on the correct radio.

Pressing the Radio Name Bar will bring forward, or close the radios Virtual Control Head.

9.7 Language

The language of Mimer SoftRadio will change depending on the settings in Windows. For example if the PC is set to Swedish, the operator will get Swedish menus. Default is English, which the software reverts to when the PC's language is not found in the data bank.

On this page there is a list of available languages:

www.lse.se/mimer-softradio/users/countries/

Please ask if there is a demand for other languages.

SoftRadio can also be forced to present a specific language without changing the PC language.

10 Network Interface

The Mimer Network Interface connects a radio to the LAN or the Internet. There are different types of interfaces for different radios. Some of the interfaces can be retrofitted later if the radio is changed out. But some are special for only one type of radio.



The Network Interface is a self-contained microcontroller running on 12 VDC. It starts up when power is connected and is made to run on the same power connection as the radio, with very small power consumption.

At one side there is a standard RJ45 connector for LAN connection.

The LAN address is set in the interface together with passwords etc through a program called “NetworkInterface SetUp” by connecting locally over the LAN.

At the other side of the interface there is one or more connectors used for accessing the different types of radios.

10.1 Network Interface LE

A special version of the interface called “LE” is made to connect to radios that supports only audio and PTT. With no means of other remote control, for example channel change.



10.2 Other interfaces

There are also special Network Interfaces for connecting the system to POTS-telephone lines, GSM-modems and interfaces for intercom. And also a special version called Mimer SoftLine that will set up a virtual 4-wire and RS232 connection over a LAN. Please refer to “Mimer, Special Functions”.

11 Special operators

11.1 Touch screen

The operator software is made in order to be easy to use from a touch screen. All push buttons can be set large enough for a finger to press without error.

We have a variety of touch screens in different sizes to fit all types of users. For installation in a control board, or for standalone use.



11.2 All in one unit

There are very well-suited PC's with built in PTT-key, speakers, microphone and touch screen. These make up a bespoke operator position.



11.3 Cord less operator

An operator can be cordless. All you need is a wireless LAN and an operator PC with a WLAN card.

12 Audio units

12.1 Audio Card

The operator PC needs to have a good audio card. Most modern audio cards are OK for use with Mimer.

We have found that from time to time that it is easier to put in an extra audio card in the computer or through the USB-port than to use the original card in the computer. It is then chosen in “Mimer Connections Setup” which card to use for the microphone and for the speaker.

At operator centrals with many parallel operators and different types of computers and audio cards it might be that the audio is presented with a time difference of a few milliseconds. This is avoided with new dedicated audio cards at the computers.

12.2 Using two audio sources

The system can be set up so that you use two audio sources. For example, a table top microphone and a headset. To switch between the two audio sources you need the option “Mimer Custom Functions Panel”. This will give you two extra keys in the operator GUI.

12.3 Microphone

The operator microphone is connected to the computers audio card. You can use most any type of standard computer microphone.

We also produce our own line of table top microphones for use with SoftRadio.

12.4 Speaker

The computers standard speakers are often used but sometimes it is better with another speaker used only for the radio system. It becomes easier to control the volume and the angel of the sound.

12.5 Handset

For users that need to keep their conversation private, or if they are in a noisy environment, a handset will be easier to use than an ordinary microphone.

For users with telephone interconnect a handset or a headset is preferred to avoid acoustic feedback.

12.6 Headset

For users that are on the radio all day a headset is most convenient. You can use simple computer headsets or more advanced types from any one of the larger office phone companies.

Using a stereo headset will give the ability to for example place one call in the right ear and all other calls in the left ear, or vice versa.

For users with telephone interconnect a handset or a headset is preferred to avoid acoustic feedback.

13 Set Up Programs

There are two basic set up programs used, one for the PC-operator and one for the Network Interface.

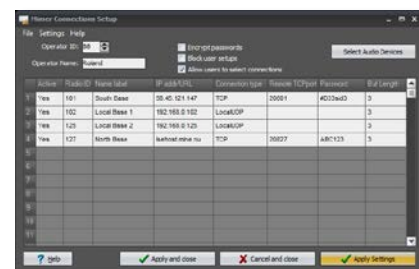
Together with these programs there are other programs that help with your installation.

More information is available on the web page, and in the help text that comes with each software.

13.1 Connections Setup

This program is used mainly for entering the IP-addresses for the Network Interfaces that each operator will connect to.

There are also settings for passwords and fire walls for each radio, when TCP is used over the Internet.

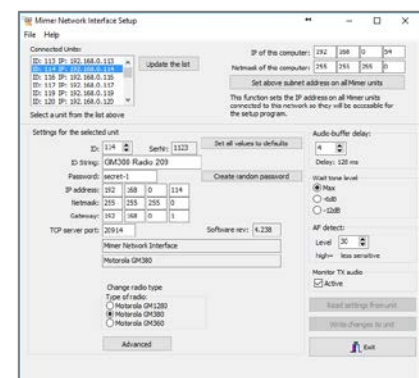


In Connections Setup the operators name and number are entered and also audio card selection for the microphone and speaker.

13.2 NetworkInterface Setup

This program is mainly used to set the interface for the right type of radio and the IP-address to where it is installed. There are also some helpful functions to use if the IP-network is not fully known.

Here you also enter the name text that appears for each device at the operators.



14 Future changes

Mimer SoftRadio is very easily upgraded. New operator PC's and new radios can be added without changing the settings in already installed units.

An add on like VoiceLog can be installed at later stages.

Old analogue radios can be changed to new digital without doing any changes at the operator's PC's.



Proudly made in Sweden by

LS Elektronik AB

www.lse.se

mimer@softradio.se