SmarTrunk Systems, Inc.

ST-9116

Programming Software Manual

Rev V1.0 – MAR 2014

Contents

1. Programming Software:

ST-9116 repeater has been equipped with USB 3.0 compatible port and Ethernet 802.3 network port.

Programming software has been designed to let you control any of the repeater features, looking for simplification of the programming process.

1.1. Installation

As you are a SmarTrunk distributor, the last updated programming software is available on your shared server area (Drop Box). You also can download it form our web site:

http://www.smartrunk.com/softwares/SDR/SDRe_Programmer_software.exe

The SDR programmer software has been designed to be compatible with Microsoft Windows XP, Windows 7 and Windows 8, in 32 or 64 bits version. If your operative system does not matches any of these options, please contact us to mailto:techsupport@smartrunk.com

Note: 1 - SDR Programming Software Compatibility

Please run the installation software by double click on the file name:

This file is a self-extractor program, which will proceed to install SDRe programming software for ST-91xx series of SmarTrunk Repeaters.

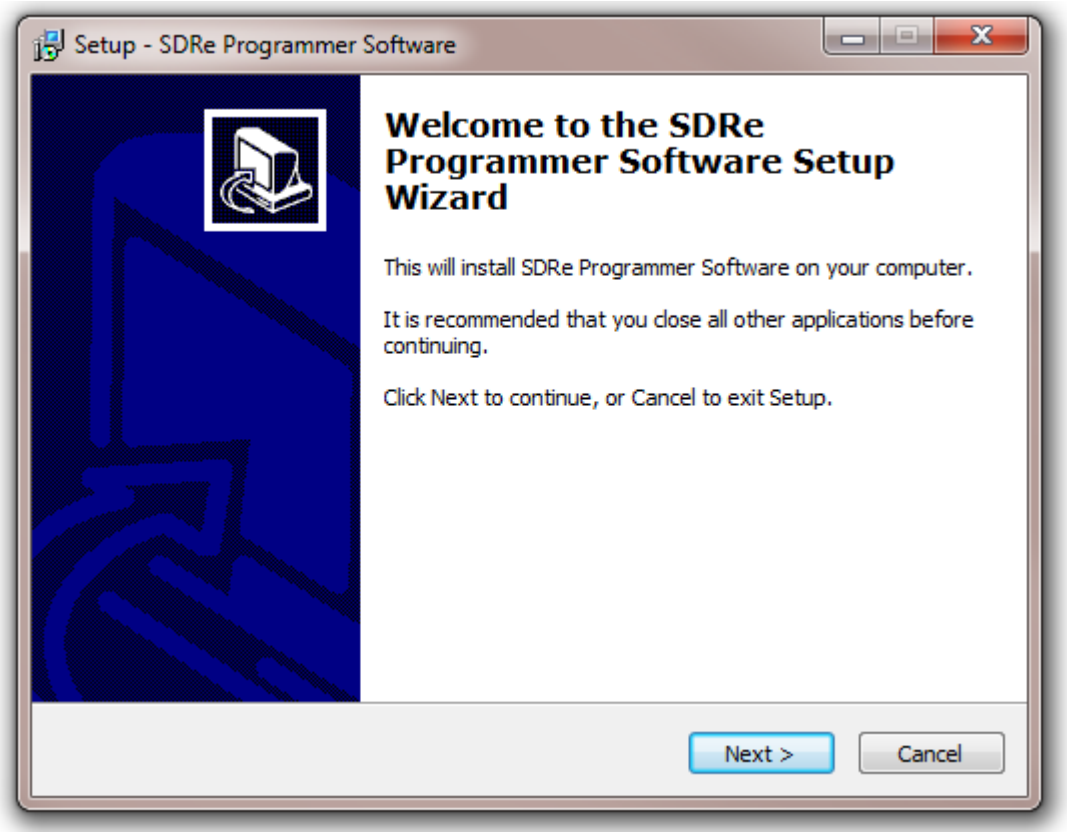


Figure 1: SDR programming software welcome screen

Click on [Next] to start the installation process.

You will be prompted to introduce the destination folder. By default it is:

C:\Program Files (x86)\Smartrunk\SDRe_Programmer

However, you can change it as per your convenience.

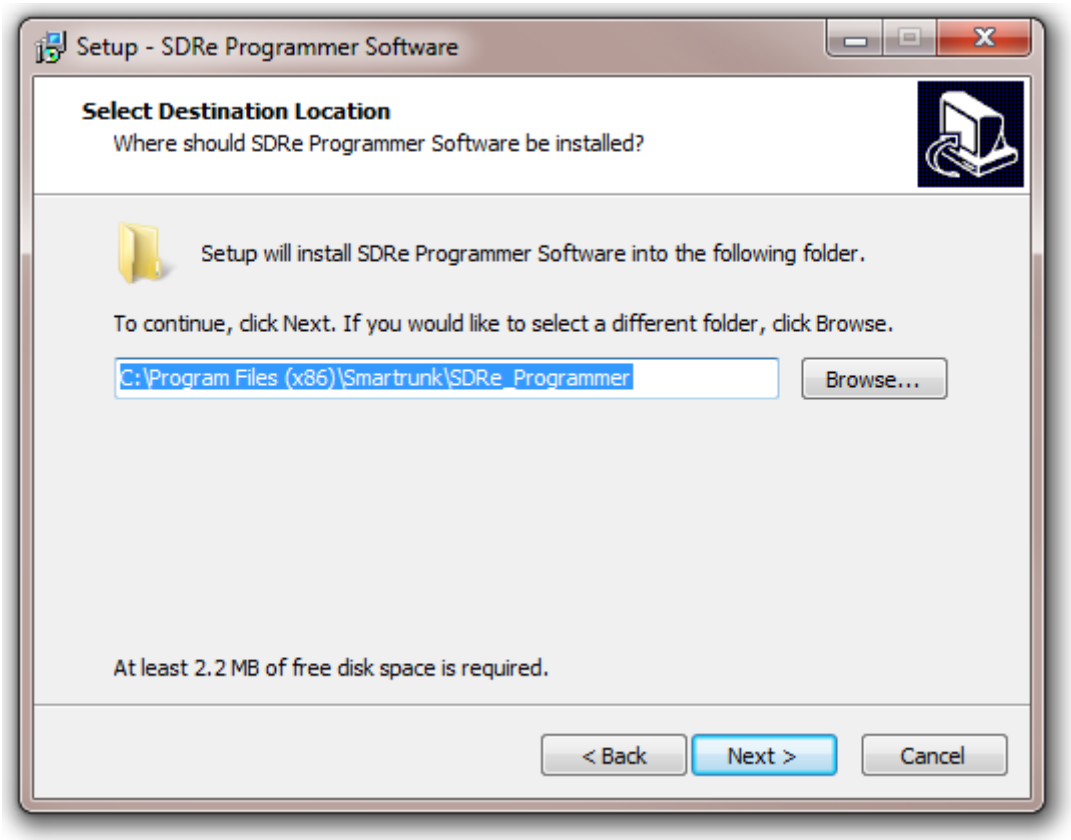


Figure 2: SDR programming software file location setup

Please be sure that you have, at least, minimum free space in your destination disk as per the recommended on this screen

Note: 2 Disk space requirement

Click on [Next] to continue or [Back] to return to previous step.

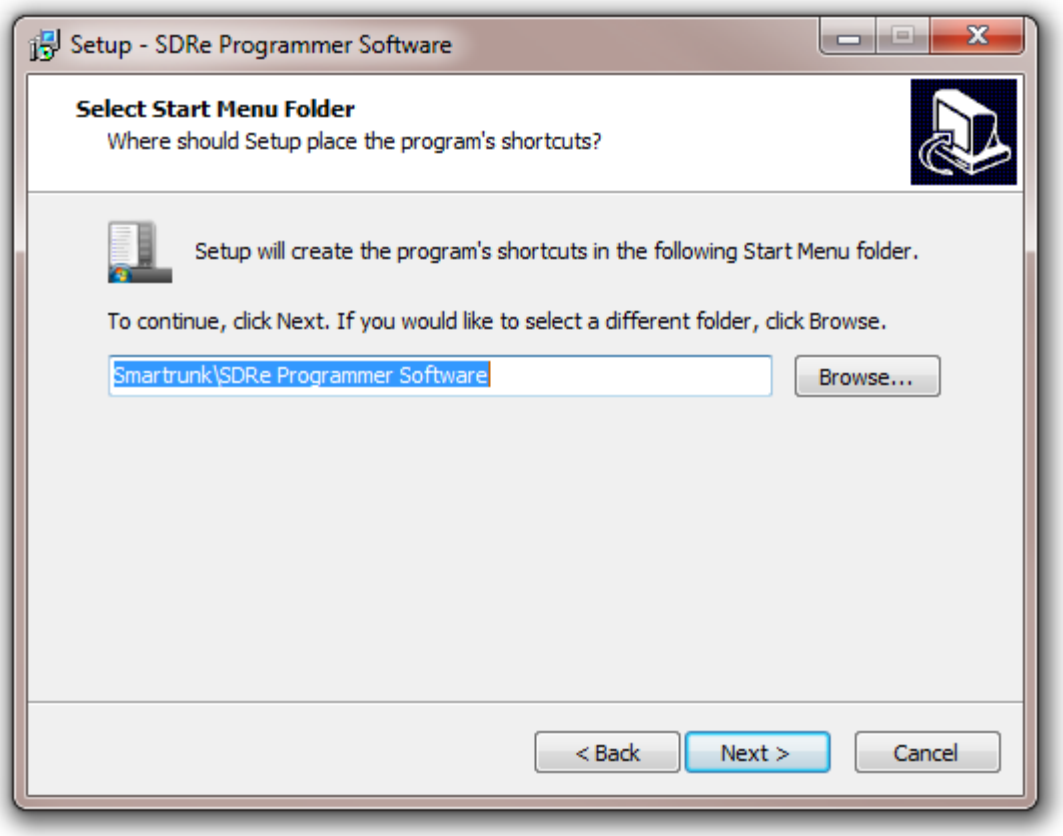


Figure 3: Start Menu destination

Please type the desired Menu folder where you will find the shortcut to run the software once installed into your computer.
Default name is: *SDRe Programmer Software*

Click on [Next] to continue or [Back] to return to the previous step.

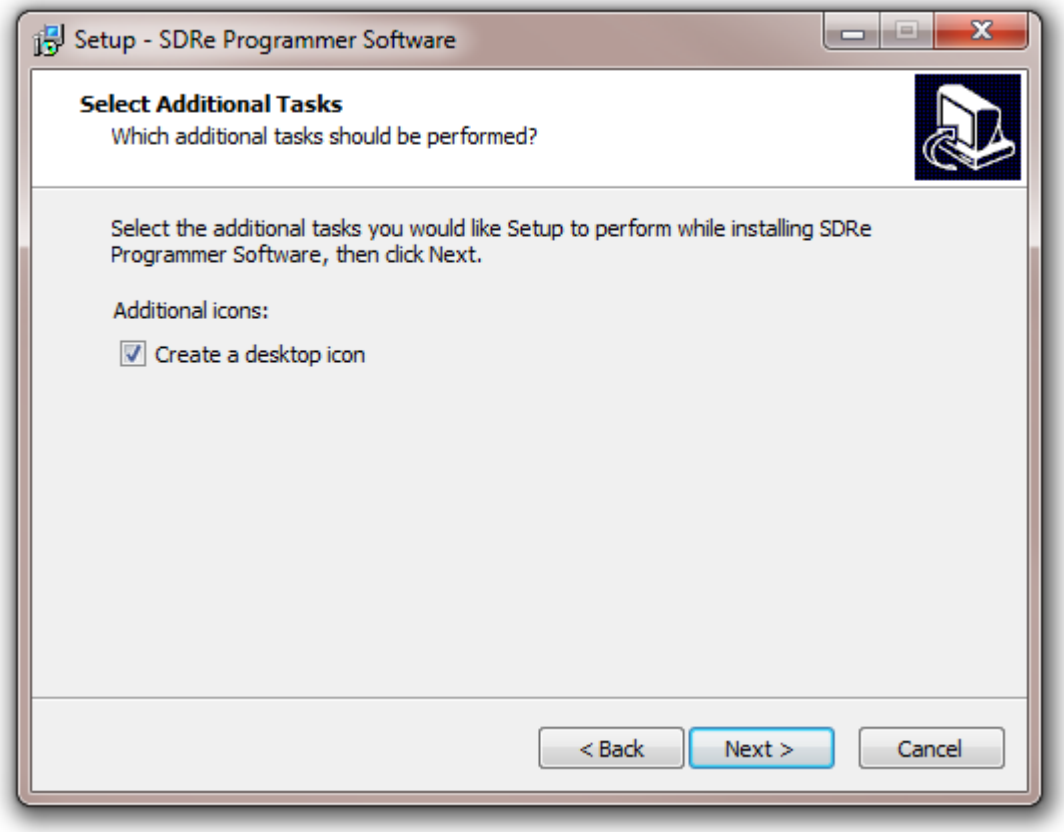


Figure 4: Additional task to be performed by installation software

If you do not want to create a shortcut into desktop, then uncheck the mark.

Click on [Next] to continue or [Back] to return to the previous step.

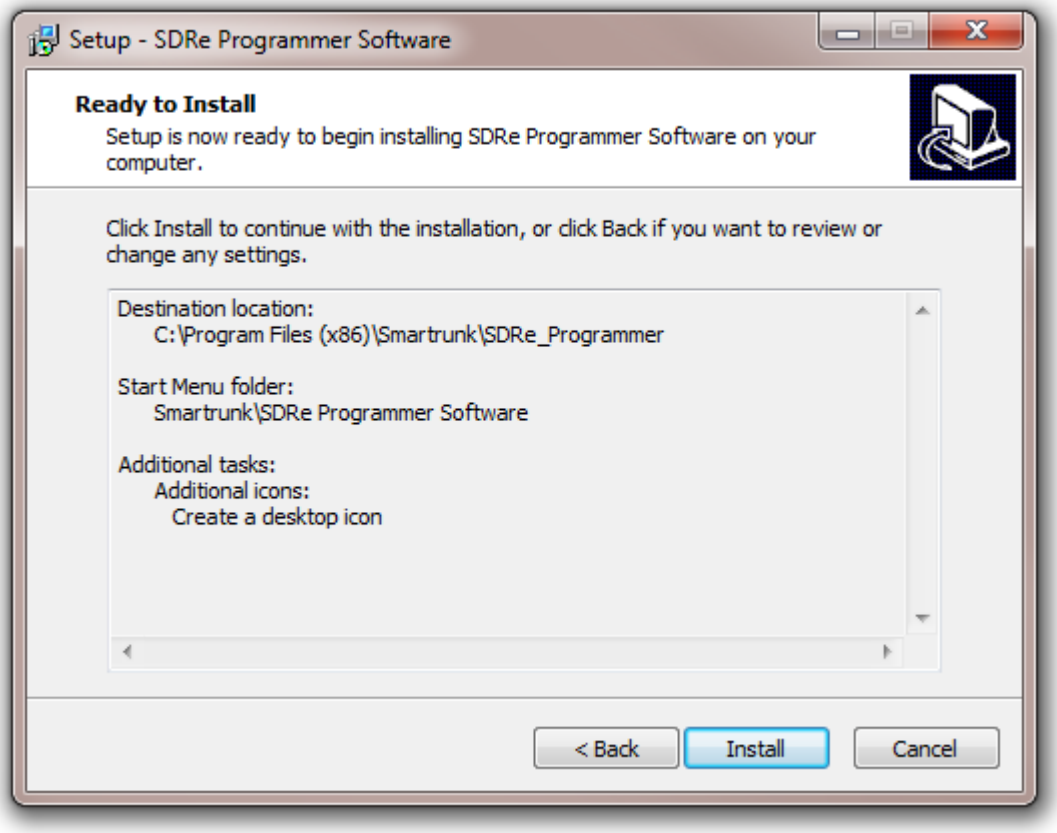


Figure 5: Installation parameters review

Check the option listed to ensure it is in agree to your desired setting, then press [Install] to proceed with the installation or press [Back] to return to the previous step

As soon as you press install, the progress bar shows you the installation process evolution. It will take only few seconds to perform.

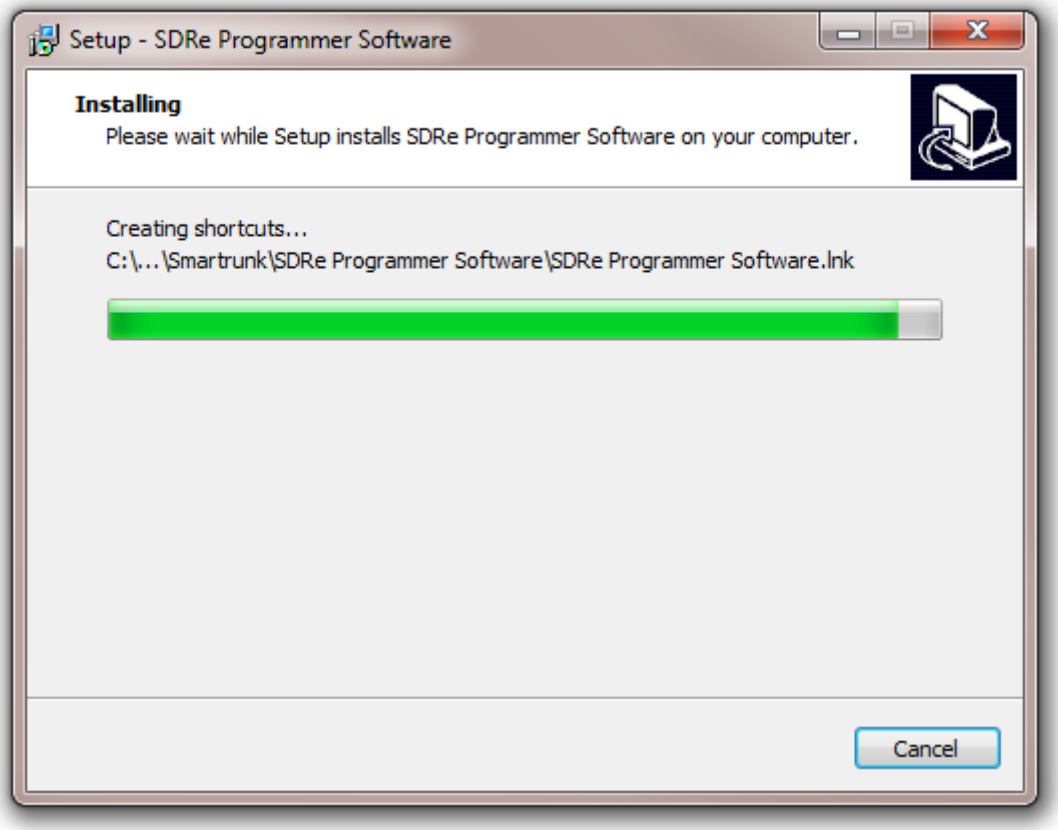


Figure 6: SDRe Programmer Software Installation progress bar

As soon as the installation finishes, you will be asked to run the software or to finish the process.

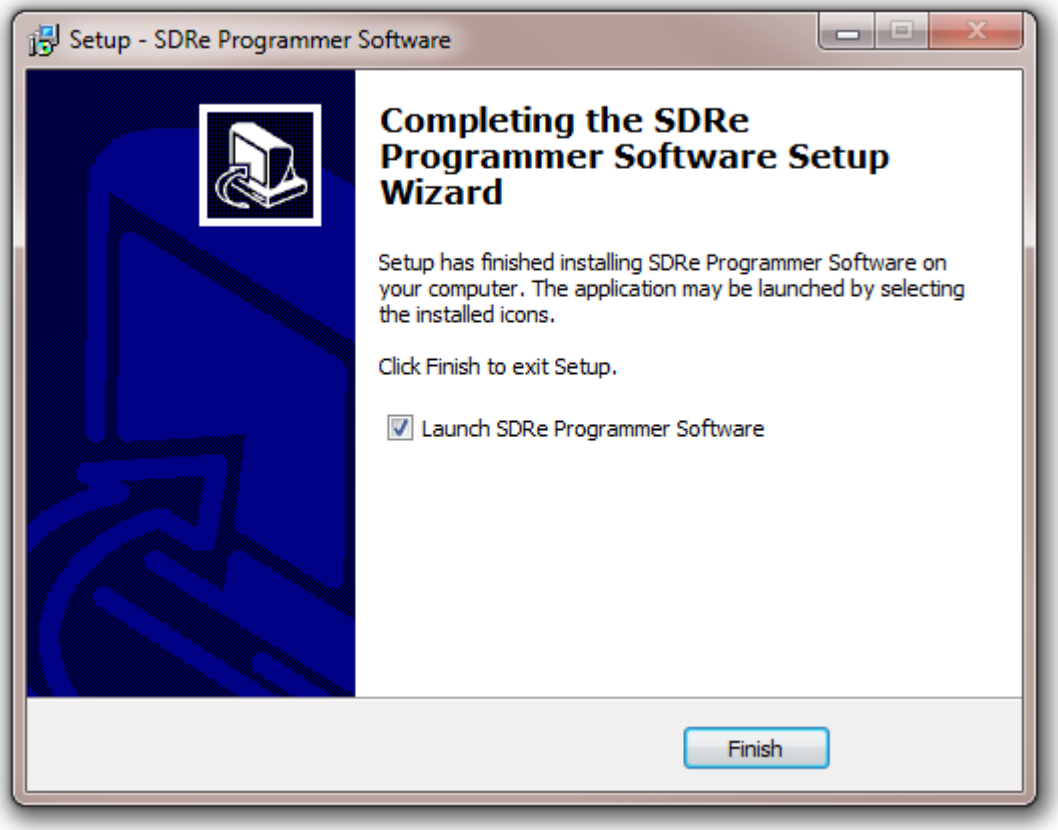


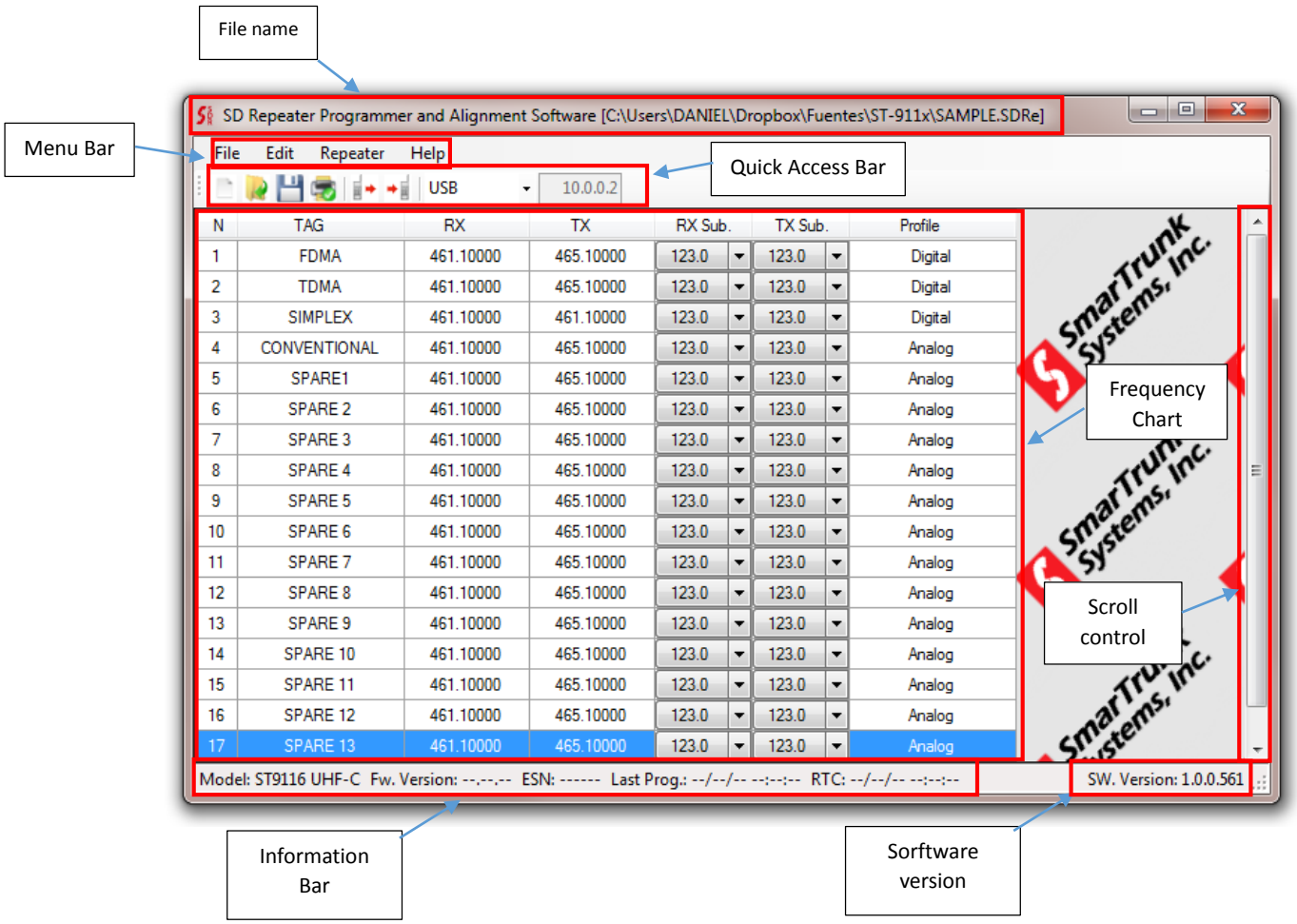
Figure 7: SDR Installation Software Final Screen

Leave the mark to run the software immediately or uncheck if you want to run the software later.

If you leave the mark, then the SDR programming software starts immediately.

2. SDR programming software aspect and screen areas

For your convenience, the SDRe programming software has been organized grouping the access to the different group of parameters or actions into a very clear shape.



2.1.1. File name screen area:

This area shows the name and root to the current file in use. In case you have not saved any file yet, this bar will shows only Programmer and alignment Software.

2.1.2. Menu Bar screen area:

This screen area lets you get the access to the right menu of each one of the features and services.

SDRE Programming software menu tree		
File	New	Create a new file from scratch
	Open	Open an existing file
	Save	Save current programming information
	Save As	Save current programming information on different file
	Recent Files	Open a recently used file
	Print	Print current programming information
	Configuration	Software configuration screen
	Exit	Close the SDR programming Software
Edit	Model Info	Radio Model information retrieved from radio memory
	Buttons	Assign functionalities to radio buttons
	Options	Choose the right options for networking and server control parameters
	Passwords	Define password protection for current file
	CTCSS Table	Access to radio phone book directory
	Profiles	Analog, Digital, MDX, Xpress, SmarTrunk II, 5 Tones
	MDC	Define the programing of MDC1200 signaling
	Digital Profiles	Define digital profiles for the current file
	Accessory port	Assign the function of each pin on the accessory connector
	Advanced	Establish advanced features as voice files, sound files, display fonts and more
Repeater	Read Repeater	Read a connected radio
	Write Repeater	Write the programming information to a connected radio
	Restart	
	Factory Reset	Make a factory general reset
	Alignment	Proceed with radio alignment
	FW Update	Proceed to update radio firmware
Help	Index	Help index
	Tech Support	Access to tech support e-mail or live chat
	Software Updates	Look for software update
	About	Related to the programming software release information

Table 1 Programming menu tree

2.1.3. Quick Access Bar:

This tool bar includes the icons to be used a shortcut saving time for most frequently actions:

 Create a new file form scratch

 Open an existing file

 Save current file

 Print current file information

 Read the repeater

 Write to the repeater

2.1.4. Frequency Chart

This is a sheet, which contains main information related to the frequencies, signaling and labels assigned to the channels.
From this area, you will access to the detailed frequency programming for each one of the repeater channels.

2.1.5. Scroll Control

In case of the quantity of channels programmed into a memory exceeds the screen length, you can move the frequency chart by using this bar.

2.1.6. Information Bar

On this area, most important information related to current repeater under programming, or to the previously downloaded file to one specific repeater, is displayed.

Model info is related to the particular configuration of the repeater.

FW Version shows the firmware release currently downloaded into the repeater.

ESN shows the Electronic Serial Number of the attached device. It is unique number who identifies the repeater.

Last Prog Shows the date and the time of the last time the attached repeater has been programmed.

RTC Shows the current date and time of the Real Time Clock of the attached repeater.

2.1.7. Software Version

This area displays the current software version you are using to program SDR repeaters.

2.2. Software configuration

Before initial use, it is required to adjust the software as per your environment.

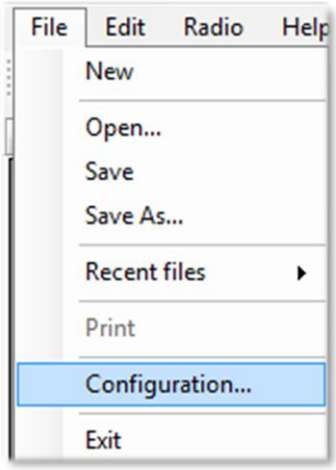


Figure 9: SDR Programming Software Configuration Access

As soon as you click on [Configuration], the right configuration screen pops up.

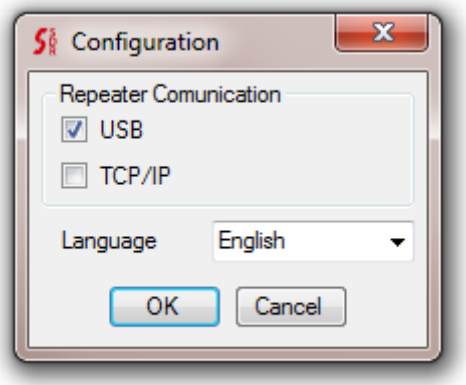


Figure 10: SDRe Programming Software Configuration Screen

2.2.1. Repeater link to the computer:

You can choose to connect your radios to the computer by USB (default) or TCP/IP media protocol.

In case of USB media connection to the radio, it should be required to install the drivers for your USB device.

As SDR repeater is not a standard device included into MW Windows library, you must install the drivers before read or write a radio.

Note: 3 - Driver installation alert for USB Media Connection

As soon as you plug a SDR repeater to the computer through the USB port, you will be prompted to install the driver. Installation software already copy the files into the selected directory you have introduced into the installation time, under {Drivers} folder: For example:

C:\Program Files (x86)\SmarTrunk\SDRe_Programmer\Driver

Once you complete driver installation, the connection to the repeater will be done automatically. The drivers must be installed only once.

In case you prefer to program the repeater by Ethernet port, then TCP/IP port must be checked and the right IP address of the repeater to be programmed must be indicated into the quick access bar:

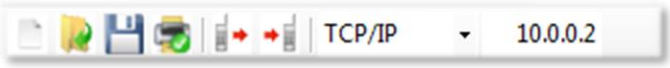


Figure 11: Selecting IP address from the quick access bar

USB or TCP/IP selection may also be done form the bar:

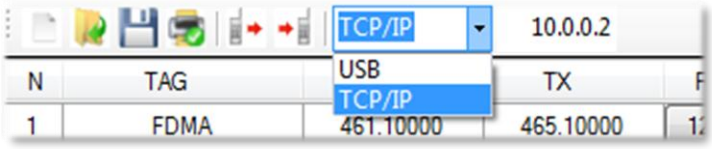


Figure 12: Selecting communication media from the quick access bar

2.2.2. Software Language:

You can choose the language for your software interface.

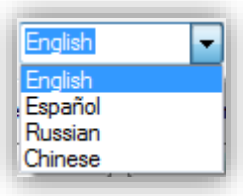


Figure 13: Software Language Configuration Screen

Select your desired language interface by click on the desired option.

Software update shall include new languages, so we recommend you try to keep your version updated.

Note: 4 - Language Update Notice

3. File operations:

3.1. New program file creation:

Evenly when in the future you can use existing files as templates to define the programming file of a repeater, the first time you must start from scratch, cleaning the dashboard.

To create a new file you can use the quick access bar then click on the new file shortcut or goes through [File] menu, and then select [New]

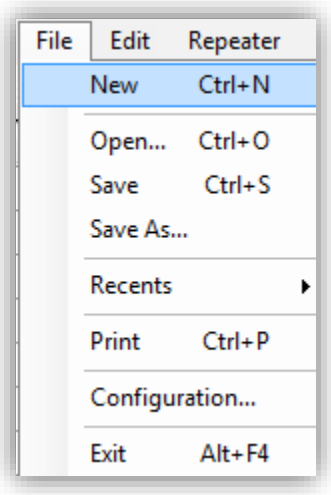


Figure 14: New file access through File menu

3.2. Open an existing template or file

To open an existing file or a template, please proceed to click on [File] then [Open].

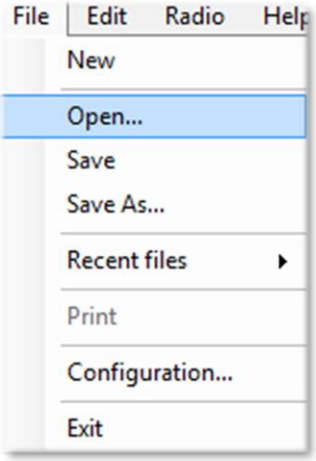


Figure 15: Accessing to open an existing file or template

As soon as you clock on [Open] a windows Explorer screen will help you to find the file.

You can also use the shortcut from the quick bar  .

Once you found the file, click on [Open] to load the information into your programming software dashboard.

3.3. Saving the dashboard information to the currently opened file.

To save current information on the programming software dashboard, you can press [File] then [Save]. The currently opened file will be updated.

Alternatively, you can also use the icon in the quick access bar: 

3.4. Saving current dashboard into different file

To save current information on the programming software dashboard but in different file, you can press [File] then [Save As].

A typical windows Explorer screen will prompt you to input the desired file name and find the file location. Once selected it, the information will be saved into the file.

In case the selected file name exists, the software will alert you to before overwrite it.

4. Repeater and parameters configuration

4.1. Model selection

Once a new file has been initiated, you must define the repeater model to be programmed.

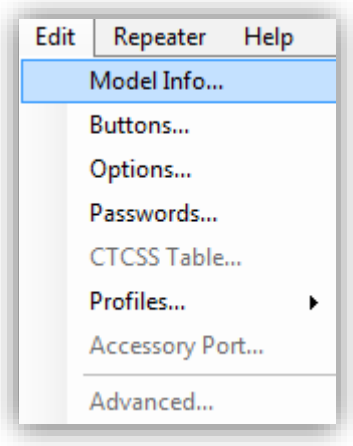


Figure 16: Model information access through Edit Menu

SDRe software can program any of the SmarTrunk Digital repeater from ST-91XX family, but each repeater requires a proper definition for most of the programming parameters.

Once you get access to the Model Info menu, a new screen will pop up:

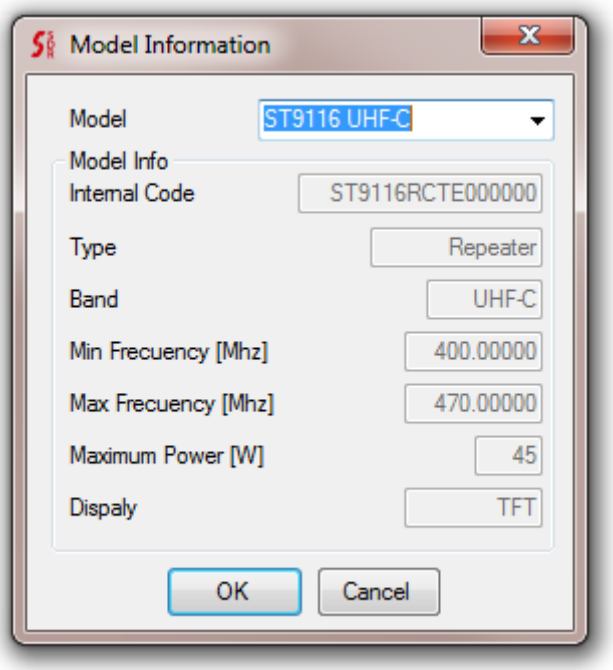


Figure 17: Model Info Screen

To select your desired model, click on the right corner of the model field then a scrollable list will drop down.

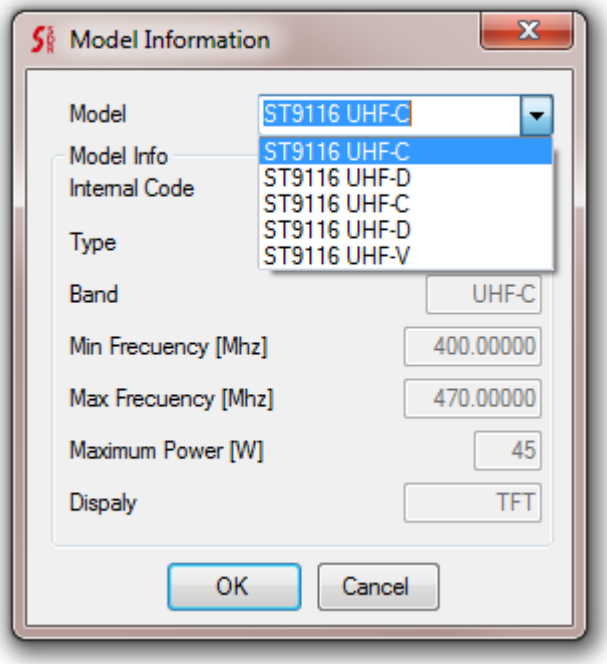


Figure 18: Model info list

To select your model you must press over the right name corresponding to your device.

If your repeater model is not in your list, please update your software.

It is important to keep your software updated to ensure any SDRe repeater is into the model info list. If your model is not into the current list, please update your repeater

Note: 5 - Incomplete model info list requires software update

If you are not sure about your model info, you can read the repeater by pressing the read button on the quick access bar once your repeater is connected through the Ethernet port or USB cable with the computer where the SDRe programming software is running.

Model info is also into the serial number label in the backside of your repeater.

Once the model is selected, the correct frequency range, max power and accessories are enabled into the model info screen.

Model: is the general model of the radio family.

Internal Code: is a production code assigned to the repeater into the manufacturing process.

Radio Type: is the type of device.

Min Freq: Refer to the lowest operational frequency, which can be programmed into your repeater.

Max Freq: Refer to the lowest operational frequency, which can be programmed into your repeater.

Maximum Power: Is the maximum power supported by your RF TX configuration. It may be different, depending on the region.

Display: Shows the type of display of the repeater

Once selected the right model press [OK] to accept it.

4.2. Repeater Buttons Definition

Before using the repeater, you must assign the functionality of each one of the repeater buttons.

Please click on [Edit] then [Buttons] to access to the buttons definition screen.

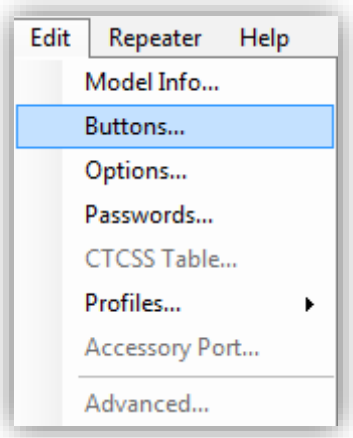


Figure 19: Accessing to Radio Buttons screen

As soon as you click on Buttons, a new screen will displayed.

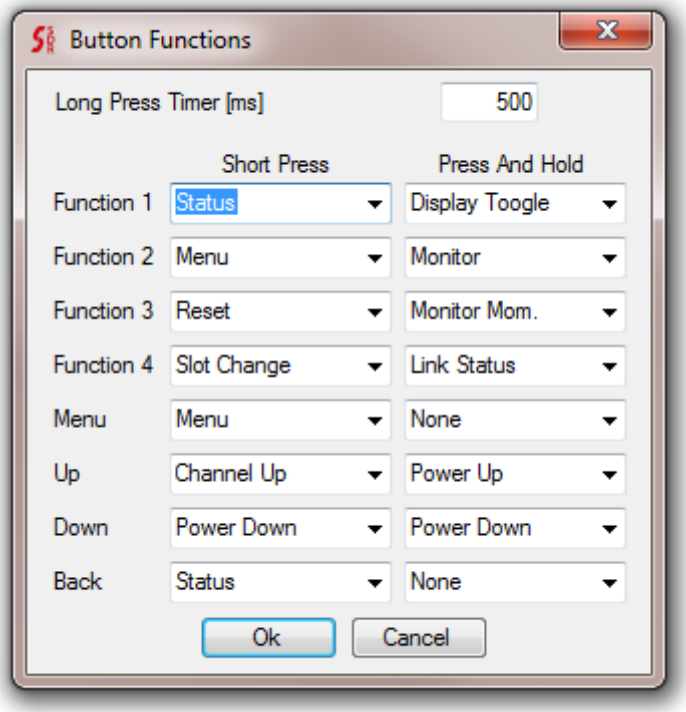


Figure 20: Buttons Definition screen

4.2.1. Long Press Timer

Each button of your repeater has two functionalities to be assigned. One is that function to be executed when the button is pressed and

released immediately and the other is that function to be executed when the button is pressed by long time.

Long Press timer is the minimum time in milliseconds [ms] that a key must be held to be considered as Press and Hold action.

This parameter can be adjusted form 100msec up to 2500 msec.

Please define it as per your convenience.

4.2.2. Buttons Actions:

The Buttons Definition Screen lets you to assign different functions to repeater buttons.

Click on the side arrow to open the selection list of possible functions to be assigned to any of the buttons, and then click on the desired function to be assigned.

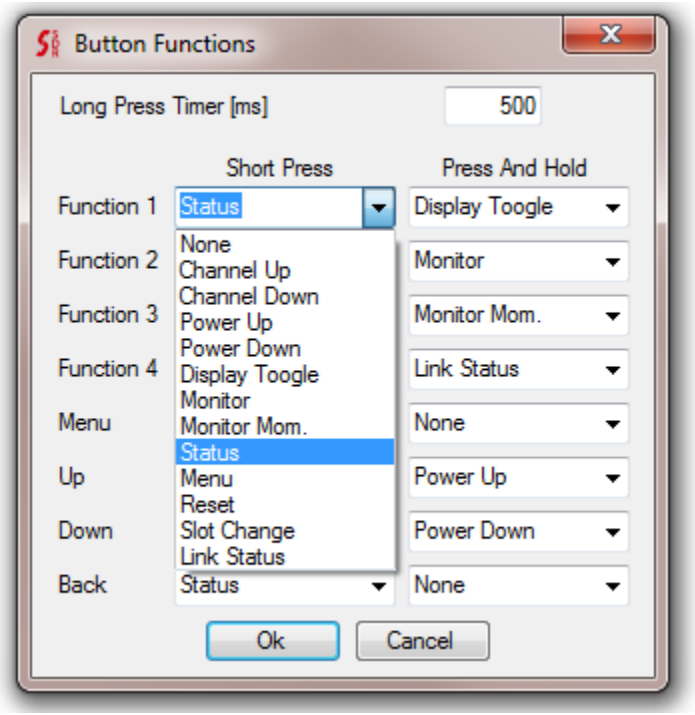


Figure 21: Assigning the function to a button

To finish the function assignment, press [Ok] to return to the main dashboard.

Press And Hold means a long push function assigned to such button.

Depending on the application firmware loaded into your radio core, some functions may not be allowed to be selected or defined.

Depending on the kind of button, some functionalities are not allowed.

The actions to be assigned to the buttons are:

4.2.2.1. None

Use this option to disable the button.

4.2.2.2. Channel Up

Assign this command to move one-step up on the list of channels. One Channel up means select the previous channel on the list of channels defined on the main SDRe programming software dashboard.

If the current selected channel selected is the top one on the list of channels, then it will jump to the last channel on the list when this action is executed.

In case only one channel is programmed on the current memory bank, this action takes no effect.

4.2.2.3. Channel Down:

Assign this command to move one-step down on the list of channels. One Channel down means select the next channel on the list of channels defined for the current list on the main SDRe programming software dashboard.

If the current selected channel is the last one on the list of channels, then it will jump to the first channel on the list when this action is executed.

In case only one channel is programmed on the current memory bank, this action takes no effect.

4.2.2.4. Power Up:

Assign this command to change the RF output power selection. This command will jump from Low Power to Mid Power, from Mid Power to High Power, from High Power to Low Power, depending on the current power selection.

The absolute power assigned to each power selection must be aligned as per Alignment section descripted on Service manual.

4.2.2.5. Power Down

Assign this command to scroll the RF output power selection. This command will jump from High Power to Mid Power, from Mid Power to Low Power, from Low Power to High Power, depending on the current power selection.

The absolute power assigned to each power selection must be aligned as per Alignment section descripted on Service manual.

4.2.2.6. Display Toggle

Commonly, the display backlight goes to power off mode after 10 seconds. If you want to let it continuously on by 12 hours, assign this function to one button then you can toggle between power save backlight mode and long term backlight on. This function is useful for in-site maintenance or inspection.

4.2.2.7. Monitor

Assign this command to open the audio path without any signaling or carrier level consideration.

This command only operates on analog and hybrid mode.

As this function does not care about any signaling, if you assign it to some button, then you may know that the system privacy may be affected when this function is active

Note: 6 - Monitor privacy warning for a fleet

4.2.2.8. Monitor Momentary

Assign this function when you want to open the audio path without any signaling or carrier level consideration meantime the assigned button is held.

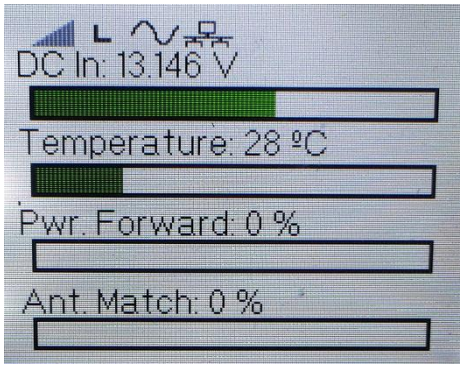
This command only operates on analog and hybrid mode.

It cannot be assigned to an instant action button. Only can be used as long press action

Note: 7 - Monitor Momentary allowed only to long press actions

4.2.2.9. Status

Assign this command to show an instant status report on screen, displaying the following information:



DC In: is the voltage on repeater DC input.

Temperature: Is the real temperature into the main board, very close to the RF power module.

PWR Forward: It is a percentage of the power pushed by the repeater in comparison to the calibrated value on the alignment procedure. For example, if you align the repeater to transmit 30W form the alignment software for such desired frequency, and now the repeater is transmitting only 20W, you will see 66% on this bar.

ANT Match: This bar shows you the result of the comparison between the SWR at calibration time related with actual SWR status. 100% means the antenna remains working as at the installation time.

Pwr. Forward and Antenna matching must be calibrated once the repeater has been installed by aligning the RF power for the operation frequency, using the proper antenna, duplexer or combiners. These values are a clear reference but it does not operate as a calibrated instrument.

Note: 8 – Power and antenna matching calibration

4.2.2.10. Menu

Assign this command to let the user access to the general repeater menu.

On Once the main menu is accessed, navigation control keys function are overridden getting the default navigation functions Home, Back, OK and Menu Exit

Note: 9 - Alternative navigation keys function under menu mode alert

4.2.2.11. Reset

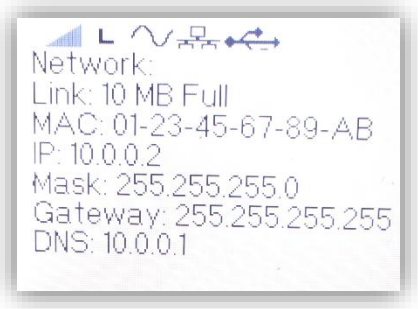
Assign this command to restart the repeater loading a set of new desired parameters. Current call will be terminated and traffic report and voice logger will be discarded.

4.2.2.12. Slot Change

Assign this command to change the time slot addressed to the speaker for TDMA call monitoring.

4.2.2.13. Link Status

Assign this command to check IP link status. The following screen will shows you the complete status:



4.3. Enhanced optional programing

On this step, you can configure some networking parameters and services features.

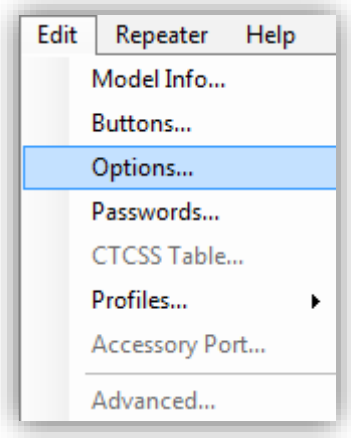


Figure 22: Option screen access through Edit Menu bar

As soon as you click on Options, the Optional programming features screen will pops up.

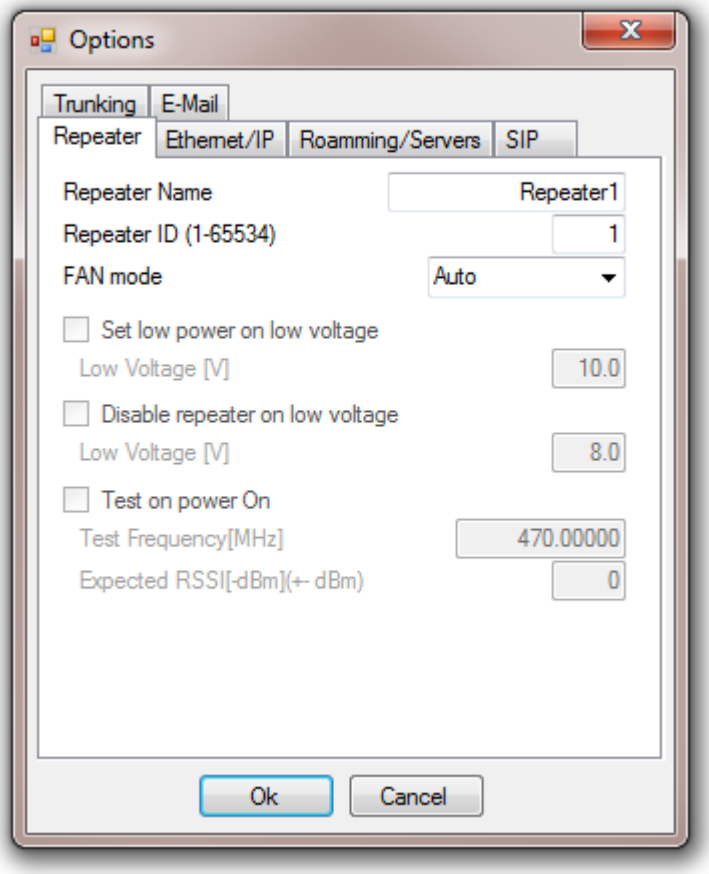


Figure 23: Options Program screen

To save the setting press [Ok] or [Cancel] to exit without saving the data changes

4.3.1. Repeater parameters

This area lest you set some parameters:

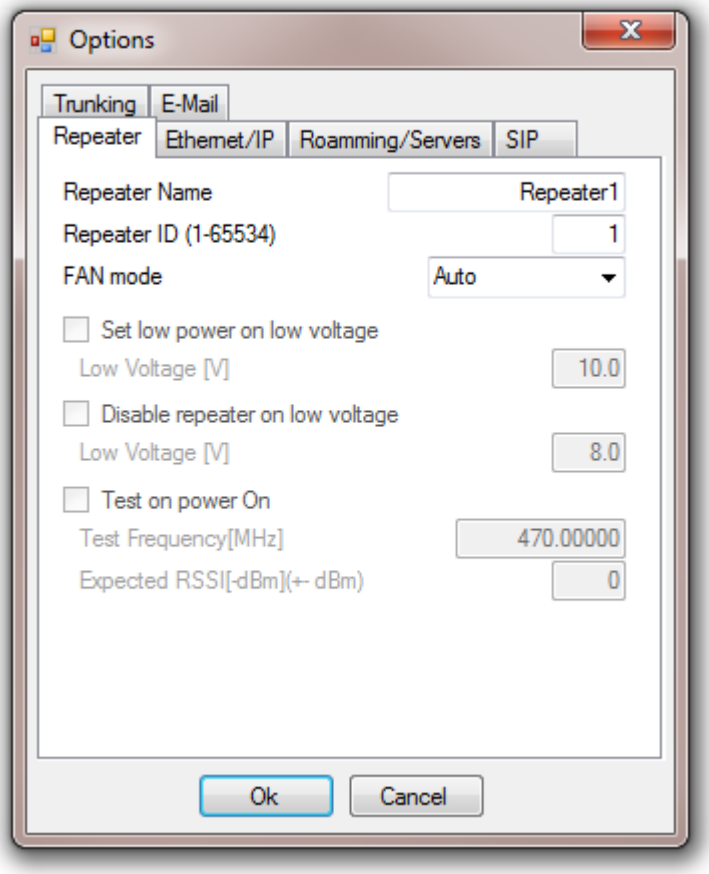


Figure 24: Repeater Parameters tab

4.3.1.1. Repeater name:

This is an Alphanumeric Nickname assigned to the repeater to get an easy access to this reference in the future, when you must administrate a network.

4.3.1.2. Repeater ID:

This is a very important parameter in case you define a network of repeaters into the system. This ID will help to identify each repeater sharing the same IP address.

The ID must be unique into the entire system. Please be sure you are not defining the same ID for two repeaters into the same network. Repeater ID is also used for Voting management.

Note: 10 – Unique ID advertence

4.3.1.3. FAN Mode:

The operating temperature of the repeater may not exceed 100°C [212°F]. Depending on environmental conditions, the internal FAN will help the heat-sync to keep temperature under the limit, extending the repeater performance.

Press on the arrow to list down the possible values:

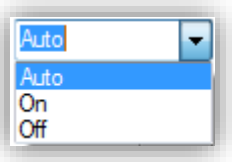


Figure 25: FAN Setting

Auto: The FAN will work controlled by repeater temperature limits programed on the alignment procedure (See ST-9116 Service manual – Alignment).

On: The FAN will remains all time on. This option will demand more quiescent current than required becoming inefficient. It should be useful for high temperature environments.

Off: The FAN never will blow.

4.3.1.4. Set Low Power on Voltage:

If the DC power voltage drops under the limit programmed on this field, then the repeater will jump to the low RF power programed for the repeater to save battery. This feature is especially useful for solar-powered sites or when the site works on power back up during a possible AC failure.

Figure 26: Low power on low voltage setting

4.3.1.5. Disable Repeater on Low Voltage:

If the DC voltage is too low, then the repeater will be automatically moved to stand-by mode serving only to emergencies.

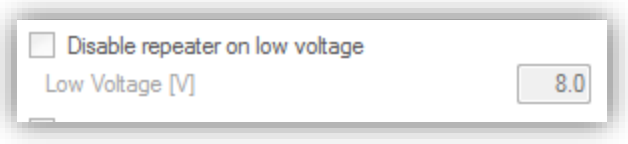


Figure 27: Disable the repeater on low voltage

4.3.1.6. Power-on Test:

Check this box if you want the repeater transmit a test carrier with some specific modulation when turned on as an additional routine to the power-on test.

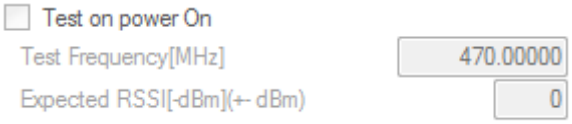


Figure 28: Power on test setting

Test Frequency is the frequency to be used to perform this test.

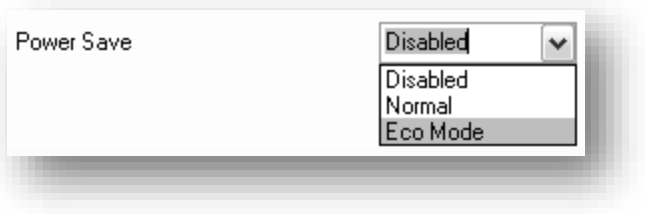
Expected RSSI is the loop value measured between TX and RX. Value lower than expected means poor TX power. Higher values means poor RX-TX isolation.

Target value to Expected RSSI depends on each installation, so you can use a test channel programmed into same TX than RX frequency and read the loop value on the main RX screen once you hit the repeater. As this is a loop, you must reset the repeater once you get the RSSI value

Note: 11 – RSSI loop value for Power-On Test

4.3.1.7. Repeater Power Save mode:

In solar powered sites, it is very important to reduce the quiescent current saving battery.



Click on the side arrow to select the proper power save mode:

Disabled: No power save functions

Normal: All internal resources are powered down, but the receiver is all time powered on getting immediate reaction to any call request.

Eco Mode: is an extreme power save, where all circuitry is powered down, getting the receiver on only 100mSec by 300Msec off. On this mode, the reaction may demand about 500msec to recognize a call request, but the power saving efficiency is very high.

4.3.2. Ethernet/IP configuration:

On this tab, you can program the parameters required for set the repeater into an IP network environment.

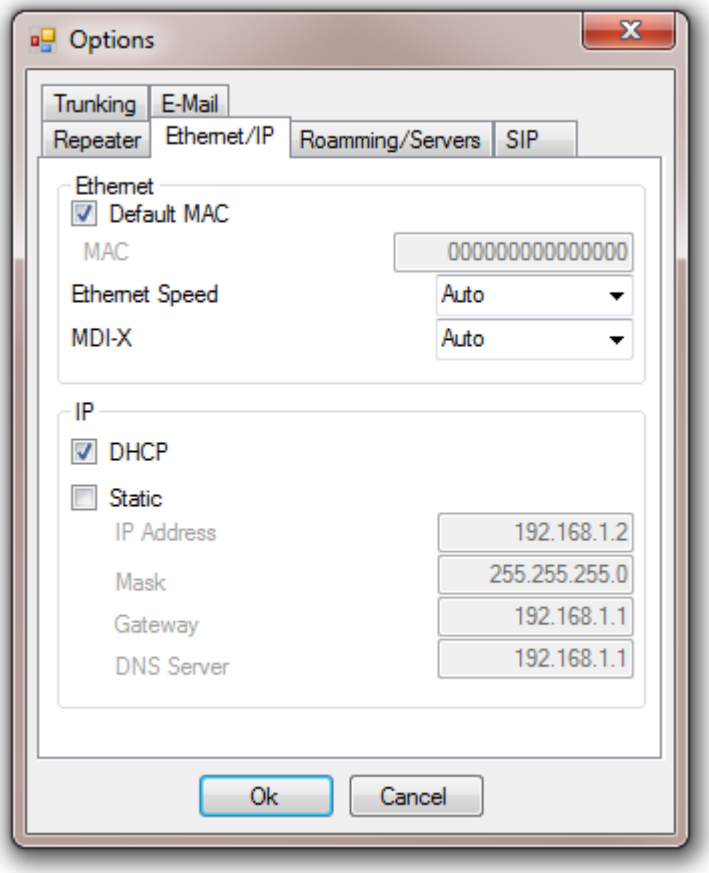


Figure 29: IP environment programming tab

4.3.2.1. Default MAC Address:

MAC address is a very important security parameter for any IP network and additionally it may be used for external servers to address a particular repeater into your network through the routers.

Check this box to use the factory pre-assigned MAC address or use your own if required, by typing it into the MAC field.

Figure 30: MAC address default setting

The MAC field is only active for typing if the Default MAC is not selected.

Type 0123456789ab for MAC address 01:23:45:67:89:ab

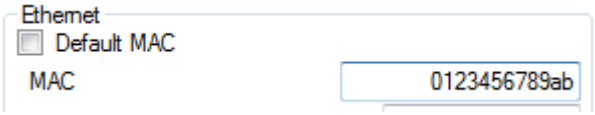


Figure 31: Sample of MAC Address input

4.3.2.2. Ethernet Speed:

Depending of the media quality and the possibilities of you link, you can select the speed for the IP port.

Press on the side arrow to slide the menu down then select you desired option:

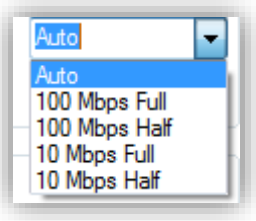


Figure 32: IP port speed and mode selection

AUTO: The repeater will negotiate the most convenient operational speed and mode in agree to the possibilities of your network.

Evenly when this selection is convenient, the success of this depends of the stability of your network because negotiation takes some time. In case it must be negotiated very often, it will be not convenient.

100Mbps Full: the PHY port will operate at 100 Mbps full duplex (RX and TX at the time).

100Mbps Half: the PHY port will operate at 100 Mbps semi duplex (never RX and TX at the same time).

10Mbps Full: the PHY port will operate at 10 Mbps full duplex (RX and TX at the time).

10Mbps Half: the PHY port will operate at 10 Mbps semi duplex (never RX and TX at the same time).

4.3.2.3. Ethernet MDI-X:

Depending of the media type, the polarity of the wiring connection must be normal or crossed. Press on the side arrow to select the appropriate configuration for your network.

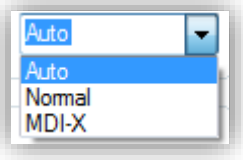


Figure 33: MDI-X selection

Auto: the PHY detects the type of connection adjusting the mode on the fly

Normal: Check this one for normal IEEE 802.3 configuration

MDI-X: for crossed connections.

4.3.2.4. IP Address setting:

You have two ways to assign the IP address for the repeater.

DHCP: Check this box to leave an external DHCP server assigns the most convenient IP address for your device.

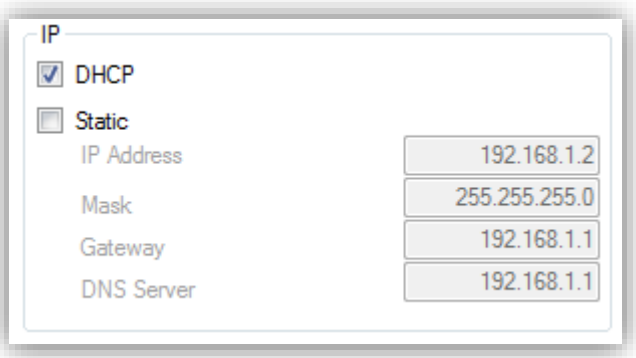


Figure 34: Setting DHCP mode

Static: Check this box to define the IP address, mask, gateway and DNS address manually.

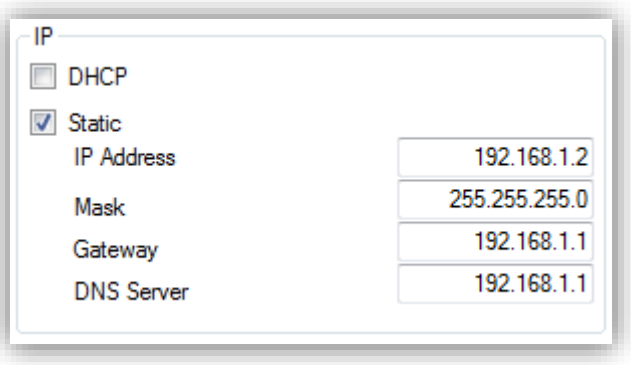


Figure 35: Manual configuration of the IP address

IP Address: Fill the IP address for your repeater, separated by dots (IP V4 format).

MASK: Fill the MASK to define the sub net of your device.

Gateway: Fill the IP address (IP V4 format) for the gateway of your network.

DNS Server: Fill the IP address for the DNS server of your network.

4.3.3. Roaming/Servers configuration:

On this tab, you can program the parameters required for set the repeater into a wide area IP network environment.

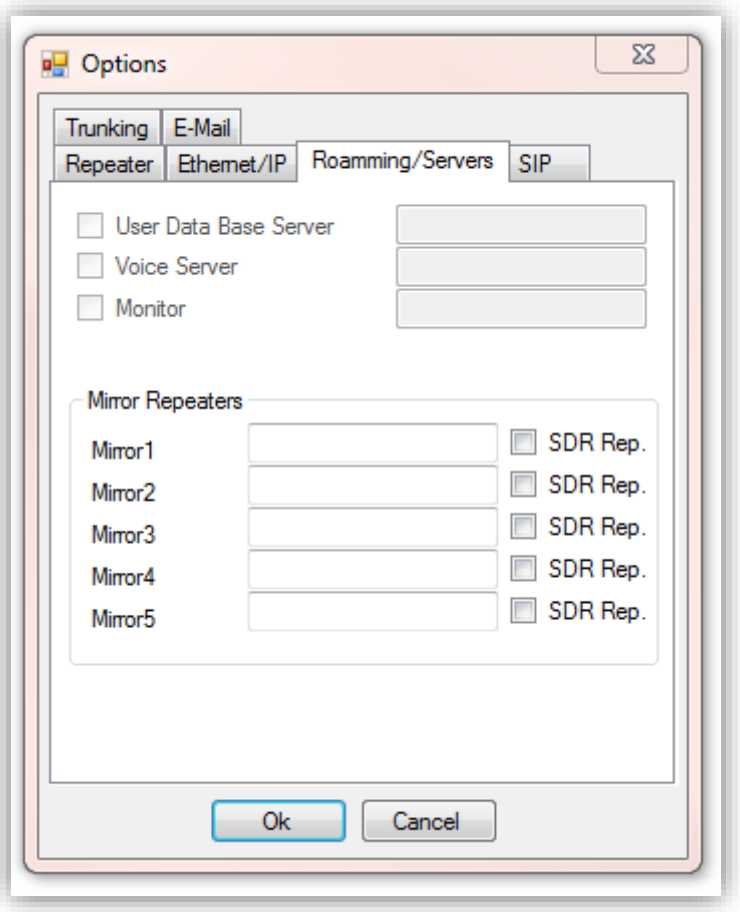


Figure 36: Roamming/Servers definition screen

4.3.3.1. User database Server:

In a wide area network, the trunking/system database may be located somewhere in the entire network. If this is the case, you can check this box then fill the IP address assigned to the active user database.

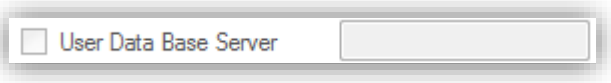


Figure 37: Selecting remote user database server

4.3.3.2. Voice Server:

In a wide area network, the trunking/system voice resources must be centralized into an external server.

This Server will assign the voice logger and the phone line resources in agree to the right network configuration.

If you network has a voice server, please check this box and fill the IP Address of you voice server.

Figure 38: Voice Server IP definition

4.3.3.3. Monitor:

In some system configuration, a centralized monitoring center is defined. On this case, check this box then fill the address of the monitoring device for your network

Figure 39: Addressing the monitor server

4.3.3.4. Mirror repeaters:

If your system is composed by single repeaters site, not trunked, then you can broadcast the conversations in up to five different locations.

Each mirror location must be integrated by a repeater or by a console.

Fill the IP address for your mirrors separated by dots and check the box in case the broadcast device is a repeater.

Figure 40: Broadcast configuration for conventional repeater sites

4.3.4. SIP Server IP configuration:

On this tab, you can program the IP address of the SIP gateway. This gateway will specify the codec, protocol and routing for any communication exchanged with external switches.

Check the box if you want to enable/disable the SIP service.

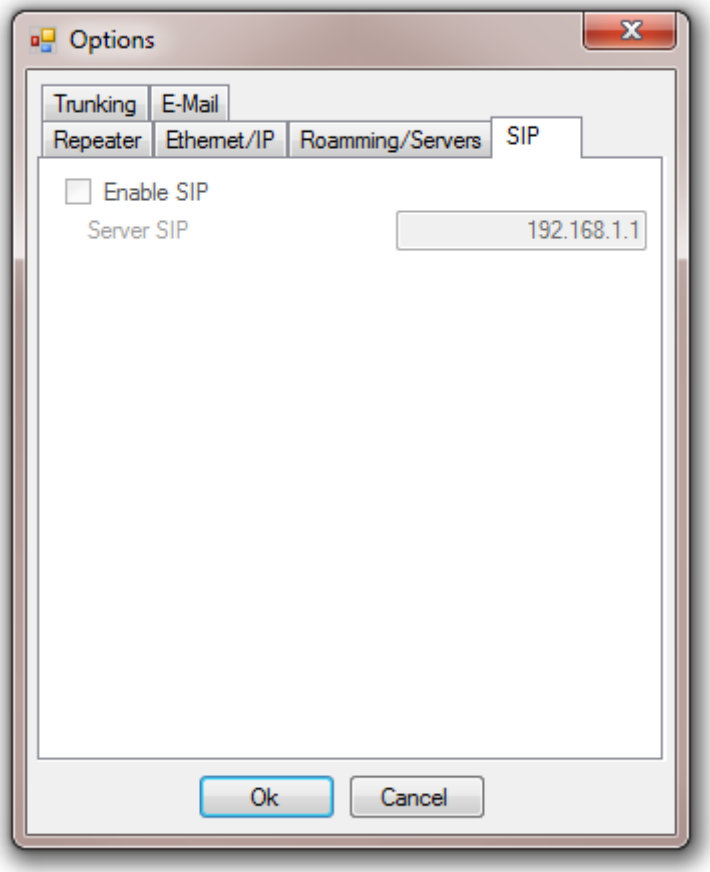


Figure 41: SIP Server IP configuration tab

To save changes press [Ok] or select other tab. If you want to cancel the modifications for this tab, press [cancel].

4.3.5. Single Site trunking configuration:

On this tab you can program the IP address and ports for any repeater into the same site.

Multi-site application software is another application. The programming of multi-site trunking networks are outside of the scope of this manual

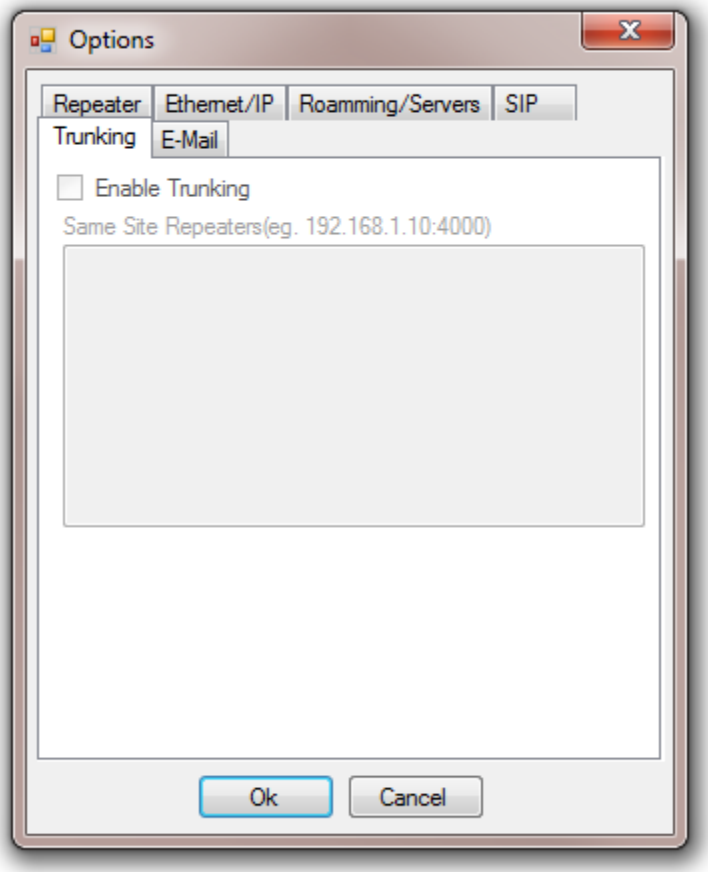


Figure 42: Single Site Trunking configuration

Fill the list with the IPs and ports for the repeaters into the same site. All repeaters must be linked by IP media in order to synchronize the entire site.

Check the box to enable single site trunking operation.

To save changes, press [Ok] or select other tab. If you want to cancel the modifications for this tab, press [cancel].

4.3.6. E-mail Service configuration:

On this tab, you can program the required parameters to support e-mail services.

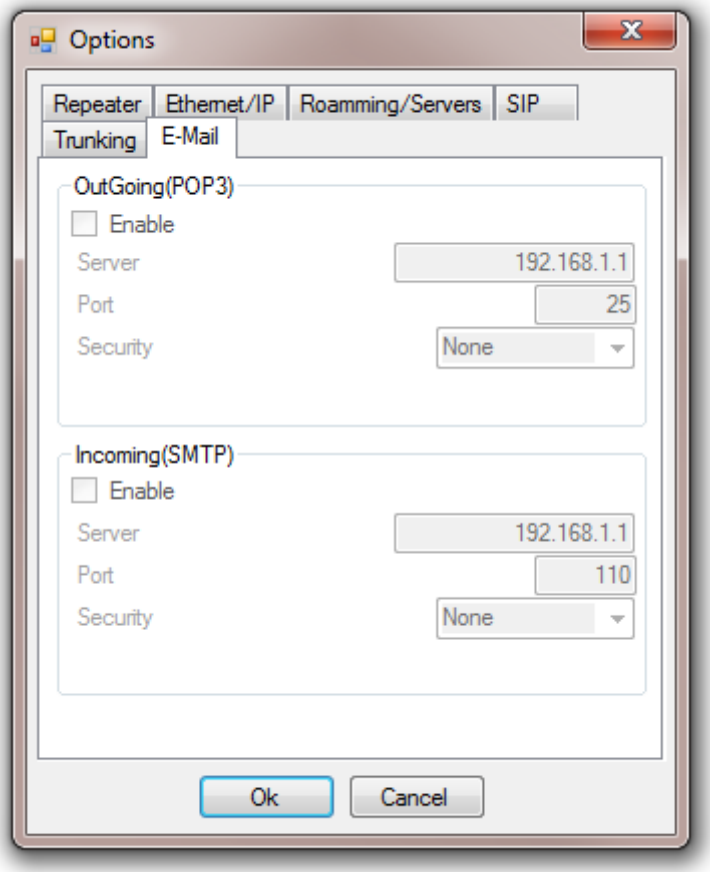


Figure 43: E-mail services configuration

4.3.6.1. Outgoing Services to the radios:

Incoming mails from the Internet must be received from the repeater using POP3 service to connect to an e-mail server.

Fill the Server IP address, the port and the security mode as per your POP3 service.

Check Enable box to activate the service

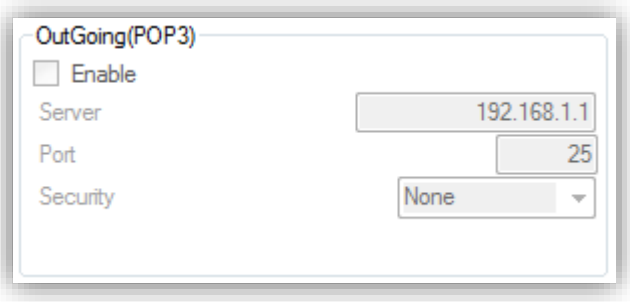


Figure 44: POP3 Service configuration

4.3.6.2. Outgoing Services to the radios:

Outgoing e-mails coming from radios to the Internet must be delivered from the repeater using SMTP service.

The SDR repeater has the SMPT Bridge embedded. You can activate this service by filling the SMPT server IP address, port and security mode, and then check the Enable box.

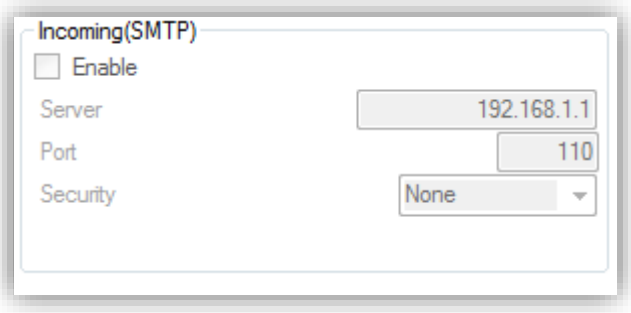


Figure 45: SMPT service configuration

4.4. Repeater and File Password Protection:

In most of the applications, it is important to protect programming information.

To access to the password protection screen, please click on [Edit] then click into [Passwords] tab.

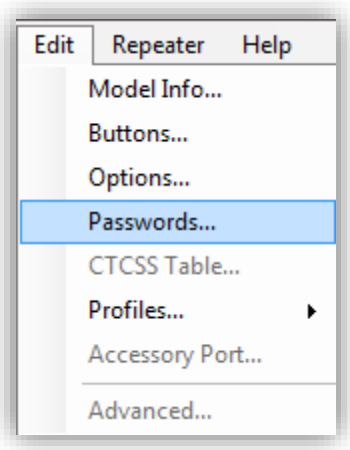


Figure 46: Access to Passwords programming screen

As soon as you click in [Passwords], the password programming screen will be launched.

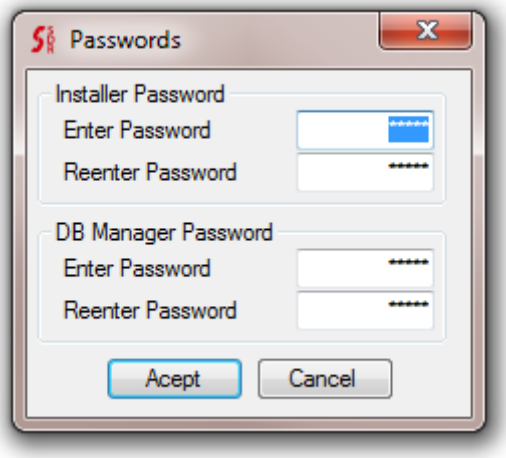


Figure 47: Installer and Data Base manager password protection screen

ST-91XX series offers two level of passwords protection: one for the Technicians who install the repeaters, makes the alignment, hardware programming, etc. and the second one for administrative programmers, who only needs access to the repeater user database, but no channel programming or alignment.

4.4.1. Installer Password:

This password enables the technicians to change the frequency programming, align the entire repeater, and define the IP environment parameters, Monitoring, Servers, etc., in local or remote environment.

To protect this repeater area, you must fill Installer Password field and confirmation with key work of 6 numeric characters.

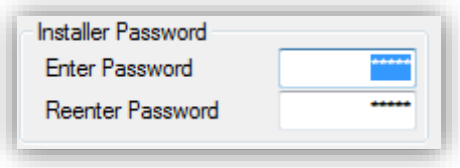


Figure 48: Installer password

Default Password in 123456. In you do not change it, the repeater never asks for password understanding that it is not required. Programming software send 123456 as default password to connect remotely.

4.4.2. DB Management Password:

This password enables the system administrator to change users database, including IDs, privileges, radios kill, radios alive, etc.

To protect this repeater area, you must fill DB Manager Password field and confirmation with key work of 6 numeric characters.

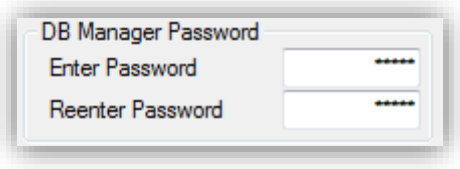


Figure 49: DB Manager Password

Default Password in 123456. In you do not change it, the repeater never asks for password understanding that it is not required. Programming software send 123456 as default password to connect remotely.

In case both passwords be the same, at the time you login to the repeater, you can get complete access to both areas.

4.5. CTCSS Table:

The SDR repeaters supports up to 32 private groups into analog or hybrid mode. The signaling used to discriminate the groups is CTCSS.

To enable a group, list the right CTCSS into the CTCSS table.

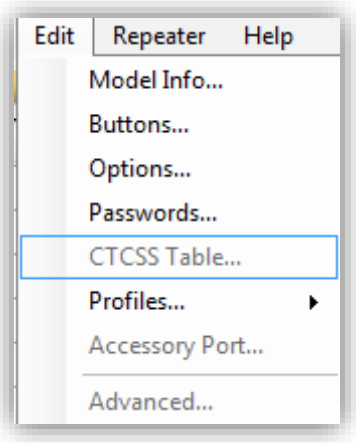


Figure 50: CTCSS Table

In case you do not fill any CTCSS table, the repeater operates only with the defined CTCSS on the frequency chart.

4.6. Profiles:

From the main menu bar, press on [Edit] then [Profiles] to access to profiles menu.

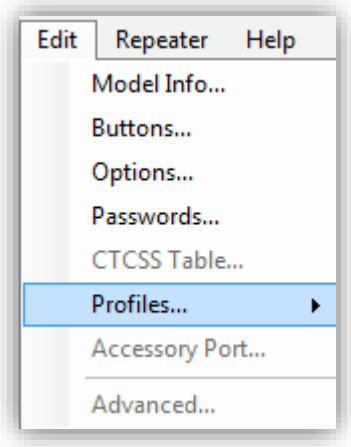


Figure 51: Profiles Menu Access

Once you press on [Profiles], a list of possible profiles will be open. If some profiles are on grey, it is because your firmware does not support that service.

4.6.1. Analog Profiles:

All common characteristic of any analog profile common to any of the channels in the repeater must be programed on this step and the associated to the right frequencies on the chart later.

To access to the Analog profile menu, proceed pressing on [Menu] then [Profiles], then [Analog]

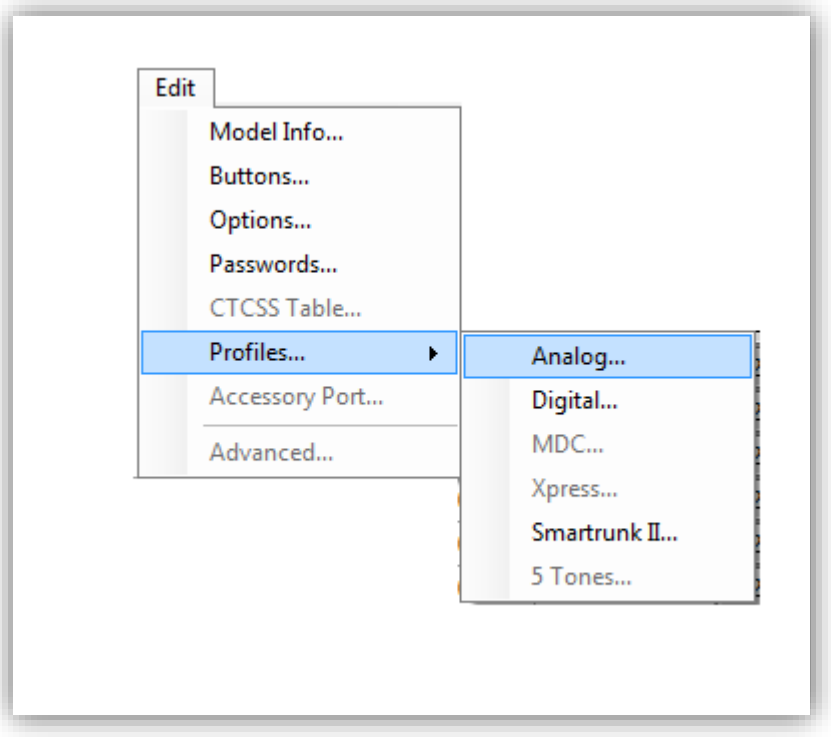


Figure 52: Accessing to the Analog Profile tab

Once you press on [Analog], the Analog Profile menu will be opened:

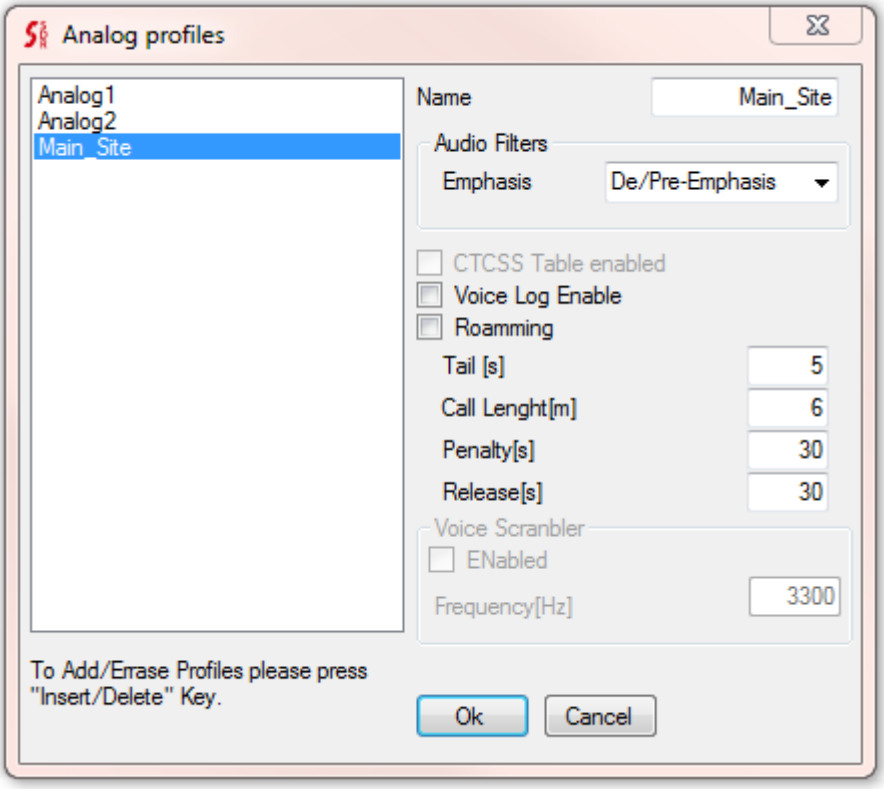


Figure 53: Analog Profile TAB

4.6.1.1. Adding a new Analog Profile

To add a new Analog Profile, get focus on Analog Profiles list then press Insert Key on your keyboard.

A new profile with default parameters will be created.

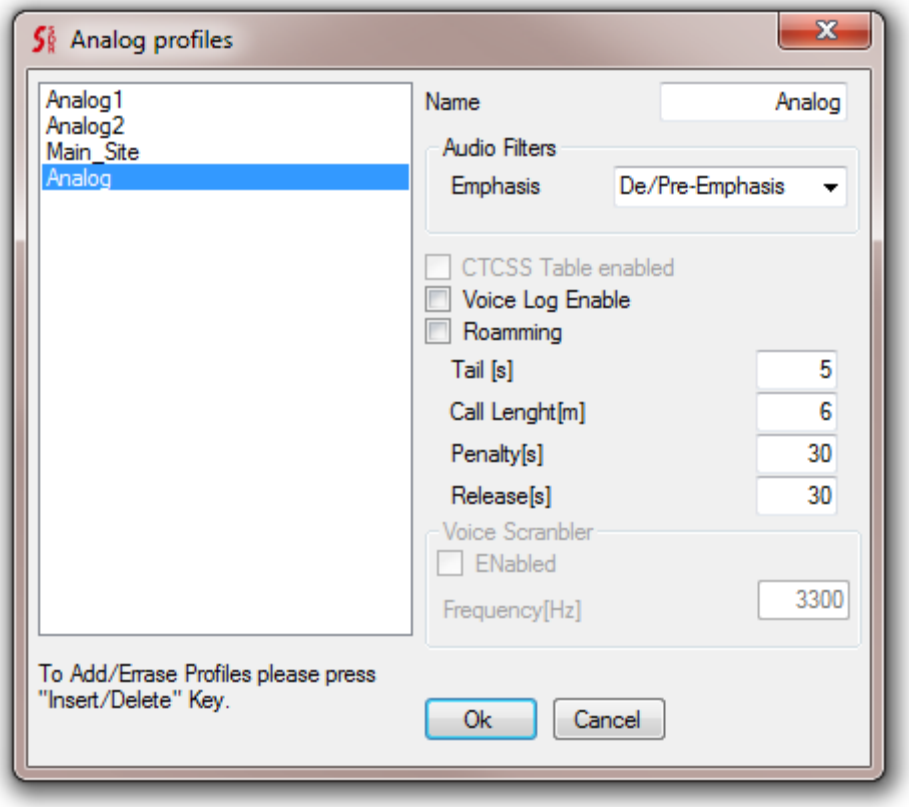


Figure 54: Default Analog Profile

4.6.1.2. Edit Analog Profile Name:

To edit the analog Profile name, focus your mouse pointer over the Name filed on the Analog Profile TAB, then edit current name as per your desires. Space character is invalid.

Figure 55: Changing the Analog Profile Name

Once you click on any other screen area, the new Profile Name is updated.

Press OK to save the changes.

4.6.1.3. Selecting the type of audio filters

Analog signals on SDR repeaters can be fltered on four modes. The standard one is the de/pre-emphasized, but you also can select other modes for some special application.

Press on the Audio Filters side arrow to slide down the menu.

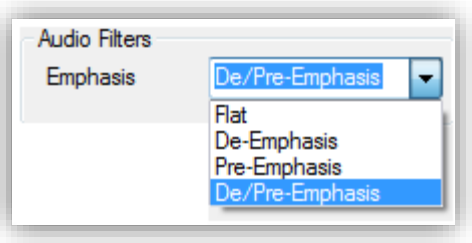


Figure 56: Audio Filters selection for analog profiles

Flat: No filtering for RX or TX. The modulation audio is just the discriminator signal (flat) from the receiver. This mode cannot be used when the repeater integrates a network environment because the audio exchanged to the IP or monitor should be emphasized.

De-Emphasis: Received signals are de-emphasized then modulated in flat format.

Pre-Emphasized: Received signal is left flat and the TX modulation on emphasized.

De/Pre-emphasized: Received signals are de-emphasized processed on this condition then emphasized again for transmit. This mode is the standard one.

To store this option, click on any part of the tab. To save the value, press [Ok] or Cancel if you want to discard the changes.

4.6.1.4. CTCSS table enabled

If you want to use a pre-loaded CTCSS table, overriding any CTCSS defined on the frequency chart, check this box.

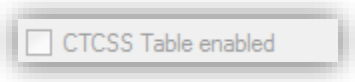


Figure 57: Enable CTCSS table on Analog Profile

To store this option, click on any part of the tab. To save the value, press [Ok] or Cancel if you want to discard the changes.

4.6.1.5. Enable the Voice Log Service on Analog Profiles

ST-9116 repeater can log any voice conversation. If you want to activate this service for a particular analog profile, please check this box.

Voice is stored on the SD memory attached to the unit.

Old files are deleted automatically if the memory is full.

If no memory, the service is deactivated automatically.

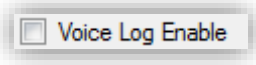


Figure 58: Voice Log Enabled for Analog Profiles

To store this option, click on any part of the tab. To save the value, press [Ok] or Cancel if you want to discard the changes.

4.6.1.6. Enable the Roaming Service on Analog Profiles

If you want to integrate a network, using this channel as a site of your wide area coverage, then you must check this box. Once this box is checked, audio from this repeater is processed and shared through IP between any other site on the network.

Figure 59: Roaming Service Activation for Analog Profiles

To store this option, click on any part of the tab. To save the value, press [Ok] or Cancel if you want to discard the changes.

4.6.1.7. Setup the repeater tail

Fill this field with the length desired for repeater tail. 0 second means no tail. Max value is 255 seconds.

Figure 60: Repeater tail setup

To store the value, click on any part of the tab. To save the value, press [Ok] or Cancel if you want to discard the changes.

4.6.1.8. Enable the Roaming Service on Analog Profiles

If you want set a limit of minutes for a call length, then fill this field. 0 minute means no limit. Absolute Max call length is 255 minutes.

Figure 61: Repeater MAX Call Length

To store the value, click on any part of the tab. To save the value, press [Ok] or Cancel if you want to discard the changes.

4.6.1.9. Repeater Penalty setup

If call length limit is reached, the repeater may apply a penalty for the CTCSS tone (group) who has reached the limit.

For example, if a particular group, who uses one of the tones defined on the CTCSS table, reaches the max length accepted for this profile, that tone remains inactive by the amount of seconds defined on this step.

Max penalty length is 255 seconds.

0 seconds of penalty means no penalty, so the group can setup a new call immediately.

Figure 62: Penalty for traffic control on Analog Profiles

To store the value, click on any part of the tab. To save the value, press [Ok] or Cancel if you want to discard the changes.

4.6.1.10. Release time for time-out timer reset

If call length limit is active (Call Length timer not equal to 0), the repeater may apply a penalty for the CTCSS tone who reached the limit.

This parameter specifies the time without any activity of that group to reset the time out timer, which controls the max call length.

To setup this value, please fill the field.

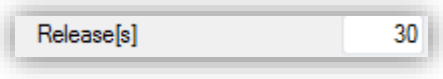


Figure 63: Release time for Traffic Control on Analog Profiles

Max Release time length is 255 seconds.

0 seconds of release means instant reset of the call length timer.

To store the value, click on any part of the tab. To save the value, press [Ok] or Cancel if you want to discard the changes.

4.6.1.11. Voice inversion encryption setup

ST-9116 supports voice inversion encryption for analog profiles. If you want to enable it, please check the [Enabled] box then input the right voice inversion sub-carrier for this profile.

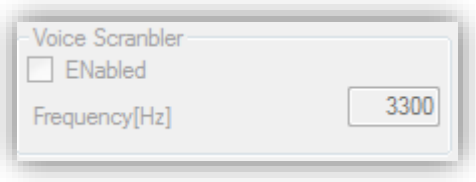


Figure 64: Voice Inversion encryption configuration

To store the value, click on any part of the tab. To save the value, press [Ok] or Cancel if you want to discard the changes.

4.6.2. Digital Profiles:

All common characteristic of any digital profile related to any of the channels in the repeater, must be programed on this step, and then associated to the right frequencies on the chart.

To access to the Digital profile menu, proceed pressing on [Menu] then [Profiles], then [Digital]

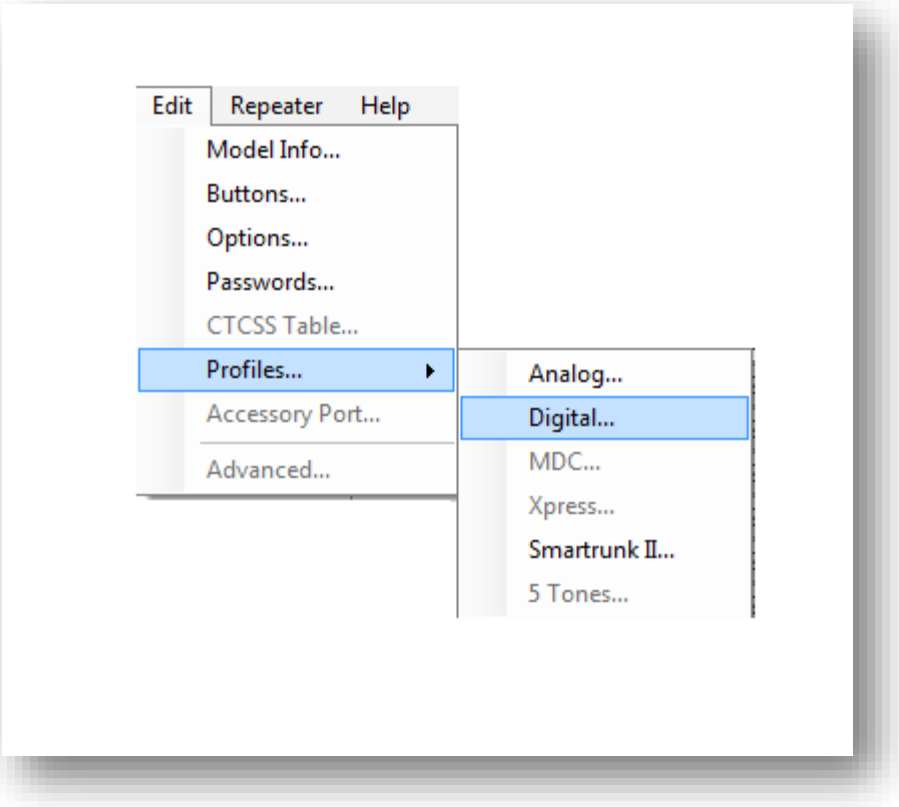


Figure 65: Accessing to the Analog Profile tab

Once you press on [Digital], the Digital Profile menu will be opened:

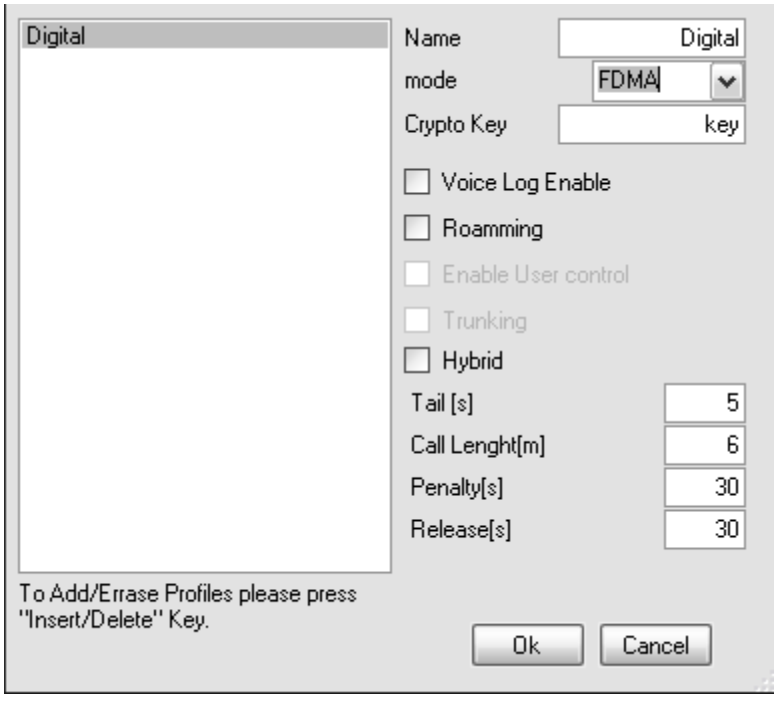


Figure 66: Digital Profile TAB

4.6.2.1. Adding a new Digital Profile

To add a new Analog Profile, get focus on Digital Profiles area then press Insert Key on your keyboard.

A new profile with default parameters will be created.

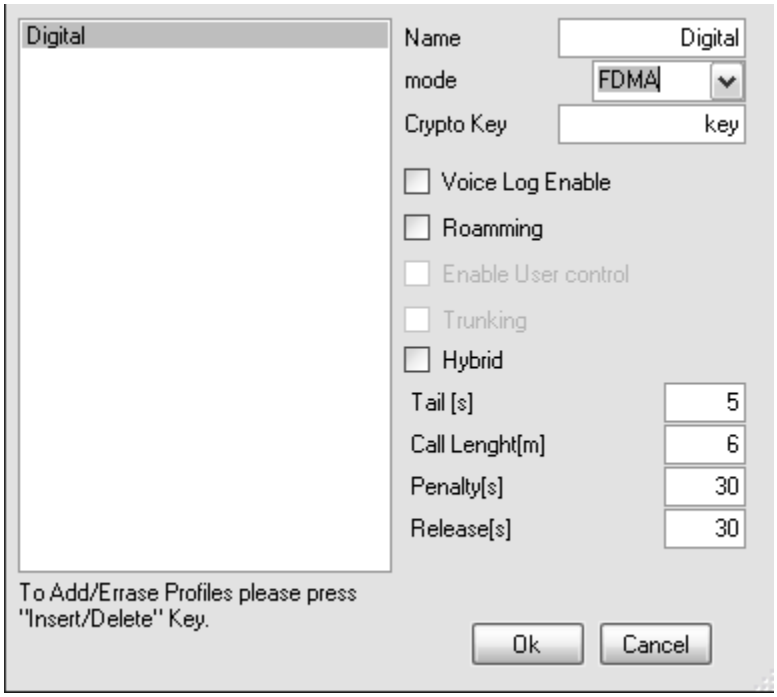


Figure 67: Default Digital Profile

4.6.2.2. Edit Digital Profile Name:

To edit the digital Profile name, focus your mouse pointer over the Name filed on the Digital Profile TAB, then edit current name as per your desire. Space character is invalid.

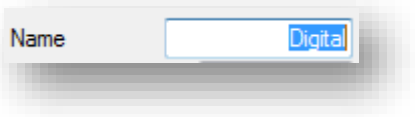


Figure 68: Changing the Digital Profile Name

Once you click on any other screen area, the new Profile Name is updated.

Press OK to save the changes.

4.6.2.3. Selecting the type of Digital Modulation

Digital Emissions on SDR repeaters can be used on three different modes. FDMA (Frequency Domain Multiple Access), TDMA (Time Domain Multiple Access) or Simplex mode (Transmit and receive on the same frequency.

Press on the Digital Mode arrow to slide down the menu.

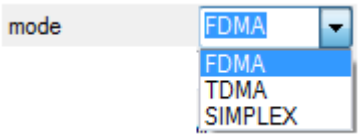


Figure 69: Digital Mode selection for Digital profile

FDMA: Transmits a single continuous 4FSK carrier @ 4800bps using ultra narrow band (6.25 Khz Bandwidth)

TDMA: Transmits two slots over a continuous carrier of 9600 bps using a narrowband channel (12.5Khz Bandwidth)

SIMPLEX: Similar to TDMA but the carrier is not continuous. Repeater receives on slot 0 and transmits the same information on slot 1, using the same frequency for TX and RX Simplex mode.

To store this option, click on any part of the tab. To save the value, press [Ok] or [Cancel] if you want to discard the changes.

4.6.2.4. Crypto Key definition

SDR protocol improves a high security encryption for voice and data. The encryption is encoded and decoded using a 128bits mask, which must be defined on this tab.

Figure 70: Crypto Key for Digital Profile

To simplify the key management, you must type any string up to 16 characters length. This key is case sensitive:

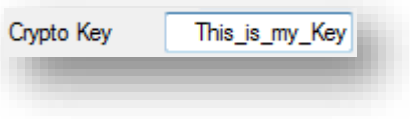


Figure 71: Sample of Crypto Key for digital profiles

To store this option, click on any part of the tab. To save the value, press [Ok] or Cancel if you want to discard the changes.

4.6.2.5. Enable the Voice Log Service on Digital Profiles

ST-9116 repeater can log any voice conversation. If you want to activate this service for a particular analog profile, please check this box.

Voice is stored on the SD memory attached to the unit.

Old files are deleted automatically if the memory is full.

If no memory, the service is deactivated automatically.

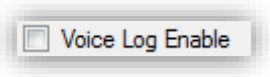


Figure 72: Voice Log Enabled for Digital Profiles

To store this option, click on any part of the tab. To save the value, press [Ok] or Cancel if you want to discard the changes.

4.6.2.6. Enable the Roaming Service on Digital Profiles

If you want to integrate a network, using this channel as a site of your wide area coverage, then you must check this box. Once this box is checked, audio form, this repeater is processed and shared through IP between any other site on the network.

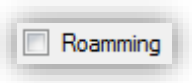


Figure 73: Roaming Service Activation for Digital Profiles

To store this option, click on any part of the tab. To save the value, press [Ok] or Cancel if you want to discard the changes.

4.6.2.7. Hybrid Mode

SDR protocol supports analog and digital modulations on the same channel. Check this box if you want to allow the repeater to support analog and digital radios over the same channel.

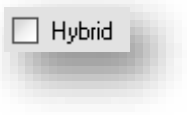


Figure 74: Hybrid mode activation

To store this option, click on any part of the tab. To save the value, press [Ok] or Cancel if you want to discard the changes.

4.6.2.8. Setup the repeater tail

Fill this field with the desired repeater tail length. 0 second means no tail. Max value is 255 seconds.

Figure 75: Repeater tail setup for Digital Profiles

To store the value, click on any part of the tab. To save the value, press [Ok] or Cancel if you want to discard the changes.

4.6.2.9. Enable the Call Length control on Digital Profiles

If you want Set a limit of minutes for a call length, then fill this field. 0 minute means no limit. Absolute Max call length is 255 minutes.

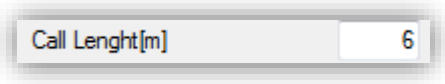


Figure 76: Repeater MAX Call Length on Digital Profiles

To store the value, click on any part of the tab. To save the value, press [Ok] or Cancel if you want to discard the changes.

4.6.2.10. Repeater Penalty setup on Digital Profiles

If Call length limit is reached, the repeater may apply a penalty for the digital ID who reached the limit.

For example, if a particular group, who uses the channel, reaches the max length accepted for this profile, that group remains inactive by the amount of seconds defined on this step.

Max penalty length is 255 seconds.

0 seconds of penalty means no penalty, so the group can setup a new call immediately.

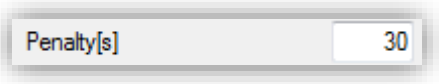


Figure 77: Penalty for traffic control on Analog Profiles

To store the value, click on any part of the tab. To save the value, press [Ok] or Cancel if you want to discard the changes.

4.6.2.11. Release time for time-out timer reset for Digital Profiles

If Call length limit is active (Call Length timer not equal to 0), the repeater may apply a penalty for the group who has reached the limit.

This parameter specify the time without any activity of that group to reset the time out timer who controls the max call length.

To setup this value, please fill the field.

Figure 78: Release time for Traffic Control on Digital Profiles

Max Release time length is 255 seconds.

0 seconds of release means instant reset of the call length timer.

To store the value, click on any part of the tab. To save the value, press [Ok] or Cancel if you want to discard the changes.

5. Adding a channel to a memory channel

To add a new channel to the repeater, please click on the first empty tag name under the last channel tag into the list

N	TAG	RX	TX	RX Sub.	TX Sub.	Profile
1	FDMA	461.10000	465.10000	123.0	123.0	Digital
2	TDMA	461.10000	465.10000	123.0	123.0	Digital
3	SIMPLEX	461.10000	461.10000	123.0	123.0	Digital
4	CONVENTIONAL	461.10000	465.10000	123.0	123.0	Analog1

Figure 79: adding a new channel tag

Type there the tag name to be assigned to the new channel, for example TEST, then click on the RX frequency field for the new channel recently created.

The programming software will complete the frequencies and signaling as per default, so please overwrite it with you desired settings.

5.1. Updating the RX frequency of a channel:

Just click with your mouse on it and type the new frequency value. If the input is wrong, then the RX frequency field will be highlighted on red.

5.2. Updating the TX frequency of a channel

Just click with your mouse on it and type the new frequency value. If the input is wrong, then the TX frequency field will be highlighted on red.

5.3. Changing the RX sub audio signaling of a channel

Just click on the side arrow of the desired value to adjust. A complete list of options will be opened.

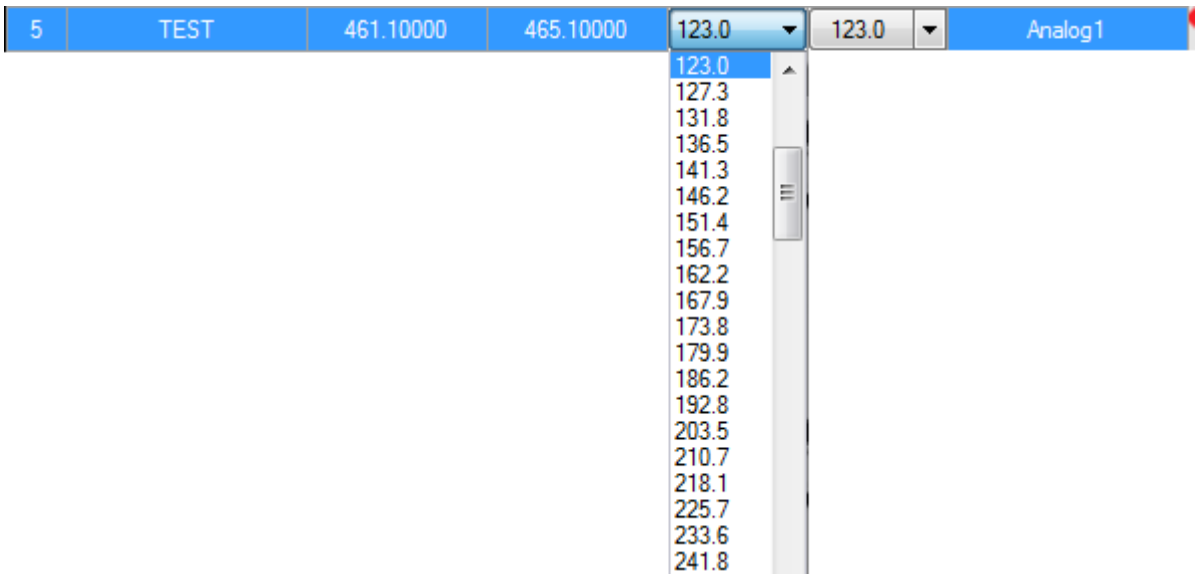


Figure 80: Selecting a new RX sub audible signaling

Click on the desired value to select it.

5.4. Changing the TX sub audio signaling of a channel

Just proceed as in the previous item but in TX signaling column.

5.5. Advanced channel configuration

After the basic channel information has been loaded, you must double click on the channel number to access to the advanced features programming screen.

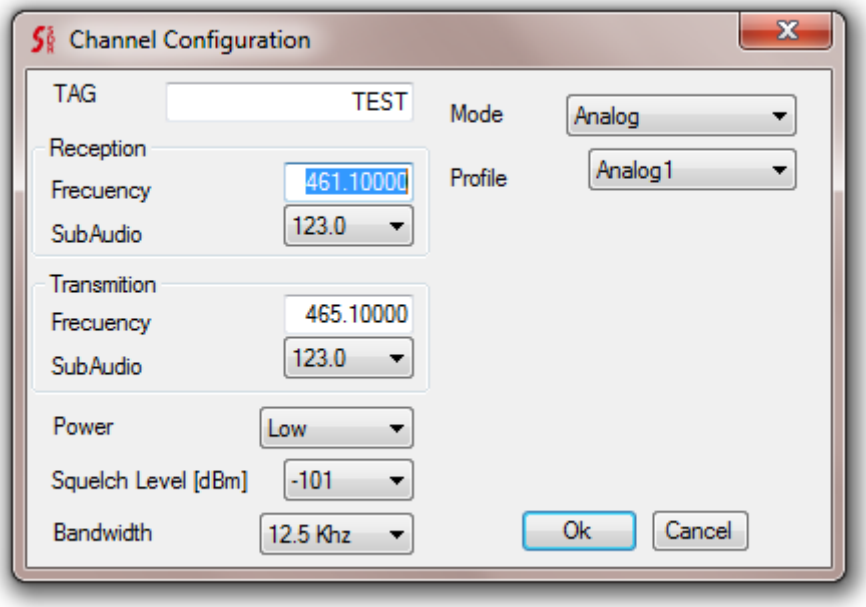


Figure 81: advanced channel configuration screen

5.5.1. Advanced configuration general tag

This tag shows mostly the same information than the main dashboards.

5.5.1.1. Channel Tag

Shows the name of the channel. You can edit it just typing on the field.

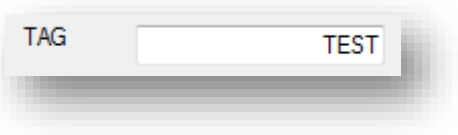


Figure 82: Channel tag

Once selected the right parameter, press [Ok] to save it or [Cancel] to exit.

5.5.1.2. RX frequency:

Shows the RX frequency for this channel. You can edit it by direct typing over the field.

Figure 83: Channel RX information

Once selected the right parameter, press [Ok] to save it or [Cancel] to exit.

5.5.1.3. RX sub Audio Signaling:

Shows the CTCSS or DCS information for the current channel.

Click on the side arrow then select a different one if you want to change it.

Once selected the right parameter, press [Ok], press over to save it or [Cancel] to exit.

5.5.1.4. TX frequency:

Shows the TX frequency for this channel. You can edit it by direct typing over the field.

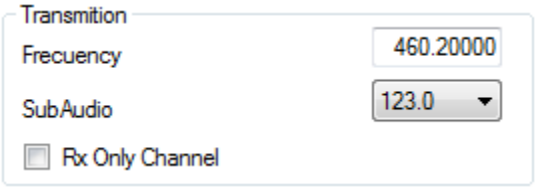


Figure 84: Channel TX information

Once selected the right parameter, press [Ok] to save it or [Cancel] to exit.

5.5.1.5. TX sub Audio Signaling:

Shows the CTCSS or DCS information for the current channel.

Click on the side arrow then select a different one if you want to change it.

Once selected the right parameter, press [Ok] to save it or [Cancel] to exit.

5.5.1.6. Channel Power selection

Shows the current power level assigned to the channel.

To change it, press on the side arrow then choose your desired level.

Figure 85: Channel Power selection

Once selected the right parameter, press [Ok] to save it or [Cancel] to exit.

5.5.1.7. Squelch Sensitivity

Shows the current squelch level for current channel. It means the absolute threshold level to consider if a carrier is present on the receiver.

Press on the side arrow to select a new value from a drop down list if you want to change it.

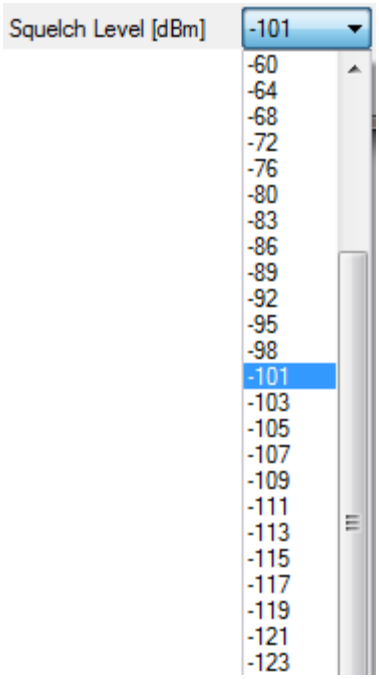


Figure 86: Squelch sensitivity

To select a value, scroll the list then click on the desired threshold level.

Once selected the right parameter, press [Ok] to save it or [Cancel] to exit.

5.5.1.8. Channel bandwidth

In analog mode, the channel bandwidth can be selected as per used desire.

Figure 87: Channel Bandwidth Selection

Press on the side arrow to change it if you want. Possible values: 12.5 KHz.

Once selected the right parameter, press [Ok] to save it or [Cancel] to exit.

5.5.1.9. Channel mode selection

This option lets you assign existing signaling profile and modulation type for the current channel.

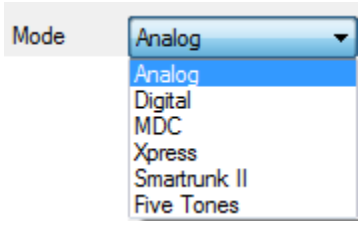


Figure 88: Channel mode selection

Once selected the right parameter, press [Ok] to save it or [Cancel] to exit.

5.5.1.10. Channel Profile Selection:

The right profile, previously defined on 4.6.1 or 4.6.2., must be attached to the current channel by pressing the side arrow on the Profile Field.

A list the pre-defined profiles will be listed.

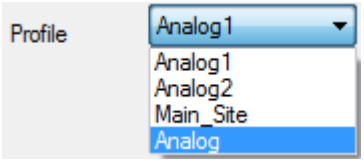


Figure 89: type of modulation

Click over the right one to select it.

Once selected the right parameter, press [Ok] to save it or [Cancel] to exit.

6. Reading the Repeater programming from the device

All the information already downloaded to your radio can be retrieved anytime.

In case that information has been protected by password, you must know such critical information to start the reading process.

To read the radio file from the repeater, you must connect the radio to the USB port on your computer or by IP, as previously defined on the Programming Software configuration (see 2.2.1), then you can use the shortcut in the quick access bar  or you go through [Repeater] then click on Read Repeater. F2 key on your computer keyboard can be used as a shortcut also.

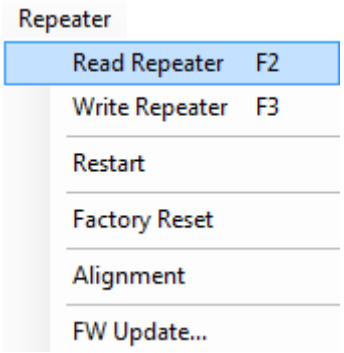


Figure 90: Accessing to read the repeater

Once you press on [Read Repeater], the information stored in the device will be loaded to your programming software automatically.

When you download a Repeater file from the Repeater, previous information into your programming software will be overwritten. Please ensure you have already saved that information before proceed to download from the repeater

Note: 12- Downloading the repeater fill will overwrite existing information in Programming Software

As soon as the process starts, a progress bar will show you the process evolution.

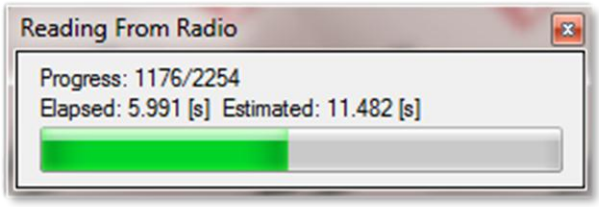


Figure 91: Repeater read progress bar

As soon as the reading process ends, a confirmation screen will show you the end of the reading process.

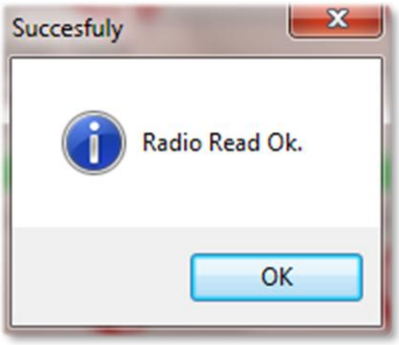


Figure 92: read repeater confirmation screen

After you got all the information, you can modify it the save or upload again to the radio.

It is very convenient to backup all sensitive information from a repeater into computer files so you can immediately clone the repeater in any event.

Note: 13 - Save repeater information on computer files

In case the model selected on the program file, according to 4.1, does not matches the repeater that you are trying to read, the process cannot progress and you must choose the right model before attempting again.

Figure 93: Model error reported when attempting to read a wrong repeater model

7. Writing a radio file

Once you get a program into your programming software ready to upload to a repeater, you must connect the device to the USB port on your computer or remotely through a TCP/IP network, then you can use the shortcut in the quick access bar  or you go through [Repeater] then click on [Write Repeater]. F3 key on your computer keyboard can be used as a shortcut also.

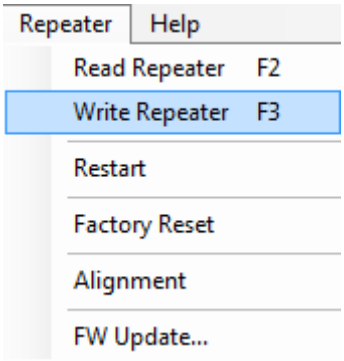


Figure 94: Accessing to write the repeater

Once you press on [Write Repeater], the information stored in the programming software will be uploaded to your repeater automatically.

As soon as the process starts, a progress bar will let you know the process ongoing.

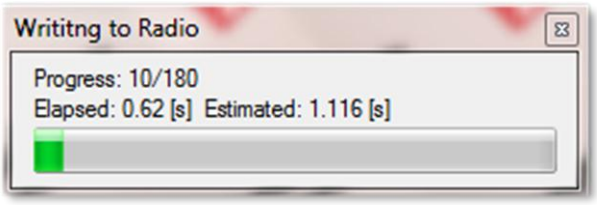


Figure 95: Writing to the repeater progress bar

As soon as the process ends, a pop up screen will notify the success process.

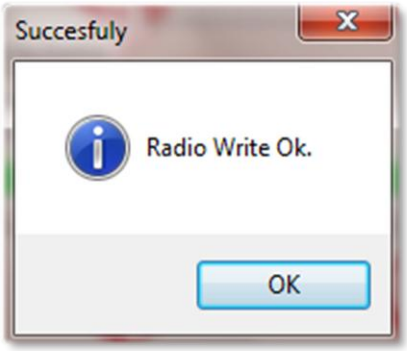


Figure 96: Repeater write confirmation screen

Repeater will do a power cycle to load the new parameters after a read or write process.

Attempting to upload to a radio will fail if the information generated with the programming software is not for such radio model.

Note: 14- Model mismatch reports uploading error.

8. Repeater Alignment

Refer to Service manual for alignment procedure.

9. Repeater factory Reset

In case the repeater has been realigned by somebody who does not understand the procedure correctly or any other problem, which may affect to the repeater performance, you can reset as per initial factory settings.

This process will erase all the information on your repeater, which cannot be recovered except from backup on computer files.

To proceed to reset the repeater as per factory default, please click on [Repeater] then [Factory Reset]

Figure 97: Accessing to restore factory default settings

As soon as you click on [Factory Reset], a warning message will alert you about the process ready to go. If you are not sure, please press [Cancel]. If you agree, please press [Yes] to continue.

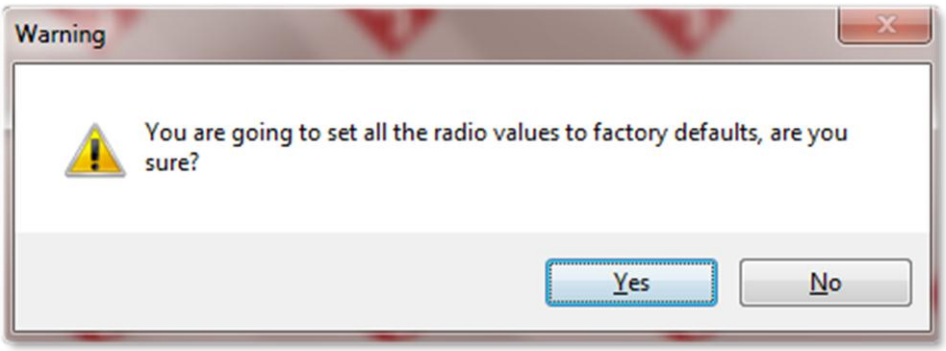


Figure 98: warning message before restoring factory default

As soon as you press [Yes], the process starts. It demands only two seconds, and then the confirmation message is displayed:

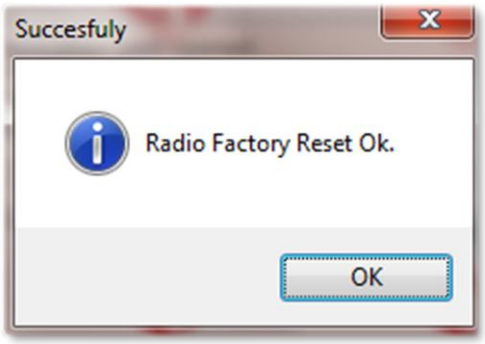


Figure 99: Factory default settings confirmation

As soon as this process ends, the radio will do a power cycle to load the new parameters.

10. Repeater Firmware Update:

Smartrunk will continue working into the new features and services development for our repeaters so frequently you will find firmware updates into our web site.

To download a new firmware to you repeater, once you have downloaded it into your computer, please clock on [Repeater] then [FW Update]

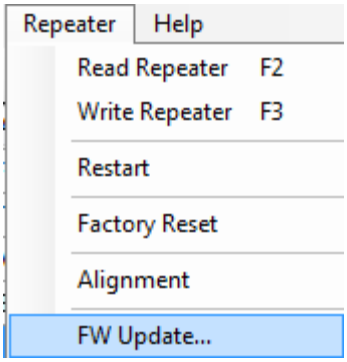


Figure 100: Accessing to Repeater firmware update screen

A soon as you click on [FW Update] a new screen will pop up.

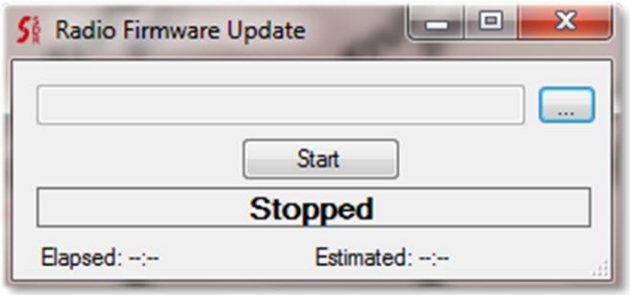


Figure 101: Repeater FW Update application screen

To find the new firmware to be downloaded to the repeater press ... to proceed to open the Windows Explorer to look for the new file previously downloaded to your computer.

Surf in your computer to select the desired file then connect you repeater to your computer USB port or through a TCP/IP network connection and then press [Start] to initiate the firmware update process.

Uploading a wrong firmware to your repeater may cause a permanent damage to the circuitry. Please verify several times that you are ready to upload a firmware version corresponding to your radio model.

Note: 15 - Wrong model firmware upload warning

A progress bar will show you the process progress.

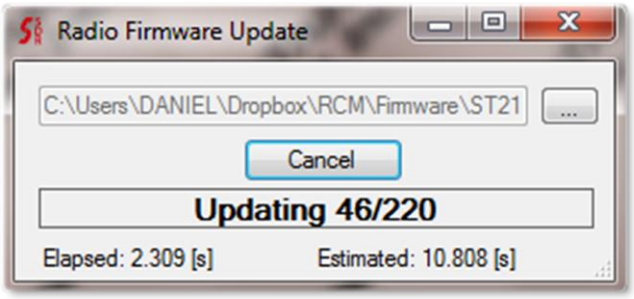


Figure 102: Firmware update progress screen

As soon as it finishes, the repeater will do a power cycle automatically to load the new firmware.

11. Exit from Programming software

To exit from the programming software please proceed through [File] then [Exit]

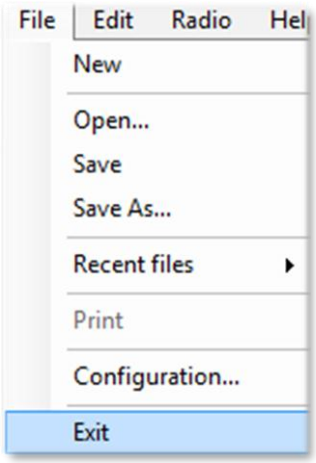


Figure 103: Exit from SDR programming software

Before exit, verify if the current data has been saved. Any change will be lost.

Note: 16 - lost data on exit warning note

12. Manual software update

You can check for new updates by clicking on [Help] then [Software Update]

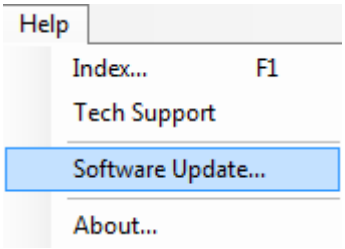


Figure 104: Manually checking firmware update

The software will look for the latest release in our web site. If your software is up to date, then a confirmation screen will pop up.

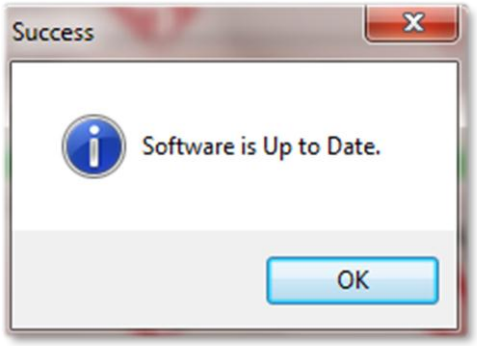


Figure 105: Software up to date confirmation screen

If no, the new software will be downloaded automatically.

Proceed to install the new software as descripted on 1.1

13. List of Figures

FCC Notices

FEDERAL COMMUNICATIONS COMMISSION INTERFERENCE STATEMENT

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

-Reorient or relocate the receiving antenna.

-Increase the separation between the equipment and receiver.

-Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.

-Consult the dealer or an experienced radio/ TV technician for help.

CAUTION:

Any changes or modifications not expressly approved by the grantee of this device could void the user's authority to operate the equipment

Use only shielded cables to connect I/O device to this equipment. You are cautioned that changes or modifications not expressly approved by the party responsible for compliance could void your authority to operate the equipment.

RF exposure warning ·

This equipment must be installed and operated in accordance with provided instructions and the antenna(s) used for this transmitter must be installed to provide a separation distance of at least 105 cm from all persons and must not be co-located or operating in conjunction with any other antenna or transmitter. End-users and installers must be provide with antenna installation instructions and transmitter operating conditions for satisfying RF exposure compliance.