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SESAM 800 RXM

LOGIC TOOL

Manual

955699-000 EN A5

Table of Contents

1 Introduction

The RXM Logic Tool provides an easy way to configure customized settings in the Sesam 800 RXM Configurable receiver. This manual describes what the tool can do, how to use it and what hardware and software that is needed.

The Sesam system is not a complete remote control system; it provides only the set of outputs that are driven according to the actions performed by the operator of the transmitter. The way the set of outputs is used for controlling the object depends on the specific installation and is outside the scope of the Sesam.

The complete remote control system, where the controlled object is one part, has to be tested and approved according to the standards/norms that are applicable and specific to the controlled object, it is not the responsibility of Åkerströms Björbo AB. No liability for the controlled object or the controlled objects actions will be accepted by Åkerströms Björbo.

2 Scope

This manual does not cover the complete installation of the Sesam radio remote system.

Installation and operating manual for the Sesam 800 RXM PLC must be used for a complete set up of the system to ensure secure, safe operation.

⚠ = This symbol highlights extremely important information.

! = This symbol highlights extra information.

3 Sesam 800 RXM Logic Tool

The RXM Logic Tool is a dialog based software for Windows PC platforms.

The programmable logic tool can be used with or without actual Sesam 800 hardware. Complete simulation of the programming can be done using the tool only.

The following items are needed to perform a custom setting using the RXM Logic Tool:

- Sesam 800 RXM PLC receiver
- Windows PC with USB interface (Windows XP/Windows 7/Windows 8/Windows 10)
- Microsoft .NET Framework 3.5
- Sesam 800 RXM USB to serial adapter; USB-to-Sesam cable
- PC Software Sesam 800 RXM Logic Tool
- Sesam 800 RXM Logic Tool manual (this document)
- Screwdriver, Torx T20

The program requires Microsoft .NET Framework 3.5. If the framework is not previously installed the user will be prompted to download and install it.

4   Installation of the Sesam RXM Logic Tool software

Insert the USB memory stick with PC Software Sesam 800 RXM Logic Tool to the PC.

Double-click on the setup.exe file and follow the instructions during the installation.

A shortcut to the program is created on the desktop; the program can also be reached via Akerstroms in the program menu.
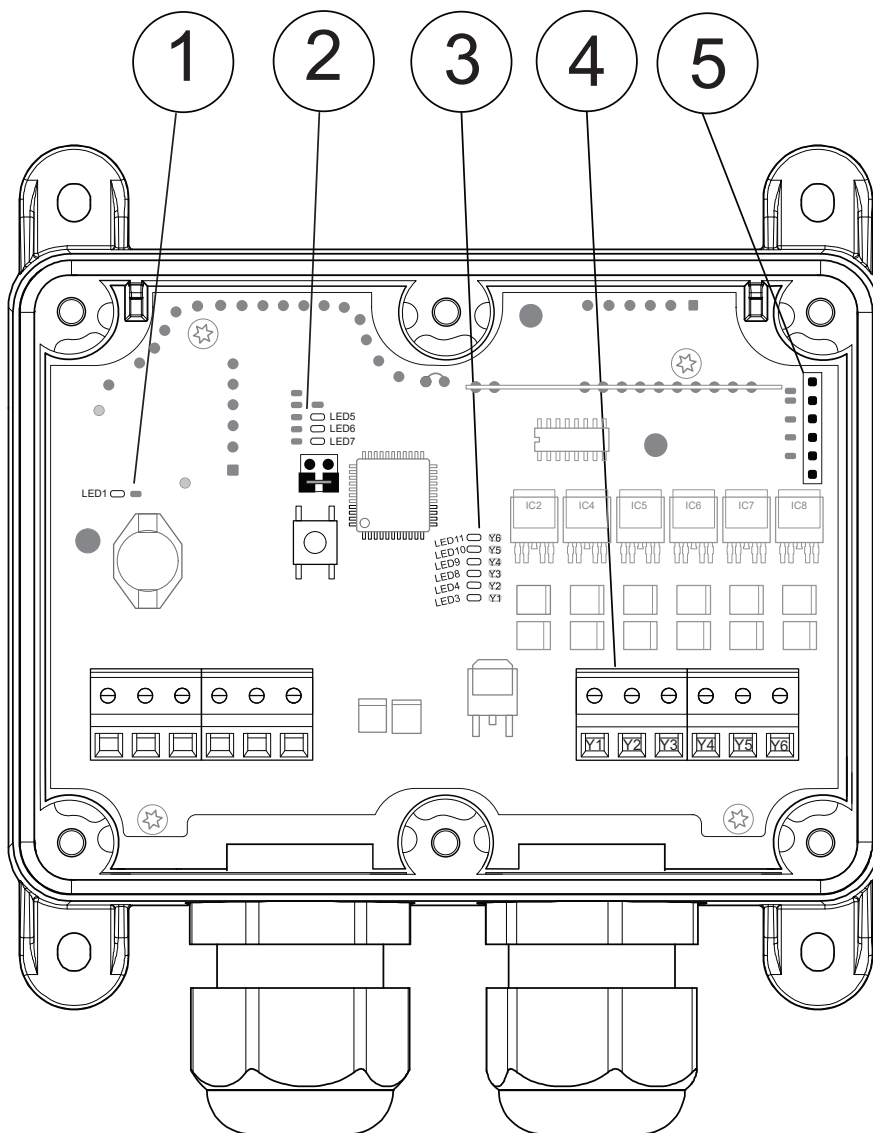

Figure 1.   Sesam 800 RXM PLC Receiver indicators and connections

1. Power LED
2. LED 5, 6 and 7
3. LED indicators for the outputs
4. Output Y1, Y2, Y3, Y4, Y5 and Y6
5. 6 pin board connector

4.1 Connecting Sesam 800 RXM PLC to the PC

1. Disconnect all power to the Sesam 800 RXM PLC Receiver. The Sesam 800 RXM PLC Receiver will be powered by the USB port.

2. Open the Sesam 800 RXM PLC Receiver by unscrewing the 6 screws in the cover using a screwdriver, Torx T20.

3. If any expansion or digital input cards is mounted, it must be removed (optional).

4. Connect the USB-to-Sesam cable to the 6 pin board connector inside the Sesam 800 RXM PLC Receiver, see ⑤ in Figure 1.

5. Make sure that the bent connector on the USB-to-Sesam cable is facing inwards and that the connector is attached over the 6-pin debug connector in the right way. Pin 1 to Pin 6 should by covered by the connector, Figure 2.
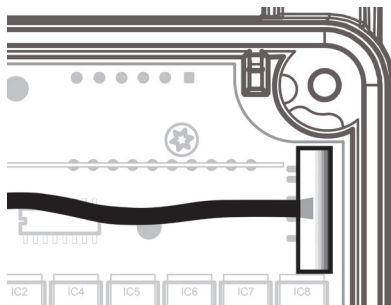

Figure 2.   USB-to-Sesam cable mounted inwards.

6. Connect the USB-to-Sesam cable to a free USB port on the PC.

   If it is the first time the PC is connected to this kind of device the PC will start to install the driver for this new hardware. After the driver installation is completed a new COM port is added to the PC.

7. When correctly connected the Power LED will turn green, ① in Figure 1.

Optional:
Below is a description to find out which number the system has assigned the new COM port. This is optional since the application itself can find the correct COM port and connect to the RXM PLC receiver.

To find out what number the operating system has assigned the new COM port, right click the "My Computer" icon on the desktop and select "Manage". Select "Device manager" from the tree view on the left. Expand the serial port tree view and check for the new COM ports added. By disconnecting the USB-to-Sesam cable from the PC the actual COM port will disappear. By reconnecting the USB-to-Sesam cable the actual port will be displayed again.

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5 Launching the tool

Start the tool by double-click the Sesam 800 RXM Logic Tool icon on your PC desktop or the program shortcut in the program menu.

The picture below shows the main window where each sub-part is numbered and marked in orange frames. Each sub-part is described in the following sections corresponding to their numbers.
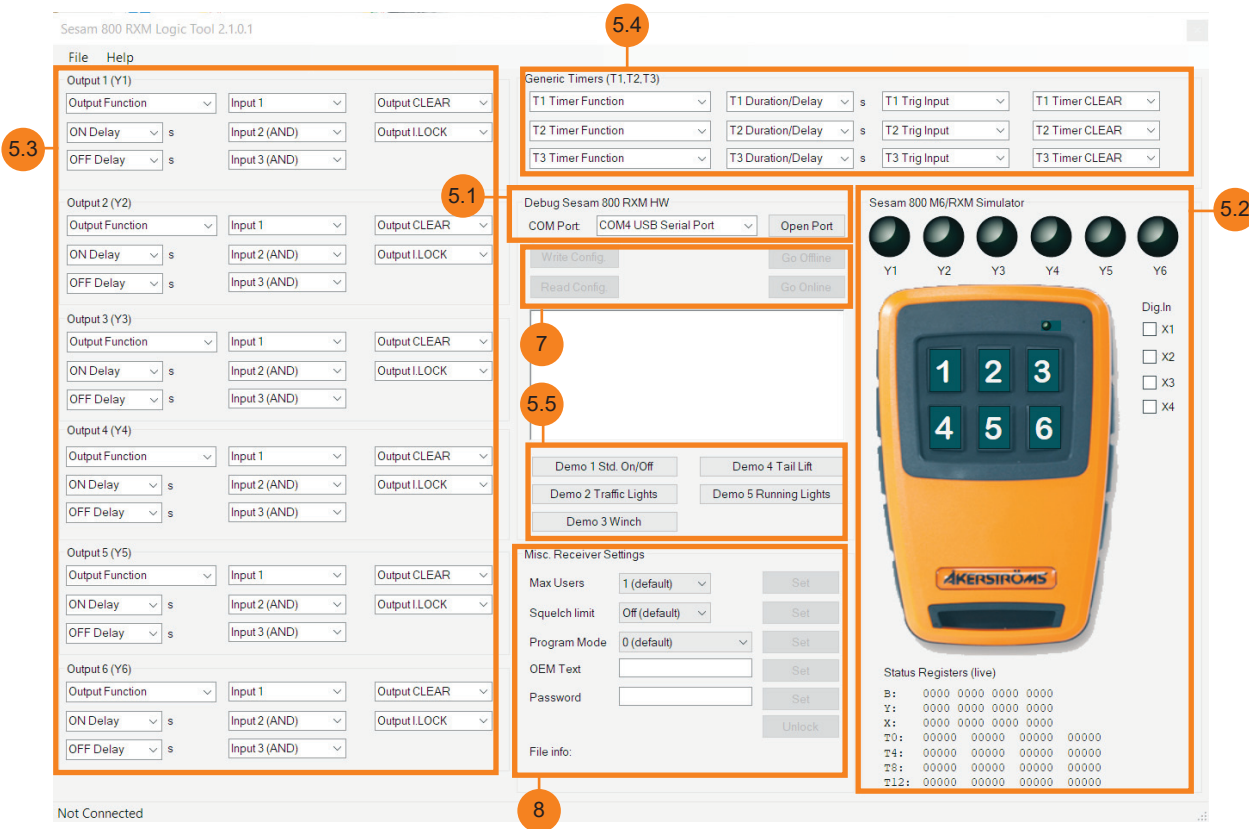
Figure 3.   Sesam 800 RXM Logic Tool program mail window

5.1 Connection / Installing COM port

Connect the USB-to-Sesam cable to your computer.

The tool will automatically detect what COM ports are present in the computer's operating system and add them to the list. Choose the COM port from the scroll bar that corresponds to your USB-to-Sesam cable connected to the receiver.

Connect to the Sesam 800 RXM PLC Receiver by selecting the serial port connected to the board from the COM Port drop down list on screen.

Press the button marked Open port.

COM port	Selects which COM port to be used for communication with the receiver
Open port	Connects to the chosen COM port
Close port	Closes the COM port

5.2   Sesam 800 M6/RXM Simulator

The programmable logic tool can be used with or without actual Sesam 800 RXM PLC Receiver or Sesam transmitter.

Complete simulation of the set output conditions can be done using the tool only. It is possible to simulate the current logic configuration directly on screen by the transmitter simulator.

The button functions B1-B6 can be simulated by pressing the corresponding Sesam 800 M6 button on the transmitter image on the screen, Figure 4.

Press the left mouse button to momentarily press a Sesam button.

Press the right mouse button to hold a Sesam button in a pressed state. *This is useful when simulating pressing more than one Sesam button at once.*

A pressed and locked button is indicated by a red button label. Right click on the button again to toggle the button state back to off.

The status of Outputs 1-6 (Y1-Y6) are shown by the simulated LED's above the transmitter image on the screen. When a LED is green the corresponding Output is active.

The status registers of the current simulation are shown in real-time.

Button B1 is pressed and locked and Output Y1 is active.

Figure 4.   Transmitter simulator

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5.3 Output Programming

The logical programming in this tool is output oriented.

There are 6 programmable outputs on the Sesam 800 RXM PLC receiver. The outputs are called Y1, Y2, Y3, Y4, Y5, Y6 corresponding to the numbering of the outputs, Figure 1.
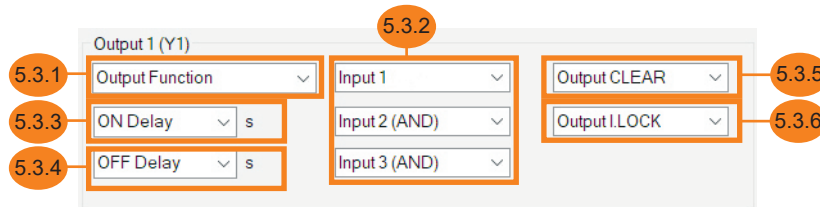

Figure 5.   Output program window box

! The programming can be done either online connected to the Sesam 800 RXM PLC Receiver or fully simulated in the PC-tool.

The total load on Outputs 1- 6 combined must not exceed 4A.
Caution must be used when programming an application that the total current never will exceed this limit.

5.3.1 Output functions

The following output logic parameters can be set individually for each output.
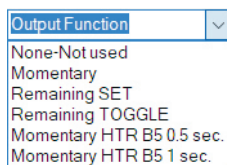
Figure 6.   Output functions

The operating modes for the outputs are:

None-Not used

Select this option when this output is not to be used.

Momentary

The output is only active while the input conditions are met.

Example: If selected button is held down the function is activated.

Remaining SET

The output is set to active when the input conditions are met. The output must be turned off with an output Clear condition.

Example: One click on selected button activates the function, no need to hold button down.

Remaining TOGGLE

The output toggles once between On (active) and Off (inactive) when the input conditions are met. The output can also be turned off with an Output Clear condition.

Example: One click on selected button activate function and next click on the same button deactivate function.

Momentary HTR B5 0.5s

This is a special Hold-To-Run function for applications when two buttons need to be pressed in a sequence within 0.5 second to activate the output. The HTR button is always button 5 and should always be configured with 1 secondary button B1...B6.

Momentary HTR B5 1s

This is a special Hold-To-Run function for applications when two buttons need to be pressedin a sequence within 1 second to activate the output. The HTR button is always button 5 and should always be configured with 1 secondary button B1...B6.

Hold-to-Run (HTR) functionality

The Hold-to-Run function can be used when extra safety is needed to activate an output.

When the HTR mode is active, 2 buttons must be pressed in a sequence within a certain time to enable the output. No other buttons are allowed to be pressed during this sequence. The HTR button must always be pressed first.

The output remains active if the 2 buttons are pressed.

The Hold-to-Run functionality is enabled by setting the output in either Momentary HTR B5 0.5s or Momentary HTR B5 1s.

The secondary HTR-button must be specified in the Input 1 option field.

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5.3.2 Input 1, Input 2 (AND), Input 3 (AND)

Each output can have up to 3 input signal conditions. Input 1, Input 2 (AND) and Input 3 (AND), Figure 5. Each drop down list looks the same, Figure 7.

Each input signal conditions can individually have up to 8 conditions.

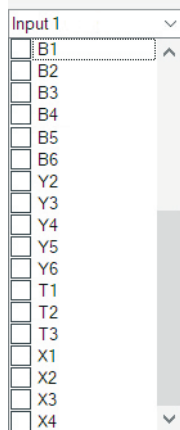! Input 1 must be filled in for every output that will be used.

Figure 7. All available conditions for Input.

B1	Button 1 on Sesam 800 transmitter
B2	Button 2 on Sesam 800 transmitter
B3	Button 3 on Sesam 800 transmitter
B4	Button 4 on Sesam 800 transmitter
B5	Button 5 on Sesam 800 transmitter
B6	Button 6 on Sesam 800 transmitter
Y1	If Output 1 is active
Y2	If Output 2 is active
Y3	If Output 3 is active
Y4	If Output 4 is active
Y5	If Output 5 is active
Y6	If Output 6 is active
T1	Generic timer 1, see chapter 5.4
T2	Generic timer 1, see chapter 5.4
T3	Generic timer 1, see chapter 5.4
X1	External input 1 (optional) / RSSI at or above squelch limit *
X2	External input 2 (optional) / RSSI above squelch limit + 10dBm *
X3	External input 3 (optional) / RSSI above squelch limit + 20dBm *
X4	External input 4 (optional) / RSSI below squelch limit *

* see Selective squelch limit in section 8

! All configured conditions must be met to activate the output function set.

Example Input 1 AND Input 2 program

If Output 1 (Y1) should be turned On with button B1 or button B2 but only if button B3 is also pressed, do the following.

In Output 1 (Y1) Output Function: Check Momentary

In Output 1 (Y1) Input 1: Check signal B1 and B2

In Output 1 (Y1) Input 2 (AND): Check signal B3

5.3.3 On Delay

Each output can have an independent switch-on delay. The time is set in seconds. If all input conditions are true during the time set in this field the output will be activated.

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Example On Delay program

Output 1 (Y1) should activate after pressing button B1 for 2 seconds.

In Output 1 (Y1) Output Function: Check Momentary

In Output 1 (Y1) Input 1: Check signal B1

In Output 1 (Y1) On Delay: Check 2 seconds.

5.3.4 Off Delay

Each output can have an independent switch-off delay. The delay timer will start when NOT all input conditions are true, as when a button no longer is held down. During this Off delay, the output will still be activated.

> ! This works only when the output function is set as Momentary

Example Off Delay program

Output 1 (Y1) should activate for at least 1 second when pressing button 1 regardless if the button is pressed a very short time.

In Output 1 (Y1) Output Function: Check Momentary

In Output 1 (Y1) Input 1: Check signal B1

In Output 1 (Y1) Off Delay: Check 1 second.

5.3.5 Output Clear

Can only be set for output Function – Remaining.

Each remaining output can have a Clear function consisting of up to 8 conditions.

Example Output Clear program

If Output 1 (Y1) should be turned On with button B1 and turned off with button B2, do the following.

In Output 1 (Y1) Output Function: Check Remaining SET

In Output 1 (Y1) Input 1: Check signal B1

In Output 1 (Y1) Output Clear: Check signal B2

5.3.6 Output Interlock (Output I. Lock)

Each output can have an interlock consisting of up to 8 conditions. Interlock prevents outputs from being activated simultaneously.

If the interlock conditions are met the output will be deactivated regardless of any other input condition.

Example Output Interlock program

If Output 1 and Output 2 should not be active at the same time the following should be checked

In Output 1 (Y1) Output Function: Check Momentary

In Output 1 (Y1) Input 1: Check signal B1

In Output 1 (Y1) Output I. Lock: Check signal Y2

In Output 2 (Y2) Output Function: Check Momentary

In Output 2 (Y2) Input 1: Check signal B2

In Output 2 (Y2) Output I. Lock: Check signal Y1

5.4 Timer Programming

Figure 8. Generic Timers (T1, T2, T3)

5.4.1 Generic Timers (T1, T2, T3)

There are 3 Generic system timers: T1, T2 and T3. They can be used for output or input timings/delays. All timers can be used to make advanced timing sequences.

The Generic timers are shared by the outputs.

5.4.2 Timer Function

There are 5 different timer types

PULSE Output, TRIG-P	PULSE Output, TRIG-P (Trig on Positive Edge). The timer will start on the positive (rising) edge of the Trig Input condition. When the timer expires the Tx logical value will be pulsed once (one logic cycle).
HIGH Output, TRIG-P	HIGH Output, TRIG-P (Trig on Positive Edge, HIGH output while timer running). The timer will start on the positive (rising) edge of the Trig Input condition. The Tx logical value will be high (true) until the timer expires.
PULSE Output, TRIG-N	PULSE Output, TRIG-N (Trig on Negative Edge). The timer will start on the negative edge of the Trig Input condition. When the timer expires the Tx logical value will be pulsed once (one logic cycle).
HIGH Output, TRIG-N	HIGH Output, TRIG-N (Trig on Negative Edge, HIGH output while timer running). The timer will start on the negative edge of the Trig Input condition. The Tx logical value will be high (true) until the timer expires.
Square wave output	The timer will run continuously while the Input condition is fulfilled. The output will alternate between 0 and 1 producing a square wave output. A timer setting of 0.1 will produce a 5 Hz output. 0.5 will produce a 1 Hz output. *For example, this timer type can for be used for a flashing warning light.*

5.4.3 Timer Duration/Delay

The timing periods allowed are: 0.1, 0.2, 0.3, 0.4, 0.5, 0.6, 0.7, 0.8, 0.9, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 20, 30, 60, 120, 180, 300, 600, 900, 1800, 3600 seconds

0 = disabled

5.4.4 Timer Trig Input

When any of the input conditions are met the Timer will be started with the defined expiration period.

Each Timer can have a start condition (trigger) consisting of up to 8 conditions.

5.4.5 Timer CLEAR

When a timer is cleared there will be no expiration event. If Timer output is configured as high during running it will immediately be cleared (deactivated).

Each Timer can have a CLEAR function consisting of up to 8 conditions.

Example Timer program

Output 1 (Y1) should momentarily be turned on with button 1. 10 seconds after Y1 has been activated, Output Y2 should automatically be activated for 1 second.

In Output 1 (Y1) Output Function: Check Momentary

In Output 1 (Y1) Input 1: Check signal B1

In Output 2 (Y2) Output Function: Check Momentary

In Output 2 (Y2) Input 1: Check signal T1

In Output 2 (Y2) Off delay: Check 1 second

In T1 Timer Function: Check PULSE Output, TRIG-P (Trig on Positive Edge)

In T1 Duration: Check 10 seconds

In T1 Trig Input: Check B1

5.5 Quick select Demo programs

There are 5 Demo configurations available directly in the simulator.

Click on the selected demo program button and the Sesam 800 RXM Logic Tool sets the configuration by itself. Change demo program just by clicking on another button.

The configuration can be manually changed.

- Demo 1 – Standard On/Off
- Demo 2 – Traffic Lights
- Demo 3 – Winch
- Demo 4 – Tail Lift
- Demo 5 – Running Lights

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6   File Menu

6.1   *Load /Save file or Clear form*

Load File

Read a complete Sesam 800 RXM PLC configuration from a previously stored file. Only .plc files can be read. The configuration is shown using the configuration controls on the screen.

Save File

Save the current configuration to file. The file will be saved as an .plc file.

Clear Form

Clear all configuration settings on the screen.

7   Read / Write configuration to Sesam 800 RXM PLC receiver

7.1   *Communication Port Settings*

Open/Close Port

Opens or Closes the connected serial port. The port must be open to download/upload configurations to a connected Sesam Receiver.

Go Online

Switches the connected Sesam 800 RXM PLC Receiver to Online mode. The receiver can now by operated by a paired transmitter.

Go Offline

Switches the connected Sesam 800 RXM PLC Receiver to PLC configuration mode. This mode must be active to download/upload receiver configurations.

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7.2 Read Configuration

Read/download the current configuration of the connected Sesam 800 RXM PLC receiver. The current configuration is shown on the Sesam 800 RXM Logic Tool screen.

Make sure the Sesam 800 RXM PLC Receiver is powered on and connected to the PC using the USB-to-Sesam cable. All available serial port devices are shown in the drop down list. Select the applicable serial port (USB Serial Port) from the list.

Click on the following buttons to download the current configuration of the Sesam 800 RXM PLC Receiver to the Sesam 800 RXM Logic Tool.

1. Open port. The port must be open to download/upload configurations to a connected Sesam 800 RXM PLC receiver.

2. Go Offline. Switches the connected Sesam 800 RXM PLC receiver to PLC configuration mode. This mode must be active to download/upload receiver configurations.

3. Read Config. The current configuration is shown using the configuration controls on the screen.

The user can make changes and then write/upload the new configuration back to the receiver.

7.3 Write Configuration

Write/upload configuration to the connected Sesam 800 RXM PLC receiver. The configuration is stored in non-volatile memory.

1. Open port. The port must be open to download/upload configurations to a connected Sesam 800 RXM PLC receiver.

2. Go Offline. Switches the connected Sesam 800 RXM PLC receiver to PLC configuration mode. This mode must be active to download/upload receiver configurations.

3. Write Config. The configuration is uploaded to the Sesam 800 RXM PLC receiver.

4. To test the current configuration on the Sesam 800 RXM PLC Receiver press Go Online to exit PLC config mode.

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8 Misc. Receiver Settings

Squelch Limit

This function can be used to reduce the operating range of the system.
Set a squelch limit between 38 and 110 (-dBm) to reduce operating range (38 shortest range).
Set to "Off (default)" for maximum range. When this limit is set, ALL button functions are inhibited if the radio signal strength (RSSI) is weaker than this value.

Max Users

Set the maximum number of users (transmitters) in the system. Default 1 user. Max 10 users can be set. Select number of users in the drop down list and click on Set.

⚠ Allowing more than 1 transmitter in the system can be dangerous depending on the application. When using more than 1 transmitter there will be a 3 second delay with inactivity when changing transmitters.

Program Mode

The receiver can operate in different modes depending on the application and expansion cards. The default setting is program mode 0.

Select the desired Program Mode from the drop down list and press "Set".

0 - (default factory setting)	Standard logic output on output 1...6. There is no output from the optional RS232 expansion card in this mode.
1 - Serial output mode 1	In addition to standard logic output on output 1...6, this mode outputs transmitter information on the optional RS232 expansion card.
	Note. The transmitter must be paired with the receiver to get output from the RS232 card.
	If a Sesam transmitter with display is used (Sesam Large L99) the receiver will use the display value during pairing and operation. The display value must match the value used during pairing. Consider using Group ID on the Large transmitter if multiple transmitters are to be used with a single receiver.
2 - Serial output mode 2	In addition to standard logic output on output 1...6, this mode outputs transmitter information from the optional RS232 expansion card.
	Note. The transmitter must be paired with the receiver to get output from the RS232 card.
	If a Sesam transmitter with display is used (Sesam Large L99) the receiver will NOT use the display value during pairing. The current display value 0-999 will be output from the RS232 card regardless of the display value during pairing. Consider using Group ID on the Large transmitter if multiple transmitters are to be used with a single receiver.
3	Selective squelch limit. (fw version 3.5 and greater)
	Automatically sets logical input X1...X4 depending on the Squelch limit setting, see section 8. Note! This mode cannot be used with optional input card.
254	Test mode. (fw version 3.5 and greater)
	Outputs ID, Button, memory position and current RSSI value to the Debug window in Sesam Logic Tool.
	Sample output: ID:20123545 B:01 MEM:1 SQ:-38dBm

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Selective squelch limit

This function can be used to reduce the operating range for specific button functions.

To enable the Selective squelch limit mode a squelch limit must be set and program mode 3 must be active.

NOTE! The optional digital input card cannot be used with this mode.

In Program mode=3 the following logical X are set depending on the strength of the received radio signal:

- X1=1 if RSSI is stronger or equal to the Squelch limit setting
- X2=1 if RSSI is stronger or equal to the Squelch limit setting-10dBm
- X3=1 if RSSI is stronger or equal to the Squelch limit setting -20dBm
- X4=1 if RSSI is weaker or equal to the Squelch limit setting. X4 is the inverse of X1.

The selective squelch limit (logical X1...X3) can typically be used for functions that requires the operator to be close to the receiver when activating. X4 can be used functions that should be blocked if the operator is too close to the receiver.

In the following example the squelch limit is set to 59 (-dBm) and the program mode is set to 3. Orange indicates signal active=1.

X Input Flag	Squelch Limit (-dBm)							
	40 (strong)	50	60	70	80	90	100	110 (weak)
X1	■	■						
X2	■	■	■					
X3	■	■	■	■				
X4			■	■	■	■	■	■

OEM Text

A personal OEM text can be set in the receiver.

Password

A password can be set. This will lock the configuration mode of the Sesam 800 RXM PLC receiver. To open the lock, write the password and click Unlock.

Note! The receiver must be restarted before the lock is activated.

! Be sure to remember the password. The password cannot be bypassed once set. Enter an empty password to disable the password once the receiver is unlocked.

9   Expansion or Digital Input Interface Card (Optional)

9.1   *RS232 Serial Interface Expansion Card (optional)*

The Sesam RXM OEM configurable receiver can be fitted with an optional RS232 serial interface card. When enabled, the current transmitter unique ID, button status and display value (Sesam 800 L99 only) will be output on the serial interface each time any button status changes. This expansion card can be used to connect to external equipment such as a PLC or PC for further processing of the user input from the transmitter.
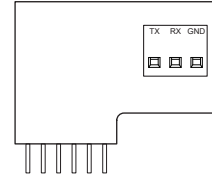
!   Note! The receiver must be set to **Program Mode 1 Serial Output or Program Mode 2** to enable the RS232 output mode. The output can be seen in the Sesam Logic Tool Debug window when connected with the USB cable.

Sesam 800 RXM RS-232 Expansion Card Protocol

Communication settings 19200 baud, 8,n,1.

The data coming out of the receiver are organized in 18-byte packets as follows:
<STX><Function><ID2><ID1><ID0><Displ. hi><Displ. lo><RX status><checksum><ETX>

<STX>:	1 byte. Start of transmission. The first byte is always STX 0x02 (hex)
<Function>:	2 bytes ASCII-HEX. (8 bits binary). Each button is mapped as a separate bit. Bit 0 – Button B1. 1 If button is pressed, 0 otherwise. Bit 1 – Button B2 Bit 2 – Button B3 Bit 3 – Button B4 Bit 4 – Button B5 Bit 5 – Button B6
<ID2> <ID1><ID0>:	6 bytes ASCII-HEX. (24 bits binary) Transmitter unique 24-bit ID. ID2 MSB, ID0 LSB.
<Displ. hi> <Displ. lo>:	4 bytes ASCII-HEX. (16 bits binary) Note! These bytes are only used when using the Sesam Large L99 transmitter with numeric display. Transmitter LCD display value coded as a 16-bit integer. Display value = 256*<Displ. hi>+<Displ. lo>.
<RX Status>:	Not used/Reserved.
<checksum>:	2 bytes ASCII-HEX. (8 bits binary) The checksum is an 8-bit addition of the fields <Function><ID2><ID1><ID0><Displ.hi><Displ. lo><RX status>.
<ETX>:	End of transmission. The last byte in the data packet. This byte is always ETX 0x03 (hex).

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9.2   *4 Channel Digital Input Card (optional)*

The Sesam 800 RXM PLC Receiver can be fitted with an optional 4 channel digital input interface card.

The inputs can be used in the regular logic programming of the receiver. The inputs are mapped as X1, X2, X3, X4. The inputs can be simulated by pressing the X1-X4 check boxes on the Sesam 800 RXM PLC-simulator on screen.

! Jumper J1 must be fitted to enable the Digital Input card (see Figure 10). When this jumper is fitted for use of a Digital Input card the USB-to Sesam cable connection is disabled so connection to the Sesam 800 RXM Logical tool will not be possible.
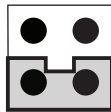

Figure 9.
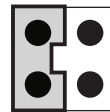*Jumper set for no expansion card or serial card, Default (Position 1)*

Figure 10.
Jumper set for digital input card

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