DEIMIC

DEIMIC IR MODULE

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1. The module status diodes

WiFi_status – Blue. This diode blinks with frequency of 2 Hz (two times for a second) in case of no connection with any WiFi network. When the device is trying to connect to a WiFi network, the diode blinks with frequency of 4 Hz. If the module is connected to a WiFi network, the diode lights with intensity proportional to the signal strength of the WiFi network, to which the module has been connected.

IR_transmission – Green. The diode blinks two times per second indicating that the module is working. Higher blinking frequency of the diode means data transmission via infrared.

IR_reception – Orange. The diode is lighting when data reception via infrared is enabled, otherwise the diode is turned off. When infrared data reception is enabled and data reception is pending, the diode blinks.

2. Connection to a WiFi network

The module requires WiFi network connection to function. To connect the module to a WiFi network, a WPS (Wi-Fi Protected Setup) function should be used. For this purpose the WPS button should be pressed, held down for 3 seconds and then released. In next step the WPS button on the WiFi access point should be pressed. When the module is connecting to a WiFi network, the *WiFi_status* diode, located on the module, is blinking with high frequency. When the connection is accomplished successfully the *WiFi_status* diode lights with intensity proportional to the signal strength of the WiFi network, to which the module has been connected.

In case of lack of WPS function in WiFi access point, WiFi connection parameters can be entered manually. For this purpose a computer/tablet/smartphone should be connected to WiFi network named DEIMIC_IR_XXXXXXXXXXX, where XXXXXXXXXXX is MAC address of the module which created that network. Default modules WiFi network password is: DEIMICDEIMIC. Then an http://192.168.9.1 address should be entered in Web browser. In the next step module configuration password, which is the same as WiFi network access password by default, should be typed in appeared module login webpage. Once a valid password is entered please click *Login* button according to Figure 1.

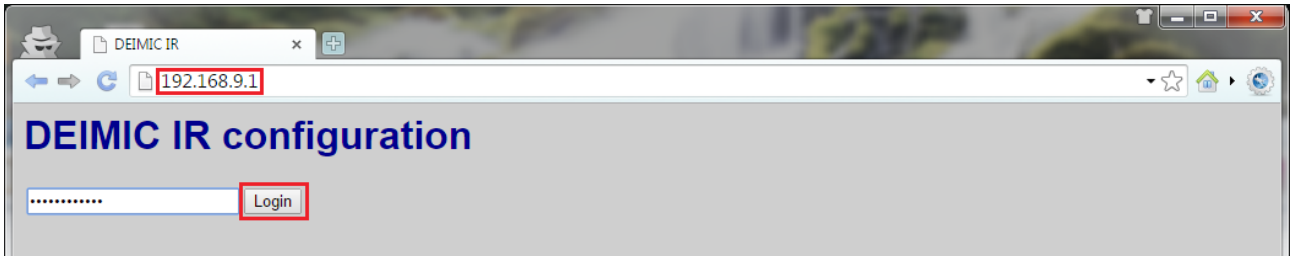

Figure 1. Logging into configuration webpage of DEMIC IR module

To connect the module with a WiFi network the following connections parameters needs to be entered in the module configuration webpage, showed on Figure 2: WiFi *SSID* and WiFi *password*.

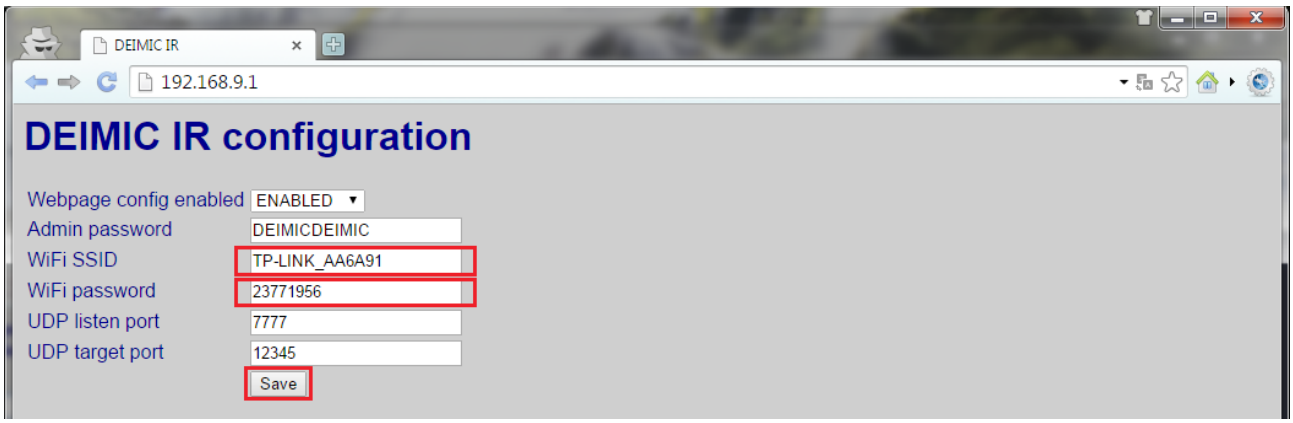

Figure 2. DEIMIC IR manual WiFi connection setup

To save entered configuration the *Save* button need to be pressed. When connection with specified WiFi network will be accomplished successfully, internal WiFi network with SSID of DEIMIC_IR_XXXXXXXXXXXX won't be longer available.

For further details please see chapter 6.

3. Communication with the module

The module uses UDP protocol to communication. UDP datagram should be send to IP address of the destination DEIMIC IR module or to the UDP broadcast address of the local network, to which the module is connected. The module responses with UDP datagram addressed to broadcast address of the local network, to which the module is connected. Table 1 contains default DEIMIC IR communication parameters.

Table 1. Default DEIMIC IR communication parameters

No.	Parameter	Value
1	Protocol	UDP
2	Input port	7777
3	Output port	12345

4. Commands

Table 2 shows available DEIMIC IR commands.

Table 2. Available commands

No.	Command	Response	Description
1	@WHOIS@\r\n	@IM@XX:XX:XX:XX:XX:XX@IP@\r\n	Te module responses with his own MAC address formatted in hexadecimal form and his IPv4 address
2	@XX:XX:XX:XX:XX:XX[1]@IR_RX_ENABLE@time;minFrameLen@\r\n	@XX:XX:XX:XX:XX:XX@OK@\r\n	Command turns on infrared data reception for the module with given MAC address for time duration specified in the *time* parameter. Units of *time* parameter are minutes. Received frames with length shorter than value of the *minFrameLen* parameter won't be respected. Parameter *minFrameLen* is optional and it's default value is 0.
3	@XX:XX:XX:XX:XX:XX[1]@IR_TX@d_0;d_1;d_2;...;d_n#repeat!space@\r\n	@XX:XX:XX:XX:XX:XX@OK@\r\n	Command sends via infrared frame described by d_0;...;d_n numbers through module with given MAC address. The *repeat* parameter sets number of consecutive transmitted frames with interframe interval specified by the *space* parameter. The *space* parameter is ignored when value of the *repeat* parameter is equal 1. Unit of the s*pace* value is the same as units of d_0;...;d_n numbers. The *repeat* and *space* parameters are optional and their default values are: repeat = 0 space=1000

[1]MAC address of a module, to which the command is addressed. When command is send to IP address of the target DEIMIC IR module, MAC address in the command structure is optional and may be omitted.

Commands which requires MAC address of the target module may be addressed to all modules in local network by broadcast MAC address defined as FF:FF:FF:FF:FF:FF. To deliver a command to all modules, it must be send to the broadcast IP address of the local network via UDP datagram.

When command is send to IP address of the target DEIMIC IR module (not broadcast address), MAC address in the command structure is optional and may be omitted.

5. Examples

5.1. Identification of all modules in a local network

Target IP address: 192.168.1.255 (broadcast address for 192.168.1 local network)
Protocol: UDP
Port: 7777
Command:
@WHOIS@\r\n
Reply sent to IP address of 192.168.1.255 and port 12345:
@IM@60:01:94:0C:F4:CE@IP@192.168.1.10@\r\n

5.2. Execution of remote controller button action

Target IP address: 192.168.1.255
Protocol: UDP
Port: 7777
@60:01:94:0C:F4:CE@IR_RX_ENABLE@30@\r\n #turning on reception of infrared data for
#30 minutes, reception of all frames lengths

@60:01:94:0C:F4:CE@OK@\r\n

(Press a button on infrared remote controller which is directed in the DEIMIC IR module direction)

Data sent by the module to IP address of 192.168.1.255 and port 12345:
@60:01:94:0C:F4:CE@IR_IN@150;185;88;14;9;14;9;14;32;14;9;14;9;13;10;14;@\r\n
#sending the data received from infrared remote controller
@60:01:94:0C:F4:CE@IR_TX@150;185;88;14;9;14;9;14;32;14;9;14;9;13;10;14;@\r\n
@60:01:94:0C:F4:CE@OK@\r\n

@60:01:94:0C:F4:CE@IR_RX_ENABLE@0@\r\n #turning off data reception via infrared

@60:01:94:0C:F4:CE@OK@\r\n

5.3. Communication with the module directly by IP address

Target IP address: 192.168.1.10
Protocol: UDP
Port: 7777
Command:
@IR_RX_ENABLE@30;3@\r\n #turning on reception of infrared data for 30 minutes,
#reception of all frames longer than 2 sequences

Reply sent to IP address of 192.168.1.255 and port 12345:
@60:01:94:0C:F4:CE@OK@\r\n

6. Configuration of module parameters

To configure the DEIMIC IR module a configuration device (personal computer, tablet, smartphone) with WiFi communication and Web browser is required.

a) First module connection with WiFi network

First the configuration device needs to be connected with WiFi network with SSID of DEIMIC_IR_XXXXXXXXXXXX, where XXXXXXXXXXXX is MAC address of the module, which created this network and it is intended to be configured. Then an http://192.168.9.1 address should be typed in Web browser.

b) Module already connected to a WiFi network

The configuration device needs to be connected with a WiFi network, to which DEIMIC IR module, intended to be configured, is connected. Then an IP address of the given DEIMIC IR module should be typed in Web browser.

DEIMIC IR configuration webpage is shown on Figure 3.

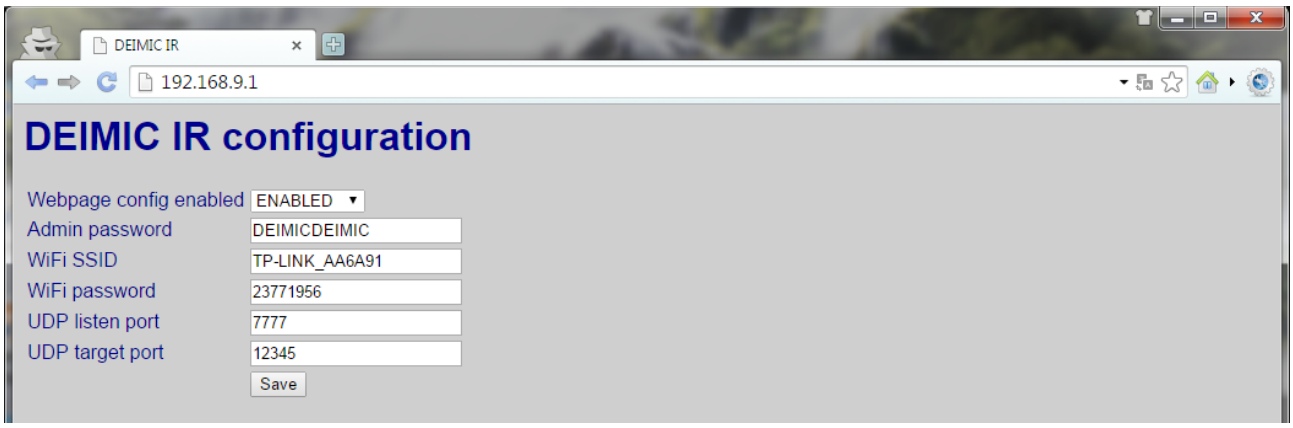

Figure 3. DEIMIC IR configuration webpage

Table 3 shows available configuration fields of the module with their descriptions.

Table 3. The module configuration parameters

No.	Parameter	Description
1	Webpage config enabled	Turns off module configuration via Web browser. To turn this option on again, the module needs to be restored to factory settings.
2	Admin password	The module configuration webpage access password.
3	WiFi SSID	Name of a WiFi network, to which module will be connected.
4	WiFi password	Password to a WiFi network with SSID is represented by *WiFi SSID* filed
5	UDP listen port	UDP port on which module is listening for incoming commands
6	UDP target port	UDP port, to which the module sends replies and data received via infrared

7. Restore factory settings

To restore factory settings of the module, WPS button should be pressed and held down and then the DEIMIC IR module should be restarted/powered on.

8. Troubleshooting

8.1. An infrared device does not react to command repeated by DEIMIC IR module

Some devices controlled by infrared requires commands to be sent twice in a row to proper them interpretation by infrared receiver. In that case a command received by the DEIMIC IR module needs to be transmitted twice with as small as possible time interval:

Data received by DEIMIC IR module:
@5C:CF:7F:25:83:75@IR_IN@47;18;46;19;14;51;46;19;46;19;14;51;14;51;14;51;14;51;14;51;14;51;46;279;@\r\n

Twice transmission of received by DEIMIC IR module command with the smallest interframe spacing:
@5C:CF:7F:25:83:75@IR_TX@47;18;46;19;14;51;46;19;46;19;14;51;14;51;14;51;14;51;14;51;14;51;46;279;#2!1@\r\n

8.2. An infrared device does not react to command code received by other DEIMIC IR module

Due to production parameters scatter between individual DEIMIC IR modules, a commands transmitter module should send commands received by himself (not readed from other modules) to ensure proper interpretation of transmitted commands by an infrared controlled device.

9. Document revision history

Table 3. Document revision history

Date	Description
2017-05-05	First translation