User Manual/Web Interface

MC-LR/MC-LR-4
MC-LRS/MC-LRS-4

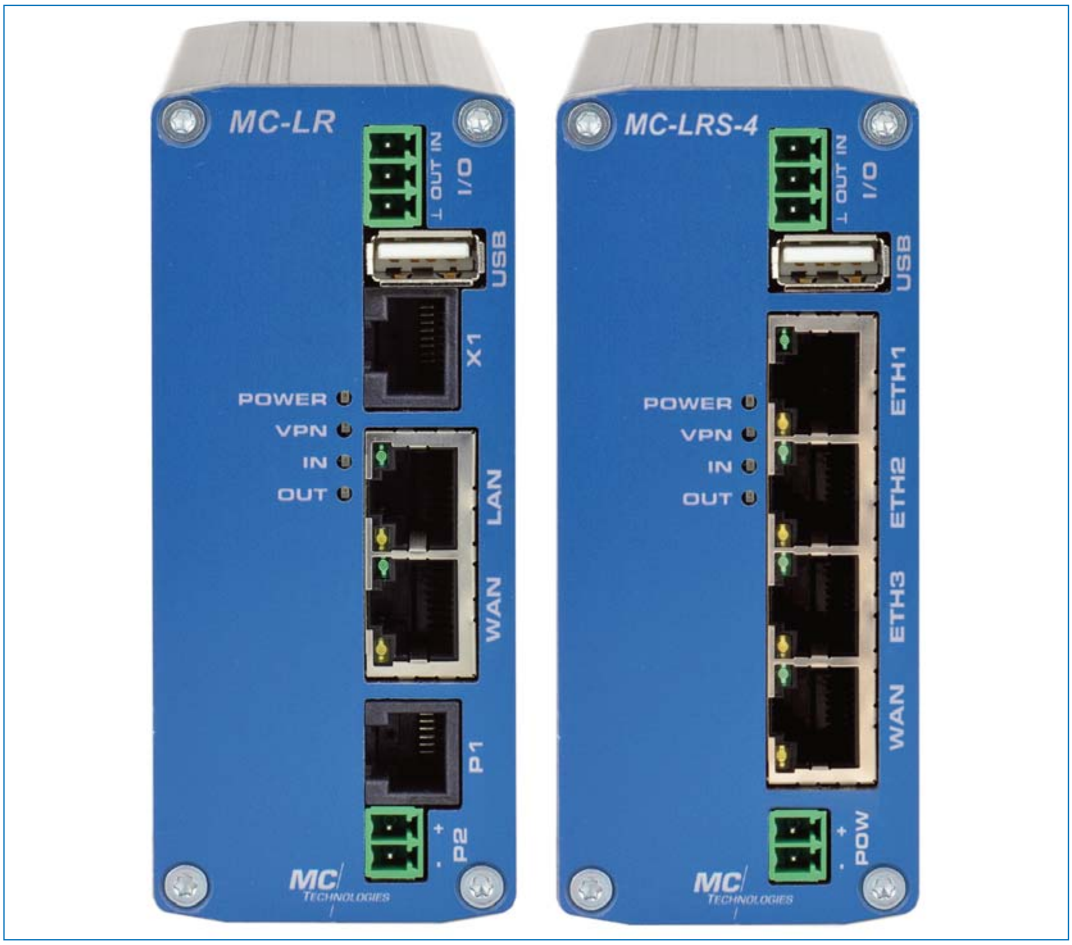
Router Description

MC Technologies routers are designed for industrial use.

Advantages at a glance:

- Easy expansion of protected networks.
- High-security data transfer via IPsec or OpenVPN tunnel, plus integrated firewall.
- Easy and identical configuration of router family via integrated web server, USB stick or "remote".
- Event alerts by email.
- Top-hat rail mounting.
- Use of applications with RS232 or RS485 interfaces on demand (only 2 port variantes).
- Integrated logbook records device-specific events.
- Delivered ready-to-use, including power supply plug and Ethernet connecting cable.

All specifications for the 2-port version also apply for the 4-port version.



Contents

1. Configuration via the integrated web interface

1.1 Preparations

1. Hook the router up to the power supply using connection "P1", "P2v or "POW".
2. To configure, connect the PC and the router to Ethernet port "ETH1" using an Ethernet cable.
3. For configuration, you will need a browser (i.e. Mozilla Firefox, Microsoft Internet Explorer, etc.) on a PC.
   The router must be connected to the power supply. The PC to be used for configuration must be connected to an Ethernet port on the router.

1.2 Configuration

1.2.1 Configuration via web interface

1. The PC must be set to "obtain IP address automatically".
   This is the default setting for PCs.
2. Open a browser on the PC.
3. Type the IP address (default: 192.168.0.1) in the address field.
4. For authentication purposes a user name and password must be entered. The default settings for the user name and password are both "admin", which should be entered in the corresponding fields. For your security, the password setting can be changed at any time using the "System/User" menu item on the web interface (see Page 39).

1.2.2 Local IP address is not (longer) known – configuration button

To reconfigure the router using the default IP address you will need to use the configuration button on the rear side of the device. This function depends on the setting you defined in Section 1.9.3 "Reset button".

Web access reset

The router is set to "Web access reset" unless you change the default setting. Press the configuration button for at least 5 seconds using a pointed object. The router web interface can be temporarily readdressed using the default IP address (192.168.0.1) for the Ethernet (LAN) connection. The configuration settings will not be lost when doing so.

i **Important note!** The router does not supply any IP address to the connected PC via DHCP. You must thus assign a fixed IP address to the PC (e.g. 192.168.0.2, default gateway 192.168.0.1).

You will now have access to web management using the default access data. Please check the settings for the router IP address, user name and password and make any changes required.

Factory reset

You changed the setting to "Factory reset" (see Item 1.9.3 "System Configuration/Reset button"). Press the configuration button for at least 5 seconds using a pointed object. The router web interface can be readdressed using the default IP address (192.168.0.1) for the Ethernet (LAN) connection.

i **Important note!** All configuration settings will be deleted and reset to the „Factory Defaults" setting.

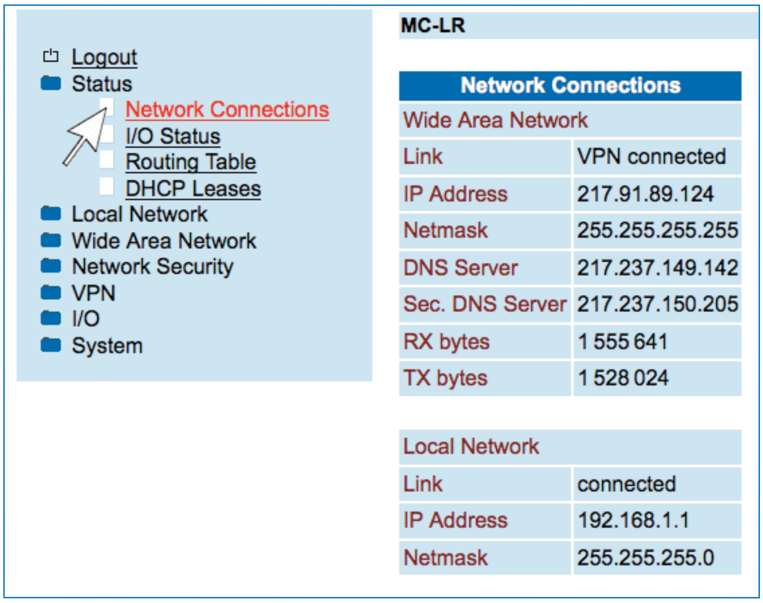
1.2.3 Resetting all parameters on the web interface

Resetting of all router settings to the factory default mode can be carried out via the internal web interface. Please click on the "Applyv button for the "Reset to Factory Defaults" function in the "System/Configuration Up-/Download" submenu.

1.3 Status

1.3.1 Network Connections

Status information on mobile connection and on local Ethernet network.



MC-LR

Network Connections	
Wide Area Network	
Link	VPN connected
IP Address	217.91.89.124
Netmask	255.255.255.255
DNS Server	217.237.149.142
Sec. DNS Server	217.237.150.205
RX bytes	1 555 641
TX bytes	1 528 024

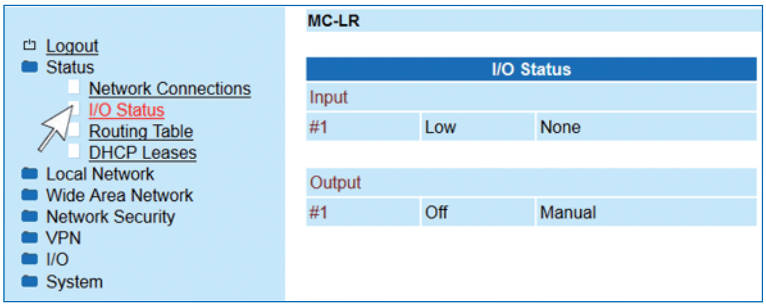
Local Network	
Link	connected
IP Address	192.168.1.1
Netmask	255.255.255.0

Network Connections

Wireless Network	
Link	VPN connected: Active VPN connection via the network. Not connected: No packet data connection in the network.
IP Address	Allocated IP address from the network.
Netmask	Allocated net mask from the network.
DNS Server	IP address of the DNS server.
Sec. DNS Server	IP address of the alternate DNS server.
RX bytes	Sum of received data since last login.
TX bytes	Sum of sent data since last login.
Local Network	
Link	For each LAN-Port Link (1-4 depending of the router type) the connection of the port is shown Connected: The local Ethernet is active. Not connected: The local Ethernet is not active.
IP Address	Router IP address in the local network.
Netmask	Router net mask in the local network.

1.3.2 I/O Status

Status information of I/O interfaces IN and OUT.



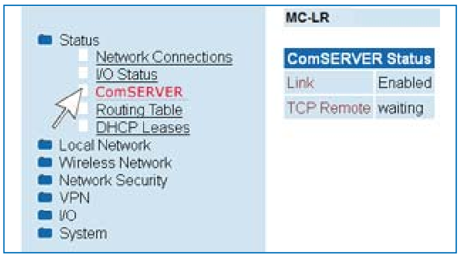
MC-LR

I/O Status		
Input		
#1	Low	None
Output		
#1	Off	Manual

Input	Signal		Event	
#1	Low:	The signal is low.	None:	No event has been triggered.
	High:	The signal is high.	E-Mail:	An email is being sent.
Output	Signal		Event	
#1	ON:	Output active.	**Based on:** Manual ON, Remote Controlled ON, VPN Service ON, Internet Link ON or Connection lost ON.	
	Off:	Output is not active.		

1.3.3 ComSERVER (only for MC Router with RS232 or RS485 interface on X1)

Status display of integrated ComSERVER



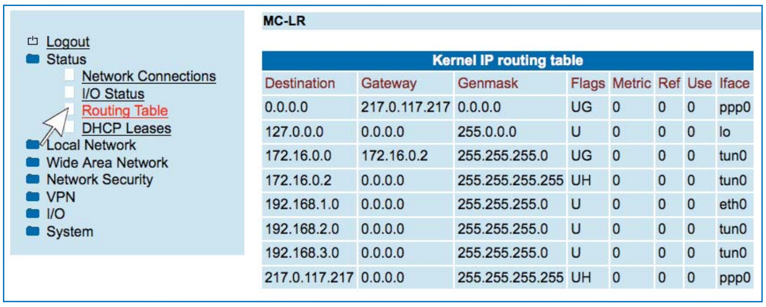
MC-LR

ComSERVER Status	
Link	Enabled
TCP Remote	waiting

See also 1.9.6. ComSERVER

1.3.4 Routing Table

Display of current routing table.



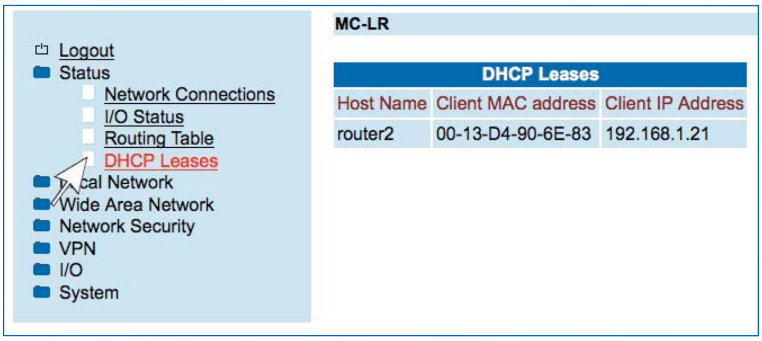
MC-LR

Kernel IP routing table

Destination	Gateway	Genmask	Flags	Metric	Ref	Use	Iface
0.0.0.0	217.0.117.217	0.0.0.0	UG	0	0	0	ppp0
127.0.0.0	0.0.0.0	255.0.0.0	U	0	0	0	lo
172.16.0.0	172.16.0.2	255.255.255.0	UG	0	0	0	tun0
172.16.0.2	0.0.0.0	255.255.255.255	UH	0	0	0	tun0
192.168.1.0	0.0.0.0	255.255.255.0	U	0	0	0	eth0
192.168.2.0	0.0.0.0	255.255.255.0	U	0	0	0	tun0
192.168.3.0	0.0.0.0	255.255.255.0	U	0	0	0	tun0
217.0.117.217	0.0.0.0	255.255.255.255	UH	0	0	0	ppp0

1.3.5 DHCP Leases

Display allocation of MAC address to IP address of terminal equipment connected to the local Ethernet.



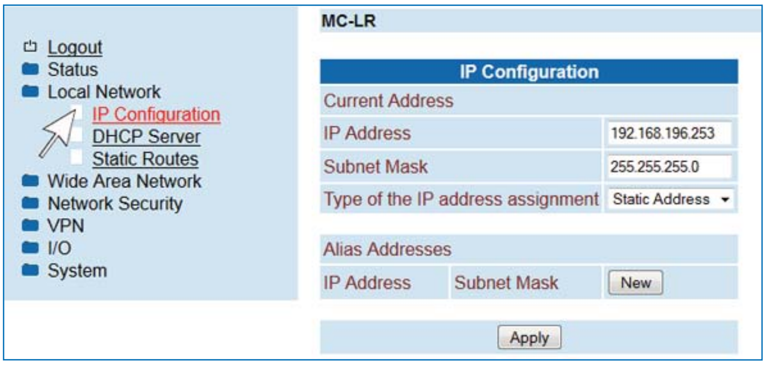
DHCP Leases

Host Name	Client MAC address	Client IP Address
router2	00-13-D4-90-6E-83	192.168.1.21

1.4 Local Network

1.4.1 IP Configuration

Setup of local IP address and subnet mask for router. Set your parameters and click "Apply". Your parameters have been saved but not yet applied. To apply the setup, restart the router.



IP Configuration

Current Address

IP Address: 192.168.196.253

Subnet Mask: 255.255.255.0

Type of the IP address assignment: Static Address

Alias Addresses

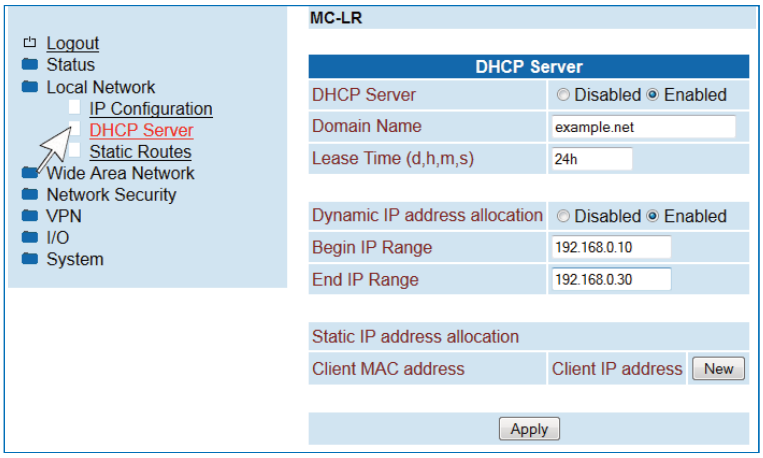
IP Address | Subnet Mask

IP Configuration

Current Address	
IP Address	Current local IP address of the router. If you forget the IP address and would like to configure the router, follow the instructions under 1.2 "Configuration" on Page 5.
Subnet Mask	Current subnet mask.
Type of IP address assignment	Static (default): The IP address has been set. DHCP: The IP address and the subnet mask are obtained dynamically from a connected DHCP server.
Alias Addresses	
IP Adress Subnet Mask	Alias addresses how the router can be reached alternatively (up to eight other IP addresses). Click "New" and add the other IP addresses, as well as the corresponding subnet masks.

1.4.2 DHCP Server

An IP address can be allocated automatically to local equipment connected via Ethernet using DHCP (Dynamic Host Configuration Protocol).



DHCP Server

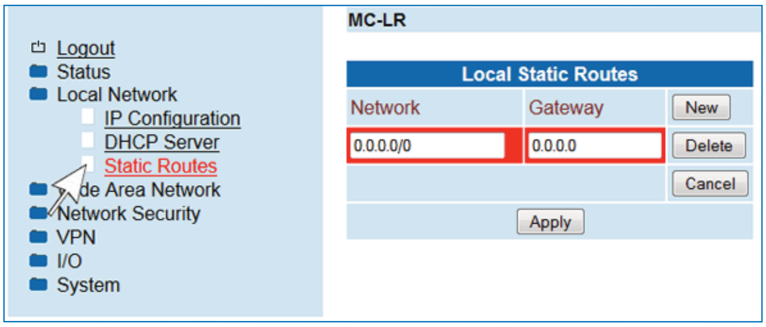
DHCP Server	○ Disabled ● Enabled
Domain Name	example.net
Lease Time (d,h,m,s)	24h
Dynamic IP address allocation	○ Disabled ● Enabled
Begin IP Range	192.168.0.10
End IP Range	192.168.0.30
Static IP address allocation	
Client MAC address	Client IP address

DHCP Server

DHCP Server	Disabled/Enabled: Click "Enabled" if the router should allocate the IP addresses to the connected terminal equipment as the DHCP server at start-up.
Domain Name	Domain name to be broadcast via DHCP.
Lease Time (d,h,m,s)	Validity period of allocated network configuration.
Dyn. IP address	Disabled/Enabled: Click "Enabled" if an IP address should be dynamically allocated to the connected terminal equipment in a set range.
Begin IP Range	Starting address for the address range from which IP addresses should be distributed.
End IP Range	Ending address for the address range from which IP addresses should be distributed.
Static IP address allocation	Static allocation of the IP address using the MAC address.
Client MAC address	MAC address of the terminal equipment.
Client IP address	IP address of the terminal equipment. Static allocation of the IP addresses should not overlap with the dynamic IP addresses. An identical IP address should not be used in multiple static allocations.

1.4.3 Local Static Routes

Data packets from the local network can be defined by static routes using other gateways for alternative routes.



Local Static Routes	
Network	Gateway
0.0.0.0/0	0.0.0.0

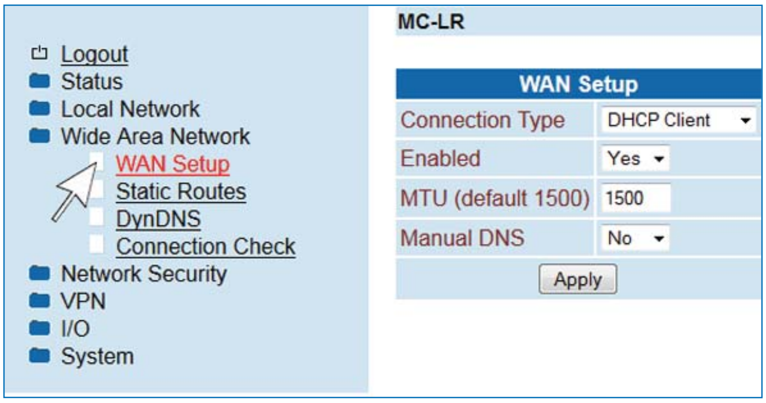
Local Static Routes

Network	Network in CIDR notation: IP address / Net mask Example: xxx.xxx.xxx.xxx/yy (x..=IP address; yy=net mask) Example: yy=24 (number of binary "ones") => net mask = 255.255.255.0
Gateway	The gateway how this network can be reached.

1.5 Wide Area Network

1.5.1 WAN Setup

Settings for use in a WAN (wide area network)



MC-LR

WAN Setup

Connection Type	DHCP Client
Enabled	Yes
MTU (default 1500)	1500
Manual DNS	No

Select the connection type in the "Connection Type" menu and set "Enabled" to "Yes".

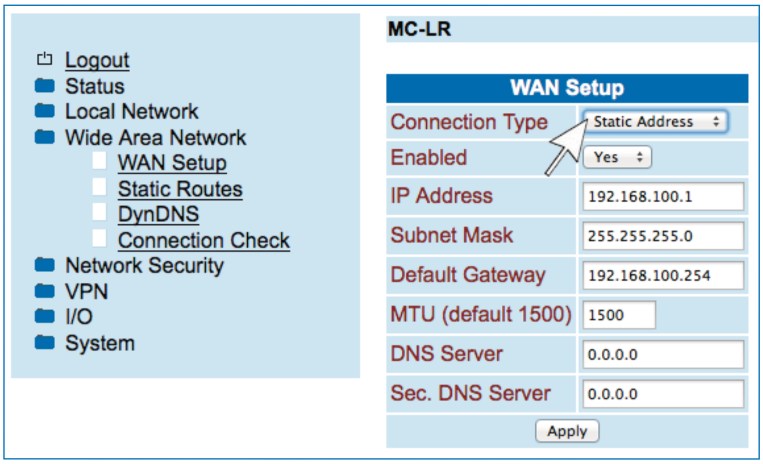
- Static Address
- DHCP Client
- PPPoE

Following this, click "Apply".

1.5.1.1 Static address - Preferred setting for operation in local networks

A fixed IP address can be assigned to routers which are operating in an existing network.

IP Address	The router's IP address at the WAN interface.
Subnet Mask	Subnet mask.
Default Gateway	The gateway's IP address in the Internet.
DNS Server	The DNS server's IP address.
Sec. DNS Server	The IP address of a second DNS server.



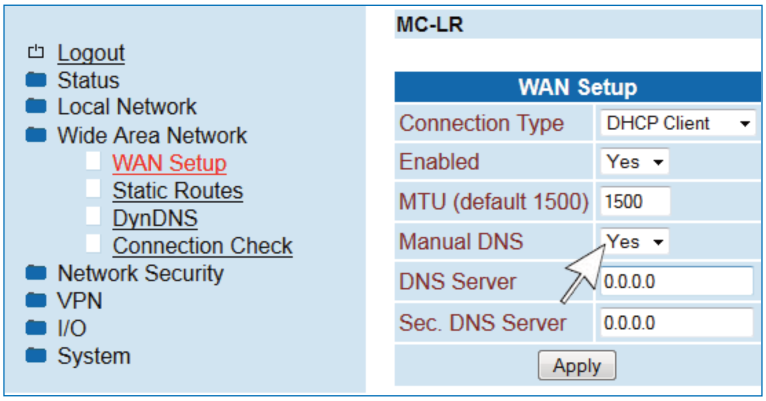
MC-LR

WAN Setup

Connection Type	Static Address
Enabled	Yes
IP Address	192.168.100.1
Subnet Mask	255.255.255.0
Default Gateway	192.168.100.254
MTU (default 1500)	1500
DNS Server	0.0.0.0
Sec. DNS Server	0.0.0.0

1.5.1.2 DHCP Client - Preferred setting for operation with cable modems and routers

If the router should automatically be assigned with an IP address from the network, set "Connection Type" to "DHCP Client" and click "Apply". If you want to manually set the DNS server’s IP addresses, set "Manual DNS" to "Yes" and enter the IP addresses. Following this, click "Apply".



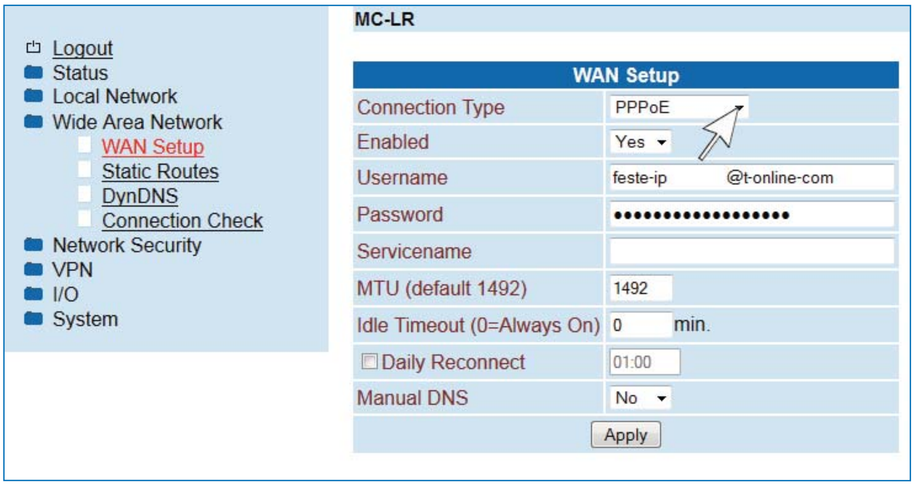
MC-LR

WAN Setup

Connection Type	DHCP Client
Enabled	Yes
MTU (default 1500)	1500
Manual DNS	Yes
DNS Server	0.0.0.0
Sec. DNS Server	0.0.0.0

1.5.1.3 PPPoE - PPPoE - Preferred setting for operation with DSL modems

For operation with a (DSL-) modem select the "PPPoE" setting under "Connection Type" and click "Apply".



MC-LR

WAN Setup

Connection Type	PPPoE
Enabled	Yes
Username	feste-ip @t-online-com
Password	••••••••••••••••••
Servicename	
MTU (default 1492)	1492
Idle Timeout (0=Always On)	0 min.
□ Daily Reconnect	01:00
Manual DNS	No

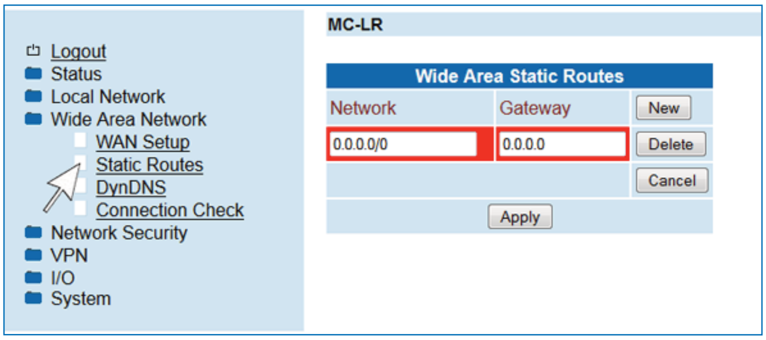
PPPoE

Username	User name for access to the (DSL) network.
Password	Password for access to the (DSL) network.
Servicename	Service name for access to the (DSL) network.
MTU (default 1492)	Maximum size of an unfragmented data package.
Idle Timeout (0=Always On)	0: Always On – no termination of the connection. Time in minutes: The router terminates the connection at the end of the set time. The timer starts when data transmission has ended.
Daily Reconnect	Repeat logging into the (DSL) network at a defined time.
Manual DNS	Yes: Manual setting. No: No manual setting.

Complete all settings with "Apply".

1.5.2 Static Routes

Data packets from the local network can be defined using static routes for alternative routes in the WAN network.



Network	Gateway
0.0.0.0/0	0.0.0.0

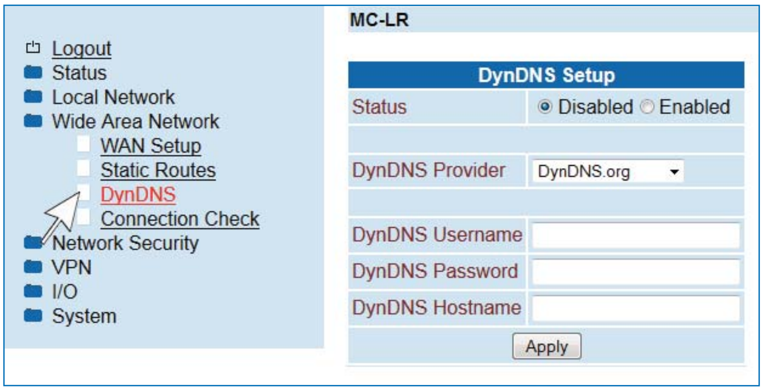
Static Routes

Static Routes	
Network	Network in CIDR notation.
Gateway	The gateway via which this network can be reached.

1.5.3 DynDNS

The router IP address in the cellular network/Internet is allocated dynamically by the mobile service operator. A name can be allocated to the dynamic IP address using a DynDNS provider, via which the router can then be reached over the Internet. The DynDNS Client must be saved and activated in the router accordingly.

Note: For this to work, the provider must have allocated a public IP address to the router, not a private one. This is not the case with all providers. DynDNS cannot replace a static IP address and has limited reliability.



MC-LR

DynDNS Setup

Status	● Disabled ○ Enabled
DynDNS Provider	DynDNS.org
DynDNS Username	
DynDNS Password	
DynDNS Hostname	

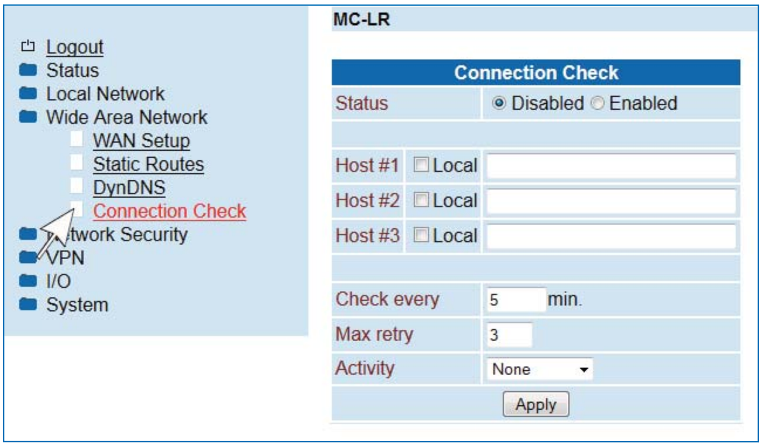
DynDNS Set-up

Status	Disabled: Deactivate DynDNS client. Enabled: Activate DynDNS client.
DynDNS Provider	Select the name of the provider with whom you are registered, i.e. DynDNS.org, TZO.com, dhs.org., selfHost.de, custom DynDNS. Use the "custom DynDNS" setting to select your preferred DynDNS provider. Please also enter the provider’s server address under "DynDNS Server".
DynDNS Username	Enter the username for your DynDNS account here.
DynDNS Password	Enter the password for your DynDNS account here.
DynDNS Hostname	The host name selected for this router for DynDNS service. Your router can then be reached under this host name.

1.5.4 Connection Check

For continuous connection monitoring, use "Connection Check". If the connection is lost, an action can be configured for establishing a new connection.

Note: Please note that frequent connection checks can lead to increased data traffic and corresponding costs.



MC-LR

Connection Check

Status	● Disabled ○ Enabled	
Host #1	□ Local	
Host #2	□ Local	
Host #3	□ Local	
Check every	5 min.	
Max retry	3	
Activity	None	

Apply

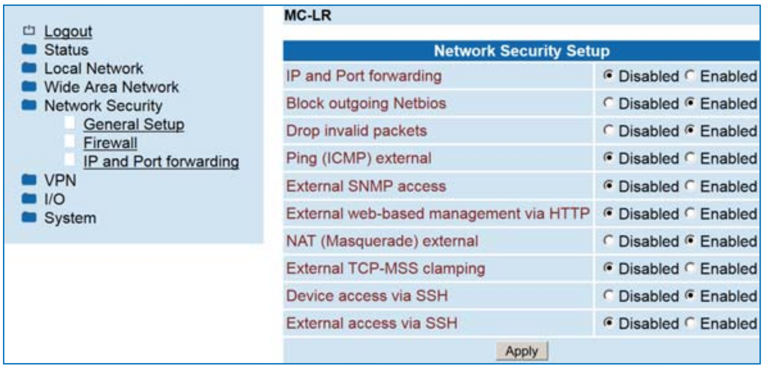
Connection Check

Status	Disabled: Connection check is deactivated (default). Enabled: Connection check is activated.
Host #1 ... #3	IP address or host name of the reference point for the connection check. "Local" option, when dealing with an address which can be reached via a VPN tunnel.
Check every	Check interval in minutes.
Max. retry	Number of repetitions until the configured action "Activity" is performed.
Activity	Reboot: Restart the router. Reconnect: Re-establish packet data connection. Relogin: Restart the cellular interface by redialing the mobile service network. None: None.

1.6 Network Security

1.6.1 General Setup

Basic settings for network security.



Network Security Setup

IP and Port forwarding	● Disabled ○ Enabled
Block outgoing Netbios	○ Disabled ● Enabled
Drop invalid packets	○ Disabled ● Enabled
Ping (ICMP) external	● Disabled ○ Enabled
External SNMP access	● Disabled ○ Enabled
External web-based management via HTTP	● Disabled ○ Enabled
NAT (Masquerade) external	○ Disabled ● Enabled
External TCP-MSS clamping	● Disabled ○ Enabled
Device access via SSH	○ Disabled ● Enabled
External access via SSH	● Disabled ○ Enabled

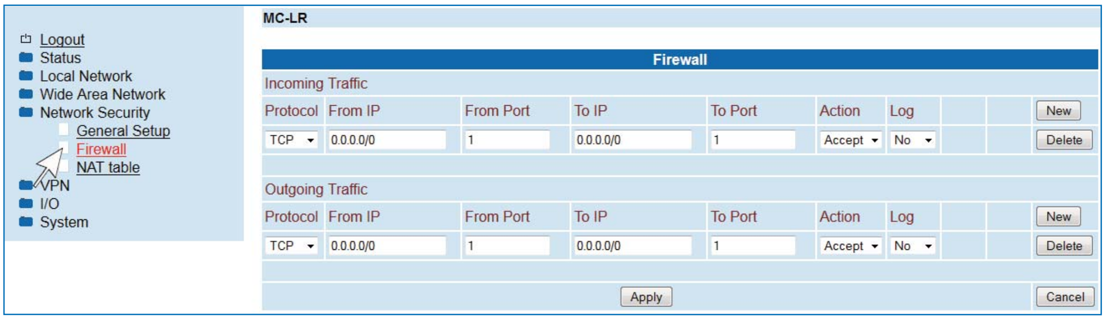
General Setup

IP and Port forwarding	Disabled: IP and Port forwarding is blocked. Enabled: IP and Port forwarding is allowed.
Block outgoing Netbios	Disabled: Outgoing NetBIOS requests are allowed. Enabled: Outgoing NetBIOS requests are blocked (default).
Drop invalid packets	Disabled: Packets will be transferred. Enabled: Invalid packets will be dropped.
Ping (ICMP) external	Disabled: A ping request from the external IP network to the router is ignored (default). Enabled: A ping request from the external IP network to the router is returned.
External SNMP access	Disabled: SNMP from the WAN interface is blocked. Enabled: SNMP from the WAN interface is permitted.
External web-based management via HTTP	Disabled: External configuration via the web interface is not possible. Enabled: External configuration via the web interface is possible.
NAT (Masquerade) external	Disabled: No IP masquerading performed. Enabled: IP masquerading is activated. Communication from a private, local networkto the Internet is allowed (default).
External TCP-MSS clamping	Disabled: Adjusts the maximum segment size on the WAN side to the MTU value. Enabled: Reduces the maximum segment size on the WAN side (for DSL operation).
Device access via SSH	Disabled: Local SSH access to the router is not possible (default). Enabled: Local SSH access to the router is possible.
External access via SSH	Disabled: Remote SSH access to the router is not possible (default). Enabled: Remote SSH access to the router is possible.

1.6.2 Firewall

The MCT router includes a Stateful Packet Inspection Firewall.
The firewall can be turned on or off (see "Network Security Setup" menu point "Firewall.") The firewall is active by default and blocks incoming data traffic. Outgoing data traffic is still possible.

ℹ The firewall rules are applied from up to down.



MC-LR

Firewall

Incoming Traffic

Protocol	From IP	From Port	To IP	To Port	Action	Log	
TCP	0.0.0.0/0	1	0.0.0.0/0	1	Accept	No	Delete

Outgoing Traffic

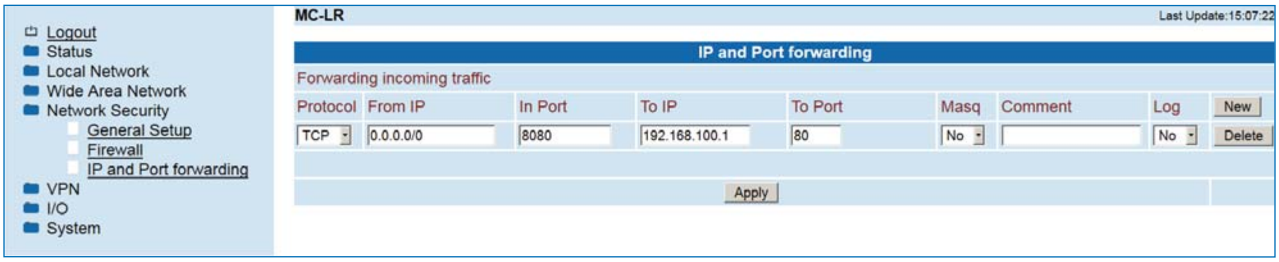
Protocol	From IP	From Port	To IP	To Port	Action	Log	
TCP	0.0.0.0/0	1	0.0.0.0/0	1	Accept	No	Delete

Firewall

Incoming Traffic	
Protocol	TCP, UDP, ICMP, all
From IP To IP	0.0.0.0/0 means all IP addresses. To enter an address range, use CIDR notation.
From Port To Port	(only with TCP and UDP) You have the following options: 1. Direct port input Example: From Port = 20, To Port = 30. 2. Any Examples: From Port or To Port = Any (Any means absolutely any port). 3. Port range Example: From Port or To Port = 80-90 (all ports from 80-90).
Action	Accept: Pass data packets. Reject: Data packets are rejected. Drop: Data packets may not pass, the sender does not receive notification.
Log	Logging firewall rules. Yes: Event is logged. No: Event is not logged (default).
New	A new firewall rule is added below the last rule. Delete: The rule is deleted.
Outgoing Traffic	Lists the installed firewall regulations. They apply for outgoing data connections that were internally initiated to communicate with a remote destination device. Factory settings: The factory settings include a rule allowing all outgoing connections. ℹ **Note:** If no rule is set, all outgoing connections are blocked (except VPN).
Protocol	TCP, UDP, ICMP, all
From IP	0.0.0.0/0 means all IP addresses. To enter an address range, use CIDR notation.
From Port To Port	(Only evaluated for TCP and UDP logs.) You have the following options: 1. Direct port input Example: From Port = 20, To Port = 30. 2. Any Examples: From Port or To Port = Any (Any means absolutely any port). 3. Port range Example: From Port or To Port = 80-90 (all ports from 80-90).
Action	Accept: Pass data packets. Reject: Data packets are rejected. Drop: Data packets may not pass, the sender does not receive notification. Logging of firewall rules.
Log	Yes: Event is logged. No: Event is not logged (default).
New	A new firewall rule is added below the last rule. Delete: The rule is deleted.

1.6.3 IP and Port forwarding

Rules for IP and port forwarding.
The router only has a single IP address which can be used to access it from outside the network.
The additionally transmitted port number can be used to re-direct data packages to ports with internal IP addresses.



Forwarding incoming traffic

Protocol	From IP	In Port	To IP	To Port	Masq	Comment	Log	New
TCP	0.0.0.0/0	8080	192.168.100.1	80	No		No	Delete

IP and Port forwarding

Protocol	TCP, UDP, ICMP
From IP	0.0.0.0/0 means all IP addresses. To enter an address range, use CIDR notation.
In Port To Port	(only with TCP and UDP) You have the following options: 1. Direct port input Example: In Port = 20, To Port = 30. 2. Port range Example: In Port = 80-90, To Port = 100-110.
To IP	0.0.0.0/0 means all IP addresses. To enter an address range, use CIDR notation.
Masq	For every individual rule, you can determine if IP masquerading should be applied. Yes: IP masquerading is activated, reply to cellular network is possible. No: (default) No reply to the Internet is possible.
Comment	Entering a comment.
Log	Logging firewall rules. Yes: Event is logged. No: Event is not logged (default).
New	The "New" button allows a new rule to be added under the last rule. The "Delete" button deletes the rule from the table.

Note: After clicking "Apply" carry out a reboot (see Page 41) or restart the router (interrupt the power supply).

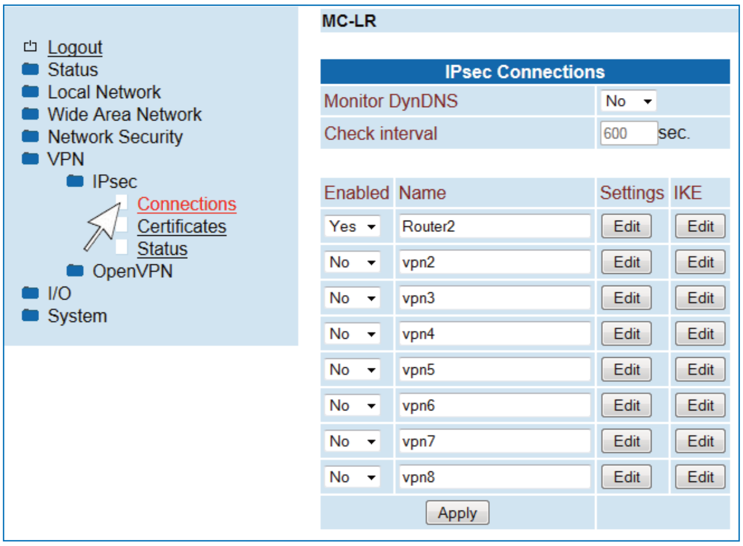
1.7 VPN

1.7.1 IPsec

1.7.1.1 Connections

IPsec (Internet Protocol Security) is a security protocol used for communicating over IP networks.

For a VPN connection, the IP addresses of the VPN remote peers must be known and addressable.
The VPN remote peer must support IPsec with the following configuration:
– Authentication by X.509 certificates or Preshared Secret Key (PSK)
– ESP
– Diffie-Hellman Group 2 or 5
– 3DES or AES encryption
– MD5 or SHA-1 hash algorithms
– Tunnel mode
– Quick mode
– Main mode
– SA lifetime (1 second to 24 hours)



IPsec Connections

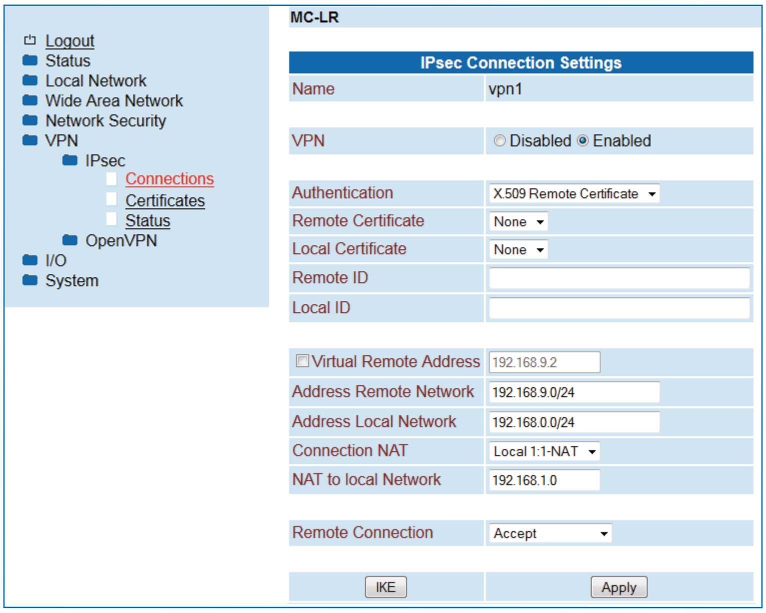
Monitor DynDNS	No
Check interval	600 sec.

Enabled	Name	Settings	IKE
Yes	Router2	Edit	Edit
No	vpn2	Edit	Edit
No	vpn3	Edit	Edit
No	vpn4	Edit	Edit
No	vpn5	Edit	Edit
No	vpn6	Edit	Edit
No	vpn7	Edit	Edit
No	vpn8	Edit	Edit

IPsec Connections

Monitor DynDNS	If DynDNS is used as "Remote Host", the "Monitor DynDNS" function should be set to "Yes".
Check interval	Check interval in seconds.
Enabled	Activate or deactivate VPN connection.
Name	Arbitrary name of VPN connection.
Settings	VPN connection settings.
IKE	The "Edit" menu includes settings to establish IKE (Internet Key Exchange protocol) automatic key management for IPsec (see Page 25).

IPsec Connection Settings > Edit



IPsec Connection Settings

Name	vpn1
VPN	○ Disabled ● Enabled
Authentication	X.509 Remote Certificate
Remote Certificate	None
Local Certificate	None
Remote ID	
Local ID	
□ Virtual Remote Address	192.168.9.2
Address Remote Network	192.168.9.0/24
Address Local Network	192.168.0.0/24
Connection NAT	Local 1:1-NAT
NAT to local Network	192.168.1.0
Remote Connection	Accept

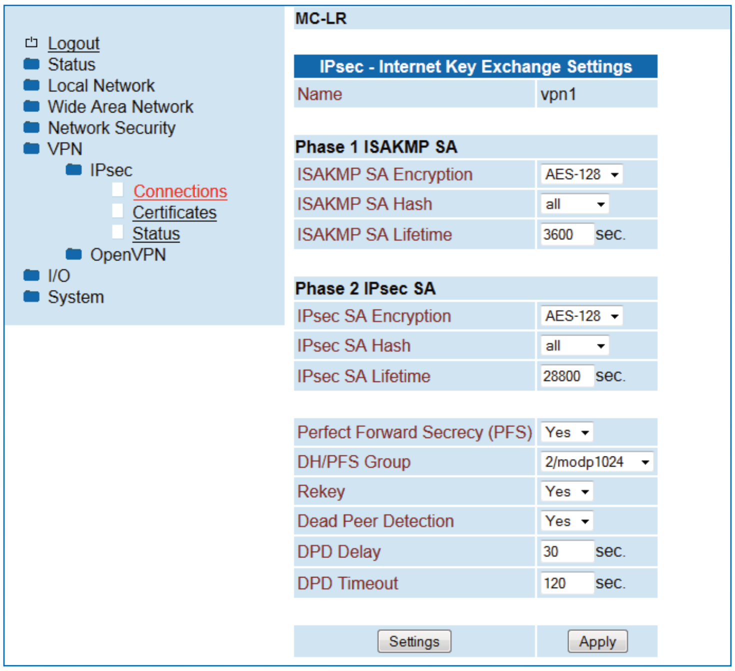
IPsec Connection Settings

Name	Name of the VPN connection.	
VPN	Active = Enabled, Inactive = Disabled.	
Authentication	X.509 Remote Certificate:	Each VPN participant has a private, secret key as well as a public key in the form of a X.509 certificate which contains further information about its owner and a certification authority (CA).
	Preshared Secred Key (PSK):	Each VPN participant knows a shared password.
	X.509 Remote + CAuth:	Like an X.509 certificate but with entry of the user name and password (e.g. when using Shrew Soft as a VPN client).
Remote Certificate	VPN remote peer certificate. The certificate must be loaded ahead of time.	
Local Certificate	Local certificate with which the router identifies itself to the VPN remote peer (machine certificate, PKCS#12.) The certificate must be loaded ahead of time.	
Remote ID	If the field is left empty (default,) the information from the certificate is used. Name for identification by remote peer. This must correspond to the information from the router certificate.	
Local ID	If the field is left empty (default,) the information from the certificate is used. The local ID allows you to set the name with which the router identifies itself to the remote peer. For more details, see Remote ID.	
Virtual Remote Address	Virtual remote IP address when using clients that cannot connect networks (e.g. PC with Shrew Soft VPN software, smartphones, etc.).	
Address Remote Network	IP address/subnet mask of the remote network to which the VPN connection needs to be established.	

IPsec Connection Settings

Address Local Network	IP address/subnet mask of the local network.
Connection NAT	None: No NAT on other IP addresses. Local 1:1 –NAT -> NAT to local Network: 1 to 1 NAT on the local network. Setting of the start IP address.
Remote Connection	Direction of connection establishment: Accept: Wait for the remote peer to establish the connection. Initiate: The router establishes the connection. Initiate on SMS: Connection established after reception of valid SMS. Initiate on Call: Connection established after valid call. Iniatiate on Input: Connection established after switch signal on IN of the I/O interface.
Autoreset	Click here and set a time in minutes after which the connection should be automatically disconnected.

IPsec Connection IKE > Edit



MC-LR

IPsec - Internet Key Exchange Settings

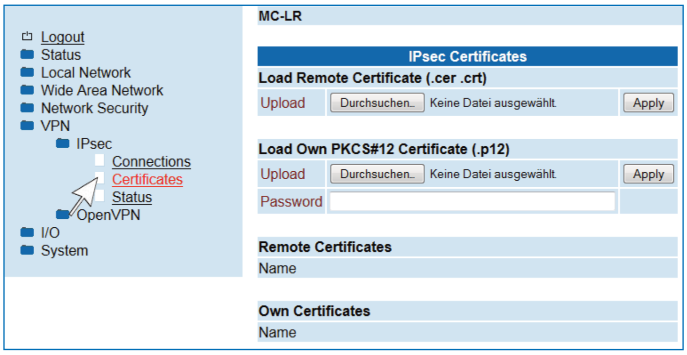
Name	vpn1
Phase 1 ISAKMP SA	
ISAKMP SA Encryption	AES-128
ISAKMP SA Hash	all
ISAKMP SA Lifetime	3600 sec.
Phase 2 IPsec SA	
IPsec SA Encryption	AES-128
IPsec SA Hash	all
IPsec SA Lifetime	28800 sec.
Perfect Forward Secrecy (PFS)	Yes
DH/PFS Group	2/modp1024
Rekey	Yes
Dead Peer Detection	Yes
DPD Delay	30 sec.
DPD Timeout	120 sec.

IPsec Connection IKE

IPsec - Internet Key Exchange Settings	Name of the VPN connection.
Phase 1 ISAKMP SA	
ISAKMP SA Encryption	AES-128 (default). AES-192, AES-256, 3 DES.
ISAKMP SA Hash	The setting "all" accepts either MD5 or SHA-1.
ISAKMP SA Lifetime	Life cycle of a key in seconds (3600 = 1 hour).
Phase 2 IPsec SA	Unlike Phase 1 ISAKMP SA (key exchange,) this is where the procedure for **Data exchange** is determined. It can differ from the key exchange procedure.
IPsec SA Encryption	AES-128 (default). AES-192, AES-256, 3 DES.
IPsec SA Hash	The setting "all" accepts either MD5 or SHA-1.
IPsec SA Lifetime	Life cycle in seconds for the key specified for IPsec SA. 28800 seconds = 8 hours (default). 86400 seconds = 24 hours (maximum).
Perfect Forward Secrecy (PFS)	Yes: Perfect Forward Secrecy activated. No: Perfect Forward Secrecy deactivated.
DH/PFS Group	Key exchange procedure (Diffie-Hellman groups for Internet Key Exchange (IKE)). 5/modp1536 = High encryption. 2/modp1024 = Normal encryption (default).
Rekey	Yes: A new key will be brokered. No: No new key will be brokered.
Dead Peer Detection	Recognition of validity and resulting action in case of interruption of IPsec connection. Yes: Dead Peer Detection activated (i.e. Restart at VPN Initiate). No: No Dead Peer Detection.
DPD Delay	Time interval to next check.
DPD Timeout	Time period after which the connection to the remote peer should be declared inactive. Default value: 120 seconds. Maximum: 86400 seconds (24 hours).

1.7.1.2 Certificates

The router authenticates itself to the remote peer with a certificate that can be uploaded onto the router.
By clicking "Apply", you upload the certificate onto the router.



MC-LR

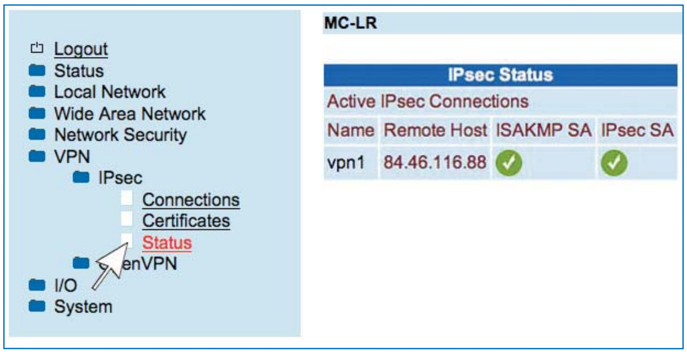
IPsec Certificates

Load Remote Certificate (.cer .crt)			
Upload	Durchsuchen...	Keine Datei ausgewählt.	Apply
Load Own PKCS#12 Certificate (.p12)			
Upload	Durchsuchen...	Keine Datei ausgewählt.	Apply
Password			
Remote Certificates			
Name			
Own Certificates			
Name			

Certificates

Load Remote Certificate	Upload	- Upload the remote peer certificate (.cer .crt). Under VPN > IPsec > Connections > Settings > Edit, you assign the certificate for the VPN connection.
Load Own PKCS#12 Certificate	Upload	- Upload the certificate (in PKCS#12 format, xxx.p12) to be used for the local router. Under VPN > IPsec > Connections > Settings > Edit, you assign the certificate to the VPN connection.
	Password	- Enter the password given during exporting.
Remote Certificates		List of imported .cer /.crt certificates.
	Delete	- Delete a certificate.
Own Certificates		List of imported PKCS#12 certificates
	Delete	- Delete a certificate.

1.7.1.3 Status



MC-LR

IPsec Status

Active IPsec Connections

Name	Remote Host	ISAKMP SA	IPsec SA
vpn1	84.46.116.88	✓	✓

IPsec Status

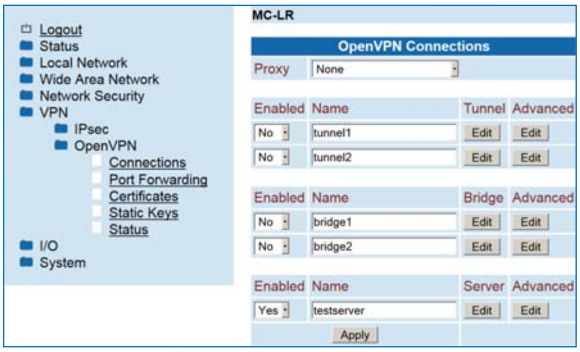
Active IPsec Connections	An active VPN connection is indicated by a green symbol.

1.7.2 OpenVPN

1.7.2.1 Connections (Tunnel 1 and 2 / Clients)

OpenVPN establishment of a virtual private network (VPN) via an encrypted connection.
Two OpenVPN tunnels can be set up at the same time (Tunnel 1 and Tunnel 2.)
The configuration of Tunnel 1 and Tunnel 2 is identical.
Additionally, 2 OpenVPN Bridge-Connections can be established at the same time.

OpenVPN Connections



MC-LR

OpenVPN Connections

Proxy	None

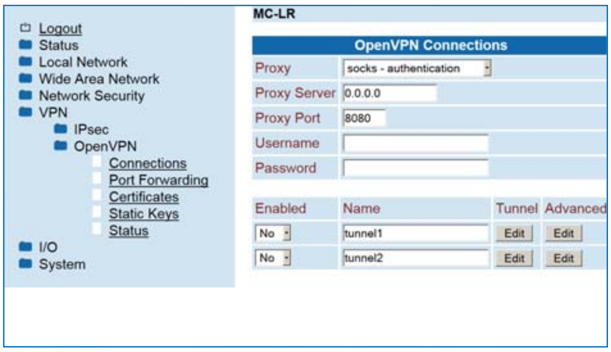
Enabled	Name	Tunnel	Advanced
No	tunnel1	Edit	Edit
No	tunnel2	Edit	Edit

Enabled	Name	Bridge	Advanced
No	bridge1	Edit	Edit
No	bridge2	Edit	Edit

Enabled	Name	Server	Advanced
Yes	testserver	Edit	Edit

Select an OpenVPN connection and click "Edit".

OpenVPN Proxy settings



MC-LR

OpenVPN Connections

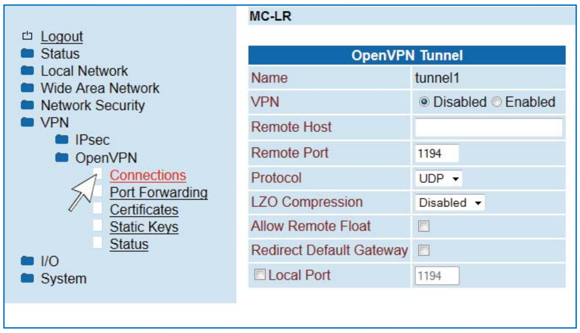
Proxy	socks - authentication
Proxy Server	0.0.0.0
Proxy Port	8080
Username	
Password	

Enabled	Name	Tunnel	Advanced
No	tunnel1	Edit	Edit
No	tunnel2	Edit	Edit

If your Internet connection is via a proxy server, you can carry out the required settings here.

Proxy	None: No proxy is used. http: An http proxy either with or with authentication is used. socks: A socks proxy either with or with authentication is used.
Proxy Server	Proxy server’s URL or IP address.
Proxy Port	Proxy server’s port.
Username	User name for authentication.
Password	Password for authentication.

OpenVPN Tunnel

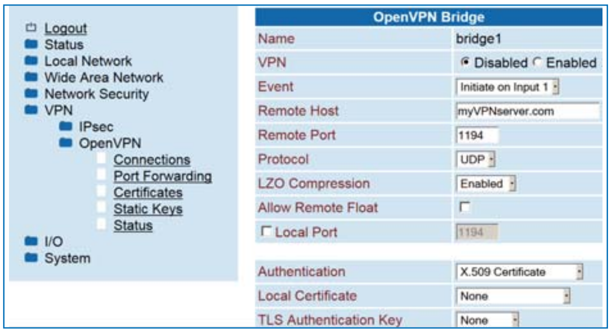


MC-LR

OpenVPN Tunnel

Name	tunnel1
VPN	● Disabled ○ Enabled
Remote Host	
Remote Port	1194
Protocol	UDP
LZO Compression	Disabled
Allow Remote Float	□
Redirect Default Gateway	□
□ Local Port	1194

OpenVPN Bridge

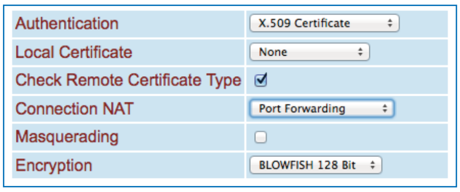


OpenVPN Bridge

Name	bridge1
VPN	● Disabled ○ Enabled
Event	Initiate on Input 1
Remote Host	myVPNserver.com
Remote Port	1194
Protocol	UDP
LZO Compression	Enabled
Allow Remote Float	□
□ Local Port	1194
Authentication	X.509 Certificate
Local Certificate	None
TLS Authentication Key	None

Name	Arbitrary name of OpenVPN connection.
VPN	Enabled: OpenVPN Tunnel activated. Disabled: OpenVPN Tunnel deactivated.
Remote Host	IP address or URL of the remote peer to which the tunnel will be established.
Remote Port	Port of the remote peer to which the tunnel will be established (default 1194).
Device Type	TAP for a TAP-OpenVPN-Connection, TUN for a TUN-OpenVPN-Connection.
Protocol	Protocol selection (UDP or TCP).
LZO Compression	Disabled: Switched off or not allowed. Adaptive: (Data) adaptive compression switched on. Yes: Switched on but can be switched off from the server. No: Switched off but can be switched on from the server. Enabled: Compression allowed; type of compression determined by the server.
Allow Remote Float	Activate this option to accept authenticated packets from each IP address during OpenVPN connection. This option is recommended if IP addresses are used for dynamic communication.
Redirect Default Gateway	The default gateway is directed via the tunnel.
Local Port	Determines a fixed port for the OpenVPN client.

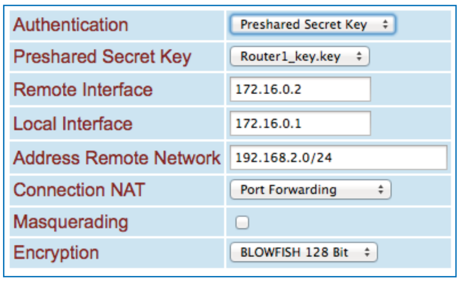
OpenVPN X.509 Certificate



Authentication	X.509 Certificate
Local Certificate	None
Check Remote Certificate Type	☑
Connection NAT	Port Forwarding
Masquerading	□
Encryption	BLOWFISH 128 Bit

Authentication	X.509 Certificate - Authentication procedure for X.509 certificate.
Local Certificate	Ascertains which certificate the router will use to identify itself to the VPN remote peer.
Check Remote Certificate Type	Activate this option to check the OpenVPN connection certificates.
Connection NAT	None: No forwarding. Local 1:1 NAT: "One-to-one" forwarding to a local network (NAT to local network). Local Masquerding: The packets going out through the tunnel are rewritten to the router source address so that equipment on the router can access the other side of the tunnel. Port Forwarding: Forwarding with the setting described under 1.7.2.2. Host Forwarding: Forwarding to the fixed IP address of a connected terminal device (Forward to local Host).
Masquerading	Only with the setting "Connection NAT" "Port Forwarding" or "Host Forwarding": Packages leaving via the tunnel are rewritten to the router's source address to allow devices connected to the router to access the other end of the tunnel.
Encryption	Encryption algorithm for the OpenVPN connection.

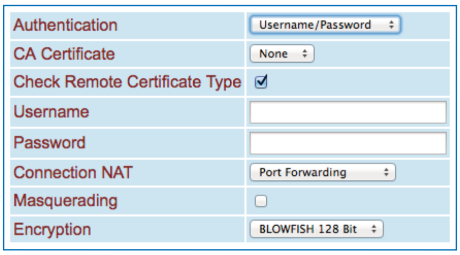
OpenVPN Preshared Secret Key



Authentication	Preshared Secret Key
Preshared Secret Key	Router1_key.key
Remote Interface	172.16.0.2
Local Interface	172.16.0.1
Address Remote Network	192.168.2.0/24
Connection NAT	Port Forwarding
Masquerading	□
Encryption	BLOWFISH 128 Bit

Authentication	Preshared Secret Key – authentication procedure with a static key (Preshared Key).
Preshared Secret Key	Ascertains preshared secret key the router uses to identify itself to the VPN remote peer.
Remote Interface Certificate Type	Virtual, remote IP address of the remote peer certificate type.
Local Interface	Virtual local IP address of the router.
Address Remote Network	Address range of the remote network.
Connection NAT	None: No forwarding. Local 1:1 NAT: "One-to-one" forwarding to a local network (NAT to local network). Local Masquerding: The packets going out through the tunnel are rewritten to the source address of the router to allow equipment on the router access to the other side of the tunnel. Port Forwarding: Forwarding with the setting described under 1.7.2.2. Host Forwarding: Forwarding to the fixed IP address of a connected terminal device (Forward to local Host).
Masquerading	Only with the setting "Connection NAT" "Port Forwarding" or "Host Forwarding": Packages leaving via the tunnel are rewritten to the router's source address to allow devices connected to the router to access the other end of the tunnel.
Encryption	Encryption algorithm for the OpenVPN connection.

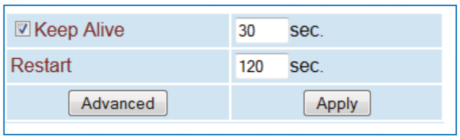
OpenVPN Username / Password



Authentication	Username/Password
CA Certificate	None
Check Remote Certificate Type	☑
Username	
Password	
Connection NAT	Port Forwarding
Masquerading	□
Encryption	BLOWFISH 128 Bit

Authentication	Username/Password - Set-up of user name and password.
CA Certificate	Enter the OpenVPN server CA certificate.
Check Remote Certificate Type	Specifying whether the remote certificate should be evaluated.
Username	Enter user name.
Password	Ente password.
Connection NAT	None: No forwarding. Local 1:1 NAT: "One-to-one" forwarding to a local network (NAT to local network). Local Masquerading: The packets going out through the tunnel are rewritten to the router source address so that equipment on the router can access the other side of the tunnel. Remote Masquerading: The packets coming in through the tunnel are rewritten on the local router address. Port Forwarding: Forwarding with the setting described under 1.7.2.2. Host Forwarding: Forwarding to the fixed IP address of a connected terminal device (Forward to local Host).
Masquerading	Only with the setting "Connection NAT" "Port Forwarding" or "Host Forwarding": Packages leaving via the tunnel are rewritten to the router’s source address to allow devices connected to the router to access the other end of the tunnel.
Encryption	Encryption algorithm for the OpenVPN connection.

Keep Alive



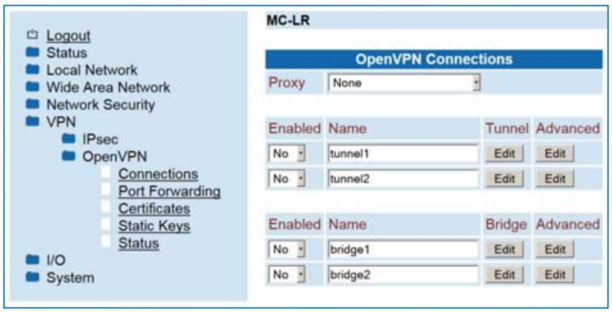
☑ Keep Alive	30 sec.
Restart	120 sec.

Keep Alive	Time period in seconds after which Keep Alive requests should be sent. These requests test whether the remote peer is still available. Default setting: 30 seconds.
Restart	Time period in seconds after which the connection to the remote peer should be restarted if there is no reply to the Keep Alive requests. Default setting: 120 seconds.

1.7.2.2 Connections Server (only for MC-LR SERVER)

The OpenVPN server function is only supported by the MC-LR SERVER LAN router.
In this case, an enhanced menu is available for configuration of OpenVPN connections.

OpenVPN Client



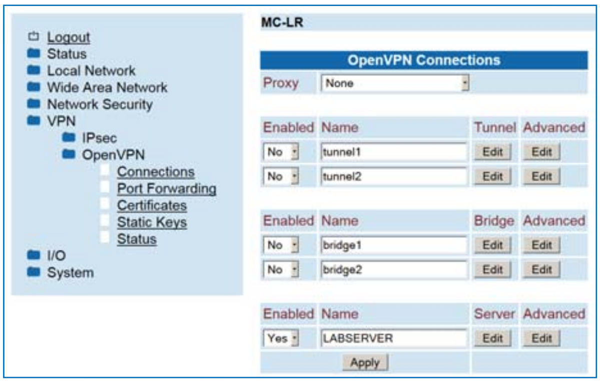
OpenVPN Connections

Proxy: None

Enabled	Name	Tunnel	Advanced
No	tunnel1	Edit	Edit
No	tunnel2	Edit	Edit

Enabled	Name	Bridge	Advanced
No	bridge1	Edit	Edit
No	bridge2	Edit	Edit

OpenVPN Client and Server



OpenVPN Connections

Proxy: None

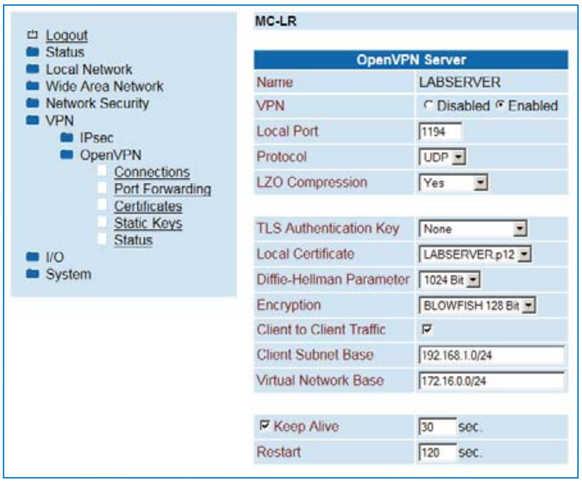
Enabled	Name	Tunnel	Advanced
No	tunnel1	Edit	Edit
No	tunnel2	Edit	Edit

Enabled	Name	Bridge	Advanced
No	bridge1	Edit	Edit
No	bridge2	Edit	Edit

Enabled	Name	Server	Advanced
Yes	LABSERVER	Edit	Edit

Configuration of the OpenVPN server

To activate the server, select the "Yes" option for the "Enabled" menu item. Enter your chosen server name under "Name". Following this, click "Apply". Click "Edit" to access the OpenVPN server settings.



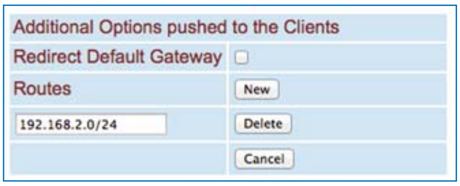
OpenVPN Server

Name	LABSERVER
VPN	○ Disabled ● Enabled
Local Port	1194
Protocol	UDP
LZO Compression	Yes
TLS Authentication Key	None
Local Certificate	LABSERVER.p12
Diffie-Hellman Parameter	1024 Bit
Encryption	BLOWFISH 128 Bit
Client to Client Traffic	☑
Client Subnet Base	192.168.1.0/24
Virtual Network Base	172.16.0.0/24
☑ Keep Alive	30 sec.
Restart	120 sec.

VPN	Disabled: VPN not activated. Enabled: VPNactivated.
Local Port	OpenVPN port setting for the server (default 1194).
Protocol	Protocol setting (UDP or TCP).
LZO Compression	Disabled: Disabled or not permitted.
	Adaptive: Adaptive OpenVPN compression is activated. No: OpenVPN compression is disabled. Yes: OpenVPN compression is activated.
TLS Authentication Key	Used to select a common TLS authentication key which has been uploaded in advance under Certificates.
Local Certificate	Used to select the OpenVPN server’s PKCS#12 certificate (.p12). The certificate must be uploaded in advance.
	ℹ **Note:** Please ensure that the router’s system time is current and thus falls within the chronological validity window for the certificates.
Diffie-Hellman Parameter	The default setting is 1024 Bit, however can be changed to 2048 Bit here (is defined when creating the certificate).
Encryption	Encryption algorithm for the OpenVPN connection.
Client to Client Traffic	Used to block or permit client-to-client traffic.
Client Subnet Base	Specification of the OpenVPN server’s base network. This setting is used to automatically derive the clients’ network segments (see Setting: Client table below).
Virtual Network Base	Specification of the OpenVPN server’s internal, virtual base network. This setting is used to automatically derive the clients’ virtual IP addresses (see Setting: Client table below).
Keep Alive	Time span in seconds after which keep alive queries should be sent. These queries test whether the remote peer is still available. Factory setting: 30 seconds.
Restart	Time span in seconds after which the connection to the remote peer should be restarted if the keep alive queries were not answered. Factory setting: 120 seconds.

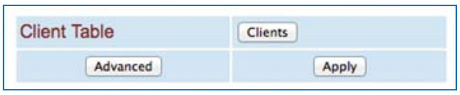
Additional Options pushed to the Clients

Can be used to provide clients with information about routes. Click "Redirect Default Gateway" to direct client routes via the OpenVPN tunnel.

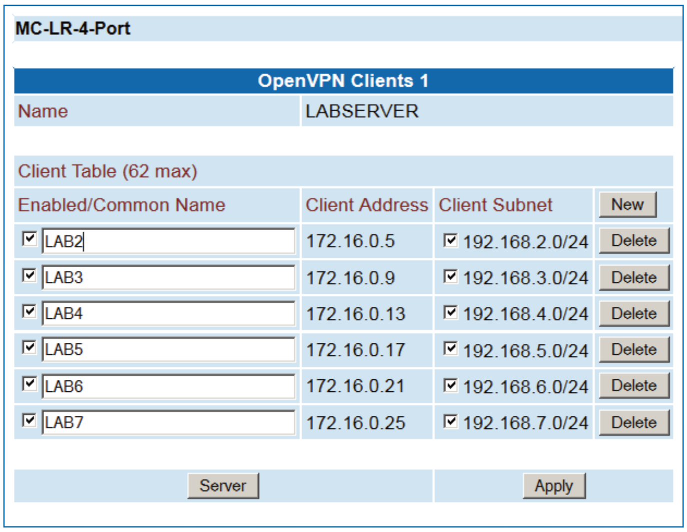


Additional Options pushed to the Clients	
Redirect Default Gateway	□
Routes	New
192.168.2.0/24	Delete
	Cancel

Click the "Clients" button to create OpenVPN clients.



Please define your OpenVPN clients here. To enable the OpenVPN server to identify clients, you must enter the common name which was defined for the client when generating the corresponding certificate under the "Common Name" menu item here. This feature is thus used to assign the client certificate to the client address defined by the server.



MC-LR-4-Port

OpenVPN Clients 1

Name	LABSERVER

Client Table (62 max)

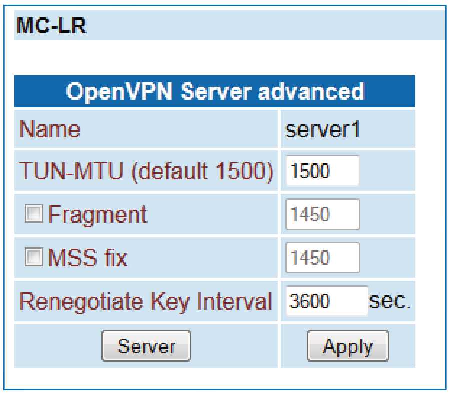
Enabled/Common Name	Client Address	Client Subnet	New
☑ LAB2	172.16.0.5	☑ 192.168.2.0/24	Delete
☑ LAB3	172.16.0.9	☑ 192.168.3.0/24	Delete
☑ LAB4	172.16.0.13	☑ 192.168.4.0/24	Delete
☑ LAB5	172.16.0.17	☑ 192.168.5.0/24	Delete
☑ LAB6	172.16.0.21	☑ 192.168.6.0/24	Delete
☑ LAB7	172.16.0.25	☑ 192.168.7.0/24	Delete

Example based on the illustration above: A client has loaded a certificate with the common name LAB2. This client can then be accessed under virtual IP address 172.16.0.5. The network on the client (router) can be accessed via the IP address segment 192.168.2.0/24.

Note:

The client address is automatically derived from the Virtual Network Base setting under: "OpenVPN Server".
(e.g. Virtual network base = 172.16.0.0/24,
First client address = 172.16.0.5,
Second client address = 172.16.0.9, etc.)
The client subnet is automatically derived from the Client Subnet Base setting under: "OpenVPN Server".
(e.g. Virtual network base = 192.168.1.0/24,
First client subnet = 192.168.2.0./24,
Second client subnet = 192.168.3.0/24, etc.)

Click "Advanced" for additional special settings.



MC-LR

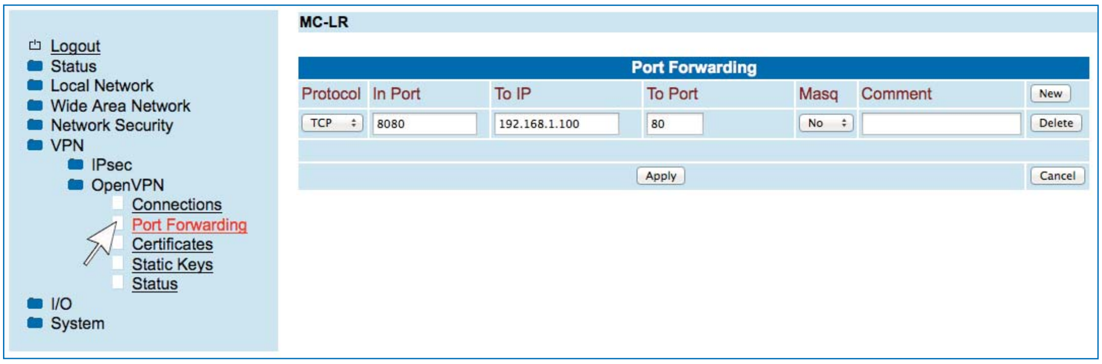
OpenVPN Server advanced	
Name	server1
TUN-MTU (default 1500)	1500
□ Fragment	1450
□ MSS fix	1450
Renegotiate Key Interval	3600 sec.
Server	Apply

Where required, you have options to create special settings for sizes: TUN-MTU, Fragment, MSS fix and for the renegotiate key interval.

Important note:
Please remember to confirm/activate all entries or changes by clicking the "Apply" button. Should the settings not be immediately effective, then you should reboot the router for good measure.

1.7.2.3 Port Forwarding

Rules for Port Forwarding: The router has only one IP address via which it can be accessed externally.
Data packets can be redirected to internal IP address ports via additional transmitted port numbers.



MC-LR

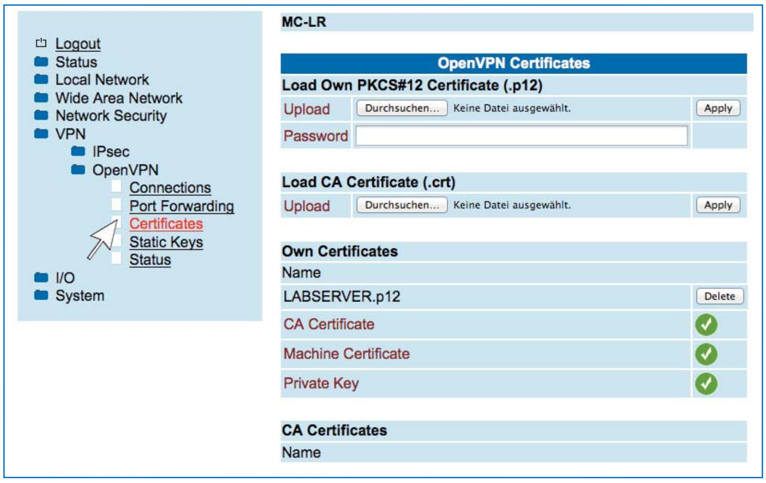
Port Forwarding

Protocol	In Port	To IP	To Port	Masq	Comment	New
TCP	8080	192.168.1.100	80	No		Delete
					Apply	Cancel

Protocol	TCP, UDP, ICMP
In Port / To Port	(TCP and UDP only) You have the following options: To Port 1. direct port input - Example: In Port = 20, To Port = 30. 2. Port range - Example: In Port = 80-90 To Port = 100-110.
To IP	Input of a target IP address, 0.0.0.0/0 means all IP addresses.
Masq	For every individual rule, you can determine if IP masquerading should be applied. Yes: IP masquerading is activated, reply to VPN tunnel is possible. No: (Default) reply to VPN tunnel is not possible.
Comment	Input comment.

1.7.2.4 Certificates

Certificate for authentication of the router to the remote peer.



MC-LR

OpenVPN Certificates

Load Own PKCS#12 Certificate (.p12)

Upload	Durchsuchen... Keine Datei ausgewählt.	Apply
Password		

Load CA Certificate (.crt)

Upload	Durchsuchen... Keine Datei ausgewählt.	Apply

Own Certificates

Name	
LABSERVER.p12	Delete
CA Certificate	✓
Machine Certificate	✓
Private Key	✓

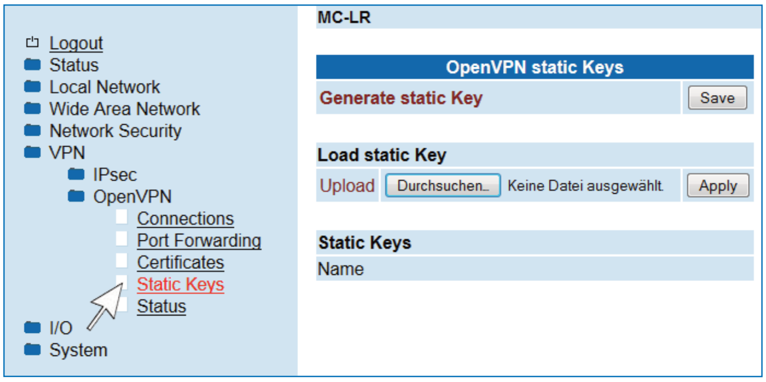
CA Certificates

Name

Certificates

Load Own PKCS#12	Upload	Upload the certificate (in PKCS#12 format, xxx.p12) to be used for the local router. Under VPN > OpenVPN > Client, you can assign one of these certificates to each VPN connection under Local Certificate.
	Password	Password with which the PKCS#12 file is protected during export.
Load CA certificate (.crt)	Upload	Upload the CA certificate.
Own Certificate	Name	Display the uploaded certificates and keys.
CA Certificate	Name	Display the uploaded CA certificates and keys.

1.7.2.5 Static Keys (Preshared Key)



MC-LR

OpenVPN static Keys

Generate static Key	Save

Load static Key

Upload	Durchsuchen... Keine Datei ausgewählt.	Apply

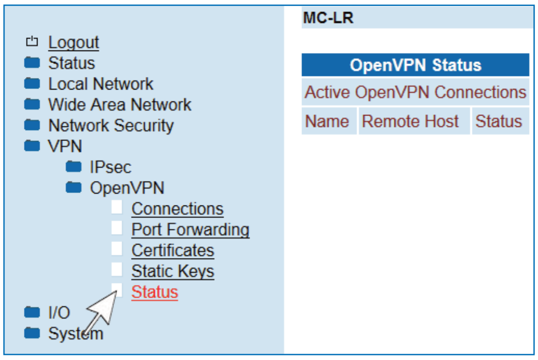
Static Keys

Name

Static Keys

Generate static Key	Click on "Save" to generate and save a static key file.	
Load static Key	Upload:	Upload the static key file. The same file must be uploaded to the remote peer's OpenVPN server.
Static Keys	List of uploaded static key files.	

1.7.2.6 Status



MC-LR

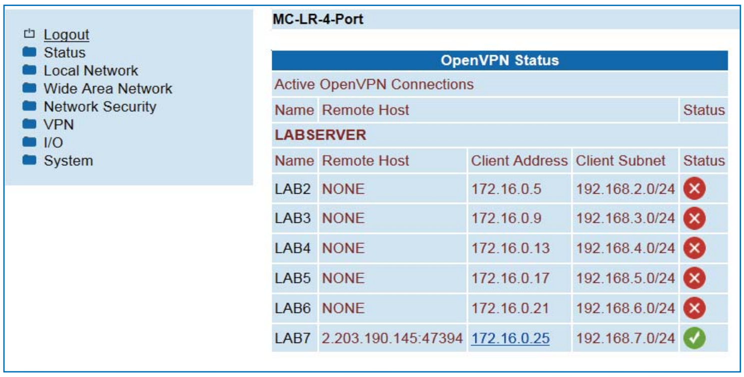
OpenVPN Status		
Active OpenVPN Connections		
Name	Remote Host	Status

OpenVPN Status

Active OpenVPN Connections	Status of the active VPN connection.

OpenVPN status for MC-LR servers

Shows the status of all client connections (see Page 28) to the OpenVPN Server (example: see "LABSERVER" as server name below).



MC-LR-4-Port

OpenVPN Status

Active OpenVPN Connections

Name	Remote Host			Status
LABSERVER				
Name	Remote Host	Client Address	Client Subnet	Status
LAB2	NONE	172.16.0.5	192.168.2.0/24	✗
LAB3	NONE	172.16.0.9	192.168.3.0/24	✗
LAB4	NONE	172.16.0.13	192.168.4.0/24	✗
LAB5	NONE	172.16.0.17	192.168.5.0/24	✗
LAB6	NONE	172.16.0.21	192.168.6.0/24	✗
LAB7	2.203.190.145:47394	172.16.0.25	192.168.7.0/24	✓

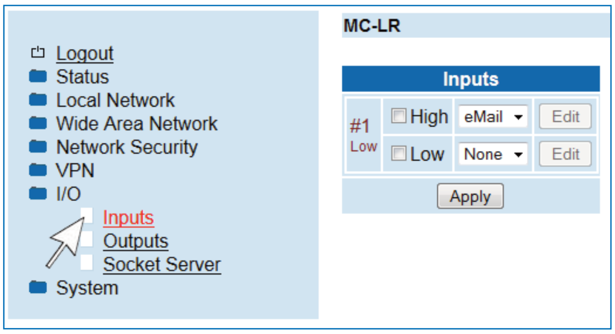
Name	Name of the logged-in OpenVPN client.
Remote Host	Sender IP address of the client from the server perspective.
Client Address	Virtual client address in the internal OpenVPN network. The client address is created as a link and serves as a direct connection to the connected client’s Web server (if there is one).
Client Subnet	Client’s network address segment.
Status	Status Green symbol: The client is connected. Red symbol: The client is not connected.

1.8 I/O

The router has an I/O input and output (Input/Output).

1.8.1 Inputs

The switch input can be used to send emails. Please check to see if the switch input is already being used to start a VPN connection. If so, it will not be possible to use it to send emails.



#1 Low
□ High eMail
□ Low None

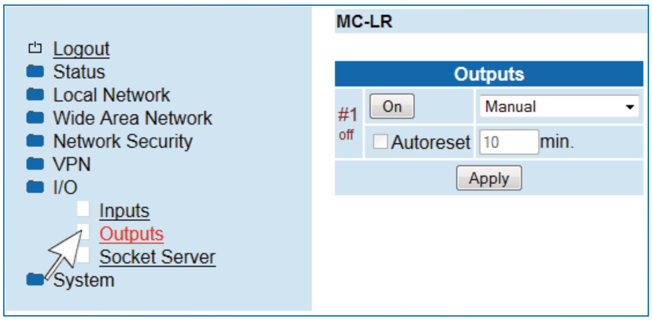
Inputs

High	E-Mail:	If activated, an email will be sent when there is a "High" level on the switching input. Select "E-Mails" and click "Apply". Following this, click "Edit" and fill out the email form.
	None:	No email is sent.
Low	E-Mail:	If activated, an email will be sent when there is a "Low" level on the switching input. Select "E-Mails" and click "Apply". Following this, click "Edit" and fill out the email form.
	None:	No email is sent.

Note: To send an email, the email account under the section 1.9.8 (see Page 40-41) SMTP Configuration must be set up.

1.8.2 Outputs

The router switch output can be controlled remotely or switched using a router connection status.



#1 off
Manual
□ Autoreset 10 min.

Outputs

Functions	Manual:	Switch the output by clicking ON or OFF in the web interface.
	Remote Controlled:	Switch the switch output remotely by SMS (see Page 13) or by Control command to the socket server (see page 14).
	VPN Service:	The switch output is active when the router has established a VPN connection.
	Connection Lost:	The switch output is active when the router connection check does not reach the configured address.
Autoreset	"Autoreset" resets the switch output after the preset period of time.	

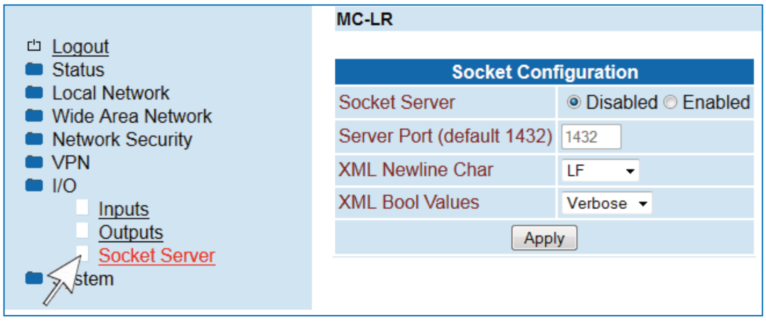
1.8.3 Socket Server

The router includes an integrated socket server and can be made to perform the following actions by receiving XML files:

1. Set and query I/O signals
2. Send email messages
3. Query the router status

To use these functions, the socket server must be set to "Enabled" in the socket configuration. The socket server port can be configured as desired, the default setting is Port 1432.

For examples of sending and receiving I/O status, email and router status using XML files via the router socket server see Section 2.2.1 (Page 47).

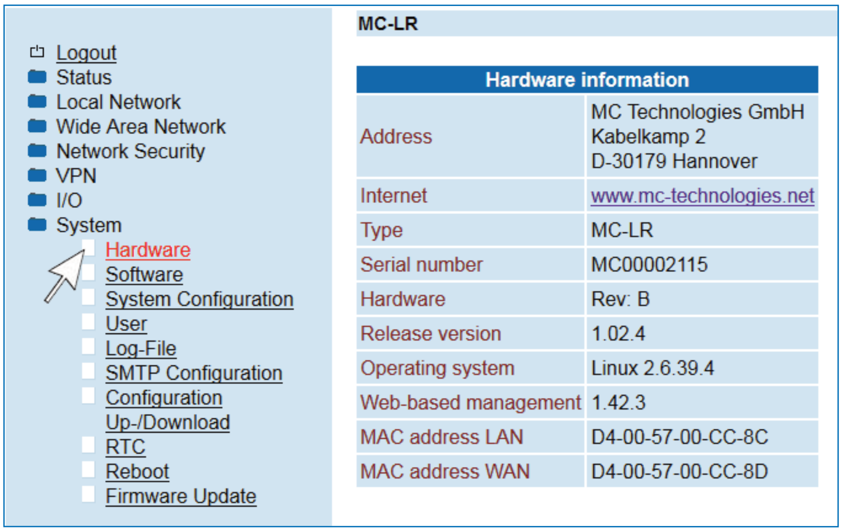


Socket Configuration	
Socket Server	● Disabled ○ Enabled
Server Port (default 1432)	1432
XML Newline Char	LF
XML Bool Values	Verbose

1.9 System

This section provides information on the hardware, software and status of the router.

1.9.1 Hardware



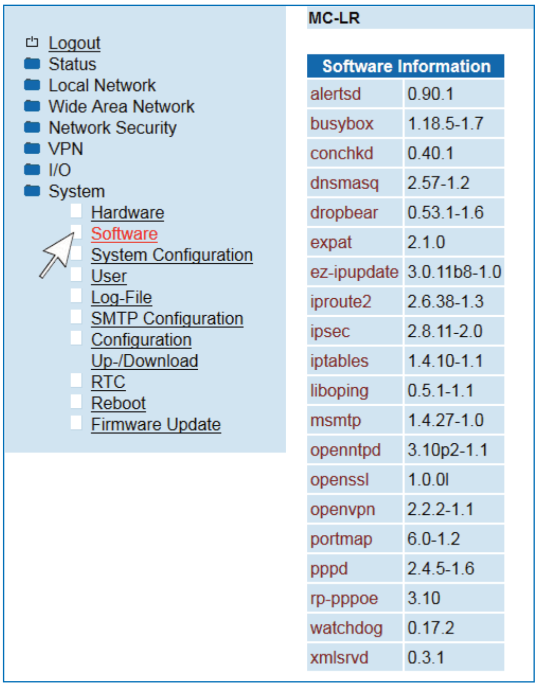
Hardware information	
Address	MC Technologies GmbH Kabelkamp 2 D-30179 Hannover
Internet	www.mc-technologies.net
Type	MC-LR
Serial number	MC00002115
Hardware	Rev: B
Release version	1.02.4
Operating system	Linux 2.6.39.4
Web-based management	1.42.3
MAC address LAN	D4-00-57-00-CC-8C
MAC address WAN	D4-00-57-00-CC-8D

Hardware Information

Address	Address of the manufacturer.
Internet	Internet address of the manufacturer.
Type	Article description of the router.
Serial number	Serial number of the router.
Hardware	Hardware version of router.
Release version	Release version of router software.
Operating system	Version of operating system.
Web-based management	Version of web interface.
MAC address LAN1	MAC address of Ethernet Connection 1.
MAC address LAN2	MAC address of Ethernet Connection 2.

1.9.2 Software

This menu item lists all the software modules installed, including their versions.



MC-LR

Software Information	
alertsd	0.90.1
busybox	1.18.5-1.7
conchkd	0.40.1
dnsmasq	2.57-1.2
dropbear	0.53.1-1.6
expat	2.1.0
ez-ipupdate	3.0.11b8-1.0
iproute2	2.6.38-1.3
ipsec	2.8.11-2.0
iptables	1.4.10-1.1
liboping	0.5.1-1.1
msmtp	1.4.27-1.0
openntpd	3.10p2-1.1
openssl	1.0.0l
openvpn	2.2.2-1.1
portmap	6.0-1.2
pppd	2.4.5-1.6
rp-pppoe	3.10
watchdog	0.17.2
xmlsrvd	0.3.1

1.9.3 System Configuration

Hostname

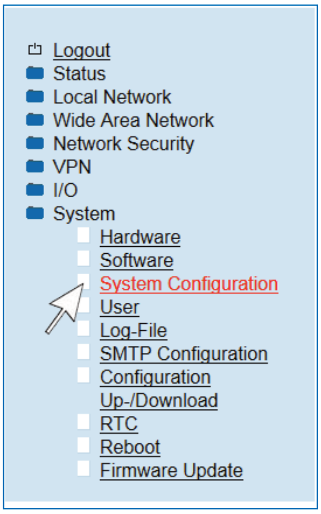
The hostname of the WAN Interface can be changed here.

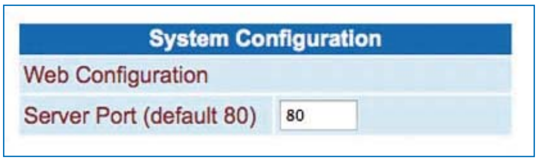
Web Configuration

The router web interface can normally be reached via the browser without additionally indicating a port or by additionally indicating Port 80. The port can be changed here if needed.

Example using router address 192.168.0.1:

Web interface address: 192.168.0.1 or 192.168.0.1:80





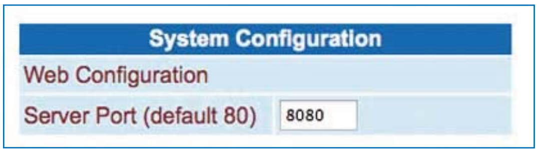
System Configuration

Web Configuration

Server Port (default 80) 80

After changing the port to, for instance,

8080 address of the web interface: 192.168.0.1:8080



System Configuration

Web Configuration

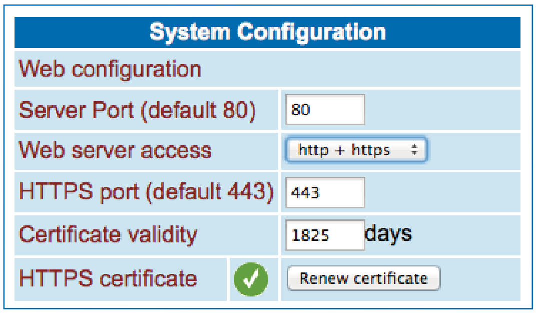
Server Port (default 80) 8080

Note: After clicking "Apply", perform a reboot (Page 44) or restart the router (interrupt the power supply).

Web server access

The router web interface can be accessed via http or https (secure) and/or http + https.

Important note! This function is only supported by 4-port routers (MC xx-4) or 2 port routers (MC xx) with firmware beginning with 2.xx.x (See: "System / Hardware / Release" e.g. 2.04.2).



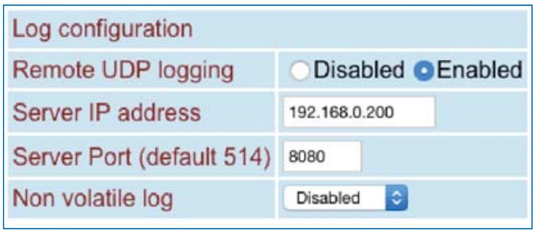
System Configuration	
Web configuration	
Server Port (default 80)	80
Web server access	http + https
HTTPS port (default 443)	443
Certificate validity	1825 days
HTTPS certificate ✓	Renew certificate

Web server access

Web server access	http: http + https: https:	http access only. http and https access. https access only.
HTTPS port (default443)	Change the https default port here.	
Certificate validity	Validity of the https certificate in days.	
HTTPS certificate	Renew certificate:	Local generation of an https certificate. Click again to renew the certificate.

Log Configuration

Log files can be saved on an external log server via UDP.

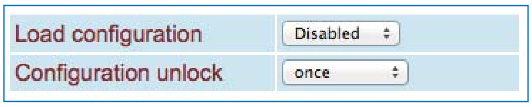


Log configuration	
Remote UDP logging	○ Disabled ● Enabled
Server IP address	192.168.0.200
Server Port (default 514)	8080
Non volatile log	Disabled

Log Configuration

Remote UPD logging	Disabled: Enabled:	No logging on external server. Logging on external server.
Server IP address	Server IP address.	
Server Port (default 514)	Server port.	
Non volatile log	Disabled: USB stick: SD card:	Logging on the internal RAM. Logging on the USB stick on the front plate. Logging on internal SD card. The SD card is not included in the scope of delivery.

Load Configuration



Load configuration	Disabled
Configuration unlock	once

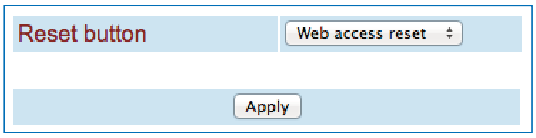
Load configuration

Load configuration	Disabled:	Uploading of the configuration from a USB stick or internal SD card is deactivated.
	USB stick:	A configuration from a USB connected to the router has been uploaded.
	SD card:	A configuration from the internal SD card has been uploaded.
		If the upload was successful, the setting is automatically set to "Disabled". The setting must be reconfigured to USB stick or SD card for a new upload.
	ℹ	**Note:** The internal SD card slot is accessible by removing the back cover.
Configuration unlock	once:	The configuration is only uploaded once from the storage medium (USB stick or SD card).
	always:	The configuration is always uploaded from the storage medium (USB stick or SD card) after the router is booted.
	by Input 1:	The configuration is uploaded from the storage medium (USB stick or SD card) when there is a High signal from the input (I/O).

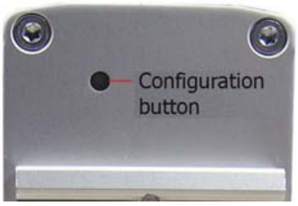
Click "Apply" to save your configuration.

Reset button

To reconfigure the router using the default IP address or to set the configuration to the factory default settings you will need to use the configuration button on the rear side of the device (See Item 1.2.2). The following settings allow you to define which function should be permanently assigned to the configuration button.



Reset button	Web access reset



Reset button

Reset button	Web access reset:	Press the reset button to readdress the router web interface using the default IP address (192.168.0.1) for the Ethernet (LAN) connection. The configuration settings will not be lost when doing so.
	Factory reset:	Press the reset button to readdress the router web interface using the default IP address (192.168.0.1) for the Ethernet (LAN) connection. All configuration settings will be deleted and reset to "Factory Default".

Click "Apply" to save your configuration.

1.2.2 Local IP address is not (no longer) known – configuration button

You must use the configuration button on the back of the device to reconfigure the router back to the default IP address. This function depends on the setting you defined under 1.9.3 "Reset button".

Web access reset

Should you not have changed the default setting, then the router will be set to "Web access reset". Use a pointed object to press the configuration button for at least 5 seconds. The router’s Web interface can now temporarily be readdressed using the default IP address (192.168.0.1) to the Ethernet (LAN) connection. The configuration settings will not be lost when doing this.

ℹ **Note:** The router does not supply an IP address to the connected PC via DHCP. You should thus set the PC to a fixed IP address (e.g. 192.168.0.2, default gateway 192.168.0.1).

You now have access to Web management with the default access information. Please check the settings for the router’s IP address, user name and password and make any necessary changes.

Factory reset

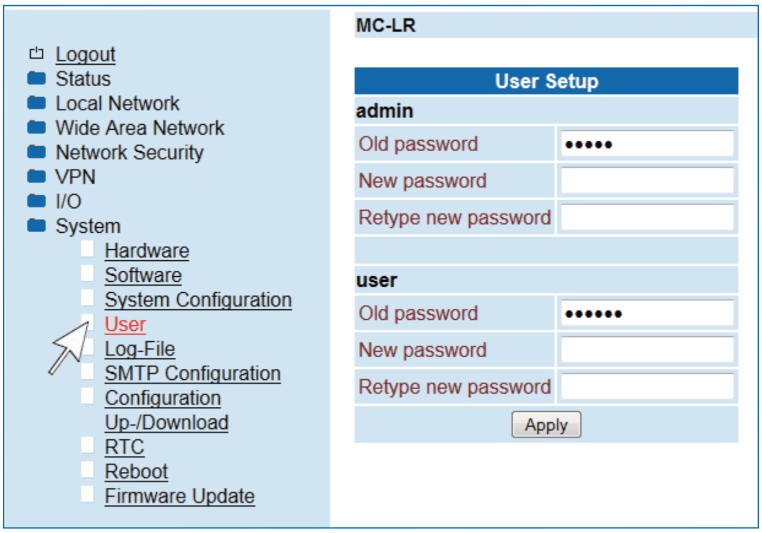
You changed the setting to factory reset (see Item 1.9.3 System configuration / Reset button). Use a pointed object to press the configuration button for at least 5 seconds. The router’s Web interface can now be readdressed using the default IP address (192.168.0.1) to the Ethernet (LAN) connection.

ℹ **Note:** All configuration settings will be deleted and reset to the "Factory Defaults" setting.

1.2.3 Resetting of all settings in the Web interface

Resetting of all router settings to the factory defaults can be carried out via the internal Web interface. To do so, go to "System/Configuration Up-/Download" in the menu and click the "Apply" button for the "Reset to Factory Defaults" setting.

1.9.4 User



MC-LR

User Setup

admin

Old password	•••••
New password	
Retype new password	

user

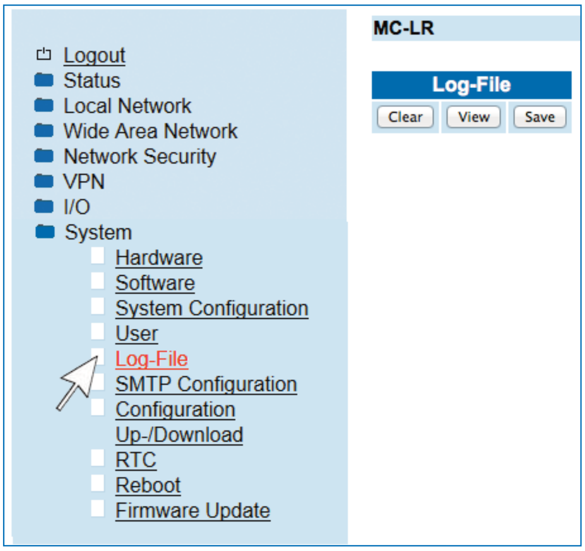
Old password	••••••
New password	
Retype new password	

User Set-up

admin	Access to all areas - password modification (default: admin).
user	Only access - password modification (default: public).

1.9.5 Log-File

All router activities are indicated in a log file. When the maximum storage capacity is reached, the oldest entries are overwritten.



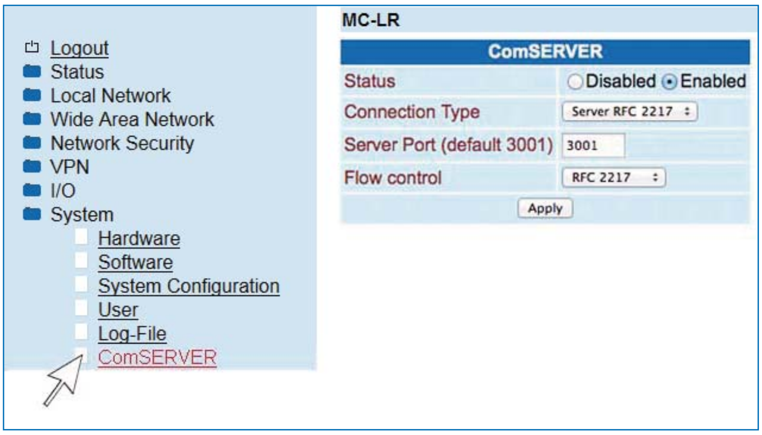
Log File

Clear	All entries are deleted.
View	Log file display.
Save	Storage of the log file as a text file on a user PC.

1.9.6 ComSERVER (Only for MC Router with RS232 or RS485 interface on X1)

For remote access to terminal equipment with a serial interface, a virtual COM port connection can additionally be established over long distances as a standard router function.

MC Technologies MC-LR router is optionally equipped with an RS232 or RS485 interface at X1 for this purpose. For detailed information, please refer to the MC Technologies Application Note 41 Router (COM-Port connection via MC router - RS232/RS485).



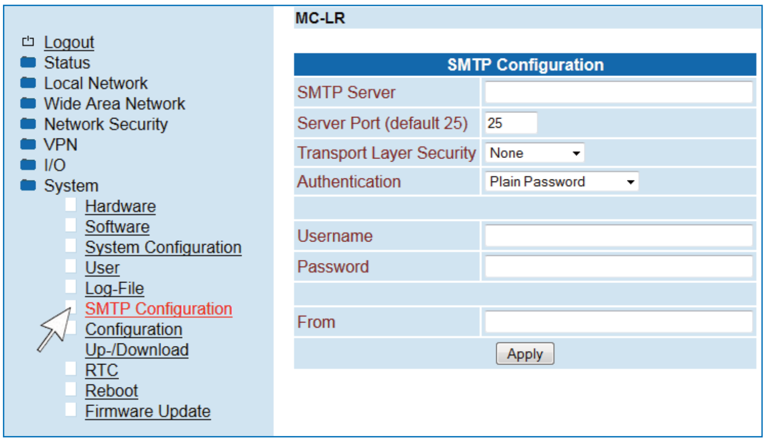
Status	○ Disabled ● Enabled
Connection Type	Server RFC 2217
Server Port (default 3001)	3001
Flow control	RFC 2217

Status	Disabled: The ComServer is deactivated. Enabled: The ComServer is activated.
Connection Type	Server RAW - Usage without RFC 2217 Client Server Protocol. Server RFC 2217 - Usage with RFC 2217 Client Server Protocol.
Server Port (default 3001)	Set the TCP port via which the ComServer is to be addressed.
Flow control	Set flow control: RFC 2217 - With an RS232 application RS485 RTS - With an RS485 application

Note: RFC 2217 is a Standard Client Server Protocol used as a standard protocol when using multiple device servers (ComServer.) The RFC 2217 protocol allows for the use of various "COM port redirector" softwares for virtual Com Port Interfaces on the PC.

1.9.7 SMTP Configuration - sending emails

To send emails as described under 1.8.1 Input (page 33), an email server must be configured with the support of the SMTP protocol. Please use your selected email account's access data.



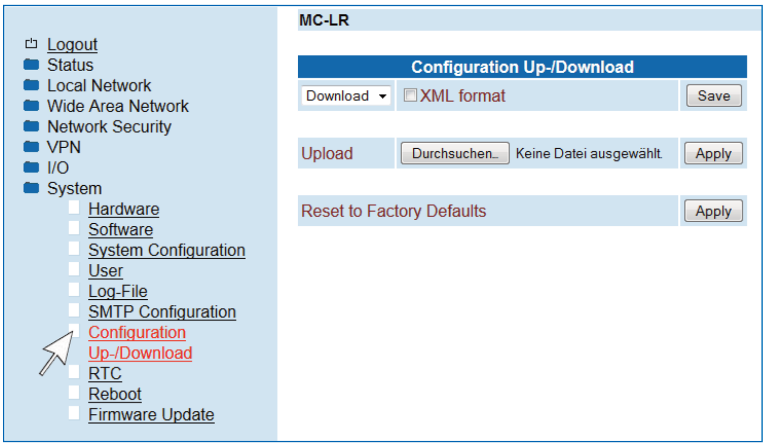
SMTP Server	
Server Port (default 25)	25
Transport Layer Security	None
Authentication	Plain Password
Username	
Password	
From	

SMTP Configuration

SMTP Server	Host name or mail server IP address.
Server Port (default 25)	Mail server port.
Transport Layer Security	None: Unencrypted connection to the mail server. STARTTLS: After STARTTLS encrypted connection to the mail server. SSL/TLS: Encrypted connection to the mail server via SSL/TLS.
Authentication	No authentication: No authentication required. Plain Password: Authentication using user name and password. Encrypted Password: Authentication using user name and password plus encrypted transmission.
Username	User name for logging onto the mail server.
Password	Password for logging onto the mail server.
From	Sender's email address.

1.9.8 Configuration Up-/Download

The configuration can be stored as a CFG file (default) or as an XML file on the user PC. Configurations stored on this PC can be uploaded to the router.

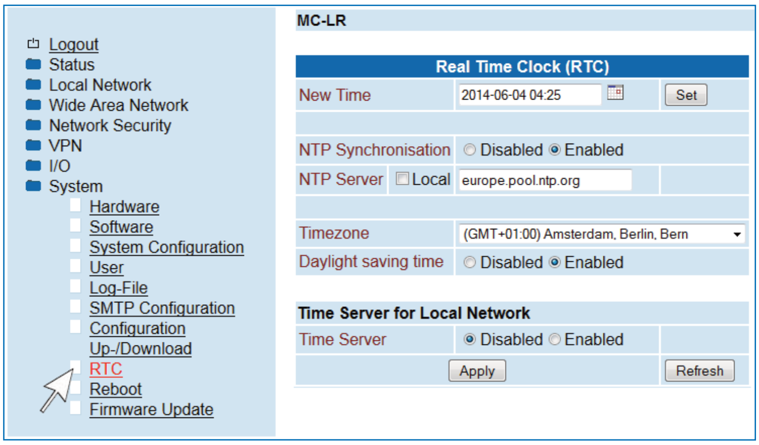


Configuration Up-/Download

Download	Download: Store the current configuration in a file on a connected PC. USB stick: Store the current configuration in a file on a USB stick inserted into the router. SD card: Store the current configuration in a file on the internally inserted SD card (The SD card slot can be accessed by opening the rear housing panel).
XML format	Check this box to save the configuration in XML format.
Upload	Upload a stored configuration.
Reset to Factory Defaults	The configuration is set to factory default settings. VPN certificates stored in the router are not affected.

Note: Configuration using SSH and XML file.
The transfer of an XML file for router configuration can also be carried out using the SSH protocol via the local Ethernet interface or in remote operation. Please follow the description under 2.1 (Page 44).

1.9.9 RTC - Setting the time and date / Time Server



MC-LR

Real Time Clock (RTC)

New Time: 2014-06-04 04:25

NTP Synchronisation: ○ Disabled ● Enabled

NTP Server: □ Local europe.pool.ntp.org

Timezone: (GMT+01:00) Amsterdam, Berlin, Bern

Daylight saving time: ○ Disabled ● Enabled

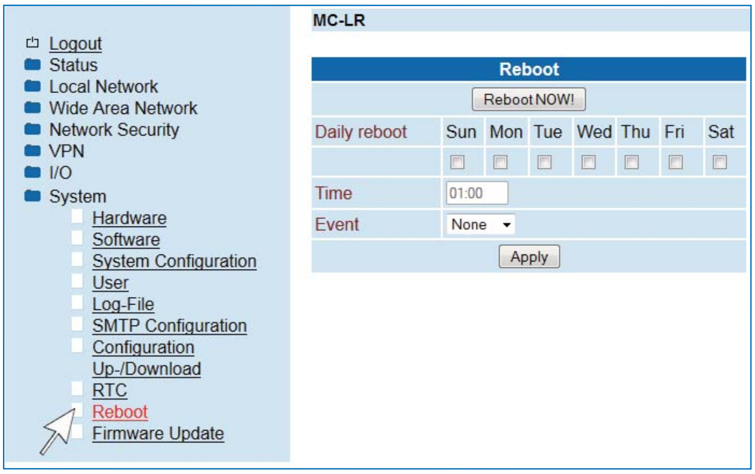
Time Server for Local Network

Time Server: ● Disabled ○ Enabled

Real Time Clock (RTC)

New Time	Manually set the time when no time server (NTP server) is available.	
NTP Synchronisation	Disabled: Enabled:	No NTP synchronisation. The router obtains date and time from a time server.
NTP Server	Local:	Use a local NTP server. NTP - Network Time Protocol - The router can be used as an NTP server for a terminal device connected to "ETH1" or "ETH2". The terminal device must then use the router address as an NTP server. NTP synchronization must be set to "Enabled".
Timezone	Timezone selection.	
Daylight saving time	Disabled: Enabled:	Without daylight saving time. With daylight saving time.
Time Server for Local Network		
Time Server	Disabled: Enabled:	The router is not a time server for the local network. The router is operated as a time server in the local network.

1.9.10 Reboot - restarting the router

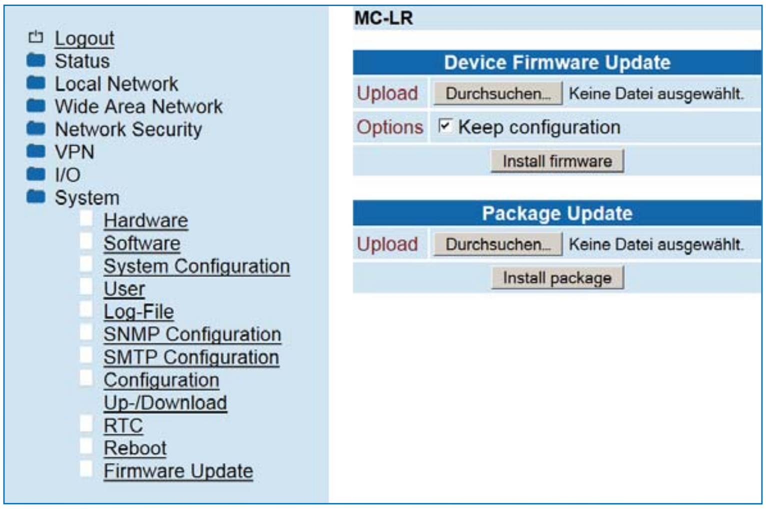


Daily reboot	Sun	Mon	Tue	Wed	Thu	Fri	Sat
	□	□	□	□	□	□	□
Time	01:00						
Event	None						

Reboot

Reboot NOW!	Router immediately shut down and then restarted.
Daily reboot	Set the day of the week for a reboot.
Time	Enter time of reboot in the format: Hour: Minute.
Event	Input1: A restart can be triggered via a HIGH signal to the switching input I/O IN. Please ensure that the switching input is ultimately set back to LOW to prevent another restart. None: No event for a reboot.

1.9.11 Firmware Update



Device Firmware Update

Upload: Keine Datei ausgewählt.

Options: ☑ Keep configuration

Package Update

Upload: Keine Datei ausgewählt.

Device Firmware Update	Upload: Allows you to upload the latest firmware to the router. Options: Select "Keep configuration" if your current configuration should be retained following a firmware update or remove the tick if the configuration should be reset to factory defaults.
Package Update	Upload: Allows you to upload the latest Web interface to the router.

2. 2. Additional functions

2.1 Router configuration using SSH and XML file

The router can be configured using the SSH protocol via the local Ethernet interface or in remote operation.

SSH or Secure Shell refers to both a network protocol and a corresponding programme which allows an encrypted network connection to be generated using a remote device.

In **Linux**, use console input. In **Windows**, we recommend using the programs **plink.exe** and **pscp.exe**, which can be downloaded at putty.org.

The examples below are based on the router default settings:

Username:	**admin**
Password:	**admin**
Router IP-Address:	**192.168.0.1**

2.1.1 Download configuration via SSH

You can download the router configuration as an XML file or as a TGZ file.

For Linux:

```
ssh admin@192.168.0.1 'su -c "/usr/sbin/export_cfg"' > config.xml
```

oder

```
ssh admin@192.168.0.1 'su -c "/usr/sbin/export_cfg tgz"' > config.tgz
```

For Windows with PLINK.EXE

```
plink -2 -pw admin admin@192.168.0.1 "su -c \"/usr/sbin/export_cfg\"" > config.xml
```

oder

```
plink -2 -pw admin admin@192.168.0.1 "su -c \"/usr/sbin/export_cfg tgz\"" > config.tgz
```

2.1.2 Upload configuration via SSH

For Linux:

a. a. Without router reboot:

```
cat config.xml | ssh admin@192.168.0.1 'su -c "/usr/sbin/store_cfg"'
```

b. b. With subsequent router reboot:

```
cat config.xml | ssh admin@192.168.0.1 'su -c "/usr/sbin/store_cfg; /sbin/reboot"'
```

The password is requested interactively by SSH. An automatic batch operation is not possible. You can, however, use the "sshpass" programme to run a script file comprising the password. The script file (for example, cfgupl.sh) must contain the following:

```
#!/bin/bash cat config.xml | ssh admin@192.168.0.1 'su -c "/usr/sbin/store_cfg; /sbin/reboot"'
```

The Linux command is as follows:

```
sshpass -padmin ./cfgupl.sh
```

For Windows with PSCP.EXE and PLINK.EXE

a. Without router-reboot:

```
pscp -scp -pw admin config.xml admin@192.168.0.1:/tmp/cfg.xml
plink -2 -pw admin admin@192.168.0.1 "su -c \"/usr/sbin/store_cfg /tmp/cfg.xml\""
```

b. With subsequent router reboot:

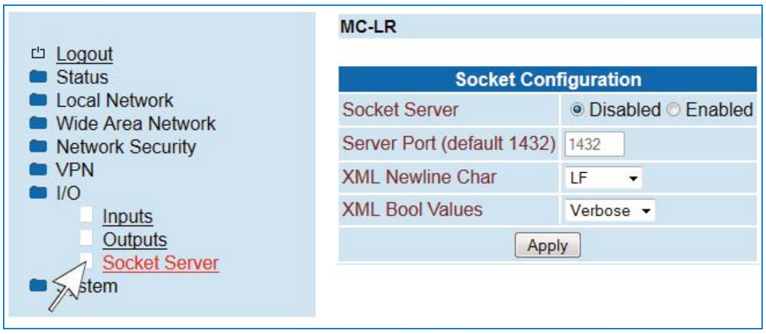
```
pscp -scp -pw admin config.xml admin@192.168.0.1:/tmp/cfg.xml
plink -2 -pw admin admin@192.168.0.1 "su -c \"/usr/sbin/store_cfg /tmp/cfg.xml; /sbin/reboot\""
```

2.2 Sending and receiving IO status, email and router status using XML files via the router socket server

The router includes an integrated socket server and can do the following by receiving XML files:

1. Set and query I/O signals
2. Send messages such as email
3. Query router status

To use these functions, the socket server must be set to "Enabled" as described under 1.8.4 (Page 34). The socket server port can be freely configured, the default setting is port = 1432.



Socket Configuration

Socket Server	● Disabled ○ Enabled
Server Port (default 1432)	1432
XML Newline Char	LF
XML Bool Values	Verbose

2.2.1 Sample for XML files

The following are a few examples of XML file content:

Example: Setting and querying the I/O signals

```
<?xml version="1.0"?>
<io>
<output no="1" value="1"/>
<input no="1"/>
</io>
```

Example: Sending an email

```
<?xml version="1.0"?>
<email to=name1@domain.de cc="name2@domain.de">
<subject>Test Mail</subject>
<body>Dies ist ein E-Mail-Text.
</body>
</email>
```

Example: Querying router status

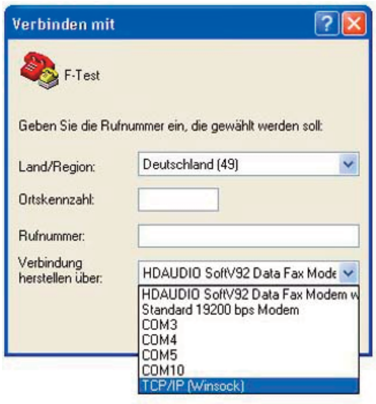
```
<?xml version="1.0"?>
<info>
<device />
<radio />
<ipsec />
<openvpn />
</info>
```

2.2.2 Functions test using Windows HyperTerminal

For a test in Windows, the programme "HyperTerminal" can be used. Hyperterminal can be used to send XML files to the router socket server. The corresponding (XML) files (see 2.2.1) must first be stored on your user PC.

Open Hyperterminal and configure the desired connection. (The example given uses the default settings):

Host address:	192.168.0.1 (Router / Socket Server IP-Address)
Connection number:	1432 (Socket Server Port)
Establish connection via:	TCP/IP (Winsock)



Verbinden mit

F-Test

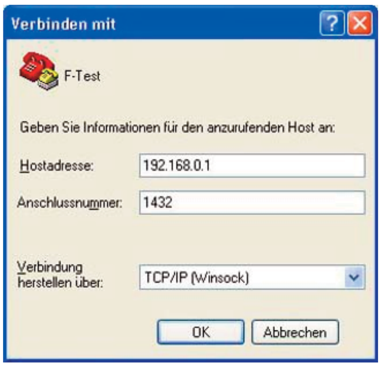
Geben Sie die Rufnummer ein, die gewählt werden soll:

Land/Region: Deutschland (49)

Ortskennzahl:

Rufnummer:

Verbindung herstellen über: HDAUDIO SoftV92 Data Fax Mode



Verbinden mit

F-Test

Geben Sie Informationen für den anzurufenden Host an:

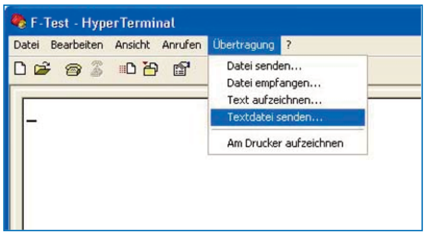
Hostadresse: 192.168.0.1

Anschlussnummer: 1432

Verbindung herstellen über: TCP/IP (Winsock)

Open the connection.

In the HyperTerminal menu "Transfer/send text file....", select the XML file to be transferred.



F-Test - HyperTerminal

After transfer is complete, HyperTerminal displays the answer to your query.

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Company profile

We are a leading European provider of innovative solutions for:

- Machine-to-machine (M2M) hardware and end-to-end solutions
- GSM/GPRS/UMTS/HSPA+/LTE/GPS modules, terminals, router and industrial computers
- Short range modules
- Customer-specific cable assemblies
- Connectors for industry

Thanks to our many years of experience we can offer:

- A wide, competitively priced product range based on German quality standards
- Design and development of the optimum solution specifically tailored to your application
- Competent technical advice for product selection and design-in
- Quick, professional implementation of all accompanying commercial and logistical processes
- Comprehensive service concepts for our products and solutions

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