FarLinX® Connect Mini

Installation & User Manual

Manual Revision 2.00
For use with: FarLinX Connect Mini version 4.2.x

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1 Introduction

This manual describes the installation, configuration, and operation of the FarLinX Connect Mini.

The FarLinX Connect Mini connects an existing HDLC device to a TCP/IP network. A connection to an HDLC device is referred to as a 'Line' and a TCP/IP connection is referred to as a 'Route'. Lines and Routes are 'linked' together to create the desired path for the data flow.

The FarLinX Connect Mini can initiate TCP/IP connections according to the configured 'Route' and it can also accept connections. Inbound TCP/IP connections can be accepted from all IP addresses or can be restricted to known remote IP addresses. Once a TCP session has been established, data can be transferred to and from the connected HDLC device.

The FarLinX Connect Mini supports HDLC bridging over a TCP/IP network when paired with a second FarLinX Connect Mini or other compatible device, and also conversion between HDLC and TCP/IP. Note that if the peer device on the HDLC line supports LAPB then the FarLinX Connect Mini can be configured to act as a LAPB endpoint and thereby route just the LAPB payload over the TCP/IP connection.

1.1 HDLC Bridging over TCP/IP

When one FarLinX Connect Mini receives data in an HDLC frame from a connected HDLC device, it converts the data in the HDLC frame payload (DL-PDU) into a format suitable for transmission over the TCP/IP network to another FarLinX Connect Mini, which then converts the data back into the original HDLC data stream before forwarding it to the connected HDLC device.

1.2 HDLC to TCP/IP Conversion

When the FarLinX Connect Mini receives data in an HDLC frame from a connected HDLC device, it converts the data in the HDLC frame payload (DL-PDU) into a format suitable for transmission over a TCP/IP network to a TCP/IP based application. Refer to the FarLinX Connect Mini Developer's Manual for information on how to develop such an application.

1.3 LAPB to TCP/IP Conversion

When the FarLinX Connect Mini receives data in an LAPB data frame from a connected LAPB device, it converts the payload (DL-SDU) into a format suitable for transmission over a TCP/IP network to a TCP/IP based application. Refer to the FarLinX Connect Mini Developer's Manual for information on how to develop such an application.

The types of conversion that are available are discussed in Section 2 - TCP / HDLC Conversion Options.

2 TCP / HDLC Conversion Options

The three types of conversion options supported by the FarLinX Connect Mini are:

- Character Stream
- Basic Header Conversion
- FarLinX Formatted Header Conversion

For the Character Stream conversion option, data received on the TCP data stream is simply forwarded to the HDLC/LAPB device as and when it is received. Data received from the HDLC/LAPB device is forwarded to the TCP data stream according to the configurable Character Stream Forwarding Criteria (i.e. on receipt, block size, timeout or receipt of the forwarding character).

Character streams are typically used where there is no requirement to retain frame boundaries in the stream of data received from the HDLC/LAPB device.

For the Basic Header and FarLinX Formatted Header (FFH) conversion options, a header is used to describe the message payload transferred over TCP data streams but this header is not transferred over the HDLC/LAPB data stream.

When data is received over the TCP data stream, the device extracts the header from the received TCP payload. The header contains the length of the message in order to delimit the end of the message thus allowing the device to recognise the start of the next message. The device removes the message header before forwarding the message body to the HDLC/LAPB device. In the reverse direction, HDLC/LAPB message, constructs and inserts the appropriate message header before forwarding the entire message (header plus body) over the TCP data stream.

The addition of a header in the TCP data stream allows the original HDLC/LAPB payload to be accurately forwarded to the peer HDLC device.

More details about each of the conversion methods are given below.

2.1 Character Stream

For the Character Stream conversion, no headers are prepended to the incoming HDLC data stream before forwarding the data to the TCP stream. Data received from the HDLC/LAPB device is forwarded to the TCP data stream according to the selected option. The forwarding options are:

- **Receipt**
  Data received from the HDLC/LAPB device is stored in the buffer and forwarded to the TCP stream as soon as it is received.

- **Block Size**
  Data received from the HDLC/LAPB device is stored in the buffer. When the number of bytes received reaches the specified Block Size, those bytes are forwarded to the TCP stream.

- **Timeout**
  Data received from the HDLC/LAPB device is stored in the buffer. A forwarding timer is started upon receipt of the first frame of HDLC/LAPB data. All data in the buffer is forwarded to the TCP stream upon expiry of the forwarding timer and the timer is restarted when the next frame of HDLC/LAPB data is received.

- **Character**
  Data received from the HDLC/LAPB device is stored in the buffer. When the specified forwarding character is received, all data in the buffer is forwarded to the TCP stream, including the forwarding character itself.

2.2 Basic Header Conversion

When the Basic Header message type is selected, the FarLinX Connect Mini will add a 2 byte header (which contains the length of the message + 2 bytes for header itself) to messages received from the HDLC/LAPB device before forwarding them over the TCP connection.

When the device receives data from the TCP connection, it assumes that the TCP payload contains a header of 2 bytes in size. The device will remove this header before forwarding the message to the HDLC/LAPB device.

Header (MSByte)	Header (LSByte)	Data

Data sent to the HDLC/LAPB device is transmitted in its original format, i.e. no concatenation or fragmentation of messages occurs.

If an error is detected within the incoming TCP data stream, the TCP connection is closed. Any data that is present in the buffers will be discarded. The HDLC/LAPB Line will remain active but it won't buffer any data until the TCP connection is re-established.

2.3 FarLinX Formatted Header Conversion

When the FarLinX Formatted Header (FFH) message type is selected, the FarLinX Connect Mini will add a header of 6 bytes (2 bytes for message type, 4 bytes for length) to messages received from the HDLC/LAPB device before forwarding them over the TCP connection.

When the Device receives data from the TCP connection, it treats the first 6 bytes of the TCP payload as the 6 byte header (the length stored in the length field is the length of the data field only and thus doesn't include the 6 bytes of header). The device will remove this header before forwarding the message to the HDLC/LAPB device.

Header (MSByte)	Header (LSByte)	Length (MSByte)	Length	Length	Length (LSByte)	Data

The FFH message type can send both command and data type messages over the TCP connection to another FarLinX Connect Mini or any compatible device. The data type message is used in a similar manner to the Basic Header Type message where the headers are stripped and added as necessary before forwarding data to the HDLC/LAPB device or TCP connection respectively. The command type messages are used to transfer management/control information, such as statistical data, between compatible devices over a TCP connection.

Note that the maximum data message size supported by the FarLinX Connect Mini is 32768 bytes.

3 Initial Configuration

3.1 Connecting to the FarLinX Connect Mini

The configuration for the FarLinX Connect Mini can be viewed and updated using a browser over a TCP/IP network. A Configuring PC, running a web browser (e.g. Google Chrome, Microsoft Edge), is required. Note that initially, the device must be configured using IPv4 addressing (not IPv6).

When the FarLinX Connect Mini is switched on for the first time, the **IP address** of the device is **10.0.0.1**. To enable your computer to connect to a new device, please configure your client PC's IP address to be between 10.0.0.2 and 10.0.0.254.

Once the FarLinX Connect Mini has powered up, connect it to the local area network. Note: If you connect the device with your configuring PC directly, a LAN crossover cable may be needed.

Use the browser to navigate to http://10.0.0.1/
A login dialog will then be presented. Enter the default user credentials:

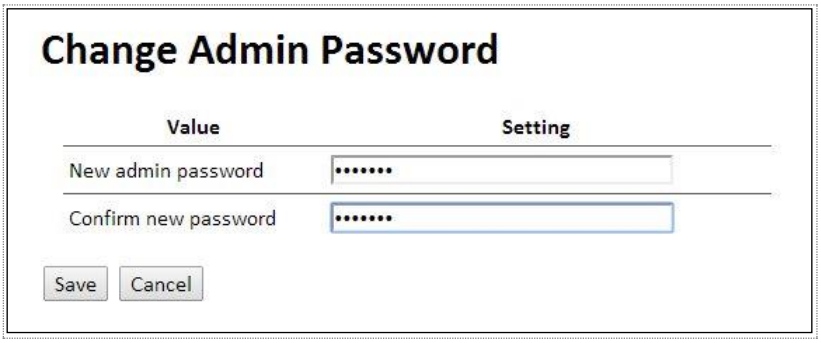
username: **admin**
password: **farlinx**

In order to help with initial management/configuration of the FarLinX Connect Mini, ICMP Pings are, by default, enabled. For security reasons, once the device is up and running, you may wish to disable the ICMP Ping option. If so, this can be easily done via the LAN configuration page.

When you have successfully logged in, there are a number of configuration changes that you should make immediately. These are detailed in the rest of this section.

3.2 Changing the Password

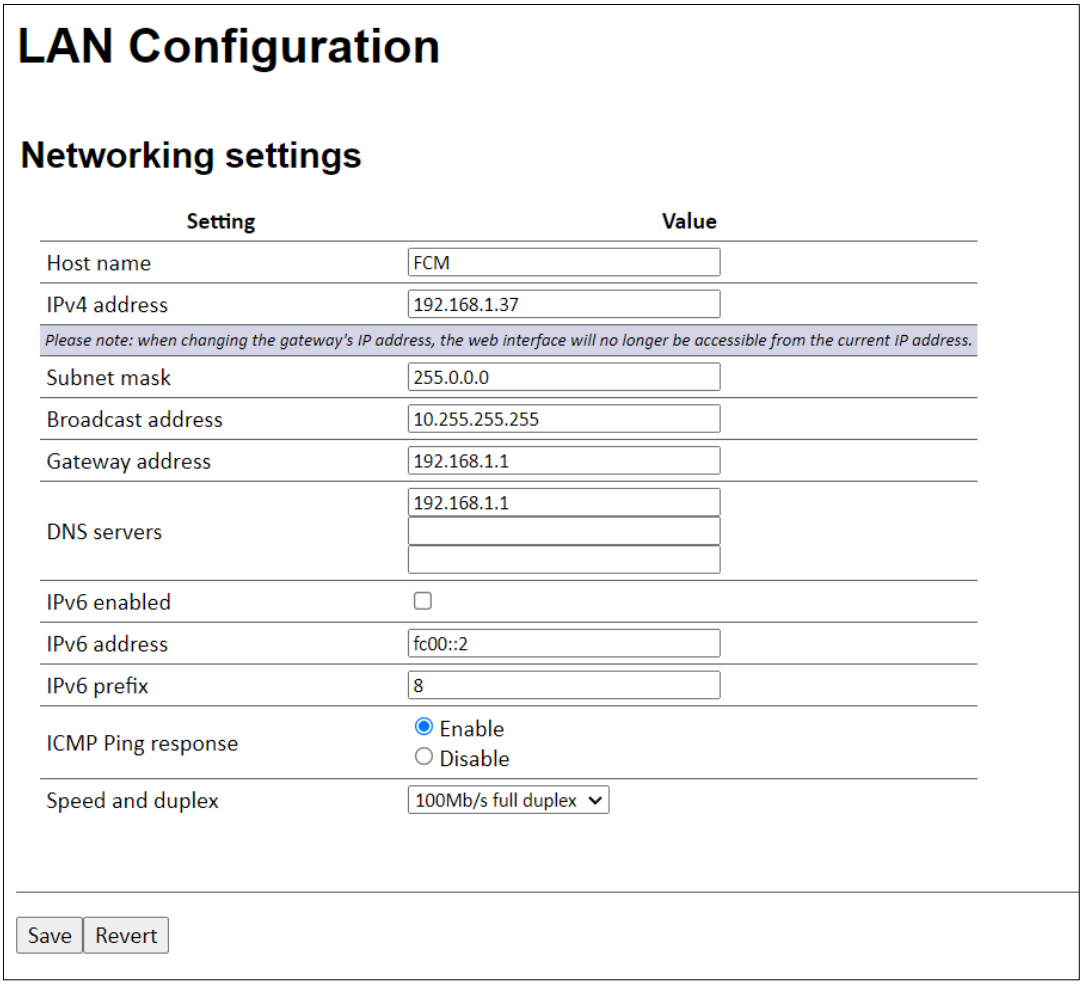
To secure your device, please change the default Administrator password. Click Admin Password under **Administration** in the navigation menu.



Enter the new password and the confirmation password in the form provided. Then click the 'Save' button to apply the new password.

3.3 Changing the IP Address of the FarLinX Connect Mini

To change the IP address and other network settings used by the device to access your local network, click LAN under **Configuration** in the navigation menu.



All the network settings for the device's LAN IP network interface are available in the form provided to be configured as required. Set these up as required for your network (e.g. IP address, Subnet mask etc.).

If you require the FarLinX Connect Mini to be accessible from IPv6 clients, or to use IPv6-based routes, then configure the IPv6 address/prefix for the device to use. Then click 'Save' to save and apply your modified configuration.

Note: You will now need to change the IP address of your configuring PC to permit access to the device with its new

IP address. When you have done this, set your browser to select the new IP address that you have just assigned to the device to continue configuration. For example if you configured an IP address of 192.168.1.100 then use http://192.168.1.100 to access the configuration web interface.

3.4 System Date and Time

The system date and time is very often set automatically using SNTP, but if the FarLinX Connect Mini is not connected to the internet and there is no local time server available this may not be possible. In this case the date and time can be set manually.

It is strongly recommended to set the correct system time as part of the initial configuration of the FarLinX Connect Mini as it is used in every log message and in the creation of filenames during log rotation (see Section 8 - Logs).

To manually set the date and time, click System Date and Time under **Administration** in the navigation menu, enter the date and time and click the 'Save' button.

It is recommended, however, to synchronize the device's time to an SNTP (Simple Network Time Protocol) server. Click SNTP Time Servers under **Administration** in the navigation menu and enter the details for the Primary timeserver, and optional Secondary timeserver.

You will also have to ensure that your LAN settings, e.g. subnet mask, gateway address (and DNS server if you are going to use a name instead of an IP address), are setup correctly in order to access the remote SNTP server.

Because the log files are named with the date and time, it is recommended that you backup log files (if required) and delete any existing log files on the device before changing the date and time.

3.5 SSL/HTTPS

For improved security, the FarLinX Connect Mini provides an option to access the configuration pages through HTTPS (HTTP Secure).

To enable HTTPS, you will first have to generate a private key and then a certificate.

To generate a private key, click on the 'Generate new private key' button.

Note that generating a private key will invalidate any existing certificates or any certificate pending requests.

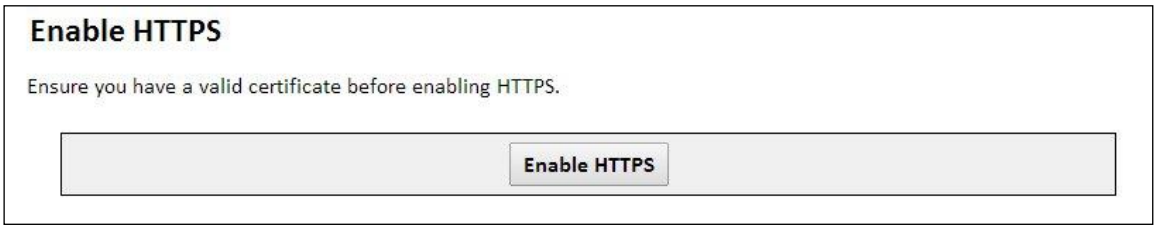
For access over a private LAN, you can generate a self-signed certificate. It is not verified by any external certificate authority, but it can still be used to negotiate SSL encryption.

To generate a self-signed certificate, click on the 'Generate self-signed certificate' button. If you access your FarLinX Connect Mini using your organization's DNS suffix, you should enter that name before pressing the button.

Alternatively, you can generate a certificate signing request by pressing the 'Generate certificate signing request' button. This will generate the 'request' file <hostname>.csr which can be downloaded to your configuring PC by pressing the 'Download' button under Certificate Management. This request can then be passed to the certificate authorities for identity verification.

When a certificate request has been fulfilled by the certificate authority, it can be uploaded to the device by clicking the 'Choose File' button, to select the required certificate and then click 'Upload' to upload it.

Once the certificate has been uploaded, you can click on the 'Enable HTTPS' button to enable HTTPS communications.



When it has been enabled, HTTPS can be disabled by clicking the 'Disable HTTPS' button.

For self-signed certificates you may get a message from your browser warning you that the security certificate is not trusted. It is safe to proceed if you know it is a self-signed certificate with no chain of trust to a certificate server.

When using the secure connection, you will be required to log in again with your username and password.

4 Line and Route Configuration

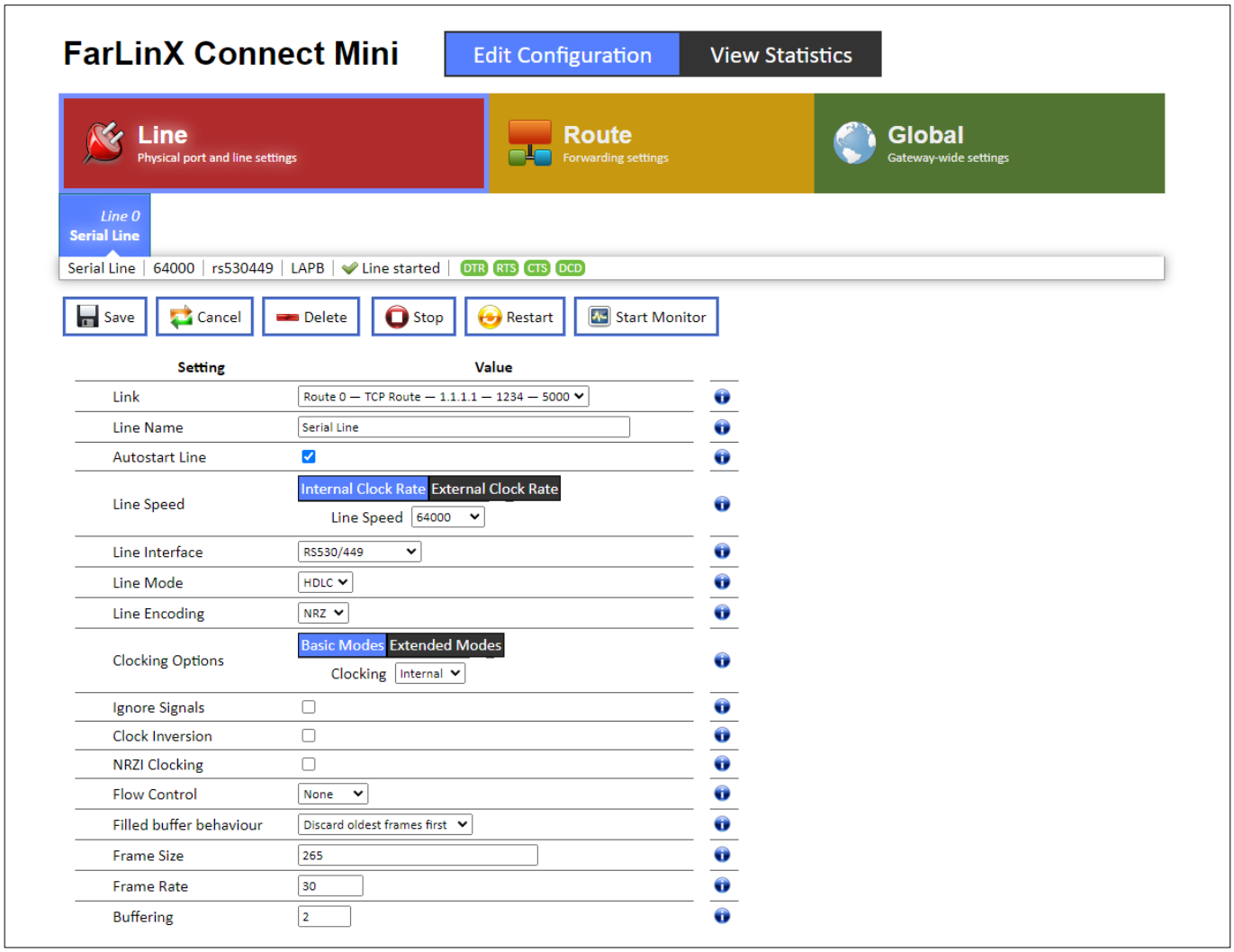
The FarLinX Connect Mini will connect an HDLC-based line[1] with a TCP route. The term 'line' is used to refer to the connection made through the physical DB25 port on the back of the device. The term 'route' is used to refer to a TCP/IP connection made via the LAN port. A route and a line are 'linked' together as a pair.

Note that a route cannot be used unless it is linked to a line.

4.1 Line Configuration

To edit the Line Configuration, click 'Line/Port & Routing' under **Configuration** in the navigation menu, and then 'Edit Configuration' and 'Lines'.

The required Line Configuration is entirely dependent on the HDLC device connected to this port. Refer to the documentation and current configuration for your HDLC device to determine the correct configuration parameters to use.



Enter the required parameters as described in Section 4.1.1 - Line Configuration Parameters. When you have finished, click on the 'Save' button. If the parameters are valid, they are saved, if they're not you will be prompted to

[1] If line is running the LAPB protocol, then the FarLinX Connect Mini can be configured to terminate the LAPB connection and relay LAPB payload (DL-SDU) rather than HDLC frame contents (DL-PDU).

fix them before they are saved.

The ‘Cancel’ button can be used to reload the current line configuration if your changes haven’t already been saved.

A saved line configuration can be deleted by pressing the ‘Delete’ button. This will update and save the line configuration with default values.

Note that on the FarLinX Connect Mini, this configuration can be stored for one line only. Other products in the range can support additional HDLC lines.

4.1.1 Line Configuration Parameters

The configurable line parameters are as follows:

- **Link**
The Link parameter links a TCP Route to an HDLC-based Line. A maximum of 8 routes can be configured, but only a single route can be linked to the line at a time. The text in the name field shows: Route ID - Route Name - Destination IP address - Destination Port - Local Port.

- **Line Name**
The Line Name text field allows you to store an identifiable name for the line. The line name entered is used within the Route Configuration page to identify which line the route is linked to.

- **Autostart Line**
When this option is ticked, the FarLinX Connect Mini attempts to automatically start the HDLC line following a power-on or a restart. If the option is not selected, the line can be manually started using the ‘Start’ button. If this option is not selected then the line will be automatically started once the corresponding route has been established.

- **Line Speed**
This value specifies the line speed (i.e. clock rate) in bits per second to be used on this line. This is always required if the internal clock option is used since it explicitly determines the rate at which clocks are generated on the line by the FarLinX Connect Mini. Even if external clocking is selected, this value should match the externally generated clocking rate of the line since this value may be used to calculate the size of the device’s buffers.

- **Line Interface**
The FarLinX Connect Mini supports the following network interfaces:
  - X.21 also known as V.11
  - V.24 also known as RS232C and X.21bis
  - V.35
  - RS485 Full Duplex
  - RS485 Half Duplex
  - RS530/449 uses RS-422 level signalling

- **Line Mode**
The FarLinX Connect Mini supports the following line modes:
  - HDLC – DL-PDUs are relayed between the peer HDLC and TCP endpoints
  - LAPB – DL-SDUs are relayed between the peer LAPB and TCP endpoints

- **Line Encoding**
The FarLinX Connect Mini supports the following line encodings:
  - NRZ
  - NRZI
  - FM0
  - FM1

- **Clocking Options**

The following basic clocking options are supported:

- Internal
- External

Select 'Internal' to enable internal clock generation for the line (at the rate specified in **'**Line Speed'). If clocking is to be generated by the HDLC/LAPB peer then select the External clocking option. If the FarLinX Connect Mini is acting as a DCE then an internal clock is normally required.

The following extended clocking options are supported:

- DCE Terminal Timing
- DTE Terminal Timing

Terminal Timing provides system-wide clock synchronisation. The following table shows the clock directions for DTE_TT and DCE_TT.

	DTE_TT	DCE_TT
TxD	OUT	IN
RxD	IN	OUT
TxC	IN	OUT
RxC	IN	OUT
TT	OUT	IN

For DTE_TT, the incoming TxC is looped to TT and TT is returned with TxD to the DCE, where TT clocks the data in the DCE. For DCE_TT, TT is used to clock TxD into the DCE.

Note that terminal timing is not relevant for X.21 line interface.

- **Ignore Signals**

Select this option to ignore the modem signals. Depending on the selection of the Line Interface, modem signals may or may not be present (i.e. modem signals are not present for RS485 Full and Half duplex modes). When they are present, they can be used to indicate that a peer HDLC device is connected (i.e. Indicate for X.21, DCD for V.24, V.35 and RS530/449) and also used for flow control (i.e. CTS for V24, V.35 and RS530/449).
Normally, incoming TCP data is only buffered if the line signals indicate that an HDLC device is present. If 'Ignore Signals' is selected this check cannot be made, so you should exercise care to ensure that buffer overflows don't occur.
The 'Start TCP Route - When line signals are present' option is not applicable if 'Ignore Signals' is selected.
The 'Flow Control' option is not applicable if 'Ignore Signals' is selected.

- **Clock Inversion**

Select this option to change the phase of the receive clock by 180 degrees for received data. If you are seeing excessive receive errors (in the Line Statistics display) and the port is configured for internal clocking then inverting the clock might solve the problem.

- **NRZI Clocking**

This option is used in conjunction with NRZI encoding. If selected, the FarLinX Connect Mini uses the separate incoming NRZI clock to clock in the data instead of recovering the clock from the incoming data stream.

- **Flow Control**

Select this option to choose the type of flow control to use on the line. With this option set to RTS/CTS, when the incoming HDLC/LAPB buffer is nearly full, the FarLinX Connect Mini will request that the connected HDLC device doesn't send any more data by deasserting its RTS signal. When there's room in the buffer for another frame, the device will assert its RTS signal. This hardware based flow control will only be effective if the peer HDLC/LAPB device supports it. If it doesn't, there will be no room in the buffer for the incoming data so data will be discarded according to the configured Filled Buffer Behaviour policy. If Line Mode is set to LAPB then level 2 based flow control options can be used instead: L2/L2.1. In this case flow control is supported with the use of RR/RNR frames instead. L2.1 supports an optimisation to send all queued upstream data in one TCP write (where possible) when the TCP connection's flow control state changes from on to off.

- **Filled Buffer Behaviour**

The two options are:

  - Discard oldest frames first
  - Discard newest frames first

There are two data buffers within the FarLinX Connect Mini, one to store incoming HDLC/LAPB data before transmission over the TCP connection and one to store incoming TCP data before transmission to the HDLC/LAPB device. It is possible under certain circumstances that either of these buffers can become full. This option allows you to choose whether to discard the oldest data in the buffer or the newest incoming data.

- **Frame Size**

This option defines the maximum frame size that is allowed to be used for communication between the FarLinX Connect Mini and the connected HDLC/LAPB device.

The minimum and maximum permissible frame sizes are 1 byte and 32768 bytes respectively.

- **Frame Rate**

This option describes the maximum number of frames per second that the FarLinX Connect Mini is expected to receive from the connected HDLC device. This optional configuration setting enables the device to optimise its buffering to maximise performance.

The specified frame rate must be less than the maximum frame rate possible for a given line rate and frame size.

The maximum frame rate (in frames/sec), can be calculated using the following formula:

frame rate = (line speed/8) / frame size

The frame rate value may be used to calculate the amount of buffering required for the buffer.

- **Buffering**

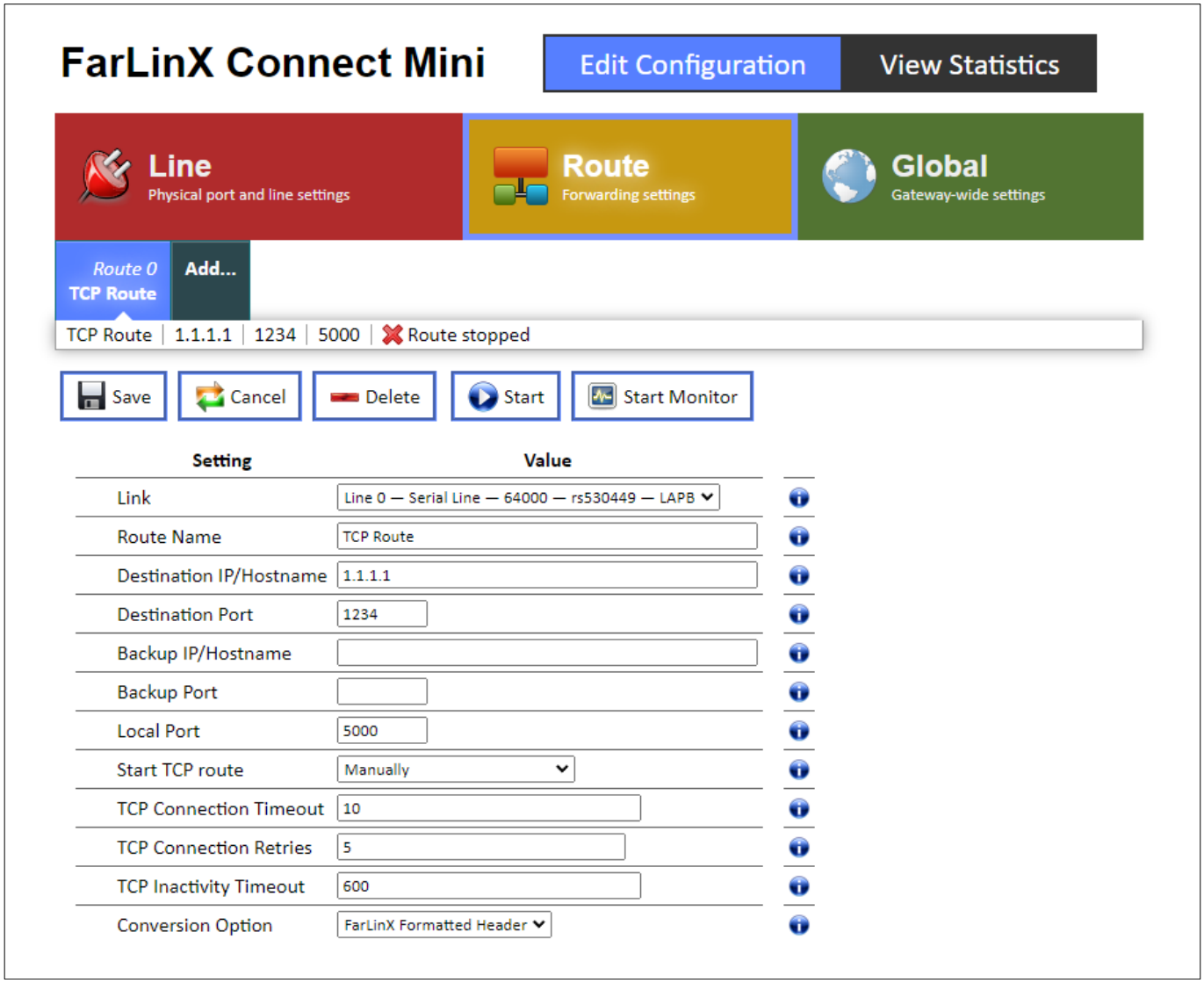
This option defines the maximum number of seconds worth of buffering that is required for the data buffers. The default value of 1 second is recommended for most scenarios, but it can be increased if necessary.

The minimum and maximum values for buffering are 0 and 60 respectively. Note that a buffering time of 0 will potentially cause buffer overflows at higher line rates.

4.2 Route Configuration

A Route defines the remote partner, whether this is another FarLinX Connect Mini or a TCP application. It also defines the formatting of the data carried over TCP/IP.

To edit the Route Configuration, click Line/Port & Routing under **Configuration** in the navigation menu, and then 'Edit Configuration' and 'Routes'.



To add a new route, select the 'Add' option and enter the required parameters as described in Section 4.2.1 - Route Configuration Parameters. When you have finished, click on the 'Save' button. If the parameters are valid, they are saved. If they are not valid, you will be prompted to correct them before they are saved.

Once a route has been saved an entry for it is added to the status area above the command buttons.

The 'Cancel' button can be used to reload the current configuration if your changes haven't already been saved.

The route can only be active if it is linked to a line.

4.2.1 Route Configuration Parameters

The following sections detail the configurable route parameters:

- **Link**

The Link parameter links the TCP Route to the configured HDLC/LAPB Line.

- **Route Name**

This text field allows you to store an identifiable name for the route. The route name is used within the Line Configuration page to identify which route the line is linked to. The maximum length of the route name is 32 characters.

- **Destination IP/Hostname**

Enter the IP address of the FarLinX Connect Mini, compatible device or TCP/IP application that you wish to connect to over the TCP network. Both IPv4 and IPv6 addresses are acceptable. Hostnames (DNS name) can also be entered.

The wildcard character '*' can also be entered if you require this FarLinX Connect Mini not to make any outgoing TCP connection attempts. If the wildcard character '*' is entered, the device will listen on the configured Local Port
and accept incoming TCP connections from any IP address.

- **Destination Port**

Enter the TCP port number which the remote FarLinX Connect Mini, compatible device or TCP/IP application is listening on for incoming connections.

- **Backup Destination IP/HostName**

You can optionally enter a backup IP address which could be used if a connection cannot be established to the primary Destination IP address. IPv4, IPv6 and hostnames are acceptable, the wildcard character '*' isn't. Note that the FarLinX Connect Mini will also accept incoming connections from the Backup Destination IP address.

- **Backup Port**

Enter the TCP port number which the backup remote FarLinX Connect Mini, compatible device or TCP/IP application is listening on for incoming connections. Note that this text field only becomes visible if there is an entry for the Backup Destination IP/Hostname.

- **Local Port**

Enter the TCP port number on which to listen on for incoming connections.

- **Start TCP Route**

There are four options to start a TCP route. Details of each option are given in Section 4.3.2 - Route Operation.

  - Manually
  - Immediately
  - When HDLC Data is received
  - On presence of HDLC line signals

- **TCP Connection Timeout**

Enter the number of seconds before the current TCP connection attempt is aborted and the next one attempted.
Range: 1 second to 10,000 seconds

- **TCP Connection Retries**

Enter the number of times to reattempt the TCP connection. If the initial attempt to establish a TCP connection to the Destination IP address fails, the FarLinX Connect Mini will reattempt to establish a connection this many times. If those attempts fail, connection attempts will be made to the Backup IP address, if set, this many times.

If the FarLinX Connect Mini is in the 'Immediately' mode, then the whole re-connection process will repeat after the same delay as configured for **TCP Connection Timeout**.
Range: 1 to 255

- **TCP Inactivity Timeout**

Enter the period of inactivity after which the TCP connection should be closed. This value is only used for TCP routes for which the TCP connection trigger is set to Line Signals or Data Received.

Range: 1 second to 10,000 seconds

- **Conversion Option**

Select the required conversion option. This option will specify if which kind of header, if any, is prepended to the data packets before transmission over the TCP network.

The options are:

▪ FarLinX Formatted Header	A 6-byte header, can be used for sending proprietary commands or data to a remote FarLinX Connect Mini or compatible device.
▪ Character Stream	No headers are added to the data stream before transmission over the TCP network.
▪ Basic Header	A simple 2-byte header indicating the length of the data that follows. The size value includes the length of the header.
▪ Basic Header-V2	A simple 2-byte header indicating the length of the data that follows. The size value does **not** include the length of the header.

For the Character Stream option, a sub-menu is also presented with the following options:

▪ Receipt	Forwards data over the TCP connection as soon as the data is received over the HDLC connection.
▪ BlockSize	Forwards data over the TCP connection when this many bytes have been received over the HDLC connection. Range: 1 byte to 4096 bytes.
▪ Timeout	Forwards data over the TCP connection after the specified timeout. The timer is restarted upon receipt of the first character since the previous timeout.
▪ Character	Forwards data over the TCP connection when the specified character is received. Any hexadecimal value can be used for the forwarding character ranging from 0x00 to 0xFF.

It is recommended that the FarLinX Formatted Header option be used when the remote device is another FarLinX Connect Mini device. Where the remote partner is a new TCP/IP application then Basic Header or FarLinX Formatted Header could be suitable as it will allow the application to see the payload data as it was received on the line and have greater control over data to be sent on the HDLC/LAPB line. Character Stream is most suitable when the remote partner is an existing TCP/IP application expecting a simple datastream of characters from the HDLC/LAPB device.

4.3 Line and Route Operation

Lines and routes can be started and stopped independently of each other. The default options are to start the HDLC/LAPB line and TCP route following a power-on or a restart.

4.3.1 Line Operation

The HDLC/LAPB line can be started under the following circumstances:

- **Manually**

The line can be started by pressing the ‘Start’ button on the Web Interface.

- **Power On or Restart**

If the ‘Autostart Line’ option is selected for the line, then the FarLinX Connect Mini will attempt to start the HDLC/LAPB line following a power-on or a restart.

- **TCP connection**

When the FarLinX Connect Mini establishes a TCP connection, the line will be automatically started if it’s not already running.

Any changes that you make to the line configuration parameters are applied to the line when it is started. This means that a line which is already running when a configuration takes place will continue to use the old parameters until it is restarted. In this situation, the FarLinX Connect Mini will display the **‘The configuration won’t be displayed until the line is next started’** message on the Web Interface.

Note that the HDLC port will only be opened if the line configuration for the port is valid. If the line configuration is not valid, the FarLinX Connect Mini will display a 'Line Configuration Invalid' message in the 'Status' area on the Web Interface. Additionally, the 'System Warning' message (see Section 6 - System Warning Messages) will be displayed.

A line can be stopped under the following circumstances:

- **Manually**
  The line can be stopped by pressing the 'Stop' button on the Web Interface.

- **Line failure**
  If the FarLinX Connect Mini detects that there is an error on the port, it will stop the line.

Note that if data transfer is in progress when the line is stopped any data that is stored in the buffers may be lost.

4.3.2 Route Operation

The FarLinX Connect Mini can act as both a server (i.e. accepts incoming TCP connections) and as a client (initiates TCP connections).

When initiating a TCP connection, the device attempts to make a TCP connection to the configured Destination IP address. If the connection attempt fails, it will try again after the time specified in 'TCP Connection Timeout'. It will then repeat the connection attempts until it reaches the number of retries specified in 'TCP Connection Retries'.
The device will then attempt to make a connection to the Backup IP address, if you have entered one, until the number of retries specified in 'TCP Connection Retries', has been reached.

It is possible that two devices can try and establish a connection to each other at the same time. If this situation occurs, the FarLinX Connect Mini will abort the outgoing TCP connection as soon as it accepts the incoming TCP connection, so that only one of the connections will succeed.

TCP Routes are started under the following circumstances:

- **Manually**
  The route can be started by pressing the 'Start' button on the Web Interface.

- **Immediately**
  In this connection mode, the FarLinX Connect Mini will attempt to initiate a TCP connection following a power on or a restart. It will also attempt to initiate the TCP connection following a Route Configuration change, if the 'Start TCP Route' option is set to 'Immediately'.

  If the connection attempts fail, it will wait for a period of <TCP Connection Timeout> seconds before restarting the connection attempts.

- **Data Received**
  If the FarLinX Connect Mini receives data from the HDLC device, and the TCP route has yet to be started, the device will initiate a TCP connection. The incoming HDLC data will be buffered whilst the TCP connection is being established. If the connection is successful, the data is forwarded over the TCP connection. If the TCP connection cannot be established the incoming buffer will eventually fill up and data loss will occur.

- **Line Signals Change**
  If the FarLinX Connect Mini detects that the connected HDLC device is ready to communicate (i.e. by asserting CTS (for V24), or Indicate (for X21)), and the TCP route has yet to be started, it will initiate a TCP connection. Any incoming HDLC data will be buffered whilst the TCP connection is being established and forwarded if the TCP connection is successful. If the TCP connection cannot be established the incoming buffer will eventually fill up and data loss may occur.

- **Incoming TCP Connection**
  The FarLinX Connect Mini listens for incoming TCP connections on the 'Local Port'. If a connection attempt is detected, the IP address of the incoming connection is compared to the Destination and Backup IP addresses. If either match, or if the Destination IP address is '*', the connection attempt is accepted. If the linked line is not

already started, that is then also started.

If a route is stopped, the FarLinX Connect Mini will wait for a period of <TCP Connection Timeout> seconds and then try to re-establish the route by making an outgoing TCP connection.

TCP Routes can be stopped by:

- **Manually**
The route can be stopped by pressing the ‘Stop’ button on the Web Interface.

- **Inactivity Timeout**
If there is no activity on the TCP route for the time specified in ‘TCP Inactivity Timeout’, the FarLinX Connect Mini will stop the route by closing the TCP connection. The ‘Inactivity Timeout’ mode is only applicable to routes that were established using the start on ‘Line Signals’ or ‘Data Received’ modes.

- **On Detection Of Errors**
For the Basic Header and FarLinX Formatted Header modes, the FarLinX Connect Mini reads the headers to determine the length of the following data packets. If it detects that there is corruption in the headers, it will log an error message in the Event Log (if the log level is set accordingly) and close the route.

- **Peer Disconnection**
If the connected peer device terminates the connection, the FarLinX Connect Mini will close the route.

- **TCP Keep Alives**
The FarLinX Connect Mini uses TCP Keep Alives to detect communication loss with a remote peer, (for example if a cable is unplugged). In this way, the device will normally be able to detect disconnections within about 10s, even when a session is idle.

Note that if data transfer is in progress when the route is stopped any data that is stored in the buffers may be lost.

4.4 Line and Route Status

The status of the Line and Route is shown in the ‘Status’ area towards the top of the page in the Line and Route Configuration pages.

For the Line status area, the following information is displayed:

- Line Name
- Line Speed
- Line Interface
- Line Mode
- Line Status (Line started, Line stopped)
- Line Signals (if the signal is asserted it is displayed with a green background, grey otherwise)

For the Route Status area, the following information is displayed:

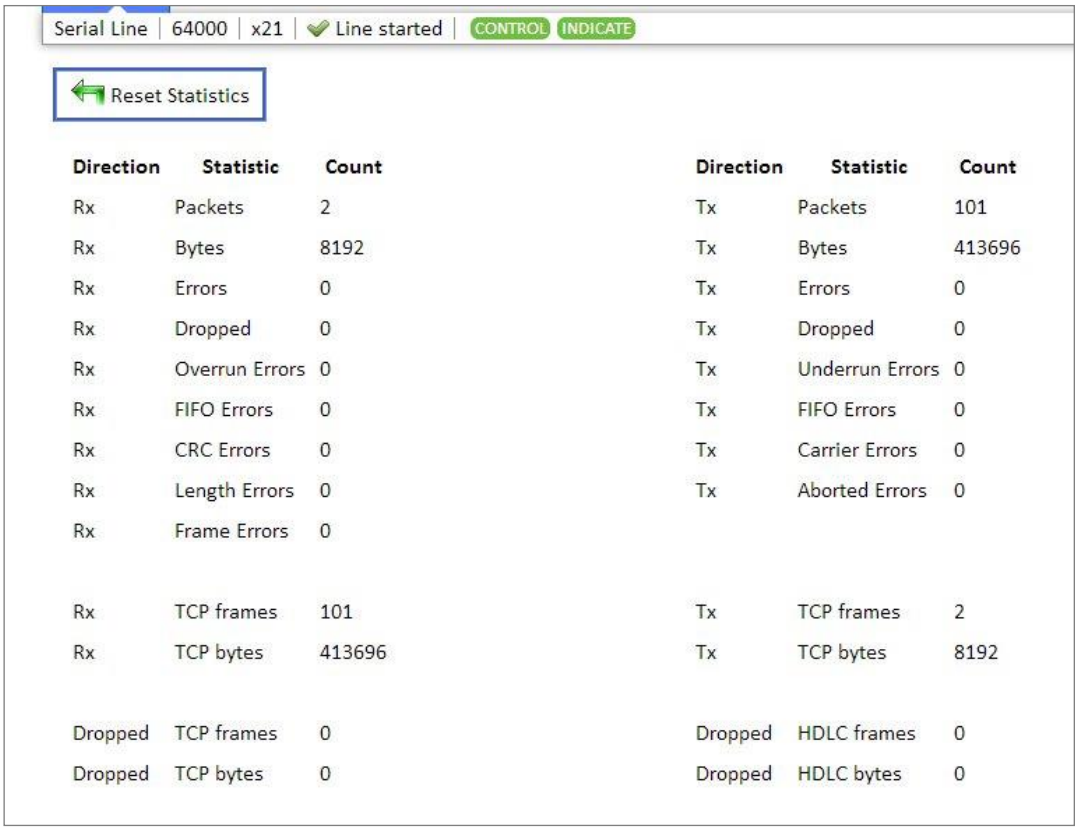
- Route Name
- Destination IP Address
- Destination Port
- Local Port
- Route Status (‘Route connected’ for outgoing connections; ‘Route accepted’ for incoming connections)
- Connection IP Address
- Connection Port (destination/backup port for outgoing connections; peer’s ephemeral port for incoming connections)

5 Statistics

The FarLinX Connect Mini provides detailed line statistics and status information. If the device is connected to a remote FarLinX Connect Mini using the FarLinX Formatted Header protocol, it can also display the line statistics of the remote device.

The individual statistics are detailed below:

5.1 FarLinX Connect Local Statistics



Direction	Statistic	Count	Direction	Statistic	Count
Rx	Packets	2	Tx	Packets	101
Rx	Bytes	8192	Tx	Bytes	413696
Rx	Errors	0	Tx	Errors	0
Rx	Dropped	0	Tx	Dropped	0
Rx	Overrun Errors	0	Tx	Underrun Errors	0
Rx	FIFO Errors	0	Tx	FIFO Errors	0
Rx	CRC Errors	0	Tx	Carrier Errors	0
Rx	Length Errors	0	Tx	Aborted Errors	0
Rx	Frame Errors	0			
Rx	TCP frames	101	Tx	TCP frames	2
Rx	TCP bytes	413696	Tx	TCP bytes	8192
Dropped	TCP frames	0	Dropped	HDLC frames	0
Dropped	TCP bytes	0	Dropped	HDLC bytes	0

5.1.1 Line statistics description

- **Rx packets** Number of frames received over the HDLC line
- **Rx bytes** Number of bytes received over the HDLC line
- **Rx errors** Total number of receive errors (sum of receive errors listed below)
- **Rx dropped** Number of frames dropped due to no space in the receive buffer
- **Rx length errors** Number of receiver buffer data length errors
- **Rx overrun errors** Number of receiver buffer overflows
- **Rx CRC errors** Number of receiver buffer CRC errors
- **Rx frame errors** Number of received frame alignment errors
- **Rx FIFO errors** Number of receiver hardware FIFO errors

- **Tx packets** Number of frames transmitted over the HDLC line
- **Tx bytes** Number of bytes transmitted over the HDLC line
- **Tx errors** Total number of transmit errors (sum of transmit errors listed below)
- **Tx dropped** Number of frames dropped due to no space in the transmit buffer
- **Tx aborted errors** Number of transmit aborted errors
- **Tx carrier errors** Number of attempts to transmit with no carrier present
- **Tx FIFO errors** (Not currently used)
- **Tx underrun errors** (Not currently used)

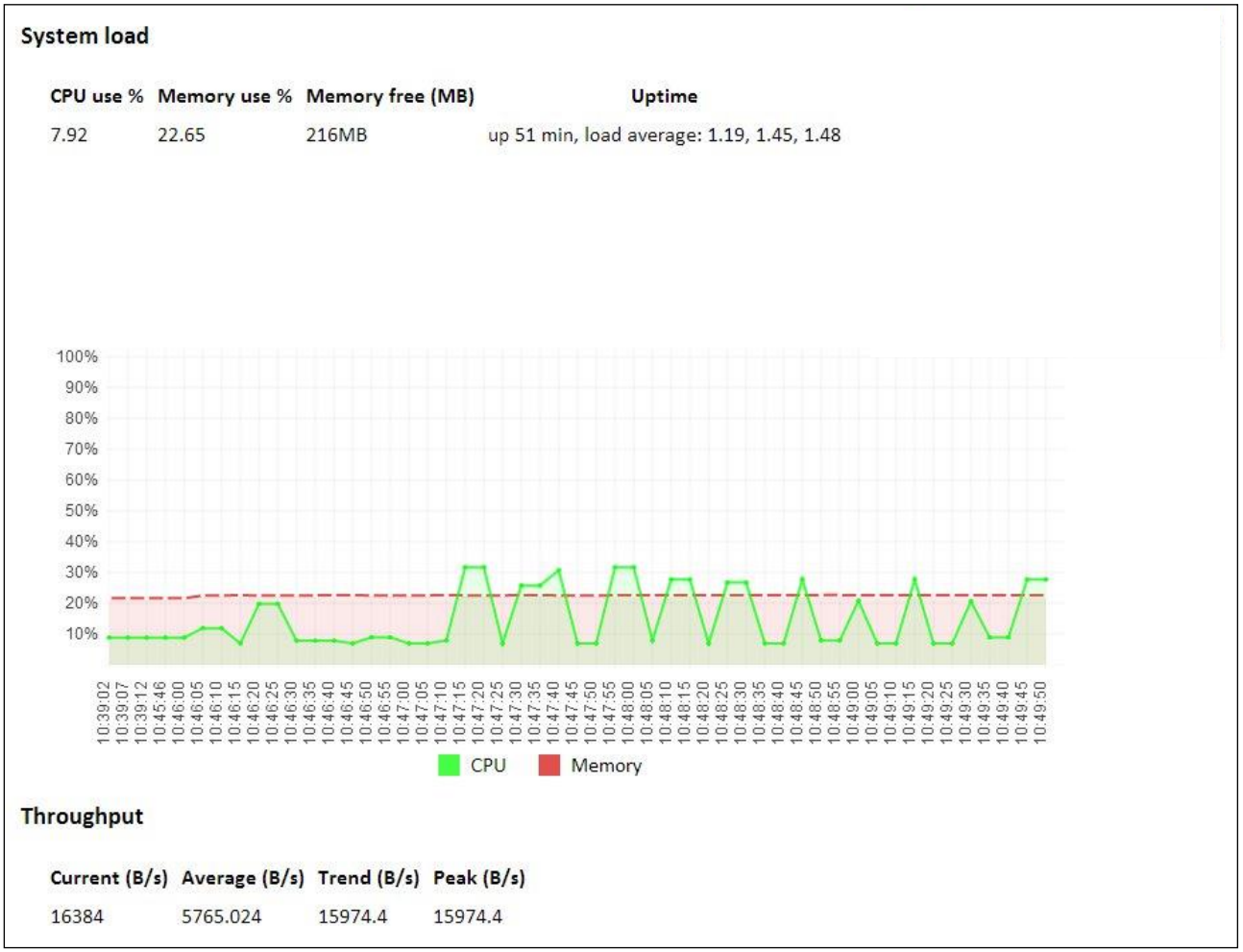
- **Dropped HDLC frames** Total number of incoming HDLC frames that have been dropped due to the HDLC buffer being full
- **Dropped HDLC bytes** Total number of incoming HDLC bytes that have been dropped due to the HDLC buffer being full

5.1.2 Route Statistics description

- **Rx TCP frames** Total number of data frames received by the device over TCP
- **Rx TCP bytes** Total number of data bytes received by the device over TCP. This value doesn't include Basic or FFH type headers or any data associated with FFH Commands
- **Tx TCP frames** Total number of data frames transmitted by the device over TCP
- **Tx TCP bytes** Total number of data bytes transmitted by the device over TCP. This value doesn't include Basic or FFH type headers or any data associated with FFH Commands
- **Dropped TCP frames** Total number of incoming TCP frames that have been dropped due to the TCP buffer being full.
- **Dropped TCP bytes** Total number of incoming TCP bytes that have been dropped due to the TCP buffer being full.

5.2 Status

The status graph is updated every 5 seconds.



5.2.1 System Load

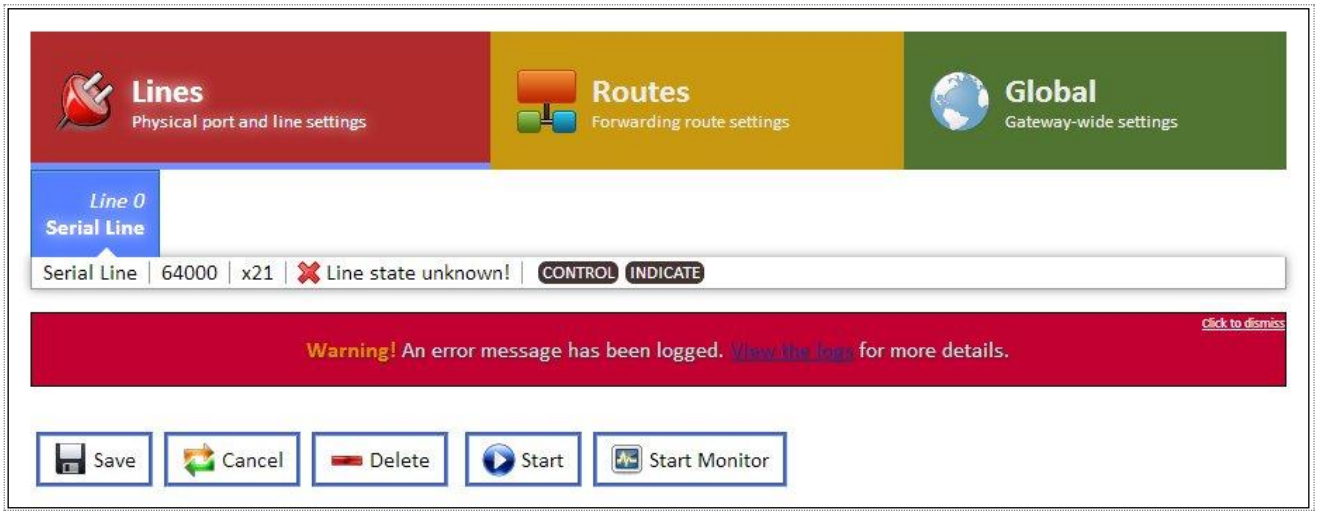
- CPU Use — CPU usage averaged over 1 second. The value is updated every 5 seconds
- Memory Use — RAM usage averaged over 1 second. The value is updated every 5 seconds
- Memory Free — Available free RAM, updated every 5 seconds
- Uptime — Shows current time, time since device startup, number of users and load average (system utilization) over the last 1,5 and 15 minutes

5.2.2 Throughput

- Current — Current data throughput (bytes/s)
- Average — Average data throughput (bytes/s) since HDLC line start
- Trend — Throughput trend (bytes/s) averaged over the last 10 seconds.
- Peak — Highest trend value calculated since HDLC line start.

6 System Warning Messages

If the FarLinX Connect Mini detects that there is a problem it will generate the following ‘Warning’ message on the FarLinX Connect pages.



If the log level was set to ‘Warning’ or ‘Error’ (see Section 8.4 - Log Configuration - Detailed), the cause of the ‘Warning’ message will have been logged in the log file. If the log level was set to none, then this information may not be available.

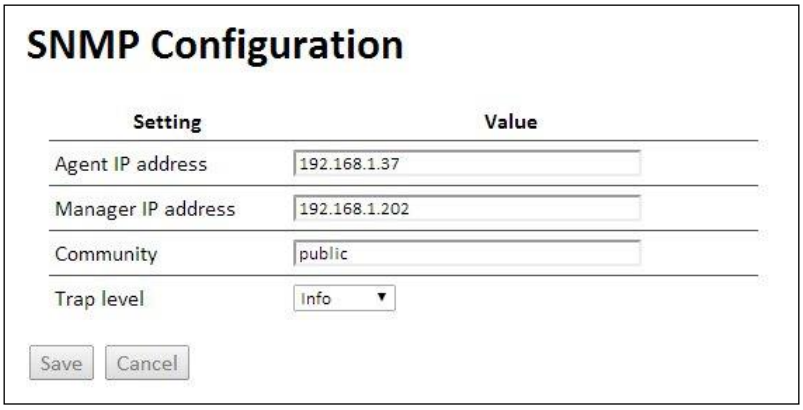
If a ‘Warning’ message is generated, you should view the log files to ascertain what caused the ‘Warning’ message.

You can then on the ‘click to dismiss’ link to remove the ‘Warning’ message.

7 SNMP Traps/Alarms

The FarLinX Connect Mini can generate SNMP v1 traps/alarms which can be sent to a nominated SNMP manager. The IP address of the SNMP manager, to which traps are to be sent, needs to be explicitly configured on the device.

Click 'SNMP' under **Configuration** in the navigation menu and configure the values for 'Agent IP address' (usually the device's own IP address), 'Manager IP address', 'Community' string and 'Trap Level' then click 'Save' button. The changed configuration will be applied automatically without restarting the FarLinX Connect Mini.



Before your SNMP manager can fully decode any traps from the FarLinX Connect Mini, you will need to import the FarSite MIB. This MIB file is supplied as \Doc\MIBs\FARSITE-MIB.txt in the product resources. The OID for FarSite Communications is 1.3.6.1.4.1.18720.1.1

The traps generated by the device include both standard and FarSite-specific traps. Each FarSite-specific trap contains the variables fsTrapSeverity, fsTrapCount and fsTrapDetails.

fsTrapSeverity can be 0,1, 2 or 3, which correspond to the device's available trap levels: OFF, ERROR, WARNING or INFO.

For the filtering of unwanted traps, you can change the value of 'Trap Level' via the web interface. For example, if 'Trap Level' is set to ERROR then WARNING and INFO traps will not be sent.

fsTrapCount indicates how many traps of this type have been generated in the last 5 seconds.

fsTrapDetails includes detailed information regarding the trap.

To avoid unnecessary processing and network traffic, set the trap level to the lowest value that match your SNMP requirements. For example, select 'Off' if SNMP trap support is not required.

Refer to the FARSITE-MIB for a description of all FarSite-specific trap types.

For further SNMP and SMI general information please reference RFC1157 and RFC1155.

8 Logs

8.1 Log Configuration - General

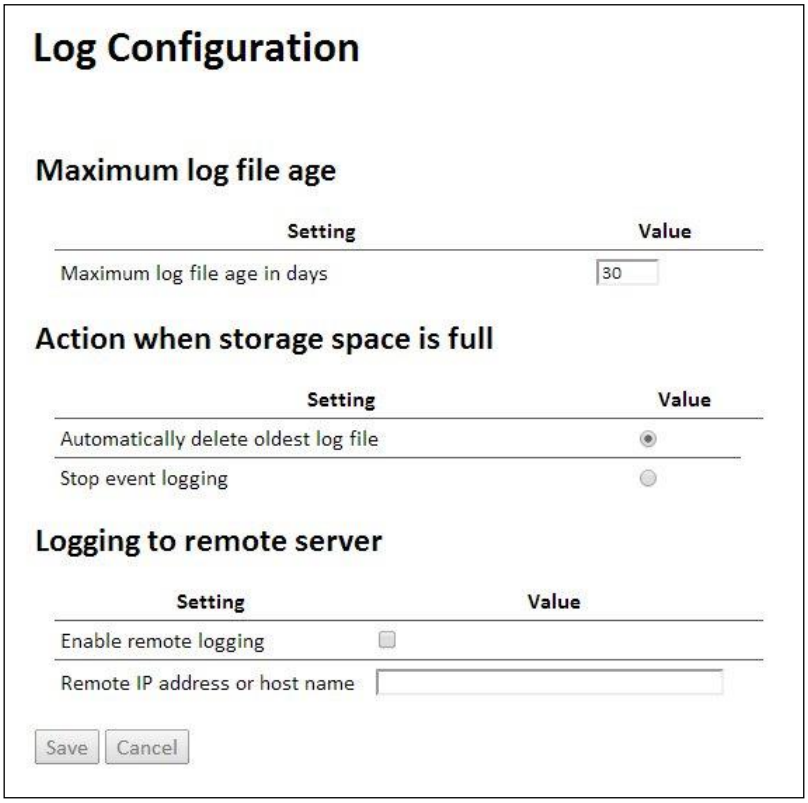
To update the logging configuration, click Log Config under **Administration** in the navigation menu.

The oldest log files are periodically deleted to ensure that there is enough space to log new information. Here you can select how long to store log files before they are deleted, the default being 30 days. Log files older than this will be discarded even if space is still available for logging.

You can also select the action to be taken when the storage space is almost full. The options are to automatically delete older log files or to stop logging further events. Large numbers of local log files increase the startup time of the FarLinX Connect Mini and can adversely affect performance.

The FarLinX Connect Mini supports 'rotation' of its log files. This means that, in order to prevent log files becoming too large, the system will periodically save and/or compress existing log files and rename them to enable events to be easily located by date and time. In particular, the device will unconditionally rotate its log files at the end of each day. Sometimes several log files can be produced and rotated in a single day (if a large number of messages have been recorded). It is recommended that the logs are downloaded regularly (see Sections 8.2 - Event Log and 8.3 - Data Log) and backed up if you need to keep copies of the local logs.

You can also select whether to log events to a remote syslog server instead of storing them locally. This is described further in Section 8.5 - Logging to a remote syslog server.



8.2 Event Log

To view locally stored event logs, click Event Logs under **Administration** in the navigation menu. All the event log files on the FarLinX Connect Mini will be listed. You can view event logs in the browser by clicking the 'View' button. You can also select individual event logs and then click 'Download' to download them to the configuring PC, or 'Delete' to delete them.

The name format of the rotated log files are FSGW<Date>-<Timestamp>.log. Compressed log files have a .gz extension. The active run-time log file is called FSGW.log and can't be deleted.

If the option to log to a remote syslog server has been selected, no information is logged locally.

8.3 Data Log

The Data Log stores the data that the FarLinX Connect Mini has transmitted and received over the HDLC lines and TCP routes if this option has been enabled (see Section 8.4.3 - Data Trace Level).

To view the locally stored Data Logs, click Data Logs under **Administration** in the navigation menu. All the Data Log files on the device will be listed. You can view Data Logs in the browser by clicking the 'View' button. You can also select individual Data Logs and then click 'Download' to download them to the configuring PC, or 'Delete' to delete them.

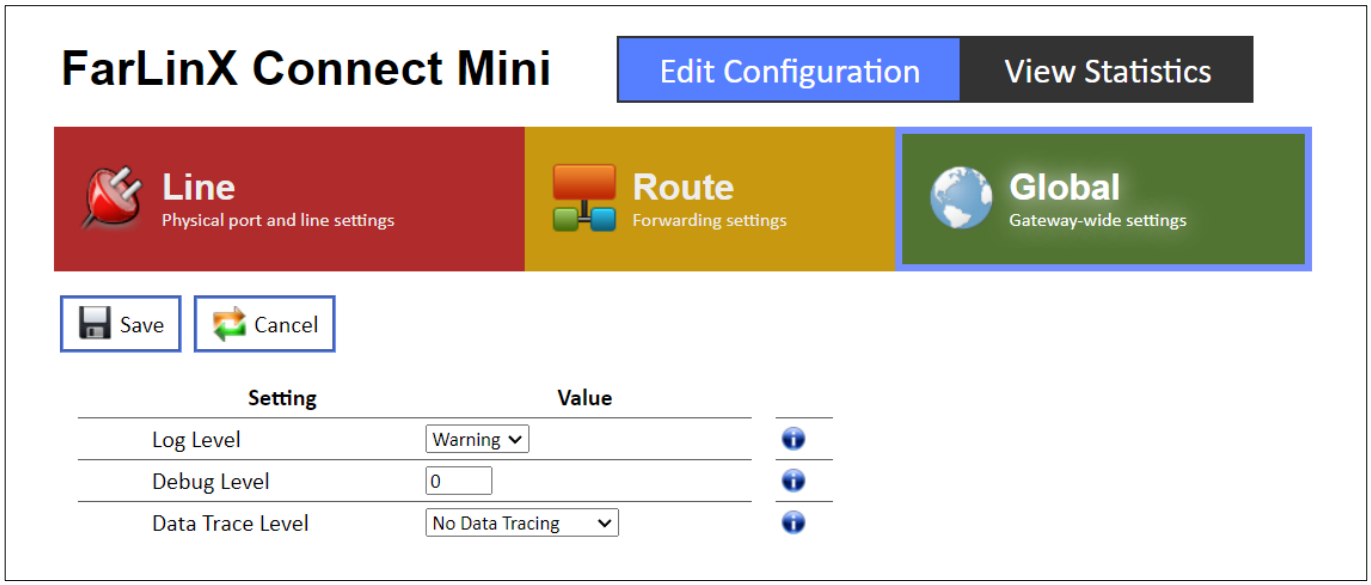
The name format of the rotated log files are FSGWTX<Date>-<Timestamp>.log. Compressed log files have a .gz extension. The active run-time log file is FSGWTX.log and this file cannot be deleted.

If the option to trace data has been selected (see Section 8.4.3 - Data Trace Level), then Data Log data will be generated. Data Logs can be large, so if logging locally, the FarLinX Connect Mini will compress Data Log data internally. If the file is very large the compression operation may take some time and may adversely impact the web configuration and/or data communication response times. It is therefore important to always disable the Data Log option when the device is in normal production mode (unless you have a specific need to run the device in debug mode for a short period of time).

Log file compression is not performed if logging to a remote syslog server. If the option to log to a remote syslog server has been selected, no information is stored locally.

8.4 Log Configuration - Detailed

To change the level of logging, click Line/Port & Routing under **Configuration** in the navigation menu, then click 'Edit Configuration' and 'Global'.



8.4.1 Log Level

This sets the level of event logging related to the FarLinX Connect Mini operation. There are four options:

- None — No events are recorded
- Error — Only operation errors are recorded
- Warning — Both operation errors and warnings are recorded
- Info — All information regarding operation is recorded

Each level will also log the levels below it, so a log level of 'Info' will also log all 'Warning' and 'Error' messages. Depending on the traffic rate though the FarLinX Connect Mini, setting the log level to 'Info' can adversely affect the

device's performance so it is recommended that a value of 'Warning' (the default) is configured for normal use.

8.4.2 Debug Level

When the debug level is set non-zero, the FarLinX Connect Mini will generate additional messages within the Event Log. The higher the level is set, the greater the amount of detail is logged. Normally there will be no need to set this parameter to non-zero unless directed to do so by a FarSite support engineer. A value greater than zero can adversely affect device performance.

8.4.3 Data Trace Level

The actual data passing through the FarLinX Connect Mini can be logged at both the HDLC interface and at the TCP/IP interface.

There are four options for data level tracing:

- No Data Tracing
- Trace HDLC only
- Trace TCP only
- Trace all

When enabled, the trace data gets written to the Data Log (see Section 8.3 - Data Log). This can generate a very large volume of output so it should only be used when diagnosing problems. Setting a value other than 'No Data Tracing' can adversely affect the device's performance.

8.5 Logging to a remote syslog server

The FarLinX Connect Mini can send messages to a remote syslog server.

A number of third party syslog tools are available for both Windows and Linux platforms. Details of how to configure them to receive remote syslog messages is beyond the scope of this manual.

8.5.1 Structure of Messages Sent to syslog

A remote syslog server treats all logging as a single log of messages, but the FarLinX Connect Mini can generate both event logs and Data Logs. The contents of different logs will become merged on the remote logging system but filtering can be used to separate the different types of message.

The event log is for notable events, such as Lines and Routes starting and stopping, and also contains debug traces if they are enabled.

The Data Log is used to store the data passing through the device.

To assist with analysis of the received log information, the structure of event log messages and Data Log messages are shown below:

For event log messages, the structure is:

```
DateTime + fsgatewayd: + Message
```

Examples of event log, event and debug messages are:

```
Jan 22 08:18:40 fsgatewayd: line interface       X.21 (RS422/V.11)
Jan 22 08:21:59 fsgatewayd: TCP Connection, route 0 started
```

For Data Log messages, the structure is:

```
DateTime + fsgatewayd: + SessionId + LineId + RouteId + msgLen + msgType
```

or

```
DateTime + fsgatewayd: + Data: + variable content
```

Examples of Data Log messages are:

```
Jan 22 07:37:56 fsgatewayd: Session 1, Line 0, Route 0, len 1030, Tx TCP
Jan 22 07:37:56 fsgatewayd: Data: 000100000040001020304-05060708090a0b0c0d0e-0f101112131415161718
```

9 Line Monitor

The FarLinX Connect Mini supports monitoring of the traffic on the HDLC/LAPB ports. The monitor support can capture all of the data on a given HDLC/LAPB line and forward it to a remote Windows system running the FarSync Line Monitor software package.

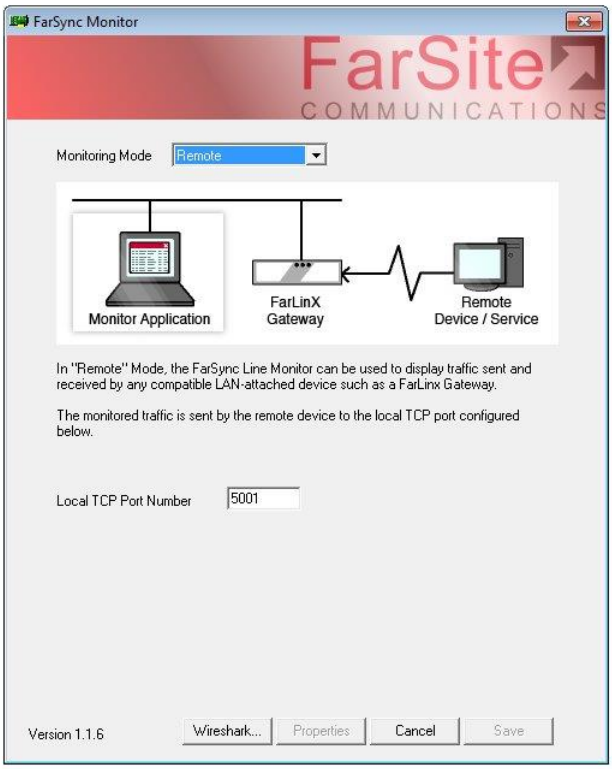
9.1 Installing and Configuring the FarSync Line Monitor

The traffic monitored by the FarLinX Connect Mini is forwarded to a remote Windows machine running the FarSync Line Monitor software package.

To install the FarSync Line Monitor software package, just run the 'FarSyncLineMonitorInstaller.exe' program on the Windows system. The installation package is located in the /apps/fsmon folder of the FarLinX Connect Mini product resources. Once installed, select "FarSync Line Monitor" from the Windows Start menu to run the program.

Once running, from the File menu, select File→Recording Mode… In the subsequent dialog box (see screenshot below), set Monitoring Mode to 'Remote' then set 'Local TCP Port Number' so that it matches the 'remote port' in the device's configuration (default 5001). Click on the 'Save' button to finish the configuration.

Ensure that the Windows system is configured to accept the TCP traffic sent to it from the FarLinX Connect Mini. This includes configuring any installed firewall to permit incoming traffic for the configured TCP port.



After configuring the TCP port, restart the line monitoring by pressing the "Record/Stop" button twice. You will then be able to view the monitored data from the FarLinX Connect Mini, in real-time. See Section 9.4 - Monitoring the HDLC lines using Wireshark, for details of how to monitor and analyse the data using the popular Wireshark network monitor application.

9.2 Configure the FarLinX Connect Mini Settings

On the FarLinX Connect Mini, you need to specify the IP address of the Windows system that is running the FarSync Line Monitor software. You must also select the TCP port number on which the FarSync Line Monitor is listening (default 5001).

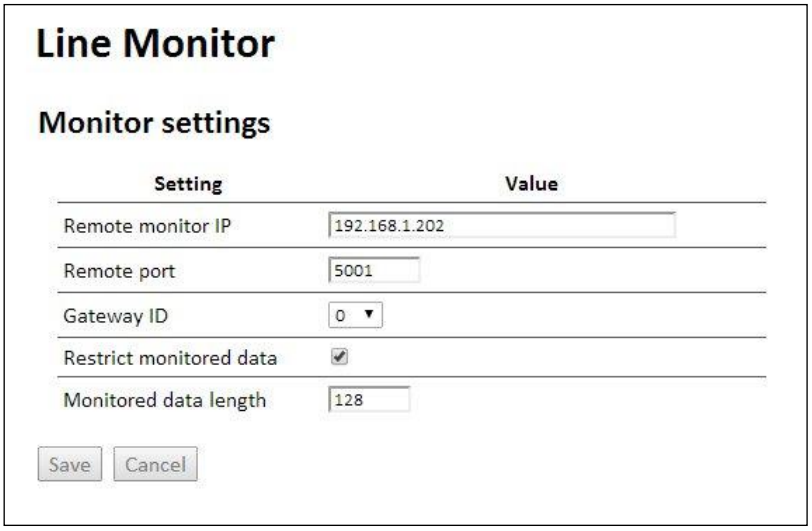
To configure the monitor settings, click on Line Monitor under **Administration** in the navigation menu.

You may then set the remote monitor IP address, remote TCP port and a Gateway ID. The Gateway ID is used to distinguish the source of monitored traffic when multiple FarLinX Connect Mini devices are sending data to the same Windows system. Ensure that the Gateway ID you choose is unique for the monitoring system. If you are only using one FarLinX Connect Mini then this can be left as the default value of 0. The Gateway ID is displayed under 'Line' in the FarSync Line Monitor.

Note that the Gateway IDs increment by 2 for compatibility with other FarSync products.

The length of each frame of data to send to the line monitor can be restricted by ticking the box and entering the length value. This option can be useful to restrict the transmission of potentially sensitive data over the LAN to the FarSync Line Monitor.

Click 'Save' to complete the configuration of the Line Monitor settings.



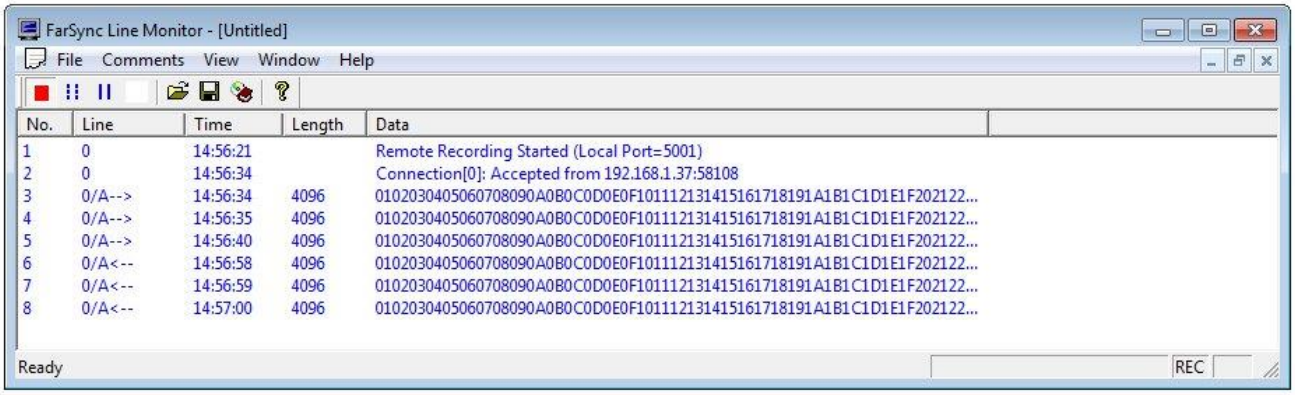
If you change the Line Monitor configuration settings on the FarLinX Connect Mini whilst the monitor is started, you will have to stop and start the monitor for the new configuration to take effect.

9.3 Start/Stop Monitor

The monitor 'Start' and 'Stop' buttons are displayed on both the Line Configuration Menu and the Route Configuration Menu, under Line/Port & Routing and 'Edit Configuration'.

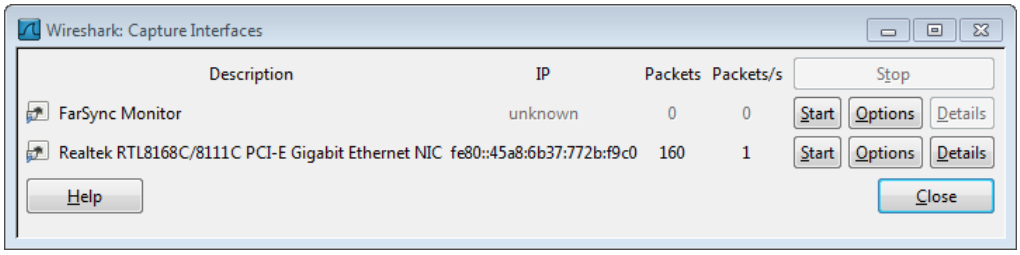
Once monitoring is started, all traffic on the corresponding line will be captured and forwarded to the remote Windows machine running the FarSync Line Monitor software package.

Remember that the FarLinX Connect Mini will continue to send monitored data to the Windows PC even if the FarSync Line Monitor application is terminated on the Windows system. This can affect network and device performance so always stop the monitoring of the HDLC line using the 'Stop' button when it is no longer required.



9.4 Monitoring the HDLC lines using Wireshark

The FarSync Line Monitor also allows data to be routed to the Wireshark network monitor application installed on the same PC. To set this up, ensure that Wireshark is not running, then in the File→Recording Mode… dialog of the FarSync Line Monitor, select the **Wireshark...** option to setup the FarSync real-time monitoring support. The next time Wireshark is started it will offer an interface called **FarSync Monitor** in the list of available interfaces:



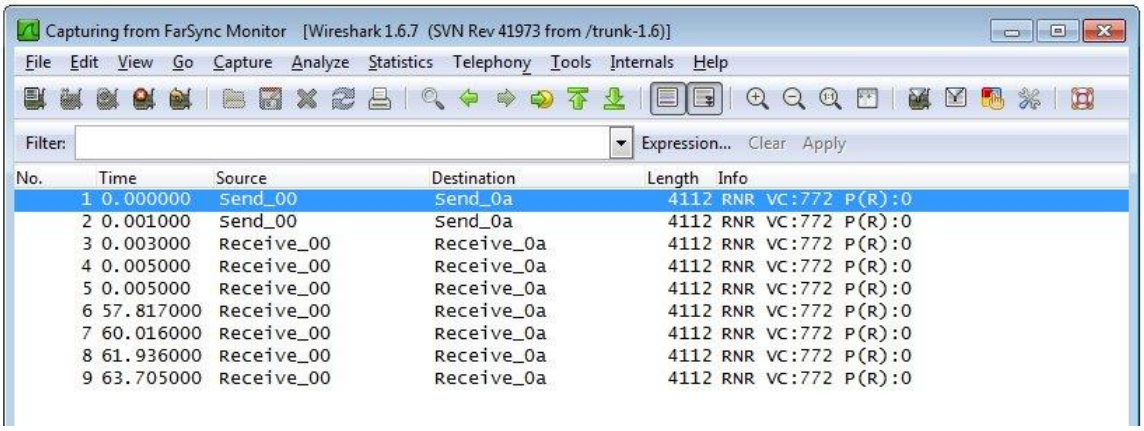
Note that only the 32-bit version of Wireshark V1.10.0 is currently supported by the FarSync Line Monitor, although this can be used on a 64-bit version of Windows.

The Wireshark product itself is available for free download - currently from http://www.wireshark.org/download.html.

Note that although both the FarSync Line Monitor and Wireshark can be used for real-time monitoring, only one can be used at any one time.

Data is provided to Wireshark in the form of Ethernet frames. A simulated MAC header is added to the data to indicate the data direction (SEND or RECV) and also the identity of the device supplying the trace data. The Ethernet addresses are used as follows:

20:53:45:4e:44:xx (53:45:4e:44 is “SEND”, displayed as **Send_xx** by Wireshark)
20:52:45:43:56:xx (52:45:43:56 is “RECV” , displayed as **Receive_xx** by Wireshark)



The final 2 digits of the addresses in the Source Ethernet address fields are used to indicate the Gateway ID. Note that the values displayed are in Hexadecimal, e.g. Receive_0c is Gateway ID 12.

The final 2 digits of the addresses in the Destination Ethernet address fields should always be ‘0a’.

Refer to Section 9.2 - Configure the FarLinX Connect Mini Settings, for details of how to configure the Gateway ID of each device you may be monitoring.

For further details regarding the use of Wireshark itself please refer to the help that is installed with the Wireshark product.

10 Front Panel LED Indication

The front panel LED indicates the operational state of the FarLinX Connect Mini as follows:

- Off — Powered off or software failure
- Solid Green — TCP connection established, no data transfer
- Flashing Green — TCP connection established, data transfer over HDLC line and TCP route
- Solid Amber — TCP connection not established, no data transfer
- Flashing Amber — TCP connection not established, data transfer over HDLC line
- Solid Red — Device not ready, if this condition persists refer to the System Status Page
- Flashing Red — Device fault, automatic restart may occur to clear the fault condition.

11 Optimising Performance

There are a number of factors that can affect the performance of the FarLinX Connect Mini, which are listed below. In order to optimise the throughput through the device please make sure that there is no unnecessary logging or monitoring of device activity enabled.

11.1 Viewing Configuration

There are small parts of the Configuration screens that are updated dynamically. If you leave your web browser open on a configuration screen then this can have small impact on the throughput rate. If your connections are sensitive to throughput, then it is suggested that the configuration screens are only viewed when required.

11.2 Viewing Statistics

There are large parts of the Statistics screens that are updated dynamically. If you leave your web browser open on a Statistics screen then this can have impact on the throughput rate. If your connections are sensitive to throughput, then it is suggested that the Statistics screens are only viewed when required.

11.3 Event Logging

When Event logging is enabled, this can have an impact on performance according to Logging Level set. Event logging is the collection of information at various points of the lifetime of a connection, including data transmitted and received. The data is either written to a local log file or could be transmitted over the TCP connection to a remote Log Server. Therefore for optimal performance, disable all logging.

If logging is required then the following is offered as advice:

- A Log Level of None will have no impact,
- A Log Level of Info and Warning will have minimal impact,
- A Log Level of Info may have a small impact when connections are made or cleared.
- A Debug Level of 0 will have no impact
- A debug Level of 1..9 (max value) could cause significant delays through the device. The Debug Level should not normally be set to a value other than 0, unless requested by a staff member of FarSite support.
- The Data Trace level of No Data Tracing will have no impact.
- The Data Trace level of Trace HDLC Payload, Trace TCP Payload or Trace All could cause significant delays through the device.

11.4 Line Monitoring

Line Monitoring enables the data transmitted and received at the HDLC interface to be sent to a remote Line Monitoring system. This could significantly affect the performance of the FarLinX Connect Mini because of the extra processing and additional TCP traffic generated when sending the monitor data to the remote monitor.

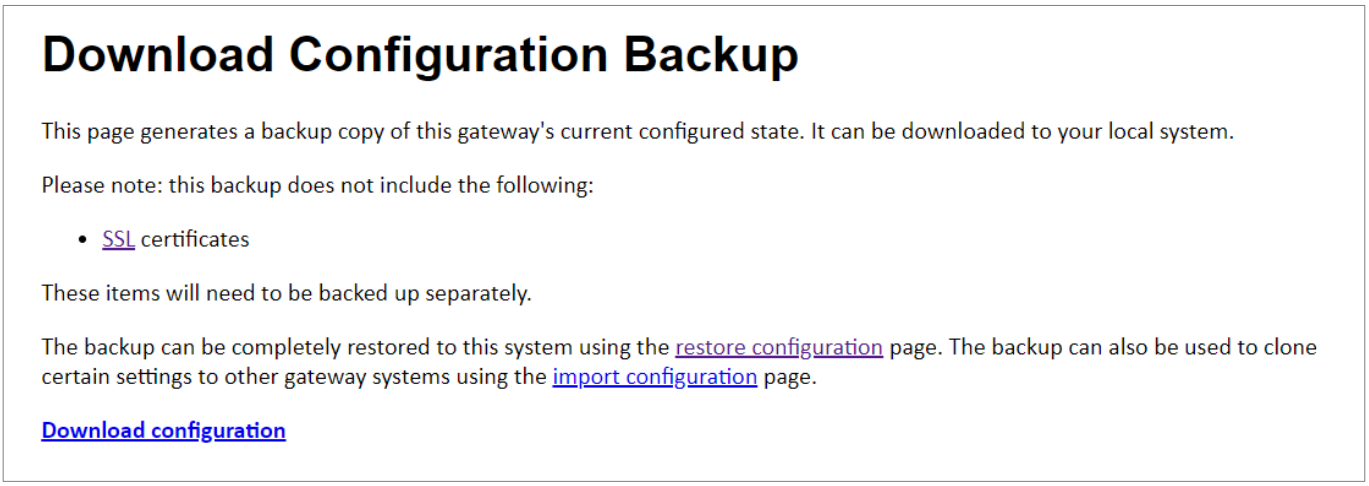
12 Maintenance

12.1 Configuration Backup and Restore

12.1.1 Backup

Click Configuration Backup under **Administration** in the navigation menu to obtain a backup file of the current configuration for the FarLinX Connect Mini. Note that the backup file does not include any configuration information for SSL certificates, so those will have to be backed up separately if required. The backup file can be downloaded to the configuring PC by clicking on the Download configuration link. The name of the backup file is farlinx_gw_<hostname>.fcfg

This package can subsequently be used to Restore Configuration to the same device which generated this package. Alternatively it can be used to Import Configuration to another FarLinX Connect Mini in order to clone the configuration.



12.1.2 Restore

Click Restore Configuration under **Administration** in the navigation menu and click the 'Choose File' button to specify the backup file. After the backup file is specified, click the 'Restore' button to restore the configuration.

The FarLinX Connect Mini will restart to apply the new configuration. Any running lines or routes will be stopped and then potentially restarted according to the settings in the new configuration.

12.1.3 Import

To import a configuration from another FarLinX Connect Mini, click Import Configuration under Administration in the navigation menu.

The import option can be used to clone the settings of another FarLinX Connect Mini. The following parameters are imported:

- Line Configuration
- Route Configuration
- Global Configuration for Log/Debug/Trace Levels

The following parameters on the FarLinX Connect Mini will not be affected by the import:

- LAN Configuration (including SSL/HTTPS)
- SNMP Configuration
- Admin Password
- System Date and Time

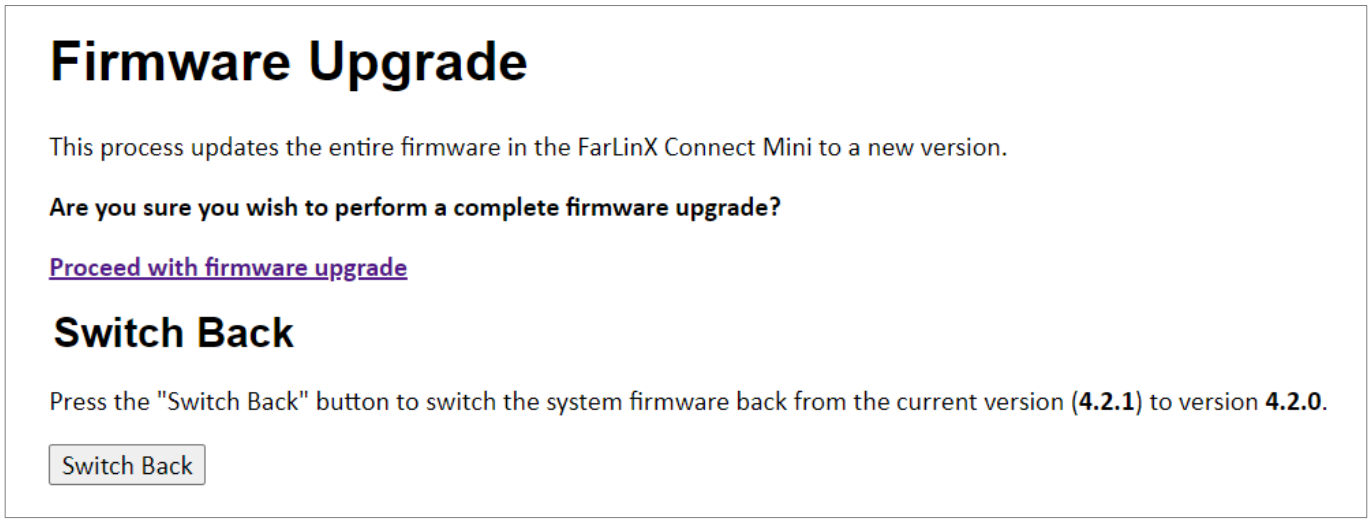
- Log Configuration (maximum log file age, logging to remote server etc.)
- Line Monitor Configuration
- Support Information

12.2 Firmware Upgrade

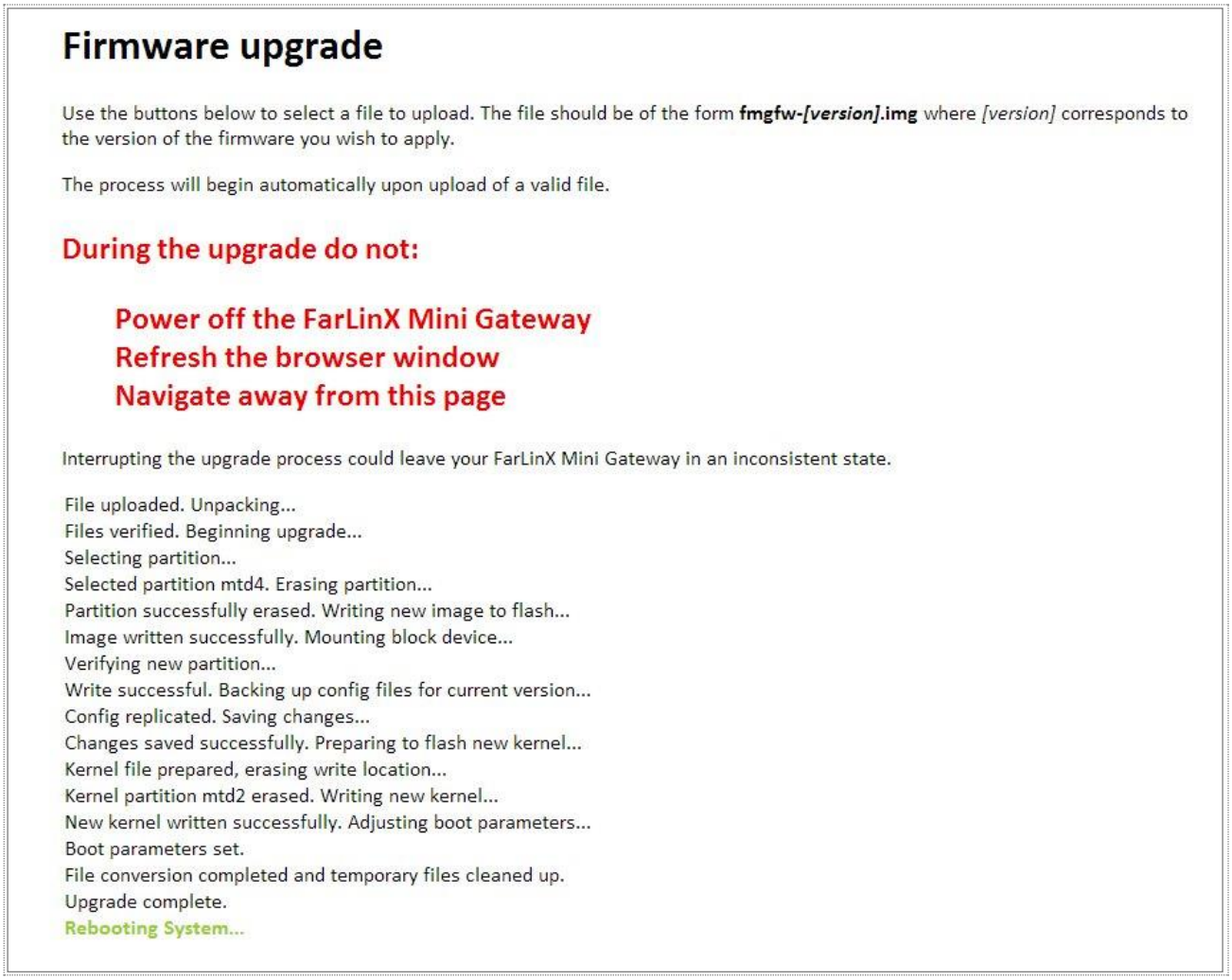
The firmware for the FarLinX Connect Mini can be updated to a new version in the field. Before applying a firmware upgrade you should stop all Lines and Routes that are running on the device.

12.2.1 Upgrade

To apply a firmware upgrade, click Upgrade Firmware under **Administration** in the navigation menu.



Then click “Proceed with Firmware Upgrade” link. In the next page, click the 'Browse' button to select the upgrade file, then click 'Upload…' button to begin upgrading. A progress display will be shown to indicate the upgrading process. When the upgrading is finished, a page will be shown to report that the upgrade is complete and that the FarLinX Connect Mini is restarting in order to use the new version.



You should ensure that a reliable network connection is available to the FarLinX Connect Mini before starting an upgrade. If the upgrade process fails due to a poor network connection then the process will be aborted with the following message:

Error: Upload aborted - please ensure that you are using a high quality network connection

Please be careful not to apply the same upgrade twice as this will result in both versions on the system being the same.

12.2.2 Switch Back

After a successful firmware upgrade, the FarLinX Connect Mini will have two versions of firmware installed. The 'Switch Back' button allows you to revert to the previous version that was running before the last upgrade was applied.

Before switching firmware versions you should stop directing all data traffic through the device.

12.3 Restart and Shutdown

To shutdown or restart the FarLinX Connect Mini, click Shutdown/Restart under **Administration** in the navigation menu.

Click the 'Restart' button to automatically turn the device off and back on again.

Click the 'Shutdown' button to turn the device off. The front panel LED will turn off when the shutdown is complete. Subsequent manual intervention will be required to start the device by removing/reapplying power.

12.4 System Status

The System has 3 levels of status: Critical, Warning and OK.

- **System status: critical**

The critical state is entered when:

- Internal free storage space is less than 6MB
- One or more internal processes have failed. The device may restart under certain critical error conditions. If you suspect that the device has restarted due to a critical condition being detected, check the event log for a “fsgatewayd: Gateway Initialised” log entry and check what events led up to the restart.

- **System status: warning**

The warning state is entered when the FarLinX Connect Mini detects issues which are not critical but are worthy of mentioning.

- **System status: OK**

There are no Critical or Warning conditions

12.5 Support Information

This section provides Product Information and Module Version numbers. This information may be required when contacting FarSite support.

12.6 Factory Default

The reset button is located on the back of the FarLinX Connect Mini next to the power connector jack. With the device operational, press this in for a few seconds until the LED on the front glows red and the system restarts. **All configuration information will be reset** to factory defaults - this includes:

- Setting the IPv4 address to 10.0.0.1
- Removing all HDLC/LAPB line and TCP route configuration
- Removing all log files
- Resetting username/password to the default (admin/farlinx)

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