

## FLEXCONNECT OVERVIEW

The ProFLEX01 and SiFLEX02 Modules are shipped pre-loaded with LS Research's FLEXConnect network firmware. FLEXConnect allows for wireless network range extension with the option of using either Simple Repeating or Source Routing messaging. LSR's host serial protocol gives you the flexibility and control to easily manage your FLEXConnect network traffic.

### Network Variables

Prior to the formation of any FLEXConnect network, four variables must be configured: **Max Repeaters**, **Max Repeats**, **Device Type**, and **Repeater Slot** (valid only when the device type is a repeater). These variables are configured through a serial host command. It is the responsibility of the Network Manager to properly configure all of the devices.

- **Max Repeaters** – 1 to 15
- **Max Repeats** – 1 to 7
- **Device Type** – Repeater or Node
- **Repeater Slot** – 1 to 15

### Device Types

- **Repeater** – Repeats Simple Repeating packets and routes Source Routed packets.
- **Node** – Does not repeat.

## FLEXCONNECT NETWORKING

It is important to understand the tradeoffs in network performance when configuring a network. While increasing the number of Repeaters and Repeats does extend the range of the network, it does so at the expense of data throughput and latency.

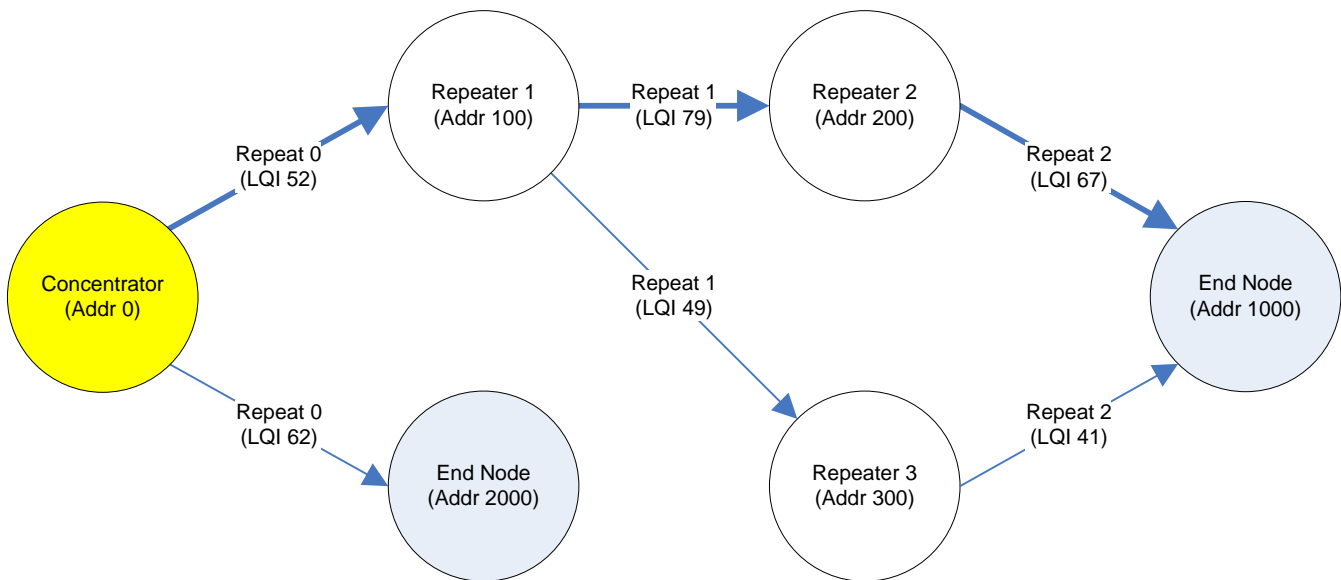
Address assignments are arbitrary, and a *unique* address must be assigned to each device in a network at the user's discretion.

FLEXConnect consists of two types of messages: **Simple Repeating** and **Source Routing**.

### Simple Repeating Messaging

With Simple Repeating messaging, any device can transmit a message to any other device; the message will be repeated by Repeaters as it propagates across the Simple Repeating network. When a device receives a message wherein the destination address matches its own address, the payload data, route the message traversed, and the LQI information is sent to the host controller. This routing information can be used to issue a Source Routed message back to the originator.

*Figure 1 shows an example of a message sent using Simple Repeating messaging. The Concentrator (Device type is a Node) transmits a message to a Node with an address of 1000. The message is received by Repeater 1 and Node 2000, repeated by Repeater 1, received by Repeaters 2 and 3, repeated again by Repeaters 2 and 3, and finally received by Node 1000, from both Repeaters 2 and 3. The path with the best Link Quality Index (LQI) or signal strength is highlighted.*



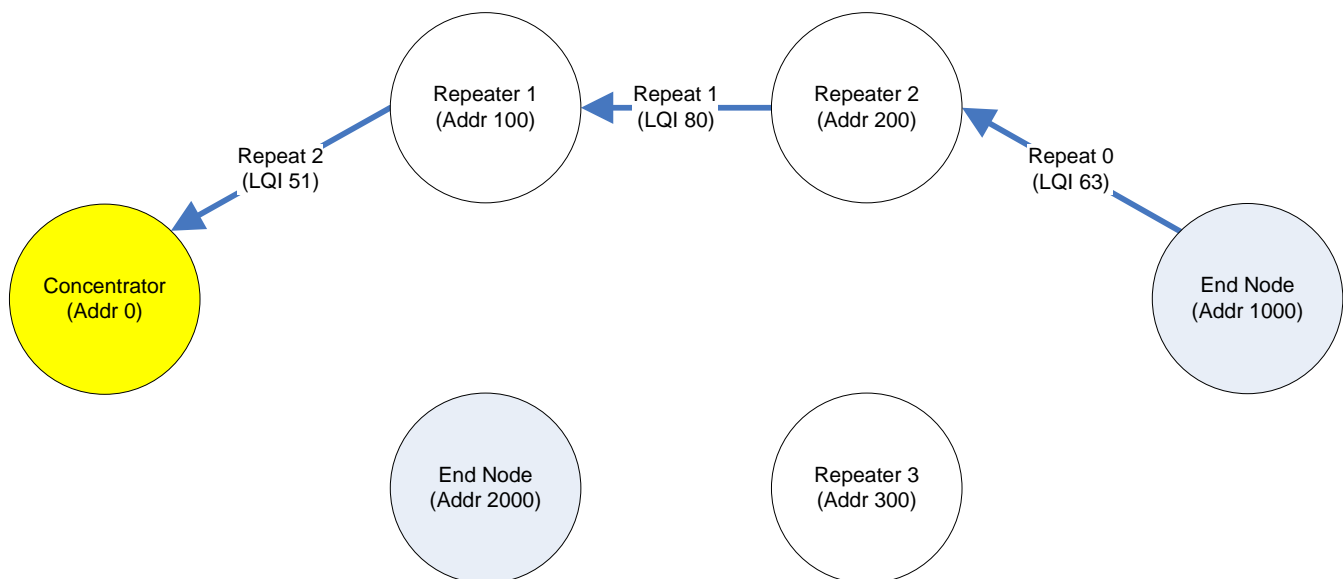
**Figure 1 FLEXConnect Network Using Simple Repeating**

When using Simple Repeating the host processor duties are simply to transmit the original message and receive it at the destination. In addition it is possible to receive multiple messages during a repeating session.

## Source Routed Messaging

With Source Routing, as with Simple Repeating, any device can transmit a message to any other device. The difference is that the source device specifies the “preferred” route (as determined by the host controller) the message shall traverse across the FLEXConnect network. Any device receiving a Source Routed message forwards the message to next device in the route list. When a device receives a message wherein the destination address matches its own address, the payload data, route, and LQI information is sent to the host controller.

*Figure 2 shows an example of a message sent using Source Routing. The End Node transmits a message to the Concentrator that contains the full Source Route the message shall traverse (200, 100, 0). The message is received by Repeater 2 at address 200, repeated, received by Repeater 1 at address 100, repeated again, and finally received by the Concentrator at address 0.*



**Figure 2 FLEXConnect Network Using Source Routing**

When using Source Routing the host processor duties, in addition to transmitting the original message and receiving it at the destination, include the following:

- Maintaining source route information
- Determining the preferred route for packet transmissions
- Filtering duplicate received messages (e.g. from various route paths)
- Other application-specific duties