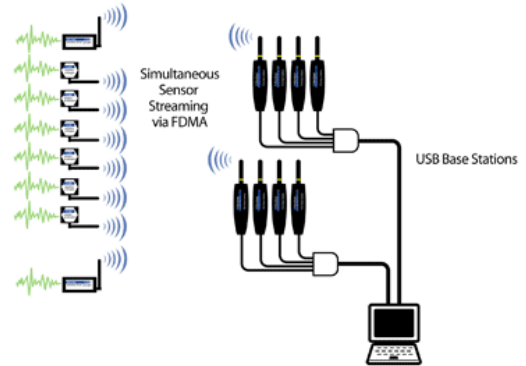


Streaming Multiple Nodes with Multiple Sensors to Multiple Base Stations

G-Link[®], V-Link[®], SG-Link[®], SG-Link[®] OEM, and DVRT-Link[™]

Background

MicroStrain has developed "frequency agile" sensor transceiver nodes and base stations, which can use a wide range of RF communications frequencies through software configuration. This technique, termed *frequency division multiplexing access* (FDMA), allows multiple wireless sensing nodes to communicate simultaneously without RF interference between them.



Architecture

Let's review the architecture of MicroStrain's wireless sensing systems.

The V-Link[®], G-Link[®], SG-Link[®], SG-Link[®] OEM and DVRT-Link[™] wireless nodes variously support 3, 4 and 8 individual sensors. The user may enable one, some or all of the channels to send during data acquisition. **Table 1** describes each node's channel compliment and sensor type.

Node Type	Channel 1	Channel 2	Channel 3	Channel 4	Channel 5	Channel 6	Channel 7	Channel 8
V-Link [®]	Differential Input	Differential Input	Differential Input	Differential Input	Single Ended Input	Single Ended Input	Single Ended Input	Internal Temp Sensor
G-Link [®]	+/-2g or +/- 10g Accelerometer	+/-2g or +/- 10g Accelerometer	+/-2g or +/- 10g Accelerometer	Internal Temp Sensor				
SG-Link [®]	Differential Input	Single Ended Input	Internal Temp Sensor					
SG-Link [®] OEM	Differential Input	Single Ended Input	Internal Temp Sensor					
DVRT-Link [™]	Differential Input	Single Ended Input	Internal Temp Sensor					

Table 1

The wireless nodes have 4 data acquisition modes, being 1) datalogging, 2) streaming, 3) high speed streaming and 4) low duty cycle. This technical note deals only with **streaming** and **high speed streaming**. Streaming and high speed streaming allow one node to seamlessly transmit all of its data, regardless of the number of channels enabled on the node, to one base station. Both the node and the base station must be on the same frequency. Two or more nodes can not stream or high speed stream to the same base station at the same time.

The wireless nodes can communicate with the base station on 16 different frequencies (radio channels) as shown in the **Table 2** below.

Radio Channel	Radio Frequency	Radio Channel	Radio Frequency
1	2.405 GHz	9	2.445 GHz
2	2.410 GHz	10	2.450 GHz
3	2.415 GHz	11	2.455 GHz
4	2.420 GHz	12	2.460 GHz
5	2.425 GHz	13	2.465 GHz
6	2.430 GHz	14	2.470 GHz
7	2.435 GHz	15	2.475 GHz
8	2.440 GHz	16	2.480 GHz

Table 2

This therefore allows us to stream up to 16 individual wireless nodes, each with any number of sensor channels enabled, to 16 base stations, all at the same time.

Host computer and software application

MicroStrain ships Node Commander[®], a fully featured software with each wireless node starter kit. The Node Commander[®] software takes advantage of the streaming functionality described above and is capable of parsing, displaying, and writing data to file, up to 4 nodes streaming simultaneously to 4 base stations. Node Commander[®] has been limited to 4 nodes to optimize its use on the broadest array of computers.

If you are writing your own software, you may also take advantage of this streaming functionality. MicroStrain makes available a complete Data Communication Protocol manual along with sample code. The protocol is completely coding language and operating system independent, and you will be able to build robust streaming applications to suit your particular needs. Using good software practices, tight code, techniques such as object instantiation and threading, and well provisioned host computers, you will be able to build applications that can support 8-12-even 16 nodes and base stations streaming. MicroStrain support engineers are always available to assist you in this regard.