



## SPECTRA User Manual

### Beginner's Guide

Reference: SPCTRA\_2.0/USER/BEGIN/2.0

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## Conventions used in this document

The following conventions are used not only in this guide but throughout the suite of SPECTRA user manuals.

### Common terms

|                     |   |
|---------------------|---|
| <i>Field</i>        | The portion of a window in which SPECTRA displays an individual item of data is referred to as a <i>Field</i> . |
| <i>(Left) click</i> | Press the left mouse button once.   |
| <i>Right click</i>  | Press the right mouse button once.  |
| <i>Double click</i> | Press the left mouse button twice in quick succession.  |
| <i>Select</i>       | Use the mouse to point to an item, then left click.   |

### Use of fonts

References to a single menu or menu item, or “buttons” on windows, are shown in italics, for example *Communications*. Sequences of menu selections are also shown in italics, separated by vertical bars, for example *File/Apply*.

Command lines are shown in a monospaced font. Optional parameters are shown in square brackets and variable text in italics. Choices are separated by vertical bars. For example:

```
dn -N network [-X filename.DN] [-E] [-B|-BC]
    [-BTIMEOUT] [-AUDIT] [-FLIP]
    [-CDE workspace] [-S filename.SHP]
    [-H|-?|-h] [label]
```

|              |  |
|--------------|--|
| <i>Note:</i> | Notes and useful definitions are in shaded boxes, with the note title in the margin, as in this example. |
|--------------|--|

### Use of the term “node”

The word "node" can mean either a software module or a point on a network. Usually the meaning is obvious from the context. However, to differentiate between these two uses, either an upper case or a lower case first letter is used:

- a *Node* is a SPECTRA software module;
- a *node* is a point on a network from/to which observations are made.

For example, the system's Network Calculation Node (NCN) uses observations to compute network node positions for a selected network.

---

## Assumed knowledge & expertise

This set of manuals is not a tutorial. To get the best out of SPECTRA, and to use these manuals effectively, you should have successfully completed the following basic training course:

- SPECTRA Integrated Navigation System Operation – Basic.

In addition, for those with some basic experience of using SPECTRA, advanced training courses can be arranged on specific topics.

For details of these and other courses, contact the Training Officer at Concept Systems Ltd.

It is also assumed you are familiar with the operation of whichever windowing system is installed on your workstation. Refer to your Windows user manuals for details on windows and how to use them, and for information on how to use the different types of menu that may be displayed in the windows.



# Chapter 1 - Introduction

This chapter gives you an idea of what SPECTRA is and how it fits together.

---

## What is SPECTRA?

SPECTRA is a comprehensive integrated seismic navigation system with a modular design allowing customers to quickly reap the benefits of any innovations in navigational techniques.

With approval from all major oil companies and used fleet-wide by the majority of leading seismic contractors, Concept Systems provide 24 hour system support and are committed to a policy of continuous improvement to keep pace with ever increasing positioning and quality control demands.

SPECTRA is based on an expandable network of UNIX workstations with a dedicated real time navigation sensor acquisition system (RTNU/RTN $\mu$ ) providing access to a tried and tested database of over 100 different navigation sensors and closure timing to a 50 micro-second resolution.

Any number of workstations can be networked, providing flexible configurations to meet individual customer needs ranging from simple 2D operations, 3D high-resolution applications to complex 3D multi-vessel, multi-streamer surveys.

### Key benefits

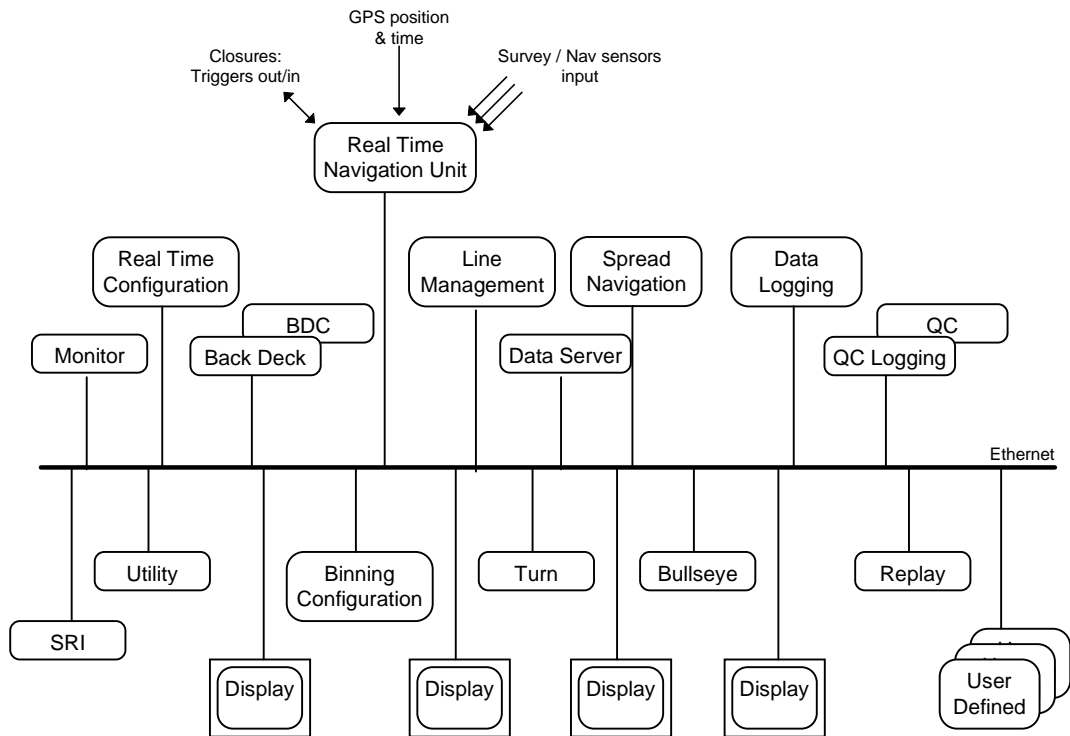
- Navigation acquisition and validation with real time source and streamer positioning for marine seismic surveys ranging from simple 2D and high resolution requirements to extensive 3D multi-streamer, multi-vessel configurations.
- Distributed Data Server provides simple connectivity to easily configure complex multi-vessel surveys. Real-time data acquisition units with integrated GPS receiver provide triggering to 50 micro-seconds, allowing remote synchronisation of seismic and acoustic systems.
- Real-time binning, CMP and offset distribution displays. Fully compatible with Concept Systems REFLEX off-line binning and analysis package including bin expansion capabilities.
- Data logging to UKOOA P1/90, P2/91 and P2/94 standards with full redundancy, providing confidence in data integrity.
- Quality Control features providing alarm and audit facility meeting UKOOA guidelines. Extensive on-line graphical analysis features and end of line reporting facilities.
- Positioning using Kalman filtering with advanced data-snooping statistical testing techniques.

- DGPS and RGPS real-time recomputation.
- Autopilot interface controlled from instrument room leaving the navigator in charge of steering. This facility is fully integrated with a comprehensive turn planning utility, providing optimum efficiency on line changes.

## What is SPECTRA made of?

The SPECTRA system has been developed by Concept Systems to accommodate any advances in positioning technology as they happen. This is achieved by adopting a generalised approach to system design so, for example, new positioning technologies can be introduced with little or no change to the software. All SPECTRA software conforms to Open Systems standards, which allows users to continuously benefit from advances in computer technology.

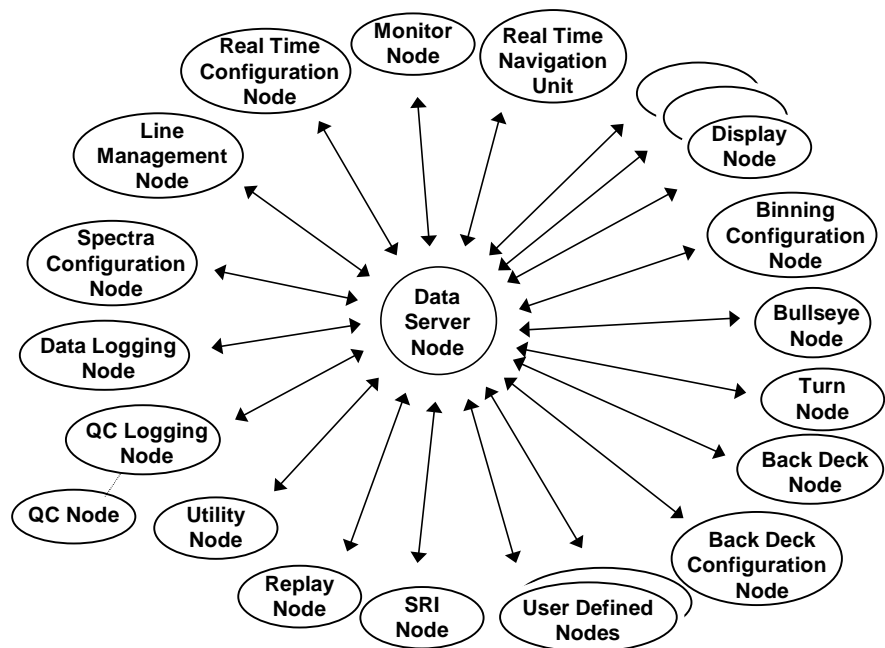
SPECTRA comprises several modules, or Nodes, which are connected by an Ethernet local area network:



Each Node consists of a process, or group of processes, performing a specific task. The Real Time Navigation Unit (RTNU) is supplied as a VME racked system, performing data acquisition and providing header output. Other Nodes run on workstations connected by the local area network.

## How does SPECTRA work?

Some of SPECTRA's processes produce information, by measurement or by calculation (producer processes), others use the information (consumer processes). SPECTRA's Nodes communicate with each other using the Ethernet network. Though Nodes can communicate directly with each other as they all share the same Ethernet, most of the time each Node communicates only with the Data Server:



The Data Server stores information supplied by the system's producer processes and passes it on demand to consumer processes. When a producer process updates information, the Data Server keeps the old information as well, until there are no consumer processes that need it.

Generally, any information regarding the set-up or configuration of a Node can be saved to file, then reloaded when required.

|              |  |
|--------------|--|
| <i>Save:</i> | Saving to file (via <i>Save</i> or <i>Save As</i> ) writes the Node's current configuration (i.e. the state stored in memory) to file. This does not alter the data used by the Data Server. |
|--------------|--|

Some Nodes can be run independently, purely to configure the required data. This is useful, as it means that survey and much other data can be set up prior to beginning the survey, then loaded for use at commencement of the survey.

Before the settings of a Node can be of any use to other parts of SPECTRA, the Node must be connected to the Data Server. This enables the Node to obtain data supplied by other Nodes, and also to supply its own data to other Nodes.

Any changes you make to the settings within a Node must first be *applied* before they are used by the Node itself.

*Apply:* The term *apply* means: take account of the edits or changes made by the user and apply them to the copy of the Node's data structures currently held in memory. This does not change the configuration stored in file or alter the data used by the Data Server.

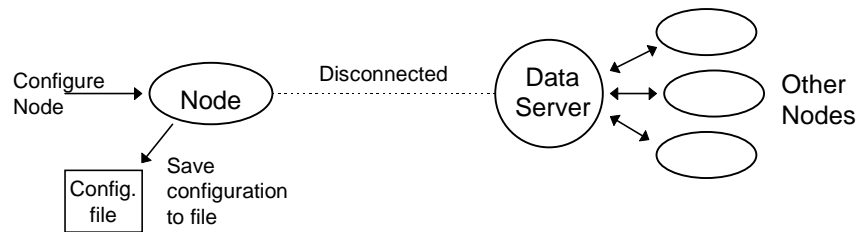
Also, because each Node allows its settings to be changed without immediately affecting the data it has registered with the Data Server, it is necessary to explicitly *submit* any changes to the Data Server before other Nodes can use them.

*Submit:* The term *submit* means: take the current state of the data structures in memory and send them to the Data Server. This does not change the configuration stored in file or write to memory.

This general scheme is illustrated in the following diagrams:

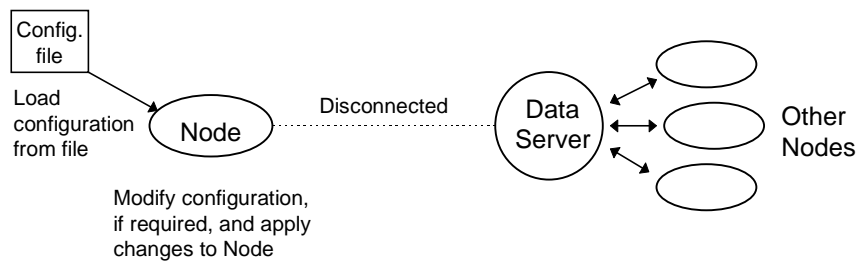
**Step 1: initial configuration of a Node**

Note that the Node need not be connected to the Data Server.



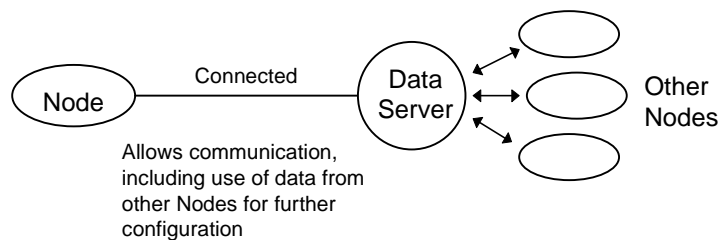
**Step 2: loading and/or modifying a Node's configuration**

Note that the Node need not be connected to the Data Server.



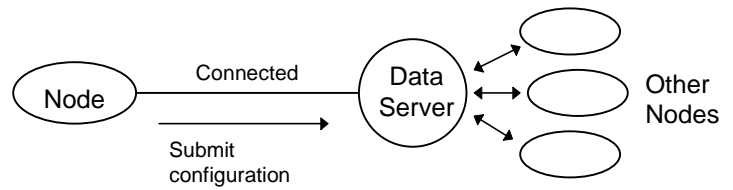
**Step 3: connecting to the Data Server**

For communication with other Nodes.



**Step 4: submit settings to the Data Server**

To allow other Nodes to use the data.

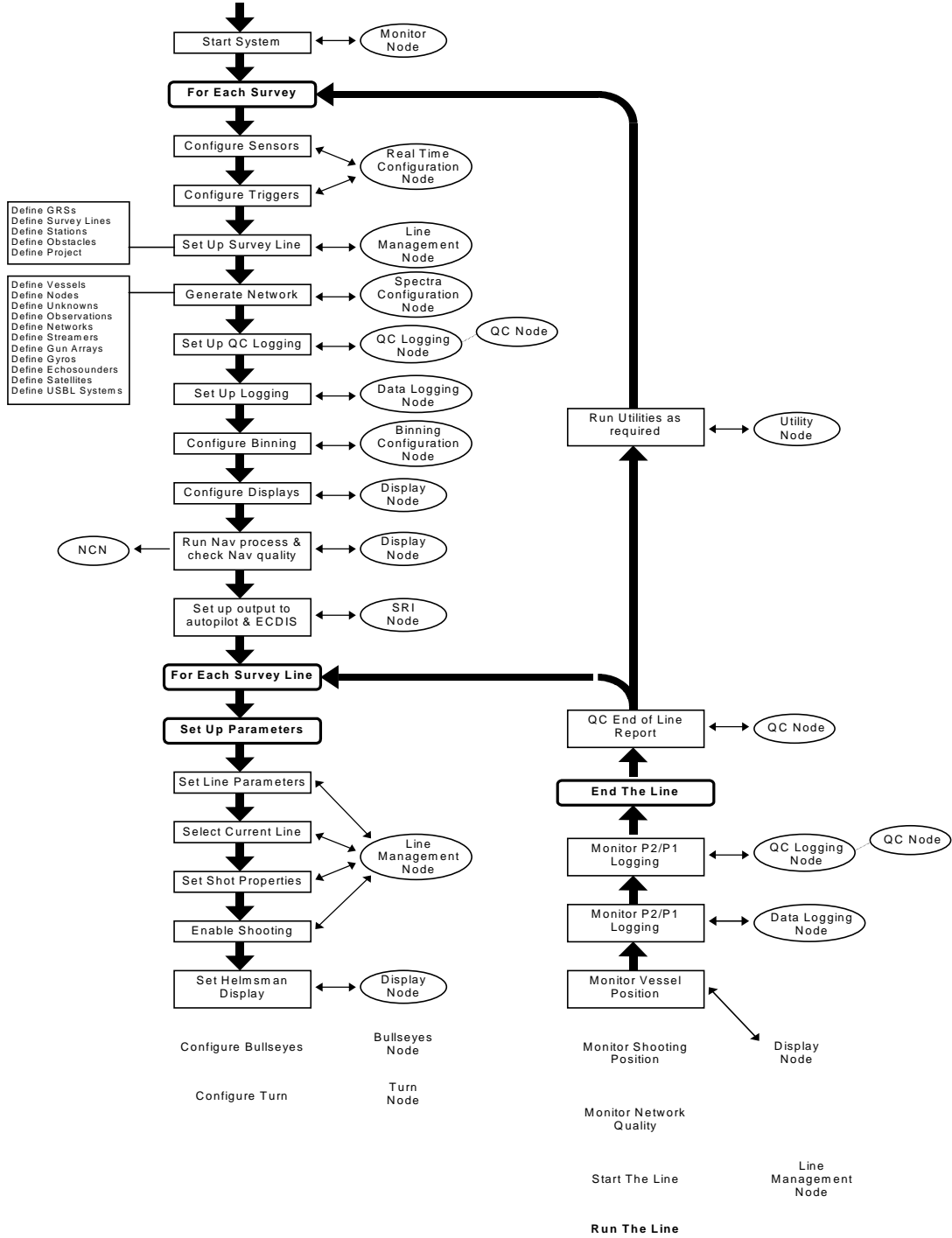


For the data defined in the configuration to be used by other Nodes, the Node submitting the configuration must be running: the configuration is lost to the Data Server when the Node is stopped.

For more information on the Data Server, see the “SPECTRA User Manual - Data Server Node”.

# And what is a typical operational cycle?

The following diagram illustrates the process of running a survey using SPECTRA, and the relationship between this process and the individual SPECTRA Nodes:



## Chapter 2 - So how do I use SPECTRA?

This chapter provides an introduction to the general operational features common to all Nodes. It also gives an overview of the operations required to set up SPECTRA for use on a survey, and outlines how to run a line.

References to individual SPECTRA Nodes occur throughout this chapter. Each Node has a discrete user manual; please refer to these manuals for full details on Node operations.

---

### Start-up

Before you can use SPECTRA, it must have been installed as explained in the Installation Manual. After installation, you can start up as follows:

1. Power up the workstation(s).
2. Log on as SPECTRA user.
3. Start the required SPECTRA Nodes.

Use the Monitor Node to start SPECTRA (type: mn& at the command line). This starts Nodes in the required order, as defined in an initialisation file. Alternatively, you can start Nodes individually from the command line, but this is only recommended for experienced users as the order in which the Node are started, and their start-up parameters, are crucial to SPECTRA's operation.

For further information on the Monitor Node's initialisation file and details of each Node's start-up parameters and options, see the *Spectra Software Installation and Set Up* manual.

---

### Using SPECTRA's graphical user interface

All the SPECTRA Nodes that you see have a graphical user interface. These all operate in the same way, so you do not have to learn separate features and operations for each Node.

#### Common features include:

- general use of the mouse buttons;
- the use of a Node's main window and sub-windows to carry out operations; and
- the use of "executive" buttons on a window to apply and submit configuration changes, and exit from the window.

#### Common operations include:

- connecting to and disconnecting from the Data Server, and viewing communications errors (via the *Communications* menu);
- selecting or specifying a file (for opening or saving the configuration);

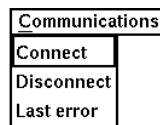
- opening and saving configuration files (via the *File* menu on a Node's main window);
- obtaining help; and
- exiting from the Node (via the *File* menu on a Node's main window).

These are outlined below.

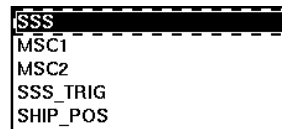
## Use of mouse buttons

The following general use of mouse buttons applies throughout the whole system:

- Left clicking on a menu in the menu bar will show the menu's options. Left clicking on an option will select it. For example:



- Left clicking when pointing the mouse cursor at a list item will select it. For example:



- Double (left) clicking on an item from a list will produce some default action (such as *OK*, or show an Editor window).
- Left clicking in a data field will place the cursor in the field ready for you to edit its contents. You can click, hold, drag and release to select part of the field's contents to over-type, or simply delete and type the required data in the field.

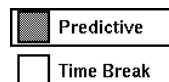


- Whenever a text field requires entry of an item from a set defined elsewhere in the system, right clicking in the field will produce the list to choose from.

- Left click on buttons to operate them, for example:



- Left click on check boxes to turn them on or off, for example:



- Left click on one of a set of radio buttons to turn it on, and the others in the set off, for example:



## The main windows

When you start a Node, either its main window or its icon appears, depending on the setting of the PN\_PAN environment variable. Shrink the window to an icon and expand the icon to the window as needed.

From the main window, you can open and save files, establish or break communication with the Data Server, submit information to the Data Server, access help and exit the Node.

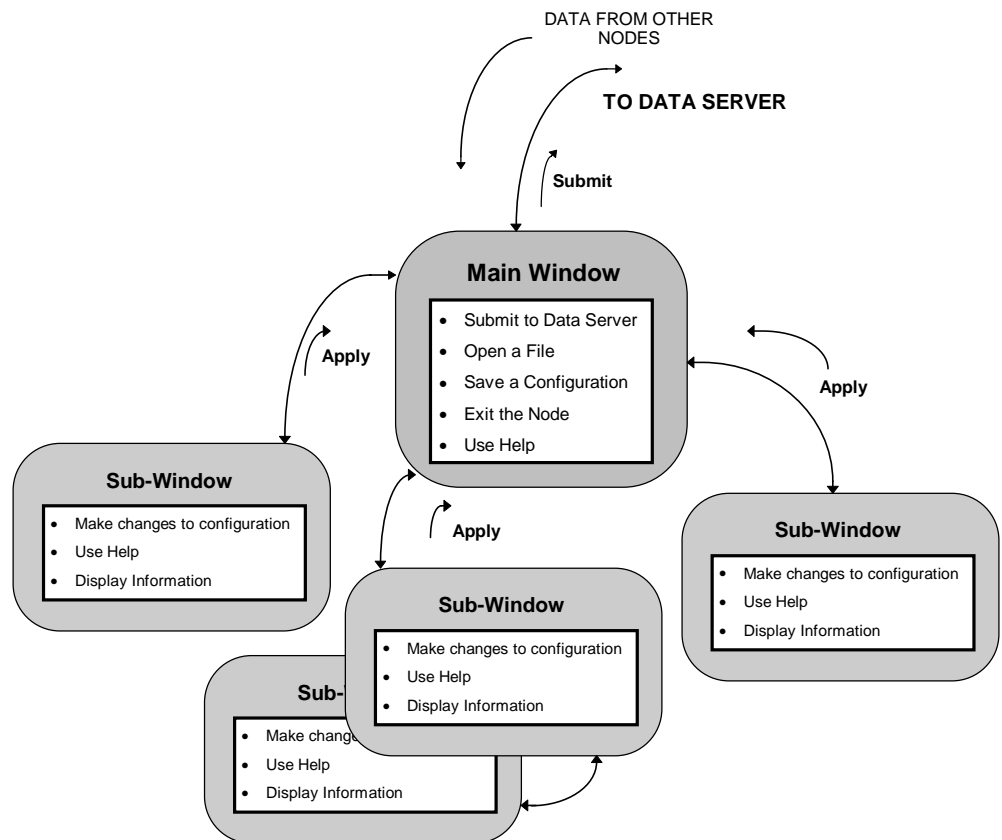
The main window's *Communication status* field displays the current status of the communications link between the Node and the Data Server. The *Change Status* field(s) indicate any configuration changes made but not yet submitted.

For most Nodes you can also call up sub-windows from the main window, to view or configure various aspects of the Node's operation.

## The sub-windows

Many Nodes have options which call up sub-windows. Some of these sub-windows simply display information; others allow you to configure various aspects of the Node's setting. In turn, these sub-windows may have sub-windows of their own in which to configure settings or display information.

The following diagram illustrates the relationship between a Node's main and sub-windows, and the types of operations performed on each:



## The “executive” buttons

The common operations of applying and submitting configuration changes can be performed from a window’s *File* menu, or by using the short-cut “executive” buttons shown on most windows.

*Submit button* The main window on most SPECTRA Nodes has a *Submit* button. Use this to submit configuration changes to the Data Server. This is an alternative to using the *Submit* option from the window’s *File* menu.

Many sub-windows of SPECTRA Nodes have the following buttons:

*Apply button* Use this to apply configuration changes without closing the sub-window. This is an alternative to using the *Apply* option from the window’s *File* menu.

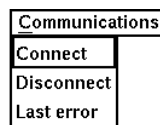
*OK button* Use this to apply configuration changes and close the sub-window. This is an alternative to using the *Apply* option from the window’s *File* menu, followed by the *Close* or *Exit* option from the *File* menu.

*Cancel button* Use this to close the sub-window without applying any configuration changes. This is an alternative to using the *Close* or *Exit* option from the *File* menu.

## To connect to / disconnect from the Data Server

Each Node in SPECTRA needs to exchange information with the Data Server and therefore must be connected to it. If you started SPECTRA from the Monitor Node, each Node will have been automatically connected, and will remain so unless you disconnect it or communication errors occur. In case of errors, you may need to connect or disconnect the Node manually.

To connect to or disconnect from the Data Server use the *Communications* menu on the Node’s main window to show the following options:



Select the *Connect* option to connect the Node to the Data Server, which then furnishes the Node with a channel for communication. The Node’s data can then be submitted to the Data Server for use by other Nodes. You cannot select this option if you are already connected.

*Connecting:* Connecting in itself does not submit data. Connecting to the Data Server will allow the Node to obtain data provided by other SPECTRA Nodes.

Select the *Disconnect* option to disconnect the Node from the Data Server. This will remove from the Data Server any data items previously produced by the Node. You cannot select this option if you are already disconnected.

*Disconnecting:* Disconnecting removes all configuration data for this Node from the Data Server.

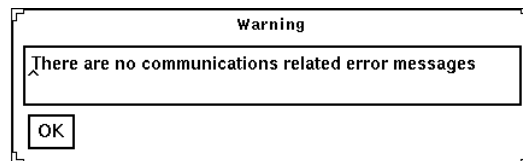
The *Communications status* field on the main window displays the current status of the communications link between the Node and the Data Server. The status will be one of:

*Connected* The communications link is operating without problems.

*Disconnected* The communications link has not been established, or has been deliberately disconnected.

In either case, if “(Errors)” is appended to the status this indicates that there is some problem with data transfer. Use *Communications/Last Error* to display a window providing a written explanation of the last known error.

When there are no errors, the message window reads:

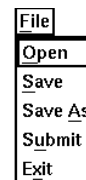


Press *OK* to remove the window from the screen.

If errors are shown, read the messages displayed and fix the problem(s) causing the error(s). Press *Clear* to clear the error buffer. You will not be able to connect to the Data Server unless the error(s) are cleared.

## To read a configuration from file

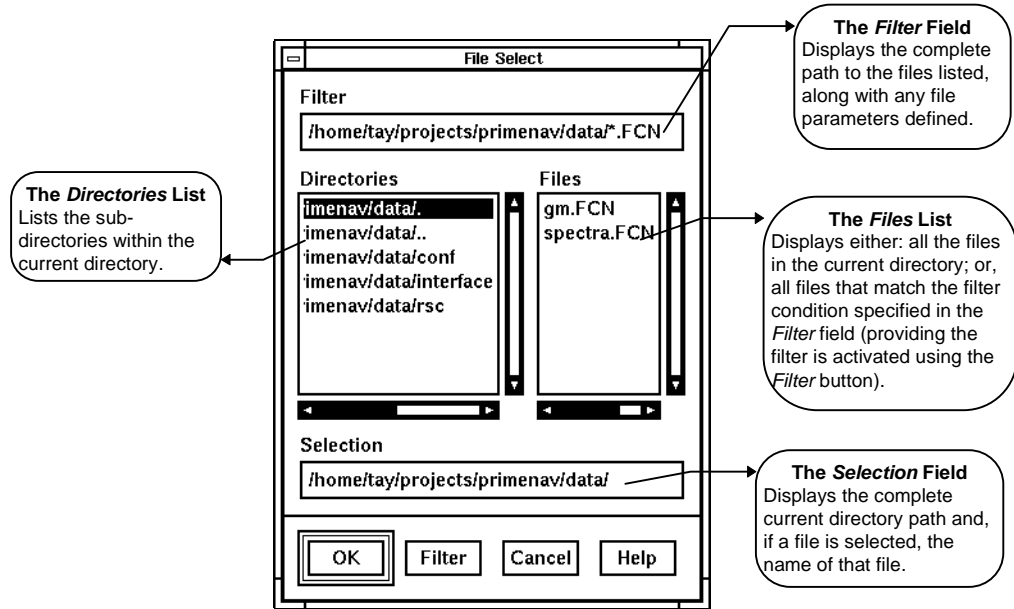
To read a configuration from file, use the *Open* option from the *File* menu on a Node's main window. For most Nodes, the following menu is displayed:



Selecting *Open* will display the File Select window shown in [“Selecting a file” on page 2-6](#). Use this window to find and select the file to open.

### Selecting a file

The file you select to open must be a permanently saved configuration file for the Node in question. As there may be numerous configuration files saved on your hard disk, use a file filter to narrow your search.



In the *Filter* field, enter the complete directory path to the file(s) you are interested in. Or, if appropriate, select a directory from the *Directories* field. Additionally, you may use wild cards, for example, an entry of `*.SCN` would limit the search to those files in the current directory which had the suffix `.SCN`, while an entry of `*con.*` would search out those files whose name ended in `con.` with any suffix.

Activate the filtering process by clicking the *Filter* button. The files displayed in the *Files* list box will be limited to those which satisfy the particular conditions.

### Opening a file

To **open** the file that you have selected, press *OK*. The configuration data is read from the specified file and all existing configuration data will be replaced by the values in the file. The old values will be lost, unless you have already saved them. The File Selection window will close.

*Note:* The values you read from file only replace those held in the Node. The actual configuration used by the Data Server does not change unless you *Submit* the new values (see [“To submit configurations to the Data Server” on page 2-8](#)).

## To configure a Node

Changes to a Node's configuration are made via sub-windows. The exact procedures for making or altering configurations vary between Nodes and between parameters. These variations are detailed in each individual Node's user manual. There are some common principles however.

To make the altered configurations the current ones, choose the *Apply* button or select the *Apply* option from the *File* Menu. This will copy the data on display to local memory.

Alternatively, choose the *OK* button. This will apply any changes which you may have made and close the window.

Applying changes to the configuration, in any of the ways described above, will result in a "Changed since last submitted" message in the appropriate *Change Status* field on the main window. This is to alert you to the fact that the data in memory is different from that held in the Data Server (which is the data used by the other Nodes) and it will remain so until you submit the new data.

To close the sub-window and return to the main window, use the *Cancel* button or select *Close* from the *File* menu. If you made changes to the definitions but failed to apply them, these changes will be lost and all values for the configuration will remain as before.

## To save a new or modified configuration

To save a new or modified configuration to file, use either the *File/Save* or *File/Save As* option from the menu on a Node's main window. This will preserve the configuration data for future use.

*Save*

This option saves the configuration to the currently open configuration file, overwriting the previously stored values in the file. If you wish to preserve the previous configuration, you can save the file under a new name (see the *Save As* option below).

*Save As*

Use this option to save the new or modified configuration under a different file name, thus preserving the previous configuration file. Selecting this option will display the File Select window (see "[Selecting a file](#)" on page 2-6). Enter a new file name in the *Selection* field or alternatively select the file to which the configuration will be written. Press *OK* and the file will be saved under the new name (and path, if a different one is specified).

## To submit configurations to the Data Server

Whilst the Data Server holds configuration data, it is volatile and lost when the Data Server is shut down. Each time SPECTRA is started up, configuration data must be presented to the Data Server by each Node. This is usually accomplished by reading in the saved configuration for the Node then submitting it to the Data Server.

To submit configuration data to the Data Server, use the *Submit* button or choose the *File/Submit* option from the menu on the Node's main window. This will send the current configuration to the Data Server. This then becomes the configuration actually used by the Data Server and made available for use by other SPECTRA Nodes.

## To access help

### ... from main windows

Select *Help* from the menu on the Node's main window. Help displays the following options:

|                        |  |
|------------------------|--|
| <i>Contents</i>        | This displays a general help topic for the Node. From here, you can call up help on use of all the Node's windows.   |
| <i>Search</i>          | This shows a search box, which you can use to search for help topics containing specified words in either their titles or the text. (Note that there is also a search button on the Help window itself: this lets you search for topics associated with pre-defined keywords.) |
| <i>Help On</i>         | This displays help on use of the Node's main window.   |
| <i>How To Use Help</i> | This shows help on the On-Line Help system itself.   |

### ... from sub-windows

On a Node's sub-windows, the *Help* menu gives the following options:

|                |   |
|----------------|---|
| <i>Help On</i> | This displays help on use of this window. |
|----------------|---|

## To exit the Node

To leave the Node, select *File/Exit* from the menu on the Node's main window. Use this only when you are finished with the Node, and it is not to continue running. When you exit, all configuration data for this Node is removed from the Data Server.

Note that some Nodes **must** be present at all times during normal operation of SPECTRA. To optimise screen space, you can shrink the window to an icon by selecting the window shrink box.