



***DIA SUITE
ProfilR and CompressR***

**OPERATION
MANUAL**



TRILITHIC

The Best Thing on Cable



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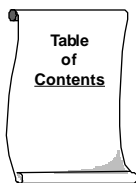
In addition to developing instrumentation for the CATV industry, TRILITHIC produces RF and microwave components and equipment for aerospace and wireless communications, as well as computer controlled assemblies for automated test systems, headend automation and communications signal routing.

TRILITHIC products are designed and manufactured at our facility in Indianapolis, Indiana. These products are distributed by sales agents in over 40 countries.

Should you have any questions or need our service, please contact us at the address or telephone numbers below:

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GENERAL INFORMATION



Introduction

Trilithic's newest software application for your Guardian Return Alignment system is the **DIA Suite**. This powerful application consists of **ProfilR** and its utility, **CompressR**, which work together to provide you the most powerful return path analysis software available today. The DIA suite enables you to condense and analyze the records generated by Trilithic's **Ingress ManagR 2.X** or **Ingress ManagR 3.X** (for more information on Ingress ManagR, refer to the *Ingress ManagR Operation Manual*). Equipped with a full range of data analysis and display functions, the DIA Suite is the only return analytical software able to determine return path availability in DOCSIS bandwidths.

- **ProfilR** – analyzes **CompressR** summaries. Then, plots changes in spectrum availability over time and frequency, and in any bandwidth and time interval you desire.

ProfilR's results are presented in clear, easily readable graphs (including the new Waterfall Graph) or as tabular reports.

- **CompressR** – continually processes return spectra being archived by **Ingress ManagR** into several measures of return performance.

Trilithic's DIA Suite is fully compatible with Trilithic's new **TrafficController** mode which enables your Guardian return path maintenance system to monitor ingress, even in bands carrying return traffic.

Overview

Ingress ManagR scans multiple hubs, SSTs and nodes, acquiring return path spectral data from each node scanned. It then saves the ingress spectral data to one or more **Access** databases. A system with a moderate number of nodes can generate thousands of records per day which provide you with regular snapshots of each node. When diagnosing a problem, you can play back the data for a given node and observe the signature of its ingress problem. By noting spectral distribution, duration and time of day that a particular ingress event occurred, you can devise a plan for finding and fixing the ingress problem. Ingress ManagR is designed to save large amounts of data on each node and is well suited to the daily business of ingress control.

There are situations, however, in which it would be useful to condense the data. Long term storage of performance data can be a valuable tool for evaluating your system's performance over time. After a few days or weeks, individual spectra becomes less important while performance trends become more useful. Observing data in terms of best, worst and average performance over a period of time make a better yardstick for comparing current operation to past performance.

It is also useful to have performance data when deciding what frequency to use to deploy a new service or to qualify a new plant. Summarized spectral data, along with the probability for performance within specified limits, is the most useful tool for predicting the quality of service at a particular frequency. A set of such tools are described in the NCTA procedures for Discrete Ingress Signal Probability. The DIA Suite is designed to condense and analyze the spectral data along this standard.

The overall process for using the DIA Suite is as follows:

- Ingress ManagR acquires Guardian SST return path ingress data and saves the spectrum to a database file (see *INGRESS MANAGR OPERATING MANUAL* for more information)
- CompressR is a utility of ProfilR which summarizes the data in user-defined time increments by creating a condensed database

- ProfilR uses CompressR's database to present the data in a graphical or tabular format

PROFILR SUMMARY

ProfilR is designed to use spectral data which has been collected by Ingress ManagR. Once the data has been compressed via CompressR, ProfilR:

- Displays the amplitude versus frequency over time
- Displays the performance to limits versus frequency over time

ProfilR contains several Report Formats which enable you to generate the performance displays.

Minimum/Maximum Average (page 27) – displays the maximum, minimum and average levels for return path noise, ingress and traffic over time. Single or multiple nodes may be selected from the system tree to analyze the time, persistence and duration of ingress levels present in the return path.

Average Discrete Ingress Probability (page 30) – used as a figure of merit for the return path. When referenced over time, it is an indication of whether noise and ingress levels are increasing or decreasing within the return path as a whole.

Ingress Theshold Probability (page 32) – displays the percentage of unavailability for each frequency in the return path against four user-selected limits.

Specific Frequency Discrete Ingress Probability (page 33) – displays the unavailability of the selected frequency against four user-selected limits.

Specific Channel Discrete Ingress Probability (page 35) – displays the unavailability of the selected channel against four user-selected limits.

Power Summing Channel Unavailability Report (page 36) – calculates the availability of return bands for DOCSIS-compliant return service. It is especially useful as a “proof of performance” tool, assessing the ingress conditions of a node’s service area to determine if the node is ready to be integrated with the system (see *POWER SUMMING* page 58 for background information).

The reports also use the marker feature which displays vital information for any selected point.

Before using ProfilR, you need to generate a compressed database file using CompressR. For more information, see *ProfilR* (page 11) and *CompressR* (page 41).

COMPRESSR SUMMARY

CompressR is a utility program of ProfilR, designed to process Ingress ManagR’s raw ingress data files into summary databases for use by it’s companion software, ProfilR. The compression activity is accomplished by two primary processes.

- Define the compression rules
- Launch one or more compression activities associated with the defined rules

Compression rules define a set of four performance limits which are used for determining frequency unavailability to limit versus time and the interval used for computing each record in the summary database.

Once the rules are defined, a compression activity in accordance with a desired rule is launched for each raw ingress file to be summarized. When launched, a compression activity generates an output database containing performance to limits data for each node in the input database.

Each output record also contains the minimum, maximum and average level for each frequency. This provides a useful tool for assessing a node’s ingress performance during each summary interval.

CompressR has the ability to compress the files in two ways:

- Manually (while you wait)
- Automatically (as a background process as data is collected)

NOTE: Before you compress the database, review the section on ProfilR (see page 11) to familiarize yourself with what it can do. This way, you will be able to generate a database which is tailored to your evaluation needs.

System Requirements

In order to run the DIA Suite, you need an IBM®-compatible computer with the following:

- Pentium 300
- 64 Meg of RAM for Win '98/Win NT
- 1 COMM Port for Mouse
- 10 Meg of Hard Drive space for installation
- 8 Gigabytes for Data Collection
- SVGA Color Monitor with a resolution of 800 x 600 and 256 Colors (the screen may look odd if other resolutions are used). The Windows System color map determines the color of the message boxes which appear. Also, in Win '95 large fonts may cause the text to look stretched.
- A PC compatible mouse
- Windows 98/NT
- 3 1/2" Floppy Drive
- Program needed to support the DIA Suite:
Ingress ManagR Version 2.X or Ingress ManagR 3.X

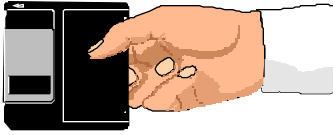
The DIA Suite is designed to work with the same setup you use for Windows. If your Windows setup works smoothly, you should have no difficulty running the software.

NOTE: If you are planning on using extensive ingress monitoring and database/compression for data analysis, we recommend that you consider purchasing more processing power. The Pentium 300 recommendation is for moderate system usage.

On-Line Help

The DIA Suite is equipped with an on-line help function to assist you in using the application. The basic help feature can be accessed by selecting the HELP Menu. You can select **F1** to search for a specific DIA Suite topic.

Once you are inside the Help Menu System (Standard Windows Help), you can locate topics by searching for key words, referring to the HELP Menu's Table of Contents, or by bringing up previously viewed Help Topics.



SOFTWARE INSTALLATION



Introduction

Now that you've checked the system requirements, you can install the DIA Suite. This program is designed for PCs with Windows '98 or higher operating systems.

Installation

To install the software, use the following procedure:

1. Turn ON your PC.
2. Insert the disk into drive **A** or **B** (depending on your drive configuration and the size of your installation disk).
3. Click on the **START** icon and then *click* on **SETTINGS/ CONTROL PANEL**.
4. Once you are in the **CONTROL PANEL**, click on the **ADD/ REMOVE PROGRAMS** icon.
5. Click on the **INSTALL** button and follow the instructions on the screen.
6. The software's setup utility will install the software and your desired components automatically into your PC.

Troubleshoot the Installation

Due to the configuration of some PCs, there may be an installation loop that prevents the software from installing properly. The PC may give you an error indicating that several files are already in use which is preventing installation.

If this happens, first check the lower right section (often shows the time) of your startup task bar as well as the STARTUP GROUP. If you see several icons, you may be able to correct the problem yourself or have your Systems operator correct it for you.

Locate the MSCONFIG file (usually located in the WINDOWS directory for Win '98). Double click on the MSCONFIG.EXE file to open the utility program.



Select the **STARTUP** tab. You will see a number of files checkmarked which your PC uses in the boot up process. *Click* on several of the files to disable some of the startup functions.

CAUTION: Do NOT disable ALL of the files. If you do, your system will not work.

By deselecting a few of the optional features (such as sound card files), you should be able to free up the conflicting file resources so that the DIA SUITE installation procedure will complete. Once the program is installed, return to the MSCONFIG program and reselect the files you turned off.

If you have further difficulties installing the DIA Suite, you will need to call Trilithic at (1-800-344-2412).



ProfiLR

Introduction

ProfiLR is designed to analyze the database summaries generated by CompressR (see page 41). It plots the changes in spectrum availability over time and frequency, in any user selected bandwidth and time interval. Results are displayed in clear, readable graphs or as tabular reports.

ProfiLR enables you to determine:

- The Maximum/Minimum/Average (Max/Min/Avg) levels of noise, ingress and traffic levels over specified intervals (see page 27)
- The Average Discrete Ingress Probability (see page 30)
- Ingress Threshold Probability (see page 32)
- Specific Frequency Discrete Ingress Probability (see page 33)
- Specific Channel Discrete Ingress Probability (see page 35)
- Power Summing Channel Unavailability (see page 36)

Overview

ProfiLR provides all of the recommended tools, as specified in the NCTA Standard Practices, for evaluating a return path in terms of performance to limits. It also enables you to track changes in return path performance over a period of time.

Each report provides results in graphic or tabular format. Data for several nodes can be displayed simultaneously which makes it easier to compare performance. To aid in comparing nodes, data for a specific node may be highlighted.

You may select colors for the graphs and highlighting data from a pop up color palette. Each graph has a handy marker function which displays data for the selected point. A *click and drag* ZOOM function makes it easy to home in on an area of interest. All graphs have a SAVE AS function which enables you to save the graph as a new file so that you can still use the originally compressed data for other evaluations.

If you desire, you can also recompile the compression time interval for a selected file to longer intervals. This recompiled data may be used temporarily or saved for later use without replacing the original data.

To open ProfilIR, go to the directory where the program is installed and *click* on its icon.

When the program opens, it displays the MAIN screen.

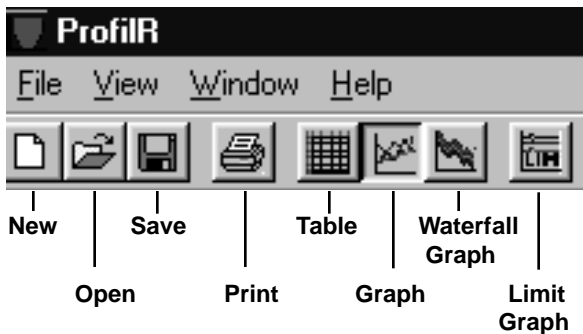


ProfilIR's MAIN MENU bar has four menus:

- FILE – contains the commands for handling files including NEW, OPEN, CLOSE, SAVE, SAVE AS, PRINT as well the EXIT command.

- VIEW – contains the commands to open ProfilIR’s work windows including TABULAR, GRAPH, WATERFALL, LIMITS and the tool screens TOOLBAR and STATUS BAR
- WINDOW – contains NEW WINDOW, CASCADE, TILE HORIZONTAL, TILE VERTICAL, and ARRANGE ICONS
- HELP – contains the online HELP and ABOUT commands (see *ON-LINE HELP* page 8)

Just below the MAIN MENU bar are several icons.



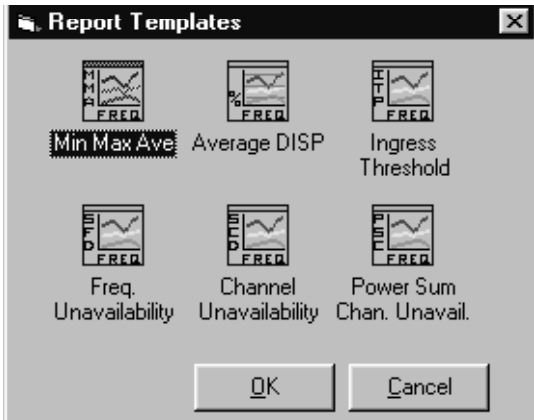
- NEW - starts a new file
- OPEN - opens an existing file
- SAVE - saves the active file
- PRINT - prints the active file
- TABLE - enables you to view the data in tabular format
- GRAPH - enables you to view the data in graph format
- WATERFALL GRAPH - enables you to see entire frequency spectrum over a period of time
- LIMIT GRAPH - enables you to view the limits graph

Operation

To start a new ProfilIR procedure, *click* on the NEW icon or select NEW from the FILE Menu. You may also open an existing ProfilIR document by *clicking* or selecting OPEN.

REPORT TEMPLATES

This brings up the REPORT TEMPLATES screen.



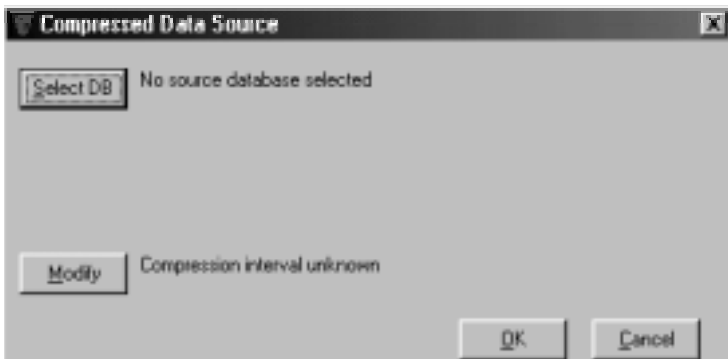
Select the desired template and *click* **OK**.

SELECT DATABASE

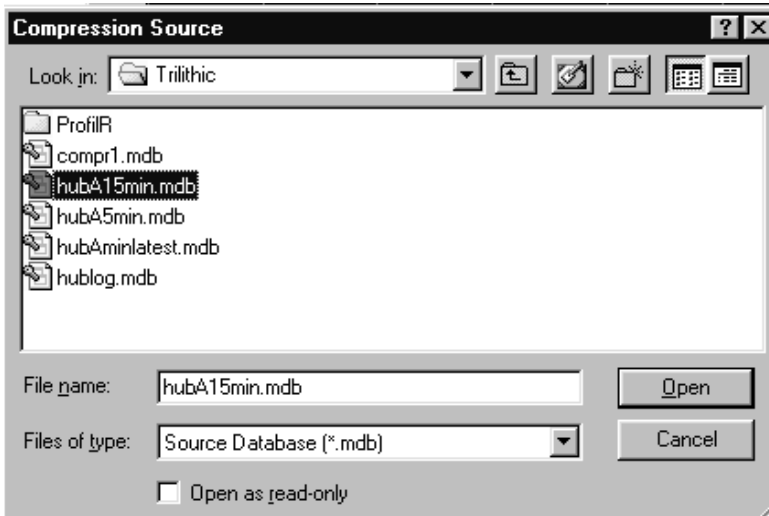
Regardless of which template you are using, you will need to select a compressed database for analysis. Once the template window is displayed, *click* on the **DATA SOURCE** button.



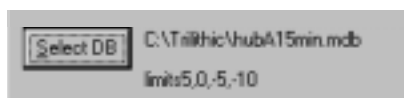
This brings up the COMPRESSED DATA SOURCE window.



Click on the **SELECT DB** button to select the compressed database file you wish to analyze.



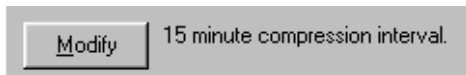
Go to the folder in which the CompressR generated files are located and select the file you wish to analyze. Then **click OPEN**. ProfilR returns to the COMPRESSED DATA SOURCE window. The information regarding the selected file appears next to the **SELECT DB** button.



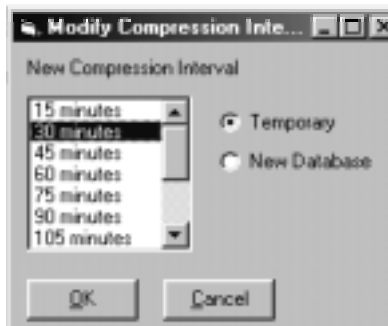
If you wish to evaluate the database via several time intervals, you don't need to recompute the information via CompressR. ProfiLR provides two methods for recomputing time intervals for the same data.

NOTE: You may not recompute shorter intervals. You can only increase the interval from the CompressR database. If you plan to evaluate several, use the **SHORTEST** increment for your CompressR process.

The **MODIFY** function is best used when you wish to recast a large amount of data for analysis. *Click **MODIFY**.*



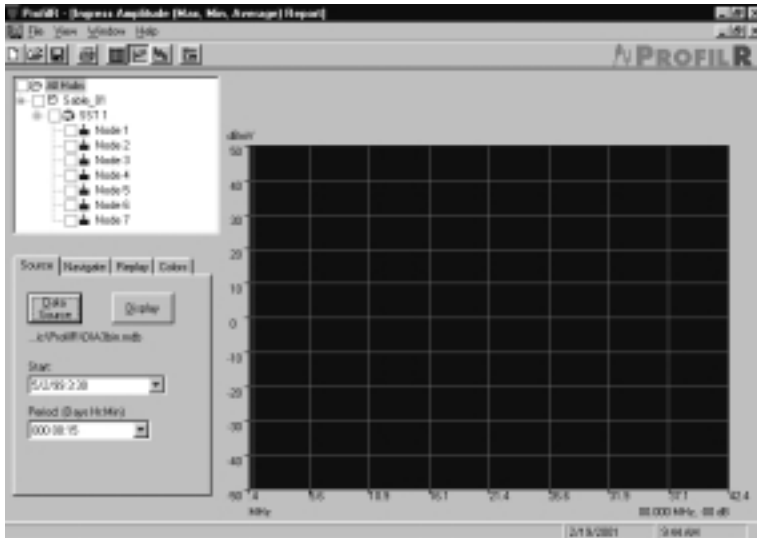
From the list, select the new interval you wish to use. To ensure that the new interval does not affect the original compressed database file, select either **TEMPORARY** or **NEW DATABASE**.



ProfiLR will then use the new interval for the active process only and the original database will not be changed. *Click **OK**.*

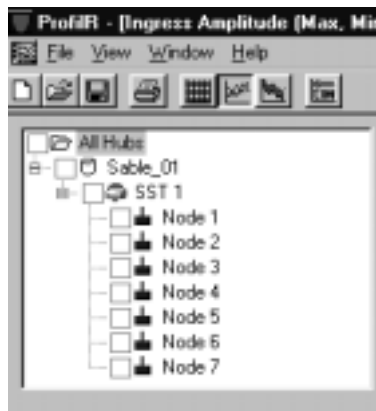
You may also change the time interval from each of the report windows via the **PERIOD** box (see page 22). The **PERIOD** box is best used for "on the fly" temporary recasts of selected reports rather than the entire database.

When the database and interval are set to your specifications, *click OK*.



DATA DISPLAY PARAMETERS

The upper left window of the main template screen displays the Hub, SST and Node data contained in the database.



For analysis purposes, you may select either a single node, two or more nodes, a single SST which displays all nodes on the SST, two or more SSTs, a single Hub or two or more Hubs. When you make your selection, a check mark appears next to the Hub, SST or Node.

NOTE: ProfilR has a delayed display timer. This means that the report display will not update while you are *clicking* the selection boxes. Once there has not been activity for a few seconds, ProfilR will then update the display to reflect the checked box selections.

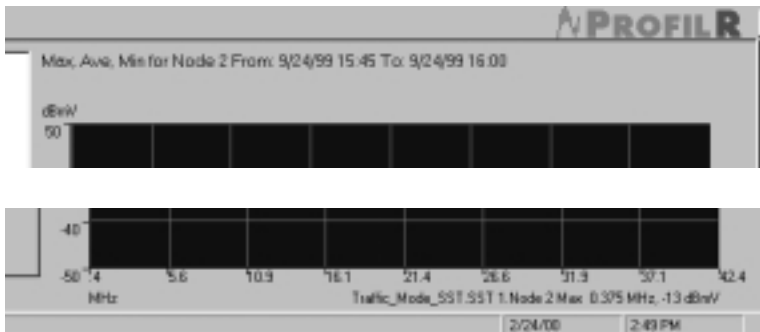


Data regarding the check marked component appears in the right display in table or graphic format (the example below is tabular).

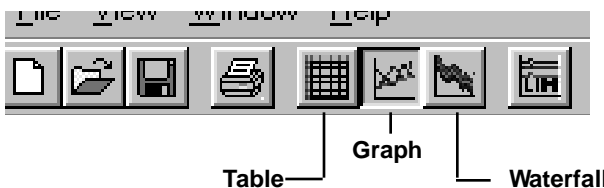
	.375	.75	1.1
Locale_01.SST 1.Node 1 Max	-27	-6	
Locale_01.SST 1.Node 1 Ave	-31	-14	
Locale_01.SST 1.Node 1 Min	-34	-21	

NOTE: If you select multiple Nodes, an SST or a Hub, it may take a few minutes for ProfilR to display all of the data.

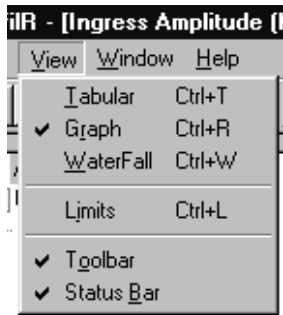
Detailed information about the nodes appears in the upper left and lower right quadrants above and below the display window.



Click on the viewing icons (TABLE, GRAPH or WATERFALL) to display the data in the desired format.



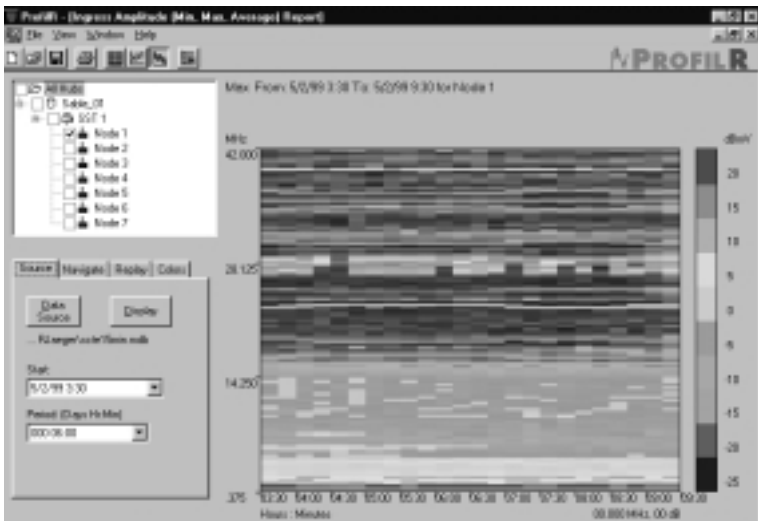
You may also select the viewing option from the VIEW Menu.



Waterfall Graph Display

In addition to a standard table and graphic display of each time interval of a report, ProfiLR also enables you to view an entire frequency spectrum over a defined period of time for a node. This is especially helpful in assessing performance over longer periods of time.

NOTE: The Waterfall Graph is not applicable to all reports. If it is not available, the icon will be grayed out. It is available in the following reports: Maximum/Minimum/Average (page 27); Specific Frequency Discrete Ingress Probability (page 33); Specific Channel Discrete Ingress Probability (page 35); Power Summing Channel Unavailability (page 36).



The frequency appears on the left while the time appears along the bottom. On the right side is a color bar representing the level of the signal in dBmV.

This color bar can be adjusted by *clicking* on the NAVIGATE tab and changing the HIGH END and LOW END values.



The graph can only display one range at a time (for example, maximum, average, minimum).

NOTE: The Waterfall Graph always displays the first range it comes to (as it checks from the top down). For example, if you have SHOW MAXIMUM, SHOW AVERAGE and SHOW MINIMUM all checked, the graph will display SHOW MAXIMUM. Therefore, if you wish to view SHOW AVERAGE, make sure that the SHOW MAXIMUM box is not checked.

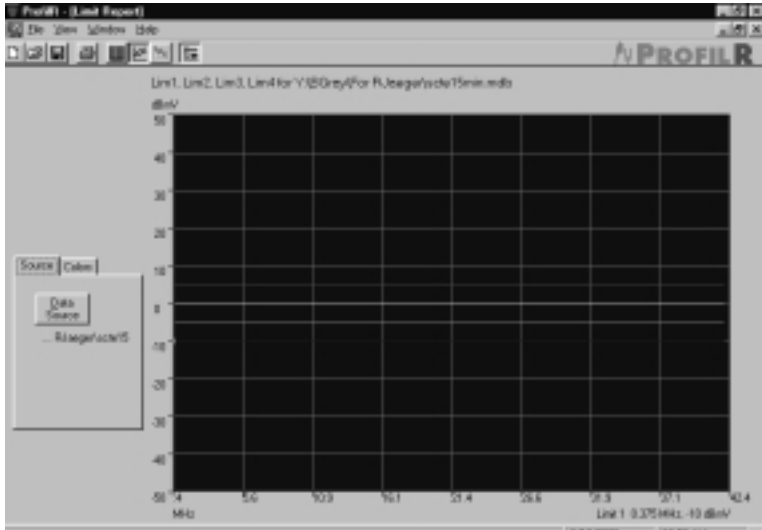
As you view different periods of time, you will need to *click* the **DISPLAY** button to refresh the graph. However, you can change nodes and it will autodetect the change and refresh the display automatically.

When using the Waterfall Graph in the Frequency and Channel Unavailability reports, keep in mind that the graph displays ALL of the frequencies. This means that the display is the same for both.

Limit Graph

If you wish to view the limits which CompressR used for the compression activity, *click* on the LIMIT GRAPH icon or select LIMITS from the VIEW Menu.

The limits are displayed in the graph.



The LIMITS GRAPH icon is *toggled* on and off. To return to the main REPORT screen, merely *click* the icon again.

REPORT FORMAT OPERATION

On each of the REPORT screens are several operation tabs: SOURCE, NAVIGATE, REPLAY or PLAY, and COLORS.

NOTE: Not every report format supports every function. For example, the **AVG DISP** report format does not have a color tab.

Source

The SOURCE tab enables you to designate the CompressR database you wish to evaluate.



To select a database, *click* on the **DATA SOURCE** button (see *SELECT DATABASE* on page 14). Once the database is opened, its starting time appears in the **START** box.

As you evaluate the data, you may change the time interval by scrolling through selections in the **PERIOD** box.

If you do change the evaluation criteria, *click* on the **DISPLAY** button to refresh or update the display screen.

Navigate

The NAVIGATE tab enables you to select specific record files within a database.

You can move between records in the displayed database by *clicking* on the navigation buttons. To view the first record *click* on **FIRST**. To view the last record, *click* **LAST**. To view the record prior to the one you are evaluating, *click* on the **PREV** button. To go to the next record, *click* **NEXT**.



Within each of the Report Format templates, you may select specific traces to view. For example, you are evaluating data with the MAX/MIN/AVG Report Template. You prefer to just view the maximum and minimum traces and want to eliminate the display of the average trace. Deselect the **SHOW AVERAGE** box (no check mark appears in box). ProfilR will only show the maximum and minimum traces.

REMINDER: When you make a change, such as deselecting a trace, *click* the **DISPLAY** button to refresh or update the display.

The NAVIGATE tab may also contain the **ZOOM OUT** button. You may use this button to restore the graphic display to the normal view after you have zoomed in (see *ZOOM FEATURE*, page 24).

Replay or Play

The PLAY or REPLAY tab enables you to scan the records from a specific point to the end.



Click on the **PLAY** button to activate the scan.

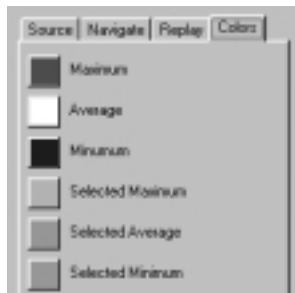
NOTE: The **PLAY** button *toggles* to **STOP** when it has been activated. Click it again to stop the scan of the records at any points you wish to examine more closely.

Use the **FAST/SLOW** slide bar to adjust the speed of the scan.

If you wish the scan to start over when it reaches the end, select the **LOOP REPLAY** box (checkmark appears in box when the feature is activated).

Color

The **COLOR** tab enables you to designate different colors for each graphic trace.

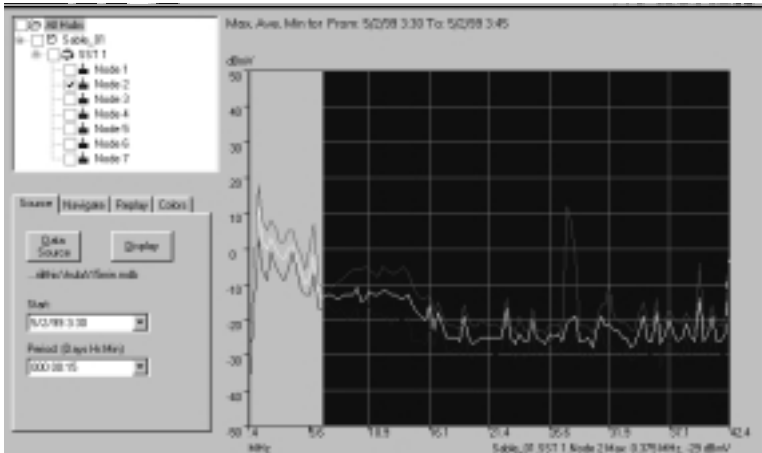


The first colors are used in common throughout all nodes. If you wish to view a specific node using different colors so you can evaluate it more easily, you may use the bottom group of **SELECTED COLORS** to highlight the desired node.

For example, you wish to view the maximum, minimum and average of Node 3 as it compares to Node 1. By using the **SELECTED** colors for Node 3, you can contrast its traces with those of Node 1.

Zoom Feature

If you wish to take a closer look at a section of a trace, click on the desired point of the graphic display with the **RIGHT** mouse button and then drag across the desired area.



A gray band covers the area. Release the button and the display zooms in on the designated location. To return to the previous view, *click* again with the RIGHT mouse button or *click* on the **ZOOM OUT** button of the NAVIGATION tab.

Marker Feature

As you are evaluating the traces, you may want to get to look at a single point. *Click* on the desired area with the LEFT mouse button. This places a small, white marker at the designated point.



Specific information regarding the marker is displayed in the lower right corner below the graphic.



If you wish to move the marker along the trace for additional data, use the RIGHT and LEFT arrow keys. To move to a different trace or Node, press the UP and DOWN arrow keys.

NOTE: If you wish to move the marker to a different Node, the marker will need to go through all of the traces of the current Node before moving to the next one. For example, if you are viewing the MAXIMUM trace of Node 1 and wish to compare it to the MAXIMUM trace of Node 2, the UP and DOWN arrow keys will first move the marker to the MINIMUM and AVERAGE traces of Node 1 before moving onto Node 2. The marker cannot “jump” past the next point.

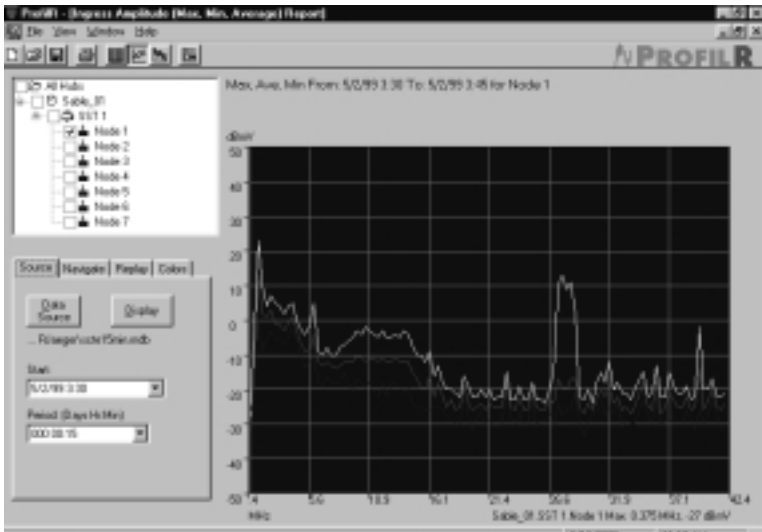
REPORT FORMAT TEMPLATES

ProfilR has several templates it uses for reports:

- The Maximum/Minimum/Average (page 27)
- The Average Discrete Ingress Probability (page 30)
- Ingress Threshold Probability (page 32)
- Specific Frequency Discrete Ingress Probability (page 33)
- Specific Channel Discrete Ingress Probability (page 35)
- Power Summing Channel Unavailability (page 36)

Min/Max/Avg

To open the Min/Max/Avg template, *click* on the **MIN/MAX/AVG** icon.



This report format's purpose is:

- Displays the maximum, minimum and average levels for all frequencies between 375 kHz and 65 MHz.

The maximum level is useful for evaluating worst case performance.

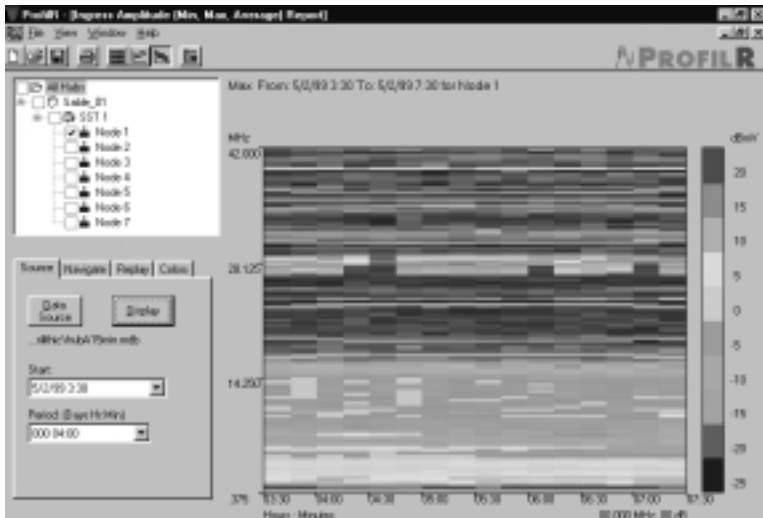
The minimum level is useful for setting a best case baseline and for determining the presence of discrete signals such as common path.

The average can be used to access the normative performances of the node.

- Data for one or more nodes can be viewed sequentially by time increment.
- Time increments may be advanced either manually or automatically.
- Frequency, amplitude, threshold limits, node and number of samples used to compute each data point for a selected node and trace are displayed using the marker function (see page 25).

This report is used to display the maximum, minimum, and average levels for return path noise, ingress and traffic over time. Single or multiple nodes may be selected from the system tree in the upper left window of the report to analyze the time, persistence and duration of ingress levels present in the return path.

This report supports the Waterfall Graph. By using this graph, you can assess the maximum, minimum and average levels over a longer period of time. As shown in the sample below, the level of ingress and noise appear lower around 04:30 and 07:00. This graph can help you assess ingress severity versus frequency at different times of the day.



POSSIBLE APPLICATIONS

If you use the alarm database (created in Ingress ManagR) as a source file, this report will display the nodes for each hub which have had alarm conditions during the specified time interval.

If you overlay the maximum trace for each of the affected nodes, you can identify ingress problems which are common to all nodes such as AM broadcast and shorewave communications. You may also display problems which are specific to a particular node such as subscriber induced ingress or Common Path Distortion (CPD).

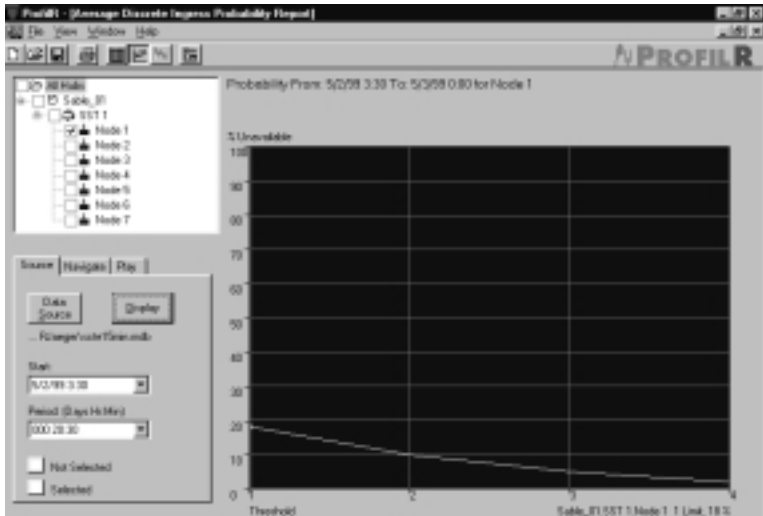
By overlaying the average trace with the maximum, an indication of the persistence of an ingress event will be pinpointed. Short duration events, where the average trace tends to appear significantly below the maximum, may be caused by switching transients. These would be of less concern unless they are repetitive in nature such as those which appear in manufacturing environments.

The minimum trace provides a quick “snapshot” of system noise and may be helpful in trouble-shooting gain-related problems. Nodes with high noise floors may not be aligned properly or may have suffered an equipment failure in the outside plant. Excessive gain raises noise and ingress levels in the affected nodes which may create ingress alarm conditions.

The Min/Max/Avg Report may also be useful during node certification. From the hub database created in Ingress ManagR, several nodes may be certified simultaneously by compressing the collected data into a 24-hour time increment or other user-selected interval. Displaying the maximum trace for each node provides a quick answer as to whether or not a node is ready for new services and acceptance.

Average Discrete Ingress Probability Report

To open the Average Discrete template, *click* on the **AVG DISP** icon.



This report format's purpose is:

- Calculates the average probability that a Node will exceed its thresholds over a user-specified time interval. The ADISP is useful as a “Figure of Merit” test for a Node’s overall performance.
- Calculates the average probability that ingress will exceed each of the four user-specified limits by summing the probabilities for each frequency versus limit over the specified time period; and then dividing by the total number of samples in the specified time period.

Consequently, the ADISP is a measure of a node’s performance independent of ingress frequency.

- Traces may be viewed sequentially by time increment or by a specific time period from a list of the time increments available.
- Percentage unavailability, number of samples for computing each data point and Node can be displayed using the Marker feature (see page 25).

The ADISP is a “figure of merit” for the return path. When referenced over time, it is an indication of whether noise and ingress levels are increasing or decreasing within the return path as a whole.

NOTE: The Waterfall Graph is not available in this report.

POSSIBLE APPLICATIONS

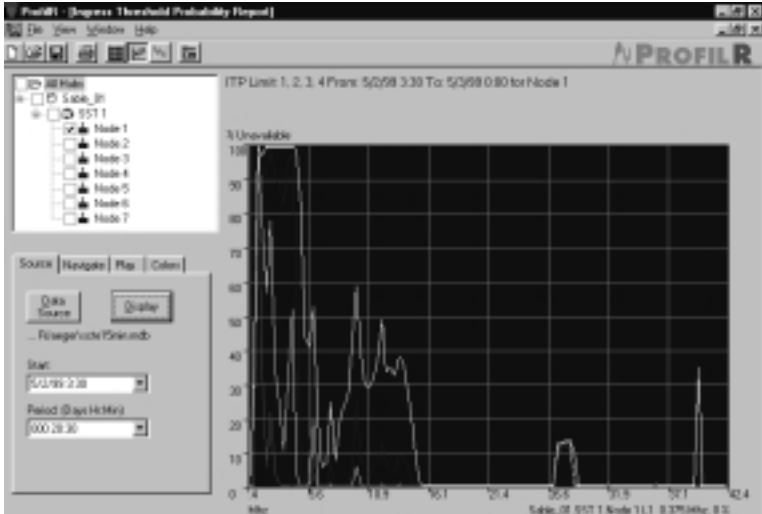
While the Min/Max/Avg report displays noise and ingress levels by frequency, it is less useful when determining the condition of the return plant over longer periods of time, such as days or weeks. The ADISP is used to evaluate the overall performance of a node and its ability to perform within the desired limits. By plotting each node’s performance abilities, you can determine the availability and unavailability of the return path as a whole.

The ADISP also makes it easier to determine the effectiveness of a preventative maintenance program by tracking the change in Return Path unavailability over a period of several days, weeks or months.

Effects of other long-term events, such as temperature and equipment aging, may also be tracked by the ADISP where gradual degradation of the cable plant begins to allow more noise and ingress into the return path.

Ingress Threshold Probability Report

To open the Ingress Threshold Probability template, *click* on the **INGRESS THRESHOLD** icon.



This report format's purpose is:

- Plots percentage of unavailability versus frequency and threshold for each frequency over a user-specified interval. This report is useful for determining the best frequency ranges for new services or for qualifying new nodes.
- Calculates the ITP as the percentage of times the level for each frequency crosses each of the four user-specified limits for the specified period.
- Traces may be viewed by time period from a list of the time increments available.
- Percentage of unavailability, limits, number of samples for computing each data point and Node can be displayed using the Marker feature (see page 25).

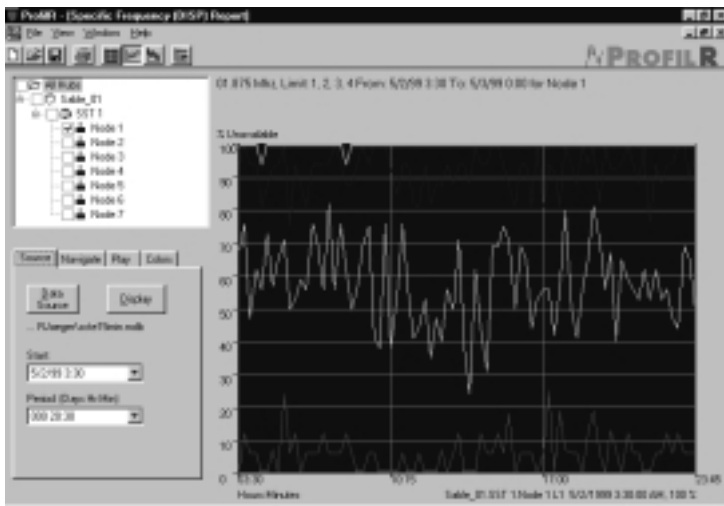
One of the most difficult decisions in deploying new services is selecting a frequency range that is available system wide. This report simplifies the decision process since it displays the percentage of unavailability for each frequency in the return path against four user-selected limits.

Setting the user thresholds to coincide with acceptable Carrier to Noise ratios, for the service about to be launched, results in displays of unavailability by frequency for the entire return spectrum. Portions of the spectrum, in which low unavailability percentages are displayed, may then be used for new services. Selecting multiple nodes will verify that the selected frequencies are available across the system.

NOTE: The Waterfall Graph is not available in this report.

Specific Frequency Discrete Ingress Probability Report

To open the Frequency Unavailability template, *click* on the **FREQUENCY UNAVAILABILITY** icon.

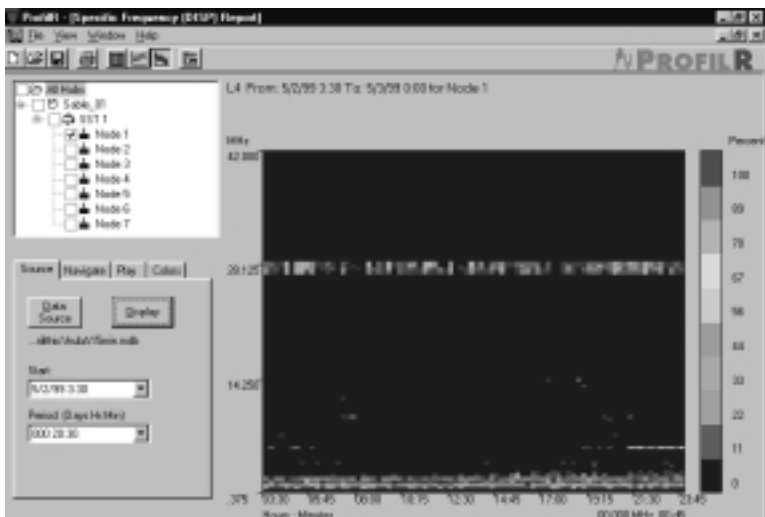


This report format's purpose is:

- Plots the DISP for a specific frequency versus time for each of the four limits.
- Calculates the DISP as the percent of threshold violations for each of the four limits for each time increment.
- Traces may be viewed by the time period from a list of the time increments available.
- Percentage of unavailability, limits, number of samples for computing each data point and Node can be displayed using the Marker feature (see page 25).

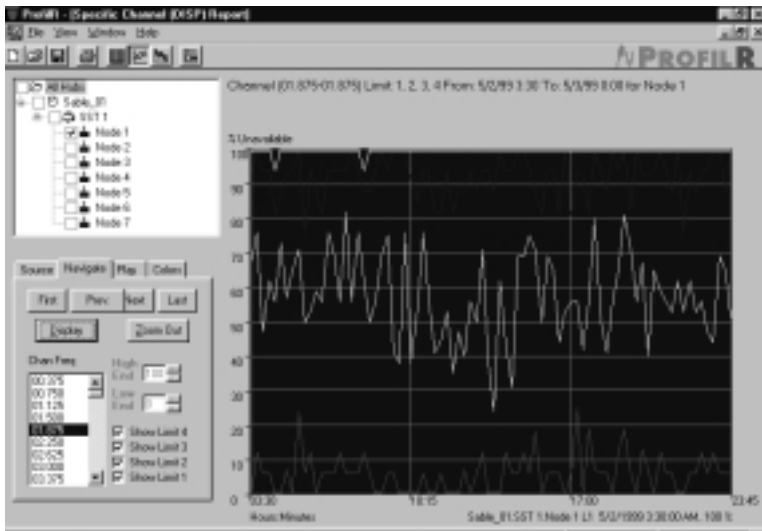
This report is used to display the unavailability of the selected frequency against four user-selected limits. The time increments are displayed simultaneously by creating a trace which shows the effect of noise and ingress on the selected frequency over time. Multiple nodes may be overlaid to determine quickly which nodes are in need of maintenance before new services can be deployed.

Use the Waterfall Graph to view frequency unavailability over a longer period of time. In the example below, the frequency of 28.125 MHz is unavailable during most of the time.



Specific Channel Discrete Ingress Probability Report

To open the Channel Unavailability template, *click* on the **CHANNEL UNAVAILABILITY** icon.



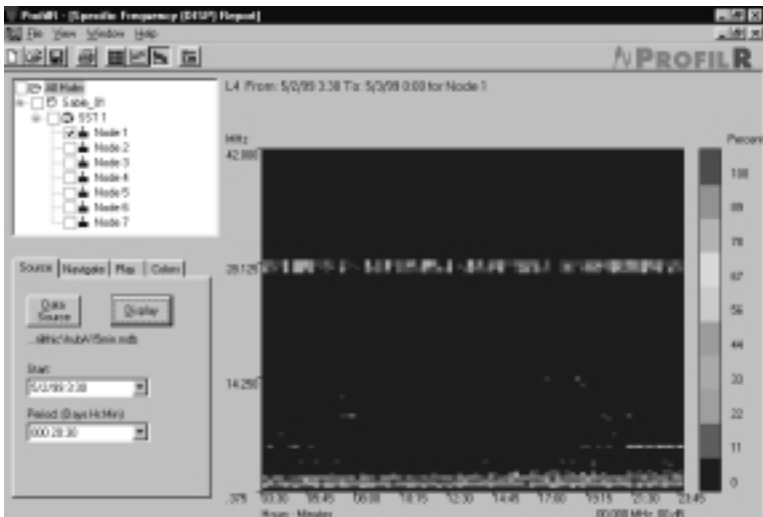
This report format's purpose is:

- Plots the DISP for a specific frequency band (channel or service) versus time for each of the four limits.
- Calculates the DISP as the percent of threshold violations by first computing the percentage of violations for each frequency in the channel and then selecting the percentage of unavailability for the worst frequency within the channel as the percentage of unavailability for the entire channel.
- Traces may be viewed by the time period from a list of the time increments available.

- Percentage of unavailability, limits, number of samples for computing each data point and Node can be displayed using the Marker feature (see page 25).

This report is used to display the unavailability of the selected channel against four user-selected limits. The time increments are displayed simultaneously by creating a trace which shows the effect of noise and ingress on the selected channel over time. Multiple nodes may be overlaid to determine quickly which nodes are in need of maintenance before new services can be deployed.

Use the Waterfall Graph to view channel unavailability over a longer period of time. In the example below, the frequency of 28.125 MHz is unavailable during most of the time.



Power Summing Channel Unavailability Report

This report calculates the availability of return bands for DOCSIS-compliant return service. It is especially useful as a “proof of performance” tool, assessing the ingress conditions of a node’s service area to determine if the node is ready to be integrated with the system (for more information see *POWER SUMMING COMPUTATION* on page 58).

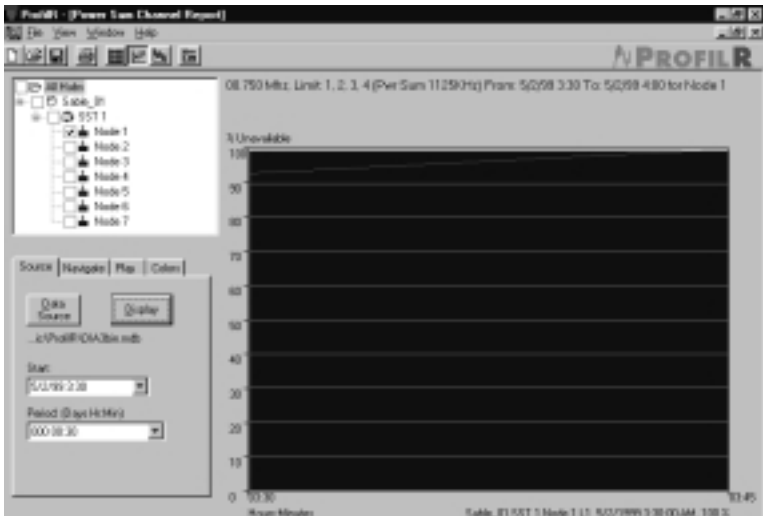
The power summing feature in ProfiIR operates in a similar fashion to the Specific Frequency Discrete Ingress Probability Report.

For power summing, you need to select the center frequency of a channel.

CAUTION: You must use compressed output which has the channel band power summed in CompressR. You cannot just use a compressed file and then try to power sum that.

REMINDER: For the standard NCTA reports (Specific Channel and Specific Frequency templates), you must use .375. Any other value will generate an error message.

To analyze the power summing database, select the POWER SUM CHAN UNAVAIL icon.



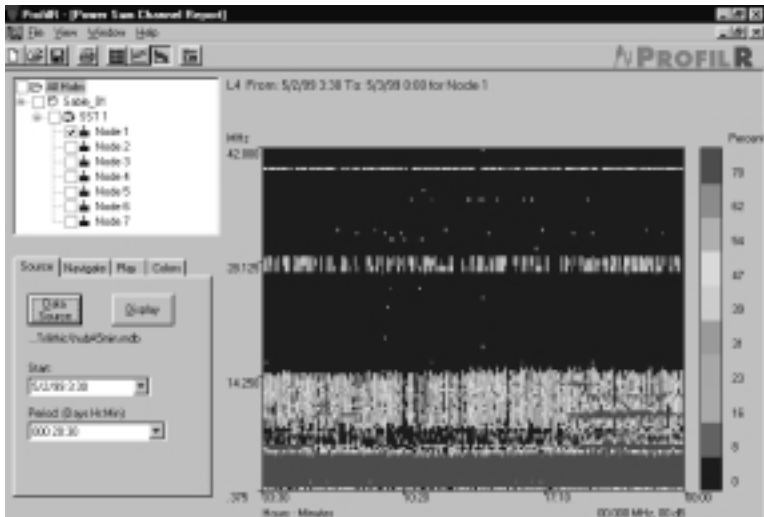
The Power Summing Channel Unavailability's report format's purpose is:

- Plots the PSCU for a specific center frequency versus time for each of the four limits.

- Calculates the PSCU as the percent of threshold violations for each of the four limits for each time increment.
- Traces may be viewed by the time period from a list of the time increments available.
- Percentage of unavailability, limits, number of samples for computing each data point and Node can be displayed using the Marker feature (see page 25).

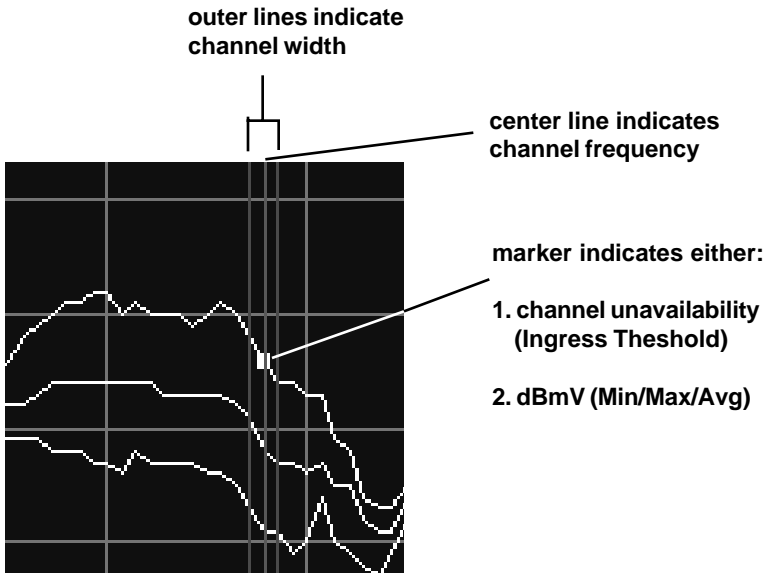
This report is used to display the unavailability of the center frequency against four user-selected limits. The time increments are displayed simultaneously by creating a trace which shows the effect of noise and ingress on the selected frequency over time. Multiple nodes may be overlaid to determine quickly which nodes are in need of maintenance before new services can be deployed.

Use the Water Graph to display the unavailability of the channels over a longer duration of time.



POWER SUMMING BANDWIDTH MARKER

ProfilR also has a marker feature for use with Power Summing in the MIN/MAX/AVG and INGRESS THRESHOLD reports. *Click* on the report's graph and a triple line is displayed which indicates the center frequency and width of the channel you are viewing.





CompressR

Introduction

Ingress ManagR takes ingress spectra on each node in a system for the purpose of detecting ingress outbeaks. This information is then saved to large databases which can contain so much data that they become unwieldy when you want to analyze them for node behavior over a period of time.

NOTE: Although CompressR is the first step in preparing the spectra in the database, it is a good idea to review the ProfilR section to get an idea of how the data can be displayed for evaluation. Please refer to pages 11 through 40.

CompressR is designed to take these large databases and reduce them to more manageable summaries; including power summing (see page 58). The program recasts the data in larger increments of time so that you can spot node behavior trends. This enables you to analyze pass problems. You can also determine if a node is suitable for new services (such as impulse pay-per-view and cable modems) and the best frequency band for implementing the new service.

The program calculates the maximum, minimum and average value of each frequency over selectable time intervals. Once you have summarized the data in CompressR, you can use ProfilR to evaluate the return path data by viewing the best and worst performance of the node so that you can troubleshoot or allocate system resources.

This can be done either manually or automatically (program set to run in the background so that it compresses the data as it is gathered). The summarizing criteria (rule) is defined by:

- User-set variables for the time interval for each summary record
- Starting and ending time/date

- Limits used for calculating statistics needed by the Discrete Ingress Probability analysis
- Source and Target databases

CompressR's summarized data provides the input for ProfilR's report generation and trend analysis (see *PROFILR*, page 11).

You may run several compression files at once by using one or more source ingress files. However, you must select different output files for each rule. Reasons to run multiple files may include compressing data for different hubs, or different limits (i.e. to determine which frequency bands will best support new cable services such as cable modems).

Considerations

Before using CompressR, you need to figure out what rules (criteria) that you will be using for the compression activity. Keep in mind that you can launch more than one compression activities to summarize the data. There are several things you need to consider in setting up the rules.

Number of Compression Activities – You may run several compression activities at the same time. Therefore, it is important to give some thought to what kind of data you wish to summarize. For example, you might want to use the same source database to compress the data using different rules (i.e. different frequencies and/or limits) for the purpose of comparing allocation possibilities for the system (see *SELECT DATABASES* page 52).

NOTE: You may run multiple Compression Activities using the same SOURCE database. However, you must set up separate DESTINATION or target databases.

Compression Time Interval – CompressR can summarize an ingress data file from five minutes up to 12 hours. You can also recalculate the time interval in ProfilR after the initial compression. ProfilR can only recompute the time interval in a larger amount so you need to set CompressR for the SMALLEST desired time interval (see page 47).

Limit Settings – CompressR enables you to set four limits based on the desired carrier-to-noise performance in your system. While deciding the appropriate carrier-to-noise, you also need to determine if you are using TrafficController (traffic mode).

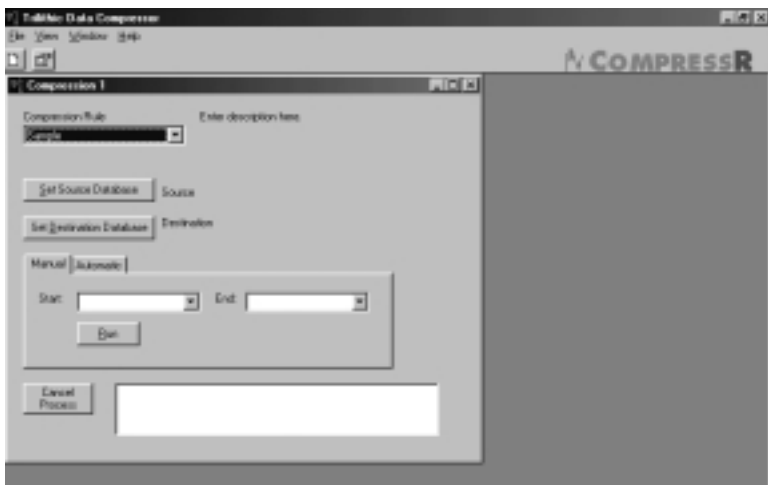
If you are not using this feature, you need to make sure the limits are ABOVE the expected traffic level so it does not give you an inaccurate evaluation. If you are using TrafficController, you don't need to set the limits artificially higher since this feature masks out the actual traffic. (See *SETTING LIMITS* page 50 for more information regarding setting the limits.)

Manual/Automatic – You should also give some thought to which method you wish to use for the compression. You can either compress an archived database (either entirely or a select block of time) by selecting MANUAL Mode or have CompressR run in the background and compress data as it is collected by Ingress ManagR in AUTOMATIC Mode (see *SELECT COMPRESSION SCHEDULE* page 54).

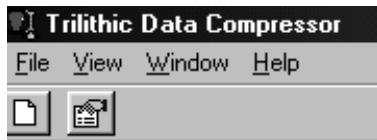
Overview

To open CompressR, go to the directory where the program is installed and *click* on its icon.

When the program opens, it displays the MAIN screen and also displays the first compression screen.



CompressR's MAIN MENU bar has four menus:



- FILE – contains the NEW and EXIT commands
- VIEW – contains RULE SETUP, SCHEDULER, TOOLBAR and STATUS BAR commands
- WINDOW – contains the CASCADE, TILE HORIZONTAL, TILE VERTICAL and the active window indication
- HELP – contains the online HELP and ABOUT commands (see *ON-LINE HELP* page 8)

Just below the MAIN MENU bar are two icons. *Click* on the left icon to open a new COMPRESSION window.

Once the window is open, use the right icon (PROPERTIES) to bring up the SET UP screen so that you can select the limits for the compression (see *SET UP PARAMETERS* below).

Operation

To use CompressR, you need to set up the parameters, select the SOURCE and DESTINATION databases and then select the compression method (MANUAL or AUTOMATIC) you wish to use.

SET UP PARAMETERS

When you first open CompressR, the program automatically opens the first compression activity window. It is called COMPRESSION 1.

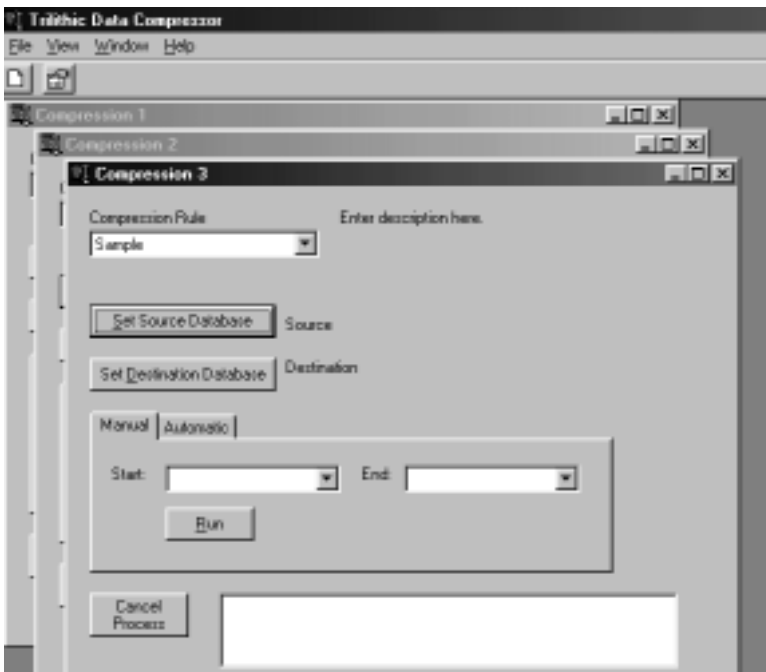
NOTE: After you have used CompressR, the program's compression activity defaults to the settings used on the last activity.

If you close the activity window and open another via the NEW icon or NEW command in the FILE Menu, the new window will indicate COMPRESSION 2 and so on.

Open more than one COMPRESSION window if you will be setting up multiple compressions.

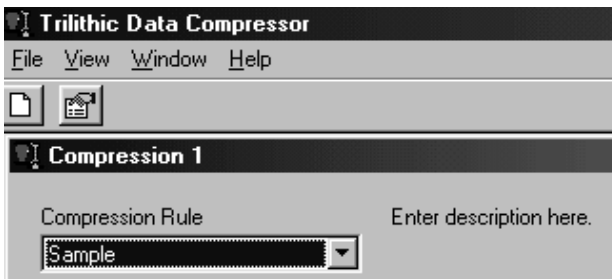
NOTE: You may run more than one compression activity at a time. These are designed to run in the background. However, keep in mind compression uses up computer resources such as disk space and processing speed; particularly if you are running both Ingress ManagR and CompressR in AUTOMATIC Mode.

If you are putting too much demand on your computer resources, Ingress ManagR will eventually slow down so that it will not be taking data at maximum input. It also may slow down the execution of the Scan Strategy. It is recommended that you run no more than two compressions until you have determined that adequate processor time is available for more.



When you have the desired number of COMPRESSION windows opened, select each COMPRESSION window and choose the Compression Rule you wish to use for that compression activity.

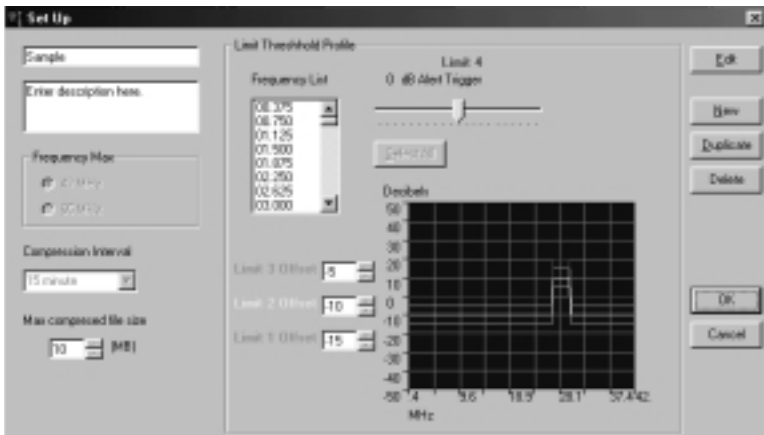
CompressR comes with a sample rule which has arbitrary parameters. When you first open the program, this is the rule that appears in the RULE display window.



NOTE: You may create your own rules by using **NEW** or **DUPLICATE** (see *EDIT* on page 49).

Define Compression Rules

To define the criteria you wish to use to compress a selected Ingress ManagR database, *click* on the PROPERTIES icon to bring up the SET UP screen. You may also access this screen by selecting the RULE SETUP command in the VIEW Menu. You can use the rules already listed on the set up screen or edit them to your own criteria.

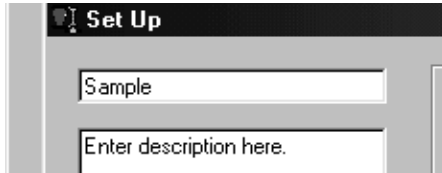


PARAMETERS DESCRIPTION

The SET UP window contains several parameters.

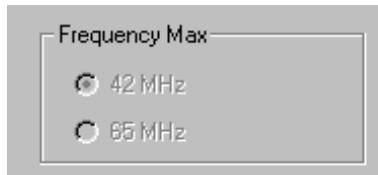
Rule Name – The upper left window contains the rule name (such as SAMPLE).

Rule Name Descriptor – Just below, is a window in which you can add a description or note for the rule.



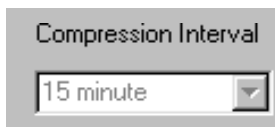
NOTE: The SET UP screen is the same for all rules. Only the upper left display changes to indicate which rule is being used.

Frequency Max – Below the Rule Name and Rule Description windows is the FREQUENCY MAX setting box. You can select either 42 MHz or 65 MHz.



NOTE: If the Ingress ManagR Source Database you select for compression is 42 MHz and you select 65 MHz for the frequency maximum, CompressR will reset the maximum to 42 MHz when you select the SOURCE database on the COMPRESSION ACTIVITY screen (see *SELECT DATA-BASES* page 52).

Compression Interval – The COMPRESSION INTERVAL selection box is under the FREQUENCY MAX setting.

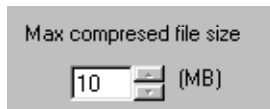


While it is possible to select a compression time of anywhere from 5 minutes up to 12 hours, it is recommended that you use intervals of 15 minutes to 1 hour. Intervals set below 15 minutes can create large files and thus negate the benefits of making the compression summary. Intervals set for longer than 1 hour start losing time of day variance.

NOTE: Since you can recalculate time intervals in ProfilR, you can use one basic CompressR database for several different interval analyses. ProfilR can recompute increments in LARGER time intervals but not smaller. Therefore, if you want to use several interval calculations, you need to set CompressR's interval to the SMALLEST amount.

For example: You want to compare a node's behavior at a specific frequency but at 15 minutes and 1 hour. Set CompressR for 15 minutes. Later, in ProfilR, you can recalculate for the 1 hour interval. This way, you don't have to recompress the original Ingress ManagR database but can work from the same summarized file.

Max Compressed File Size – Below the COMPRESSION INTERVAL is the MAX COMPRESSED FILE SIZE box. Use this parameter to limit the size of the compressed file.

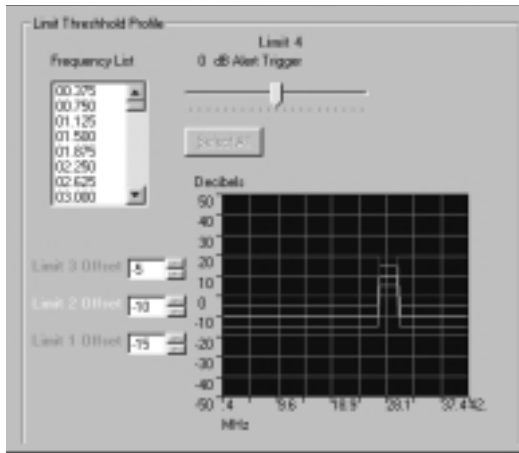


For example, if you select 10 MB, CompressR saves the data in 10 MB sized files. If the compression extends beyond the designated size, CompressR starts a new file and simply appends **_#** at the end of the file:

- 15minuteCastle_1.mdb (initial segment of 10 MB)
- 15minuteCastle_2.mdb (second segment of 10 MB)
- 15minuteCastle_3.mdb (third segment of 10 MB)

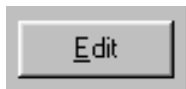
NOTE: It is recommended that you use 10 to 20 MB for maximum effectiveness. Files will become very large and could overflow. Large files require considerable time to update and will slow down the data collection process.

Limit Settings – The central portion of the SET UP screen contains the parameters for setting the four limits.



CompressR compares each frequency to four user-defined limits. When compressing the Ingress ManagR source data into the specified time intervals, the program indicates how often the frequency limits are exceeded for that interval. This information then enables you to calculate the percentage of times each frequency on a given node has exceeded the limits.

Edit – Use the **EDIT** button to make temporary limits and interval changes to an existing rule or to make the changes to a **NEW** or **DUPLICATE** rule.



New – If you want to create an entire new rule, *click* on the **NEW** button. The **RULE NAME** and **RULE NAME DESCRIPTION** change from the existing designation to “Rule Name” and “Rule Description”. Type in the desired new designations and set the parameters.



Duplicate – If you wish to make only slight modifications to an existing rule and want to maintain that rule in its original format, *click* the **DUPLICATE** button. This will bring up an identical rule to the original. The RULE NAME designation will add “A” to the original name. Type in the new designations and make the desired parameter changes.



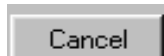
Delete – Use the **DELETE** button to remove any rules you no longer wish to maintain in CompressR.



OK – *Click* on the **OK** button when you have finished setting the compression parameters to return to the COMPRESSION ACTIVITY window.



Cancel – *Click* the **CANCEL** button to exit the SET UP window without saving any changes.



PARAMETERS SET UP

Once you have opened the desired rules SET UP window, *click* on the **EDIT** button. This enables you to set the various parameters if you are adding a new rule or modify them from an existing rule.

If you are starting a new rule or modifying an existing rule, type in the name and description in the **RULE NAME** and **RULE DESCRIPTION** boxes. Then select the **FREQUENCY MAX**, **COMPRESSION INTERVAL**, and **MAX COMPRESSED SIZE**.

Setting Limits – CompressR enables you to set up four limits. Limit 4 can be set up frequency by frequency while Limits 1, 2 and 3 are constant offsets from Limit 4.

NOTE: Limits 1, 2 and 3 will always have a lower value in dBmV from Limit 4.

Since you want to see trends and how your system performance varies over specific time intervals, you should set the limits based on the desired carrier-to-noise performance in your system. Ideally, you should pick at least one limit worse than the acceptable minimum. For example, if the desired carrier-to-noise is 25 dB, you can set the limits as follows:

Limit 4 - 22 dB (3 dB worse than desired carrier-to-noise)

Limit 3 - 25 dB (minimum desired carrier-to-noise)

Limit 2 - 28 dB (3 dB more than desired carrier-to-noise)

Limit 1 - 31 dB (6 dB more than desired carrier-to-noise)

REMINDER: Digital communications has a very sharp degradation with regard to the bit error rate vs. carrier-to-noise. 3 dB can indicate a very significant performance difference.

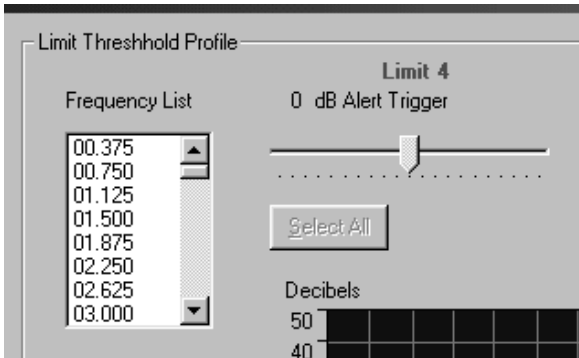
Set the limit for carrier-to-noise in a ratio that is suitable for the service you want to implement. For instance, impulse pay-per-view might work acceptably at 15 dB carrier-to-noise while cable modems might need 25 dB. You need to adjust Limit 4 according to the desired carrier-to-noise.

NOTE: If you are not using TrafficController (traffic mode), you will need to raise the four limits ABOVE the expected traffic level so the results aren't skewed and give you a false impression when traffic is on.

If you are using TrafficController, you don't need to set the limits artificially high since this feature masks the actual traffic and just leaves noise.

To set Limit 4, select the desired frequency from the **FREQUENCY LIST**. If you want to select all the frequencies, *click* **SELECT ALL**. Fine tune the frequency selection by using the **0 dB ALERT TRIGGER**. *Click* on the trigger and use the mouse to move it right or left (you may also use the arrow keys).

REMINDER: Limit 4 is ALWAYS the highest. Limit 1 is ALWAYS the lowest. If you are setting Limit 3 and it goes higher than Limit 4, Limit 4 will be forced up as well. The limits cannot cross over.



When you have set the parameters for the rules, *click* **OK**. CompressR will return to the COMPRESSION ACTIVITY window.

Select Databases

Once you have selected the Compression Rule and set it's parameters, you need to select the SOURCE and DESTINATION databases.

The SOURCE database can only be an Ingress ManagR database file which has been saved by a Scan Strategy (see the *INGRESS MANAGR* operation manual for more information).

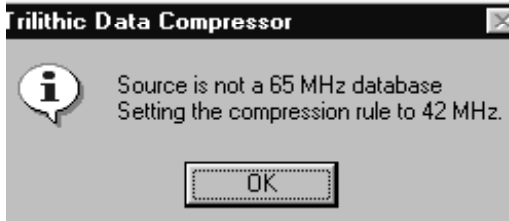
CAUTION: You cannot aim CompressR at any of the databases designed for use with **ApplinkR**, such as LIVE or PLAYBACK files.

Before selecting the database, however, you need to decide if you want to compress an archived file (use MANUAL) or compress from Ingress ManagR's FIFO as it is saving data (use AUTOMATIC with CompressR running in the background). To select the SOURCE database, *click* **SET SOURCE DATABASE**.



A standard Windows directory box is displayed. Go to the directory which contains the database file you wish to use as the source, select the file from the list and then *click* **OPEN**.

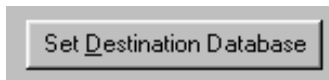
REMINDER: If the Ingress ManagR Source Database you select for compression is 42 MHz and you selected 65 MHz for the frequency maximum in the SET UP window, CompressR will reset the maximum to 42 MHz.



The selected source database will appear next to the **SET SOURCE DATABASE** button.



Next, select the target database to where you want the program to send the compressed data. *Click* on the **SET DESTINATION DATABASE** button.



This brings up the SAVE DESTINATION window. Select the directory where you want the compressed database to be located. Then, select a file name.

NOTE: If you are saving the compressed database to the same directory as the source database, make sure you assign a different name to the compressed file.

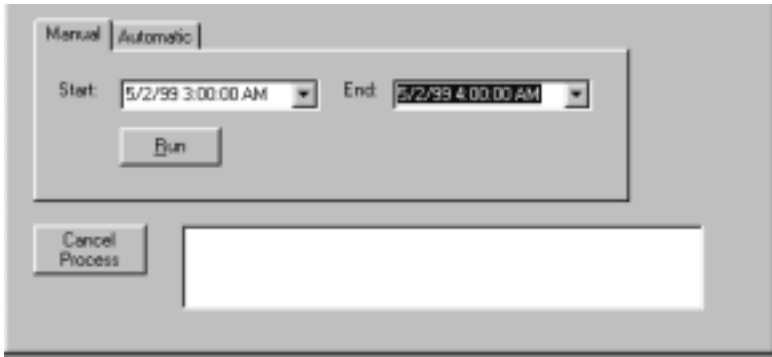
When ready, *click* **SAVE**. The DESTINATION appears next to the **SET DESTINATION DATABASE** button.



REMINDER: You may run multiple Compression Activities using the same SOURCE database. However, you must set up separate DESTINATION databases.

Select Compression Schedule

Now that you have designated your source and destination databases, select the schedule for the compression. You may either choose MANUAL or AUTOMATIC.

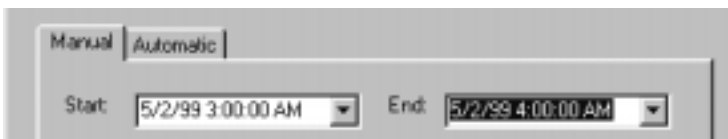


Use MANUAL if the source database is a static file (such as an archived or previously saved file).

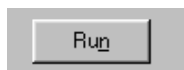
Use AUTOMATIC to gather incoming data from Ingress Managr's ongoing FIFO process.

MANUAL OPERATION

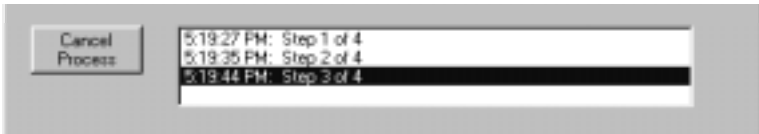
If you wish to start compressing the source database immediately, select the MANUAL tab. Then, you need to select the START and END times for the compression.



Once you have set the start and end times, *click* **RUN**.



CompressR will begin and will finish based on the rules you set. You can keep an eye on the progress via the ACTIVITY LOG at the bottom of the COMPRESSION ACTIVITY window.



If you wish to stop the Compression, *click* **CANCEL PROCESS**.

AUTOMATIC OPERATION

Automatic is used if you wish to compress a data being collected in Ingress ManagR's FIFO while it is being saved. For example, you can set CompressR to run in the background overnight so that the compression data will be available first thing in the morning.

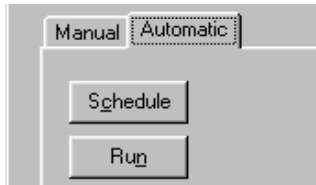
CAUTION: If you are using AUTOMATIC, make sure you do not close CompressR. If you wish to work on other tasks or have it compress data overnight, minimize the window so it can run in the background. CompressR is not designed to load itself at designated times.

Since Ingress ManagR saves a lot of data, you might want to limit the compression to 1 hour intervals and save the data in separate files.

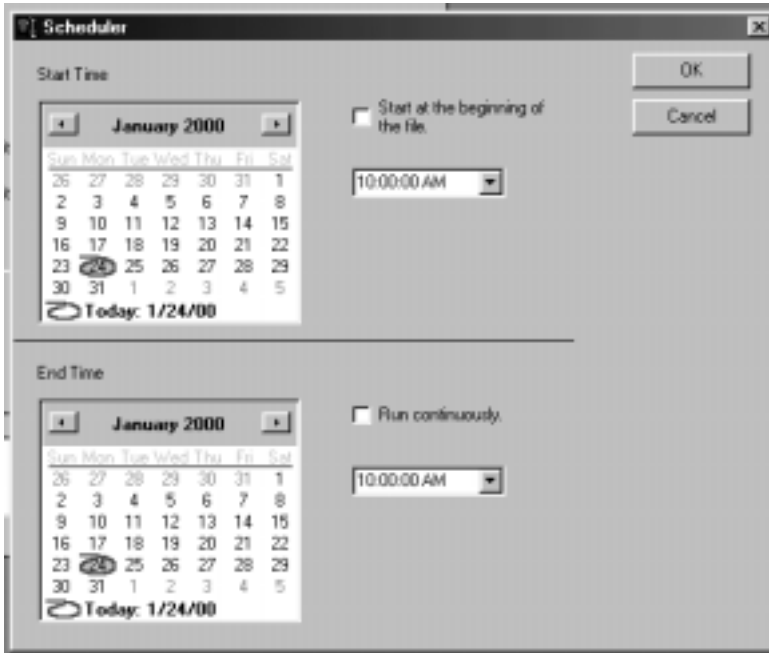
NOTE: CompressR works via an interim process. This means that it won't wait until the last moment and try to crunch huge amounts of data. Instead, it will go out periodically from time to time to collect what it can.

For this reason, the Ingress ManagR FIFO needs to be set large enough so that CompressR can collect data. It is recommended that you set the FIFO for at least 16K so that data is not lost.

To use the AUTOMATIC mode, *click* on the **AUTOMATIC** tab.



Click on the **SCHEDULE** button.



This brings up the SCHEDULER window with the start and end time calendars. To change to a different month, simply *click* on the left and right arrow buttons next to the month.

Select the day you want CompressR to start by *clicking* on the calendar day. An oval shadow highlights the desired date.

Choose the start time from the hour list at the right of the calendar display.

January 2000

Sun	Mon	Tue	Wed	Thu	Fri	Sat
26	27	28	29	30	31	1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30	31	1	2	3	4	5

Today: 1/24/00

Start at the beginning of the file.

10:00:00 AM

Select the end time the same way.

End Time

January 2000

Sun	Mon	Tue	Wed	Thu	Fri	Sat
26	27	28	29	30	31	1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30	31	1	2	3	4	5

Today: 1/24/00

Run continuously.

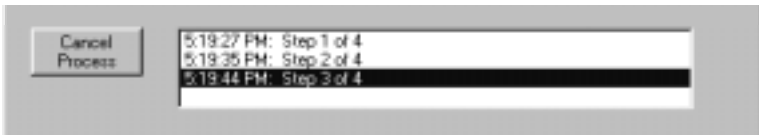
10:00:00 AM

You may also select two operation options. To have CompressR start at the beginning of the source database file, *click* the START AT THE BEGINNING OF THE FILE box. To have CompressR run continuously, *click* the RUN CONTINUOUSLY box.

When you have the times scheduled and the options selected to your specifications, *click* **OK**.

This returns you to the AUTOMATIC tab. Click **RUN** and CompressR will compress and save the data at the designated time.

CompressR will begin and will finish based on the rules you set. You can keep an eye on the progress via the ACTIVITY LOG at the bottom of the COMPRESSION ACTIVITY window.



If you wish to stop the Compression, click **CANCEL PROCESS**.

Power Summing

The **Power Summing Channel Unavailability Report** calculates the availability of return bands for DOCSIS-compliant return service. It is especially useful as a “proof of performance” tool, assessing the ingress conditions of a node’s service area to determine if the node is ready to be integrated with the system.

Use **CompressR** to create summaries of return spectra as a series of overlapping bands of selectable widths. Each bandwidth is close to one of the DOCSIS-prescribed bandwidths. Doing this eliminates the need for bandwidth correction factors which introduce errors into the evaluation of some types of ingress. Using the time and date stamp that IngressManagR adds to each record, CompressR groups spectra into selected intervals, then calculates the percent of the records for each interval in which each band was unavailable for service.

POWER SUMMING COMPUTATION

Since many services occupy more than one bin or bandwidth in a spectrum, it is necessary to know the total power available in the channels for such services.

“Summing Technique”

The SST outputs return spectra as records containing 112 slices or “bins”, each 375 kHz wide. CompressR sums the power in these bins so it is added up into wider bandwidths of three, five, seven and nine bins. These wider bandwidths are calculated as overlapping channels corresponding to each of the 112 (or 174 for 65 MHz) bins. A compression rule may be set to sum power in one, three, five, seven or nine bins.

NOTE: You may only set up one channel width for each rule. Therefore, if you wish to sum more than one width, use the copy function to create additional rules for each bandwidth you wish to sum.

The power value of each of the three, five, seven and nine bin bands is assigned to the bin in the center of that band, the “center frequency”.

For example, a band, which is three bins wide calculated at 10 MHz, includes the bins for 10 MHz - 375 kHz, for 10 MHz and for 10 MHz + 375 kHz. The next band “up” includes the bins for 10 MHz, 10 MHz + 375 kHz and 10 MHz + 750 kHz. This banding process is performed at 1 bin increments, from the bottom to the top of the return band.

NOTE: Actually, end-bands are computed a little differently from the other bands because you run out of bins to make bands before you run out of center frequencies. The process given here has been simplified a little to avoid superfluous detail.

The program calculates the maximum, minimum and average value of each frequency over selectable time intervals. Once you have summarized the data in CompressR, you can use ProfilR to evaluate the return path data by viewing the best and worst performance of the node so that you can troubleshoot or allocate system resources.

You may run several compression files at once by using one or more source ingress files. However, you must select different output files for each rule. Reasons to run multiple files may include compressing data for different hubs, or different limits (i.e. to determine which frequency bands will best support new cable services such as cable modems).

Meeting the Summing Criteria

The summing criteria assembles the power distributed through the return spectrum into bands. It is the aggregate power in these bands that is compared to the limit value.

The aggregate power is calculated at selected bandwidths. The selection provided puts at least one computed bandwidth within 20% of each of the corresponding DOCSIS bandwidths.

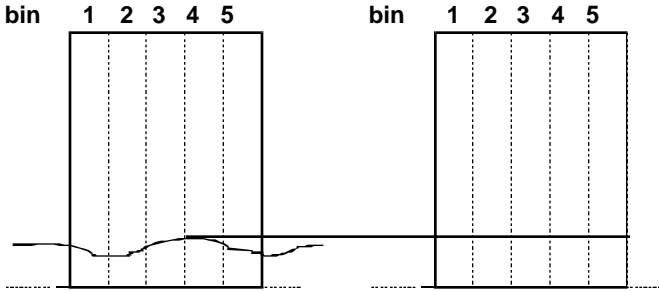
CompressR makes its evaluations solely on the criteria of power within computed bandwidth. Since the computed bandwidths are close to the real DOCSIS bandwidths (within 0.8 dB, worst case), no bandwidth correction factors are needed. Consequently, CompressR/ProfilR evaluates both coherent and incoherent ingress with equal accuracy.

Distortion Assessments

One way to estimate wideband noise from readings taken with a narrowband instrument (SLM, analyzer, etc) is to apply a bandwidth correction factor. This is a common practice and is the method used by SLM's to compute forward-channel noise (4 MHz, nominally) in carrier-to-noise calculations. It is a reliable method as long as it is known that the power in the wider bandwidth is spread evenly, so that the segment of the band that is measured is representative of the whole. If this is the case, calculations are simple.

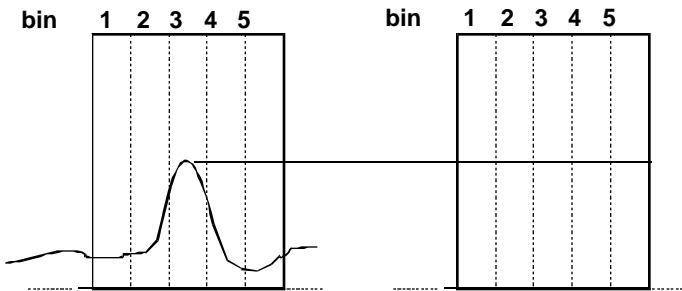
For a band that is five bins wide, for example, and assuming similar power in all of the bins, the power in the whole band is:

$$10 \cdot \log[\text{the number of bins}] = 7 \text{ dB} + [\text{the level in one bin}]$$



Effect of a bandwidth correction factor when applied to broadband noise measurements.

The problem with this is that true return path ingress really isn't noise and the power in all bins in a band is not always equal. In fact, coherent ingressors such as common path distortions, broadcast carriers, computer clocks, etc. are narrowband phenomenon occupying only in a single bin. Adding a correction factor to a coherent ingressor will make it look worse than it really is by the value of the correction.



Effect of a bandwidth correction factor when applied to a channel with coherent ingress.

Because of the unreliability of bandwidth correction factors for evaluating the ingress in multi-bin bands, Trilithic has designed power summing so that it does not need correction factors. Instead of estimating broadband ingress from narrowband measurements, CompressR computes the sum of the measured powers in the bins comprising the band.

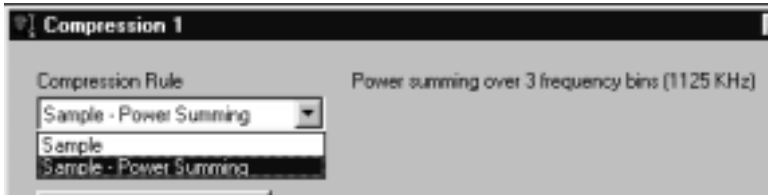
POWER SUMMING OPERATION

When using the power summing feature, keep in mind that when you set up the rules for the compression you also need to select the bandwidth.

REMINDER: You can only use one bandwidth or bin per rule. For example, if you wish to compress for the 3, 5 and 7 bins, you will need to set up three separate rules.

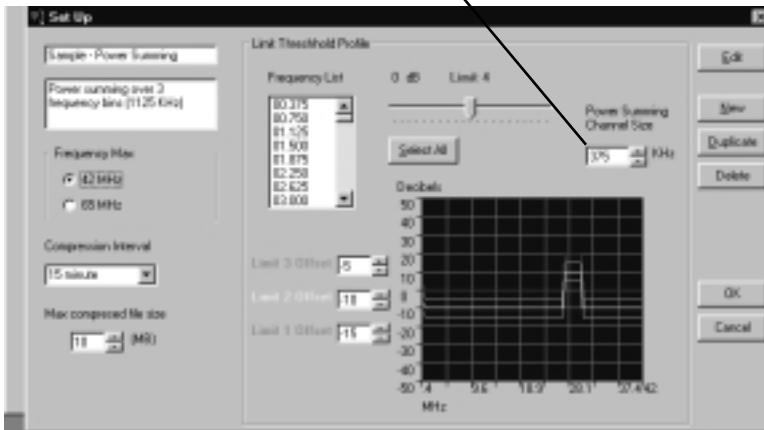
Also, keep in mind that for standard NCTA tests, compensation must be performed at the 1 bin or .375 kHz bandwidth.

To set up your rule for power summing, open CompressR to the MAIN screen. In the COMPRESSION RULE box, select SAMPLE-POWER SUMMING.



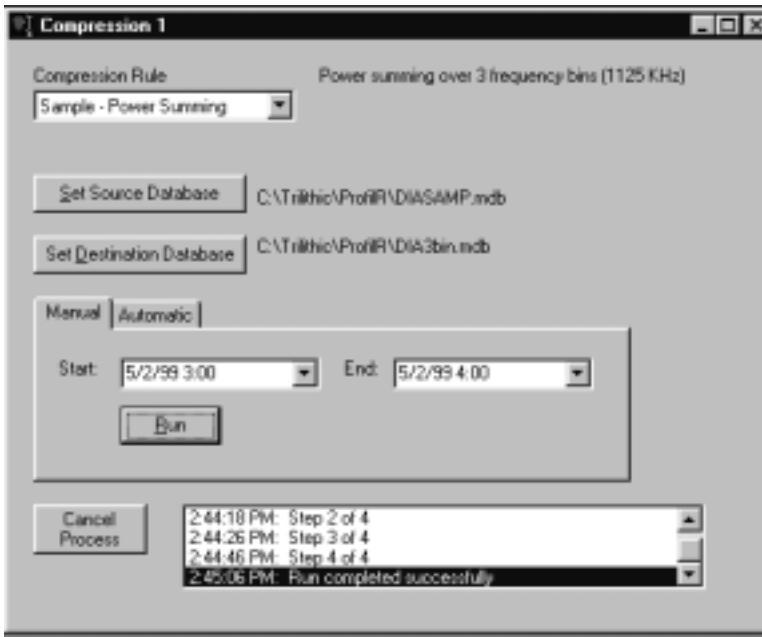
Next, select the **PROPERTIES** icon or **RULE SETUP** command in the **VIEW** Menu. Use the **POWER SUMMING CHANNEL SIZE** box to select the desired criteria for the power summing compression. Set the parameters as you would for any compression.

**Power Summing
Channel Size Box**



Once the parameters are set (in the previous example, 3 bins over 1125 kHz), *click* **OK** and set the source and destination data-bases. Select the method of compression (manual or automatic) and the start and end times.

Click **RUN**.



Once you have your desired power summing compressions, use ProfilR (see page 11) to analyze the data.



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