8310 RSA
Return SpeedSweep Analyzer

Operation Manual

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Putting Innovation Within Reach

Product innovation at Trilithic has always been characterized by one thing: it's practical. It makes life easier for customers. It's the natural result of listening to them. That philosophy has been the driving force behind the company's growth from its beginnings as a two-man engineering team in 1986 to its current position as a global manufacturer with more than 130 employees.

A privately held company, Trilithic broadend its original RF and microwave component product line by acquiring filters manufacturer Cir-Q-Tel and instruments manufacturer Texscan, adding broadband solutions to the product line. The company also expanded operations to Thailand in 2001, to meet increasing demand for its products in the growing markets of Asia.

As new communications applications continue to emerge, part of Trilithic's business has evolved into managing change—helping customers respond quickly to market opportunities with innovative technology and individualized solutions. But the core value of Trilithic's business approach—listening to customers—hasn't changed. Keeping that focus intact will help provide better products in the long run and ensure continued growth for decades to come.

Trilithic is comprised of three major divisions:

Broadband Instruments

The company is best known for innovations in signal level measurement, leakage detection and reverse path maintenance—like the use of Digital Signal Processing (DSP) technology, which lets field technicians upgrade their signal analyzers by simply downloading firmware.

Emergency Alert Systems

Trilithic's EAS division is a leading supplier of homeland security government-mandated emergency alert systems for broadband and other communication system providers. As the communications industry continues its rapid evolution, Trilithic has begun offering comprehensive systems and services to address a wide variety of emergency alert system needs, including the design and architectural layout of complex analog and digital EAS networks.

XFTP

Trilithic's XFTP division offers a specialty line of field technical products for cable operators and technicians, as well as a line of products for installing electronics in the home of the future. The division brings together an experienced Trilithic team and a new group of exclusive distributors to provide popular products and services at an affordable price, without sacrificing quality or support.

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Helpful Website

The following website contains general information which may be of interest to you:

http://www.trilithic.com

Trilithic's website contains product specifications and information, tips, release information, marketing information, frequently asked questions (FAQs), bulletins and other technical information. You can also check this website for product updates.

Where to Get Technical Support

Trilithic technical support is available Monday through Friday from 8:00AM to 5:00PM EST. Callers in North America can dial 317-895-3600 or 800-344-2412 (toll free). International callers should dial 317-895-3600 or fax questions to 317-895-3613. You can also e-mail technical support at support@trilithic.com.

For quicker support response when calling or sending e-mail, please provide the following information:

• Your name and your company name

• The technical point of contact (name, phone number, e-mail)

• The version numbers for the 8310 RSA firmware and hardware

• The serial number for the 8310 RSA

• A detailed description of the problem you are having, including any error or information messages

How this Manual is Organized

This manual is divided into the following chapters:

- Chapter 1, "General Information" provides Trilithic contact information and describes how this operation manual is structured.

- Chapter 2, "Introduction & Installation" introduces what the 8310 RSA is and what it does. This chapter discusses the practical application, connections, and controls of the 8310 RSA.

- Chapter 3, "Setup" describes how to configure and operate the 8310 RSA.

- Chapter 4, "Web Access" shows how to access the 8310 RSA through a web browser and apply firmware updates.

- Chapter 5, "Appendix" shows the technical specifications of the 8310 RSA.

Conventions Used in this Manual

This manual has several standardized conventions for presenting information:

- Connections, menus, menu options, and user-entered text and commands appear in **bold**.

- Section names, web, and e-mail addresses appear in *italics*.

NOTE   *A NOTE is information that will be of assistance to you related to the current step or procedure.*

CAUTION   *A CAUTION alerts you to any condition that could cause a mechanical failure or potential loss of data.*

WARNING   *A WARNING alerts you to any condition that could cause personal injury.*

Precautions

WARNING   *Do not use the 8310 RSA in any manner not recommended by the manufacturer.*

CAUTION   *The 8310 RSA may not operate correctly in the presence of a strong electromagnetic field.*

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This chapter:

- Describes the purpose of the 8310 RSA

- Gives a feature overview of the 8310 RSA

- Lists the equipment supplied with the 8310 RSA

- Gives a guided tour of the 8310 RSA and explains the display screen and web configuration pages.

What is the 8310 RSA?

The 8310 RSA Return Sweep Analyzer receives a sweep initiated from a field test point by Trilithic's 1G DSP maintenance meter and transmits the received sweep level information back to the 1G DSP on a downstream telemetry signal.

The 1G DSP injects an agile sweep signal configured to "step around" active channels, sweeping in unoccupied spectrum areas to a frequency resolution of 100 kHz. The reverse sweep is received by the 8310 RSA, and the response information is relayed back to the 1G DSP via a user-configurable frequency agile forward telemetry signal.

> **NOTE**
>
> ***The 8310 RSA can also be used with the 860 DSPi in the same manner as the 1G DSP.***

8380 RPC

The 8380 RPC™ Return Path Combiner is a 16 x 1 nonblocking RF matrix switch designed for use with Trilithic's 8310 RSA™ in the return path of CATV systems. The 8380 RPC has 16 input ports that can be combined into a single output.

There are two versions of the 8380 RPC available, a master and a slave. The master 8380 RPC is used to control each slave using an RS-485 connection.

> **NOTE**
>
> ***Much of the 8310 RSA can be set up via a web browser. To set up an IP address, see Chapter 3: Setting Up a Network Connection. To remotely set up the unit, see Chapter 4: Web Access.***

System Diagram

The following diagram shows the typical deployment of an 8310 RSA system.
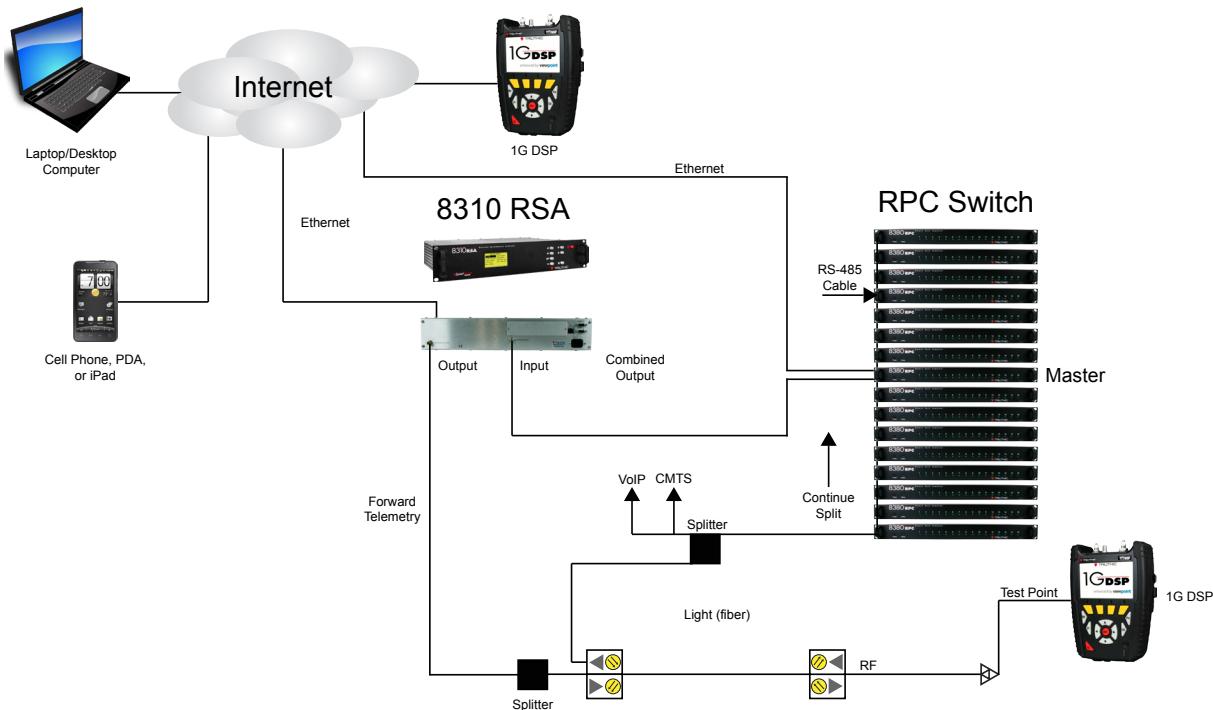
Return Path Sweep Comparisons

- The RSA Sweep feature on the 1G DSP maintenance meter enables the meter to function as an upstream return path sweep transmitter. It allows for troubleshooting micro-reflections and instances of narrow suck-outs between the test point and the headend, while also stepping around active channels in order to avoid interference.

- When this function is selected, the 1G DSP transmits the return sweep from a test point in the field to the 8310 RSA Return SpeedSweep Analyzer in the headend for analysis.

- The channel plan on the 8310 RSA and the sweep response information are then sent back to the 1G DSP via a telemetry signal which allows the 1G DSP to track up to 643 individual sweep points and display a full sweep on the screen every four seconds.

- The instrument compensates for differences in the amplitudes of the carriers by comparing two sweeps, a reference scan saved to the 1G DSP (typically at the node or first active component of the network) and a test point in the field.

- If the successive amplifiers are operating according to the designed unity gain principle, where each amplifier output test point will ideally have the same output level characteristics then the response will be very close to that of the stored reference. When there is damage, loose connections, or an adjustment is required, the display response will deviate from the ideal "flat" response.

RSA SWEEP SCAN

RSA SWEEP REFERENCE
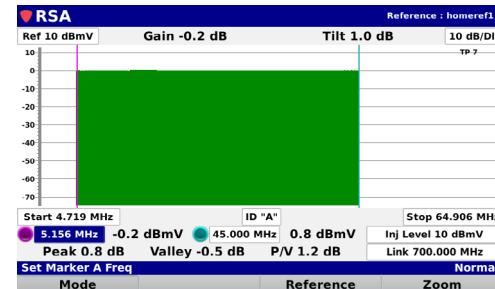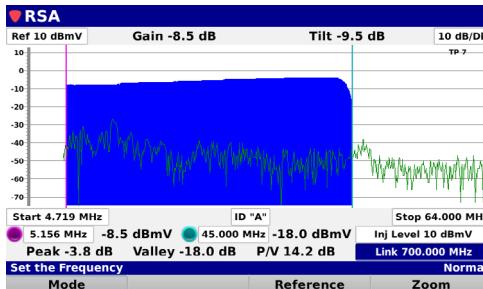
8310 RSA Features

The 8310 RSA includes the following features:

- Speeds Troubleshooting and Maintenance with Fast, High Resolution Return Sweep Analysis

- Finds Mirco-Reflections and Narrow Suck-Outs

- Part of a Comprehensive Maintenance System, Works with the 1G DSP Maintenance Meter

Available Models

Part Number	Description
2011375000	65 MHz 8310 RSA with 120 to 240 VAC Power Supply
2011375100	65 MHz 8310 RSA with -48 VDC Power Input
2011699000	85 MHz 8310 RSA with 120 to 240 VAC Power Supply
2011699100	85 MHz 8310 RSA with -48 VDC Power Input

Equipment Supplied with Your 8310 RSA

The 8310 RSA comes with the following:

- 8310 RSA Return Sweep Analyzer

- AC U.S. Power Cable (for 120/240 VAC units only)

A Guided Tour of Your 8310 RSA

Front View
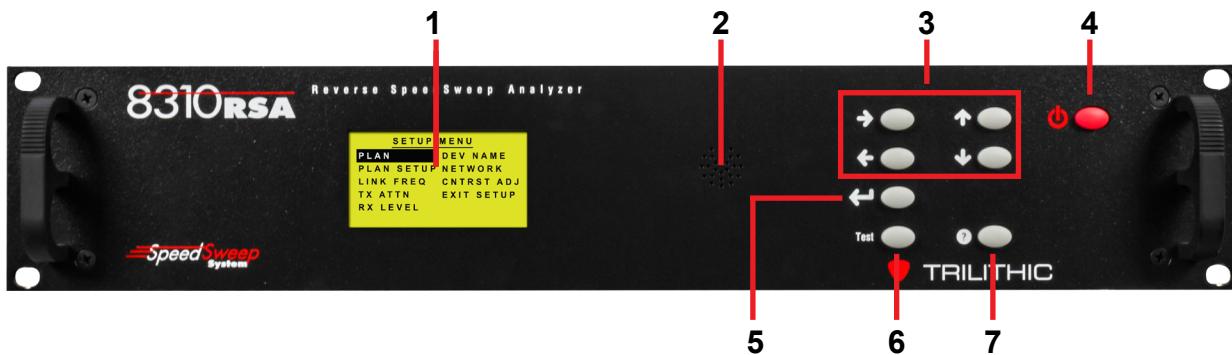
1. **Display Screen** – This LCD is used to display the setup and operational status of the 8310 RSA. The setup information on most screens can be adjusted from the front panel of the device.

2. **Speaker** – An internal speaker that beeps when buttons are pressed.

3. **Arrow Buttons** – These buttons are used to control the 8310 RSA as follows:

    • Scroll through the main menus

    • Scroll through the setup/display options available within the selected sub-menu

    • Adjust the settings within individual setup options after the **Enter** button has been selected

4. **Power Button** – This button enables or disables operation of the instrument. To turn off the instrument, remove the power cable.

5. **Enter Button** – This button is used to control the 8310 RSA as follows:

    • Enter the menus and sub-menus

    • Select individual setup options to adjust settings

6. **Test Button –** This button is used to view the internal temperature, date, and time of the instrument.

7. **Info Button –** This button is used to view the hardware and software version numbers of the instrument.

Rear View
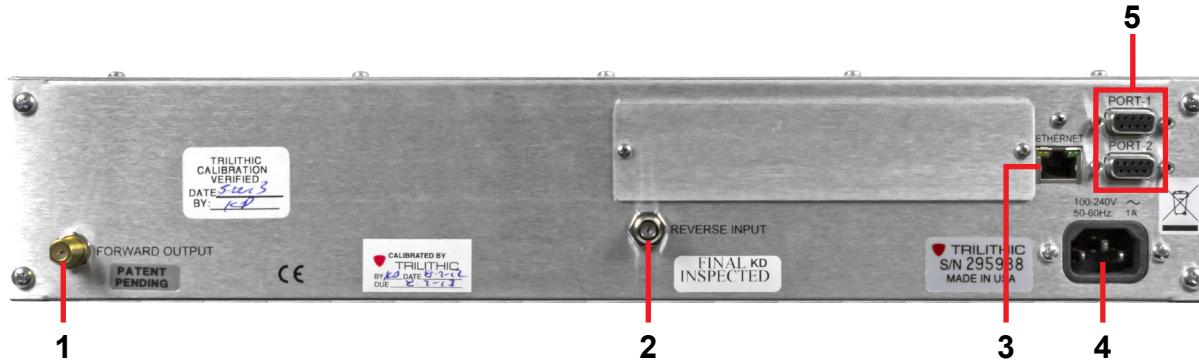
1. **Forward Output** – This is the output connection that the 8310 RSA transmits the received sweep level information back to the 1G DSP on a downstream telemetry signal.

2. **Reverse Input** – This is the input connection that the 8310 RSA uses to receive a sweep initiated from a field test point by a 1G DSP.

3. **Ethernet** – This port is for factory use only.

4. **AC Power Input** – This is a female (IEC 320C13) port for connection of an AC power cable. This port accepts AC input power from 100 to 240 VAC (50-60 Hz), 1 A.

5. **Port-1 & Port-2** – Expansion (For Future Use)

Installing the 8310 RSA

The following section explains the procedure used to physically install the 8310 RSA. In order to properly setup the 8310 RSA the following steps must be completed in this order. Do not skip any steps.

> **NOTE**
>
> ___DO NOT___ **plug in the 8310 RSA's power cord until instructed below.**

1. Mount the 8310 RSA in a standard rack using four retaining screws.

> **CAUTION**
>
> **Make sure the fan intake holes on the left of the 8310 RSA and the fan exhaust holes on the right of the 8310 RSA remain unblocked.**

Fan Intake Holes ———   **Fan Exhaust Holes** ———

2. Plug the 8310 RSA's power cord into the 100-240 VAC Power Connection and then into an AC power source. When power is supplied to 8310 RSA, the screen on the front of the 8310 RSA is illuminated.

> **NOTE**
>
> **If the display screen is not illuminated upon connecting power to the 8310 RSA, call Trilithic Application Support at 1-800-344-2412 for assistance.**

Welcome Screen Navigation

After the splash screen disappears, either of the following types of screens will appear depending on the status of your instrument.

Sweep Not Active

In the screen shown to the right, the selected channel plan has not been set up yet and the sweep signal is not active.

In this example, the selected channel plan number is designated as "XX" and the message "PLAN NOT SET UP" is displayed below instead of the channel plan name.

```
      S W E E P   N O T   A C T I V E

P L A N   X X
 P L A N   N O T   S E T   U P


               S E T U P
```

> **NOTE**
>
> *A sweep signal will not be enabled until at least one channel plan has been set up and enabled on the instrument.*

Sweep Active

In the screen shown on the right, the selected channel plan has been set up and the sweep is currently active.

This screen will normally appear this way when at least one channel plan has been setup and enabled.

In this example, the selected channel plan number is designated as "XX" and the channel plan name is shown below.

```
        S W E E P   A C T I V E

P L A N   X X
 X X X X X X X X X X X X X X X X X X X X


               S E T U P
```

Instrument Time, Date, & Internal Temperature

From the **Welcome** screen, select the **Test** button to display the current time, date, and internal temperature of the instrument.

The time and date of the unit are set at the factory and are not adjustable at this time. The time is set to Greenwich Mean Time (GMT).

In this example, the internal temperature is designated as "XX", the date is designated as

```
        INTERNAL
      TEMPERATURE
          XX  C


  MM/DD/YYYY    HHMM
 PRESS ENTER TO EXIT
```

"MM/DD/YYYY", and the time is displayed in a 24 hour format as "HHMM". To exit this screen and return to the Welcome screen, select the **Enter** button.

Firmware & Software Version Numbers

From the **Welcome** screen, select the **Info** button to display the current firmware & software version numbers and Trilithic contact information.

To exit this screen and return to the Welcome screen, select the **Enter** button.

```
 DA v01.01      DB v04.22
 MA v05.00N     MA v04.50


   WWW.TRILITHIC.COM
      800 344 2412
  PRESS ENTER TO EXIT
```

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8310RSA
Return Sweep Analyzer

Setup Menu Navigation

From the **Welcome** screen, select the **Enter** button to display the **SETUP MENU**, as shown to the right.

Use the arrow buttons to highlight the desired setup option, and then select the **Enter** button to adjust it.

To exit the **SETUP MENU**, highlight **EXIT SETUP** and then select the **Enter** button.

```
        SETUP MENU
PLAN              DEV NAME
PLAN SETUP  NETWORK
LINK FREQ    CNTRST ADJ
TX ATTN       EXIT SETUP
RX LEVEL
```

> **NOTE**
>
> *Much of the 8310 RSA can be set up via a web browser. To set up an IP address, see the Setting Up a Network Connection section later in this chapter. To remotely set up the unit, see Chapter 4: Web Access.*

Selecting the Active Channel Plan

To select the active channel plan, perform the following steps:

1. From the **SETUP MENU**, highlight **PLAN** and then select the **Enter** button to display the **PLAN SELECT MENU**.

2. Use the arrow buttons to highlight the plan number and then select the **Enter** button to adjust it.

```
        SETUP MENU
PLAN              DEV NAME
PLAN SETUP  NETWORK
LINK FREQ    CNTRST ADJ
TX ATTN       EXIT SETUP
RX LEVEL
```

```
     PLAN SELECT MENU

PLAN XX
   XXXXXXXXXXXXXXXXXXXX

                        OK
```

3. Use the up/down arrow buttons to adjust the value of the selected digit, and then use the left/right buttons to change between the digits. Once you have finished, select the **Enter** button to accept your changes.

```
  P L A N   S E L E C T   M E N U

P L A N  X X
 X X X X X X X X X X X X X X X X X X X X


                              O K
```

> *Once you have selected a channel plan, either the channel plan name or the message "PLAN NOT SET UP" will then be displayed below the plan number.*

> *The 8310 RSA allows a maximum of 16 user configurable channel plans. If you select a channel plan number above 16, the instrument will default back to channel plan 16.*

4. To return to the **SETUP MENU**, use the arrow buttons to highlight **OK,** and then select the **Enter** button.

```
  P L A N   S E L E C T   M E N U

P L A N   X X
 X X X X X X X X X X X X X X X X X X X X


                              O K
```

8310 RSA
Return Sweep Analyzer
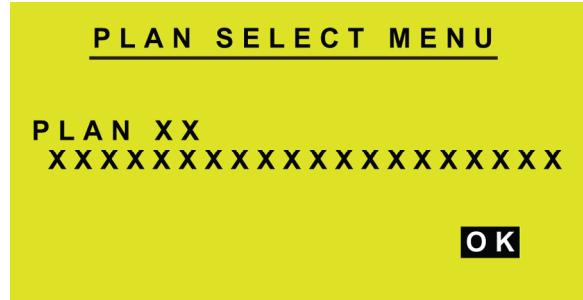
Setting Up the Active Channel Plan

From the **SETUP MENU**, highlight **PLAN SETUP** and then select the **Enter** button to display the **PLAN SETUP MENU**.

Use the arrow buttons to highlight the desired channel plan setting, and then select the **Enter** button to adjust it.

```
        S E T U P   M E N U
P L A N                D E V   N A M E
P L A N   S E T U P    N E T W O R K
L I N K   F R E Q      C N T R S T   A D J
T X   A T T N          E X I T   S E T U P
R X   L E V E L
```

Setting Start, Stop, & Step Frequency

To adjust the start, stop, and step frequency of the sweep, perform the following steps:

1. From the **PLAN SETUP MENU**, use the arrow buttons to highlight **START**, **STOP**, or **STEP,** and then select the **Enter** button to edit the frequency.

2. Use the up/down arrow buttons to adjust the value of the selected digit and then use the left/right arrow buttons to change between the digits. Once you have finished editing the frequency, select the **Enter** button to accept your changes.

```
      P L A N   S E T U P   M E N U
S T A R T     X X . X X X X X   M H Z
S T O P       X X . X X X X X   M H Z
S T E P       X X . X X X X X   M H Z
A D D             N A M E
D E L             V I E W        S A V E
          P L A N   S I Z E   X X X
```

```
      P L A N   S E T U P   M E N U
S T A R T     X X . X X X X X   M H Z
S T O P       X X . X X X X X   M H Z
S T E P       X X . X X X X X   M H Z
A D D             N A M E
D E L             V I E W        S A V E
          P L A N   S I Z E   X X X
```

NOTE

The 8310 RSA has a minimum sweep frequency of 5.0625 MHz and a maximum of 65.25 MHz, with a minimum step frequency of 93.75 kHz.

Adding Sweep Points to the Channel Plan

To add the sweep points to the channel plan, perform the following steps:

1. From the **PLAN SETUP MENU**, use the arrow buttons to highlight **ADD** and then select the **Enter** button to add the sweep points specified Start, Stop, and Step frequencies.

2. The **PLAN SIZE** field will be updated to reflect the newly added sweep points.

   • The minimum number of sweep points that may be defined is 2.

   • The maximum number of sweep points is 643 for a sweep of the entire spectrum (5.0625 to 65.25 MHz), with a step frequency of 93.75 kHz.

```
     P L A N   S E T U P   M E N U
  S T A R T      X X . X X X X X   M H Z
  S T O P        X X . X X X X X   M H Z
  S T E P        X X . X X X X X   M H Z
  A D D               N A M E
  D E L               V I E W        S A V E
        P L A N   S I Z E   X X X
```
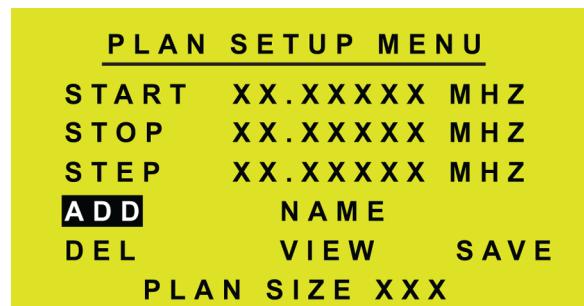
Deleting Sweep Points from the Channel Plan

To delete sweep points from the channel plan, perform the following steps:

1. Select the **Start** and **Stop** frequencies for the block to be deleted. All points from Start to Stop will be deleted, regardless of the Step frequency setting.

2. From the **PLAN SETUP MENU**, use the arrow buttons to highlight **DEL**, and then select the **Enter** button.

3. The **DELETE PLAN ITEMS** menu will appear, use the arrow buttons to highlight **YES,** and then select the **Enter** button to delete all of the specified sweep points.

4. To exit without deleting all of the sweep points from the channel plan, use the up/down arrow buttons to highlight **NO**, and then select the **Enter** button to exit without deleting the sweep points.

```
     P L A N   S E T U P   M E N U
  S T A R T      X X . X X X X X   M H Z
  S T O P        X X . X X X X X   M H Z
  S T E P        X X . X X X X X   M H Z
  A D D               N A M E
  D E L               V I E W        S A V E
        P L A N   S I Z E   X X X
```

```
     D E L E T E   P L A N   I T E M S
  D E L E T I N G   A L L   F R O M
  S T A R T   T O   S T O P   F R E Q
          X X X   I T E M S
  C O N F I R M   D E L E T I O N ?
        Y E S             N O
```
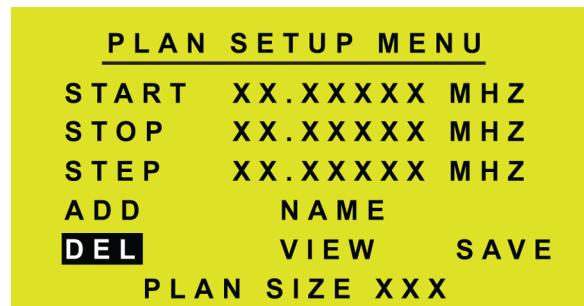
Editing the Channel Plan Name

To edit the name of the channel plan, perform the following steps:

1. From the **PLAN SETUP MENU**, use the arrow buttons to highlight **NAME,** and then select the **Enter** button.

2. The **PLAN NAME MENU** will appear, use the arrow buttons to highlight the name, and then select the **Enter** button.

3. Use the up/down arrow buttons to adjust the value of the selected digit, and then use the left/right arrow buttons to change between the digits. Once you have finished editing the name, select the **Enter** button to accept your changes. The channel plan name is limited to 20 characters.

4. Use the arrow buttons to highlight **OK** and then select the **Enter** button to save the channel plan name.

```
PLAN SETUP MENU
START   XX.XXXXX MHZ
STOP    XX.XXXXX MHZ
STEP    XX.XXXXX MHZ
ADD       NAME
DEL       VIEW    SAVE
   PLAN SIZE XXX
```

```
PLAN NAME MENU

XXXXXXXXXXXXXXXXXXXX

              OK
```

```
PLAN NAME MENU

XXXXXXXXXXXXXXXXXXXX

              OK
```

```
PLAN NAME MENU

XXXXXXXXXXXXXXXXXXXX

              OK
```
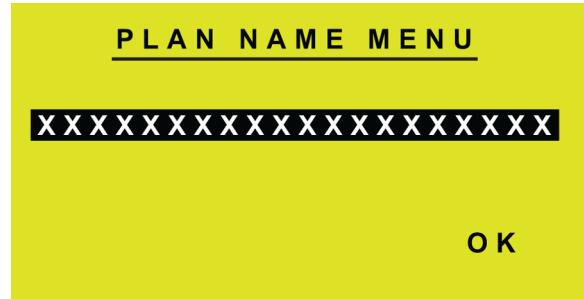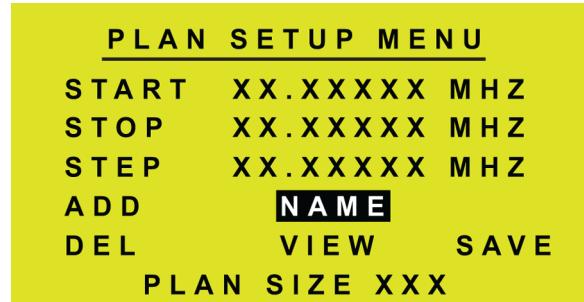
Viewing / Deleting Individual Sweep Points in the Channel Plan

To view and/or delete individual sweep points that are part of the channel plan, perform the following steps:

1. From the **PLAN SETUP MENU**, use the arrow buttons to highlight **VIEW,** and then select the **Enter** button.

2. The **VIEW PLAN ITEMS** menu will appear, use the up/down arrow buttons to move between individual sweep point frequencies.

3. To delete an individual sweep point, use the left/right arrow buttons to highlight **DEL,** and then select the **Enter** button.

4. Once you have finished viewing and/or deleting sweep points from the channel plan, use the left/right arrow buttons to highlight **EXIT**, and then select the **Enter** button.

```
        PLAN SETUP MENU

  START     XX.XXXXX MHZ
  STOP      XX.XXXXX MHZ
  STEP      XX.XXXXX MHZ
  ADD          NAME
  DEL         VIEW      SAVE
         PLAN SIZE XXX
```

```
       VIEW PLAN ITEMS
  XX.XXXXX
  XX.XXXXX
  XX.XXXXX           DEL
  XX.XXXXX
  XX.XXXXX
  XX.XXXXX          EXIT
  XX.XXXXX
```

```
       VIEW PLAN ITEMS
  XX.XXXXX
  XX.XXXXX
  XX.XXXXX           DEL
  XX.XXXXX
  XX.XXXXX
  XX.XXXXX          EXIT
  XX.XXXXX
```
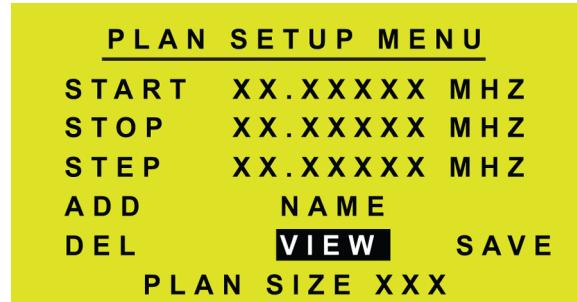
Saving the Channel Plan

To save the channel plan, perform the following steps:

1. Use the arrow buttons to highlight **SAVE,** and then select the **Enter** button.

2. If less than 2 sweep points were entered, the message "PLAN MUST HAVE 2 OR MORE ENTRIES!" will be displayed, press the **Enter** button to return to the **PLAN SETUP MENU** to add more sweep points to your channel plan.

3. The save confirmation screen will appear, use the arrow buttons to highlight **YES,** and then select the **Enter** button to save the channel plan.

4. To exit without saving the channel plan, use the arrow buttons to highlight **NO,** and then select the **Enter** button to exit without saving the channel plan.

```
        P L A N   S E T U P   M E N U
   S T A R T      X X . X X X X X   M H Z
   S T O P        X X . X X X X X   M H Z
   S T E P        X X . X X X X X   M H Z
   A D D              N A M E
   D E L              V I E W      S A V E
           P L A N   S I Z E   X X X
```

```
        P L A N   S E T U P   M E N U

   P L A N   M U S T   H A V E   2   O R
   M O R E   E N T R I E S !


                                  O K
```

```
        P L A N   S E T U P   M E N U

   A R E   Y O U   S U R E   Y O U
   W A N T   T O   S A V E   P L A N ?


           Y E S           N O
```
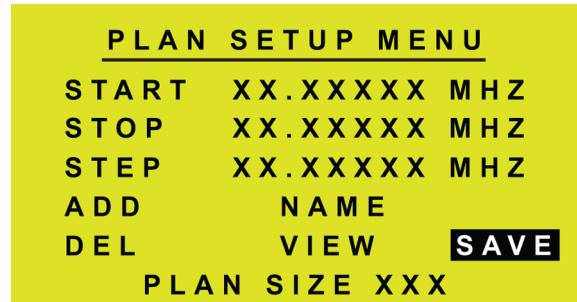
Setting the Link Frequency

To set the link frequency, perform the following steps:

1. From the **SETUP MENU**, highlight **LINK FREQ,** and then select the **Enter** button to display the **LINK FREQUENCY** menu.

2. Use the arrow buttons to highlight the link frequency, and then select the **Enter** button to edit the frequency.

3. Use the up/down arrow buttons to adjust the value of the selected digit, and then use the left/right buttons to change between the digits. Once you have finished editing the frequency, select the **Enter** button to accept your changes. The 8310 RSA has a minimum link frequency of 0050.00 MHz and a maximum of 1000.00 MHz.

4. Use the arrow buttons buttons to highlight **OK**, and then select the **Enter** button to save the link frequency.

```
        S E T U P   M E N U
P L A N              D E V   N A M E
P L A N   S E T U P  N E T W O R K
L I N K   F R E Q    C N T R S T   A D J
T X   A T T N        E X I T   S E T U P
R X   L E V E L
```

```
     L I N K   F R E Q U E N C Y


        X X X X . X X   M H Z


                       O K
```

```
     L I N K   F R E Q U E N C Y


        X X X X . X X   M H Z


                       O K
```

```
     L I N K   F R E Q U E N C Y


        X X X X . X X   M H Z


                       O K
```
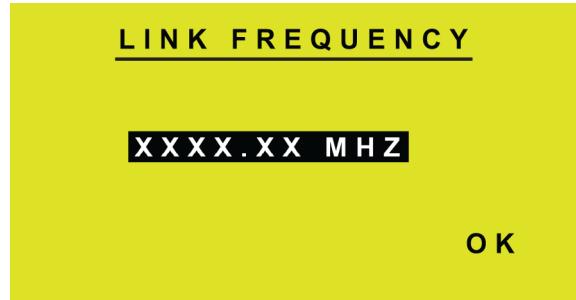
Setting the TX Attenuation Level

To set the TX attenuation level, perform the following steps:

1. From the **SETUP MENU**, highlight **TX ATTN** and then select the **Enter** button to display the **TX ATTENUATOR** menu.

2. Use the arrow buttons to highlight the attenuation value and then select the **Enter** button to edit the level.

3. Use the up/down arrow buttons to adjust the value of the selected digit, and then use the left/right arrow buttons to change between the digits. Once you have finished editing the level, select the **Enter** button to accept your changes. The 8310 RSA has a minimum attenuation level of 00.0 dB and a maximum of 31.5 dB.

4. Use the arrow buttons to highlight **OK,** and then select the **Enter** button to save the TX attenuation level.

SETUP MENU

PLAN   DEV NAME
PLAN SETUP NETWORK
LINK FREQ   CNTRST ADJ
TX ATTN   EXIT SETUP
RX LEVEL

LINK FREQUENCY

XXXX.XX MHZ

OK

LINK FREQUENCY

XXXX.XX MHZ

OK

LINK FREQUENCY

XXXX.XX MHZ

OK
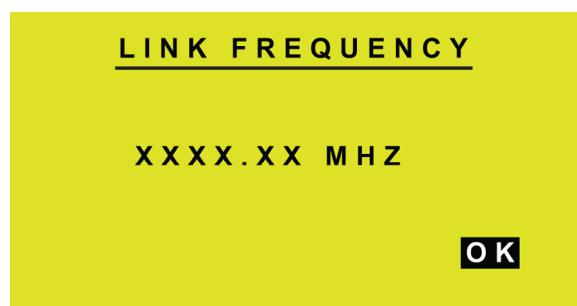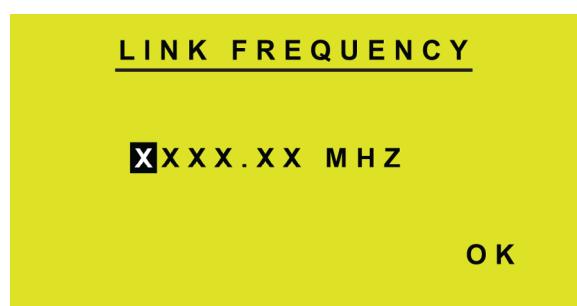
NOTE *The TX Attenuation Level should be set approximately 0 to 10 dB below the Video carrier level to avoid interference with adjacent channels.*

Setting the RX Level & Tap Value

To set the RX level and tap value, perform the following steps:

1. From the **SETUP MENU**, highlight **RX LEVEL** and then select the **Enter** button to display the **RX LEVEL** menu.

2. Use the arrow buttons to highlight the **RX Level** or **Tap Value,** and then select the **Enter** button to edit the level.

3. Use the up/down arrow buttons to adjust the value of the selected digit, and then use the left/right arrow buttons to change between the digits. Once you have finished editing the level, select the **Enter** button to accept your changes. The 8310 RSA has a RX level range of 0 to 60 dBmV and a tap value range of 0 to 60 dB. The minimum tap level must be within 15 dB of the current RX level, or the instrument will automatically adjust the value to bring the tap value within the proper range.

4. Use the arrow buttons to highlight **OK** and then select the **Enter** button to save the RX level and tap value.

```
        SETUP MENU
PLAN          DEV NAME
PLAN SETUP  NETWORK
LINK FREQ    CNTRST ADJ
TX ATTN       EXIT SETUP
RX LEVEL
```

```
        RX LEVEL

   RX LEVEL XX DBMV
 TAP VALUE XX DB

                 OK
```

```
        RX LEVEL

   RX LEVEL XX DBMV
 TAP VALUE XX DB

                 OK
```

```
        RX LEVEL

   RX LEVEL XX DBMV
 TAP VALUE XX DB

                 OK
```

Editing the Device Name

To edit the name of the device, perform the following steps:

1. From the **SETUP MENU**, use the arrow buttons to highlight the **DEV NAME,** and then select the **Enter** button.

2. The **DEVICE NAME MENU** will appear, use the arrow buttons to highlight the name, and then select the **Enter** button.

3. Use the up/down arrow buttons to adjust the value of the selected digit, and then use the left/right arrow buttons to change between the digits. Once you have finished editing the name, select the **Enter** button to accept your changes. The device name is limited to 20 characters.

4. Use the arrow buttons buttons to highlight **OK,** and then select the **Enter** button to save the device name.

```
        SETUP MENU
PLAN            DEV NAME
PLAN SETUP  NETWORK
LINK FREQ   CNTRST ADJ
TX ATTN     EXIT SETUP
RX LEVEL
```

```
     DEVICE NAME MENU


 TRILITHIC 8310 RSA

                        OK
```

```
     DEVICE NAME MENU


 TRILITHIC 8310 RSA

                        OK
```

```
     DEVICE NAME MENU


 TRILITHIC 8310 RSA

                        OK
```

8310 RSA
Return Sweep Analyzer

Setting Up a Network Connection

From the **SETUP MENU**, highlight **NETWORK,** and then select the **Enter** button to display the **NETWORK MENU**.

Use the arrow buttons to highlight the desired network setting, and then select the **Enter** button to edit the selected parameter.

```
              SETUP MENU
PLAN              DEV NAME
PLAN SETUP       [NETWORK]
LINK FREQ         CNTRST ADJ
TX ATTN           EXIT SETUP
RX LEVEL
```
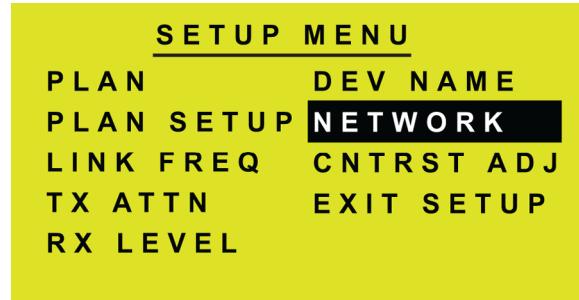
Enabling & Disabling DHCP

To enable and disable DHCP, perform the following steps:

1. Use the arrow buttons to highlight **DHCP**, and then select the **Enter** button.

2. Use the arrow buttons to highlight **ENABLE** or **DISABLE,** and then select the **Enter** button. You will automatically be returned to the **NETWORK MENU** once you select the **Enter** button.

```
           NETWORK MENU
[DHCP]
MAC ADDR
IP SETUP
USER NAME
EXIT
```

```
          DHCP SETUP

            [ENABLE]
             DISABLE


    PRESS ENTER TO EXIT
```
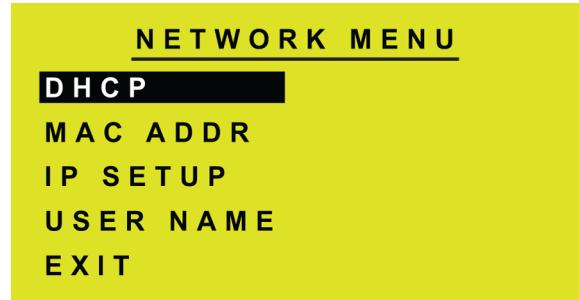
> **NOTE**
>
> *The 8310 RSA must be rebooted before the DHCP selection will be used.*

Viewing the Instrument MAC Address

To view the MAC address of your instrument, perform the following steps:

1. From the **NETWORK MENU**, use the arrow buttons to highlight **MAC ADDR,** and then select the **Enter** button.

2. The **MAC ADDRESS** menu will be displayed, press the **Enter** button to return to the **NETWORK MENU**.

```
        N E T W O R K   M E N U
D H C P
M A C   A D D R
I P   S E T U P
U S E R   N A M E
E X I T
```

```
        M A C   A D D R E S S

 X X   X X   X X   X X   X X   X X



    P R E S S   E N T E R   T O   E X I T
```
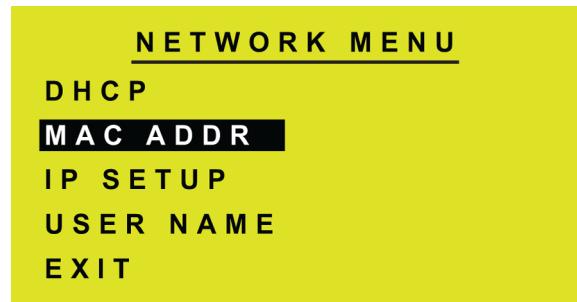
NOTE

The MAC Address of the 8310 RSA is for viewing only, this value cannot be changed.

Manual Setup of Network Connection Settings

To set the IP address, subnet mask, gateway, DNS-1 & DNS-2, perform the following steps:

1. From the **NETWORK MENU**, use the arrow buttons to highlight **IP SETUP,** and then press the **Enter** button.

```
        N E T W O R K   M E N U
D H C P
M A C   A D D R
I P   S E T U P
U S E R   N A M E
E X I T
```
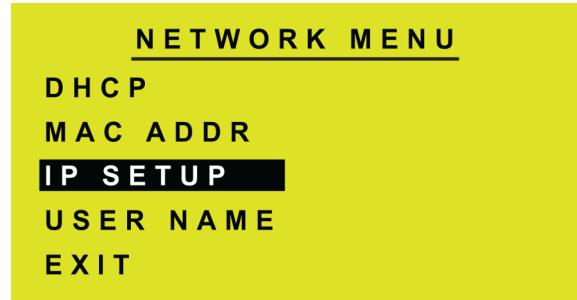
NOTE

If DHCP has been enabled and the 8310 RSA has been rebooted, the 8310 RSA will display the IP SETUP - DHCP menu for viewing purposes only. The values shown in that menu are assigned by the DHCP server and cannot be changed.

2. The **NETWORK SETUP** menu will be displayed, use the arrow buttons to highlight the **IP, SN, GW, DNS1**, or **DNS2** value fields, and then select the **Enter** button to edit the value.

```
NETWORK SETUP
IP      XXX.XXX.XXX.XXX
SN      XXX.XXX.XXX.XXX
GW      XXX.XXX.XXX.XXX
DNS1    XXX.XXX.XXX.XXX
DNS2    XXX.XXX.XXX.XXX
                    OK
```

3. Use the up/down arrow buttons to adjust the value of the selected digit, and then use the left/right arrow buttons to change between the digits. Once you have finished editing the value, select the **Enter** button to accept your changes.

```
NETWORK SETUP
IP      XXX.XXX.XXX.XXX
SN      XXX.XXX.XXX.XXX
GW      XXX.XXX.XXX.XXX
DNS1    XXX.XXX.XXX.XXX
DNS2    XXX.XXX.XXX.XXX
                    OK
```

4. Once you have made all of the network changes, use the arrow buttons to highlight **OK,** and then select the **Enter** button to save the network settings.

```
NETWORK SETUP
IP      XXX.XXX.XXX.XXX
SN      XXX.XXX.XXX.XXX
GW      XXX.XXX.XXX.XXX
DNS1    XXX.XXX.XXX.XXX
DNS2    XXX.XXX.XXX.XXX
                    OK
```

NOTE

Network settings do not take effect until the 8310 RSA has been rebooted. Take note of the IP address, it is necessary to remotely connect to the 8310 RSA through a web browser.

Viewing Automatically Assigned DHCP Network Settings

To view the IP address, subnet mask, gateway, DNS-1 & DNS-2 that has been assigned by the DHCP servier, perform the following steps:

1. From the **NETWORK MENU**, use the arrow buttons to highlight **IP SETUP,** and then select the **Enter** button.

2. The **IP SETUP - DHCP** menu will be displayed. The **IP, SN, GW, DNS1**, and **DNS2** fields will display the values assigned by the DHCP server.

3. To return to the **NETWORK MENU**, select the **Enter** button.

```
        N E T W O R K   M E N U

D H C P
M A C   A D D R
I P   S E T U P
U S E R   N A M E
E X I T
```

```
       I P   S E T U P  -  D H C P

  I P         1 0 .    1 .  3 1 .   1 5
  S N      2 5 5 . 2 5 5 .   0 .    0
  G W        1 0 .    1 .    1 .    1
  D N S 1    1 0 .    1 .    1 .   1 9
  D N S 2    1 0 .    1 .    1 .   2 0

    P R E S S   E N T E R   T O   E X I T
```
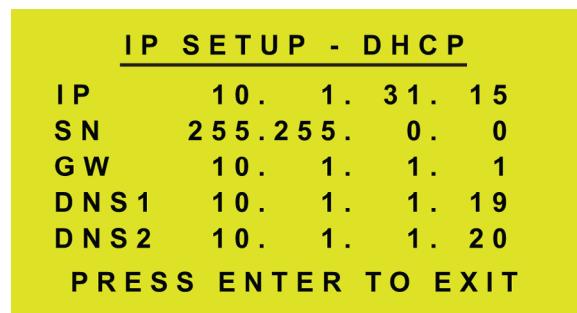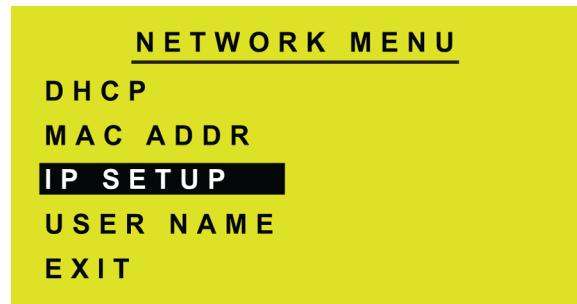
NOTE

DHCP must be enabled and the 8310 RSA must be rebooted before the IP SETUP - DHCP menu will be displayed. The values shown are automatically assigned by the DHCP server and cannot be changed.

NOTE

Take note of the IP address, it is necessary to remotely connect to the 8310 RSA through a web browser.

8310**RSA**
Return Sweep Analyzer

Setting Username & Password

To set the username and password perform the following steps:

1. From the **NETWORK MENU**, use the arrow buttons to highlight **USER NAME,** and then select the **Enter** button.

2. The **USERNAME SETUP** menu will be displayed, use the arrow buttons to highlight the **NAME** or **PSWD** field, and then select the **Enter** button to edit the value.

3. Use the up/down buttons to adjust the value of the selected digit, and then use the left/right buttons to change between the digits. Once you have finished editing the value, select the **Enter** button to accept your changes.

4. Once you have made all of the username and password changes, use the arrow buttons to highlight **OK,** and then select the **Enter** button to save the username and password settings.

```
          N E T W O R K   M E N U
 D H C P
 M A C   A D D R
 I P   S E T U P
 U S E R   N A M E
 E X I T
```

```
        U S E R N A M E   S E T U P

 N A M E   X X X X X X X X X X X X X X X X
 P S W D   X X X X X X X X X X X X X X X X


                              O K
```

```
        U S E R N A M E   S E T U P

 N A M E   X X X X X X X X X X X X X X X X
 P S W D   X X X X X X X X X X X X X X X X


                              O K
```

```
        U S E R N A M E   S E T U P

 N A M E   X X X X X X X X X X X X X X X X
 P S W D   X X X X X X X X X X X X X X X X


                              O K
```
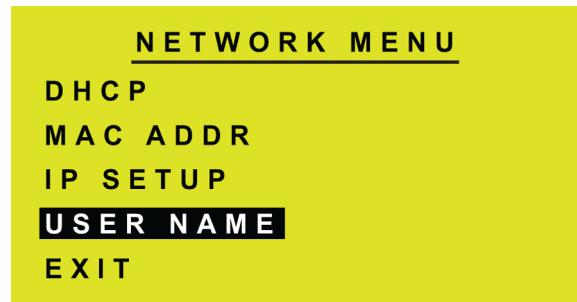
NOTE

Take note of the username and password, it is necessary to remotely connect to the 8310 RSA through a web browser.

Adjusting Display Screen Contrast

To adjust the contrast of the display screen, perform the following steps:

1. From the **SETUP MENU**, use the arrow buttons to highlight **CNTRST ADJ,** and then select the **Enter** button.

2. The **CONTRAST ADJUST** menu will appear, use the up arrow button to make the screen darker and the down arrow button to make the screen lighter.

3. Once you have finished adjusting the screen contrast, select the **Enter** button to return to the **SETUP MENU**.

```
        SETUP MENU
PLAN            DEV NAME
PLAN SETUP  NETWORK
LINK FREQ   CNTRST ADJ
TX ATTN         EXIT SETUP
RX LEVEL
```

```
     CONTRAST ADJUST

    UP FOR DARKER

   DOWN FOR LIGHTER

  PRESS ENTER TO EXIT
```

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Accessing the 8310 RSA with a Web Browser

To access the 8310 RSA from a web browser, perform the following steps:

1. Open an internet web browser and enter the IP address of the 8310 RSA that you would like to connect to.

2. A dialog box will appear, enter the username and password that you setup for your 8310 RSA in Chapter 3.

3. The 8310 RSA homepage will be displayed as shown below. Select any of the hyperlinks from the left column to navigate to the specific web page.
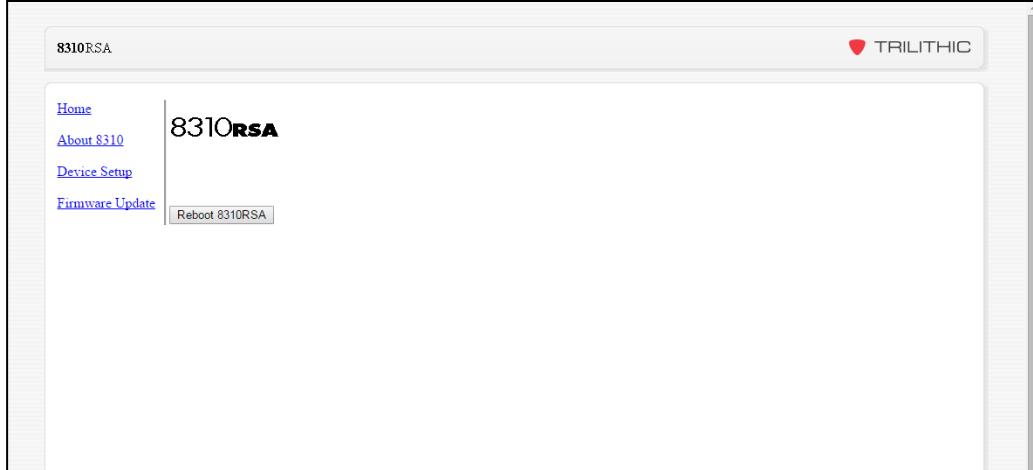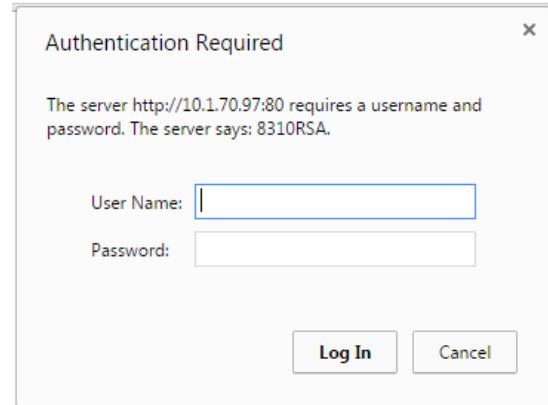
About the 8310 RSA

Select the **About 8310** link to view the following information about the 8310 RSA:

- MAC Address

- Device Date & Time

- DSP Application/Bootloader Firmware Version

- Processor Application/Bootloader Firmware Version

Device Setup

Select the **Device Setup** link to adjust the following settings of the 8310 RSA:

- **Current Channel Plan** – Select the down arrow to the right of this field to select the current channel plan.

- **Channel Plan Setup** – Select this button to configure the system channel plan. See Channel Plan Setup later in this section for more information.
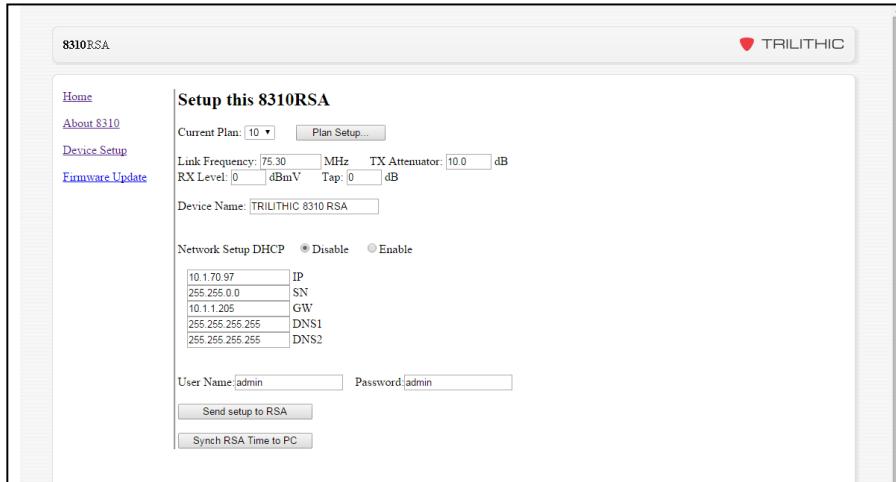
- **Link Frequency** – Enter the link frequency into this field. The 8310 RSA has a minimum link frequency of 0050.00 MHz and a maximum of 1000.00 MHz.

- **TX Attenuation Level** – Enter the TX Attenuation Level into this field. The 8310 RSA has a minimum attenuation level of 00.0 dB and a maximum of 31.5 dB.

- **RX Level & Tap Value** – Enter the TX Level & Tap Value into their corresponding fields. The 8310 RSA has a RX level range of 0 to 60 dBmV and a tap value range of 0 to 60 dB. The minimum tap level must be within 15 dB of the current RX level or the instrument will automatically adjust the value to bring the tap value within the proper range.

- **Device Name** – Enter the name of the device into this field. The device name is limited to 20 characters.

- **Network Settings** – Choose between Static or DHCP network settings and enter the corresponding IP Address, Subnet, Gateway, and DNS settings in the corresponding fields. See Network Settings later in this section for more information.

- **Username & Password** – Enter the Username and Password into their corresponding fields.

> **NOTE**
>
> ***When finished updating or viewing the settings, reboot the 8310 RSA before closing your browser.***

Channel Plan Setup

Perform the following actions to set up the channel plans of the 8310 RSA:
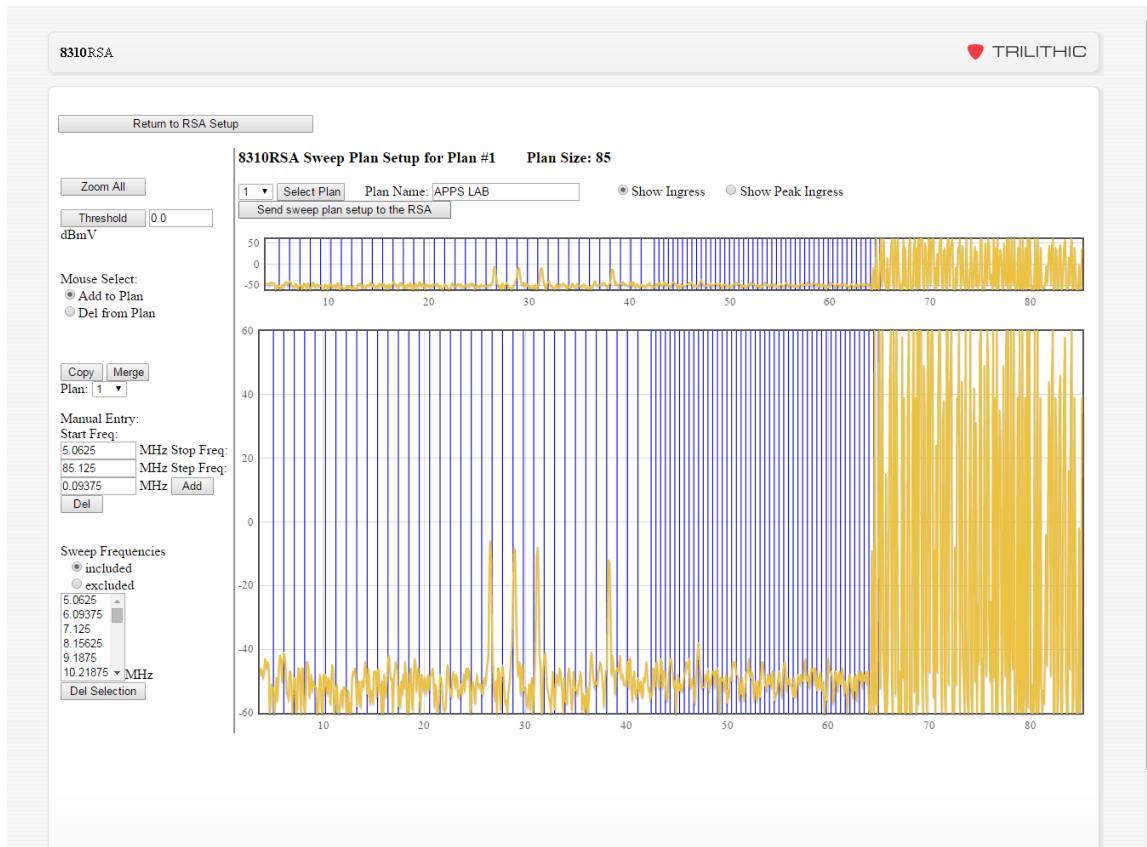
- **Select Plan** – Select the dropdown box to the left of the **Select Plan** button to choose the channel plan number and then select the **Select Plan** button to view the channel plan.

- **Plan Name** – Enter the name of the channel plan into this field.

- **Show Ingress** – Select this option to show the live ingress trace.

- **Show Peak Ingress** – Select this option to show the peak ingress trace over time.

- **Zoom All** – Select this option to return to full view of a zoomed area. To zoom, highlight the area at the top you want to zoom to.

- **Mouse Select** – Select from either **Add to Plan** or **Del from Plan**. Then, the mouse can be used to either add or delete frequencies from the sweep. Hover over the sweep graph with the mouse over the area to add or delete. Then, left click and hold the mouse button while moving the mouse to highlight the area to add or delete. Finally, release the mouse button to add or delete the frequencies.

- **Copy / Merge** – Select the dropdown box below the **Select** button to choose the channel plan to copy or merge and then select the **Copy** or **Merge** button to either copy or merge the settings of the currently displayed plans to the selected plan.

- **Manual Entry** – To manually select the frequencies for the sweep, enter the following information and then select the **Add** or **Del** button to add or delete the selected frequencies:

    - **Start Frequency** – Enter the Start Frequency into this field.

    - **Start Frequency** – Enter the Stop Frequency into this field.

    - **Step Frequency** – Enter the Frequency Step into this field.

- **Sweep Frequencies** – To view the sweep frequencies that are included or excluded, select either the **Included** or **Excluded** option. The list shown below will update to show the included or excluded frequencies. To delete an included or excluded frequency, use the mouse to select the frequency and then select the **Del Selection** button.

- **Send Sweep Plan to the RSA** – After changing any of the channel plan settings, select this button to send the settings to the device. The new sweep settings will not take affect until they are sent to the device.

- **Return to RSA Setup** – To return to the RSA setup screen, select this button. You must first send the channel plan to the device if any changes have been made. Otherwise any changes that have been made will be lost.

> **NOTE**
>
> *When finished updating or viewing the settings, reboot the 8310 RSA before closing your browser.*

Network Settings

Perform the following actions to setup the network settings of the 8310 RSA.

- **Network Setup DHCP** – Select **Disable** to manually set the network settings of the 8310 RSA or select **Enable** to automatically obtain the network settings from a DHCP server.

> **NOTE**
>
> *The 8310 RSA must be rebooted before the DHCP selection will be used.*

- **IP** – Enter the IP address of the 8310 RSA into this field.

- **SN** – Enter the Subnet of the 8310 RSA into this field.

- **GW** – Enter the Gateway of the 8310 RSA into this field.

- **DNS1** – Enter the Primary DNS address of the 8310 RSA into this field.

- **DNS2** – Enter the Secondary DNS address of the 8310 RSA into this field.

> **NOTE**
>
> *If DHCP is enabled, the values shown for the IP Address, Subnet, Gateway, & DNS are automatically assigned by the DHCP server and cannot be changed.*

> **NOTE**
>
> *After rebooting the 8310 RSA, and if the IP address of the 8310 RSA is changed, you will need to enter the new IP Address into the web browser to access the Web Interface.*

Firmware Update

Select the **Firmware Update** link, then perform the following steps to apply a firmware update to the 8310 RSA:

1. Select the **Firmware Type** that you would like to upload by selecting from one of the following options:

    *   **UP Application** – This is firmware designed for the microprocessor controller and has the following file name structure "rsmaXXXX.mot".

    *   **DSP Application** – This is firmware designed for the Digital Signal Processor controller and has the following file name structure "rsdaXXXX.mot".

2. Select the **Browse** button to bring up a window to chose the file to upload. Select the folder location and name, and then select the **Open** button.
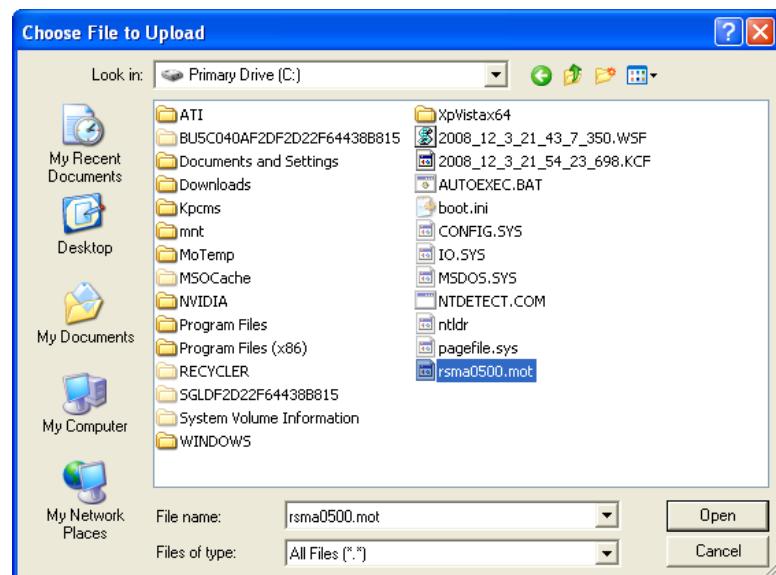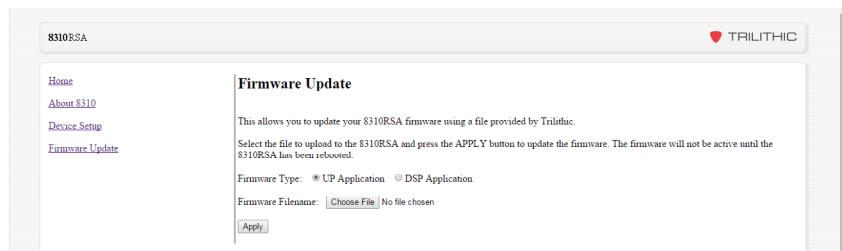
3. The path and file name of the firmware file will now be displayed in the **Firmware Filename** field.
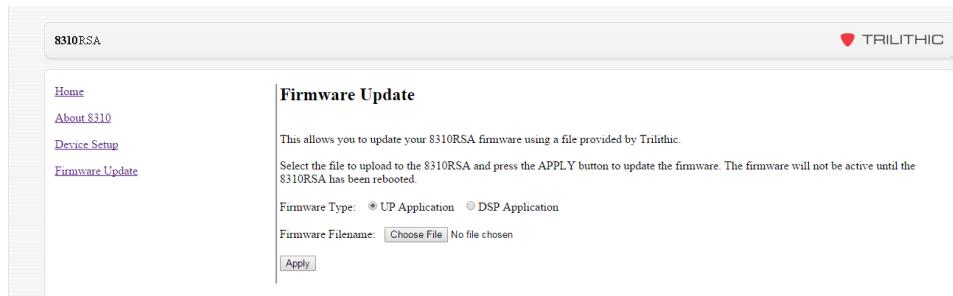
4. Select the **Apply** button, you will be prompted with the following message; *"Do you wish to continue with the upgrade process?"*. To proceed with the firmware update, select the **OK** button or to exit without upgrading, select the **Cancel** button.


5. The message shown below will appear, indicating that the 8310 RSA may be unresponsive for a few minutes while the upgrade process is completed.
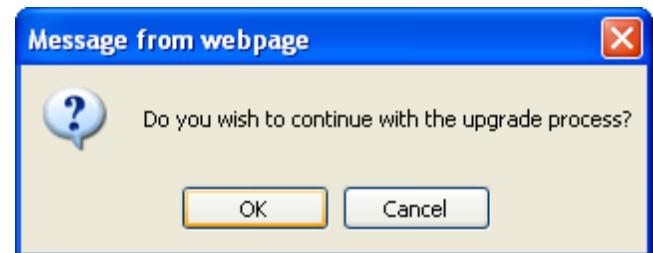
6. Once the firmware update starts, the display screen on the 8310 RSA will indicate the download progress as shown to the right.


DOWNLOAD IN PROGRESS...

7. Once the firmware update is complete, the 8310 RSA web interface will indicate *"Firmware Upgrade Succeeded!"* as shown to the right.
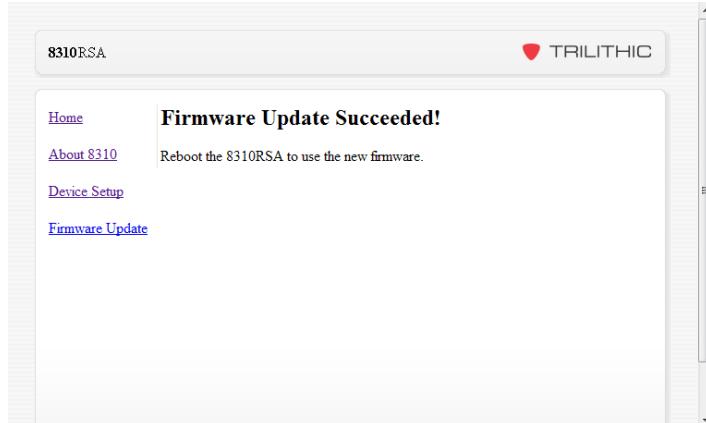
8. Select the **Home** link to return to the homepage.
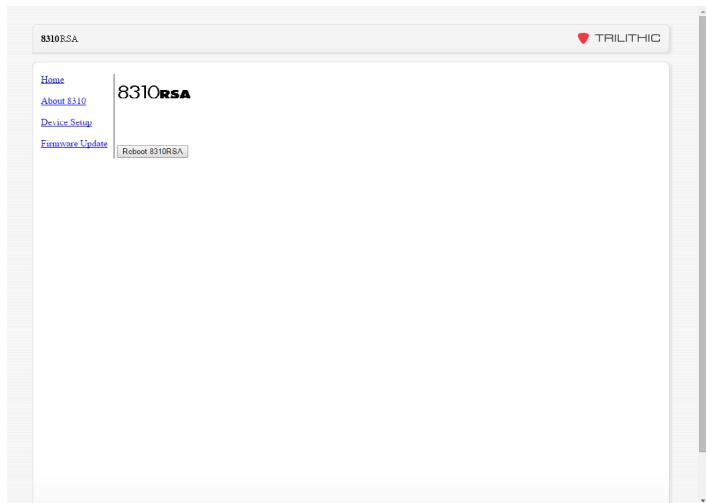
9. Select the **Reboot 8310 RSA** button, you will be prompted with the following message; *"Are you sure you want reboot the 8310 RSA?"*. To proceed with the reboot, select the **OK** button or to exit without rebooting, select the **Cancel** button.
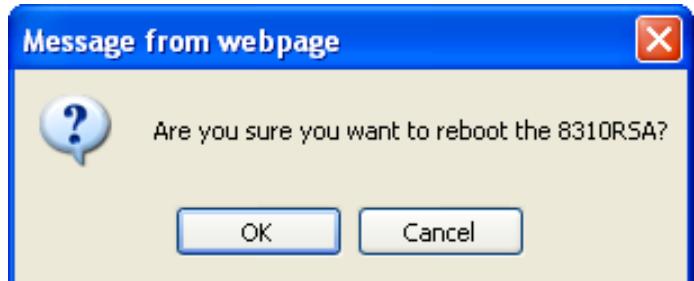
10. The message shown below will appear, indicating that the 8310 RSA may be unresponsivefor a few minutes while the reboot process is completed.

NOTE   *If DHCP is enabled, you may need to verify the new IP address that is assigned to the 8310 RSA after the reboot. This will be necessary if you wish to communicate with the 8310 RSA via the internet web interface again.*

Specifications

Frequency

Range	5.0625 to 85.125 MHz – user configurable
Resolution	93.75 kHz

Level

Input Range	25 dBmV maximum
Accuracy *	±1.0 dBmV

Telemetry (downstream only)

Frequency	50 to 1,000 MHz – user configurable
Occupied Bandwidth	≤ 500 kHz @ -60 dBc
Output Level	≥ 50 dBmV with ≤ 31.5 dB attenuation – user configurable in 0.5 dB steps
Spurious Carrier Suppression	-60 dB

Mechanical

Rack Height	2 RU

Power Specifications

AC Power Input	100 to 370 VAC ~ 47 to 440 Hz, 0.75A Max
DC Power Input	-36.8 to -74.9 VDC, 3.0A Max

*system accuracy, assuming stable plant

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Trilithic Broadband Instruments 2-Year Limited Warranty

Trilithic, Inc. ("Trilithic") warrants to the buyer that the product will be free from defects in materials and workmanship, under normal use, operating conditions and service for a period of two (2) years from date of delivery. Trilithic reserves the right, before having any obligation under this limited warranty, to inspect the damaged product, and all costs of shipping the product to Trilithic for inspection shall be borne solely by the buyer. Trilithic's obligation under this limited warranty shall be limited, at Trilithic's sole option, to replacing or repairing the product, or to replacing or repairing any defective part, F.O.B. Indianapolis, Indiana. If neither of the two options is reasonably available, then Trilithic, in its sole discretion, may provide a prorated refund to the buyer of the purchase price of the product, as evidenced by the proof of purchase, less any applicable service fees in accordance with the following schedule: months 0-3 = 100%; months 4-12 = 50%; and months 13–24 = 25%. Batteries and fans are not included or covered by this limited warranty. Any product or part that is repaired or replaced under this limited warranty shall be covered only for the remainder of the original warranty period which applied to the original product or part, or for ninety (90) days, whichever is longer. All products or parts that are exchanged for replacement shall become the property of Trilithic.

In order to recover under this limited warranty, buyer must make a written claim to Trilithic within sixty (60) days of the occurrence and must present acceptable proof of original ownership of the product (such as an original receipt, purchase order or similar documentation). In order for this limited warranty to be effective, the product must have been handled and used as set forth in the documentation accompanying the product and/or its packaging. This limited warranty shall not apply to any damage due to accident, misuse, abuse, neglect, fire or other casualty. Further, this limited warranty shall not apply to any product which has been altered or where the damage was caused by a part not supplied by Trilithic. Trilithic retains the final decision whether a product is within warranty conditions.

THE REMEDY SET FORTH HEREIN SHALL BE THE ONLY REMEDY AVAILABLE TO THE BUYER AND TO THE FULLEST EXTENT PERMITTED BY LAW, IN NO EVENT SHALL TRILITHIC BE LIABLE FOR ANY SPECIAL, INCIDENTAL, PUNITIVE OR CONSEQUENTIAL DAMAGES, INCLUDING BUT NOT LIMITED TO, LOST REVENUES, LOST PROFITS, LOSS OF USE OF SOFTWARE, LOSS OR RECOVERY OF DATA, DOWNTIME, REPLACEMENT EQUIPMENT AND ANY THIRD PARTY CLAIMS ARISING OUT OF ANY THEORY OF RECOVERY INCLUDING WARRANTY, CONTRACT, STATUTORY OR TORT IN CONNECTION WITH THE PRODUCT, EVEN IF TRILITHIC HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES. NOTWITHSTANDING THE FOREGOING, IN THE EVENT THAT THIS LIMITED WARRANTY FAILS OF ITS ESSENTIAL PURPOSE, IN NO EVENT SHALL TRILITHIC'S ENTIRE LIABILITY TO BUYER EXCEED THE PURCHASE PRICE OF THE DEFECTIVE PRODUCT.

EXCEPT FOR THE LIMITED WARRANTY PROVIDED HEREIN, TO THE FULLEST EXTENT PERMITTED BY LAW, TRILITHIC DISCLAIMS ALL WARRANTIES, EXPRESSED OR IMPLIED (INCLUDING WITHOUT LIMITATION, ANY IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE), WITH RESPECT TO THE PRODUCT OR ITS SUITABILITY FOR ANY USE INTENDED FOR IT BY THE BUYER. TO THE EXTENT ANY IMPLIED WARRANTIES MAY NONETHELESS EXIST BY OPERATION OF LAW, ANY SUCH WARRANTIES ARE LIMITED TO THE DURATION OF THIS LIMITED WARRANTY.

This limited warranty is non-transferable. This limited warranty does not affect any other legal rights buyer may have by operation of law. No agent, reseller, distributor or business partner of Trilithic is authorized to modify the terms of this limited warranty on behalf of Trilithic.

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