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Agilent 86121A
WDM Channel Analyzer



Agilent Technologies

Agilent 86121A—At a Glance

The Agilent 86121A WDM channel analyzer measures the wavelength and optical power of laser light in the 1270–1650 nm wavelength range. Because the Agilent 86121A WDM channel analyzer simultaneously measures multiple laser lines, you can characterize wavelength-division-multiplexed (WDM) systems.

Laser Classification

This product is classified FDA Laser Class I (IEC Laser Class 1) laser.

Safety Considerations

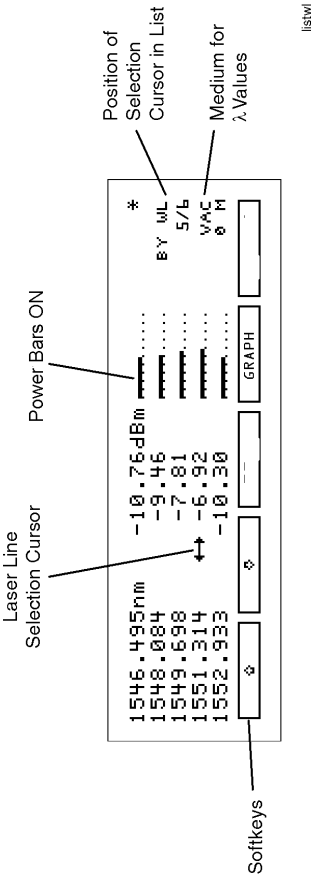
Please review all laser and other safety considerations in the *Agilent 86121A User's Guide*.

Line Power Requirements

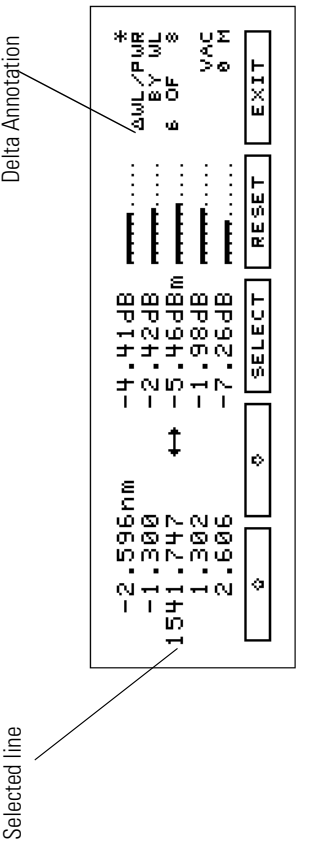
Line Power Requirements

Power:	115 VAC: 110 VA MAX. / 60 WATTS MAX. / 1.1 A MAX. 230 VAC: 150 VA MAX. / 70 WATTS MAX. / 0.6 A MAX.
Voltage	nominal: 115 VAC / 230 VAC range 115 VAC: 90–132 V range 230 VAC: 198–254 V
Frequency	nominals: 50 Hz / 60 Hz range: 47–63 Hz

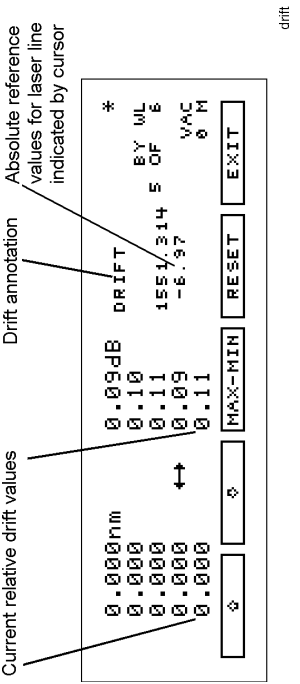
WDM Channel Analyzer Display



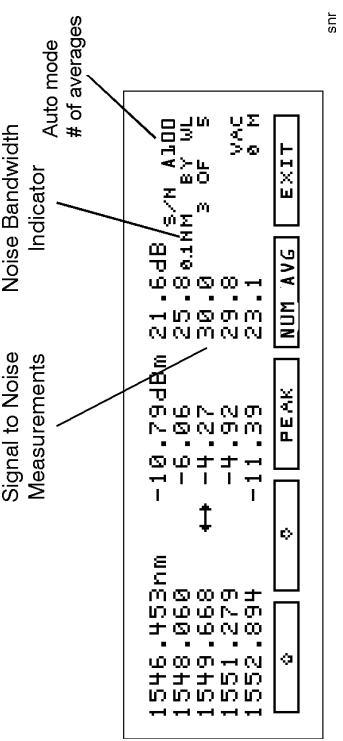
Display after the front-panel Run key is pressed.



The Delta display.

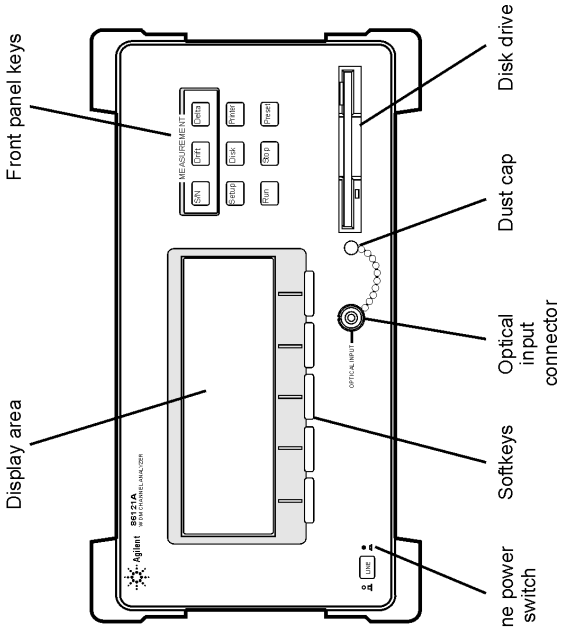


The Drift display.



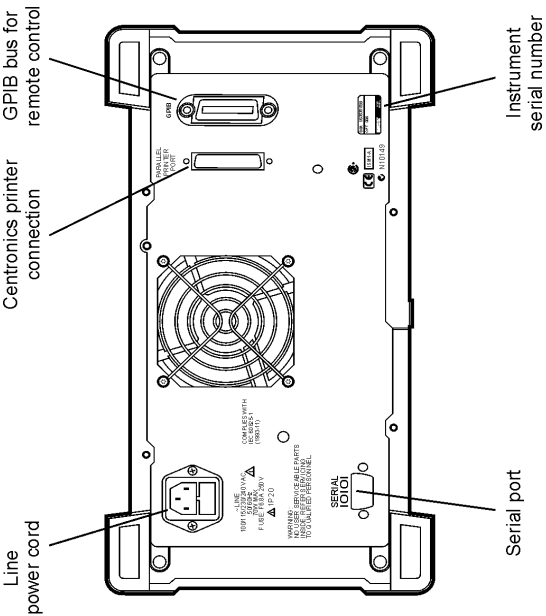
The S/N with Averaging display.

Agilent 86121A Front Panel



Agilent 86121A WDM channel analyzer front panel.

Agilent 86121A Rear Panel



Agilent 86121A WDM channel analyzer rear panel.

Measuring Wavelength and Power

To limit the wavelength measurement range

1. Press the Setup key.
2. Press the *WL LIM* softkey.
3. Press the *STARTWL* softkey to adjust the start wavelength value and then press *RETURN* when you are done.
4. Press the *STOP WL* softkey to adjust the stop wavelength value and then press *RETURN* when you are done.

To measure broadband devices and chirped lasers

1. Press the Setup key.
2. Press *MORE* twice, and then the *DEVICE* softkey.
3. Press the *BROAD* softkey.To return to measuring narrowband devices, press *NARROW* and then press *RETURN*.

To see the graphical display

1. Press the *GRAPH* softkey.
2. To exit the graphical display, press any softkey.

To save an instrument state

1. Press the Setup key.
2. Press the *SAV/RCL* softkey.
3. Press the *SAVE* softkey.
4. Press one of the four *SAVE* softkeys to save the instrument state.

To recall an instrument state

1. Press the Setup key.
2. Press the *SAV/RCL* softkey.

3 Press the *RECALL* softkey.

4 Press one of the four *RCL* softkeys to recall an instrument state.

To control the power bar

1 Press the Setup key.

2 Press *MORE* twice, and then *PWR BAR*.

3 Press *BAR ON* to display the power bar, and press *BAR OFF* to hide the power bar display.

Changing the Units and Measurement Rate

To change the units of measure

1. Press Setup.
2. Press the *MORE* softkey.
3. Press the *WL UNIT* softkey.
4. Select one of the following units. Then, press *RETURN* to complete your selection:
   - *NM* for nanometers
   - *THZ* for terahertz

To change the measurement speed

1. Press the Setup key.
2. Press the *MORE* softkey.
3. Press the *UPDATE* softkey.
4. Select either *NORMAL* or *FAST*.

Defining Laser-Line Peaks

To define laser-line peaks

1. Press the Setup key.
2. Press the *THRSHLD* softkey.

   The peak excursion value can range from 1 to 30 dB. The default value is 15 dB.
3. Press *PK EXC*, and enter the peak excursion value. Use the → softkey to select the digit that requires editing. Use the ↑ and ↓ softkeys to change the value.
4. Press *RETURN*.
5. Press *PK THLD* and then enter the peak threshold value.

   The peak threshold value can range from 0 to 40 dB. Setting this value to 0 dB ensures that only the peak wavelength is identified. The default value is 10 dB.

   Pressing the green PRESET key changes the peak excursion and peak threshold values to their default settings. It also turns wavelength range limiting on. Cycling the power off and then on does *not* change these settings.

Measuring Laser Separation

To measure delta channel separation

1. Press the front-panel Delta key.
2. Select the type of separation to observe:
   - Δ *WL* displays channel separation.
   - Δ *PWR* displays differences in power.
   - Δ *WL* / Δ *PWR* displays both channel separation and differences in power.
3. Use the ⇧ and ⇩ softkeys to select the reference laser line.
4. Press *SELECT*.

   Press *SELECT* at any time to select a new reference. Press *RESET* at any time to turn off the delta calculation.

To measure flatness

1. Press the front-panel Delta key.
2. Select Δ *PWR*.
3. Use the ⇧ and ⇩ softkeys to select the laser line with the greatest power level.
4. Press *SELECT*.

   Since the largest power signal is the reference, the relative power measurements for the other responses shows system flatness.
   You can use relative power measurements to measure flatness (pre-emphasis) in a WDM system. Simply select one carrier as the reference and measure the remaining carriers relative to the reference level. The power differences represent the system flatness. Press *RESET* to turn off the delta calculations so that all responses are shown in absolute wavelength and powers.

Measuring Laser Drift

To measure drift

1. Press the front-panel Drift key.

   Pressing *DRIFT* sets the current laser-line values as the reference from which to compare all drift.

2. Press *MAX-MIN* for the desired type of drift measurement.

Measuring Signal-to-Noise with Averaging

To measure signal-to-noise with averaging

1. Press the front-panel S/N key.
2. To change the number of averages, press *NUM AVG*. The default value is 100 averages.
3. To stop the measurement at the current number of averages shown, press the front-panel Stop key. Then press the front-panel Run key to continue the present measurement.
4. When the measurement is complete, the instrument will stop.
5. To make a new measurement, press the Run key.
6. To exit, press the *EXIT* softkey, then press the Run key to return to continuous measurement.

Measuring Total Power Greater than 10 dBm

To measure total power exceeding 10 dBm

1. Connect an optical attenuator between the front-panel OPTICAL INPUT connector and the fiber-optic cable.

   The attenuator must reduce the total input power to the 86121A so that it is below +10 dBm.

2. Press Setup, *MORE*, *CAL*, and then *PWR OFS*.

   Notice that the `PWR OFS` annotation appears on the screen to indicate an offset is applied.

3. Use the → softkey to select the digit that requires editing.

4. Use the ↑ and ↓ softkeys to change the value.

   Power offset values are added to the display power readings. For example, if you placed a 10 dB attenuator on the front-panel connector, enter a power offset value of +10 dB. Negative values can also be entered if you connect an amplifier instead of an attenuator.

Calibrating Measurements

To enter the elevation

1. Press the Setup key.
2. Press the *MORE* softkey.
3. Press the *CAL* softkey.
4. Press *ELEV*.
5. Use the ⇧ and ⇩ softkeys to enter the elevation in meters. Entries jump in 500 meter steps from 0 m to 5000 m.

   In order for the WDM channel analyzer to meet its published specifications, the elevation value selected with the softkeys must be within 250 meters of the actual elevation.
6. Press *RETURN* to complete the entry.

Converting feet to meters

If you know your elevation in feet, you can convert this value to meters by using the following equation:

$$m = \frac{ft}{3.281}$$

Setting the Date and Time

To set the date and time

1. Press the Setup key.
2. Press the *MORE* softkey.
3. Press the *MORE* softkey again.
4. Press the *CLOCK* softkey.
5. Press *DATE* to adjust the year, month and day. Press *RETURN* when you are done.
6. Press *TIME* to adjust the hour, minute and seconds. Press *RETURN* when you are done.

Saving and Printing the Measurement Results

To save measurement results

1. Press the DISK hardkey. The softkeys that will appear are *STORE* and *RETURN*.
2. Press *STORE* to save the data to a file on the disk. Press *RETURN* to return to the previous state.

To create a hardcopy on an external printer

To print using an external printer, connect a compatible printer to the rear-panel PARALLEL PRINTER PORT connector. The output is ASCII text. An example of a compatible printer is an HP* LaserJet series printer. Be sure to use a parallel printer cable to connect the printer.

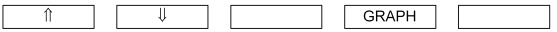
1. Press the PRINTER key. The softkeys that appear are *INTERNL*, *EXTERNL*, *PRINT*, and *RETURN*.
2. Select *EXTERNL* printer. The active printer will be in inverse video.
3. Press *PRINT* to begin printing. You can press *ABORT* to stop the print job in progress.

*. HP is a U.S. registered trademark of Hewlett-Packard Company.

Softkey Menus

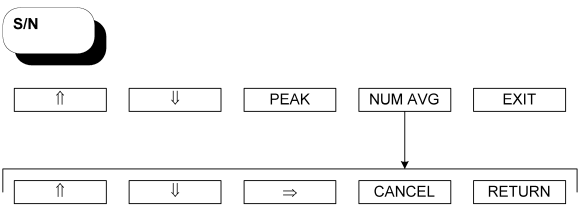
The Startup menu

These softkeys are visible when the instrument is started up.



Signal-to-Noise measurement menu

The Signal-to-Noise measurement softkeys are accessed by pressing the front-panel S/N key.



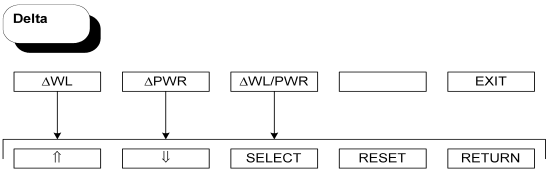
Drift measurement menu

The Drift measurement softkeys are accessed by pressing the front-panel Drift key.



Delta measurement menu

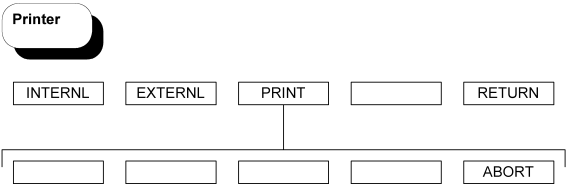
The Delta measurement softkeys are accessed by pressing the front-panel Delta key.



Disk menu



Printer menu



Safety Information

This product has been designed and tested in accordance with IEC Publication 1010, Safety Requirements for Electronic Measuring Apparatus, and has been supplied in a safe condition. The instruction documentation contains information and warnings which must be followed by the user to ensure safe operation and to maintain the product in a safe condition.

Laser Classification

This product is classified FDA Laser Class I (IEC Laser Class 1) laser.

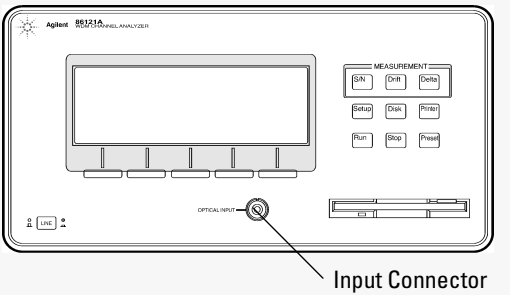
WARNING **If this instrument is not used as specified, the protection provided by the equipment could be impaired. This instrument must be used in a normal condition (in which all means for protection are intact) only.**

WARNING **No operator serviceable parts inside. Refer servicing to qualified personnel. To prevent electrical shock, do not remove covers.**

Table 0-1.

There is no output laser aperture

The Agilent 86121A does not have an output laser aperture. However, light less than 1 nw escapes out of the front-panel OPTICAL INPUT connector. Operator maintenance or precautions are not necessary to maintain safety. No controls, adjustments, or performance of procedures result in hazardous radiation exposure.



If you should ever need to clean the cabinet, use a damp cloth only.

WARNING **To prevent electrical shock, disconnect the Agilent 86121A from mains before cleaning. Use a dry cloth or one slightly dampened with water to clean the external case parts. Do not attempt to clean internally.**

WARNING **This is a Safety Class I product (provided with a protective earthing ground incorporated in the power cord). The mains plug shall only be inserted in a socket outlet provided with a protective earth contact. Any interruption of the protective conductor inside or outside of the instrument is likely to make the instrument dangerous. Intentional interruption is prohibited.**

CAUTION This product has autoranging line voltage input. Be sure the supply voltage is within the specified range.

CAUTION Ventilation Requirements. When installing the product in a cabinet, the convection into and out of the product must not be restricted. The ambient temperature (outside the cabinet) must be less than the maximum operating temperature of

the product by 4°C for every 100 watts dissipated in the cabinet. If the total power dissipated in the cabinet is greater than 800 watts, then forced convection must be used.

CAUTION This product is designed for use in INSTALLATION CATEGORY II and POLLUTION DEGREE 2, per IEC 1010 and 664 respectively.

CAUTION The front panel LINE switch disconnects the mains circuits from the mains supply after the EMC filters and before other parts of the instrument.

CAUTION Install the instrument so that the ON/OFF switch is readily identifiable and is easily reached by the operator. The ON/OFF switch or the detachable power cord is the instrument disconnecting device. It disconnects the mains circuits from the mains supply before other parts of the instrument. Alternately, an externally installed switch or circuit breaker (which is readily identifiable and is easily reached by the operator) may be used as a disconnecting device.

CAUTION Install the instrument according to the enclosure protection provided. This instrument does not protect against the ingress of water. This instrument protects against finger access to hazardous parts within the enclosure.

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