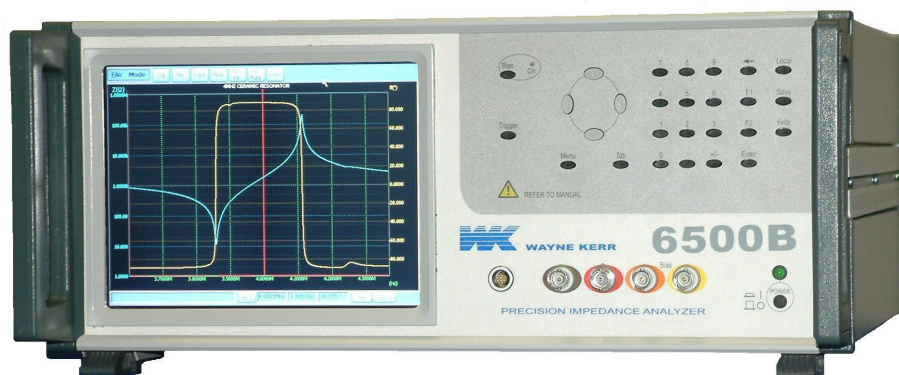


## Precision Impedance Analyzers



**6505B 5MHz**

**6510B 10MHz**

**6515B 15MHz**

**6520B 20MHz**

**6530B 30MHz**

**6550B 50MHz**

**65120B 120MHz**

- Precise high frequency impedance measurements
- Characterize components to 120 MHz (65120B)
- 0.05% basic measurement accuracy
- Comprehensive measurement functions
- Easy to use with large TFT touch screen
- Clear graphic displays
- Intuitive user interface
- Fully programmable over GPIB
- Equivalent Circuit Analysis function
- Competitively priced

The 6500B series of Precision Impedance Analyzers provide precise and fast testing of devices at frequencies up to 120 MHz. Basic measurement accuracy is  $\pm 0.05\%$  making the instruments the best in their class.

The accuracy and versatility makes these precision instruments the ideal choice for many different tasks and applications including passive component design, dielectric material testing and resonant frequency characterisation.

Engineers need to evaluate component characteristics at high frequencies with very high levels of accuracy. The 65120B 120MHz Precision Impedance Analyzer is therefore ideal for many demanding tasks, combining accuracy and ease of use at an affordable price. If a maximum frequency less than 120MHz is required, other models are available in this range.

### AC Measurement parameters

- Impedance (Z)
- Phase Angle ( $\theta$ )
- Capacitance (C)
- Dissipation Factor (D)
- Inductance (L)
- Quality Factor (Q)
- Resistance (R)
- Reactance (X)
- Conductance (G)
- Susceptance (B)
- Admittance (Y)

### High measurement accuracy

Capacitance, inductance and impedance basic accuracy are all an excellent  $\pm 0.05\%$ . Dissipation factor accuracy is  $\pm 0.0005$  and the quality factor accuracy is  $\pm 0.05\%$ .

## Graphical sweep of components

The 6500B series of Precision Impedance Analyzers are highly accurate high frequency component analyzers with a host of useful features.

Graphical sweep of two measured parameters is available and displayed on the large clear colour display. Swept parameters are frequency, drive level and DC bias.

Display formats available include series or parallel equivalent circuit.

An Equivalent Circuit Analysis function is available. This allows modelling and curve fitting to various models of equivalent circuits. 4 types of 3-component model and 1 type of 4-component model can be selected. The instrument will calculate the nearest equivalent circuit parameters for the measurement traces and revise the results for the different models instantly. Alternatively the parameters can be entered by the user and the instrument will plot the resulting frequency characteristics and revise the plot between the various models instantly.

For single frequency measurements a meter mode is available.

## Variable drive and bias levels

AC drive levels up to 1V or 20 mA can be selected to evaluate components in realistic operating environments. /D1 DC bias option provides 0 to +40V dc bias voltage and 0 to +100mA dc bias current. /D2 option provides -40V to +40V dc bias voltage.

## External control

The GPIB interface is used to control the instrument and read back measured values for applications such as quality control or for archiving purposes.

An Ethernet interface similarly allows the instrument to be controlled and to send out data, allowing it to be integrated into many test environments.

## Wide range of interfaces

An external monitor or projector may be connected to the instrument's VGA output. The ability to provide a large screen display of measurement results is invaluable in production environments or for teaching and training.

Instrument control from both a keyboard and mouse is available. Any keyboard or mouse, with either a PS/2 or USB interface, can simply be connected to provide an alternative method of instrument control and operation.

## Data storage and retrieval

All measurement and setup data can be stored using the Ethernet interface or a USB flash memory (supplied as standard).

## Setup Data

Up to 20 instrument setups may be locally stored for each mode.

## Bin handling option

/B1 option (non-isolated 5V) or /B2 option (isolated 24V) signals are available through a 25-way D-type connector. 10 bins can be set using absolute or percentage limits.

## Printer outputs

Hard copy printouts can be obtained in a number of ways including direct to an HP-PCL compatible graphics printer or Epson compatible text/ticket printer. A networked HP-PCL compatible printer may also be used via the Ethernet connection.

## Component connections

Four front panel BNC connectors permit three or four terminal connections with the screens at ground potential.

The 1J1011 Component Fixture, supplied as standard, ensures optimum performance when measuring a wide range of leaded components and devices.

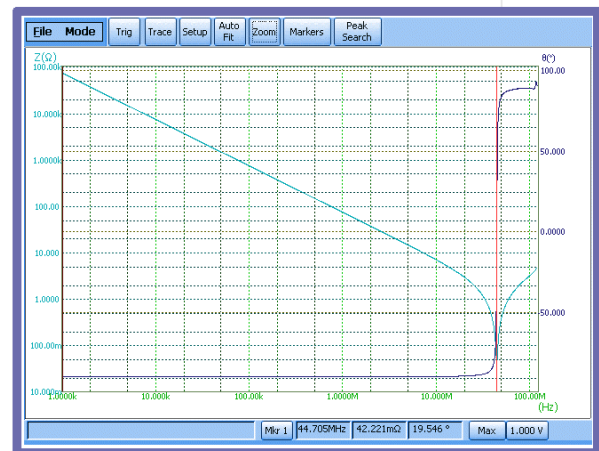
1J1012 (2 terminal) and 1J1014 (4 terminal) Fixtures allow connection to surface mount devices.

## Protection against charged capacitors

High precision measuring instruments can be damaged by charged capacitors which can cause costly repairs and unacceptable downtime. All the models in the range incorporate protection against charged capacitors.

## Comprehensive and precise component tests at higher frequencies

The 6500B series is best summarised by "Comprehensive and precise component tests at higher frequencies". The instrument is the perfect solution for those who have demanding component measurement needs.



*Simultaneous plot of impedance and phase displayed against frequency on a clear colour display*

## Technical specifications

### Measurement parameters

Any of the following parameters can be measured and displayed:

#### AC functions

- Impedance (Z)
- Phase Angle ( $\emptyset$ )
- Capacitance (C)
- Dissipation Factor (D)
- Inductance (L)
- Quality Factor (Q)
- Resistance (R)
- Reactance (X)
- Conductance (G)
- Susceptance (B)
- Admittance (Y)

#### Display format

Series or parallel equivalent circuit – all parameters

3 and 4-element models (R, L & C)

### Test conditions

#### Frequency range

6505B 20Hz to 5MHz

6510B 20Hz to 10MHz

6515B 20Hz to 15MHz

6520B 20Hz to 20MHz

6530B 20Hz to 30MHz

6550B 20Hz to 50MHz

65120B 20Hz to 120MHz

Frequency step size: 0.1mHz

Accuracy of set frequency  $\pm 0.005\%$

#### AC drive level

10mV to 1Vrms\*

200 $\mu$ A to 20mA<sub>rms</sub>\*

\*Varies with frequency

Signal source impedance: 50 $\Omega$  nominal

#### DC bias

##### D1 option

0 to +100mA<sub>dc</sub> bias current; 0 to +40V<sub>dc</sub> bias voltage

##### D2 option

-40V to +40V<sub>dc</sub> bias voltage

#### Binning (optional)

10 bins with absolute and percentage limits.

25 way D-type interface connector.

#### Option /B1 (non-isolated)

Common 0V. Bin outputs 0 to 5V(nominal) with >10mA current sink capability.

#### Option /B2 (isolated)

Common 24V input. Outputs 0 to 24V with >10mA current source capability.

### Mode of operation

#### Graphical sweep mode

Allows graphical sweep of any two measurement parameters

Swept parameters: - frequency, drive level or DC bias

#### Meter mode

Allows the instrument to be used as a standard LCR meter

#### Setup Data

Up to 20 instrument setups may be locally stored for each mode.

#### Equivalent Circuit Analysis

4 types of 3-component model and 1 type of 4-component model.

### Measurement connections

Four front panel BNC connectors permit three or four terminal connections with the screens at ground potential.

### Measurement accuracy

#### Dissipation factor

$\pm 0.0005 (1+D^2)^*$

#### Quality factor

$\pm 0.05 \% (Q+1/Q)^*$

#### Capacitance / Inductance / Impedance

$\pm 0.05\%^*$

\*Varies with frequency, drive level and measured impedance

### General

#### Power Supply

Input voltage 90VAC to 264VAC (Autoranging)

#### Mains frequency

47Hz to 63Hz

#### Display

8.4" VGA (640 x 480) colour TFT with touch screen

#### Local Printer

HP-PCL compatible graphics printing

Centronics / parallel printer port, Epson compatible text / ticket printing

#### Network Printer

HP-PCL compatible graphics printing

## **GPIB interface**

External instrument control. 24 pin IEEE 488 connector

## **Remote trigger**

Rear panel BNC with internal pull-up, operates on logic low or contact closure

## **USB interface**

Two Universal Serial Bus Interfaces  
USB 1.1 compliant

## **VGA interface**

15-way D-type connector to drive an external monitor in addition to the instrument display

## **Network interface**

10/100-BASE-TX Ethernet controller. RJ45 connector

## **Keyboard interface**

Standard USB or PS/2 keyboard port. Instrument front panel remains active with keyboard plugged in

## **Mouse interface**

Standard USB or PS/2 mouse port. Touch screen remains enabled when the mouse is connected.

## **Bin handler (option)**

/B1 option (non-isolated 5V) or /B2 option (isolated 24V).  
25-way D-type connector

## **Environmental conditions**

This equipment is intended for indoor use only in a non-explosive and non-corrosive atmosphere

## **Temperature range**

Storage -20°C to 60°C  
Operating 0°C to 40°C  
Full Accuracy 18°C to 28°C

## **Relative humidity**

Up to 80% non-condensing

## **Altitude**

Up to 2000 m

## **Installation category**

II in accordance with IEC664

## **Safety**

Complies with the requirements of EN61010-1

## **EMC**

Complies with EN61326 for emissions and immunity

## **Mechanical**

Height 190 mm (7.5")      Depth 525 mm (20.5")  
Width 440 mm (17.37")      Weight 14.5 kg (32 lb)

## **Order codes**

<b>Description</b>	<b>Order code</b>
<b>6505B</b> 5MHz Precision Impedance Analyzer	<b>1J6505B</b>
<b>6510B</b> 10MHz Precision Impedance Analyzer	<b>1J6510B</b>
<b>6515B</b> 15MHz Precision Impedance Analyzer	<b>1J6515B</b>
<b>6520B</b> 20MHz Precision Impedance Analyzer	<b>1J6520B</b>
<b>6530B</b> 30MHz Precision Impedance Analyzer	<b>1J6530B</b>
<b>6550B</b> 50MHz Precision Impedance Analyzer	<b>1J6550B</b>
<b>65120B</b> 120MHz Precision Impedance Analyzer with /EC option and either /D1 or /D2 option as standard	<b>1J65120B</b>

All models supplied with:-

User manual	AC power cable
Universal component fixture (1J1011)	USB memory

## **Options**

<b>Description</b>	<b>Order code</b>
Bin handler (non-isolated)	/B1
Bin handler (isolated 24V)	/B2
DC Bias (0 to +40V, 0 to +100mA)	/D1
DC Bias (-40V to +40V)	/D2
Equivalent Circuit Analysis	/EC