Resolution

Resolution is expressed in terms of *number of digits* the multimeter can measure or display. You can set the resolution to 4, 5, or 6 *full digits*, plus a "½" digit which can only be a "0" or "1". To increase measurement accuracy and improve noise rejection, select 6½ digits. To increase measurement speed, select 4½ digits.

Applies to all measurement functions. The resolution for the math operations (null, min-max, dB, dBm, limit test) is the same as the resolution for the measurement function in use.

The correspondence between the number of digits selected and the resulting integration time (in *power line cycles*) is shown below. The autozero mode is set indirectly when you set the resolution. *See also "Autozero," on page 59.*

| Resolution Choices	Integration Time
Fast 4 Digit	0.02 PLC
* Slow 4 Digit	1 PLC
Fast 5 Digit	0.2 PLC
* Slow 5 Digit *(default)*	10 PLC
* Fast 6 Digit	10 PLC
Slow 6 Digit	100 PLC

* These settings configure the multimeter just as if you had pressed the corresponding "DIGITS" keys from the front panel.

Resolution is local to the selected function. This means that you can select the resolution for each function independently. The multimeter remembers the resolution when you switch between functions.
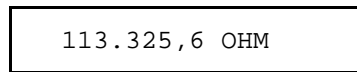
5 digits ────────────┐

```
10.216,5  VDC
```
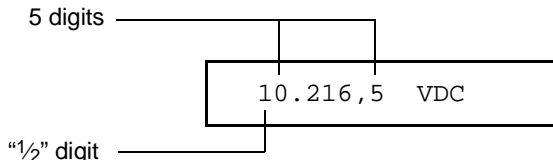
"½" digit ────────────┘

This is the 10 Vdc range, 5½ digits are displayed.

"½" digit ────────────┐

```
-045.23   mVDC
```
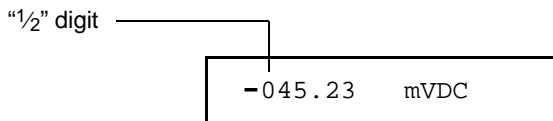
This is the 100 mVdc range, 4½ digits are displayed.

```
113.325,6 OHM
```

This is the 100 ohm range, 6½ digits are displayed.

3

- The resolution is stored in *volatile* memory; the multimeter sets the resolution to 5½ digits (for all functions) when power has been off or after a remote interface reset.

- The resolution is fixed at 5½ digits for continuity and diode tests.

- For dc and resistance measurements, changing the number of digits does more than just change the resolution of the multimeter. It also changes the *integration time,* which is the period the multimeter's analog-to-digital (A/D) converter samples the input signal for a measurement. *See also "Integration Time," on page 57.*

- For ac measurements, the resolution is actually fixed at 6½ digits. If you select 4½ digits or 5½ digits, the multimeter "masks" one or two digits. The only way to control the reading rate for ac measurements is by setting a trigger delay (*see page 79*).

- For ratio measurements, the specified resolution applies to the signal connected to the **Input** terminals.

Resolution
(continued)

- *Front-Panel Operation*: Select either the slow or fast mode for each resolution setting. *The default mode is 5 digits slow.*

  ```
  5: RESOLUTION   (MEAS MENU)
  ```

  See also "To Set the Resolution," on page 21.

- *Remote Interface Operation*: You can set the resolution using the following commands.

  CONFigure:*<function>* {*<range>*|MIN|MAX|DEF},{*<resolution>*|MIN|MAX|DEF}

  MEASure:*<function>*? {*<range>*|MIN|MAX|DEF},{*<resolution>*|MIN|MAX|DEF}

  <function>:RESolution {*<resolution>*|MIN|MAX}

  Specify the resolution in the same units as the measurement function, *not in number of digits*. For example, for dc volts, specify the resolution in volts. For frequency, specify the resolution in hertz.

CONF:VOLT:DC 10,0.001	*4½ digits on the 10 Vdc range*
MEAS:CURR:AC? 1,1E-6	*6½ digits on the 1 A range*
CONF:FREQ 1 KHZ,0.1 Hz	*1000 Hz input, 0.1 Hz resolution*
VOLT:AC:RES 0.05	*50 mV resolution on the ac function*

Integration Time

Integration time is the period during which the multimeter's analog-to-digital (A/D) converter samples the input signal for a measurement. Integration time affects the measurement resolution (for better resolution, use a longer integration time), and measurement speed (for faster measurements, use a shorter integration time).

Applies to all measurement functions except ac voltage, ac current, frequency, and period. The integration time for the math operations (null, min-max, dB, dBm, limit test) is the same as the integration time for the measurement function in use.

3

- Integration time is specified in *number of power line cycles* (NPLCs). The choices are 0.02, 0.2, 1, **10**, or 100 power line cycles. *The default is 10 PLCs.*

- The integration time is stored in *volatile* memory; the multimeter selects 10 PLCs when power has been off or after a remote interface reset.

- Only the integral number of power line cycles (1, 10, or 100 PLCs) provide normal mode (line frequency noise) rejection.

- The only way to control the reading rate for ac measurements is by setting a trigger delay (*see page 79*).

- The following table shows the relationship between integration time and measurement resolution.

Integration Time	Resolution
0.02 NPLC	0.0001 x Full-Scale
0.2 NPLC	0.00001 x Full-Scale
1 NPLC	0.000003 x Full-Scale
10 NPLC	0.000001 x Full-Scale
100 NPLC	0.0000003 x Full-Scale

Integration Time
(continued)

- *Front-Panel Operation*: Integration time is set indirectly when you select the number of digits. *See the table for resolution on page 54.*

- *Remote Interface Operation*:

      <*function*>:NPLCycles {0.02|0.2|1|10|100|MINimum|MAXimum}

For frequency and period measurements, *aperture time* (or gate time) is analogous to integration time. Specify 10 ms (4½ digits), **100 ms** (default; 5½ digits), or 1 second (6½ digits).

      FREQuency:APERture {0.01|0.1|1|MINimum|MAXimum}
      PERiod:APERture {0.01|0.1|1|MINimum|MAXimum}

Front / Rear Input Terminal Switching

Any measurement made using the front terminals can also be made using the input terminals on the rear panel. See "The Front Panel at a Glance," on page 2, for the location of the front/rear switch.

The input terminals can only be configured from the front panel. You cannot select the terminals from the remote interface, but you can query the present setting.

- The **Rear** annunciator turns on when you select the rear terminals.

- *Remote Interface Operation*: You can query the multimeter to determine whether the front or rear input terminals are selected.

      ROUTe:TERMinals?   *returns "FRON" or "REAR"*