FLUKE®

PM 6680B / PM 6681 / PM 6681R

Technical Data

Timer / Counter / Analyzers
Rubidium Frequency Reference / Counter / Calibrator

PM 6681: the highest performance timer/counter/ analyzer available
The PM 6681 from Fluke sets the new standard for measurement and analysis of time intervals, frequency, phase and jitter. For development, calibration or challenging production test applications, the PM 6681 is the leader.

Check these key PM 6681 performance parameters, and compare the new state-of-the-art for yourself:
- 50 ps single-shot time interval resolution (1 ps averaged)
- 1.25 mV vertical resolution
- 300 MHz range, options to 4.5 GHz
- 8k readings/s to internal memory
- 250 readings/s over GPIB
- Continuous single-period measurements at up to 40k readings/s
- Unique hold-off and arming delay facilities to measure any part of any complex signal
- TimeView™ PC software for time and frequency analysis

So for the ultimate performance, choose the advanced PM 6681.

PM 6680B: the value leader
For applications that don't demand the PM 6681's sheer performance, check into Fluke's PM 6680B. This model offers a combination of performance and price that makes it today's undisputed value leader. Key specs. are identical to the PM 6681, except for:

- 250 ps single-shot time interval resolution
- 100 ps averaged time interval resolution
- 225 MHz range, options to 4.5 GHz
- 2k readings/s to internal memory

So, for today's top timer/counter value, choose the economic PM 6680B.

PM 6681R: ideal for calibration applications
The Rubidium reference of the PM 6681R makes this instrument the most accurate Frequency Reference/Counter/Calibrator for the calibration of frequency, time or phase.

- High accuracy and short warm-up times:
  $1x10^{-9}$ within >7 min
  $4x10^{-10}$ within >10 min
  Ageing $2x10^{-10}$ per year
- Calibrates Frequency, Time or Phase
- Calibrates any application specific frequency
- 5x 10MHz & 1x 5MHz buffered reference outputs
- 5 year warranty on Rubidium element

Measuring Functions

Refer to table 1 for uncertainty information. Inputs A and B can be swapped internally in all modes except Rise and Fall Time.

Frequency A, B, C

Range:	
Input A (PM 6681):	10^{-10} Hz to 300 MHz
Input A (PM 6680B):	10^{-10} Hz to 225 MHz
Input B:	10^{-10} Hz to 100 MHz
Input C:	Up to 1.3 GHz, 2.7 GHz, 4.2 GHz or 4.5 GHz with options
Resolution (PM 6681):	11 digits in 1s measuring time
Resolution (PM 6680B):	10 digits in 1s measuring time

Frequency Burst A, B, C

Frequency and PRF of burst signals can be measured without external control signal and with selectable start arming delay.

Range:	
Input A (PM 6681):	Up to 300 MHz
Input A (PM 6680B):	Up to 160 MHz
Input B:	Up to 100 MHz
Input C (PM 6681):	Up to 3 GHz with options
Start Delay Range (PM 6681)	200 ns to 1s, 100 ns resolution

Period A

Range (PM 6681):	3.3 ns to 10^{10} s
Range(PM 6680B):	6 ns to 10^{10} s
Resolution (PM 6681):	11 digits in 1s measuring time
Resolution (PM 6680B):	10 digits in 1s measuring time

Ratio A/B, C/B

Range:	10^{-9} to 10^{15}
Frequency Range:	
Input A, B:	10^{-10} Hz to 160 MHz
Input C:	Up to 1.3 GHz, 2.7 GHz 4.2 GHz or 4.5 GHz with options

Time Interval A to B

Range:	0 ns to 10^{10} s
Resolution	
single shot (PM 6681):	50 ps (1 ps average)
PM 6680B):	250 ps
Frequency Range:	Up to 160 MHz

Pulse Width A

Range:	3 ns to 10^{10} s
Frequency Range:	Up to 160 MHz

Rise and Fall Time A

Range:	3 ns to 10^{10} s
Frequency Range:	Up to 160 MHz
Input Amplitude (PM 6681):	>250 mV p-p
Input Amplitude (PM 6680B):	>500 mV p-p

Phase A Relative B

Range:	-180° to +360°
Resolution:	0.01
Frequency Range:	0.03 Hz to 160 MHz

Duty Factor A

Range:	0 to 1
Frequency Range:	0.11 Hz to 160 MHz

Totalize A, B

Range:	0 to 10^{17}, 0 to 10^{10} in A-B modes
Frequency Range:	0 to 160 MHz
A Gated by B:	Event counting on Input A during the presence of a pulse on Input B. Single or cumulative event counting during set measuring time
A Start/Stop by B:	Event counting on Input A between two consecutive pulses on Input B
Manual A-B:	Input A minus Input B event counting with manual start and stop
Manual/Timed A-B:	Input A minus Input B event counting with manual start. Stop after set measuring time. Time counted from first trigger event on A.

AC/DC Voltage A, B

Range:	-50V to +50V
Frequency Range (PM 6681):	DC, 1 Hz to 100 MHz
Frequency Range (PM 6680B):	DC, 100 Hz to 100 MHz
Mode:	V_{max}, V_{min}, V_{p-p}
Resolution (PM 6681):	1.25 mV
Resolution (PM 6680B):	20 mV
Gated Volt:	External masking of unwanted signal components such as overshoot

Input and Output Specifications

Inputs A and B (PM 6681)

Frequency Range:	
DC-Coupled:	DC to 300 MHz
AC-Coupled:	10 Hz to 300 MHz
Coupling:	AC or DC
Impedance:	1 MΩ/15 pF or 50Ω (VSWR 2:1) 1 MΩ/65 pF or 50Ω with PM 9611/80 rear panel inputs
Trigger Slope:	Positive or negative
Channel Inputs:	Separate, common A or swapped
Max. channel timing difference:	500 ps
Sensitivity:	20 mV rms, <100 MHz 30 mV rms, 100 MHz to 200 MHz 40 mV rms, 200 MHz to 250 MHz 60 mV rms, >250 MHz
Pulse Width:	>5 ns at 60 mV p-p, >3 ns at 90 mV p-p
Attenuation:	x1 or x10
Hysteresis Window (x1):	20 mV p-p
Variable Hysteresis A (x1):	30 mV p-p to 10V p-p up to 120 MHz
Dynamic Range (x1):	60 mV p-p to 10V p-p within ±5V window
Trigger Level:	Read-Out on display
Range:	(x1): -5V to +5V (x10): -50V to +50V
Resolution (x1):	1.25 mV
Uncertainty (x1):	±(4 mV + 1% of trigger level)
AUTO Trigger Level:	Trigger level is automatically set to 50% point of input signal (10% and 90% for Rise/Fall Time, 75% and 25% for variable hysteresis A)
Frequency:	>1 Hz
Low Pass Filter A:	100 kHz fixed. >40 dB attenuation at 1 MHz
Digital Low Pass Filter:	1 Hz to 10 MHz using trigger Hold-Off
Trigger Indicator:	Tri-state LED-indicator
Max Voltage Without Damage: 1 MΩ:	350V (DC + AC pk) at DC to 440 Hz, falling to 12V rms (x1) and 120V rms (x10) at 1 MHz
50Ω:	12V rms

Inputs A and B (PM 6680B)

Frequency Range:	
DC-Coupled:	DC to 225 MHz
AC-Coupled:	10 Hz to 225 MHz
Coupling:	AC or DC
Rise Time	Approx. 1.5 ns
Impedance:	1 MΩ/30 pF or 50Ω (VSWR 2:1) 1 MΩ/80 pF or 50Ω (with PM 9611/80 rear panel inputs)
Trigger Slope:	Positive or negative
Channel Inputs:	Separate, common A or swapped
Max. channel timing difference:	1 ns
Sensitivity:	20 mV rms, <100 MHz 30 mV rms, 100 MHz to 200 MHz 40 mV rms, >200 MHz
Pulse Width:	>5 ns at 60 mV p-p, >3 ns at 90 mV p-p
Attenuation:	x1 or x10
Hysteresis Window (x1):	30 mV p-p
Variable Hysteresis A (x1):	60 mV p-p to 10V p-p up to 120 MHz
Dynamic Range (x1):	60 mV p-p to 10V p-p within ±5V window
Trigger Level:	Read-Out on display
Range:	(x1): -5.1V to +5.1V
Range (cont'd):	(x10): -51V to +51V

Resolution (x1):	20 mV
Uncertainty (x1):	±(20 mV + 1% of trigger level)
AUTO Trigger Level:	Trigger level is automatically set to 50% point of input signal (10% and 90% for Rise/Fall Time, 75% and 25% for variable hysteresis A)
Frequency:	>100 Hz
Amplitude:	>150 mV p-p
Low Pass Filter A:	100 kHz fixed. >40 dB atten. at 1 MHz
Digital Low Pass Filter:	1 Hz to 5 MHz using trigger Hold-Off
Trigger Indicator:	Tri-state LED-indicator
Max Voltage Without Damage: 1 MΩ:	350V (DC + AC pk) at DC to 440 Hz, falling to 12V rms (x1) and 120V rms (x10) at 1 MHz
50Ω:	12V rms

Input C (Option PM 9621)

Frequency Range:	70 MHz to 1.3 GHz
Prescale Factor:	256 (PM 6680B) 512 (PM 6681)
Operating Input Voltage Range:	
70 to 900 MHz:	10 mV rms to 12V rms
0.9 to 1.1 GHz:	15 mV rms to 12V rms
1.1 to 1.3 GHz:	40 mV rms to 12V rms
Amplitude Modulation:	
DC to 0.1 MHz:	Up to 94% depth
0.1 to 6 MHz:	Up to 85% depth
Minimum signal must exceed minimum operating input voltage	
Impedance:	50Ω nominal, AC coupled, VSWR <2:1
Max Voltage Without Damage:	12V rms, pin-diode protected
Connector:	BNC

Input C (Option PM 9624)

Frequency Range:	100 MHz to 2.7 GHz
Prescale Factor:	16 (PM 6680B) 32 (PM 6681)
Operating Input Voltage Range:	
100 to 300 MHz:	20 mV rms to 12V rms
0.3 to 2.5 GHz:	10 mV rms to 12V rms
2.5 to 2.7 GHz:	20 mV rms to 12V rms
Amplitude Modulation	As PM9621
Impedance:	50Ω nominal, AC coupled, VSWR <2.5:1
Max Voltage Without Damage:	12V rms, pin-diode protected
Connector:	Type N Female

Input C (Option PM 9625B)

Frequency Range :	150 MHz to 4.2 GHz
Prescale Factor:	32 (PM 6680B) 64 (PM 6681)
Operating Input Voltage Range:	
150 to 300 MHz:	20 mV rms to 1V rms (-21 to +13 dB)
0.3 to 2.2 GHz:	10 mV rms to 1V rms (-27 to +13 dB)
2.2 to 3.5 GHz:	15 mV rms to 1V rms (-23.5 to +13 dB)
3.5 to 4.2 GHz:	25 mV rms to 1V rms (-19 to +13 dB)
Amplitude Modulation	As PM 9621
Impedance:	50Ω nominal, AC coupled, VSWR <2.5:1
Max Voltage Without Damage:	12V rms, pin-diode protected
Connector:	Type N Female

Input C (Option PM 9625)

Frequency Range :	150 MHz to 4.5 GHz
Prescale Factor:	32 (PM 6680B) 64 (PM 6681)
Operating Input Voltage Range:	
150 to 300 MHz:	20 mV rms to 1V rms (-21 to +13 dB)
0.3 to 2.5 GHz:	10 mV rms to 1V rms (-27 to +13 dB)
2.5 to 3.7 GHz:	15 mV rms to 1V rms (-23.5 to +13 dB)
3.7 to 4.5 GHz:	25 mV rms to 1V rms (-19 to +13 dB)
Amplitude Modulation	As PM 9621
Impedance:	50Ω nominal, AC coupled, VSWR <2.5:1
Max Voltage Without Damage:	12V rms(+34 dBm), pin-diode protected
Connector:	Type N Female

Rear Panel Inputs and Outputs

Reference Input (PM 6681):	1, 2, 5, or 10 MHz >200 mV rms signal
Reference Input (PM 6680):	10 MHz >500 mV rms signal
Reference Output (PM 6680B):	1x 10 MHz >0.5V rms sinewave into 50 load
PM 6681R:	5x 10 MHz & 1x 5 MHz. >0.5V rms sinewave into 50W load
Arming Input:	Most measuring functions can be performed.
Frequency Range (PM 6681):	DC to 100 MHz
Frequency Range (PM 6680B):	DC to 50 MHz
Slew Rate:	>2 V/s
Trigger Level:	TTL level, 1.4V nominal
Trigger Slope:	Positive or negative
Gate Output:	Gate open/gate closed signal output
Trigger Level Outputs:	Outputs for channel A and B trigger levels
Probe Compensation Outputs:	Outputs for channel A and B to adjust for best pulse response when using probes for counter input
Analog output:	0 to 4.98V proportional to 3 selected digits

Auxiliary Functions

Trigger Hold-Off

Time Delay Range (PM 6681):	60 ns to 1.34s, 10 ns resolution
Time Delay Range (PM 6680B):	200 ns to 1.6s, 100 ns resolution
Event Delay Range B (PM 6681):	2 to 2^{24}-1, max. 100 MHz
Event Delay Range B (PM 6680B):	2 to 2^{24}-1, max. 20 MHz

External Arming

Time Delay Range B, E:	200 ns to 1.6s, 100 ns resolution
Event Delay Range B:	2 to 2^{24}-1, max. 20 MHz

Statistics

Functions:	Maximum, Minimum, Mean and Standard Deviation
Sample Size (PM 6681):	1 to 2 x 10^{-9} samples
Sample Size (PM 6680B):	1 to 65535 samples

Mathematics

Functions:	(K*X+L)/M and (K/X+L)/M. X is current reading and K, L and M are constants; set via keyboard or as frozen reference value (X_0) or as value from preceding measurement (X_{n-1})

Other Functions

Measuring Time (PM 6681):	Single cycle, 80, 160, 320, 640, 1280 ns and 20 µs to 20s (or to 400s for some functions)
Measuring Time (PM 6680B):	Single cycle, 0.8, 1.6, 3.2, 6.4, 12.8 µs and 50 µs to 20s (or to 400s for some functions)
Display Hold:	Freezes measuring result, until a new measurement is initiated via Restart
Settings:	20 instrument setups can be saved and recalled from internal non-volatile memory. 10 can be user protected.
Auxiliary Menu:	Gives access to additional functions
Display:	10-digit LCD with high-luminance backlight

GPIB Interface

Programmable Functions:	All front panel accessible functions
Compatibility:	IEEE 488.2-1987, SCPI 1991.0
Interface Functions:	SH1, AH1, T6, L4, SR1, RL1, DC1, DT1, E2
Time Stamping (PM 6681):	125 ns resolution

Measurement Rate*	PM 6681	PM 6680B
Via GPIB	250 readings/s	125 readings/s
To Internal Memory:	8k readings/s	2k readings/s

Internal Memory Size (PM 6681)* Up to 6100 readings
Internal Memory Size (PM 6680B)*Up to 2600 readings
Data Output: ASCII, IEEE double precision floating point

TimeView™ Time & Frequency Analysis Software

TimeView runs on an IBM PC/AT or compatible with VGA monitor.

Data Capture Modes and Measurement Rate*

	PM 6681	PM 6680B
Free Running Measurement:	8k readings/s	2k readings/s
Repetitive Sampling:	Up to 10 MHz	Up to 10 MHz
Continuous Single-Period:	Up to 40k readings/s (200 ns resolution)	N/A
Waveform Capture:	Yes	N/A
Data Analysis Features:	Measurement data vs time FFT Graph Root Allan Variance Smoothing function Zoom function Cursor measurements Distribution Histogram Setup and Measurement Data Archive and printing	

* Depending on measurement function and internal data format

Systematic Uncertainties

Trigger Level Timing Error

Time Interval, Rise/Fall Time, Pulse Width, Duty Factor (x1):
Trigger Level Timing Error =
= TLU x (1/Sx + 1/Sy) ± 0.5 x Hyst. x (1/Sx + 1/Sy)
Where:
Sx = Slew rate at start trigger point in V/s
Sy = Slew rate at stop trigger point in V/s
TLU = Trigger Level Uncertainty for each model in Volt
Hyst. = Hysteresis Window for each model in Volt
Hyst. = 0 for Time Interval and Rise/Fall Time for PM 6681

Phase, sinewave signals and trigger levels OV (x1):
Trigger Level Timing Error (PM 6681) =
= [0.2/V pk of A + 0.2/V pk of B] °
Trigger Level Timing Error (PM 6680B) =
= [0.3/V pk (A) + 0.3/V pk (B)] ° ± [0.9/V pk (A) – 0.9/V pk (B)] °
Where:
V pk (A) = Input A peak voltage in Volt
V pk (B) = Input B peak voltage in Volt

Measurement Uncertainties

Measuring Function	Random Uncertainty rms	Systematic Uncertainty
Time Interval **Pulse Width** **Rise/Fall Time**	$\frac{\sqrt{(QE)^2 + (\text{Start Trigger Error})^2 + (\text{Stop Trigger Error})^2}}{\sqrt{N}}$ or min.: 1 ps for PM 6681, 100 ps for PM 6680B	± Trigger Level Timing Error ± 500 ps Systematic Error (PM 6681) ± 1 ns Systematic Error (PM 6680B) ± Time Base Error x Time Interval
Frequency **Period**	$\frac{\sqrt{(QE)^2 + 2 \times (\text{Start Trigger Error})^2}}{\text{Measuring Time}}$ x Frequency or Period	± Time Base Error x Freq. or Period
Ratio f_1/f_2	$\frac{\sqrt{(\text{Prescaler Factor})^2 + 2x\,(f_1 \times \text{Start Trigger Error of } f_2)^2}}{f_2 \times \text{Measuring Time}}$	
Phase	$\frac{\sqrt{(QE)^2 + (\text{Start Trigger Error})^2 + (\text{Stop Trigger Error})^2}}{\sqrt{N}}$ x Freq. x 360° or min.: (1 ps for PM 6681, 100 ps for PM 6680B) x Freq. x 360°	± Trigger Level Timing Error° ± 500 ps Sys. Error x Freq. x 360° (PM 6681) ± 1 ns Sys. Error x Freq. x 360° (PM 6680B)
Duty Factor	$\frac{\sqrt{(QE)^2 + (\text{Start Trigger Error})^2 + (\text{Stop Trigger Error})^2}}{\sqrt{N}}$ x Frequency or min.: (1 ps for PM 6681, 100 ps for PM 6680B) x Frequency	± Trigger Level Timing Error x Freq. ± 500 ps Sys. Error x Freq. (PM 6681) ± 1 ns Syst. Error x Freq. (PM 6680B)

Table 1: Measurement Uncertainties

Random Uncertainties

(QE) Quantization Error
(PM 6681): 10°C to 40°C: 50 ps rms
0 to 10°C and 40 to 50°C: 75 ps rms
(QE) Quantization Error
(PM 6680B): 0°C to 55°C: 250 ps rms
(N)Number of samples
(PM 6681): Frequency <12 kHz: Measuring Time x Frequency/2
Frequency >12 kHz: Measuring Time x 6000

(N) Number of samples
(PM 6680B): Frequency <2 kHz: Measuring Time x Frequency/2
Frequency >2 kHz: Measuring Time x 1000

Start/Stop Trigger Errors:

$$\frac{\sqrt{(\text{Vnoise-input})^2 + (\text{Vnoise-signal})^2}}{\text{Signal slew rate (V/s) at trigger point}}\ \text{rms}$$

Vnoise-input (PM 6681): 100µV rms typical
Vnoise-input (PM 6680B): 200µV rms typical
Vnoise-signal: The rms noise of the input signal

Display Resolution

LSD Displayed
Unit value of the least significant digit displayed. All calculated LSDs should be rounded to the nearest decade (e.g. 0.3 Hz is rounded to 0.1 Hz, 5 Hz is rounded to 10 Hz.) and cannot exceed the 12th digit.

Frequency and Period
LSD Displayed (PM 6681) $\frac{50\ ps \times Frequency\ or\ Period}{measuring\ time}$
LSD Displayed (PM 6680B) $\frac{500\ ps \times Frequency\ or\ Period}{measuring\ time}$

Time Interval, RT, FT, PW
LSD Displayed (PM 6681) $\frac{50\ ps}{\sqrt{N}}$
LSD Displayed (PM 6680B) $\frac{500\ ps}{\sqrt{N}}$

Duty Factor
LSD Displayed 1×10^{-6}

Phase
LSD Displayed 0.01°

Ratio f1/f2
LSD Displayed $\frac{Prescaler\ Factor}{f_2 \times measuring\ time}$

Time Base Options

Option model:		PM668-/-1-	PM668-/-2-	PM668-/-4-	PM668-/-5-	PM668-/-6-	PM668-/-7-
Retro-fittable option:		non retrofit.	PM9678B/021	PM9690/011	PM9691/011	PM9692/011	non retro-fit.
Time base type:		Standard	TCXO	OCXO	OCXO	OCXO	Rubidium
Uncertainty due to:							
Calibration adjustment tolerance, at + 23°C ± 3°C		$<1x10^{-6}$	$<2x10^{-7}$	$<5x10^{-8}$	$<2x10^{-8}$	$<5x10^{-9}$	$<5x10^{-11}$
Ageing:	per 24 hr.	n.a.	n.a.	$<1.5x10^{-9}$ ❶	$<5x10^{-10}$ ❶	$<3x10^{-10}$ ❶	n.a.
	per month	$<5x10^{-7}$	$<1x10^{-7}$	$<2x10^{-8}$	$<1x10^{-8}$	$<3x10^{-9}$	$<5x10^{-11}$ ❷
	per year	$<5x10^{-6}$	$<5x10^{-7}$	$<1x10^{-7}$	$<7.5x10^{-8}$	$<2x10^{-8}$	$<2x10^{-10}$ ❸
Temperature variation:	0°C-50°C,	$<1x10^{-5}$	$<1x10^{-6}$	$<1.5x10^{-8}$	$<5x10^{-9}$	$<2.5x10^{-19}$	$<3x10^{-10}$
	20°C-26°C (typ. values)	$<3x10^{-6}$	$<2x10^{-7}$	$<2x10^{-9}$	$<6x10^{-10}$	$<4x10^{-10}$	$<5x10^{-11}$
Power voltage variation:	± 10%	$<1x10^{-8}$	$<1x10^{-9}$	$<5x10^{-10}$	$<5x10^{-10}$	$<5x10^{-10}$	$<1x10^{-11}$
Short term stability:	τ = 1 s					$<1x10^{-11}$	$<5x10^{-11}$
(root Allan Variance)	τ = 10 s	not specified	not specified	not specified	not specified	$<3x10^{-12}$	$<1.5x10^{-11}$
	τ = 100 s					$<1x10^{-12}$	$<5x10^{-12}$
Power-on stability:							
Deviation versus final value after 24hr on time,		n.a.	n.a.	$<1x10^{-7}$	$<1x10^{-7}$	$<5x10^{-9}$	$<4x10^{-10}$
after a warm-up time of:		30 min	30 min	15 min	15 min	10 min	10 min
Total uncertainty, for operating temperature							
0°C to 50°C, at 2σ (95%) confidence interval:							
1 year after calibration		$<1.2x10^{-5}$	$<1.2x10^{-6}$	$<1.5x10^{-7}$	$<1x10^{-7}$	$<2.5x10^{-8}$	$<7x10^{-10}$
2 years after calibration		$<1.5x10^{-5}$	$<1.5x10^{-6}$	$<2.5x10^{-7}$	$<2x10^{-7}$	$<5x10^{-8}$	$<9x10^{-10}$
Typical total uncertainty, for operating temperature							
20°C to 26°C, at 2σ (95%) confidence interval:							
1 year after calibration		$<7x10^{-6}$	$<7x10^{-7}$	$<1.5x10^{-7}$	$<1x10^{-7}$	$<2.5x10^{-8}$	$<6x10^{-10}$
2 years after calibration		$<1.2x10^{-5}$	$<1.2x10^{-6}$	$<2.5x10^{-7}$	$<2x10^{-7}$	$<5x10^{-8}$	$<8x10^{-10}$

n.a. Not discernible, neglectable versus 1°C temperature variation.
❶ After 48 hours of continuous operation, PM9692 typical value 1×10^{-10} / 24h
❷ after 1 month of continuous operation
❸ after 1st year, ageing during 1st year: < 5 x 10-10

Explanation
Calibration Adjustment Tolerance is the maximal tolerated deviation from the true 10MHz frequency after a calibration. When the reference frequency does not exceed the tolerance limits at the moment of calibration, an adjustment is not needed.
Total uncertainty is the total possible deviation from the true 10MHz value under influence of frequency drift due to ageing and ambient temperature variations versus the reference temperature. The operating temperature range and the calibration interval are part of this specification.

General Specifications

Environmental Data

Operating Temp (PM 6681): 0°C to +50°C
Operating Temp (PM 6680B): 0°C to 55°C
Fan option is required when:
1. Ambient temp. >50°C
2. Internal rack temp. >45°; while mounted with no free air convection space and oven oscillator PM 9690 or PM 9691 is installed
StorageTemp : -40°C to +70°C
Vibration: 3G at 55 Hz per MIL-T-28800D
Shock: Half-sine 40G per MIL-T-28800D. Bench handling. Shipping container.
Reliability: MTBF 30 000 h (calculated)
Safety: IEC 1010 Class 1, CSA 22.2 No. 231, EN 61010-1, CE

EMC: EN 55011 ISM Group 1, Class B; EN 50082-2; FCC Part 15J Class A, CE

Power Requirements

90V rms to 265V rms, 45 Hz to 440 Hz,
35W (PM 6680B - 6681)
100 W during warm-up (5 min.), 47 W during normal operation (PM 6681R)

FLUKE®

Dimensions and Weight

Width:	315 mm (12.4 in),
Height:	86 mm (3.4 in),
Depth:	395 mm (15.6 in)
Weight PM 6680B, PM 6681:	Net 4 kg (8.5 lb), Shipping 7 kg (15 lb)
Weight PM 6681R:	Net 4.8 kg (10.5 lb), Shipping 7.8 kg (16.8 lb)

Ordering

Basic Models

PM 6680B/011	225 MHz, 250 ps Timer Counter including Standard Time Base
PM 6681/016	300 MHz, 50 ps Timer/Counter including Standard Time Base, External Reference Frequency Multiplier (1, 2 or 5 MHz), GPIB–interface and Time & Frequency Software, TimeView

Rubidium Reference Basic Model

PM 6681R/076	300 MHz Frequency Reference/ Counter/Calibrator including GPIB–interface and Time & Frequency Software, TimeView

Included with Instrument

One year product warranty, line cord, operator manual, and Certificate of Calibration Practices

Input Frequency Options (PM 6680B, PM 6681, PM 6681R)

PM 668 _ /4 _ _	1.3 GHz Input C (PM 9621)
PM 668 _ /6 _ _	2.7 GHz Input C (PM 9624)
PM 668 _ /7 _ _	4.5 GHz Input C (PM 9625)
PM 668 _ /8 _ _	4.2 GHz Input C (PM 9625B)

Time Base Options (PM 6680B, PM 6681)

PM 668 _ /_ 2 _	TCXO (PM 9678B)
PM 668 _ /_ 4 _	High Stability Oven Time Base (PM 9690)
PM 668 _ /_ 5 _	Very High Stability Oven Time Base (PM 9691)
PM 668 _ /_ 6 _	Ultra High Stability Oven Time Base (PM 9692)
PM 6680B /_ 8 _	Standard Time Base plus External Reference Frequency Multiplier (1 or 5 MHz) (PM 9697) (PM 6680B only)

GBIB–Interface option (PM 6680B)

PM 6680B /_ _ 6	GPIB–Interface (PM 9626/00) including Time & Frequency software: TimeView

Example Ordering Configuration

To order the PM 6681 300 MHz, 50 ps version with the 2.7 GHz input C ond TCXO Time Base, select the complete Model Number: PM 6681/626.

Options and Accessories

PM 9611/80	Rear Panel Inputs (front inputs disconnected)
PM 9621	1.3 GHz Input C
PM 9624	2.7 GHz Input C
PM 9625	4.5 GHz Input C
PM 9625B	4.2 GHz Input C
PM 9678B	TCXO Time Base
PM 9690	High Stability Oven Time Base
PM 9691	Very High Stability Oven Time Base
PM 9697*	External Reference Frequency Multiplier (1, 5, 10 MHz)
PM 9626/00**	GPIB–Interface for PM6680B
PM 9628/00	Cooling Fan for PM6680B
PM 9622/00	Rack–Mount Kit
PM 9627B	Carrying Case
PM 9020/001	200 MHz 10:1 probe 1MΩ/30pF (for PM6680B)
PM 8929/191	500 MHz 10:1 probe 1MΩ/15pF
PM 8911/091	1.5 GHz 10:1 probe 50Ω for C channel option (BNC)

* PM 9697 External Reference Frequency Multiplier can be used only with the standard Time Base, of PM 6680B
** Only for PM 6680B. includes Analog Output and TimeView™ Analasys Software. These options are included in the basic model PM 6681.

When ordered together with the basic counter, options are factory installed.
Options ordered separately can be customer retrofitted, except PM 9611/80 Rear Panel Inputs.
SW Drivers on request
MET/CAL procedures are available
HPVEE driver is available
LabView driver is available from National Instruments (PM6681)

Manuals

Operator *
Programming**
Service
*No charge with purchase of unit
** No charge with purchase of PM 6681/81R or the GPIB–interface to PM 6680B

Factory Warranty

One year product warranty
Five year warranty on Rubidium Element

Fluke Corporation
P.O. Box 9090, Everett, WA 98206

Fluke Europe B.V.
P.O. Box 1186,
5602 BD Eindhoven,
The Netherlands

For more information call:
In the U.S.A.: (800) 443–5853
or Fax: (425) 356–5116
In Europe/M–East:
+31 (0)40 2 678 200
or Fax: +31 (0)40 2 678 222
In Canada: (905) 890–7600
or Fax: (905) 890–6866
From other countries:
+1(425) 356–5500
or Fax: +1 (425) 356–5116
Web access: http://www.fluke.com