THURLBY THANDAR INSTRUMENTS

TF800 Series

Bench/portable frequency counters

200MHz & 1.3GHz

TF830 eight digit LCD universal counter

1.3GHz with high resolution reciprocal counting

Microcontroller based versatility

The TF830 universal counter incorporates an advanced microcontroller which significantly enhances its capabilities when compared with conventional frequency counters.

A wide range of functions

In addition to frequency measurement the TF830 offers period measurement, frequency ratio, pulse width measurement and event counting.

Pulse width measurements can be made from rising to falling edge or vice versa.

High resolution reciprocal counting

The TF830 uses the reciprocal frequency counting technique to achieve high resolution at all frequencies.

Reciprocal counting involves synchonised multiple period measurements followed by computation of the reciprocal value.

This results in high resolution measurements regardless of the signal frequency and eliminates the +/-1 input cycle errors of a conventional frequency counter.

The system yields at least 7 digits of resolution per second of measurement time and can measure low frequencies to a resolution of 0.001mHz.

Low power operation gives true portability

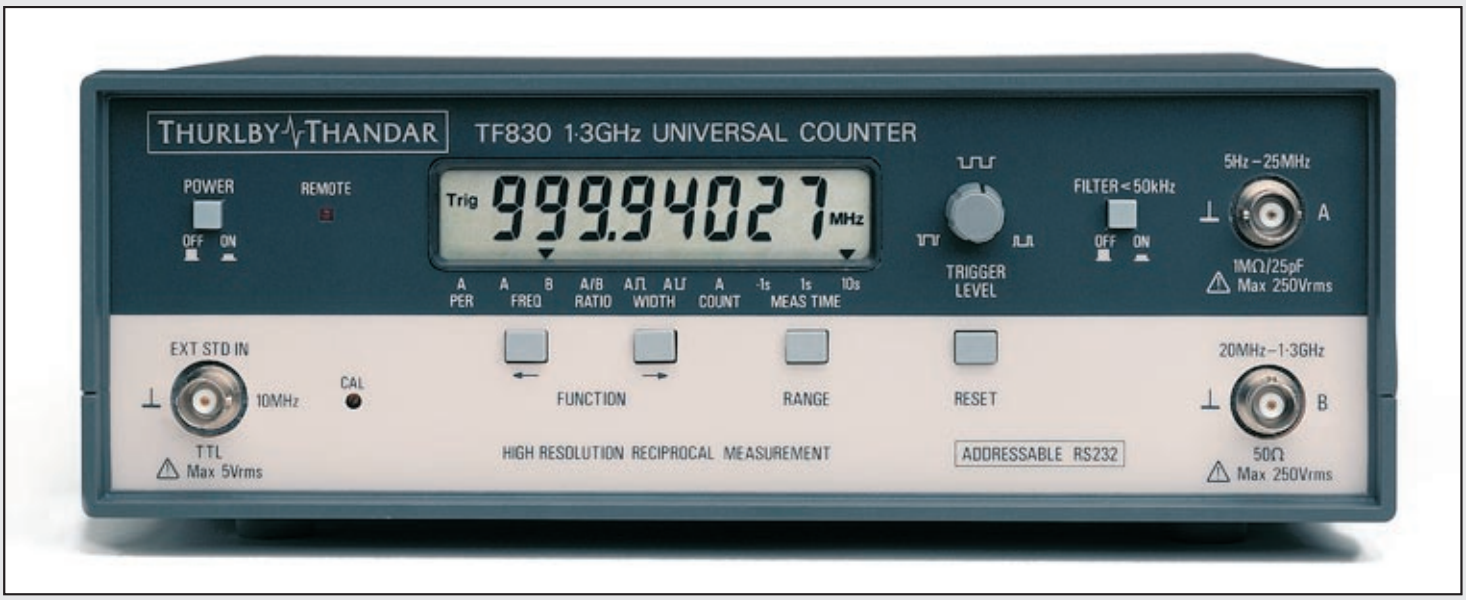
To ensure maximum flexibility the TF830 can operate from disposable batteries, rechargeable batteries or AC line.

Low power circuitry is combined with an LCD display to give up to 200 hours of operation from alkaline batteries.

Remote control and read-back

The TF830 is available with the option of an addressable RS-232 interface. This can be used as a normal RS-232 interface or as part of a multi-instrument setup under the TTi ARC system.

All front panel functions can be remotely controlled and measurements can be read back to the controller. This makes it suitable for use in a wide variety of automatic measurement systems.



- *Frequency, period, pulse width, frequency ratio and event counter modes*
- *High resolution reciprocal counting gives at least 7 digits of resolution per second of measurement time*
- *5Hz to 1.3GHz frequency range, 0.001mHz resolution*
- *Excellent sensitivity across the frequency range*
- *Very low power consumption, mains or battery operation*
- *Optional addressable RS-232 interface gives remote operation and read-back*

Stylish and robust

All three TF800 series models are housed in the latest Thurlby-Thandar mid-size instrument case.

This heavy duty ABS case features an integral multi-position handle which acts as an adjustable tilt stand.

Internal metal screening provides excellent shielding against RF interference and ensures compliance with EMC regulations.

TF810 & TF820 eight digit LED frequency counters

200MHz and 1.3GHz

Low-cost counters for general purpose applications

The TF810 and TF820 are low-cost conventional frequency counters offering wide frequency range and excellent sensitivity.

The large displays use red LEDs for good viewability and the simple front panel layout makes them particularly easy to use.

The two models are similar apart from the maximum measurement frequency.

200MHz or 1.3GHz range

The maximum measurement frequency is 200MHz for the TF810. The TF820 extends this to 1.3GHz for applications in the UHF area.

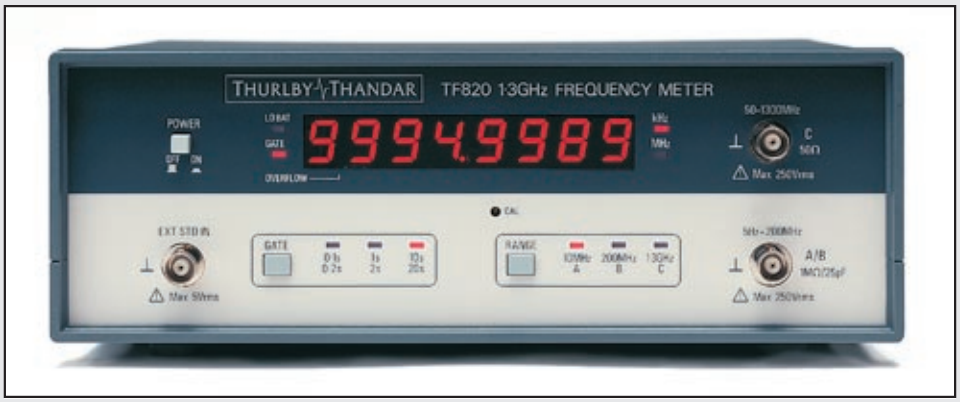
Both models offer a choice of gate times and provide a frequency resolution down to 0.1Hz. Sensitivity is excellent being typically 10mV rms.

A choice of power source

The TF810 and TF820 are each available in two versions.

The AC/battery versions have an internal AC power supply and can also operate from disposable or rechargeable batteries.

The battery versions, which are less expensive, require an external AC adaptor



- *Wide range - 5Hz to 200MHz or 1.3GHz*
- *Large eight digit display*
- *High sensitivity (10mV typical)*
- *High accuracy (±2ppm initial adjustment)*
- *Selectable gate times (0.1Hz max. resolution)*
- *External frequency standard input*
- *Battery or mains/battery operation*

Part of a larger frequency counter range

The TF800 series is part of a larger range of frequency counter products offered by TTi.

The PFM1300, illustrated, is a 1.3GHz hand-held frequency counter incorporating a large 8 digit LCD display.

Specifications

TF810 and TF820

Frequency Ranges

10MHZ (Range A)

Frequency range:	5Hz to 10MHz
Input socket:	A/B
Gate times:	0.1s, 1s and 10s
Readout units:	kHz
Resolution:	0.1Hz to 10Hz determined by gate time

200MHz (Range B)

Frequency range:	5MHz to 200MHz
Input socket:	A/B
Gate times:	0.2s, 2s and 20s
Readout units:	kHz
Resolution:	1Hz to 100Hz determined by gate time

1.3GHz (Range C) not TF810

Frequency range:	50MHz to 1300MHz
Input socket:	C
Gate times:	0.1s, 1s and 10s
Readout units:	MHz
Resolution:	10Hz to 1kHz determined by gate time

Input Specifications

Socket A/B

Input impedance:	1MΩ/25pF
Frequency range:	5Hz to 200MHz
Sensitivity:	Typically 10mV rms, 20mV rms max. to 10MHz Typically 25mV rms, 50mV rms max. to 200MHz
Max. permissable input voltage:	200V DC, 250V rms 50/60Hz reducing to 1V rms above 1MHz

Socket C (not TF810)

Input impedance:	50Ω nominal
Frequency range:	50MHz to 1300MHz
Sensitivity:	Typically 5mV rms, 10mV rms max. to 800MHz Typically 25mV rms, 50mV rms max. to 1300MHz
Max. permissable input voltage:	200V DC, 250V rms 50/60Hz, 1V rms 50MHz to 1300MHz

External Standard Socket

Frequency:	10MHz
Selection:	Automatic detection and changeover
Sensitivity:	TTL/CMOS compatible, AC coupled
Max. permissable input voltage:	5Vrms, 50V dc

Timebase

Oscillator frequency:	10MHz
Initial adjustment error:	<±2ppm at 23°C
Temp. coefficient:	Typically <0.3ppm/°C 18°C to 28°C, ±10ppm -20°C to +70°C
Ageing rate:	<±5ppm per year

Technical Specifications (continued)

Specifications TF830

Functions

Frequency (Range A)

Frequency range:	5Hz to 25MHz
Input socket:	A
Resolution:	0.001mHz to 100Hz (see Note 1)

Frequency (Range B)

Frequency range:	20MHz to 1.3GHz
Input socket:	B
Resolution:	1Hz to 10kHz (see Note 1)

Period

Input socket:	A
Frequency range:	5Hz to 25MHz
Resolution:	10^{-7}ns to 1us (see Note 1)

Count

Input socket	A
Counter range:	1 to 268435456 (2^{28}), only the least significant 8 digits shown with overflow indication past 99999999 pulses
Frequency range:	1Hz to at least 14MHz
Minimum pulse width:	20ns

Ratio A/B

Frequency range:	A - 5Hz to 25MHz B - 20MHz to 1.3GHz
Resolution:	The answer is displayed with 8 significant digits irrespective of actual input frequencies and measurement time

Pulse Width

Input socket:	A
Mode:	Falling to rising edge or rising to falling edge
Pulse width Range:	1us to 26s
Resolution:	100ns
Measurement time:	0.1s and 1s ranges determine the inter-measurement time. 10s range will hold until reset

Note 1: The resolution depends upon the measurement time and input frequency. At least 7 digits are displayed per second of measurement time.

Input Specifications

Input A

Input impedance:	1MOhm//25pF
Frequency range:	5Hz to 25MHz
Sensitivity:	Sinewave 15mVrms 10Hz to 20MHz; pulse 40mV pk-pk 0Hz to 14MHz
Trigger level:	Continuously adjustable by front panel control
Max. permissible input voltage:	200Vdc; 250Vrms 50/60Hz reducing to 1Vrms above 1MHz
Low pass filter:	Switchable 50kHz low pass noise filter
Coupling:	AC

Input B

Input impedance:	50 Ohm nominal
Frequency range:	20MHz to 1.3GHz
Sensitivity:	10mVrms 20MHz to 700MHz, <50mVrms to 1.3GHz
Max. permissible Input voltage:	250Vdc; 250Vrms 50/60Hz; 1Vrms 20MHz to 1.3GHz
Coupling:	AC

External Standard Socket

Frequency:	10MHz
Selection:	Automatic detection and change-over
Sensitivity:	TTL/CMOS compatible, AC coupled
Max. permissible input voltage:	5Vrms, 50V dc

Timebase

Oscillator:	10MHz Xtal
Initial adjustment error:	<±1ppm at 23°C
Temperature coefficient:	Typically less than ±0.3ppm/°C 18°C to 28°C, ±10ppm -20°C to 70°C
Ageing rate:	<±5ppm/year

RS232 Interface

(TF830-RS232 ONLY)

Addressable RS-232 interface, all functions remote-controllable including trigger level and filter. Complies fully with the TTi ARC interface standard.

Common Specifications

Power Requirements

Batteries

Battery type:	6 'C' size disposable or rechargeable cells, type selectable by rear panel switch
Charge current:	Typically 100mA from internal AC or external DC input
Battery life: (Alkaline cells)	Typical figures TF810/820 - 40 hrs TF830 - 200 hrs
Low battery indication:	Lo Bat indicator lights when approx. 10% of life remains

External DC

(TF810/820 battery versions)

Voltage	7V to 12V from approved AC adaptor
Socket size:	2.1mm, centre pin negative

AC Line

(TF810/820 AC/battery versions & TF830)

AC Input:	230 volts ±14% AC nominal or 115 volts ±14% AC nominal, adjustable internally.
Power consumption:	8VA max.

General

Electrical Safety:	Complies with EN61010-1
EMC:	Complies with EN50081-1 and EN50082-1
Environmental operating range:	+5°C to +40°C, 20% to 80% RH
Environmental storage range:	-20°C to +70°C
Size:	257(W) x 224(D) x 88(H) excluding handle and feet
Weight: (excluding batteries)	TF810/820 battery versions - 1.3kg, TF810/820 AC/battery versions - 1.5kg TF830 - 1.55kg

Thurlby Thandar Instruments Ltd. operates a policy of continuous development and reserves the right to alter specifications without prior notice.

Designed and built in the U.K. by:

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