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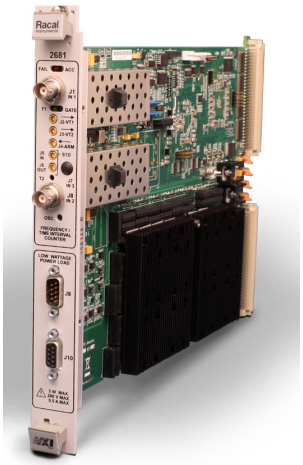
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Racal Instruments™ 2681

FTIC + Load

Racal Instruments™ 2681 is a high-performance, 2-channel, universal 200 MHz timer/counter.

Key Features

- **Meets requirements for joint services military ATE programs**
- **Perform precision timing measurements with unsurpassed resolution**
- **Programmable load**
- **Key specifications include:**
  - **200 MHz frequency measurement**
  - **9 digits per second resolution**
  - **1 ns time interval resolution (100 ps with averaging)**
  - **2.5 mV trigger resolution**
  - **Programmable measurement timeout**
  - **9 different arming modes**

Product Information

Brief Description

The 2681 includes a high-performance universal counter offering five automatic measurement functions:

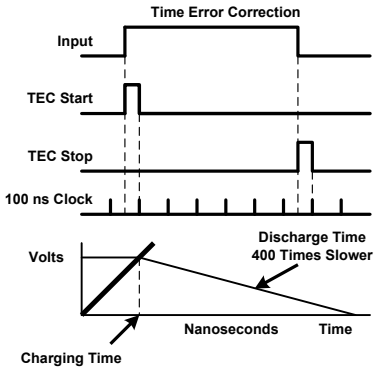
- Frequency
- Period
- Time Interval
- Time Interval Delay
- Totalize

Outstanding Resolution

The 2681 counter offers 200 MHz frequency measurements with up to 9 digits of resolution per second. In Time Interval mode, the resolution is 1 ns in single shot and 100 ps in average mode.

High Speed Time Measurement

By using Time Error Correction (TEC) in combination with traditional reciprocamatic techniques, measurement time is minimized without any performance compromise.



Measurement Timeout

Programmable measurement Timeout enables system performance to be optimized where input signals are missing.

High-Performance Trigger

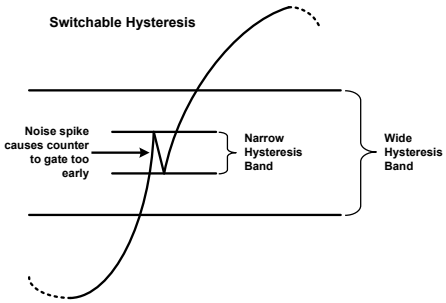
The trigger level is programmable from -5.1 V to +5.1 V (-51 V to +51 V in x10 mode) with a resolution of 2.5 mV (25 mV in x10 mode).

Individual Channel Filtering

The 2681 counter offers indepen-dent 50 kHz low pass filters on each channel to allow measurements in noisy environments.

Selectable Sensitivity

The sensitivity of the counter can be reduced to optimize the front end for low-level or low slew rate signals with noise. This feature is also very important for system applications, where noisy signals are encountered. Four standard sensitivity settings are provided.



ASTRONICS TEST SYSTEMS

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Product Information
continued

Powerful Arming Capability

Nine different modes are provided with the ability to select the arming source between the external arming input and the VXI TTL trigger lines.

Programmable Load

The 2681 counter includes a five-watt programmable resistive load. The load is programmable from 1 Ω to 100 kΩ with 0.1 Ω resolution and provides a stable resistance value under all operating conditions. The load has built-in over-current, over-voltage, over-power, and over-temperature protection, which opens the load terminals under any fault condition making it difficult to damage the 2461-LW-C2 load.

Programmable Load Software Calibration

The 2681 load uses software calibration factors stored in non-volatile memory to maintain its accuracy. Softcal is automated and can be performed by connecting the load terminals to a DMM, but it can also be performed manually.

Specifications

Note: The Astronics Test Systems policy is one of continuous development and improvement. Consequently, the equipment may vary in detail from the description and specifications in this publication.

Measurements

Frequency (Channels 1 and 2)

- Channel 1: 600 µHz to 200 MHz
- Channel 2: 600 µHz to 100 MHz
- Resolution: ±(1.4 x Trigger Error x Frequency/Gate Time) ±1 LSD* ±2 LSD with 6-10 digits selected
- Accuracy: ±(Resolution ±Timebase Error x Frequency)

* % of measured pk-pk

Period

- Channel 1: 5 ns to 1700 s
- Channel 2: 10 ns to 1700 s
- Resolution: ±(1.4 Trigger Error x Frequency/Gate Time) ±1 LSD
- Accuracy: ±(Resolution ±Timebase Error x Frequency)

Time Interval

- Range: 0 ns to 800,000 s
- Slope (Start & Stop): (+) or (-)
- Start→Stop Configurations: IN1→IN2, IN2→IN1 or IN1→IN1
- LSD: 1 ns (Average Mode: 100 ps)
- Resolution: ±1 ns_{rms} ±Trigger Error ±1 LSD
- Accuracy: ±Resolution ±(Timebase Error x TI) ±Trig Level Timing Error ±2 ns

Time Interval Delay

- Range: 200 µs to 1.048560 s

Totalize

- Channel 1 by 2: Pulse triggered
- Channel 2 by 1: Cycle triggered
- Channel 1 by Arm input: Pulse triggered
- Range: 0 to (10^{12} - 1) events
- Maximum Rate: 10^8 events/s
- Pulse Width: 5 ns min at Trig Points
- Accuracy: ±1 count

Averaging Mode

- Availability: all functions except Totalize
- Sample Size: 100
- Resolution: 1 extra digit relative to non-averaged mode

Input Characteristics

Frequency Range (DC Coupling)

- Channel 1: DC to 200 MHz
- Channel 2: DC to 100 MHz

Frequency Range (AC Coupling)

- Channel 1: 10 Hz to 200 MHz
- Channel 2: 10 Hz to 100 MHz

Input Conditioning (Channels 1 and 2)

- Impedance: 50 Ω or 1 MΩ
- Channels Commoned: 500 kΩ
- Coupling: AC or DC
- Attenuation: x1 or x10
- Low Pass Filter: None or 50 kHz

Pulse Sensitivity (Channels 1 & 2, 5 ns Width, x1 Attenuation)

- 75 mV_{pk-pk}

Nominal Hysteresis Settings

- 35 mV Low
- 65 mV High

Dynamic Range (x1 Attenuation)

- <50 MHz: 5 V_{pk-pk} min
- <100 MHz: 2.5 V_{pk-pk} min
- <200 MHz: 1.5 V_{pk-pk} min

Dynamic Range (x10 Attenuation)

- <50 MHZ: 50 V_{pk-pk} min
- <100 MHz: 25 V_{pk-pk} min
- <200 MHz: 15 V_{pk-pk} min

Damage Level Input (Channels 1 & 2)

- 1 MΩ (x1):
  ≤2 kHz: 260 V (DC + AC_{rms})
  ≤100 kHz: (5 x 10^5/Fin)V_{rms}
  >100 kHz: 5 V_{rms}
- 1 MΩ (x10):
  ≤20 kHz: 260 V (DC + AC_{rms})
  ≤100 kHz: (5 x 10^6/Fin)V_{rms}
  >100 kHz: 50 V_{rms}
- 50 Ω: DC to 200 MHz: 5 V_{rms}

Crosstalk

- (Channel 1 to 2, 100 MHz @ 50 Ω) <36 dB

Triggering Characteristics

General

- X1
  Range: ±5.1 V
  Resolution: 2.5 mV
  Accuracy: ±(1% of rdg ±300 mV)
- X10
  Range: ±51 d V
  Resolution: 25 mV
  Accuracy: ±(1% of rdg ±300 mV)

Trigger Level Outputs (Scale by 10 for x10 Attenuation mode)

- Range: ±5.1 VDC
- Resolution: 2.5 mV
- Accuracy: ±1% V_{out} ±10 mV

Arming Characteristics

External Arming Sources

- Front Panel "Arm" Input or VXI TTL Trig0-7; ECL TRIG0-1

Arming Modes

- Start: Self Arm, Rise/Fall Edge
- Stop: Self Arm, Rise/Fall Edge

Input Logic Levels

- -1.3 V ECL
- 0.0 V GND
- 1.6 V TTL

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Specifications
continued

Measurement Timeout
- 1 to 10^5 s

Time Base Characteristics
Timebase selectable as follows:

Default
- VXI CLK10

External Input
- Frequency: 10 MHz
- Input Level: 100 mV min
- Input Impedance: 1 kΩ nom
- Coupling: AC

Interface

Backplane Signal Support
- TTLTRG0-7, ECLTRG0-1: External Arm Input, Gate Output
- CLK10: Default Time Base

Memory Storage
- 14,000 readings max

Cooling (10° C Rise)
- Min. Airflow: 4 l/s

Peak Current & Power Consumption
- Total Power: 31 W

	I_{Pm} (A)	I_{Dm} (A)
+24	0.45	0.02
+5	1.81	0.08
-2	0.02	0.0
-5.2	0.76	0.12
-24	0.27	0.02

Front Panel I/O

Inputs
- Channels 1 & 2: BNC, 50 Ω, 1 MΩ, or 500 kΩ
- Arm: MCX, 1 kΩ 19 V_{rms} max, DC coup
- Clock: MCX, 1 kΩ, 100 mV_{rms}
- Low-Wattage Power Load:
  - J9: 9-pin Male D-sub connector, Load Output Port
  - J10: 9-pin Female D-sub connector, Load Test Output Port

Outputs
- Clock: MCX, 1 V_{pk-pk} into 50 Ω
- Trig. Level 1 & 2: MCX, -5.1 V to +5.1 V

Resistive Load

Resistance Range
- 1 to 100,000

Resolution
- 0.1 Ω

Accuracy*
- 1 Ω to 60 Ω: ±0.15 Ω
- 60.1 to 100,000 Ω: ±0.25%

Voltage (max)
- 220 V

Current (max)
- 0.5 A

Fault Conditions (auto shutoff)
- Overvoltage, Overcurrent, Overtemperature, Overpower

Environmental
(All environmental conditions tested to MIL-HDBK-217 FN2, GB GC, 25°)

Temperature
- Operating: 0° C to 50° C
- Storage: -40° C to 71° C

Relative Humidity
- 5% to 95% RH non-condensing ≤30° C
- 5% to 75% RH above 30° C
- 5% to 45% RH above 40° C

Altitude
- Operating: 15,000 ft
- Non-Operating: 15,000 ft

Shock
- 30 g peak, half sine, 11 ms pulse

Vibration
- Random: 5 to 500 Hz

MTBF
- 61,559 hrs

Bench Handling
- 4-inch drop at 45º

*Guaranteed for currents >10 mA at settings <100 Ω

Ordering Information

R-2461CD-S-2822 : Racal Instruments™ 2681
FTIC + Load

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