TELEDYNE PHILBRICK

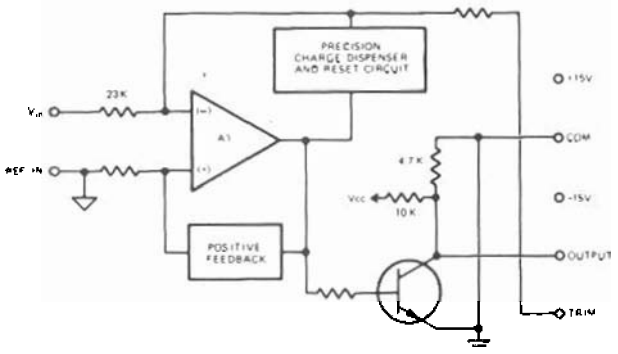
100kHz High Performance Voltage to Frequency Converters

4703

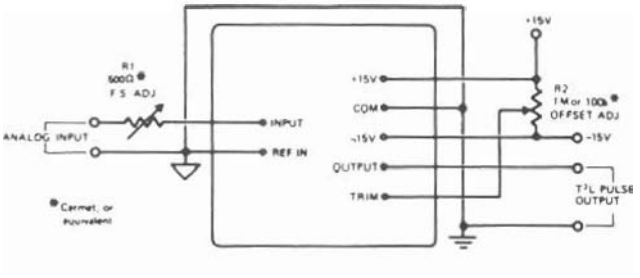
The 4703 is a high performance, low cost voltage to frequency converter capable of producing a 100Hz to 100kHz output pulse train from a +10mV to +10V input signal. Twenty percent overrange, up to 13 bit resolution, low noise feedthrough and extended temperature range are some of the inherent features of this general purpose device. Applications include FM telemetry, magnetic tape recording and digital to frequency conversion.

Applications Information

Precalibrated to meet all published specifications, the 4703 provides the user with optional trimming for applications requiring greater absolute accuracy (see figure below). Input offset voltage is trimmed by applying a 100mV signal to the input terminals and adjusting R2 for a 1000Hz output. Full scale is them trimmed by applying 10V to the input terminals and adjusting R1 for a 100kHz output. Repeat above procedure for precise calibration.



Functional Block Diagram



Connections Required for Operation, plus optional Input Offset and Full Scale Adjustments

FEATURES

- 20% Overrange
- 13 Bit Resolution
- High Noise Rejection
- ± 0.05%FS Max Nonlinearity
- Low Linearity Drift
  Low Cost

APPLICATIONS

- FM Telemetry
- Precision Integrators
- High Common Mode Voltage Isolation
- Digital to Frequency Conversion

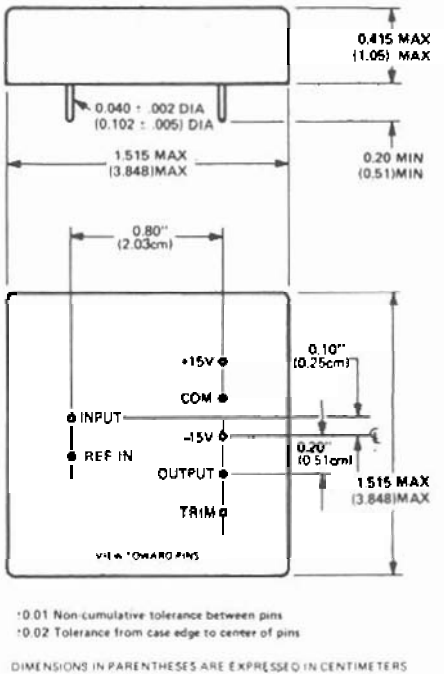
TELEDYNE PHILBRICK Allied Drive @ Rte. 128, Dedham, Massachusetts 02026
Tel: (617) 329-1600, · TWX: (710) 348-6726, Tlx: 92-4439

SPECIFICATIONS [T_A = + 25°C, V_{CC} = ± 15VDC, unless otherwise indicated]

ANALOG INPUT	
Full Scale	0VDC to + 10VDC
Overrange	+ 20% minimum
Configuration	Single-ended, referred to ground
Offset Voltage (adjustable to zero)	± 10mV max., ± 3mV typical
Impedance	23kΩ nominal at V_{in}
Overvoltage Protection	± 15V max. input voltage without damage to either input
FREQUENCY OUTPUT	
Full Scale Frequency (f_{out})	100Hz to 100kHz, plus 20% overrange
Linearity (V_{in} = + 10mV to + 11V)	± 0.05% of FS Max; ± 0.008% typical
Full Scale Factor	9.900V ± 0.075V (trimmable to 10.000V for Full Scale Freq.)
Waveform (See Figure)	Train of DTL/TTL compatible pulses@ f_{out}
Pulse Characteristics	
"1" (High)	+ 5V ± 0.5V (no load); + 2.4V min. (+ 0.4mA load)
"0" (Low)	+ 0.20V ± 0.20V@ − 16mA sink current
Width	4μsec ± 2μsec
Output Impedance (In High State)	1kΩ
Fan-out	10 standard T²L loads
Short circuit Protection to Ground	May be short-circuited indefinitely without damage
RESPONSE	
Settling Time to 0.01% for Step Input	1 to 2 cycles of new frequency plus 2μsec
Overload Recovery	2 seconds
STABILITY	
Full Scale (Span)	
Gain T.C. (ppm/°C of FS)	± 100ppm max., ± 24 typical
Drift Per Day	± 100ppm
Drift Per Month	± 200ppm
Power Supply Sensitivity	± 500ppm/% ΔV_{CC}
Linearity	± 30ppm/°C max., ± 10ppm/°C typ
Input Offset	
T.C. (μV/°C)	± 30 typical; ± 100 maximum
Drift Per Day	± 100μV
Drift Per Month	± 200μV
Power Supply Sensitivity	± 100μV/% ΔV_{CC} maximum
Warm Up Time	< 1 minute to 0.02%
POWER	
Voltage (V_{CC})	± 15V ± 5% (± 12V to ± 18V with derated specs)
Current (I_{CC})	± 12mA typical, ± 16mA maximum
ENVIRONMENTAL	
Temperature	
Operating	− 25 to + 85°C
Storage	− 55 to + 85°C
Humidity, Operating and Storage	99% non-condensing

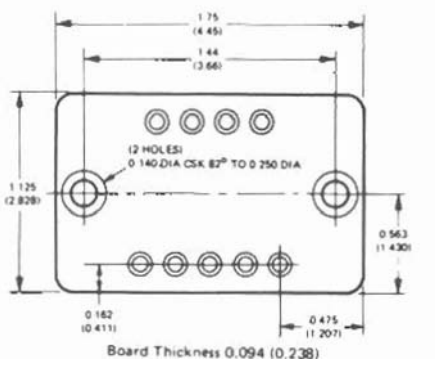
Notes:

CAUTION: The output of the 4703 is circuit protected for indefinite shorts to ground and will tolerate momentary (less than 5 seconds) short circuits to the positive power supply voltage. However, the output will definitely FAIL if it is shorted to the negative power supply voltage.



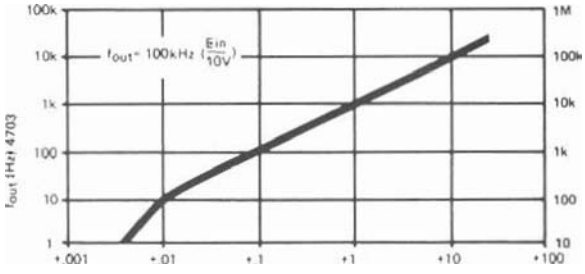
±0.01 Non-cumulative tolerance between pins
±0.02 Tolerance from case edge to center of pins

DIMENSIONS IN PARENTHESES ARE EXPRESSED IN CENTIMETERS

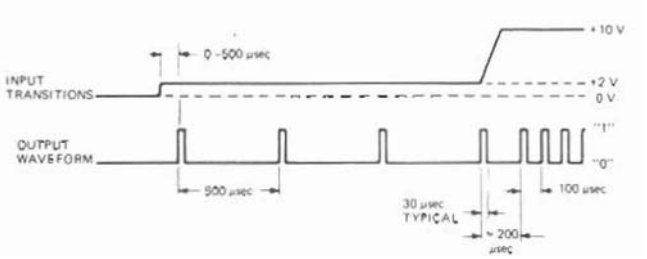


Board Thickness 0.094 (0.238)

Optional Socket: Model NSK-20



Ideal Transfer Function



Typical Waveforms, Showing Timing Relationships

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