IUF - Current to Frequency / Current to Voltage Converter

Features:
- Converts very low currents to frequency or to voltage with a linearity better than 0.3% for the frequency output, better than 0.1% for the voltage output
- High sensitivity - up to 5 pA/mV voltage output or 25 pA/kHz frequency output
- Three models ACUF4-1, ACUF4-2 and ACUF4-3 offer different input sensitivity
- Low noise design with very low leakage current and wide dynamic range
- 50 nA to 1000 nA full scale current range
- Pulse frequency (TTL) and voltage output, optical pulse output

Description:
The IUF-Series Current-to-Frequency and Current-to-Voltage converters is a compact device that can be mounted close to the signal source such as a Faraday Cup, Ion-Chambers, etc. and can transmit the voltage or frequency output to such devices as transient recorders, ADC’s, digital volt meters (DVM) or multiscalers.

The optical output enables the user to bridge large differences of voltage levels. A fiber optical cable and receiver is included with every IUF module.

Either positive or negative inputs are accepted (bipolar inputs only for voltage output). The output voltage or frequency is directly proportional to the input signal.

By counting the output pulses per unit time, one gets the high resolution current information. Integration of the input signal may be obtained over the counting duration by counting the output pulses in a scaler which is indicative of the total accumulated charge.

A very high (2 MHz full scale) output frequency provides exceptional resolution at short counting periods.

The IUF models can be used as a digital current integrator. A typical application is a beam current digitizer.

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### Model Specifications

<table>
<thead>
<tr>
<th>Model</th>
<th>ACUF4-1</th>
<th>ACUF4-2</th>
<th>ACUF4-3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jumper Position</td>
<td>1 (neg) 2 (pos)</td>
<td>1 (neg) 2 (pos)</td>
<td>1 (neg) 2 (pos)</td>
</tr>
<tr>
<td>R feedback</td>
<td>10 MOhm</td>
<td>50 MOhm</td>
<td>100 MOhm</td>
</tr>
<tr>
<td>C fb</td>
<td>2.7 pF</td>
<td>2.7 pF</td>
<td>2.7 pF</td>
</tr>
<tr>
<td>Timeconstant</td>
<td>37 µs</td>
<td>185 µs</td>
<td>370 µs</td>
</tr>
<tr>
<td>Input leakage current (typ)</td>
<td>1 pA</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Frequency Output:

- **Current range:** 0 nA to -1000 nA +500 nA -200 nA +100 nA -100 nA +50 nA
- **Frequency sensitivity:** -500 pA/kHz +250 pA/kHz -100 pA/kHz +50 pA/kHz -50 pA/kHz +25 pA/kHz
- **Output frequency range:** 0 to 2 MHz
- **Linearity error:** 0.3% max
- **FS Current accuracy:** +1%
- **Test input Freq. converter:** 0...10 V
- **FS Freq. Adj. Range:** 0...30 kHz
- **Voltage output:** from +500 nA -250 nA +100 nA -50 nA +50 nA -25 nA
- **Current range:** from -1000 nA +500 nA -200 nA +100 nA -100 nA +50 nA
- **Sensitivity Volt:** -100 nAV +50 nAV -20 nAV +10 nAV -10 nAV +5 nAV
- **Noise Voltage (output, typ.)**:
  - 0.2 mV rms 0.4 mV rms 0.3 mV rms 0.6 mV rms 0.5 mV rms 1.0 mV rms
  - 0.4 mV rms 0.8 mV rms 0.6 mV rms 1.2 mV rms 0.9 mV rms 1.8 mV rms
  - (bandwidth 0.1..10000Hz)
- **Offset Voltage (max):** 0.8 mV 1.6 mV 0.8 mV 1.6 mV 0.8 mV 1.6 mV
- **Linearity error:** 0.1% max

### Power Supply

- +22 to +26 V @ 100 mA
For high resolution signal recording or signal-averaging the IUF models can be used as a front end of a FAST ComTec multichannel scaler such as the Model P7882 or the Model MS-12 Multi-Input Scaler board.

Dimensions, Cables & Connectors:

**DIMENSIONS and WEIGHT**
- DIMENSIONS: 160 x 54 x 28 mm
- WEIGHT: 280 g

**INPUT/OUTPUT CONNECTORS**
- SIGNAL: Lemo 00
- VOLTAGE-out Lemo 00
- TEST-in: Lemo 00
- Frequency-out: Lemo 00 (signal, 50 Ohm)
- Frequency-out: ST-connector (optical)
- Fibre optic cable: 62.5/125 um
- POWER-in Lemo 0 (304)

**FIBRE OPTIC CABLE CONVERTER**

**DIMENSIONS and WEIGHT**
- DIMENSIONS: 60 x 35 x 20 mm
- WEIGHT: 50 g

**INPUT/OUTPUT CONNECTORS:**
- Input FOC: ST connector
- Output-TTL (50 Ohm): BNC

**POWER SUPPLY**

- **for IUF**
  - Input: 90 ... 230V AC
  - Output: 24V / 0.4A
  - Connector: Lemo 0 (304)
  - Weight: 120 g

- **for Fibre Optic Cable Converter**
  - Input: 90 ... 230V AC
  - Output: 7.5V / 0.8A
  - Connector: 2.1 x 5 mm

**FIBRE OPTIC CABLE**

- Fibre optic cable: 62.5/125 um
- Outer diameter: 2.8 mm FRNC
- Connectors: ST
- Length: 10 m

**ORDERING INFORMATION**

<table>
<thead>
<tr>
<th>Model</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACUF4-1</td>
<td>ACUF41</td>
</tr>
<tr>
<td>ACUF4-2</td>
<td>ACUF42</td>
</tr>
<tr>
<td>ACUF4-3</td>
<td>ACUF43</td>
</tr>
</tbody>
</table>

Each model is shipped including: two Power Supplies, Fibre Optic Cable Receiver and 10 m Fibre Optic Cable