

Introduction

The Kemo 1600 series of programmable active filter modules are available in a range of frequencies and filter responses. The 1600 series are designed for use in analogue signal circuits, for ground based general laboratory and test house conditions. The modules are available in either 8 pole (50 x 50 mm), or 4 pole (50 x 25 mm), versions, with 255 steps of filter cut-off controlled by 8 control lines. This operating guide covers both versions. This operating guide assumes that the user has some basic knowledge of analogue electronics.

Important Points

To achieve low noise it is important that the modules are supplied with a stable low noise supply. We recommend each supply rail is decoupled with 47 nF capacitors to zero volts close to the filter module. The cut off frequency of the modules are set by a static control lines. NOTE that high speed logic circuits and precision analogue circuits do not always mix well.

- ⚡ The filters can be damaged by reverse polarity connection.

Labelling

The 1600 modules are labelled as follows:- 1600/FF/RR PP

FF	base frequency	usually 1,2,5,10,20,50,100,200
RR	filter response	Kemo code describing the filter characteristics
PP	high or low pass	LP = low pass HP = high pass
	eg: 1608/200/01 LP	is an 8 pole, 200Hz base frequency, 01 response low pass filter module

Setting the Cutoff frequency

The 1600 series filter modules are controlled by static (unlatched) logic levels. The control lines are active when Low. In most Kemo circuits we hold the logic lines high with 100k Ω resistors and switch the lines to zero volt as required. Pin D0 is the Least Significant Bit (LSB, value 1 x base frequency), D7 is the Most Significant Bit (MSB, value 128 x base frequency).

- ⚡ The filters can be damaged if all control lines are set Low, bit value 00000000.
- V Dref is the supply for the logic circuits in the module and may be between +5V to +15V. The control lines typically change at 50% of V Dref.

1600W Modules

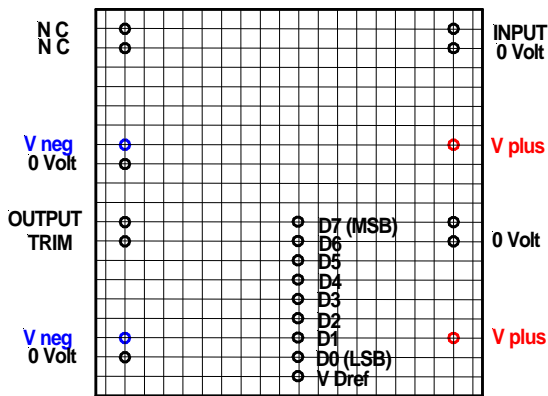
The 1600 W series are identical in size and pin layout. BUT have only 100 valid control inputs, individual modules are supplied with a table giving the control values.

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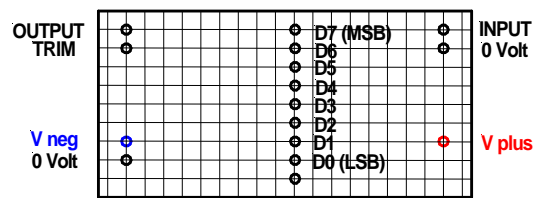
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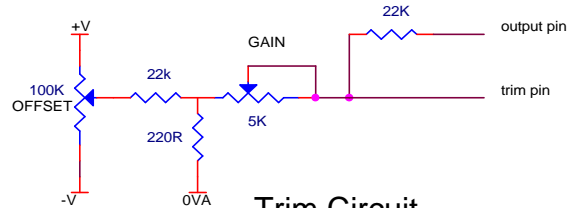


2.54mm (0.1") Pitch
1608 Top View

Pin Connections



2.54mm (0.1") Pitch
1604 Top View



Trim Circuit

Trim - The gain and DC output offset can be trimmed by the circuit shown. The trim circuit should be as close to the filter module as possible, and use a stable low noise supply, the same as the filter module is acceptable. If the trim circuit is not used the trim pin **MUST** be connected to 0 V.

0 Volt – The 0 Volt pins on 1600 series modules are internally connected.

Mechanical Specification

1600	4 pole	8 pole
Dimensions (case)	25 x 50 x 15 mm 1 x 2 x 0.6 "	50 x 50 x 15 mm 2 x 2 x 0.6 "
Weight	20 gms 0.7 oz	35 gms 1.3 oz
Connectors	Sockets suitable for \varnothing 1.0 mm (0.040") round pins 0.64 mm (0.025") square pins	
Temperature	0 – 45 °C, non condensing	

Electrical Specification ¹

Input Impedance	1 M Ω
Output Impedance	47 Ω
Output current	5 mA (max)
Supply voltage	+/- 7 Volt to +/- 16 Volt DC
Supply current	4 pole 25 mA 8 pole 50 mA (+/- 15V supply)
Logic supply current	4 pole 10mA 8 pole 20mA
Gain	-1 dB (pin to trim increased gain)
DC Offset	< +/- 50 mV (trim pin on modules)
DC offset drift	100 μ V/ °C at 25 °C
Gain	-1dB ¹ (with trim 0 dB)
Signal level (sine wave)	within 2.5 Volts of supply Voltage, for >10 K Ω load
Phase matching between modules	+/- 2° ¹ (within pass band)
Noise and THD	< 0.003% typical (dependant on frequency and amplitude)

Notes

- 1 Filter performance is dependant on many variables during use, including input levels and frequencies, and quality of voltage supply. Here representative typical values are given.
- 2 Older modules may be marked 1604/FF/RR PP for 4 pole and 1608/FF/RR PP for 8 pole filters.

Due to continued product development Kemo reserves the right to modify specification without notice

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