

Model PAS-2

Preamplifier/AMP/TSCA

Operating Manual

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Grünwalder Weg 28a, D 82041 Oberhaching
Germany

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Model PAS-2 PREAMPLIFIER/AMPLIFIER/TSCA



FEATURES

- Preamplifier/ Amplifier/Timing Single Channel Analyzer
- Amplifier and TSCA output
- Compact design
- Designed for use with Proportional Counters

APPLICATIONS



- Mossbauer Spectroscopy
- other general purpose use

DESCRIPTION

The PAS-2 combines a Preamplifier for Proportional Counters, an Amplifier and a Timing Single Channel Analyzer. The bipolar Amplifier is designed for counting rates which are typical in Mossbauer Spectroscopy. Both a linear output from the Amplifier and a timing output from the TSCA are available for spectroscopy and counting purposes.

SPECIFICATIONS

Preamplifier

Gain: -0,8 V/pC
Noise: $<6 \cdot 10^{17}$ Coulomb (at 0 pF)

$<1 \cdot 10^{16}$ Coulomb (at 100 pF)

Detector Input: MHV HV Input: SHV,
max. 3000 Volts DC

Amplifier

Gain: +70 V/V
Shaping time: 2 psec. bipolar
Amplitude: up to 10V, positive lobe leading Output
connector: BNC, 50 Ohm

Timing Single Channel Analyzer

LLD: 0,4 to 10V, settable by 10 turn
locking dial potentiometer
ULD: 0,4 to 10V, settable by 10 turn
locking dial potentiometer
Output: logic pulse 5V, 1 μ sec. width,
BNC, 50 Ohm

Monitor Output

(sum of AMP/TSCA outputs) for convenient
setting of LLD and ULD. Amplitude 200
mV, BNC, 50 Ohm

Power Amphenol 17-20090 connector for external
+12V supply, load 150 mA. Cable 3m lengths
provided

Size 17x10x5 cm

PERFORMANCE

Stability: 0.01% /°C

Integral Nonlinearity:
>0,5%, 0.2 to 10 V



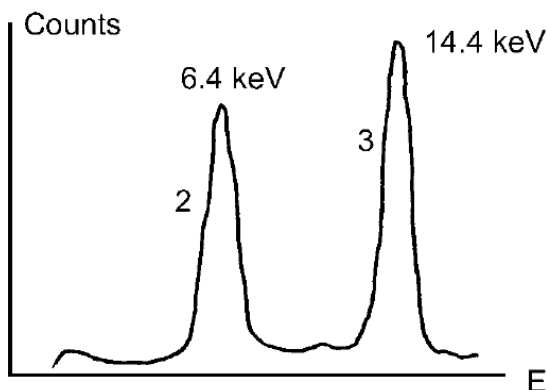
ComTec

GmbH · Grünwalder Weg 28a · D-82041 Oberhaching · Germany
Tel 49-(0)89-66 51 80 50 · FAX 49-(0)89-66 51 80 40 · <http://www.fastcomtec.com>

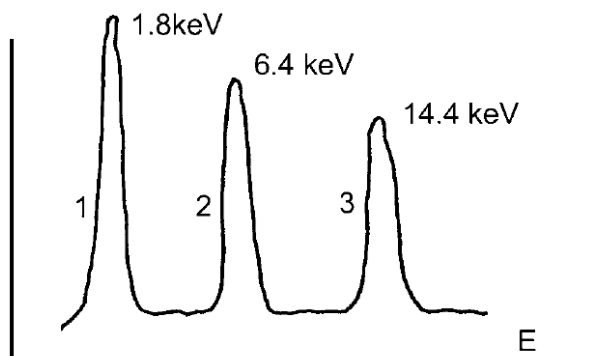
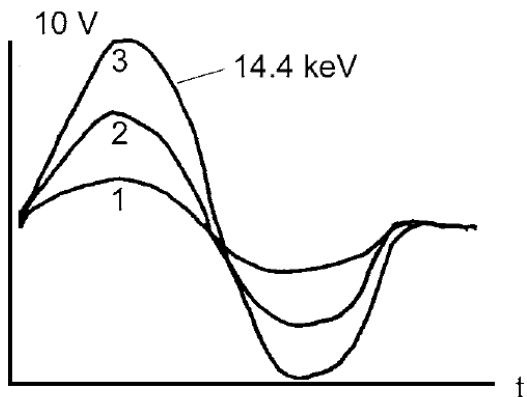
Setup using an oscilloscope

A typical pulse-height spectrum ^{57}Co looks like this:

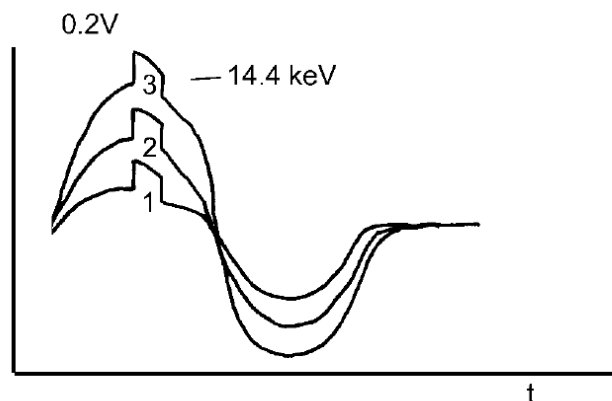
a) with a detector filled with Xenon gas, b) with Krypton gas



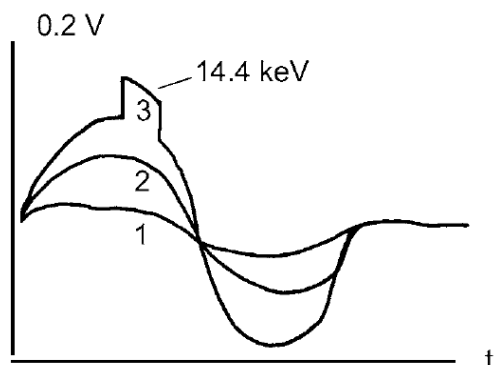
The output of the Amplifier looks like this - the example is for a detector filled with Krypton gas



The monitor output with lower level setting at minimum and upper level setting at maximum



A typical monitor output signal after setting the lower- and upper level to the 14.4 keV line which is significant for Mossbauer work



An oscilloscope must be used for proper setup. The **monitor** output shows three (two with a Xenon gas filled detector) clearly separated energy lines. By adjusting the lower level and upper level potentiometers the 14.4 keV energy line can be clearly set. Setting the potentiometers to the 6.4 keV line will not produce the desired Mossbauer effect.

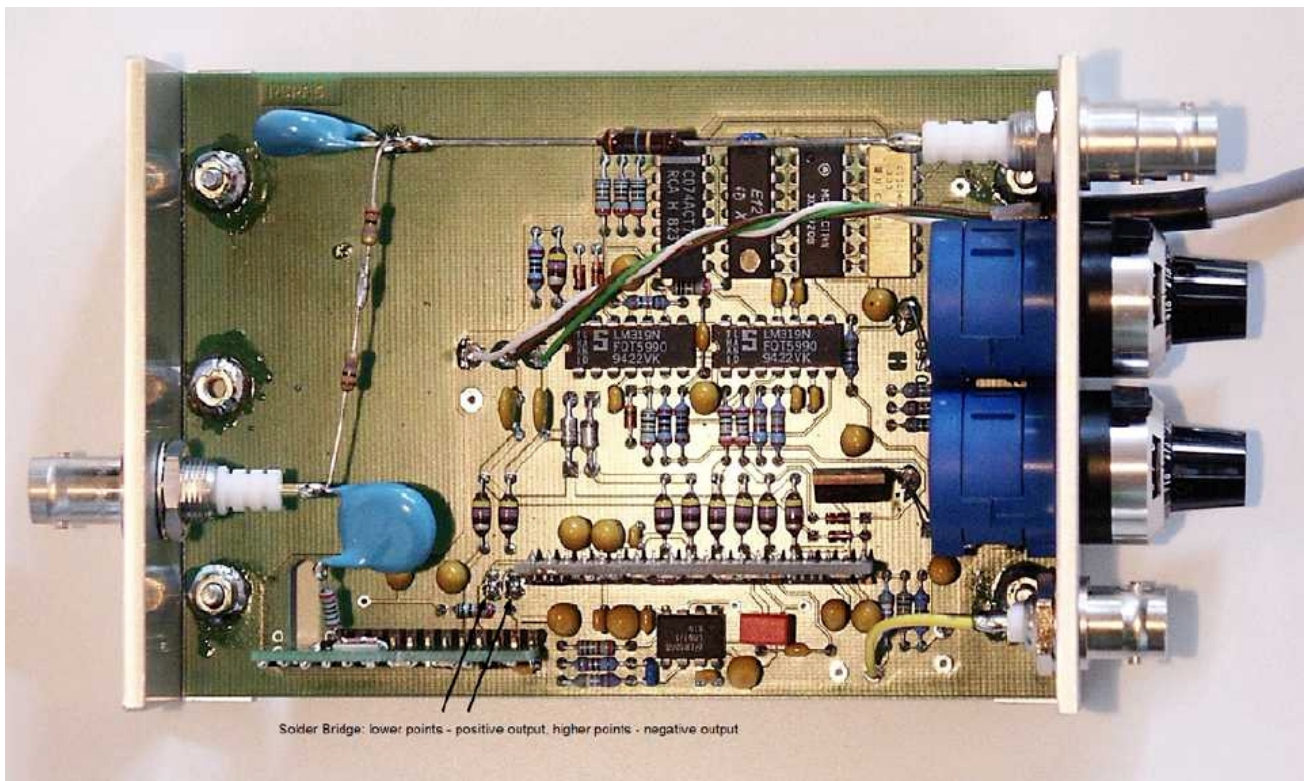
Some hints: The monitor output should be set to 5 to 7 Volts for the 14.4 keV line. Use the HV potentiometer to make this adjustment.

Make sure the trigger level of the oscilloscope is set just slightly above the zero level as you otherwise do not see the rising edge of the pulses correctly.

An alternative is to connect the OUT pulse to input 1 of a scope, the SCA pulse to input 2 and set the scope to "add". You will see the same kind of displays as above but because of the higher output level you will find it easier to trigger the oscilloscope.

If a MCA is available the setup can also be made in pulse height analysis using the Amplifier output of the PAS-2 as the input to the ADC and the SCA output as a gate signal of the ADC.

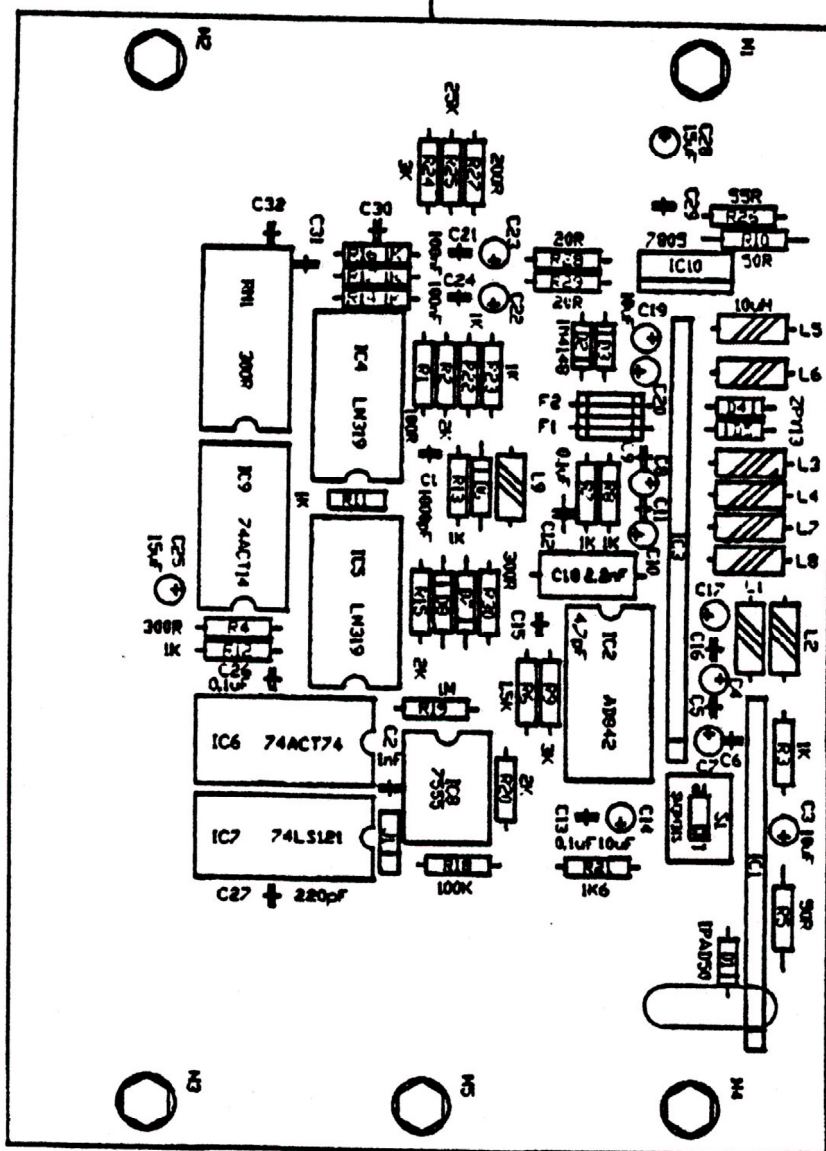
The internal switch should be in pos. 1 for setup as otherwise the output pulses of the amplifier will be inverted and therefore difficult to setup.

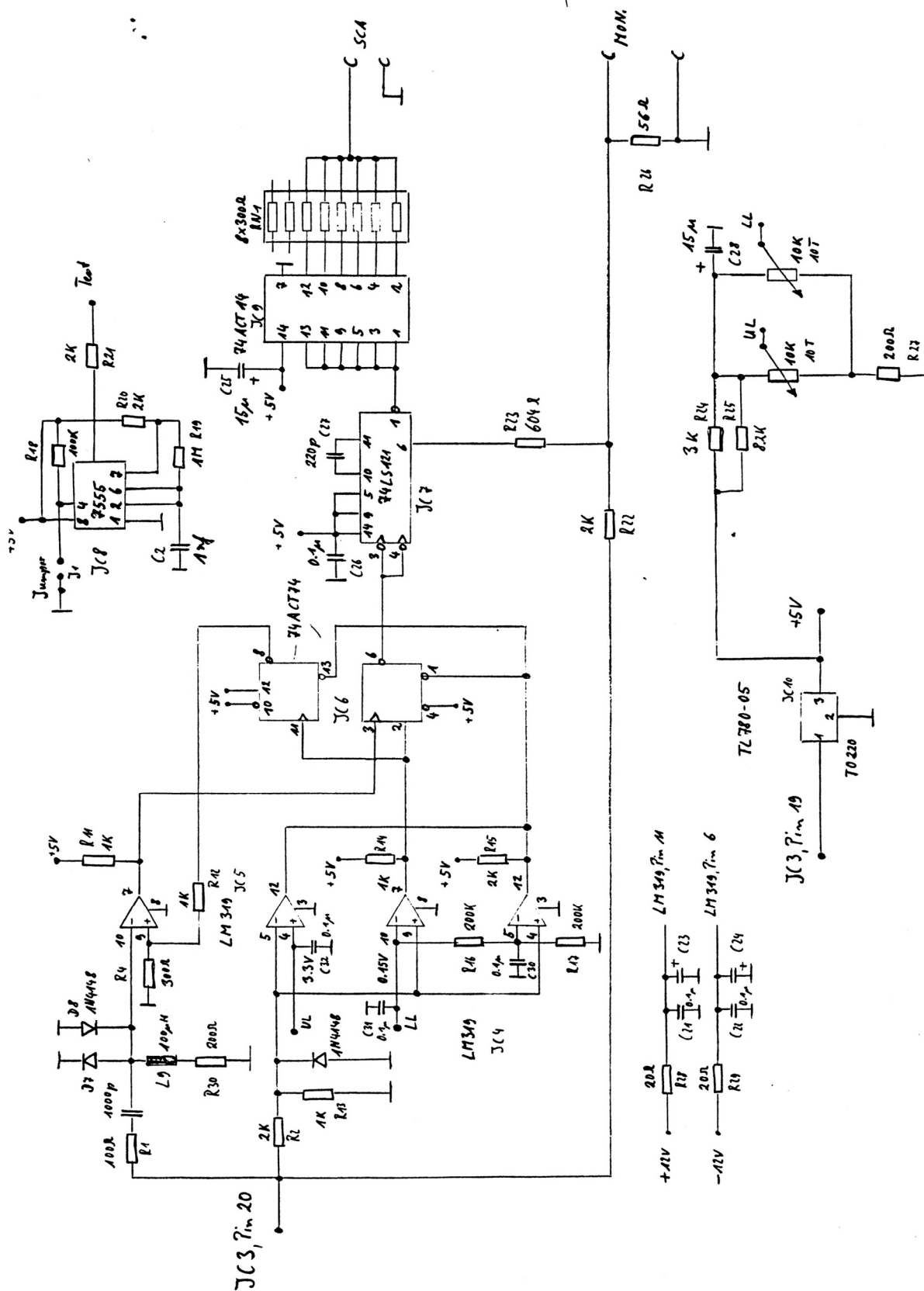


Component view of the printed circuit board showing the solder bridge settings for positive amplifier output

Legend to power supply connector D-sub 9 male:

- 1 Ground
- 2 Ground
- 4 +12V
- 9 -12V





[illegible]

Max. T_r 3/8/10/12/13 u 16

$(8 \times R_5 \quad 240 \mu m \quad (V_{max} \text{ in } t_4))$

| | orig | λ_{res} | $0.5 \mu\text{s}$ |
|-----|------|------------------------|-------------------|
| C8 | 100p | 470p | 270p |
| C9 | 330p | 150p | 82p |
| C10 | 470p | 220p | 100p |
| C11 | 330p | 180p | 100p |
| C12 | 220p | 110p | 56p |
| R5 | 240K | 500K | 910K |