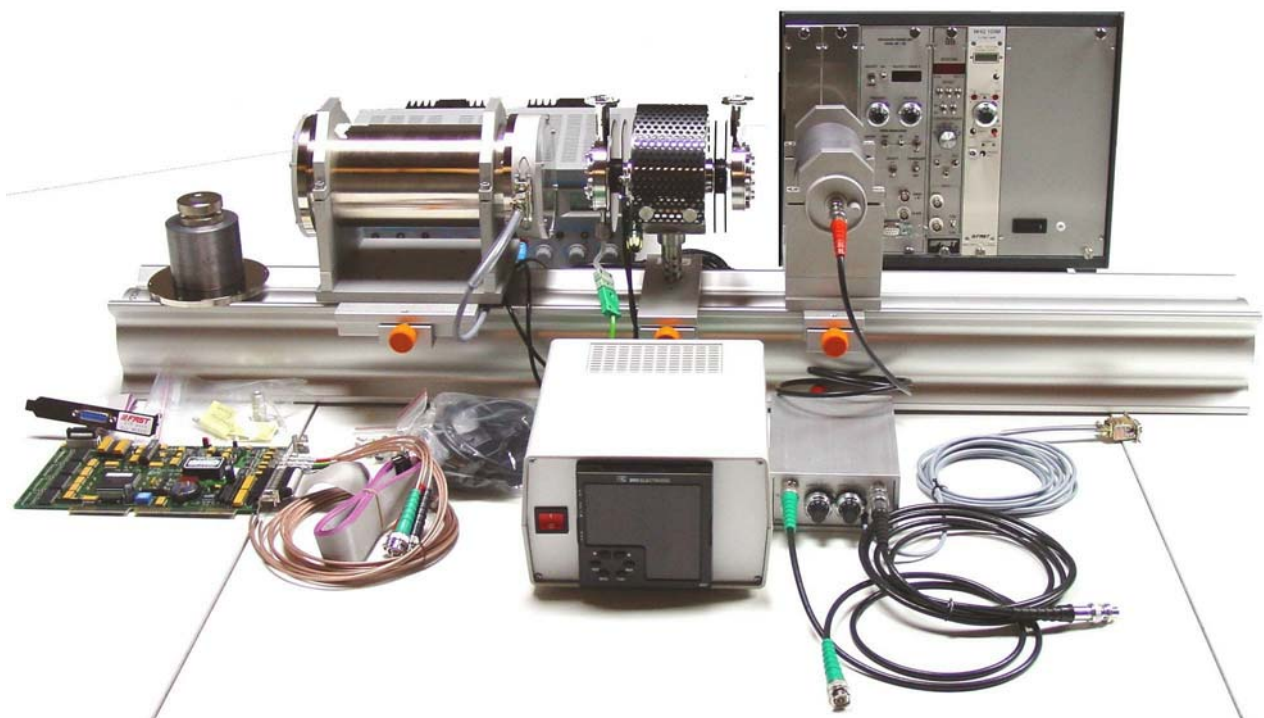
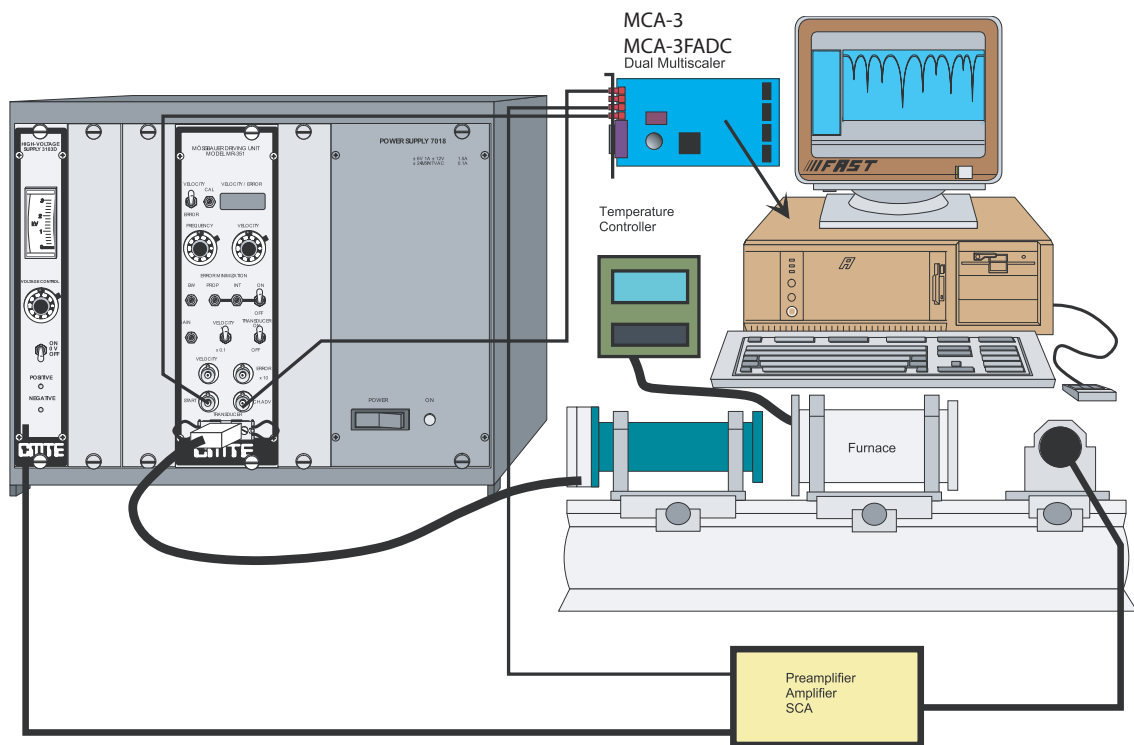


Mössbauer Systems Electronics and Software



Research-Grade Instrumentation for Mössbauer Effect Measurements -
professional Mössbauer Systems from a single supplier.





FAST Mössbauer Systems are based on the popular NIM-technology - a modular approach that allows the user to configure our systems to his requirements. We can offer components such as Mössbauer Drive and Control Units, Digital Function Generator, Proportional-Counter with leadshield, Mössbauer Bench complete with riders for mounting the Drive, also a Proportional-Counter, Pre-amplifier, Amplifier/Singlechannel Analyzer, Multichannel Analyzer, powerful Mössbauer Analysis Software and PC-computer systems with high resolution color monitors and any peripherals required for graphics output of spectra and calculated results.

We can also offer complete systems including a Mössbauer Furnace and a variable temperature Mössbauer Cryostat - the temperatures range from liquid Helium and liquid Nitrogen temperature to 1100 °C with a precision Microprocessor-controlled Temperature Controller with programmable temperature profiles

FAST Nuclear Instrumentation Modules (NIM) are used in over 54 countries world wide. They are known for their outstanding reliability and unsurpassed price/performance ratio.

Typical Mössbauer Systems consist of the MA-250A Velocity Transducer and a combination digital function generator / driving unit - the economically priced Model MR-351A.

A typical source would be Co57 in a Rhodium matrix. An activity of 50 mCi is recommended. Different detectors, preamplifiers and amplifier/

discriminators are available to suit the requirements of the user.

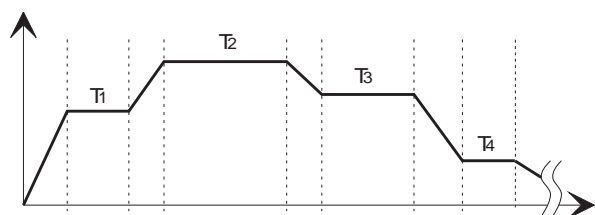
We offer two different Multiscalers/Multichannel analyzers as PC-boards. A special feature of some of our PC-board MCA's is the battery protected data memory. The operating software is based on MS-WINDOWS.

For the analysis of Mössbauer spectra the **PC-MOS II** software is available.

We recommend a state of the art PC computer with Intel ATX form factor motherboards because of their computational power and the excellent and fast graphics capabilities. However our Mössbauer systems can also be used with some older model PC's.

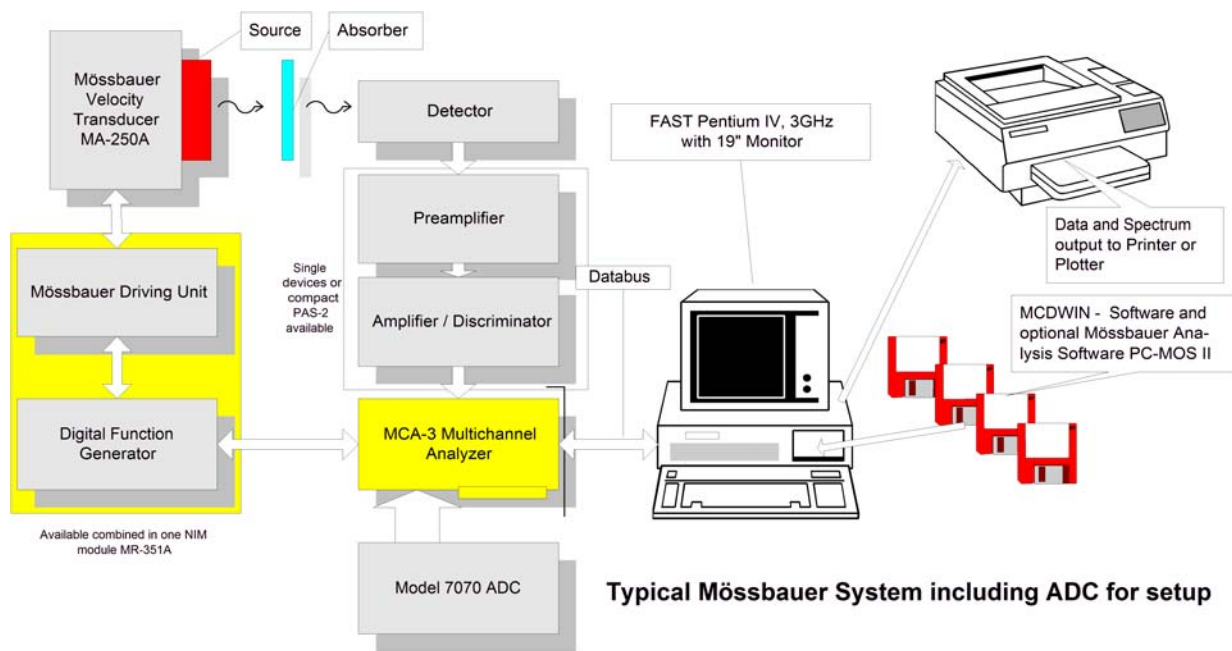
If you need further information or a firm quotation, please feel free to contact us: support@fastcomtec.com

visit our web-page:
www.fastcomtec.com



Temperature Profile

Typical Mössbauer Systems



Model MA-250, Mössbauer Velocity Transducer

The Mössbauer Velocity Transducer MA-250A is equipped with Alnico high field magnets with have an excellent temperature stability. The high magnetic field and low mass of the moving parts make the MA-250A suited for operation at high velocities. (For such applications the transducer can be optionally furnished with special springs). Due to the compact design of the MA-250A, sources can be mounted at both ends of the driving tube for the simultaneous acquisition of two Mössbauer spectra. The MA-250A operates in any horizontal or vertical position. Seals are provided for operation in vacuum.

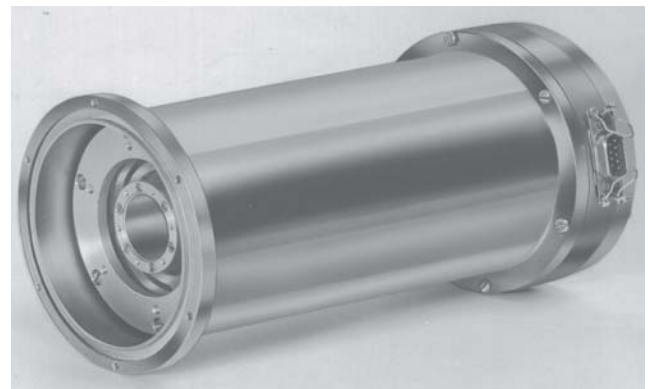
The high precision used in our manufacturing process and the excellent stability of the springs allow the use of the MA-250A for a long time without the necessity of recalibration. The factory suggested recalibration intervalls are 3 months.

For further details see the application note "Calibration of Mössbauer Spectra"

SPECIFICATIONS MA-250/MR-351A

Velocity Range: 0 - 200 mm/s
 Resonance Frequency: 25 Hz
 Frequency Range: 1 - 100 Hz
 Calibration Constant (CC): 30 mm/s per 1 V
 Accuracy (at a max. load of 400 g): +/- 0.5 ‰ in sinusoidal and triangular mode
 Temperature Shift of the Velocity: smaller than $10^{-4}/^{\circ}\text{C}$

Outputs: VELOCITY (correct value of the velocity)



$$U_{\text{out}} = V_{\text{correct}} / \text{CC} \\ (\text{30 mV per mm/s})$$

ERROR x 10 (difference between the correct and the actual value of the velocity; 10-fold enhanced error signal of the transducer):

$$U_{\text{err}} = 10 \times (V_{\text{actual}} - V_{\text{correct}}) / \text{CC} \\ (\text{300 mV per mm/s})$$

START,CHA: TTL signals to synchronize a multiscaler with a start of sweep pulse and channel advance pulses

Displays: MAX. VELOCITY: 3 1/2-digit display for the maximum value (199.9 mm/s) of the velocity
 ERROR: 3 1/2-digit display of the percentage error

Controls: VELOCITY: Front panel 10-turn potentiometer for velocity adjustment, front panel toggle switch for reducing the range of adjustment to one tenth

FREQUENCY: 1 to 100 Hz

CAL: Front panel 25-turn trim potentiometer

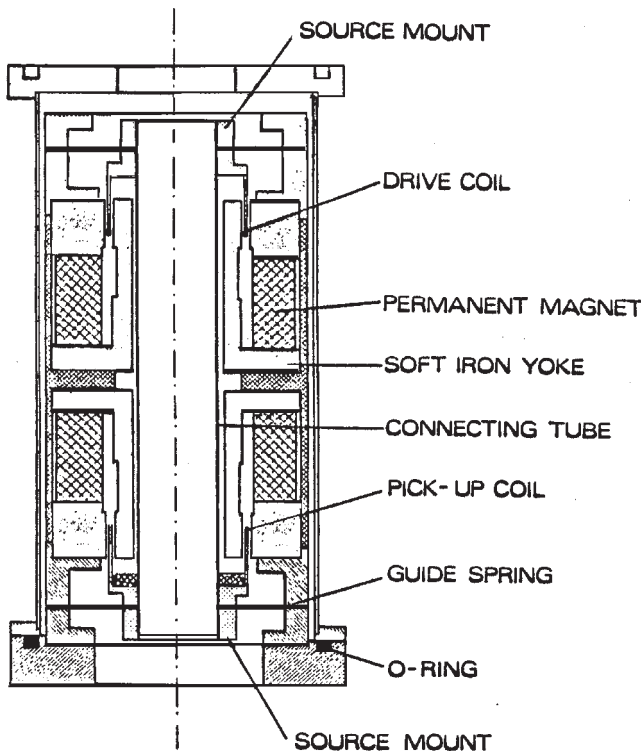
for calibrating the display of the max. velocity
GAIN: Front panel 25-turn trim potentiometer for adjusting the amplification of the feedback loop
ERROR MINIMIZATION/ 1-2-3: Three front panel 25-turn trim potentiometers for error minimization, front panel toggle switch for switching control circuits 2 and 3 on or off

TRANSDUCER: Front panel toggle switch for switching the Velocity Transducer on/off

Internal Controls:

Jumper plug to select the number of channels: 256, 512, 1024 or 2048 channels per sweep
 switch to select sinus or linear mode
 jumper plug to select high or low pulses for START and CHA signals

Mössbauer Velocity Transducer MA 250A:



Size: 178 mm long, 108 mm in diameter
 Weight: 5.2 kg
 Housing: brass, nickel plated
 Guide springs: fiberglass enforced epoxy

Model MR-351A, Mössbauer Driving Unit/Digital Function Generator



FEATURES

- **Digital Function Generator and Driving Unit in one 2/12 NIM module**
- **Sinusoidal and Triangular modes**
- **Digital display of: Velocity with a resolution of 3 1/2 digits Error with a resolution of 3 1/2 digits**
- **Economically priced**

DESCRIPTION

The MR-351A is a compact Mössbauer driving system - it contains a digital function

generator and the driving- and control electronics. The MR-351A will operate with our two input multichannel scaler Model 7882, the Multichannel Data Processors MCA-3 and MCA-3FADC as well as with other models that provide connectors for the control signals required for the synchronization of the MCS sweeps.

A digital display can either indicate velocity or error and allows the user to constantly check the correct operation of the transducer.

Two modes are selectable: sinusoidal or constant velocity mode. The best accuracy is obtained in sinusoidal motion at the resonant frequency of the transducer approx. 23 Hz.

Mössbauer Driving Unit MR 351A:

Size: Double width NIM-module

Weight: 1 kg

Power Requirements: +/-24 V, 50 mA, +/-12 V, 300 mA, + 6 V, 300 mA

Picture shows the Model MR-351 Rev.A

The Multichannel Analyzers

Fast ComTec offers a comprehensive line of multiscaling MCS PC-cards specifically designed for Mössbauer applications. All have two count inputs that can be used for single- or dual source Mossbauer experiments.

The Model MCA-3 card has features like RAMP-OUT, ADC port connector etc. built-in.

A full version is the MCA-3FADC which has an ultra fast ADC built-in but otherwise it has dual multiscaling inputs quite similar to the MCA-3.

A dual multiscaler with the very short dwell times of the MCA-3 is the model 7882. This unit is not intended to be used with an external nuclear ADC.

The MCA cards are delivered with the comprehensive operating software MCDWIN in a 32 bit version for WIN2000, WIN XP and WIN-NT4.0.

A special function in the graphic menu lets you optimize the display of Mossbauer spectra.

A **Mössbauer Analysis Program PC-MOSII** is available. A separate datasheet is available for this program.

Model 7070 Mossbauer ADC

(useful for calibration and systems check)

FEATURES

- Wilkinson ADC with 100 MHz clock rate
- Full 8k Conversion Gain and Range
- Digital Offset in 256 channel increments
- Instantaneous Dead-Time display
- Lower Level and Upper Level Discriminator
- Pulse Height Analysis with automatic peak detection
- Simultaneous Single- Channel Output for Mössbauer experiment setup

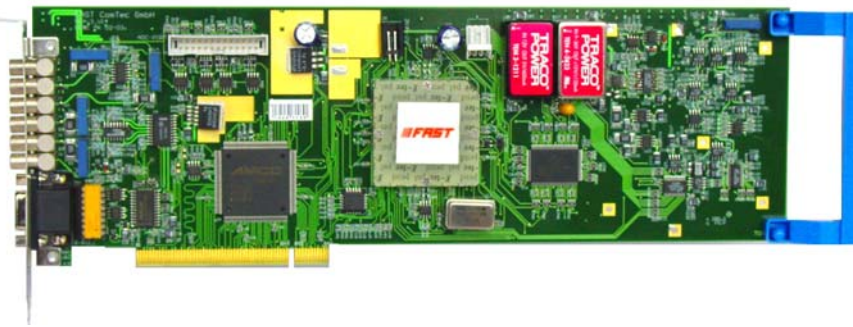
DESCRIPTION

The model 7070 is a Wilkinson-type Analog-to-Digital Converter with a 100 MHz clock rate. The 7070 is ideally suited for applications in nuclear- and X-ray Spectroscopy. It is an ideal tool to check and setup Mossbauer systems. The upper- and lower-level discriminator has a separate output on the rear panel. The Single-Channel Analyzer output can be used to observe the Mössbauer lines.

SPECIFICATIONS

INPUTS (front panel)

Signal Input: BNC-Connector accepts +25mV to +8V



(standard / +10V optional) linear pulses, $Z_{in} = 1k \text{ Ohm}$, risetime: $\geq 100\text{ns}$ to $100\mu\text{s}$, fall time: 200ns to $100\mu\text{s}$, $0.5\mu\text{s}$ flat top width, dc coupled.

Gate: BNC-Connector accepts positive TTL

OUTPUTS (rear panel)

Data: 13 bit binary data lines and data transfer commands, Amphenol D-Sub-connector.

SCA-output: BNC-connector, TTL pulse approx. $0.5\mu\text{s}$ duration. One output pulse for each input signal that falls

between the ULD and LLD setting.

INDICATORS

DEADTIME: LED-bar indicates activity of the ADC. Range 0 to 100% deadtime

PERFORMANCE

Conversion Time: $(1.0 + 0.01N) \mu\text{s}$, where N is the channel address generated by the 7070 ADC (including digital offset)

ADC Deadtime: time-to-peak + $1\mu\text{s}$ + conversion time.

Integral non-linearity: less than $\pm 0.05\%$ of full scale over top 99% of selected range.

Differential non-linearity: less than $\pm 0.75\%$ over top 99% of selected range.

Gain stability: better than $50 \text{ ppm}/^\circ\text{C}$

Baseline stability: $50\mu\text{V}/^\circ\text{C}$

Temperature range: 0°C to $+50^\circ\text{C}$

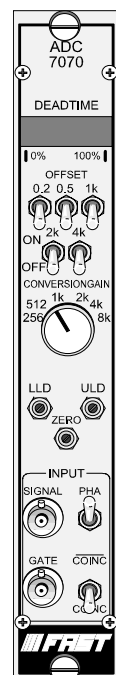
Power Requirements

+24V, 80mA, -24V, 120mA,
+ 6V, 600mA, -6V, 20 mA

Physical

Size: single width NIM module
1.35 x 871 inches;
3.43 x 22.13 cm as per TID - 20893 (rev.)

Shipping weight: 1.2 kg (net 0.8 kg)

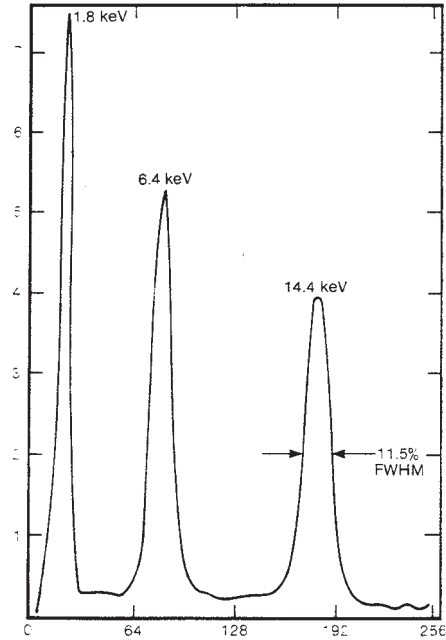
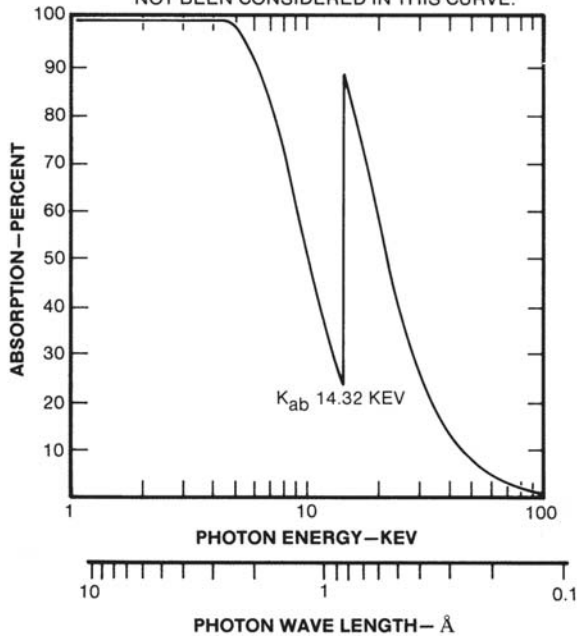


X-ray Proportional Counters

Absorption-Efficiency and Pulse Height Spectra for Krypton and Xenon gas filled counters

GAS ABSORPTION—97% KRYPTON—3% CO₂
 AT ONE ATMOSPHERE PRESSURE THRU SIDE WINDOW
 OF 5.08 CM DIAMETER PROPORTIONAL COUNTER

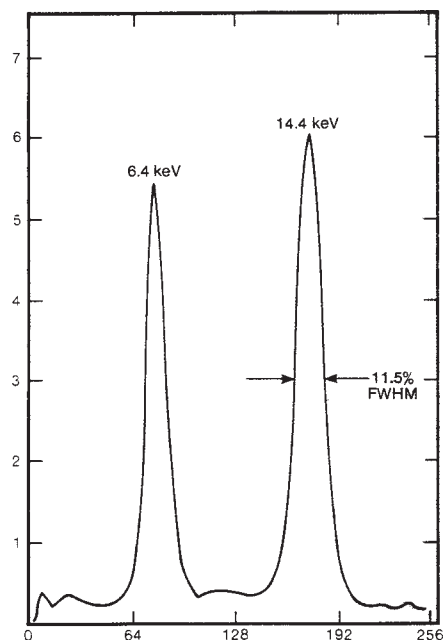
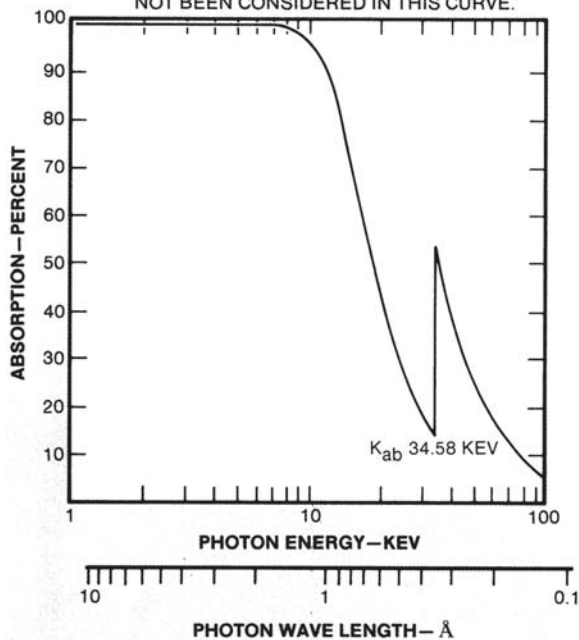
NOTE: THE EFFECT OF WINDOW TRANSMISSION
 (ABSORPTION) CHARACTERISTICS HAS
 NOT BEEN CONSIDERED IN THIS CURVE.



One Atmosphere: 97% krypton—3% CO₂
 Anode Voltage: 1800 volts

GAS ABSORPTION—97% XENON—3% CO₂
 AT ONE ATMOSPHERE PRESSURE THRU SIDE WINDOW
 OF 5.08 CM DIAMETER PROPORTIONAL COUNTER

NOTE: THE EFFECT OF WINDOW TRANSMISSION
 (ABSORPTION) CHARACTERISTICS HAS
 NOT BEEN CONSIDERED IN THIS CURVE.



One Atmosphere: 97% xenon—3% CO₂
 Anode Voltage: 2000 volts