TN-7200: Standard Features

The broadest range of performance at the lowest possible price!! The TN-7200 provides the user with all the necessary performance needed in a multichannel analyzer with absolutely no compromise in quality. The TN-7200 is yet another example of Tracor Northern’s dedication to producing the highest quality instrumentation to meet the ever-changing demands of the analytical marketplace.

**2048 or 4096 Data Channels:** The TN-7200 is ideal for high resolution applications using Ge(Li), intrinsic Ge, or Si(Li) detectors. Features include a 16 million count-per-channel capacity.

**Flicker-Free Display:** The 5 inch video monitor provides a bright, extremely clear display of spectral data and acquisition parameters. The TN-7200 will also drive a remote video monitor for classroom or conference room applications.

**Multiple Regions-of-Interest:** The TN-7200 supports up to ten Regions-of-Interest with overlapping limits. Gross/net integral calculations are performed automatically.

**Simultaneous Regions-of-Interest:** The TN-7200 simultaneously displays all regions-of-interest!!! Using two levels of intensification, a primary (user selected) ROI is readily differentiated from all other displayed ROIs.

**OMNI Control Knob:** A Tracor Northern exclusive!! Convenient one-knob control for positioning the cursor, defining regions of interest, and rolling expanded displays.

**Data Processing:** The TN-7200 can strip a reference spectrum from an unknown (livetime differences are automatically compensated). 3-point smoothing, add/subtract and multiply/divide constants are also standard.

**Digital X-Axis Calibration:** Two point digital calibration converts channel number to energy, mass, time, position, etc. . .

**Pulse Height Analysis (PHA):** For precision pulse height analysis (PHA), the TN-7200 has a built-in 50 MHz analog-to-digital converter that can also digitize DC levels and slowly varying AC signals.

**Multichannel Scaling (MCS):** MCS input accepts frequencies to 10 MHz with a 10 μs minimum dwell time.

**Single Channel Analysis (SCA):** Precision ten-turn potentiometers control upper and lower level discriminators. The SCA pulse couples directly to the MCS input for accurate isotopic decay measurement.

**Preamp/Amplifier:** Built-in preamp/amplifier for NaI type detectors. Optional spectroscopy amplifier and built-in high voltage bias supply are also available.

**Portable Operation:** Small outside dimensions, light weight, and low power consumption makes the TN-7200 ideal for portable applications.

**Standard Data Input/Output Capability:** The TN-7200 comes equipped with a serial ASCII I/O port which will interface to a wide variety of hardcopy terminals. Optional I/O capability includes an IEEE-488 interface which readily connects to most small desk-top calculators and business computers; or additional serial ASCII I/O port.

**Built-in Diagnostics:** The TN-7200 is microprocessor based and includes diagnostics that can be periodically activated to verify MCA performance.

**Pressure Sensitive Front Panel:** The TN-7200 front panel features a pressure sensitive touch pad; field proven to assure the highest standards of reliability. The comprehensive control layout has been designed for easy operation and includes a random-entry numerical section for defining of analyzer parameters.

**Optional Remote Control:** Using simple ASCII character transmission, a remote teleprinter or computer can control MCA operation through the Serial RS-232 or IEEE-488 interface.

TN-7200.MAX
ADC Characteristics

Input Signal
Input: 0.10V Unipolar or Positive First Bipolar (8V FS with 25% overrange).
Rise/Fall Times: 1 to 10 μs.
Dc Error: 0.1% (terminated).
Impedance: 1k ohm.
Coupling: DC, AC Passive, and AC Active.
Internal Delay: None.

Conversion
Clock Frequency: 50 MHz crystal controlled.
Range: 256, 512, 1024, 2048, 4096 channels for nominal 8V input.
Type: Wilkinson.

Dead Time Per Event (Fixed + Variable)
Fixed: 2.6 μs per conversion.
Variable: (.02μs/n+ bp + Tr); N = converted number; bp = burst mode time from trigger to threshold; n = peak amplitude; Tr = Transfer Time (2 μs typical).
Live Time Correction Accuracy: less than or equal to 0.5% for up to 5 kths count rate.

Lower Level Discriminator
Range: Nominal 0-100% of 8V input.
Stability: Better than 100 ppm per °C or 24 hr.
period at constant line voltage and temperature.
Control: 10-turn helipot with lockable indicating dial.

Upper Level Discriminator
Range: 5-125% of 8V input.
Stability: Better than 100 ppm per °C or 24 hr.
period at constant line voltage and temperature.
Control: 10-turn helipot with lockable indicating dial.

Zero Level
Range: -25% to 10% of 8V input.
Stability: Better than 100 ppm per °C or 24 hr.
period at constant line voltage and temperature.
Control: 20-turn screwdriver adjustment.

Single Channel Analyzer
Control: Uses lower and upper level discriminators.
Timing: Output occurs at ADC peak-detected time.
Output: ±5V, 250 ma TTL pulse.
Impedance: 50 ohms.

Digital Offset
Function: Shifts spectrum so that effective zero level can be selected digitally.
Range: 0 to 6496 in 512 channel increments.
Linarity
Integral Non-Linearity: ±0.05% over top 99% of range.
Differential Non-Linearity: Less than or equal to ±0.75% over top 99% of range.

Stability
Temperature: Zero level/Conversion gain coefficients equal to or less than 100 ppm/°C (Ref: FS Analog Input).
Time: Less than or equal to 0.01% combined zero level and conversion gain over 24 hr, period at constant line and temperature.

Coincidence/AntiCoincidence Input
Input: BNC gate input with switch selection of coincidence or anti-coincidence mode (positive true TTL compatible).
Coincidence Mode: Selective Pulse Analysis:
Coincidence gate pulse must occur 500 ns before ADC input signal reaches peak amplitude and remain until peak-detected time.
DC: Measured: By setting gate input with a 1 μs pulse, the ADC will sample and digitize slowly varying AC or DC signals.
AntiCoincidence Mode: ADC will not analyze the input signal if a pulse occurs simultaneously at the gate input.
Gate pulse must remain through peak detect time.

Preamp/Amplifier
Input Charge Sensitivity: Designed for negative current pulses from photomultiplier anodes or proportional counter pulses.
Maximum Gain: 10-turn helipot with adjustment range of 20:1.
Shaping: 1.2 μs RC with pole zero cancellation.
Linearity: ±0.05% monotonic change.

MCS Characteristics
Multichannel Scaling
Input: Positive 3 to 15V pulse (TTL compatible).
Maximum Frequency: 10 MHz.
Minimum Pulse Duration: 50 ns.
Double Pulse Resolution: 100 ns.
Impedance: Nominal 500 ohms.
Time Base Jitter: Less than or equal to 100 ns.
Dead Time Per dwell Period: Less than or equal to 500 ns.
Channel Dwell Range: 10 ms to 99 seconds.
Preset Scan: 1 to 60 dwell or infinity.

Vertical Display Scale
Linear: Manual selection, selectable from 16 counts to 16 million counts full scale in binary increments.
Logarithmic: Full scale display.

Overlay: Any two memory groups may be compared. Vertical separation of overlapped groups is operator selectable.

Horizontal Display Scale
Digital Expand/Contract: 16 channels to full memory in binary steps.
Digital Null: One channel increments to either limit of memory.

Digital Calibration: Channel number, or 2-point linear calibration.

Data Input/Output Ports (5 available)
Standard: RS-232/20 mA Serial ASCII
Optional: Additional RS-232/20 mA Serial ASCII and/or IEEE-488 Input/Output Interface

Preheat Operation
Preheat PHA Live Time: Selectable by keypad entry from 1 to 65535 hours with 5 significant digits.
Preheat Operation: Selectable by keypad entry from 1 to 65535 hours with 5 significant digits using Region 00. Acquisition terminates on next live time second if integral is equal to or greater than preset.
Preheat PCS Scan: Number of scans selectable by keypad entry from infinity to 65535.

TN-7200 Operational Modes
Manual: Standard; uses front and rear panel controls.
Auto Repeat: Standard; performs a memory clear, data acquisition (for preset time/scan), and data output.

TN-7200 Physical Characteristics
Physical
Weight: 20 lb.
Size: 8.5" x (21.6 cm) W, 11" (28 cm) H, 15" (38 cm) D.
Configuration: Table Top only.

Power Requirements
Voltage Range: 100, 120, 220, or 240 VAC.
Frequency: 50 or 60 Hz.
Noise Suppression: Built-in line filter.
Power Consumption: 150 watts.

Environmental
Operating Temperature: 50°F - 100°F.
Operating Humidity: 10% - 90%, non-condensing.

Traco Northern maintains a commitment to continuous development and improvement of its products and, therefore, reserves the right to make changes in specifications without notice.

TN-7200.MAX