

# Model 9641 ICB Programmable H.V. Power Supply

## Features

- Complete programmability within the Genie™ family
- Utilizes the CANBERRA Instrument Control Bus (ICB)
- Regulated up to  $\pm 2000$  V dc, 1 mA output
- Noise and ripple  $< 3$  mV peak to peak
- Overload and short circuit protected
- Overload, inhibit and polarity status indicators
- Inhibit and overload latching circuits
- Ramped high voltage output with bar graph indication
- Secure computer operation without conflicting front panel controls

## Description

The CANBERRA Model 9641 High Voltage Power Supply is a single-width NIM family member of the Instrument Control Bus (ICB) line of programmable front end electronics. It has been designed primarily for use with photomultiplier and electron multiplier tubes. The Model 9641 accepts programming information over the 8-bit wide CANBERRA bus standard called the ICB. By design, the Model 9641 will accommodate any detector requiring a bias voltage up to 2000 V and a current level of 1 mA or less.

The Model 9641 allows the user to select from two outputs, one ranging from  $\pm 15$  to  $\pm 2000$  V dc and the other derived from the first but attenuated by a factor of 10 giving  $\pm 1.5$  to  $\pm 200$  V dc. A 20-segment bar graph displays the output voltage. In addition, this unit allows the user to select the output voltage polarity with an internal control.

The Model 9641 can withstand any overload or short circuit for an indefinite period of time. The unit can be programmed to either resume normal operations after removal of the fault or to require a programmed reset command.

An INHIBIT input is available for remote shutdown of the Model 9641. The unit can be programmed to either resume operation upon removal of the INHIBIT signal or to require a programmed reset command.

ICB NIMs connect to this bus via a host module such as the Model 556A Acquisition Interface Module (AIM) as part of a hierarchy of networked acquisition and control managed by a Genie family computing platform.

Most adjustments are made through the graphical user interface of the Genie software environments. Equivalent batch procedure commands are also available in the environments. All ICB NIM parameters are stored in the single data file structure of the Genie family, allowing verification of correct set up from one experiment to the next.

All ICB NIMs feature a characteristic READY LED to indicate operational status.

## Specifications

### INPUTS

- INHIBIT – Logic low or ground inhibits the HV outputs; max logic low  $\leq 0.7$  V; logic high  $\geq 2.0$  V or open circuit enables.
- ICB – Provides for connection to the Instrument Control Bus. Control of the Model 9641 by Genie software is through this interface.



### Phone contact information

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## OUTPUTS

- HV OUTPUT –  $\pm 15$  to  $\pm 2000$  V dc, programmable in 1.95 V increments; 1 mA output current capability; rear panel SHV connector.
- $\pm 10$  OUTPUT –  $\pm 1.5$  to  $\pm 200$  V dc, programmable in 0.195 V increments; output impedance 20 M $\Omega$ ; rear panel SHV connector.
- ICB – Provides feedback on the Model 9641's status: Inhibit, Overload, Polarity, ON/OFF and HV setting.

## MANUAL CONTROLS

- ADDRESS – Rotary switch selects 1 of 16 unique ICB Addresses; accessible through opening in the side cover.
- POLARITY – Internal programming plug sets output polarity.

## ICB PROGRAMMABLE CONTROLS

- ON-OFF – Enable or disable the HV Output.
- HV RESET – Restores normal operation following a latched Inhibit and/or Overload Fault condition.
- VOLTAGE – Programmable in increments of 1.95 V (0.195 V for the  $\pm 10$  output).
- MODE CONTROL – Selects latched or non-latched modes for the Inhibit and/or Overload conditions.

## FRONT PANEL INDICATORS

- READY – Bi-color LED; green when on-line; yellow for fault or error; off when the module is waiting for the computer to recognize it.
- HV OUTPUT – 20-segment Bar graph, 0-2 kV.
- POLARITY – Front panel LEDs indicate polarity continuously.
- INHIBIT – LED to indicate Inhibit status.
- OVERLOAD – LED to indicate Overload status.

## PERFORMANCE

- RIPPLE AND NOISE –  $\leq 3$  mV peak to peak at 1 mA.
- OUTPUT STABILITY – Long term drift of output voltage is  $\leq 0.01\%/hr.$  and  $\leq 0.02\%/8$  hr. at constant input line voltage, load, and ambient temperature after a 30 minute warmup.
- TEMPERATURE COEFFICIENT –  $\leq \pm 40$  ppm/ $^{\circ}C$  after 30 minute warmup, operating range 0 to 50  $^{\circ}C$ .
- REGULATION –  $\leq 0.001\%$  variation in output voltage over the load range and  $\leq 0.001\%$  for  $\pm 0.1\%$  input voltage change within the operating range at constant ambient temperature.
- OVERLOAD PROTECTION – Power supply will withstand and recover from overload, including a short circuit for an indefinite period.
- CURRENT LIMIT – 1.3 mA maximum.
- RESOLUTION – 1.95 V increments (0.195 V for the  $\pm 10$  output).

## CONNECTORS

- HV OUTPUT – Rear panel SHV.
- $\pm 10$  OUTPUT – Rear panel SHV.
- INHIBIT – Rear panel BNC.
- ICB – Rear panel, 20-pin ribbon.

## ICB PROGRAMMING SUMMARY

Setup Parameters	Read	Write
Output Voltage	X	X
Voltage Polarity	X	
Inhibit Logic Levels	X	X
Latch Inhibit Mode	X	X
Latch Overload Mode	X	X
Module Status		
ICB Address	X	
Model Number	X	
Factory Serial Number	X	
Hardware Fault	X	
Inhibit Condition	X	
Overload Condition	X	
Control		
On-Line	X	X
Off-Line	X	X
Problem	X	X
Inhibit/Overload Reset		X

## POWER REQUIREMENTS

- +24 V dc – 15 mA
- +12 V dc – 55 mA
- 24 V dc – 10 mA
- 12 V dc – 50 mA
- +6 V dc – 350 mA

## PHYSICAL

- SIZE – Standard single width NIM module 3.43 x 22.12 cm (1.35 x 8.71 in.) per DOE/ER-0457T.
- NET WEIGHT – 1.02 kg (2.25 lb).
- SHIPPING WEIGHT – 1.93 kg (4.25 lb).

## ENVIRONMENTAL

- OPERATING TEMPERATURE – 0 to 50  $^{\circ}C$ .
- OPERATING HUMIDITY – 0-80% relative, non-condensing. Meets the environmental conditions specified by EN 61010, Installation Category I, Pollution Degree 2.

## CABLES

- A 12-port connecting cable is supplied with each Model 556A AIM; if the cable is ordered separately, specify Model C1560 12-port ICB Connecting Cable.



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