

# Low Current Battery Cycle Life Testing

Model MCN

R&D System  
for Primary  
and Rechargeable  
Batteries in Many  
Chemistries



*Model MCN16-10/1/0.1-5  
with optional cell  
holding fixture*

- ▶ **Laboratory Equipment for Low Current Testing of Many Chemistries: Lithium-Based, NiMH, NiCd, Small VRLA and Others**
- ▶ **Flexible Network Control With Bitrode's VisualCN® Lab Client Software for Windows® 98 and Windows NT®**
- ▶ **Flexible Data Channel Assignment for Custom Laboratory Testing**
- ▶ **Multiple Current Ranges per Unit Available, from 1mA to 10A**



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## Model MCN



Model MCN96-0.1-5

## Laboratory Systems

Bitrode's Model MCN is a low-current cycle life test system for development of primary and rechargeable batteries in many different chemistries.

Developers of Lithium-based, NiMH, NiCd and sealed lead-acid batteries can use the features of the MCN for electrochemical research, burn-in testing for primary cells, and development of new materials.

### What Does It Do and How?

Operating from a common microprocessor controller, multiple circuits in the MCN module can run individual test programs. The model MCN is based on a linear current control design and can be built with bipolar voltage capability, cycling batteries to negative voltage.

MCN is available in current ranges from 1mA to 10 amperes, with higher current ratings available upon request. Each circuit can optionally be configured for up to three current ranges. The MCN controls and monitors amperage to a maximum resolution of 1mA.

The MCN can be configured in a wide range of voltages, from 3 to 30 volts, and is designed for use with individual or multiple cells per circuit.

Testing in a laboratory environment requires flexibility in control and data gathering, and the MCN delivers this



with multiple data channels assignable to user requirements. These channels are accessed by addition of up to four optional data cards in each 16-circuit module. Data cards are available with 16 high impedance voltage channels per card or 8 temperature channels per card. Other input types, such as pressure, specific gravity and digital I/O for external device control are also available. Up to four channels can be applied to a running circuit program, and any data channel can provide information to multiple programs. For instance, a single channel can provide ambient temperature data to programs controlling several cell tests.



**Custom Engineered Solutions for Specific Laboratory Environments**



**Designed for Accuracy and Manufactured for Reliability**



**VisuaLCN Lab Client for Network Control with Windows 98 or Windows NT**



**Single Source for Electronics and Fixture Design and for Manufacture, Service, and Support**

## Get In And Drive

The Model MCN is controlled by Bitrode's VisuaLCN Lab Client software package. VisuaLCN, designed for Windows 98 and Windows NT, is a complete circuit control and test data reporting solution for Bitrode's network based test equipment.

VisuaLCN's client-server architecture gives users control of any Bitrode MCN circuit from anywhere on a computer network. Using software controls, an operator develops test profiles to meet customer specified guidelines. Up to 99 steps of charge, discharge and rest can be programmed to user specifications. Tests in progress are easily monitored with VisuaLCN; circuit activity is viewable in both tabular and graphical formats.

Test data can be sampled in user-specified time increments with data acquisition available every one second, with an optional upgrade to 0.1 second acquisition. Data retrieved from tests is stored in Microsoft Access format and may be viewed and

analyzed with VisuaLCN's user-configurable graphical data analysis tools, or placed in Access reports of your design.

VisuaLCN is also designed to work with other Bitrode network-based circuitry, enhancing the flexibility and power of your laboratory toolkit. Contact a Bitrode representative for more information.



## Reliable Modular Construction

Handling unique cell shapes and dimensions requires special fixture design and connections. Bitrode's technical sales staff, design engineers and on-site manufacturing team will produce custom fixturing to match specific battery designs.

Circuits can be packaged in varying densities, from a single benchtop module to high-density upright cabinets for multiple cell and battery testing.

The MCN is designed and built for ease of maintenance and service. The modular construction of the MCN means that most subassemblies, large or small, remove easily for service outside the cabinet and fast replacement.

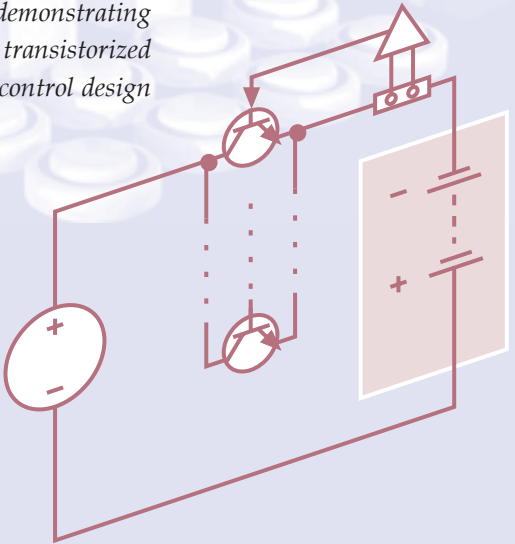
Calibration procedures are straightforward and efficient, with software designed to streamline this important maintenance routine. Calibration history is stored in a file on the Lab Client PC, allowing easy and efficient access to the maintenance history of each MCN module.



## Note the **Features:**


- ▶ Current ratings from 1mA to 10A, with higher configurations available
- ▶ Voltage specifications for single or multiple cells, with voltage ranges configured to customer specifications
- ▶ Measurement and control are accurate to within  $\pm 0.1\%$  of full scale
- ▶ Network control and data acquisition with Windows interface
- ▶ Modular design and easy access rear doors for maintenance and service
- ▶ Software calibration controls

*Schematic demonstrating Model MCN's linear transistorized current control design*



## Beyond the basics:

Optional features make the Model MCN a robust testing system, custom designed for specific laboratory environments. Build the module which fits your testing needs with the options listed below.

- ▶ Multiple Current Ranges - up to three - per Circuit
  - ▶ Temperature Monitoring
  - ▶ Bipolar Voltage Capability
  - ▶ Counter Electrodes
  - ▶ Reference Electrodes
  - ▶ Use of Auxiliary Voltage as Control Parameter
  - ▶ 0.1 Second Data Acquisition
  - ▶ Transducer Inputs (i.e., pressure)
  - ▶ Non-Time-Based Data Acquisition Sampling
  - ▶ Custom Fixture and Connection Design and Manufacture for Unique Cell Shape and Dimension
  - ▶ Programmable Digital or Analog I/O
- 

# Specifications

Model* **	Constant Current Amp Range ( $\pm 0.1\%$ ) (Charge/Discharge)	Voltage ( $\pm 0.1\%$ )	Constant Wattage	Ampere Hour	Watt Hour
MCN16-0.01-5	0-10.000mA	5.000V	50.00mW	99.999mAh	999.99mWH
MCN96-0.01-5	0-10.000mA	5.000V	50.00mW	99.999mAh	999.99mWH
MCN16-0.01-10	0-10.000mA	10.000V	100.00mW	99.999mAh	999.99mWH
MCN96-0.01-10	0-10.000mA	10.000V	100.00mW	99.999mAh	999.99mWH
MCN16-0.1-5	0-100.00mA	5.000V	500.0mW	999.99mAh	9999.9mWH
MCN96-0.1-5	0-100.00mA	5.000V	500.0mW	999.99mAh	9999.9mWH
MCN16-1-5	0-1.0000A	5.000V	5.000W	9.9999Ah	99.999Wh
MCN96-1-5	0-1.0000A	5.000V	5.000W	9.9999Ah	99.999Wh
MCN16-3-5	0-3.000A	5.000V	15.00W	99.999Ah	999.99Wh
MCN96-3-5	0-3.000A	5.000V	15.00W	99.999Ah	999.99Wh
MCN16-5-5	0-5.000A	5.000V	25.00W	99.999Ah	999.99Wh
MCN96-5-5	0-5.000A	5.000V	25.00W	99.999Ah	999.99Wh
MCN16-10-5	0-10.000A	5.000V	50.00W	99.999Ah	999.99Wh
MCN96-10-5	0-10.000A	5.000V	50.00W	99.999Ah	999.99Wh

Model* **	Circuits Per Cabinet	Cabinet Input Power (50 or 60 Hz)					Dimensions <sup>†</sup> Width x Depth x Height
		Three Phase			Single Phase		
		230V	400V	460V	115V	230V	
MCN16-0.01-5	16				2	1	For single 16-circuit module: 44 x 35 x 18 in 112 x 89 x 48 cm
MCN96-0.01-5	96				12	6	
MCN16-0.01-10	16				2	1	
MCN96-0.01-10	96				12	6	
MCN16-0.1-5	16				2	1	
MCN96-0.1-5	96				12	6	
MCN16-1-5	16				6	3	For 6-module, 96-circuit cabinet: 44 x 35 x 87 in 112 x 89 x 220 cm
MCN96-1-5	96				35	18	
MCN16-3-5	16	4	2	2			
MCN96-3-5	96	19	11	10			
MCN16-5-5	16	5	3	3			
MCN96-5-5	96	29	17	15			
MCN16-10-5	16	9	5	5			
MCN96-10-5	96	54	31	27			

\*If required voltage, current, or number of circuits do not appear in this table, contact Bitrode Corporation; custom product engineering is one of our greatest strengths.

\*\*Module names are interpreted as: MCNxx-yy-zz, where xx indicates number of circuits per cabinet, yy indicates amperage and zz indicates voltage.

†Dimensions may vary according to design requirements.

All products are subject to change in physical appearance and circuitry which will not alter performance specifications.

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