



Alternative Equipment Replacement (NUMAC)

Mark W. Parrish

Simulator Coordinator – Hope Creek Generating Station

Power Plant Simulator Conference

Jonathan Atkinson – Simulator Hardware Engineer implemented this solution. Please contact him with specific questions.

Jonathan.Atkinson@pseg.com

856-339-2778

Problem

NUMACs are BWR instrumentation for displaying radiation, temperature, neutron monitoring.

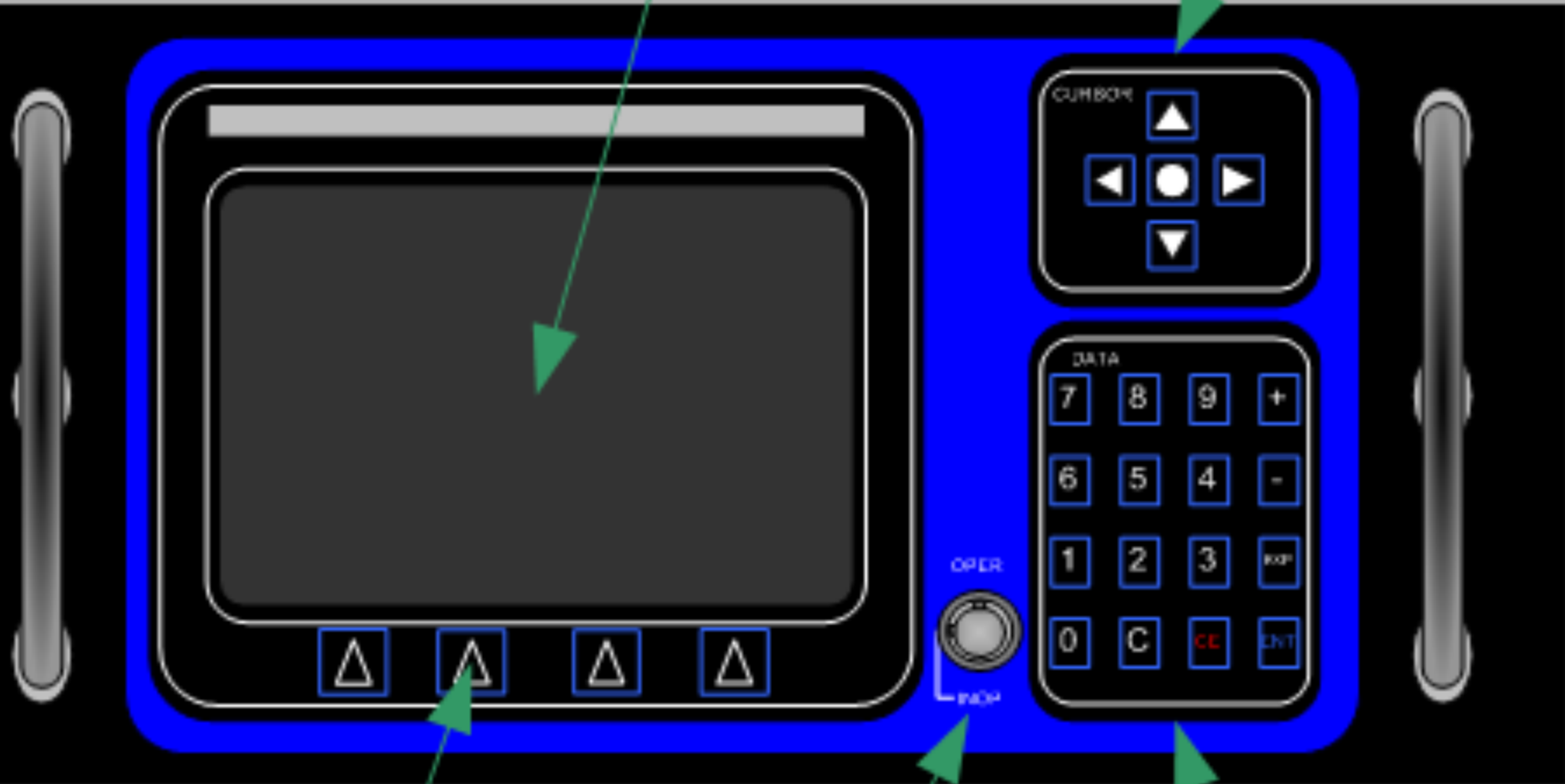
Simulator replacements are custom built at a high cost.

Hardware engineer identified a economical solution that retained the hardware but used ThunderView.

Considered using ThunderView to replace entire unit as a softpanel.

MESSAGE
DISPLAY

CURSOR KEYPAD



PUSHBUTTON/SOFTKEY
(TYPICAL)

KEYLOCK (MODE) SWITCH

NUMERIC KEYPAD

NUMAC LDM FRONT PANEL

What was needed for the substitution

- 1. Replicate the display.**
- 2. Interface to the membrane pushbutton.**
- 3. Operate a buzzer.**
- 4. Interface to the simulator.**

Required Equipment and Software

Existing front plate with membrane keys and buzzer.

Computer

Monitor

ThunderView drawing for the display

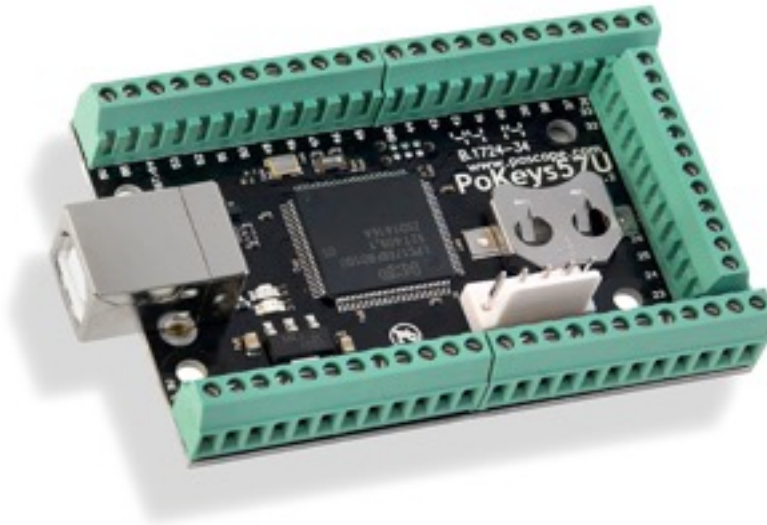
PoLabs PoKeys57U USB I/O Interface (~\$50)

PoKeys and PoBlocks Configuration software (included with hardware)

AutoHotKey software (Open Source)

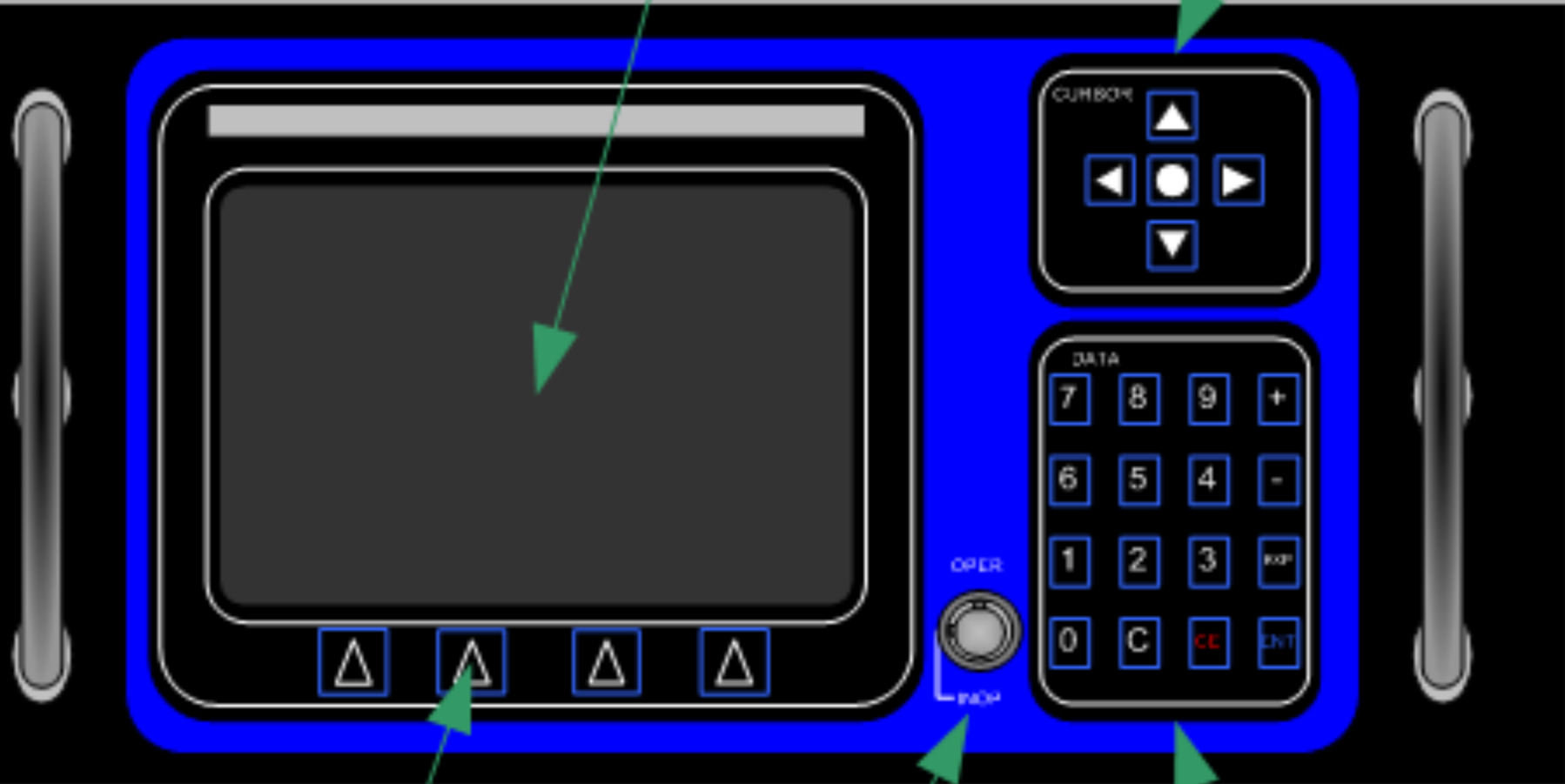
PoLabs PoKeys57U USB I/O Interface

Interfaces the NUMAC membrane keys to a USB input.



MESSAGE
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KEYLOCK (MODE) SWITCH

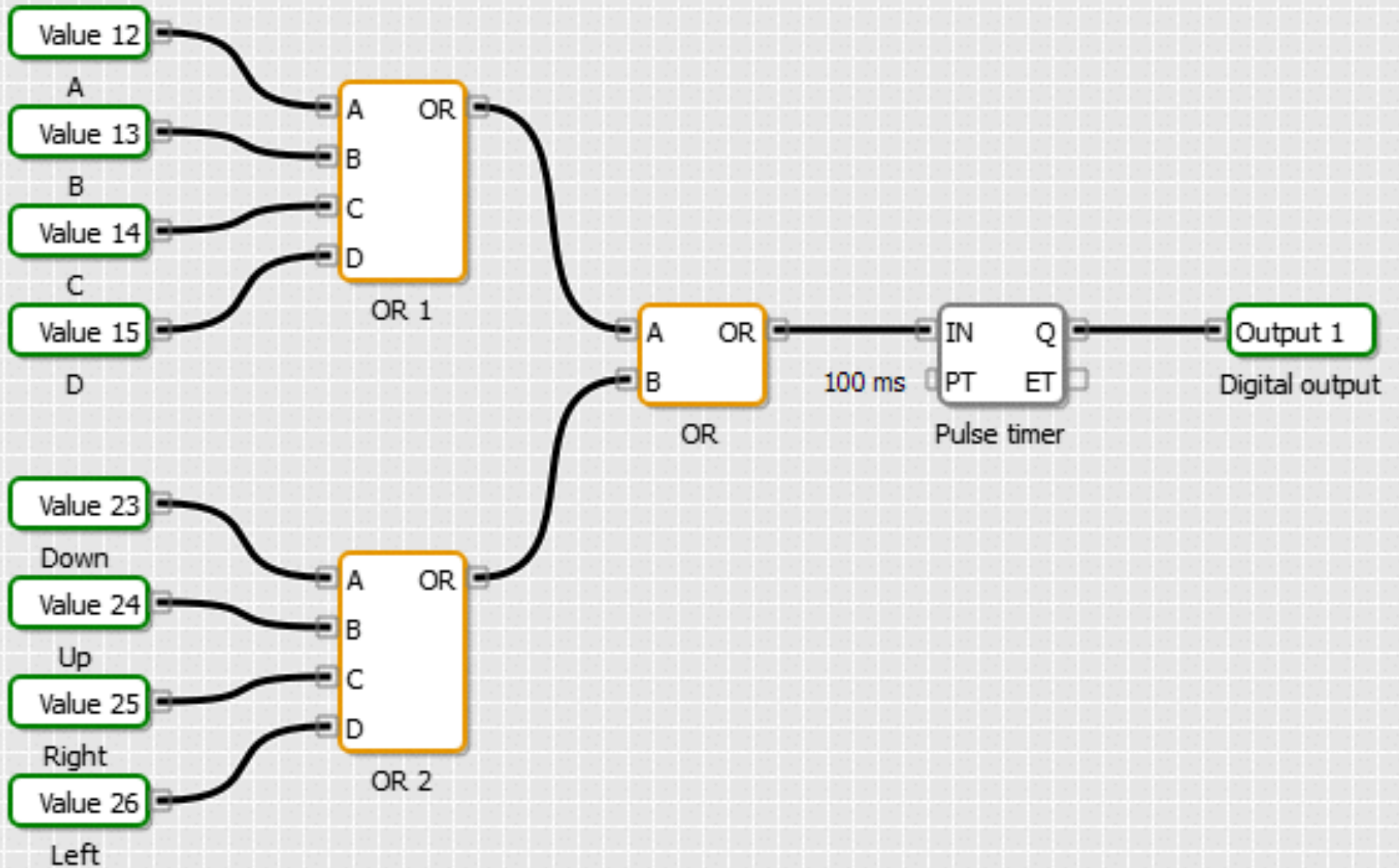
NUMERIC KEYPAD

NUMAC LDM FRONT PANEL

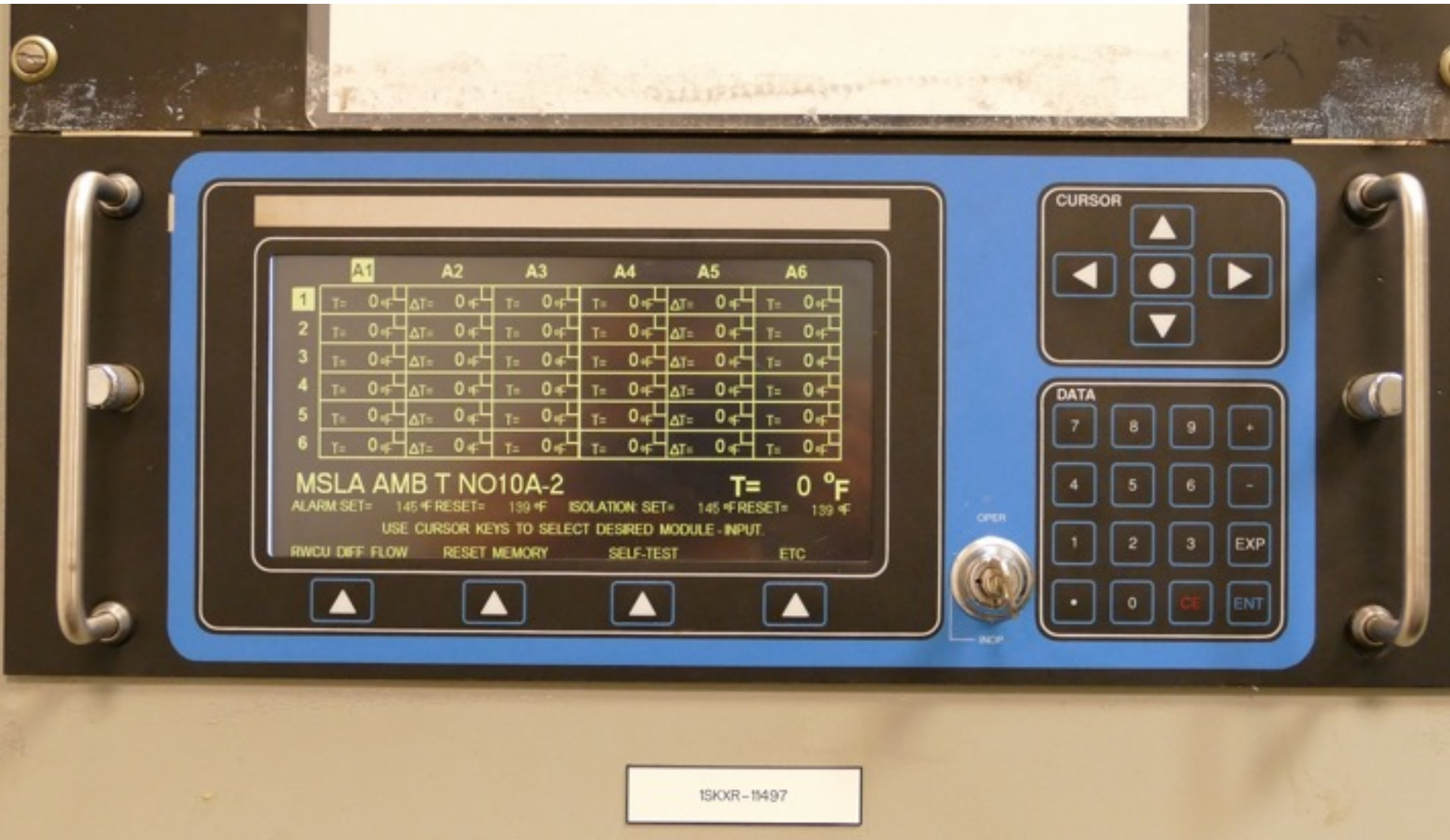
Sequence

- 1. Remove internals from NUMAC except for buzzer.**
- 2. Connect the keys to the USB I/O.**
- 3. Use PoKeys to assign values to the keys. For example assign softkeys to values A, B, C, D and the arrow keys.**
- 4. Use PoBlocks to create a logic to drive the buzzer.**
- 5. Use AutoHotKey to move the cursor in the ThunderView drawing and click to replicate the response.**
- 6. Install in the assembly and install in panel.**
- 7. Interface the computer running ThunderView to the simulator network.**

Software Configuration – Drive Buzzer



Finished Product



Feel free to contact Jonathan with any questions. I have a more detailed description available.