

# BREATHING NEW LIFE INTO OLDER INSTRUMENTS

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LabVIEW and Micro-Webservers as  
Alternative GUI Platforms

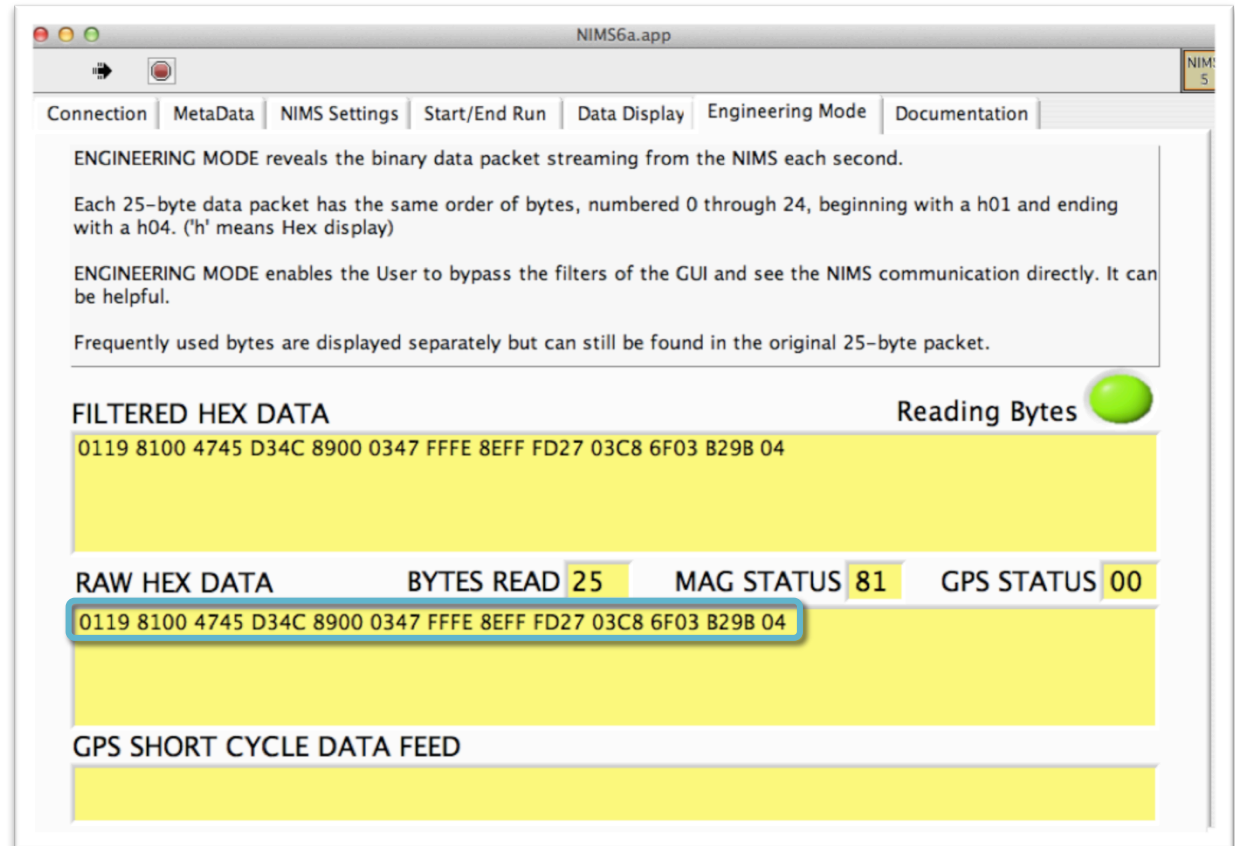


# How to ensure older equipment is viable for years to come?

- Changes in OS
- Changes in Hardware

# NIMS Serial Data Packet

- 26 Bytes/Every Second
- Packet Contains:
  - Status Flags
  - 5 Components
  - GPS Bytes
  - Gain Status
  - Etc



# NIMS Serial Interface

## HP Palmtop PC



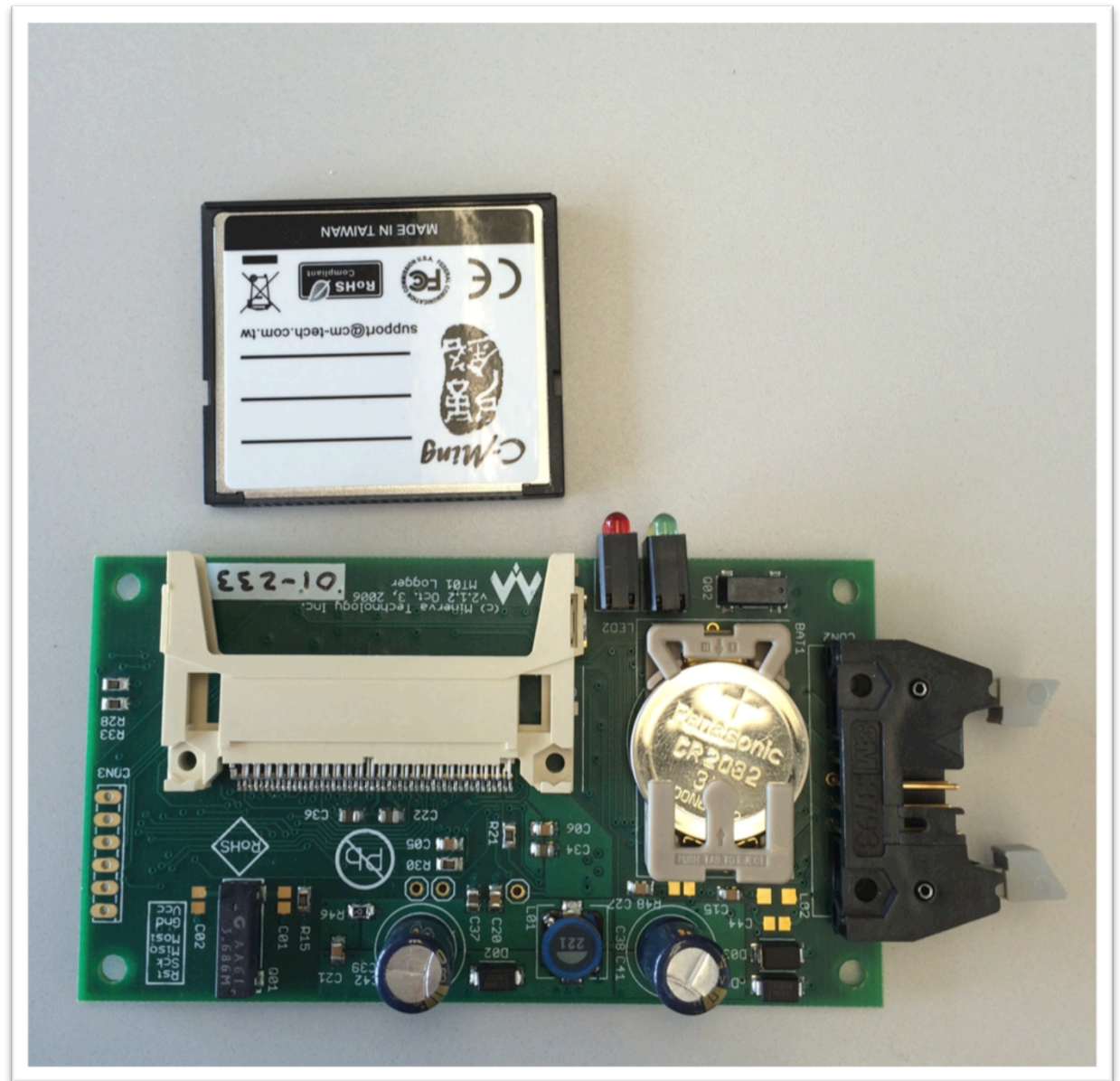
## Commands:

- Z – change gains of e-field amplifier
- Ctrl-U – start header mode
- D – start logging data
- E – end logging data
- Etc.



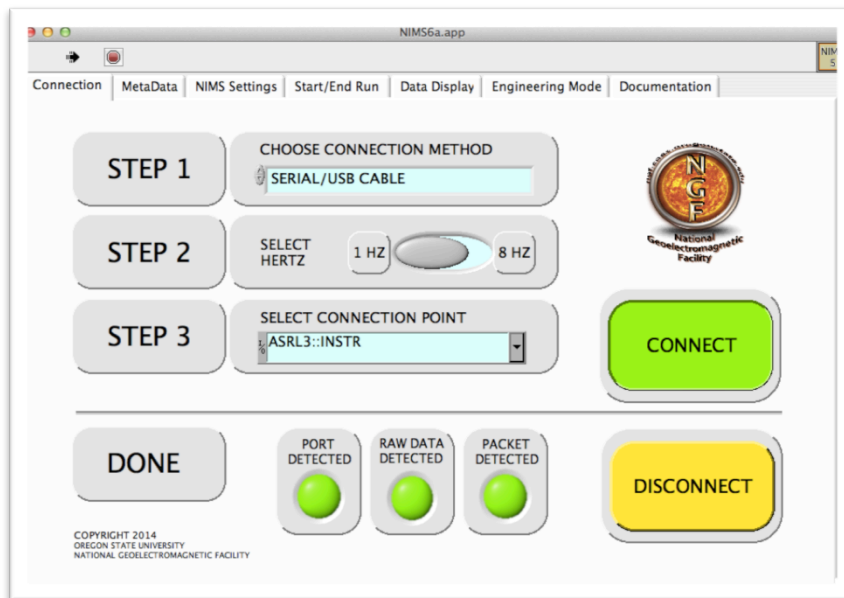
## Minerva Board

- CF Card Recording Medium
- Serial Front End

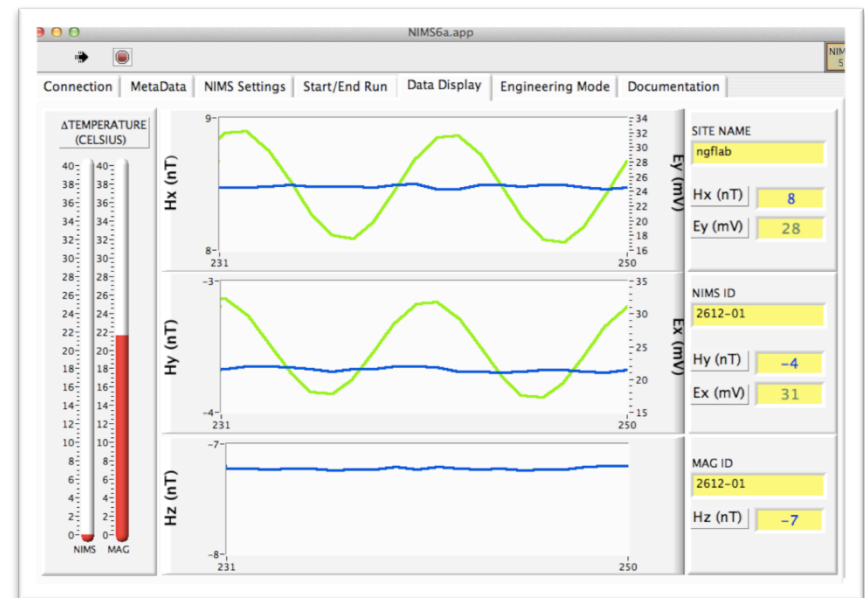


# LabVIEW

## Connection



## Graphing inputs



# LabVIEW cont.

## Entering Metadata

NIMS6a.app

Connection | MetaData | NIMS Settings | Start/End Run | Data Display | Engineering Mode | Documentation

**ALL DATA RUNS REQUIRE A HEADER FILE CONTAINING METADATA  
THERE IS NO OTHER WAY TO IDENTIFY A DATA FILE**

SITE NAME ngflab	NIMS ID 2612-01 MAC ID 2612-01	N-S DIPOLE (Ex) Length (m) 100 Heading (deg E mag N) 0	ELECTRODES N Electrode ID 1234 S Electrode ID 1234 E Electrode ID 1234 W Electrode ID 1234 GRND Electrode Cpr	MOST RECENT GPS TIME STAMP (UTC) : DATE (dd/mm/yy) // LATITUDE (dd) 44.5682 N LONGITUDE (dd) 123.2774 W ALTITUDE (m)
STATE / PROVINCE Oregon		E-W DIPOLE (Ey) Length (m) 100 Heading (deg E mag N) 90		
COUNTRY USA				
RUN ID lab001				
OPERATOR Brady Fry				

GPS DATA THAT WILL POPULATE THE HEADER FILE IF METADATA IS UPDATED

GPS DATA (displayed during Acquisition)  
\$GPRMC,172712,A,4434.0892,N,12316.6418,W,0

FIELD CREW COMMENTS (150 char max)  
Lab bench example


**UPDATE METADATA**

## Start/Stop Run


NIMS6a.app

Connection | MetaData | NIMS Settings | Start/End Run | Data Display | Engineering Mode | Documentation



MAGNETOMETER READY TO RECORD  
If green, the magnetometer is ready to record.  
If red, the magnetometer is still slewing.

Ready? 



MAGNETOMETER FACING NORTH  
If yellow, the East-West magnetic field (Hy) is greater than +/- 100 nT.  
Mag might not be pointed to magnetic north.

North? 


ELECTRIC CHANNEL HIGH GAIN STATUS  
If yellow, the electric channel may be outside the +/- 16 mV range. There may be data loss unless channel is set to LOW GAIN.

Ex Spec?   
Ey Spec? 

METADATA UPDATE?  
A green light indicates a decision to UPLOAD METADATA to the header file of the data run. Highly recommended.


**---DATA LOGGING---  
MASTER CONTROL PANEL**


GPS SHORT CYCLE IS UPDATING: 

GPS STATUS AND ELECTRIC FIELD GAINS  
ACQUIRING GPS SIGNAL  
GAINS UNKNOWN



STARTING A DATA RUN USING THE NIMS

1. Insert microSD card into adapter
2. Press 'Format Card' button and wait for 'Reading Bytes' light to turn solid green
3. Mag Ready to Record light must be green
4. Short Cycle the GPS (for MetaData)
5. Fill in the MetaData
6. Press START RUN button
7. Short Cycle the GPS again (for Time-Stamp)

**START RUN** 


**END RUN** 

LOGGING

Local   
NIMS: 

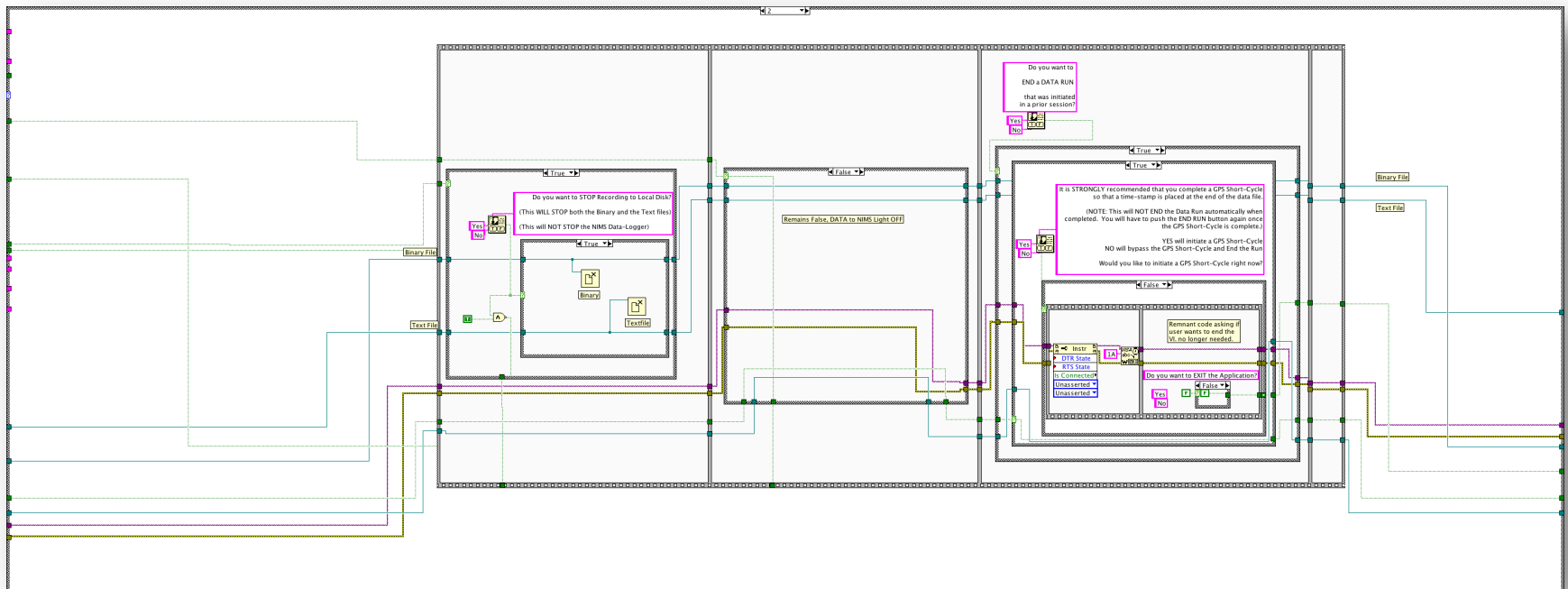
ENDING A DATA RUN USING THE NIMS

1. Short Cycle the GPS (for time-stamp)
2. Press END RUN button
3. Remove only the microSD card
4. Store in safe location

**EMPTY FIELD** 

# LabVIEW cont.

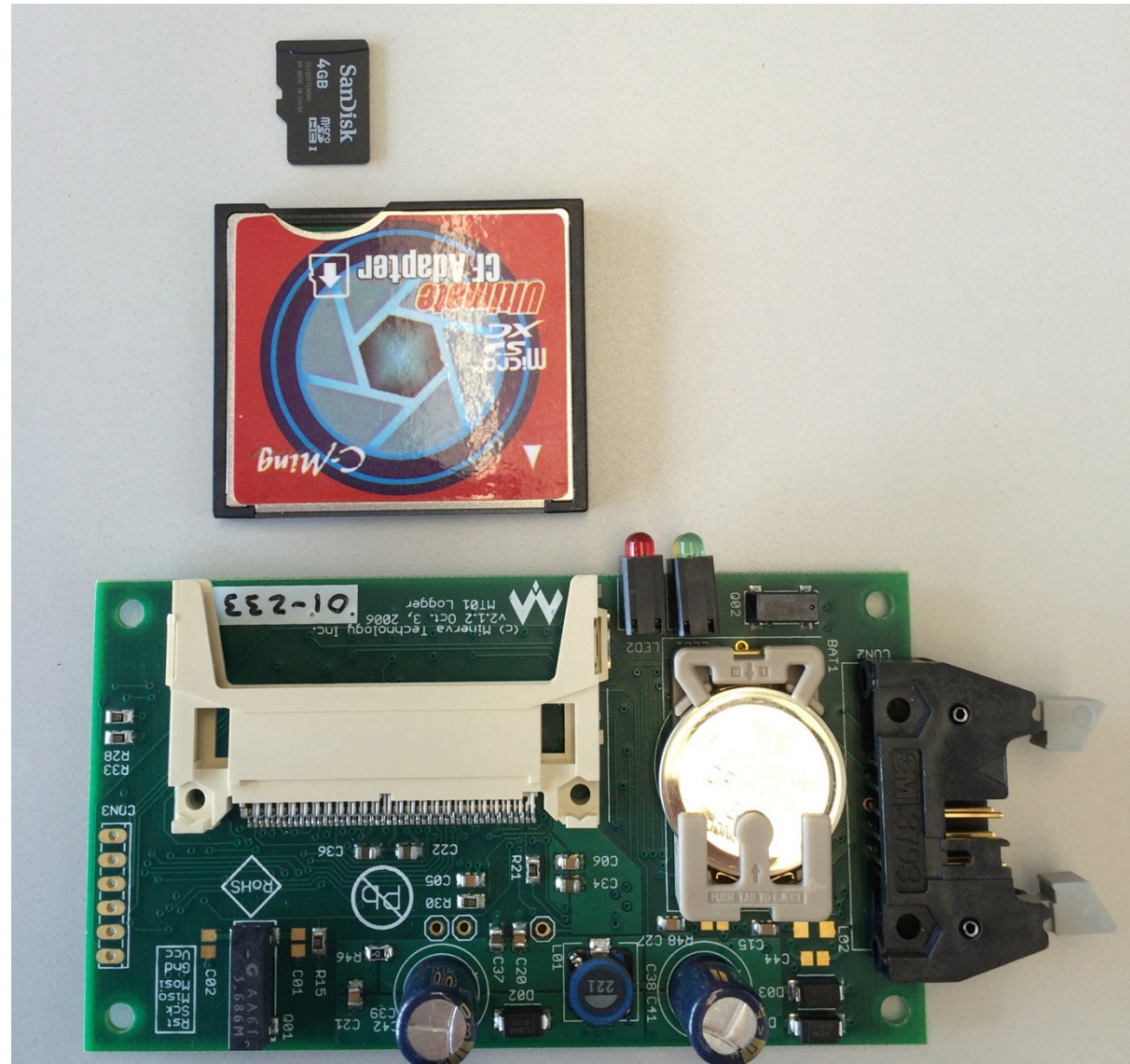
- Difficult to maintain
- Dependent on LabVIEW





# CF to microSD Card Adapter

- Quality of adapters is questionable
- Firmware updates
  - Antiquated hardware components
  - Card removal recognition
  - Dated compiler/software

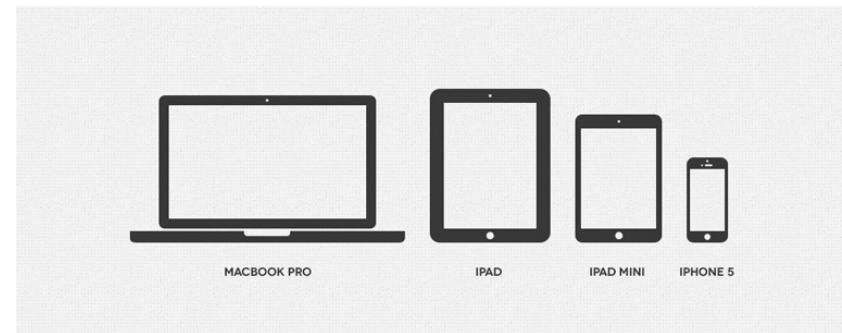


# Development of Webserver

Front End Webserver



Device Independent



# Prototype

Atmel SAMD21 Xplained



TI CC3200 Launchpad



