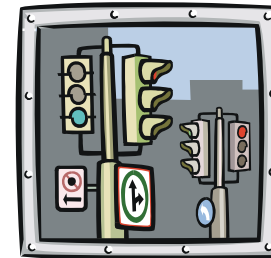


MMU-16LE *SmartMonitor*®

Advanced Signal Monitor Overview



Eberle Design Inc.

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Managing Cabinet Malfunctions

The signal monitor has three basic important tasks to perform:

- *Detect* improper signals / voltages
- *Display* cabinet status and fault status
- *Diagnose* with accurate information

Detecting Cabinet Malfunctions

- 1) To **detect** cabinet fault conditions the monitor must be programmed correctly.
 - Many monitors in the field have only a minimal set-up with much of the fault coverage left disabled.
 - In most cases the main reason is a lack of understanding of the issues involved in developing the correct monitor configuration settings.
 - Too much “monitor-speak” terminology!!!
 - › red fail, field check, leakage current, etc.

Display Cabinet Fault Status

2) Accurate cabinet fault status **display** provides the “clues”:

- Full Intersection Display
 - › Visually verify and spot faulty signal states
- RMS Voltage Reporting
 - › Signal voltage values help resolve fault types
- Historical Event Logs
 - › Time / Date, signal state interaction, accurate notes
- Signal Sequence Logs
 - › View signal timing or intermittent conditions leading to the fault

Diagnose for the Cause & Remedy

3) Diagnose the cause and find a remedy

- After the “clues” to the failure are assembled we must put them together in a clear fashion and interpret the results.
- Once again, understanding the details of monitor operation, the reasons voltage monitors react the way they do, and the related “monitor-speak” that results, often makes assembling the clues into a cause and remedy difficult.

Wouldn't it be great if you could...

- Use a built-in Setup Wizard to quickly and accurately configure the monitor to the exact requirements of the cabinet and intersection,
- Use a menu driven LCD interface to view vital cabinet data such as signal voltages, event logs, and configuration data,
- Use a built-in Diagnostic Wizard to automatically diagnose cabinet malfunctions and pinpoint faulty signals.

If your answer is YES,
the MMU-16LE *SmartMonitor* is for you!



The MMU-16LE *SmartMonitor*

- Nema TS2-2003 compliant
- LCD Menu Driven user interface
 - › Alpha Status display
 - › Full Intersection Channel display
 - › Context Help System
- Full Event Logging, ECcom software
- True RMS voltage measurements
 - › LEDguard[®] increases the level of protection when monitoring LED signal heads.
- Built-in [Setup Wizard](#) and [Diagnostic Wizard](#)
- Type 12 with SDLC Mode for legacy TS-1 Cabinets
- Ethernet Port option
- Flashing Yellow Arrow support



SmartMonitor Set-up

- Monitor Set-up -

A technician can use the Set-up Wizard to completely program the “enhanced” monitor functions by answering a series of *intersection* questions.

- ✓ Unused, Peds, 2-section turn (PP), Vehicle...
- ✓ Field Check, Dual Indication, Red Fail, MYRCD are programmed
- The standard Nema Program Card is still used for Conflict, Min Flash, and MYCD programming.
- Enhanced function programming is also stored in nonvolatile memory on the EDI Program Card. Replacing the card transfers the total MMU-16LE configuration database.
- Configuration databases can be up or down loaded to disk files using ECcom.

SmartMonitor Set-up (cont)

- Program Card -

- Permissive Matrix
 - › Insert a jumper for each channel pair that can run concurrently.
- Minimum Yellow Change Disable
 - › Insert a jumper for each channel that does not drive a true Yellow Clearance output (G ⇔ Y ⇔ R). For example, Peds.
- CVM & 24VDC Latch
 - › Insert a jumper to change non-latching operation to latching.
 - CVM Latch requires adequate minimum flash time
 - CVM Latch precludes TOD flash
 - 24VDC Latch can be problematic due to varying loading issues on the Cabinet Power Supply combined with short AC Main interrupts.

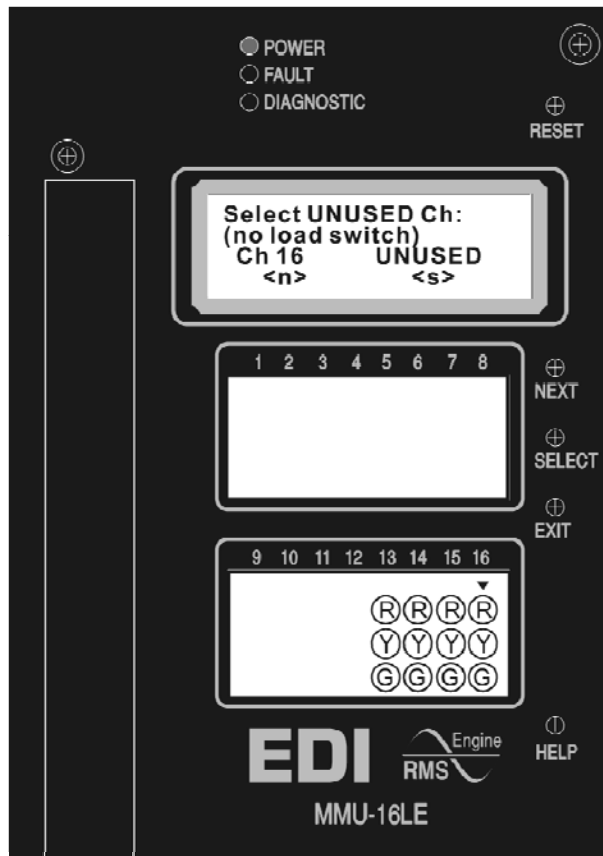
SmartMonitor Set-up (cont)

- Enhanced Functions -

- Field Check Enable
 - › Enable each color input if the signal reflects the Controller load switch command
- Dual Indication Enable
 - › R-G, R-Y, & G-Y for each channel
- Red Fail Enable
- Minimum Yellow + Red Clearance
 - › Disabled only for special conditions
- Unit options
 - › Program Card Memory
 - › LEDguard
 - › Flashing Yellow Arrow

Set-up Wizard Example

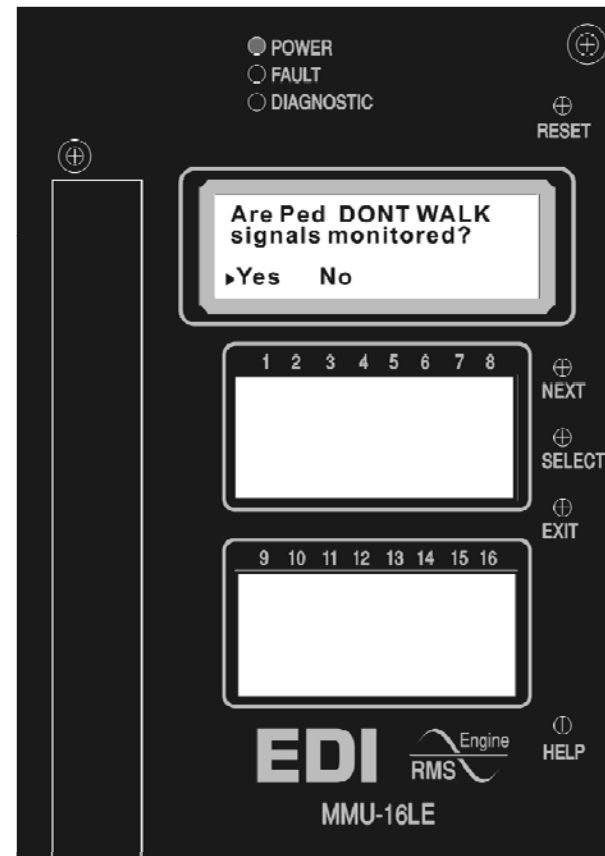
First Wizard Screen
(Select Unused Channels)



NEXT



Second Wizard Screen
(Select Don't Walk Monitoring)

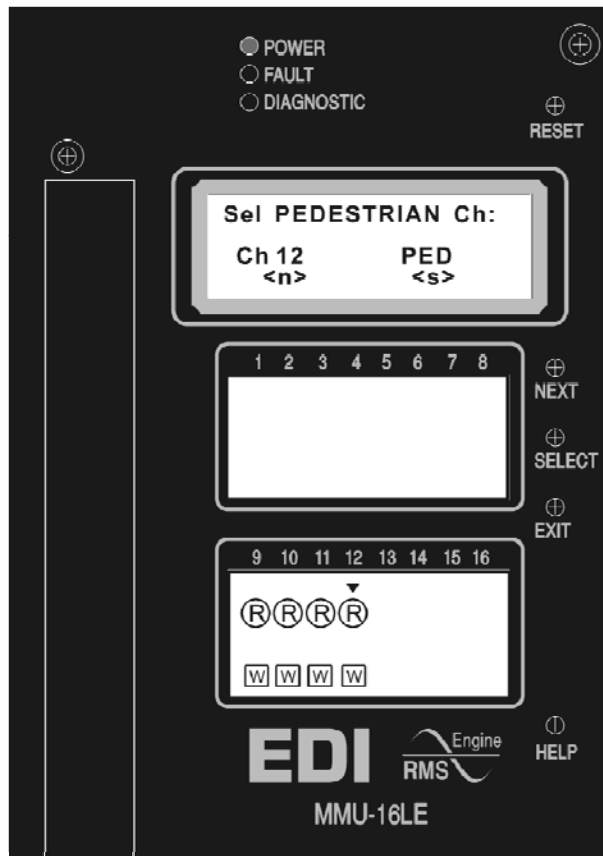


NEXT



Set-up Wizard Example (cont)

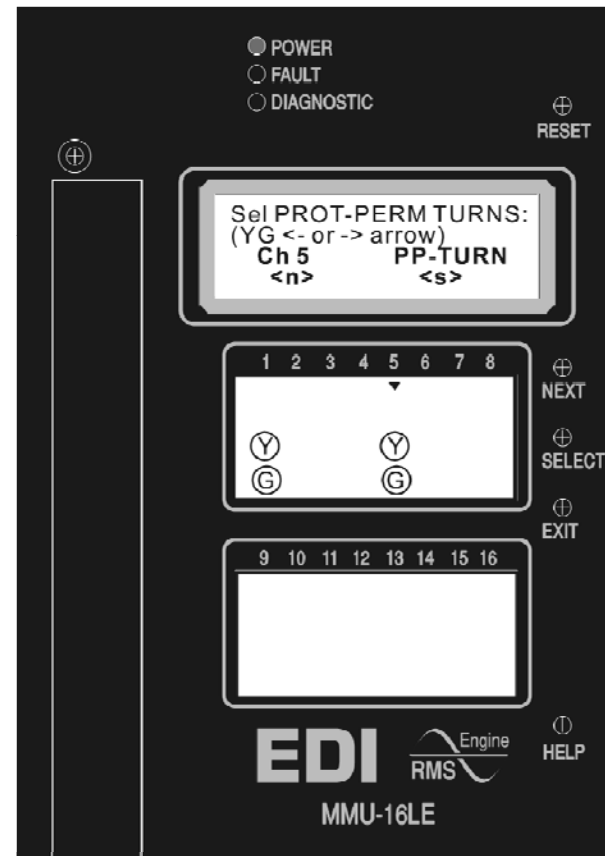
Third Wizard Screen
(Select Pedestrian Channels)



NEXT



Fourth Wizard Screen
(Select Prot-Perm Channels)



NEXT

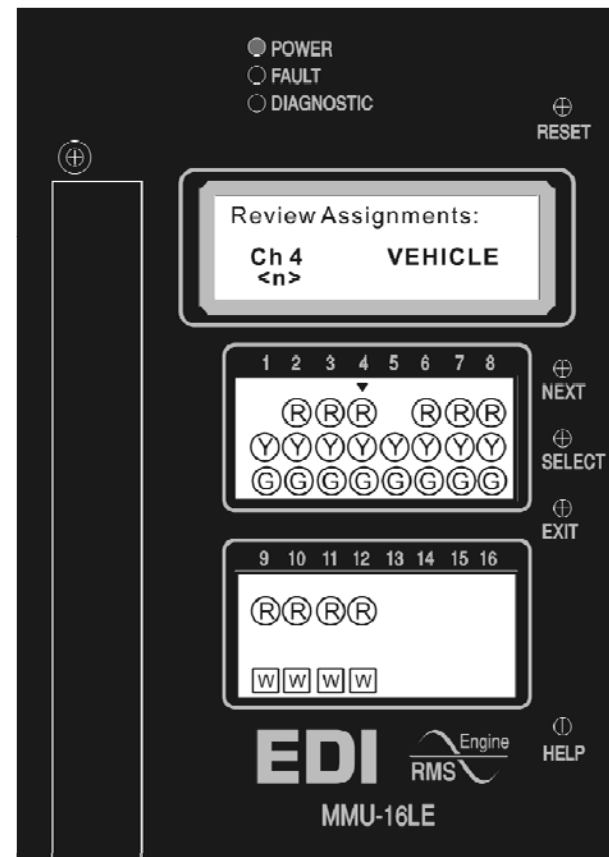


Set-up Wizard Example (cont)

- The final step of the Set-up Wizard is to review the selected channel assignments.
- The results will be used to *automatically* program:
 - › Field Check Enable
 - › Red Fail Enable
 - › Dual Indication Enable
 - › MYRC Disable



Final Wizard Screen (Review Channel Assignments)



DONE
!



SmartMonitor Set-up Methods

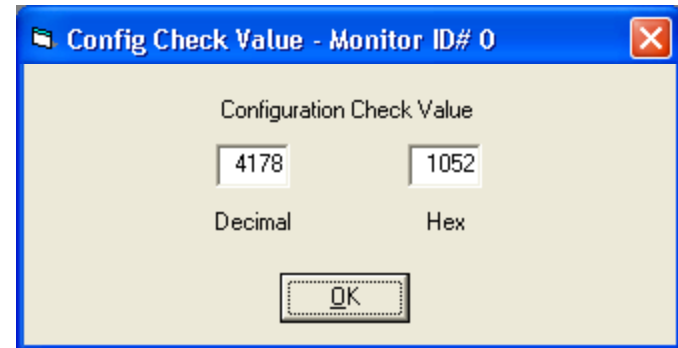
- Program Card soldering
- *SmartMonitor* Front Panel Menu
 - › Set-up Wizard (recommended)
 - › Manual data entry
- ECcomtm Program
 - › Set-up Wizard (recommended)
 - › Manual data entry
 - › File upload

SmartMonitor Program Card Memory

- Enhanced function programming is also stored in nonvolatile memory on the EDI Program Card.
- Replacing the card transfers the *SmartMonitor* configuration database
- The PGM CARD MEMORY option should be enabled in Unit Options. If a card without memory is used, this option must be OFF.
- If the database on the Program Card is different than the *SmartMonitor*, the unit will remain in the fault mode.
 - › A front panel menu choice results:
 - Program Card Memory doesn't match MMU:
 - Copy FROM PgmCard?
 - Copy TO PgmCard?

Configuration Check Value

- This parameter is calculated as a check value on the configuration database.



- The value be used as a quick check to verify the settings of the *SmartMonitor* have not been modified.
MENU → SET / VIEW CONFIG → CONFIG CHECK VALUE
- If the Check Value is different then the configuration is different.

Trouble Shooting a Fault

- **Diagnose** the cause and find a remedy. The Diagnostic Wizard is the first step.
- After the “clues” to the failure are assembled we must put them together in a clear fashion and interpret the results.
 - › Channels & Colors
 - › Signal RMS Voltages
 - › Time of Day
 - › Signal Sequences
 - › AC Service
- Monitor logs are only one side of the story. Correlating with CU Logs may also be helpful.
 - › Preemption event
 - › TOD event
 - › AC Service event
- Have confidence the remedy relates to the cause!

SmartMonitor Diagnostic Wizard

- Diagnosing the Fault -

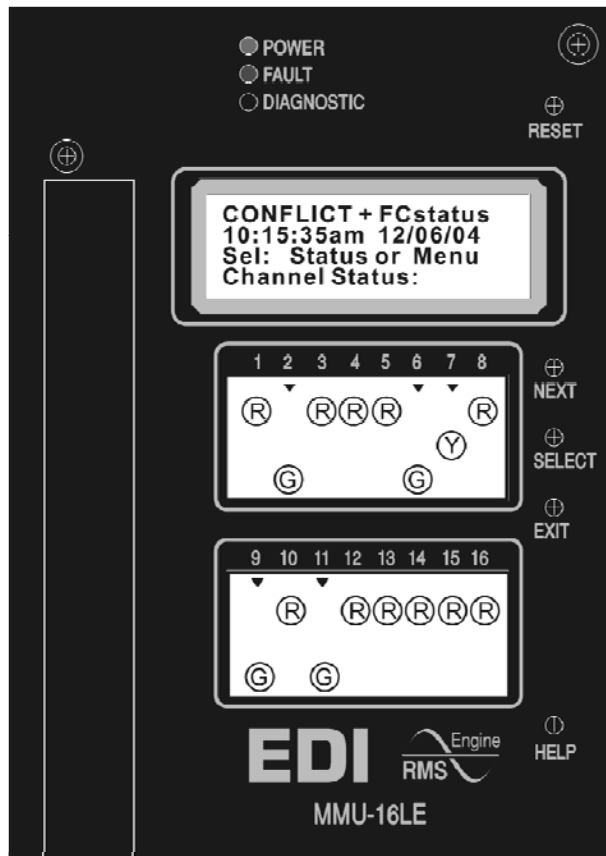
The Diagnostic Wizard automatically pinpoints faulty signals and offers relevant trouble shooting advice.

- › Identifies if the CU is the cause of the fault
 - › Pinpoints faulty signals caused by fault in the load bay or field
- First screen shows an explanation of the fault type and a concise view of only the channels involved in the fault.
 - Second screen pinpoints known faulty signals.
 - The last step offers the technician a list of probable causes to trouble shoot.

Just press the “Help” button!

Diagnostic Wizard Example

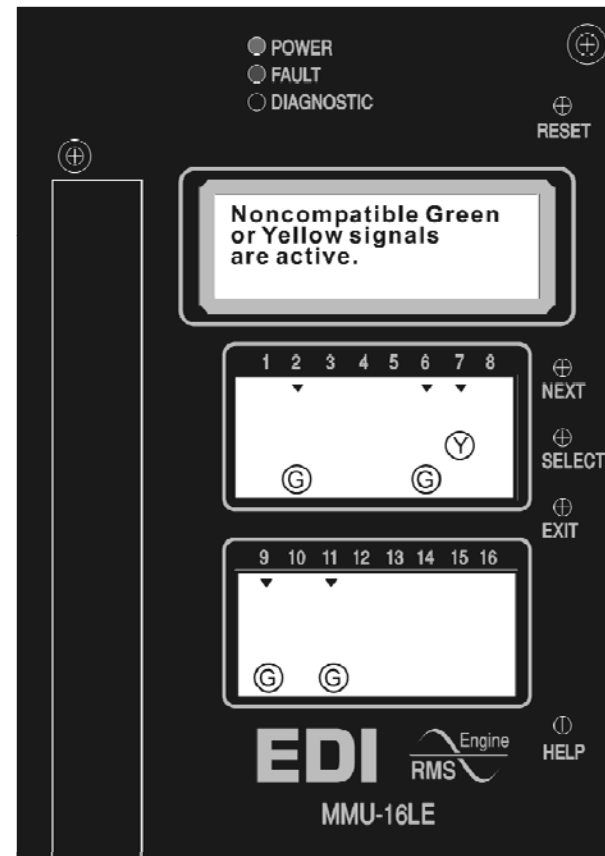
Main Status Screen



HELP



First Wizard Screen
(Concise Display)

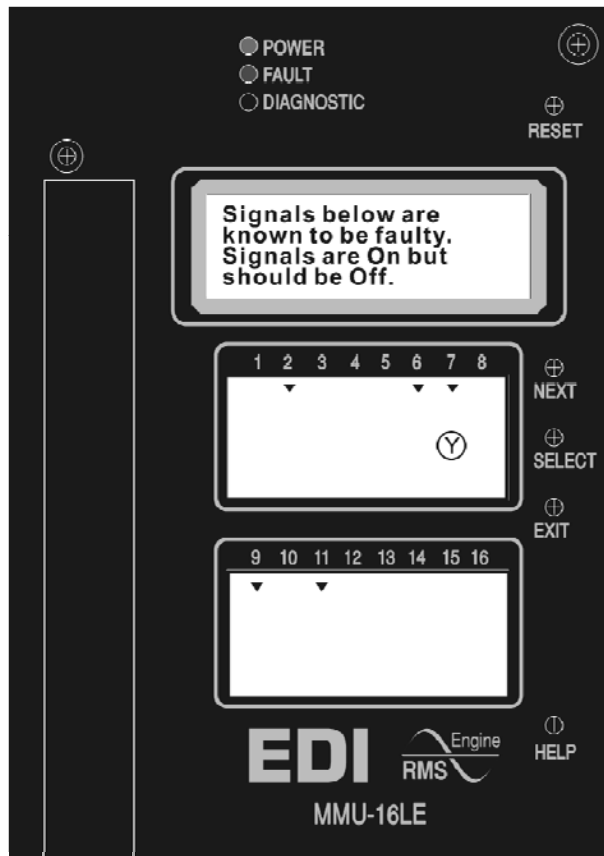


NEXT



Diagnostic Wizard Example (cont)

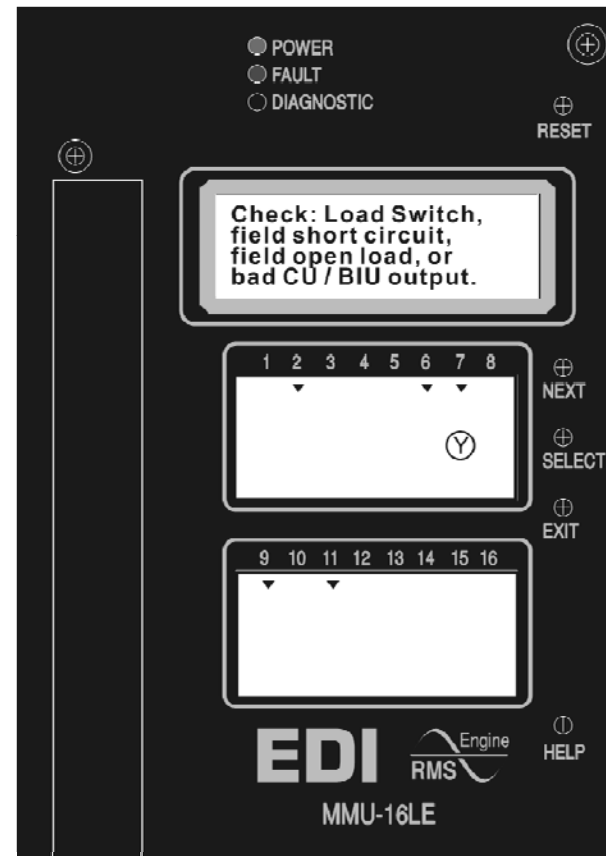
Second Wizard Screen
(Pinpoint faulty signals)



NEXT



Third Wizard Screen
(Trouble shooting advice)



DONE !

“Type 12 with SDLC” Option

● Benefits

- › Display interface remains 12 channel TS1 mode (RYGW)
- › EDI Field Check powers the Diagnostic Wizard
 - Identifies if the CU is at fault
 - Directly pinpoints faulty signals in load bay or field
- › MMU time clock is synchronized with the CU
- › Program Card is verified against the CU ring structure
- › Start-up Call function automatically puts CU in programmed start-up phases on exit from flash
- › CU provides redundant Conflict monitoring function
- › MMU fault status is available in the CU

● Requirements

- › CU to MMU Port 1 cable
- › Peds assigned to phases 2, 4, 6, and 8
- › No wiring changes to the cabinet are needed.

Putting it all together

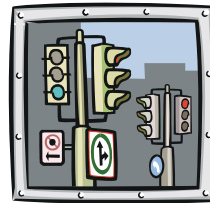
- From start to finish, even a novice technician can:
 - › correctly program the MMU-16LE *SmartMonitor*,
 - › collect accurate data regarding a cabinet malfunction,
 - › then diagnose the problem quickly and effectively.
Without even knowing what “field check, leakage, ...” is!
- With the MMU-16LE *SmartMonitor*
 - › Correct setup means fault coverage is broadened.
 - › Safety levels go up and liability risks go down.
 - › Intersection down time is reduced.
 - › Call backs are reduced with more effective repairs.

Have confidence that the repair actually affected the original problem!



ECcom

Signal Monitor Communications Software

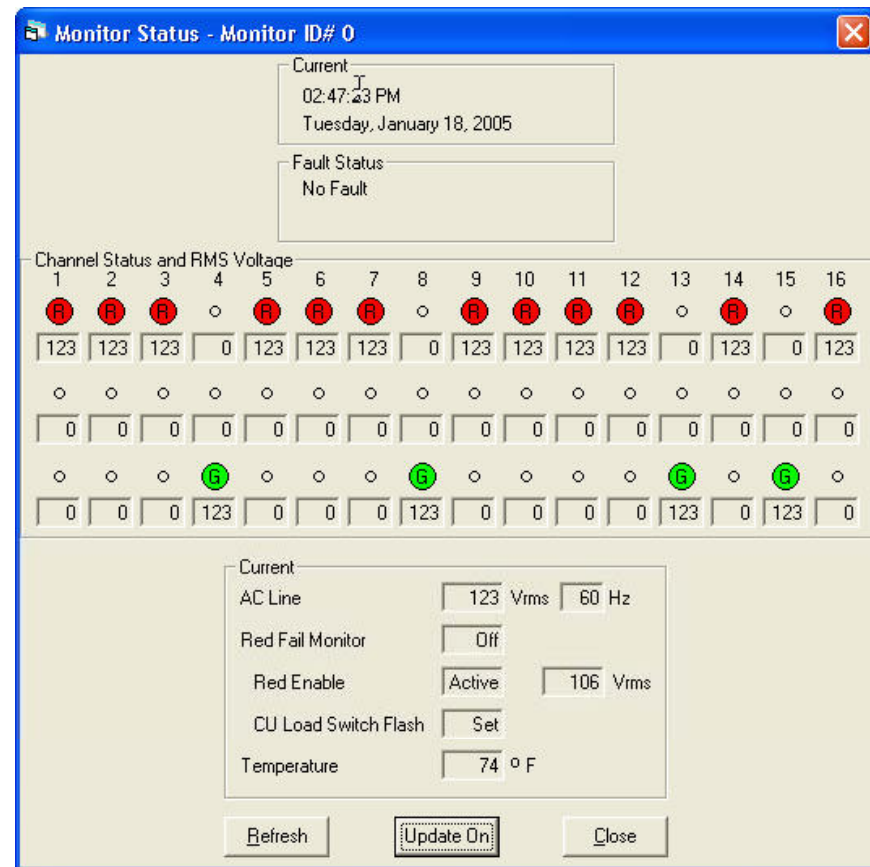


ECcomtm Communications Software

- ECcom software is used to communicate with an EDI signal monitor to retrieve and display valuable diagnostic information.
- Maintenance incident documentation is easy, complete, and accurate.
- Monitor reports can be seamlessly uploaded to the central system.

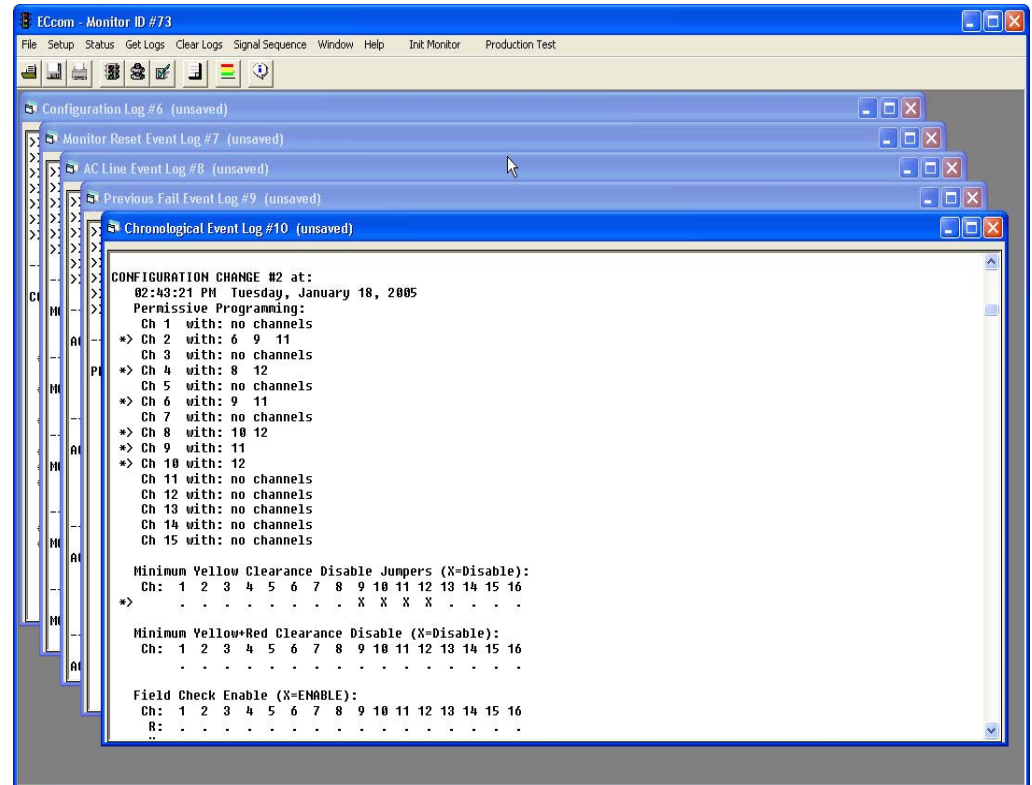
Why guess when you can know...

- Real time status shows all signal states, field terminal voltages, and cabinet control voltages.
- Current fault type and fault status is displayed with time and date stamp.
- Channels involved in the fault are directly indicated.



Diagnose with Accurate Information

- Four Event Log Types
 - › Previous Failures (25)
 - › Monitor Reset Events (25)
 - › AC Line Events (40)
 - › Configuration Change Events (10)
- Chronological sort of event types by time and date



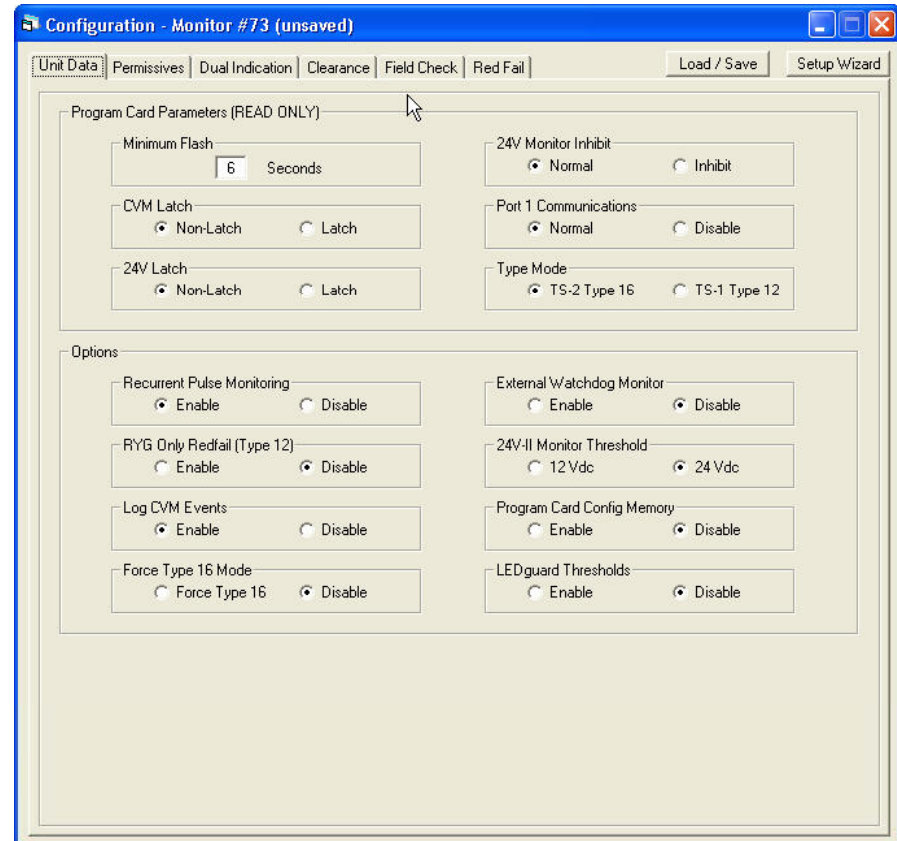
Diagnose with Accurate Information

- Signal Sequence Display
 - › Graphically display signal states for 30 seconds prior to fault trigger.
 - › 50 millisecond resolution.
- The MMU-16LE maintains Signal Sequence logs for the last five fault events.



EDI ECcom Misc Functions

- View Monitor Configuration
- Set Clock and Monitor ID
- View Configuration Check Value
- View firmware revision info
- *SmartMonitor*
 - › Transfer configuration database to / from disk file
 - › Set-up Wizard

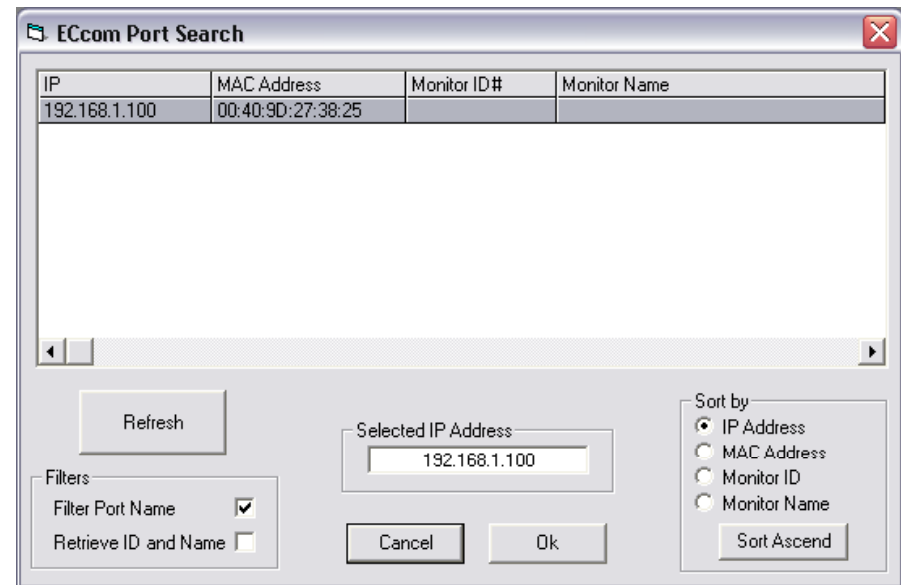


SmartMonitor Ethernet Configuration

- The default network settings from the factory are:
 - › IP Address 192.168.1.100
 - › Subnet Mask 255.255.255.0
- To change the *SmartMonitor* network settings
 - › ECcom Search Function
 - › Using ECcom DOES NOT require that the network settings of the PC match the network settings of the *SmartMonitor* (UDP)

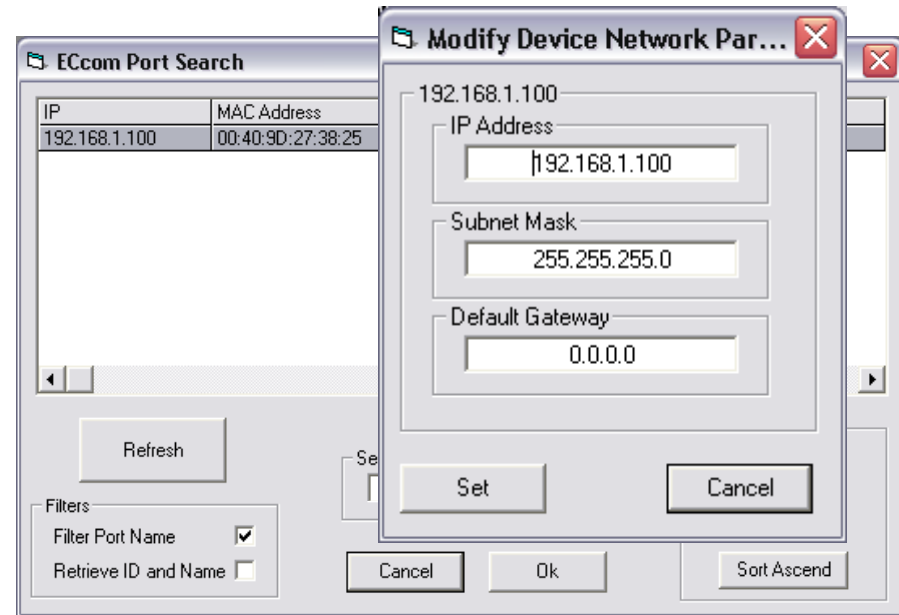
ECcom Ethernet Configuration

- SETUP / COMM PORT / SETTINGS menu item,
- Click on the SEARCH button. The Search function will find all EDI monitors on the local subnet.



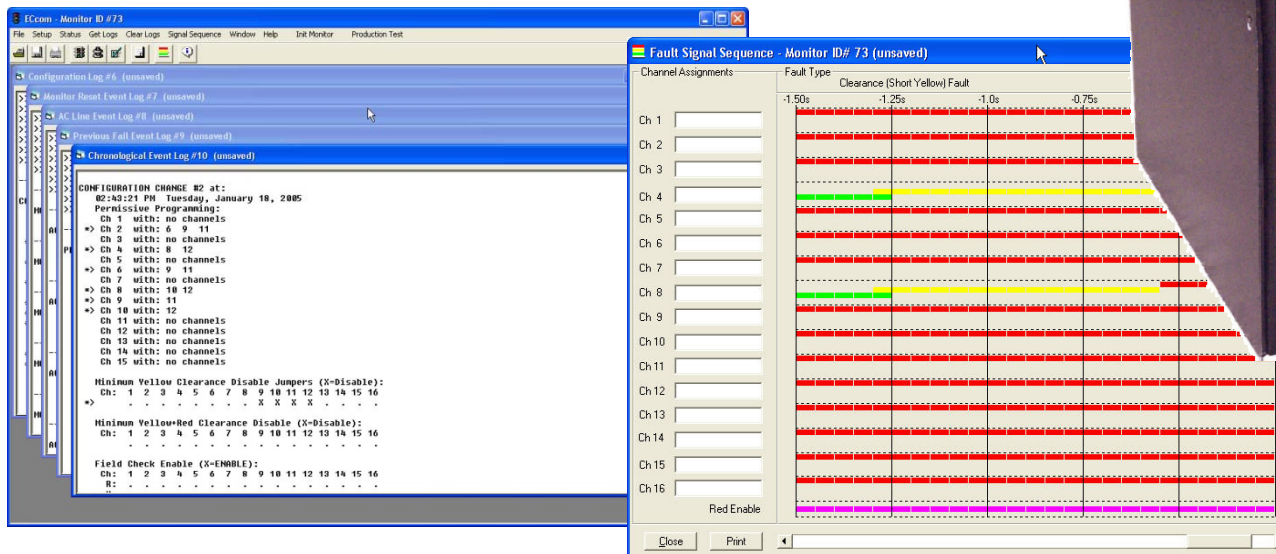
ECcom Ethernet Configuration

- Right Click on the monitor entry that needs to be configured
- Select CONFIGURE SETTINGS
- Set the new network parameters



MMU-16LE *SmartMonitor*tm

Whether you are a NOVICE or EXPERT Signal Technician, the MMU-16LE *SmartMonitor* and ECcom make a great combination.



Thank You...

Setting the Standard
for
Quality and Reliability

Eberle Design Inc.

www.EDIttraffic.com

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