LOG OF MEETING
DIRECTORATE FOR ENGINEERING SCIENCES

SUBJECT: Faultless Plug Cordset and Self-Testing Ground-Fault Circuit-Interrupter Technologies

DATE OF MEETING: October 2, 2001

PLACE OF MEETING: East West Towers, Bethesda, Md

LOG ENTRY SOURCE: Doug Lee, ESEE

DATE OF LOG ENTRY: October 23, 2001

COMMISSION ATTENDEES:
Doug Lee, ESEE
William King, ES
Andrew Trotta, ESEE
Michael Greene
Carolyn Meiers
Linda Edwards
Hope Johnson
Robert Garrett
Ed Krawiec

NON-COMMISSION ATTENDEES:
David Nemir- X-L Synergy
Ken Gettman- NEMA

SUMMARY OF MEETING:

Mr. Nemir presented two of X-L Synergy's technologies to the CPSC staff, the Faultless Plug® cordset and self-testing ground-fault circuit-interrupter (GFCI). Mr. Nemir had previously informed the staff about his Faultless Plug technology in 1997 that addressed lamp cord protection for kids chewing on power cords. Adding this technology to a lamp increases product costs significantly. Mr. Nemir explained that by adding these circuits to an appliance control circuit for products such as: electric blankets, heating pads, aquarium heaters, and sump pumps, the product can be made more competitively.

Some of the features of adding this circuit to a plug include: no moving parts, total encapsulation, programmable sensitivities, detection and interruption of ground-faults, and detection and interruption of parallel and series arc faults. Unlike a GFCI, the device can detect and interrupt line to neutral faults. Mr. Nemir informed the staff that this device is listed as an Underwriters Laboratories (UL) recognized component for leakage current detection and interruption.

Mr. Nemir cited the need for a self-testing GFCI based on a 2001 NEMA field test survey that

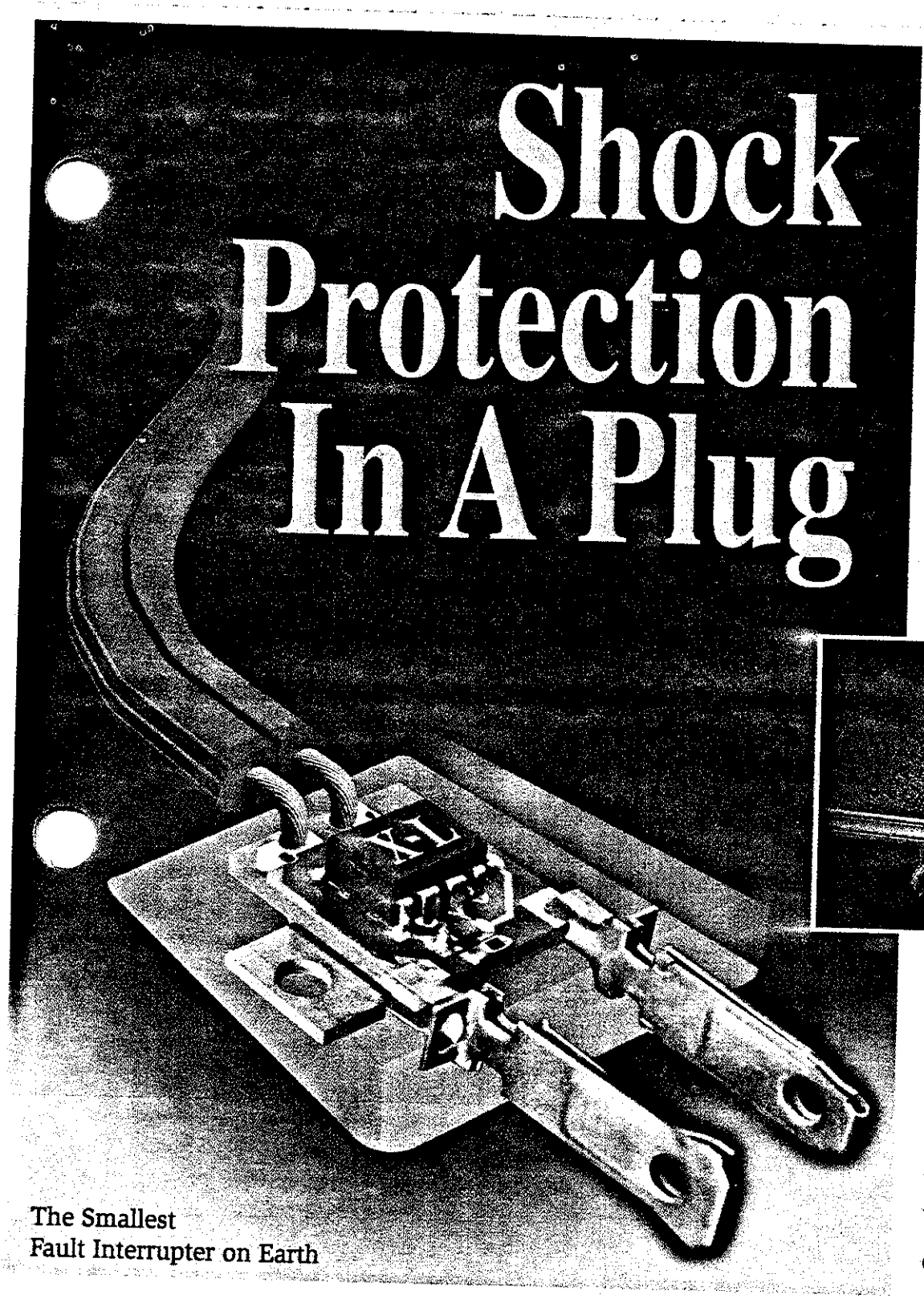
showed that 8% of GFCI receptacles were non-operational and 14% of GFCI circuit beakers were non-operational. He stated that X-L Synergy recently received a patent for the invention of a fail safe fault interrupter. This technology can be added to GFCIs, arc-fault circuit interrupters (AFCIs), and residual current detectors (RCDs) to automatically test the function of all detection components without the need for manual or user intervention.

Two methods of self-testing were presented, automated and semi-automated. The automated self-testing GFCI does not require user input to test or recognize a failure mode and a failure in any single component would not result in unprotected power to a user.

The semi-automated self-testing GFCI performs a test when the user presses a test button or when a fault is sensed. In both methods, an inexpensive secondary breaker is used to open the power to the load if a primary circuit failure occurs. Costs for the additional test circuits were estimated below one dollar.

A description of the features and block diagram are attached for both technologies. A specification sheet is attached for the Faultless Plug technology.

Shock Protection In A Plug



The Smallest
Fault Interrupter on Earth

X-L Synergy's Faultless Plug® appliance cordset detects and interrupts the electrical current leakages that can injure or kill. The patented technology uses an all-electronic design that fits into a conventional plug. The design makes it ideal for smart appliance and slow start applications.

OEM Cordsets Featuring:

High Sensitivity •

Self-Resetting •

Stops Frayed Cord and Arc Faults •

Programmable features for appliance control •

No more oversized, ugly plugs.

X-L Synergy

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email: sales@xlsynergy.com
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FAULTLESS PLUG CORDSET

AND

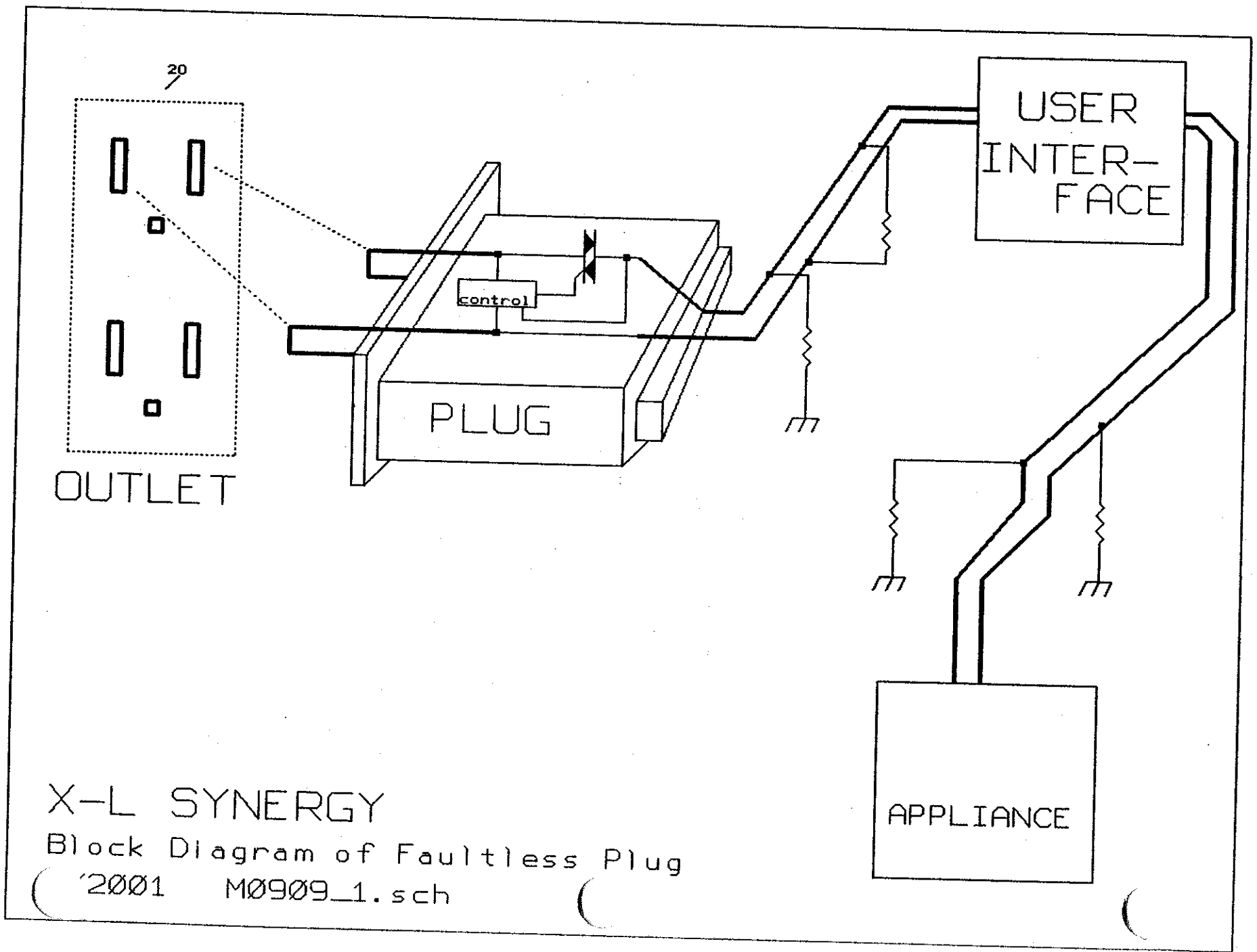
SELF-TESTING GFCI

David Nemir
X-L Synergy, LLC
El Paso, TX

CPSC 10/2/01

FAULTLESS PLUG® APPLIANCE CORDSET

- No moving parts
- Totally encapsulated
- Programmable sensitivity & noise immunity
- Detects and interrupts ground faults
- Detects and interrupts parallel and series arc faults
- Addition of appliance control features makes it cost competitive
- Example: Electric heating pad/electric blanket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OUTLET
control
PLUG
USER
INTER-
FACE
APPLIANCE
X-L SYNERGY
Block Diagram of Faultless Plug
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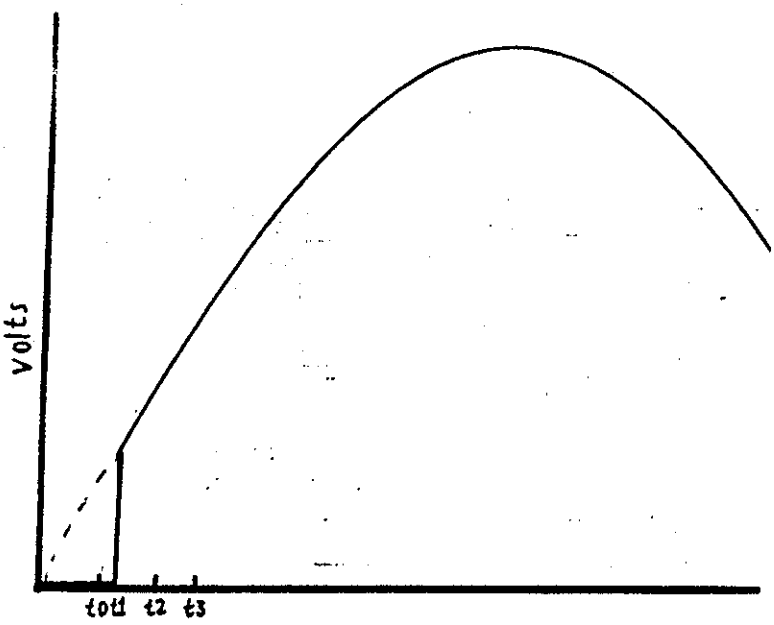

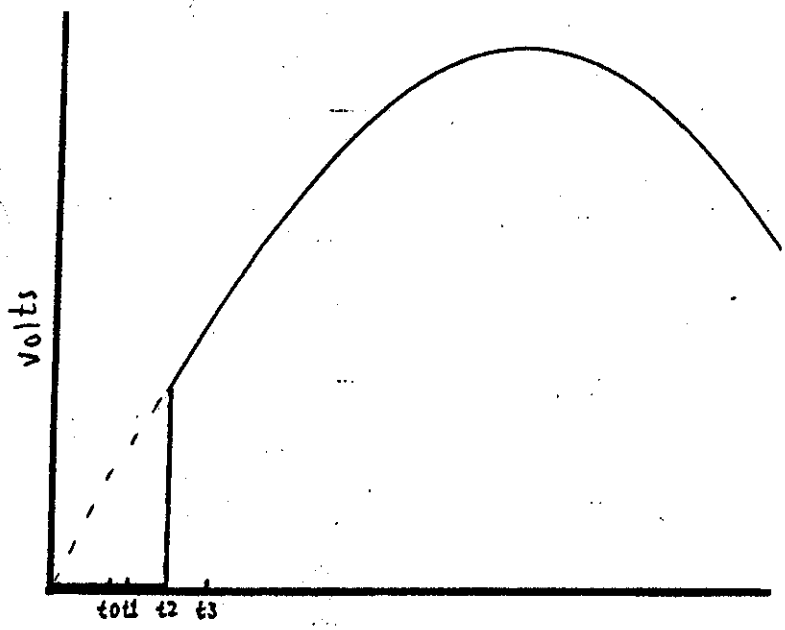

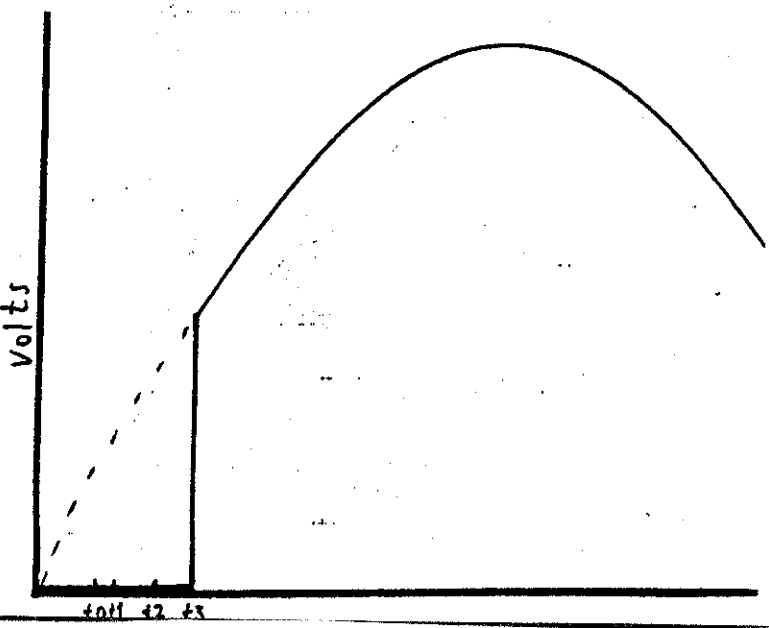

X-L SYNERGY

Control is Undertaken by Implementing Dead Zones

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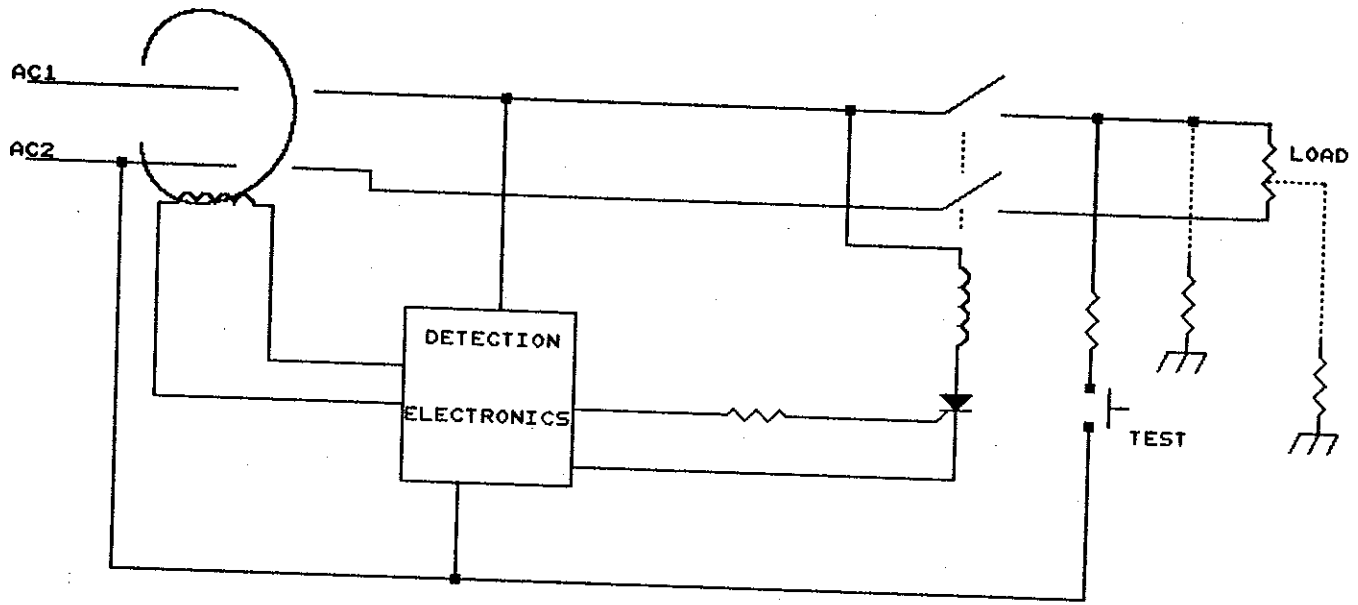
SELF-TESTING GFCI

2001 GFCI FIELD TEST SURVEY SHOWED A PROBLEM

- 8% of installed GFCI receptacles were nonoperational 14% of breakers
- Failures correlate positively with age & humidity
- No correlation with high lightning areas

SUGGESTED SOLUTIONS

- Additional measures to resist environmental contamination ---- supported by data
- Additional measures to protect against voltage transients ---- not supported by data
- Self Diagnostics ---- addresses failures from multiple sources



X-L SYNERGY

Block Diagram for GFCI Circuits

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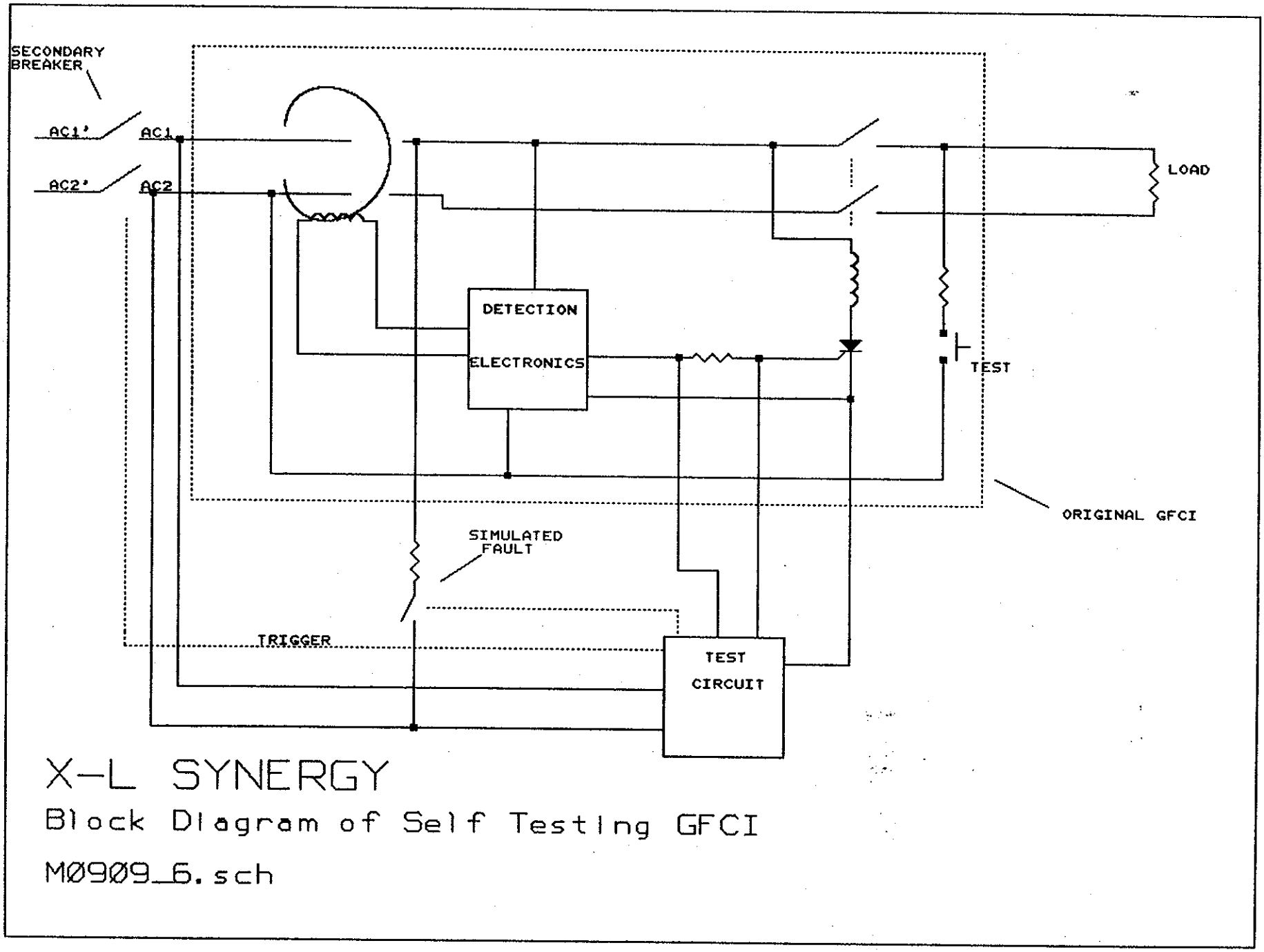

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Block Diagram of Self Testing GFCI

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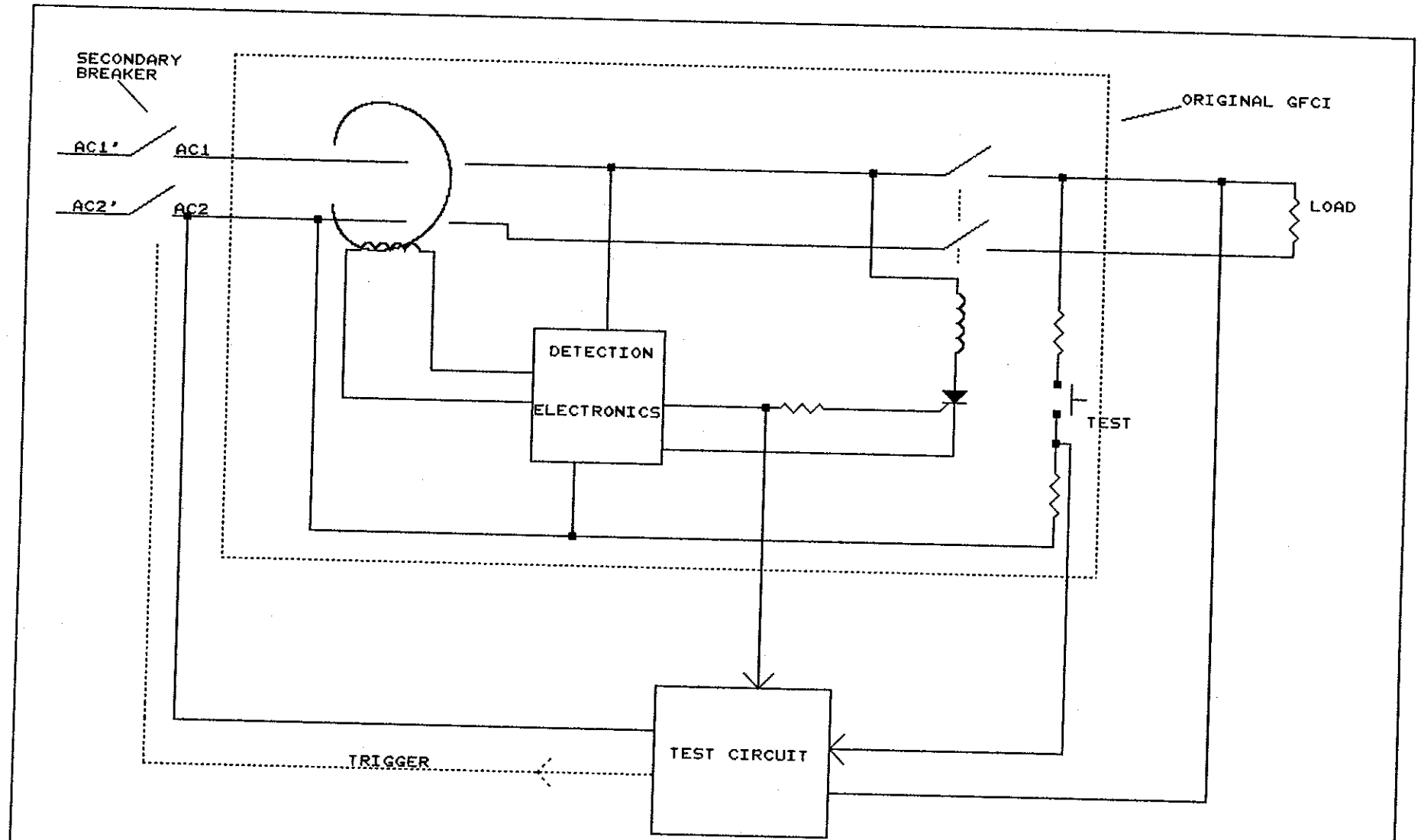

X-L SYNERGY

Block Diagram of Semi-Auto Tester

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AUTOMATED SELF-TESTING GFCI

- Does not require user input to test or to recognize a failure mode
- A failure in any single component within the GFCI will not result in unprotected power

SEMI-AUTOMATED SELF-TESTING GFCI

- Performs a test when user presses test button or when a fault is sensed

A SECONDARY BREAKER IS KEY TO THESE APPROACHES