fiXtress™ Sneak Circuit Analysis (SCA)
Prevent Hidden Hazard Potential

What are Sneak Circuits?

Sneak circuits are hidden paths in the circuits which cause undesired functions to occur, unrelated to a component failure. Sneak circuits can result in an undesired operation, or in an operation at an undesired time (or both).

Sneak circuit issues occur when the designer does not have an overall system view, and typically considers these events as EMI interferences or grounding issues.

Sneak circuit analysis is performed on electrical hardware circuits, and searches for these hidden paths in order to prevent hazards.

Possible Impacts of Sneak Paths

In a vehicle, the radio can generally be operated only when the ignition switch is on. However, when the radio switches on when the ignition is off, this could indicate a hidden sneak path.

In the diagram on the next page, when a driver presses the brake pedal, nothing happens. However, if while pressing the brake pedal, the hazard switch is on, the Radio switches on unsolicited. Although this sneak path is non-hazardous, in other cases, a sneak path could cause a missile to be launched, an airplane to crash or a submarine to move in the wrong direction.

fiXtress Automated SCA

How it Works

fiXtress creates electrical loops and calculates the current in each loop. Based on the current, it calculates the power and voltage dissipation to perform stress analysis and schematic review.

fiXtress then detects the unwanted loops, or sneak paths. By using component states and defining the "Target Object" and "Condition", it can detect all sneak paths easily and swiftly.

Benefits

- Automatically detects all sneak circuits
- Easy to use
- Performed in the schematic phase
- Supports all eCAD tools
- Improves reliability of the end product

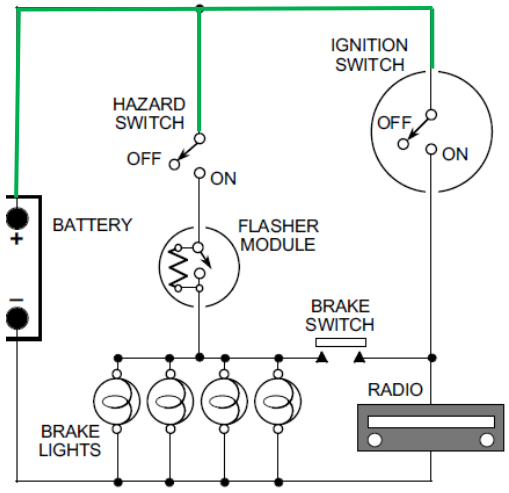
Methodologies

fiXtress supports standard methodologies for running SCA, using automated state vectors such as:

- Ground dome
- Power dome
- H-pattern
- Combined power/ground

	HAZARD	BRAKE	IGNITION	SNEAK PATH
1	OFF	OFF	OFF	No SNEAK PATH
2	OFF	ON	OFF	No SNEAK PATH
3	ON	ON	OFF	SNEAK PATH

1

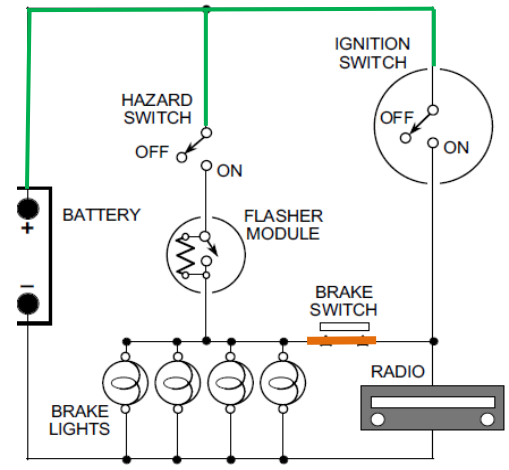


All switches open

Result: **No sneak path**

	RefDes	Pin #	Component State	Net Name	Ptotal	Vtotal	Itotal
1	Battary	1	-	hazard_Ignition	---	---	---
2	Battary	2	-	gnd			
3	Brake	1	SwitchOn	hazrad_brake	---	---	---
4	Brake	2	-	brake_ignition			
5	hazard	1	SwitchOff	hazard_Ignition	---	---	---
6	hazard	2	-	hazrad_brake			
7	Ignition	1	SwitchOff	hazard_Ignition	---	---	---
8	Ignition	2	-	brake_ignition			
9	Radio	1	-	brake_ignition	---	---	---
10	Radio	2	-	gnd			
11							

2

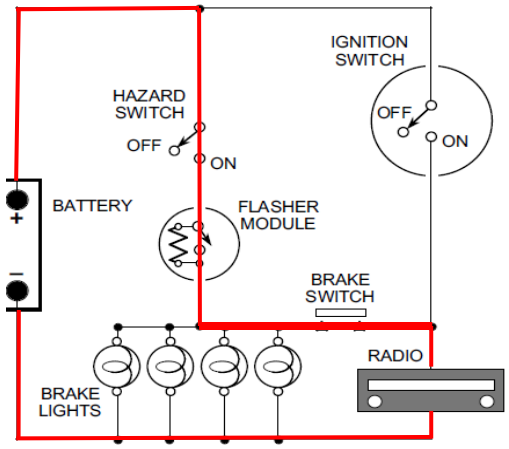


BRAKE switch pressed

Result: **No sneak path**

	RefDes	Pin #	Component State	Net Name	Ptotal	Vtotal	Itotal
1	Battary	1	-	hazard_Ignition	---	---	---
2	Battary	2	-	gnd			
3	Brake	1	SwitchOff	hazrad_brake	---	---	---
4	Brake	2	-	brake_ignition			
5	hazard	1	SwitchOff	hazard_Ignition	---	---	---
6	hazard	2	-	hazrad_brake			
7	Ignition	1	SwitchOff	hazard_Ignition	---	---	---
8	Ignition	2	-	brake_ignition			
9	Radio	1	-	brake_ignition	---	---	---
10	Radio	2	-	gnd			
11							

3



BRAKE & HAZAZRD switches pressed

Result: **A sneak path**

	RefDes	Pin #	Component State	Net Name	Ptotal	Vtotal	Itotal
1	Battary	1	-	hazard_Ignition	---	---	0.002
2	Battary	2	-	gnd			
3	Brake	1	SwitchOn	hazrad_brake	0.001	---	0.002
4	Brake	2	-	brake_ignition			
5	hazard	1	SwitchOn	hazard_Ignition	0.001	---	0.002
6	hazard	2	-	hazrad_brake			
7	Ignition	1	SwitchOf	hazard_Ignition	---	---	---
8	Ignition	2	-	brake_ignition			
9	Radio	1	-	brake_ignition	0.071	26.717	0.002
10	Radio	2	-	gnd			
11							