An Overview of

ATC
CABINETS

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AGENDA

- Introduction

- ATC Cabinet Overview

- Brief Development Overview

- Features and Benefits

- Assemblies & Components

Cabinet Overview

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Cabinet Overview

- The ATCC is an open architecture traffic control cabinet based on the ITE/NEMA AASHTO ITS Cabinet v1 standard.

- It offers significant improvements to conventional cabinets in modularity and compact size, motorist safety, technician safety, and diagnostics.

- This cabinet is intended to update or replace all cabinet types; NEMA TS-1, NEMA TS-2, and Caltrans 33x.
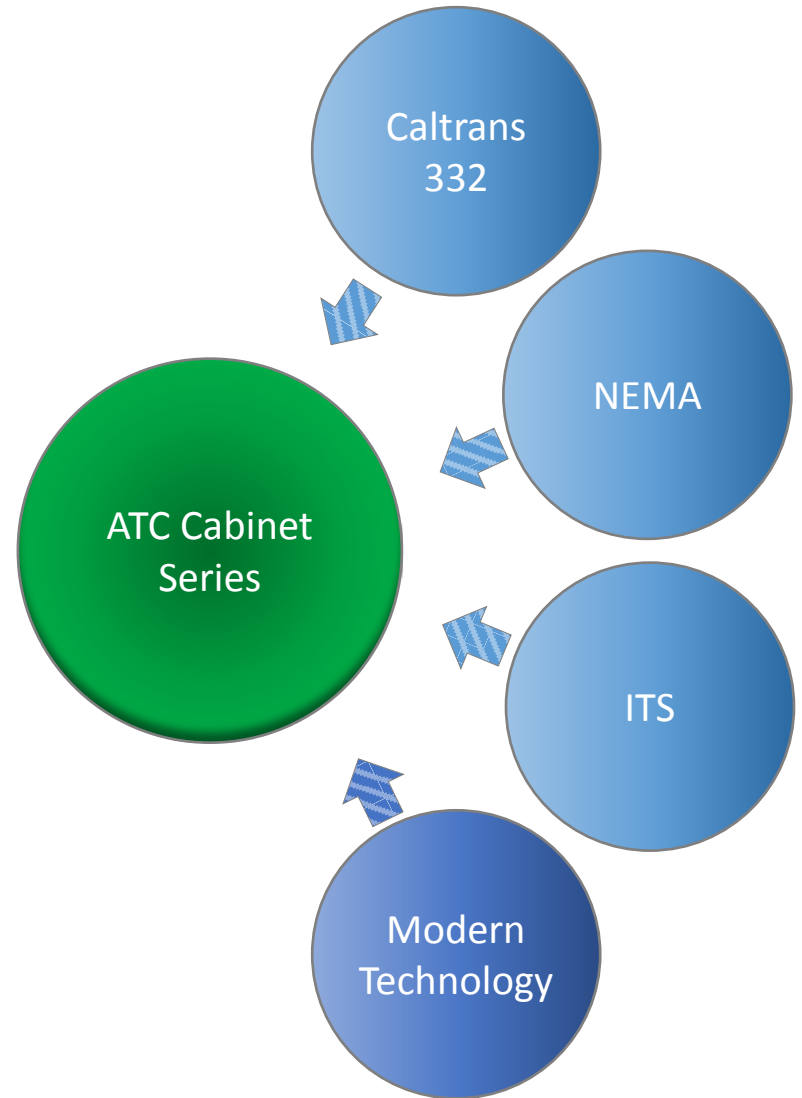

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Cabinet Overview

Best of All Worlds

- Combines existing standards and the latest technological advancements to increase cabinet reliability, functionality, and ease of maintenance.

Why "ATC"?

- The ATCC Standard is a component of the ITE/NEMA/AASHTO suite of ATC standards. It is intended to update the ITS Cabinet standard v1 to version 2.

Caltrans 332

NEMA

ATC Cabinet Series

ITS

Modern Technology

Brief Development History

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Brief Development History

- The ATCC *architecture* is based on the ITS Cabinet ITE/NEMA/AASHTO Standard v01.02.17b, published in 2006.

- This next phase ATCC work (v2) was developed using the FHWA Systems Engineering Process to develop the Concept of Operations (ConOps), Systems Requirements, capture user needs and requirements, and produce a high level design.
  - USDOT Work Order 14-0701, Tasks 7-12

- Goal of the v2 project was to refine v1 and adapt the lessons learned, and to support low voltage DC operation.

- In 2011 the WG lost funding and three manufacturers continued the program to bring the high level design to the detail level and produce working equipment.
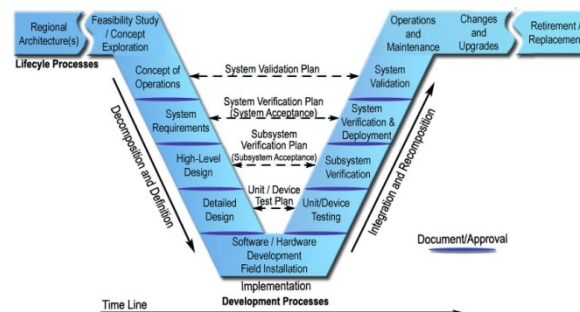
Features and Benefits

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Design Objectives

- Compact size

- LED signal compatibility

- Technician and Motorist Safety

- Modular rack mounted configurable design

- Accommodate large or multiple intersections

- Low Voltage Operation

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ATCC Features (Size Matters)

Put twice the equipment in the same space, or the same equipment in half the space.

- Compact double density size, 19" rack mounted

- High Density Components

- 16 or 32 channel Output capacity (16 channels shown)

- 120 channel Input capacity
  - 48 channel quad-density input assembly option

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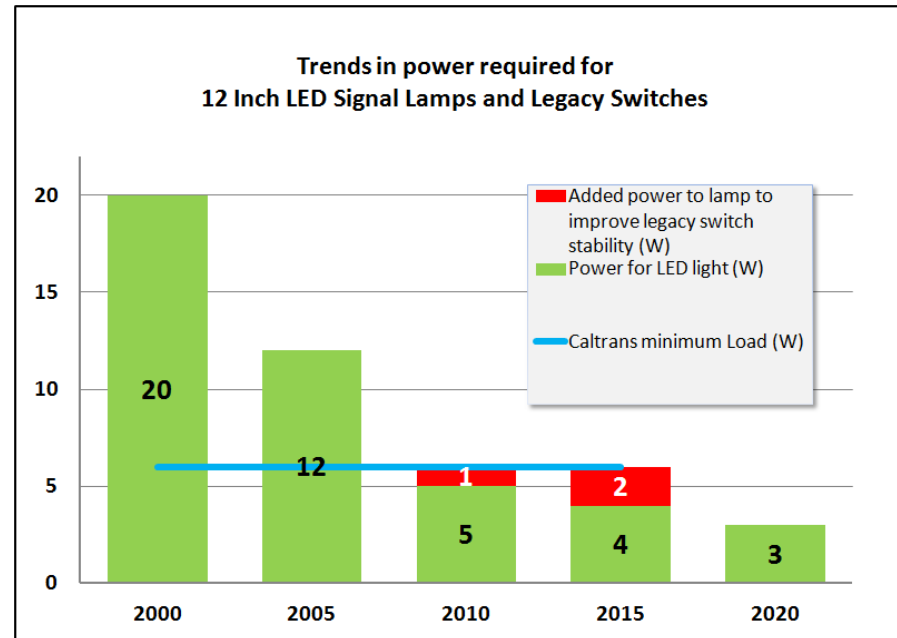
ATCC Features (LED Signals)

The ATCC Output technology is an *enabler* for higher energy efficiency.

- True LED compatibility. Load switches will support Ultra low power LED signals less than 2 watts.

- Higher energy efficiency within the cabinet, load switches utilize FET devices minimizing heat and waste, with no leakage current.

- Battery backup becomes more cost effective.

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ATCC Features (LED Signals)

- Conventional Triac based 10 Amp load switches have forced LED signal designers to maintain a minimum load for reliable field operation.

Trends in power required for 12 Inch LED Signal Lamps and Legacy Switches

Legend:
- Added power to lamp to improve legacy switch stability (W)
- Power for LED light (W)
- Caltrans minimum Load (W)

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ATCC Features (Motorist Safety)

Load Current monitoring detects a dark approach *immediately*.

Improvements for Fail-Safer design

- Flasher Output Monitor
- CMU Output Override
- 24Vdc Override
- All assemblies except FOTA and SA can be replaced with intersection still in flash
- Pluggable surge protection on Mains, Inputs, and Outputs

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ATCC Features (Technician Safety)

Technician Safety

- High voltage components are not exposed, per NEC

NFPA 70 Requirements

- Low Voltage cabinet further promotes Technician safety in the cabinet, as well as citizen safety when downed wires are present.

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ATCC Low Voltage Configuration

The ATC Cabinet design directly supports Low Voltage DC operation

- Spend less on PPE requirements

- Improved operational efficiencies

- Component costs are reduced

- Reduce liability risks

- Minimize regional electrician licensing issues

![ATC Cabinets logo] ATCCABINETS

ATCC Features (Architecture)

- Modular Assembly design
  - Modular construction facilitates a wide variety of configurations and allows for future expansion

- Easily handle advanced operations:
  - Adaptive
  - Bicycle detection
  - Count data
  - Texas Diamond
  - RWIS, etc....

- Competitive Procurement
  - Open architecture allows for interchangeable assemblies and components between manufacturers
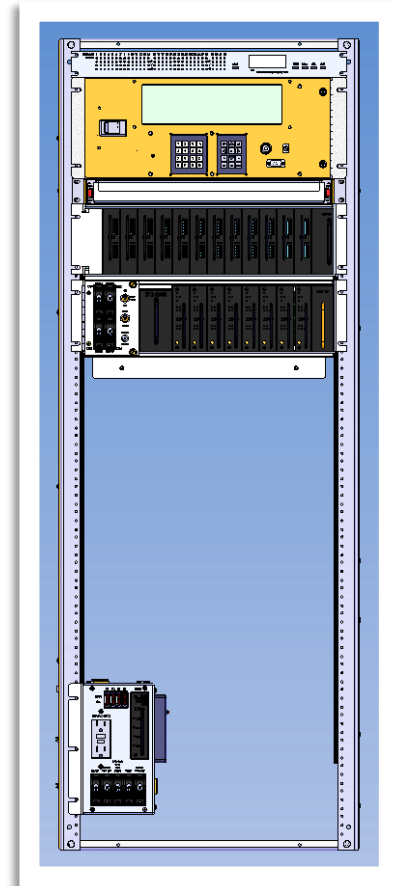 - Same cabinet design can support both 120 Vac and 48 Vdc operation.

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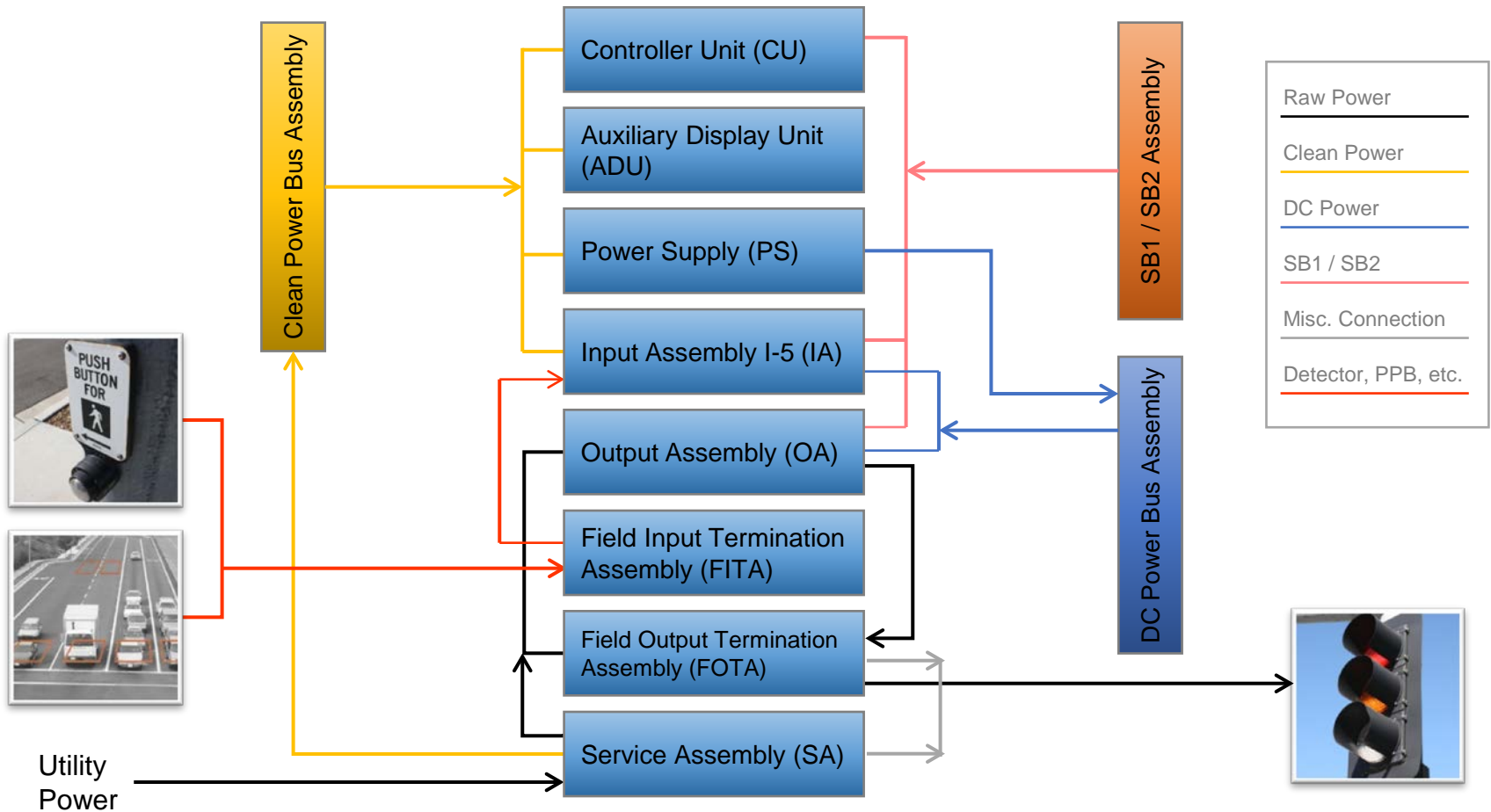# Assemblies and Components

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ATCC Assemblies

- **19" or 14" Rack Mounted Modular System**
  - ATC Controller with Serial Bus
  - Output Assembly
  - Input Assembly
  - Serial Bus / DC Bus Cable Assembly
  - AC Clean Power Cable Assembly
 - Input and Output Termination Panels

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ATCC Block Diagram

Legend:
- Raw Power
- Clean Power
- DC Power
- SB1 / SB2
- Misc. Connection
- Detector, PPB, etc.

Blocks:
- Clean Power Bus Assembly
- Controller Unit (CU)
- Auxiliary Display Unit (ADU)
- Power Supply (PS)
- Input Assembly I-5 (IA)
- Output Assembly (OA)
- Field Input Termination Assembly (FITA)
- Field Output Termination Assembly (FOTA)
- Service Assembly (SA)
- SB1 / SB2 Assembly
- DC Power Bus Assembly
- Utility Power

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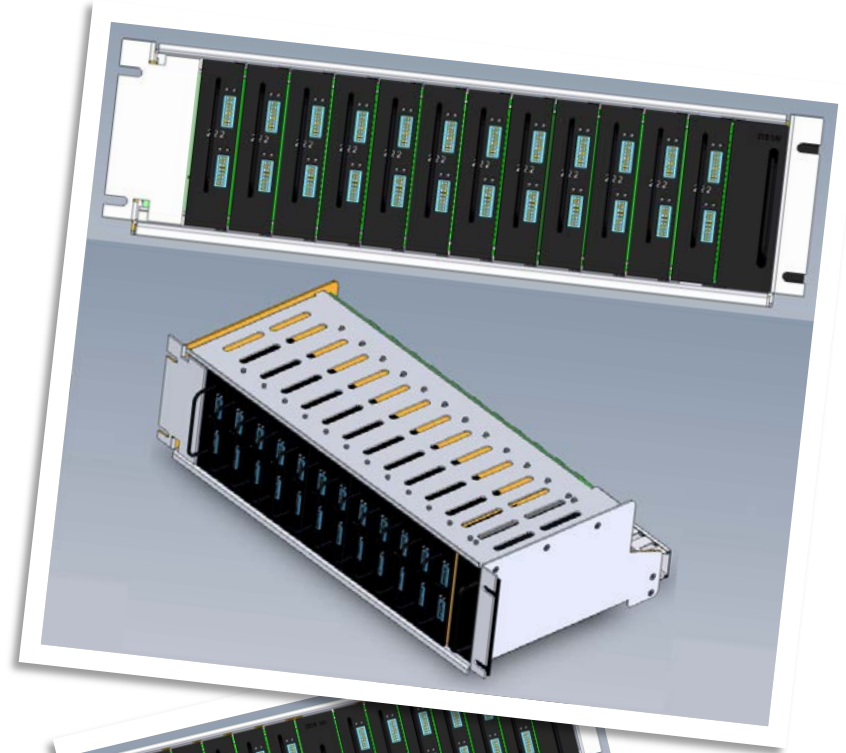# Output Assembly

Output Assembly Houses

- Model 2212 Cabinet Monitor Unit (CMU2)

- Model 2202 High-Density Switch Pack (HDSP)
  - *16 channel version*
  - *32 channel version*

- Model 2218 Serial Interface Unit (SIU2)

- Main Contactor (MC)
  - 48 VDC coil
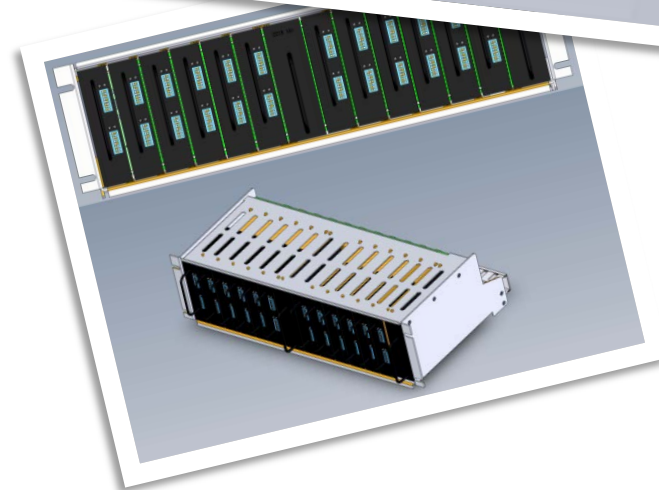 - Mercury-free

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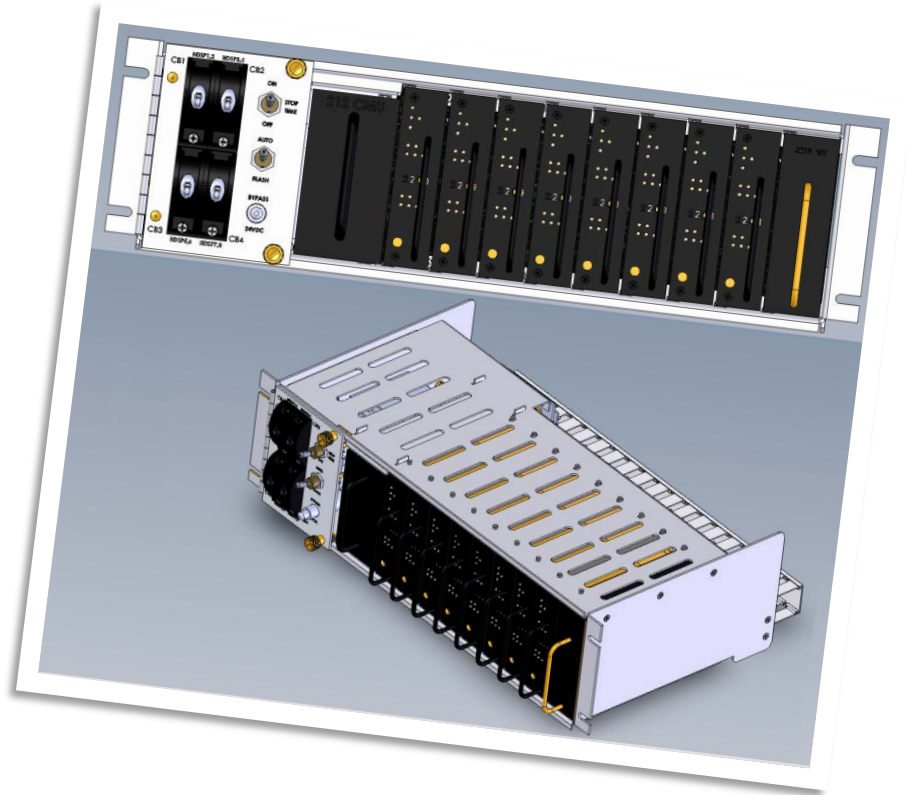
Input Assembly

24-Channel Input Assembly

- Houses twelve 2-channel devices, or six 4-channel devices, or a combination of 2 & 4 channel devices

- *Detector fault status provided*

- *Supports 120 inputs*

48-Channel Input Assembly

- Houses twelve 4-channel half width devices

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ATCC Key Components

- Cabinet Monitor Unit (CMU2)
- Auxiliary Display Unit (ADU)
- High Density Switch Pack / Flasher Unit (HDSP-FU)
- Serial Interface Unit (SIU2)
- Cabinet Power Supply (PS)
- High Density FTR

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ATCC Components (HDSP)

- Card based *two channel* Load Switch, interchangeable with the Four Output Flasher

- Output *Voltage and Current* measured for each output (6), reported to CMU via SB#3
  - Six outputs rated at 5 mA to 1 Amp (1-120 watts)

- LED compatible to <2 watts, no leakage

- CMU controlled output over-ride for fail-safer operation

- "ID" indicators driven by CMU based diagnostics for simplified trouble-shooting

- 120 Vac (HV) and 48 Vdc (LV) versions

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ATCC Components (CMU, ADU)

- The CMUip-2212 is a modular signal monitor *capable of monitoring 32 channels*.

- Voltage and current data is received from each HDSP and HDFU device via SB #3.

- All configuration programming is provided in the *Datakey*, a non-volatile memory device.

- The ADU2220 provides the CMU display capability for access to the *SmartMonitor*® technology.
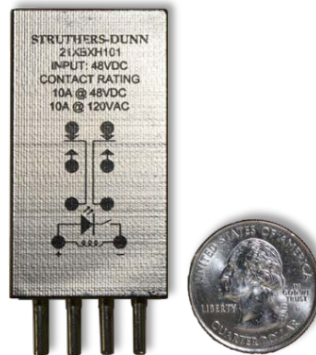
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ATCC Components (FTR)

Combat the Elements

HD Flash Transfer Relay

- Hermetically sealed nitrogen enclosure

- LED indicator reports actual contact status

- DC coil voltage

ATCC Components (Surge)
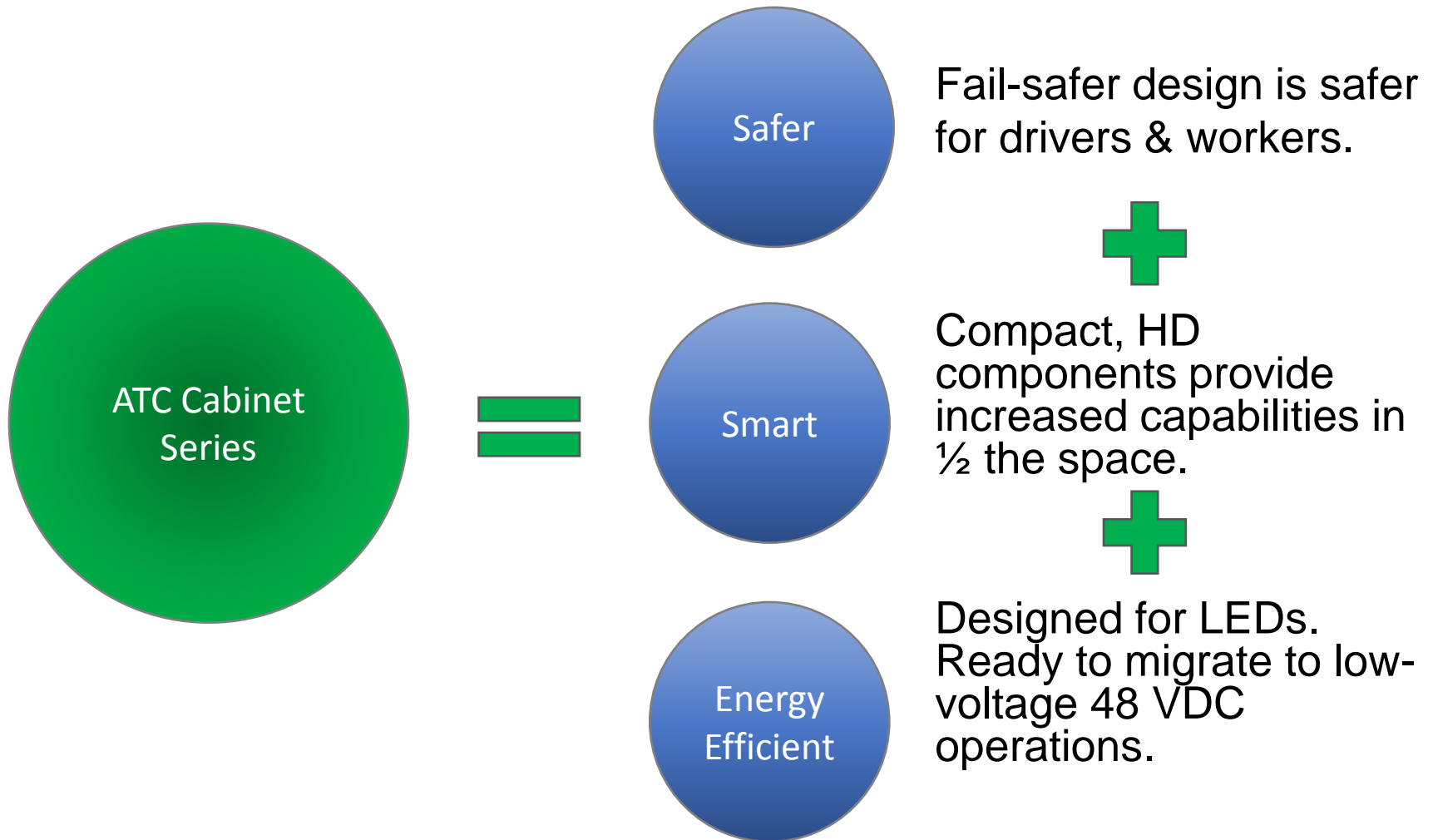
Combat the Elements

- Pluggable SHA1250 Surge/Filter
  - LED health indicators

- Pluggable Input and Output Transient protection devices
  - Loop Inputs
  - Field Outputs
  - Mains Inputs

- Pluggable means testable

Summary

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ATCC Summary

ATC Cabinet Series =

Safer

Fail-safer design is safer for drivers & workers.

Smart

Compact, HD components provide increased capabilities in ½ the space.

Energy Efficient

Designed for LEDs. Ready to migrate to low-voltage 48 VDC operations.

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ATCC Status

- Equipment Availability
  - Two OEM manufacturers in production (HV & LV)
  - Two other OEM manufacturers in design

- Several projects already deployed

- Six CU local software suppliers
  - Two currently qualified for ATCC software

- Standards document in draft development

- Funding is being secured to reinstate the ITE/NEMA/AASHTO Working Group to complete the ATCC Standard

Want to Know More?

Q & A

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ATCC Contacts

Want to Know More?

Q&A

- Eberle Design   www.EDItraffic.com
- Intelight   www.Intelight.com
- McCain   www.McCain-inc.com
- Struthers-Dunn   www.struthers-dunn.com
- Eagle Traffic   www.eagletrafficcontrolsystems.com
- Econolite   www.Econolite.com

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