350i ATC Cabinet

Traffic Controller Cabinet Operations Manual

USER MANUAL

Manual Version: 1.1

Part Numbers:
M56764, M59267

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1 GENERAL DESCRIPTION

1.1 Overview

The Model 350i ATCC-HV is a four door Cabinet (double front and rear doors) and complements the operational capabilities of ATC controllers. The Model 350i ATCC-HV is engineered to facilitate independent assembly and designed to house high-density components that dramatically reduce assembly space requirements. The unit easily handles up to 120 detector inputs and 32 channel outputs.

The advanced safety features of the 350i ATCC-HV include load current monitoring, no exposed high-voltage per NEC, and the ability to keep the intersection in flash while replacing the output assemblies. The cabinet operates in a 120VAC environment.

1.2 Major Assemblies

The 350i ATCC-HV Cabinet is comprised of the following major assemblies:

- Housing
- Fan Panel Assembly
- LED lamp Assembly
- Rack Assembly:
- Mounting Cage
    - Mounting Cage
    - CMU Auxiliary Display Unit
    - Drawer shelf
    - Input Assembly 24 channels (48 channels optional)
    - Output Assembly 16 channels (32 channels optional)
    - Service Assembly
    - PS-2216-24-HV Power Supply
    - Bus Assembly (SB1/SB2 communication ports, DC Power & AC Clean Power)
    - Field Output Termination Assembly
    - Field Input Termination Assembly

The cabinet can accept the following plug-in units:

- Model 2202-HV High Density Universal Switch Pack / Flasher (HDSP/HDFU-HV)
- CMUip-2212-HV Cabinet Monitor Unit (CMU)
- SIU-2218 Serial Interface Unit (SIU)
- 21XBXHL-48VDC High-Density Flash Transfer Relay (HDFTR)
- Model 222 Loop Sensor Unit
- Model 224 Loop Sensor Unit
- Model 242L DC Isolator
- Model 252/5 AC Isolator
- Model 244L DC Isolator
- A two or four channel detection module

1.3 Specifications

Temperature Range	-37 degrees C to +74 Degrees C
Relative Humidity	0 to 95% (Non-Condensing)
Power	90 to 135VAC
Conductors	MIL-W-16878D Type B or better
Materials	Aluminum, 5052-H32, 0.125” thick
Finishes	Natural, painted, powder coat anti-graffiti
Dimensions	67” H X 45” W X 26” D
Mounting	Base mounted, bolt pattern 40.5” X 18” (4) ¾” X 18” anchor bolts (optional)
Access	Full size doors, front and rear.
Ventilation	200 CFM Fan with Thermostat Control Filtered air intake in front door
Lock System	3 point, choice of Corbin or Best Locks
Handles	Stainless steel with padlock features
Door Stops	90° and 180° (± 10°) each door, top
Rack Assembly	Removable 19” EIA racks
Shipping Weight	450 lbs. without plug-ins or controller

2 GENERAL CHARACTERISTICS

2.1 Cabinet Wiring

The wiring for the Model 350i ATCC-HV consists of fan panel / police panel harness, HP1-CC harness, and loop wires.

All AC+, AC- and EG conductors are identified by a solid black, solid white and solid green color respectively. The 48VDC, 24VDC, 12VDC and DC- wires are identified by solid yellow, red, orange and white with red stripe respectively, and are physically separated from the AC wires.

2.2 Fan And Thermostat Assemblies

Two Fan Panel Assemblies are attached to the cabinet top, left and right side, and are wired to the rack through one 9-position connector (HP1). Each Fan Panel Assembly includes one fan with an easy mount bracket. The bracket does not require any tools to be removed.

The two fans are part of the cabinet exhaust system and have a total capacity of 200 CFM.

The Thermostat Assembly is placed on the top of the rear side of the rack assembly EIA rail and it includes two fuses for each fan, one fuse for the lamp, two adjustable thermostats, one switch to power on/off the lamp and one two pole bypass test switch to verify if the fans are working properly.

2.3 Police Panel And Door Switch Assembly

The Police Panel compartment is designed to give limited access to emergency staff. The Police Panel contains AUTO/FLASH, SIGNAL, Manual Control Enable and Interval Advance switches, which are wired through the CC connector. These switches are located behind the Police Panel Door.

2.4 Service Assembly

The Service Assembly is located on the lower left side of the cabinet mounted on the side panel and the EIA rail. The Service Assembly contains five circuit breakers for power protection, one high-density flasher unit (HDFU), four automotive type fuses for flasher outputs protection, one GFCI, one SHA-1250-

ITS surge protector or equal, two copper bus bars for EQ ground and Neutral, and some AC outlets for general purpose use.

The five position terminal block on the Service Assembly is for connecting the AC power input as well as BBS. When a BBS is being used, the BBS jumper #10 AWG will be removed from the terminal block.

2.5 Service Assembly with Two Flashers

The Service Assembly is located in the lower left side of the cabinet mounted on the side panel and the EIA rail. The Service Assembly contains six circuit breakers for power protection, two high-density flasher units (HDFU), eight automotive type fuses for flasher outputs protection, one GFCI, one SHA-1250-ITS surge protector or equal, two copper bus bars for EQ ground and Neutral, and some outlets for general purpose.

The five position terminal block on the Service Assembly is for connecting the AC power input as well as BBS. When a BBS is being used, the BBS jumper #10 AWG will be removed from the terminal block.

2.6 Input Assembly

The Input Assembly contains twelve slots to operate twelve 2-channel detection modules or six 4-channel detection modules. The Input Assembly accommodates one Serial Interface Unit (SIU) with capacity to operate 24 input channels. The SIU communicates to the Controller unit via SB1/SB2 ports using a DB25 connector receptacle mounted on the back. The model 350i ATCC-HV has capacity to accommodate up to five 24 channel Input Assemblies. Each Input Assembly is addressed using an ADC Phoenix Block mounted on the back.

The Input assembly also includes, on the backside, one DCP connector for DC power, one P1 connector for AC clean power and two IDC connectors, FITA J1 and FITA J2, for loop wire interconnections.

2.7 Rack Assembly

The Rack Assembly is modular and easily facilitating the interchange of assemblies. It contains:

- EIA rails where all the assemblies are mounted
- Drawer shelf
- Input Assembly, 24 channel (48 channels optional)
- Output Assembly, 16 channel (32 channels optional)
- Service Assembly
- Cabinet Power Supply
- DC Power / Communication Bus
- Clean AC Bus
- Field Output Termination Assembly, 16 channel
- Field Input Termination Assembly, 24 channel
- CMU Auxiliary Display Unit

2.8 PS-2216-24-HV Cabinet Power Supply

The Model PS-2216-24-HV Cabinet Power Supply is 1U high and a high efficiency switching power supply. It provides regulated 48VDC and 24VDC outputs.

A green LED indicator displays AC Line input status and fuse integrity. Separate green LED indicators display output status and fuse integrity for each DC output.

The output connector is a Phoenix Contact. Pin #1 is the right most pin when viewed from the rear of the supply.

Pin	Function
1	+48VDC
2	48VDC GROUND
3	+24VDC
4	+12VDC (optional)
5	24/12 VDC GROUND
6	EQ GROUND

2.9 Output Assembly, 16 Channel

The 16 channel Output Assembly is 3U high and provides 16-output channels. The 16 channel Output Assembly contains eight slots to operate eight 2-channel High Density Switch Packs and one Cabinet Monitor Unit (CMU). Each of the 16 channels connects to the Serial Interface Unit by means of a printed circuit motherboard. The Output Assembly contains four circuit breakers for signal head power protection. Each circuit breaker provides power to two High Density Switch packs.

A stop time switch, an AUTO/FLASH switch, and a 24VDC bypass switch are located on the front panel of the Output Assembly.

Eight white connectors are mounted on the backside to interconnect to the Filed Output Termination Assembly. Each connector connects two phases (red, yellow and green) and their respective HDSP output sense wire.

2.10 Output Assembly, 32 Channel

The 32 channel Output Assembly is 6U high and provides 32 output channels. The 32 channel Output Assembly contains sixteen slots to operate sixteen 2-channel High Density Switch Packs and one Cabinet Monitor Unit (CMU). Each of the 32 channels connects to two Serial Interface Units by means of a printed circuit motherboard. The Output Assembly contains eight circuit breakers for signal head power protection. Each circuit breaker provides power to two High Density Switch packs.

A stop time switch, an AUTO/FLASH switch, and a 24VDC bypass switch are located in the front panel of the Output Assembly.

Sixteen white connectors are mounted on the backside to interconnect to the Field Output Termination Assembly. Each connector connects two phases (red, yellow and green) and their respective HDSP output sense wire.

2.11 Field Output Termination Assembly

The Field Output Termination Assembly (FOTA) provides 16 field output channels and it is mounted on the EIA rail in the back of the Rack assembly. The FOTA includes sixteen Phoenix blocks for the output channels, sixteen flasher blocks for red, yellow or non-flashing configuration, eight High Density Flash Transfer Relays and eight Phoenix blocks on the backside for optional surge protection.

2.12 Field Input Termination Assembly

The Field Input Termination Assembly (FITA) provides 24 field input channels and it is mounted on the EIA rail in the back of the Rack Assembly. The FITA includes twelve Phoenix blocks for the input channels and twelve headers for optional suppressors.

2.13 Bus Assembly

The Bus Assembly provides serial communication and DC power to the entire cabinet. The Bus Assembly is located in the back of the cabinet below the Cabinet Power Supply. The Bus Assembly contains a mechanism allowing the assembly to fold down in case access to the rear of the Controller is required. The panel is secured to the EIA rails with fixed 10-32 screws and two thumbscrews on the top for easy access.

Below the Bus Assembly, a conduit protects the connected harnesses and allows for easy wiring.

The Bus Assembly has eight AC receptacles and provides Clean AC power to the entire cabinet.

3 INSTALLATION

3.1 Installation

This section contains information on the installation of the 350i ATCC-HV cabinet and its accessories. On-site installation, by qualified personnel, will include connection of service power, signal wires, loop detector wires, etc. Refer to the cabinet print furnished with the cabinet. Be sure to provide adequate safety at the intersection during installation. Follow your D.O.T. guidelines.

The 350i ATCC-HV cabinet is base mounted using (4) ¾” X 18” anchor bolts for installation. The Bolt pattern is 40.5” X 18”. Two lifting ears are provided for installing the cabinet on its foundation.

3.2 PS-2216-24-HV Cabinet Power Supply

The model PS-2216-24-HV Cabinet Power Supply is an EIA rail mounted type and is installed in the top rear of the rack assembly. It is secured with four 10-32 x ½ screws. For more details, see the cabinet print.

3.3 Other Rack Assembly Installation

Installation consists of placing each assembly in the correct position within the cabinet mounting cage and fastening it in place with 10-32 x ½ inch truss screws. Make the appropriate harness connections to terminals according to the cabinet print.

4 ADJUSTMENT

4.1 Mechanical Adjustment

ATC cabinet assemblies easily move up and down on the EIA rails to meet customer needs.

4.2 Electrical Adjustment

Cabinet Power Supply Adjustment: Refer to the PS-2216-24-HV Power Supply adjustment.

4.3 Field Adjustment

Thermostat is set at turn-on per end-user discretion.

5 THEORY OF OPERATION

5.1 One-Line Diagram and Theory of Operation

The 350i ATCC-HV cabinet is a serially interconnected cabinet. The ATC controller is connected to the cabinet via two serial ports, SB1/SB2, using a DB25 cable. These ports are located in the “SB1/SB2 & DC power bus” in the back of the cabinet. The Input and Output Assemblies are connected to the above-mentioned bus using a DB25 cable.

The CMU, located in the Output Assembly, communicates with the High-Density Switch Packs, High-Density Flasher Unit and CMU Auxiliary Display via serial port SB3. The SB3 port is interconnected between the assemblies using a RJ45 cable.

5.1.1 Signal Mode (Normal Operation)

In normal mode, the ATC controller is responsible for the intersection signal indicator changes and timing.

The HDFTR’s and Main Contactor coils are energized during Signal Mode. The following needs to happen to keep the HDFTR’s and MC coils energized:

- Police Panel Signal On/Off should be in the “On” position.
- Police Panel Signal Auto/Flash should be in the “Auto” position.
- CB1 through CB4 should be all in the “On” position.
- Output Assembly Auto/Flash switch should be in the “Auto” position.
- CMU, with Datakey, should be plugged in and fault relay should be in normal position when the cabinet door is closed.

5.1.2 Flash Mode

In flash mode, the flashers will be responsible for the signal indicator to flash Red/Yellow. Lack of any of the above conditions 1-5 will result in the removal of AC+ to the Main Contactor control input and HDFTR’s coils. When the Cabinet Monitor Unit senses a fault (i.e., conflicting field output circuits, or improper DC voltage), the 48VDC will be removed from the Main Contactor control circuit and HDFTR coils. In the Flash Mode, the Cabinet Monitor Unit reports the status to the Controller unit via serial bus 1.

5.1.3 Dark Mode

When the Police Panel Signal On/Off switch is placed in the OFF position, the HDFTR coil is energized, keeping the transfer relays in signal mode and at the same time the Main Contactor coil is de-energized removing the power to the Switch Packs causing the intersection signal indicators go to dark.

5.2 Input Assembly Theory of Operation

The Input Assembly accommodates twelve slots for detection modules. Each detection module includes two channels for a total of 24 channels. Each detection module output is connected to the 96-Pin connector of the Serial Interface Unit (SIU) by means of a printed circuit motherboard. The SIU unit senses all the detection module outputs and provides the status to the Controller Unit by serial communications. Serial communications is established using a 25-pin D socket mounted in the rear. The socket shall mate with a DB25 cable, which is connected to the SB1/SB2 & DC Power Bus.

The Inputs from the field are brought into a FT terminal block or into an IDC-26 connector and are connected to the slots of the detector cards. Each FT terminal block provides two positions for each loop detector input and two equipment ground positions for shield grounding of the loop cable.

The Input Assembly provides four bits for assembly addressing placed in an 8-positions terminal block. The terminal block also provides four DC ground pins placed between the address pins to generate Ground True logic “1” levels using a wire jumper.

The Input Assembly also provides an optional CDC connector for special function inputs. The connector is a D type socket placed in the back. The inputs are electrically isolated and are driven by 48VDC and referenced by an isolated ground. Those isolated inputs are terminated in four OPTO switches for general-purpose use. The switches are placed on a small front panel in the left side of the Input Assembly.

5.3 Output Assembly Theory of Operation

The Output Assembly provides 120VAC to the intersection signal heads.

The operation of the Output Assembly is as follows: The High-Density Switch Packs AC power supply enters at connector P6.

P6-4 (CB1) provides power to the HDSP1 and HDSP2, channels 1, 2, 3 and 4.

P6-3 (CB2) provides power to the HDSP3 and HDSP4, channels 5, 6, 7 and 8.

P6-2 (CB3) provides power to the HDSP5 and HDSP6, channels 9, 10, 11 and 12.

P6-1 (CB4) provides power to the HDSP7 and HDSP8, channels 13, 14, 15 and 16.

Each of these power inputs is attached to a Signal Circuit Breaker on the Output Assembly front panel. Each Circuit Breaker independently provides 5 Amps of service power to two High-Density Switch Packs in the Output Assembly.

The input (Logic 0) for the High-Density Switch Packs is generated by the Auxiliary Device model SIU-2218. The ATC Controller communicates with the SIU-2218 via SB1/SB2 ports to change the inputs for the High-Density Switch Packs. The High-Density Switch Pack input pins are A2, C2, E2, A4, C4 and E4:

Pin	A (Bottom Row)	C (Middle Row)	E (Top Row)
2	Ch 1 Red In	Ch 1 Yellow In	Ch 1 Green In
4	Ch 2 Red In	Ch 2 Yellow In	Ch 2 Green In

The presence of any input and the presence of 24 VDC at pin A6 will cause the activation of a Switch Pack input circuit. The Cabinet Monitor Unit located in the Output Assembly configures the channel enable for each High-Density Switch Pack by means of the CMU Datakey. Once the channel enable configuration is assigned to the CMU Datakey, the CMU communicates to the High-Density Switch Packs by the SB3 serial port to enable the AC outputs.

The High-Density Switch Pack outputs are routed to the R connector to interconnect to the Field Output Termination Assembly (FOTA).

5.4 Field Output Termination Assembly Theory of Operation

The Field Output Termination Assembly is placed in the back of the rack assembly and it can be moved up or down if it is required. The main function of the FOTA is to provide Field connections for the Intersection Signal heads and to transfer the intersection signal heads to flashing mode.

The High-Density Flasher Unit (HDFU) outputs come from the Service Assembly and go to the normally closed side of the eight High-Density Flash Transfer Relays (HDFTR):

HDFU 1-1	HDFTR1, CH1	HDFTR2, CH2	HDFTR5, CH9	HDFTR6, CH10
HDFU 1-2	HDFTR3, CH5	HDFTR4, CH6	HDFTR7, CH13	HDFTR8, CH14
HDFU 2-1	HDFTR1, CH3	HDFTR2, CH4	HDFTR5, CH11	HDFTR6, CH12
HDFU 2-2	HDFTR3, CH7	HDFTR4, CH8	HDFTR7, CH15	HDFTR8, CH16

The Field Output Termination Assembly provides sixteen Flash Programming Blocks for red or yellow flashing operation.

5.4.1 Red Flash Programming

The program block FPB1 ties pin-3 to pin-2, which connects to the normally open contact of HDFTR1 pin-2. The HDFTR routes the Red signal trough the common contact pin-3 back to the program block pin-5. The program block ties the pin-5 and pin-6 and routes the Red signal to the FT1 pin-1/2 of the field terminal block. Since the Yellow signal is not required to flash in this instance, the Yellow signal is routed through pin-1 and pin-4 directly to the field terminal block FT1 pin-3/4.

5.4.2 Yellow Flash Programming

The program block FPB1 ties pin-1 to pin-2, which connects to the normally open contact of HDFTR1 pin-2. The HDFTR routes the yellow signal trough the common contact pin-3 back to the program block pin-5. The program block ties the pin-4 and pin-5 and routes the Yellow signal to the FT1 pin-3/4 of the field terminal block. Since the Red signal is not required to flash in this instance, the Red signal is routed through pin-3 and pin-6 directly to the field terminal block FT1 pin 1/2. In the drawing, the HDFTR relay is shown in the flash state (non-energized).

Note that the Yellow and Green signals are dark during Flash Mode due to the loss of AC power to the High-Density Switch Pack pin A30, C30 & E30. The green signal does not flash therefore High-Density Switch Pack 1 Green output connects directly to the output terminal block FT1 pin-5/6.

If Yellow flash is required, the Red flash program block is removed from its receptacle and interchanged with the Yellow flash program block.

A third type of program block is available which routes all three High-Density Switch Packs outputs directly to the field terminal blocks. This is normally used for Pedestrian outputs.

5.5 Fan and Thermostat Assemblies Theory of Operation

The Fan and Thermostat Assemblies are part of the 350i ATCC-HV cabinet ventilation system. The DC power for the Fan Assembly is provided by the Bus Assembly placed in the back of the Rack Assembly and is wired through a Phoenix Block connector to the Thermostat Assembly. The DC power routes to the thermostat panel through a harness and is connected to the in-line fuse and thermostat. A bypass push switch is connected in parallel with the thermostat terminals to verify the fan operation. The DC power is protected by the fuse connected to the thermostat. DC power is then connected to the fan assembly through a two-position connector.

5.6 Police Panel and Door Switch Assembly Theory of Operation

The Police Panel can be accessed by means of a master police key and is designed to give limited access to emergency staff. The Police Panel contains the Signals ON/OFF, AUTO/FLASH, Manual Control Enable and Interval Advance switches.

The Signal ON/OFF switch powers the field signal indications. When it is in ON position, the switch transfers the voltage output of the Circuit Breaker auxiliary switches to the Main Contactor coil and to the HDFTR coils. When the Signal ON/OFF switch is in OFF position the switch removes the voltage to the Main Contactor coil and energizes the HDFTR coils. The ATCC is now in the Dark mode.

The AUTO/FLASH switch drives 48VDC to be monitored by the CMU (pin A21/B21). When the AUTO/FLASH switch is in AUTO position, the CMU output relay (pin A22/B22) is energized providing 48VDC to the Main Contactor and the HDFTRs to work in normal mode. When the AUTO/FLASH switch is in the FLASH position, the CMU output relay is de-energized removing the 48VDC to the Main Contactor and HDFTR coils and places the ATCC in flash mode.

The Front and Rear Door Switches are part of the 350i ATCC-HV cabinet interlock circuit. The purpose of this switch is to ensure the Conflict Monitor Unit is installed and the CMU Datakey is inserted properly when the door is closed. If a service technician closes the door without the Conflict Monitor Unit being installed and the CMU Datakey inserted properly, the Door Switch forces the cabinet to go to flash mode.

5.7 Bus Assembly Theory of Operation

The Bus Assembly provides eight female DB25 connectors for serial communications, one male Phoenix Block for DC power input and seven female Phoenix Blocks for DC power output. The pins of the eight female DB25 connectors are daisy chained by means of a printed circuit board. The pins of the male and female Phoenix Blocks are daisy chained by means of the same printed circuit board but in an isolated electrical circuit.

The Bus Assembly provides +12VDC, +24VDC and +48VDC to the entire 350i ATCC-HV cabinet. The DC voltages come from the DC power supply by means of a DC harness.

The Bus Assembly also provides eight NEMA 5-15 Receptacles to provide clean AC power to the 2070 Controller, DC Power Supply and Input Assembly. The terminals of the NEMA 5-15 receptacles are daisy chained by means of color coded wires, 18AWG black wire for AC+, 18AWG white wire for AC- and 18AWG green wire for Equipment Ground.

The AC Clean power input enters by mean of a NEMA 6-15 plug cord that is connected to the Service Assembly where the Surge Protector is installed.

5.8 Service Assembly Theory of Operation

The Service Assembly provides AC power to the 350i ATCC-HV cabinet and it is installed on the lower left side of the cabinet. The Service Assembly contains the main and secondary Circuit Breakers, cabinet voltage surge protector, one High-Density Flasher unit with automotive type fuses, AC- and EQ Ground copper bars and some outlets for general-purpose use.

TBS is a five position terminal block and it is the entry point for AC power. TBS has two terminals for the BBS connection option. If a BBS is used, the jumper placed on the lower side of the terminal block shall be removed. The TBS terminal block provides AC power to the Main Circuit Breaker, which is the main protection for the entire cabinet. The main Circuit Breaker feeds the Secondary Circuit Breakers (Clean and Raw power Circuit Breakers, HDFU Circuit Breaker and Output Assembly circuit breaker).

The Model SHA-1250-ITS is a Surge Protector installed in the Service Assembly to provide surge and spike protection to the clean AC power bus.

The Service Assembly also contains one High-Density Flasher Unit (HDFU), which provides flashing voltage to the intersection signal heads when the cabinet is in flash mode. The HDFU provides four flashing outputs protected by four automotive type fuses. The flashing outputs are wired to the Field Output Termination Assembly through an eight-position Tyco connector placed on the right side of the Service Assembly. The HDFU also provides four sense inputs to monitor the four flashing outputs. The sense inputs are wired to the Field Output Termination Assembly through the eight-position Tyco connector placed on the right side of the Service Assembly.

One of the maintenance benefits of having the HDFU located in the Service Assembly is the Output Assembly can be replaced while keeping the Intersection in Flash Mode.

5.9 Service Assembly with Two Flashers Theory of Operation

The Service Assembly provides AC power to the 350i ATCC-HV cabinet and it is installed on the lower left side of the cabinet. The Service Assembly contains the main and secondary Circuit Breakers, cabinet voltage surge protector, two High-Density Flasher units with automotive type fuses, AC- and EQ Ground copper bars and some outlets for general purpose.

TBS is a five position terminal block and it is the entry point for AC power. TBS has two terminals for the BBS connection option. If a BBS is used, the jumper placed on the lower side of the terminal block shall be removed. The TBS terminal block provides AC power to the Main Circuit Breaker, which is the main protection for the entire cabinet. The main Circuit Breaker feeds the Secondary Circuit Breakers (Clean and Raw power Circuit Breakers, HDFU Circuit Breakers and Output Assembly circuit breaker).

The Model SHA-1250-ITS is a Surge Protector installed in the Service Assembly to provide surge and spike protection to the clean AC power bus.

The Service Assembly also contains two High-Density Flasher Units (HDFU), which provide flashing voltage to the intersection signal heads when the cabinet is in flash mode. Each HDFU provides four flashing outputs protected by four automotive type fuses. The flashing outputs are wired to the Field Output Termination Assembly through an eight-position Tyco connector placed on the right side of the Service Assembly. Each HDFU also provides four sense inputs to monitor the four flashing outputs. The sense inputs are wired to the Field Output Termination Assembly through the eight-position Tyco connector placed on the right side of the Service Assembly.

One of the maintenance benefits of having the HDFU located in the Service Assembly is the Output Assembly can be replaced while keeping the Intersection in Flash Mode.

5.10 Field Input Termination Assembly Theory of Operation

The Field Input Termination Assembly (FITA) is made with a printed circuit board where the inputs from the field are connected to twelve 10 positions Phoenix blocks. Each FITA PCB has a capacity of 24 input channels. The field inputs are wired to the Input Assembly through two IDC-26 female connectors placed on the top rear side of the FITA PCB. The FITA PCB has one Equipment ground terminal for every two channels to terminate the shield of the field loop wires.

The Field Input Termination Assembly is located on the rear side of the EIA rails of the Rack Assembly. The FITA PCB has twelve optional surge protectors model EDCO MRA-6LC-6 or equal. Each surge protector accommodates two channels.

6 MAINTENANCE

6.1 Overview

Preventive maintenance should be conducted on a regular basis. Only trained individuals should perform the maintenance. Follow all safety rules and your local traffic codes.

6.2 Maintenance Guidelines

6.2.1 Replacement

- Replace cabinet air filter if dirty.

6.3 Cleaning

- Vacuum the cabinet.
- Remove graffiti if any.

6.3.1 Mechanical Inspection

- Check cabinet doors, locks, and foundation.
- Test cabinet fan, thermostat, GFCI and light.
- Inspect the cabinet for external damage.

6.3.2 Operation Inspection

- Follow your DOT guidelines.

6.3.3 Electrical Inspection

- Follow your DOT guidelines.
- Check that wiring from service to the cabinet is tight and secure.

6.3.4 Check log

- Fill out the check log. Write arrival, departure time, date, and summary of what you did and any follow up action required.
- Check the ADU for any alarms and take corrective action.
- Check the cabinet suppressor filter, HDSP suppressor and detection module suppressors.

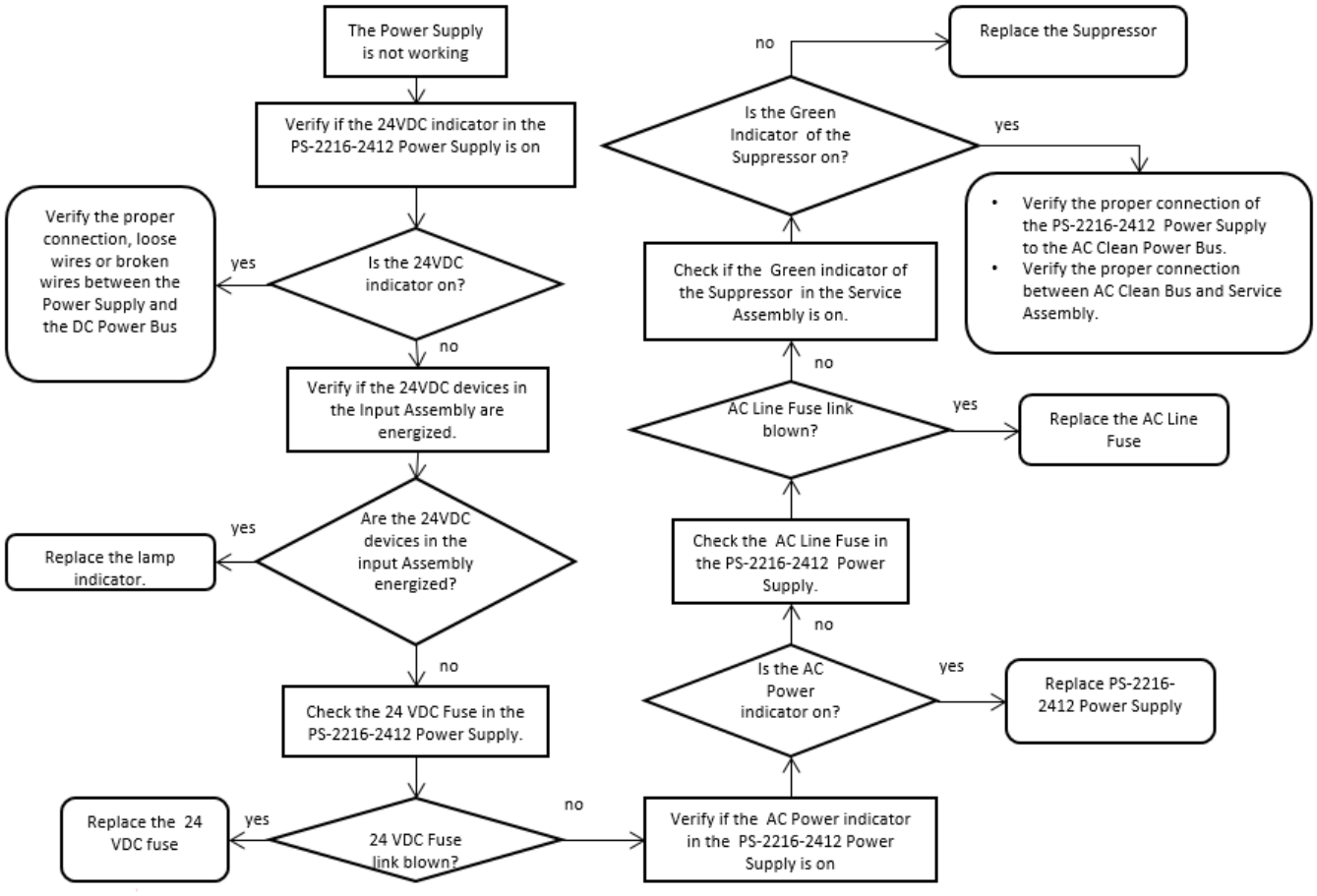
6.4 Troubleshooting Guidelines

6.4.1 Input Assembly

SYMPTOMS	POSSIBLE CAUSE	CORRECTIVE ACTION
Detector cards do not power on.	Absence of +24VDC	Check PS-2216-24-HV Cabinet Power Supply.
Detector cards do not place calls to the controller.	Controller programming.	Check controller programming.
Detector cards do not place calls to the controller.	Controller.	Replace controller.
A Detector card does not work in any slot.	Detector card.	Check the detector card switch setting.
A Detector card does not work in any slot. Switch setting is OK.	Detector card.	Replace the detector card.
Detector card places permanent calls into the controller.	Loop cable (DLC).	Perform loop continuity test.

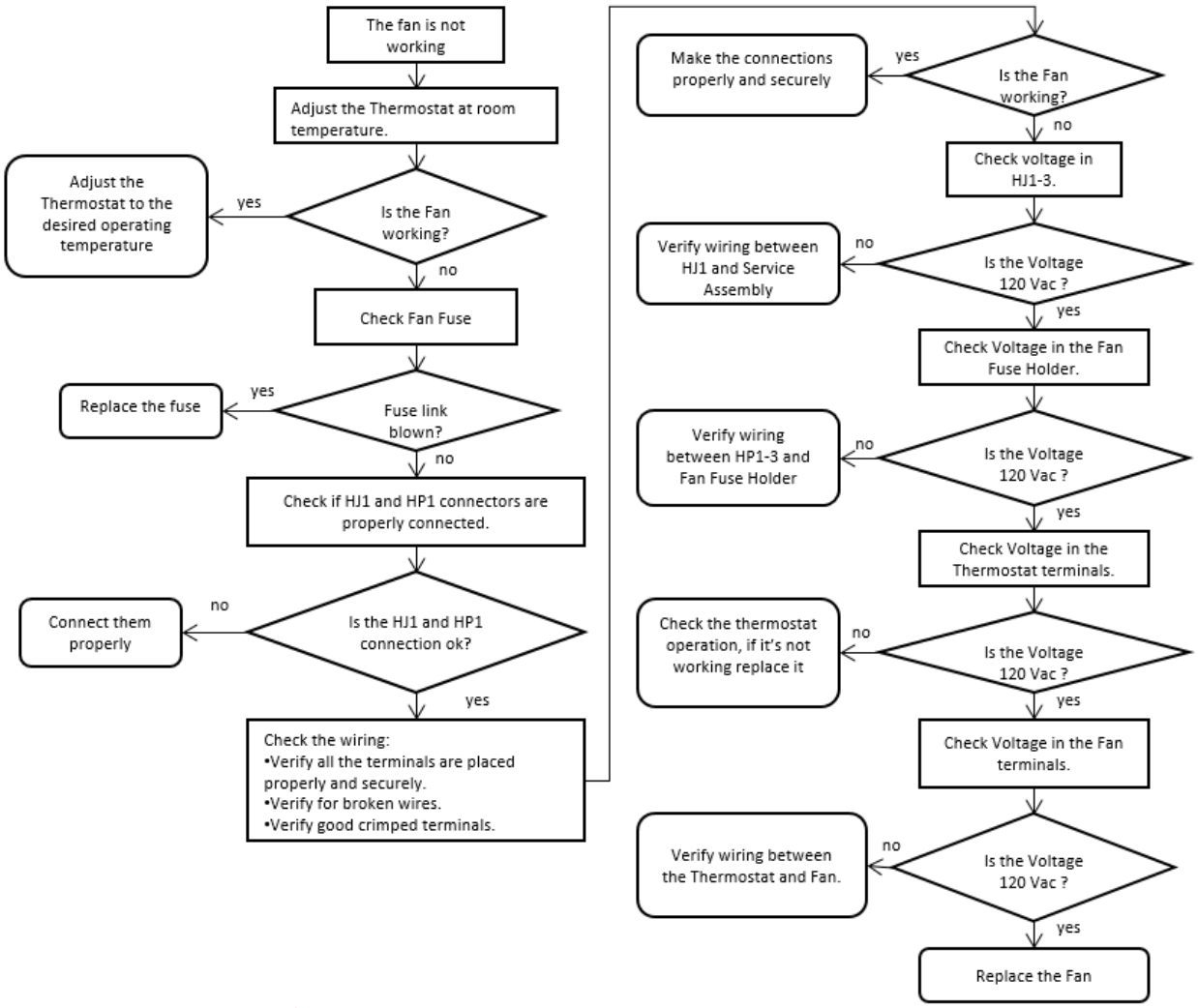
6.4.2 PS-2216-24-HV Cabinet Power Supply

SYMPTOMS	POSSIBLE CAUSE	CORRECTIVE ACTION
AC Line indicator OFF	AC Line Fuse	Check AC Line Fuse
AC Line indicator OFF	Service Assembly, Clean PWR Bus Circuit Breaker	Check circuit breaker
24 VDC indicator OFF	24 VDC Fuse	Check 24 VDC Fuse
48 VDC indicator OFF	48 VDC Fuse	Check 48 VDC Fuse
24 VDC fuse keeps blowing	Short	Identify and remove Short
No 24 VDC. Fuses are OK. AC Line indicator ON	PS-2216-24-HV Cabinet Power Supply	Replace PS-2216-24-HV Cabinet Power Supply



6.4.3 Fan Panel Assembly

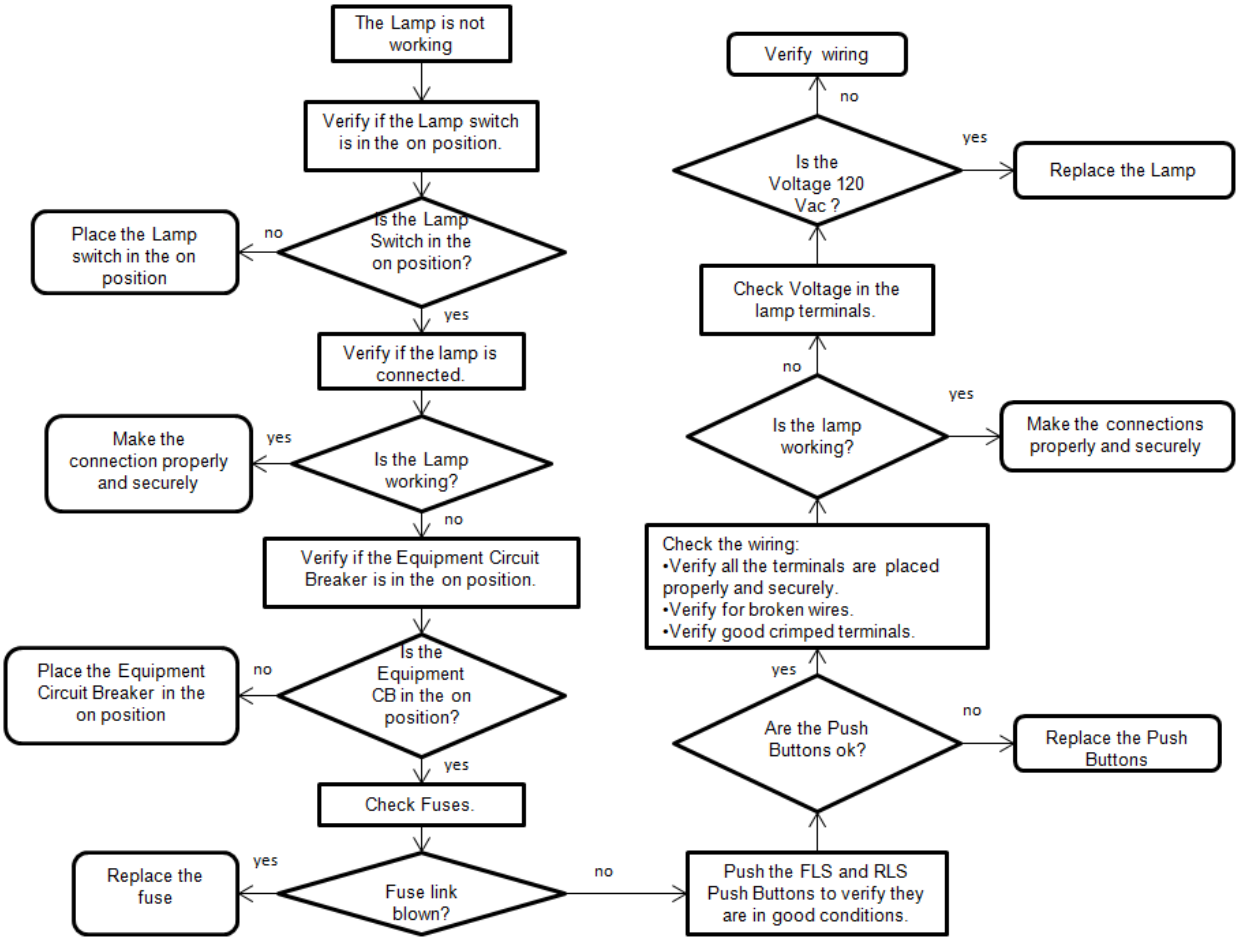
SYMPTOMS	POSSIBLE CAUSE	CORRECTIVE ACTION
Fan does not turn on.	Fuse.	Check fuse. Replace if defective.
Fan does not turn on.	Thermostat.	Check your thermostat setting.
Fan does not turn on.	Fan.	Check fan. Replace if defective.



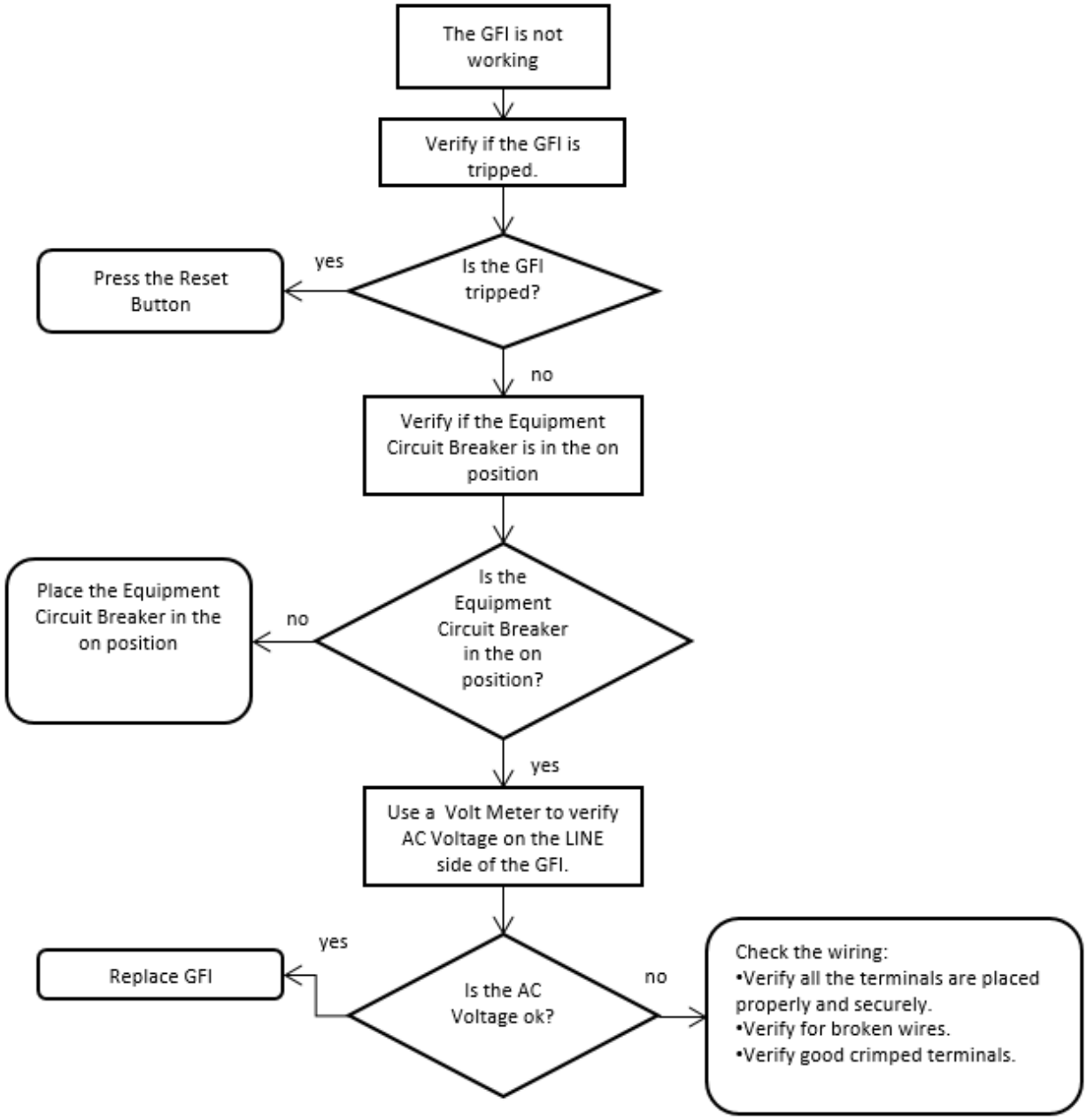
6.4.4 350i ATCC-HV Cabinet

SYMPTOMS	POSSIBLE CAUSE	CORRECTIVE ACTION
Cabinet is in FLASH. No AC+ out on the Suppressor of the Service Assembly HE1750 ATC pin-5.	HE1750 ATC suppressor.	Verify the HE1750 ATC. Replace if defective.
When cabinet is placed on flash, the intersection goes Dark.	HDFU circuit breaker.	Check your HDFU circuit breaker if it is in the ON position.
When cabinet is place on flash, the intersection goes Dark.	High-Density Flasher Unit.	Check High-Density Flasher Unit. Replace if defective.

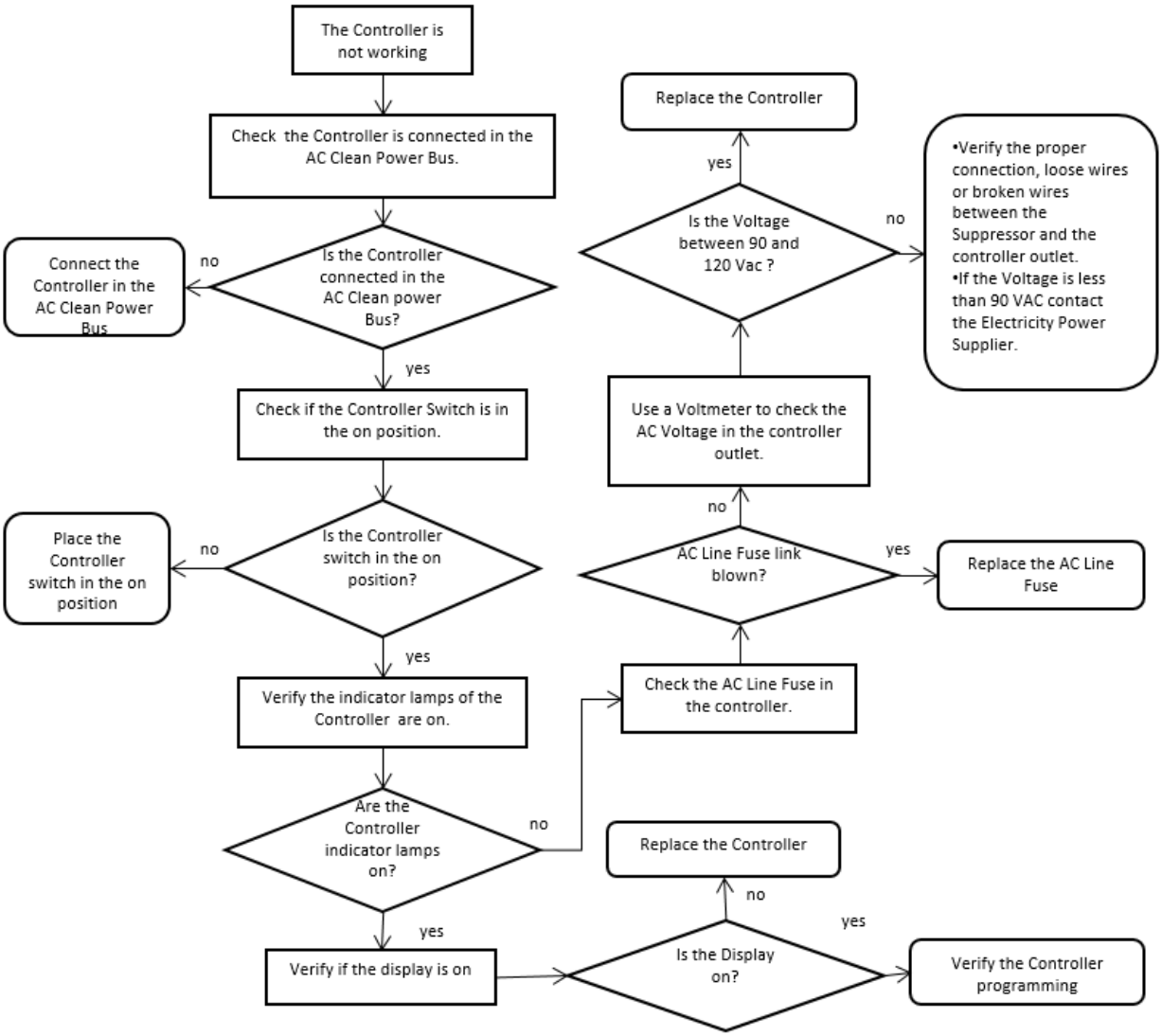
6.4.5 Cabinet Lights



6.4.6 Cabinet GFCI



6.4.7 Cabinet Controller



ATC Cabinet 16-Channel (Ch) Output Assembly

Controller Phase/Overlap/Pedestrian Assignments

	Ch1/2	Ch3/4	Ch5/6	Ch7/8	Ch9/10	Ch11/12	Ch13/14	Ch15/16	
	HDSP1	HDSP2	HDSP3	HDSP4	HDSP5	HDSP6	HDSP7	HDSP8	
	R	R	R	R	R	R	R	R	SIU 1
	Y	Y	Y	Y	Y	Y	Y	Y	
	G	G	G	G	G	G	G	G	
	R	R	R	R	R	R	R	R	
	Y	Y	Y	Y	Y	Y	Y	Y	
	G	G	G	G	G	G	G	G	

CMU Channel (Ch) Assignments

HDSP1	HDSP2	HDSP3	HDSP4	HDSP5	HDSP6	HDSP7	HDSP8	
Ch-1	Ch-3	Ch-5	Ch-7	Ch-9	Ch-11	Ch-13	Ch-15	SIU 1
Ch-1	Ch-3	Ch-5	Ch-7	Ch-9	Ch-11	Ch-13	Ch-15	
Ch-1	Ch-3	Ch-5	Ch-7	Ch-9	Ch-11	Ch-13	Ch-15	
Ch-2	Ch-4	Ch-6	Ch-8	Ch-10	Ch-12	Ch-14	Ch-16	
Ch-2	Ch-4	Ch-6	Ch-8	Ch-10	Ch-12	Ch-14	Ch-16	
Ch-2	Ch-4	Ch-6	Ch-8	Ch-10	Ch-12	Ch-14	Ch-16	

SIU Output (IO) Assignments

HDSP1	HDSP2	HDSP3	HDSP4	HDSP5	HDSP6	HDSP7	HDSP8	
IO 0	IO 6	IO 12	IO 18	IO 24	IO 30	IO 36	IO 42	SIU 1
IO 1	IO 7	IO 13	IO 19	IO 25	IO 31	IO 37	IO 43	
IO 2	IO 8	IO 14	IO 20	IO 26	IO 32	IO 38	IO 44	
IO 3	IO 9	IO 15	IO 21	IO 27	IO 33	IO 39	IO 47	
IO 4	IO 10	IO 16	IO 22	IO 28	IO 34	IO 40	IO 48	
IO 5	IO 11	IO 17	IO 23	IO 29	IO 35	IO 41	IO 49	

HDSP Addresses

HDSP1	HDSP2	HDSP3	HDSP4	HDSP5	HDSP6	HDSP7	HDSP8	
0 (00000)	1 (00001)	2 (00010)	3 (00011)	4 (00100)	5 (000101)	6 (00110)	7 (00111)	SIU 1

ATC Cabinet 24-Channel Input Assembly #1 (7/15/2016)

SIU Input (IO) Assignments

2-Ch Card	2-Ch Card	2-Ch Card	2-Ch Card	2-Ch Card	2-Ch Card	2-Ch Card	2-Ch Card	2-Ch Card	2-Ch Card	2-Ch Card	2-Ch Card	SIU 9
IO 6	IO 8	IO 10	IO 12	IO 14	IO 16	IO 18	IO 20	IO 22	IO 24	IO 26	IO 28	
IO 7	IO 9	IO 11	IO 13	IO 15	IO 17	IO 19	IO 21	IO 23	IO 25	IO 27	IO 29	
	*IO 6	*IO 8	*IO 10	*IO 12	*IO 14	*IO 16	*IO 18	*IO 20	*IO 22	*IO 24	*IO 26	
	*IO 7	*IO 9	*IO 11	*IO 13	*IO 15	*IO 17	*IO 19	*IO 21	*IO 23	*IO 25	*IO 27	

ATC Cabinet 24-Channel Input Assembly #1

SIU Input (Ch) Assignments

2-Ch Card	2-Ch Card	2-Ch Card	2-Ch Card	2-Ch Card	2-Ch Card	2-Ch Card	2-Ch Card	2-Ch Card	2-Ch Card	2-Ch Card	2-Ch Card	SIU 9
Ch-1	Ch-3	Ch-5	Ch-7	Ch-9	Ch-11	Ch-13	Ch-15	Ch-17	Ch-19	Ch-21	Ch-23	
Ch-2	Ch-4	Ch-6	Ch-8	Ch-10	Ch-12	Ch-14	Ch-16	Ch-18	Ch-20	Ch-22	Ch-24	
	*Ch-1	*Ch-3	*Ch-5	*Ch-7	*Ch-9	*Ch-11	*Ch-13	*Ch-15	*Ch-17	*Ch-19	*Ch-21	
	*Ch-2	*Ch-4	*Ch-6	*Ch-8	*Ch-10	*Ch-12	*Ch-14	*Ch-16	*Ch-18	*Ch-20	*Ch-22	

* If 4-ch device being used

ATC Cabinet 24-Channel Input Assembly #2

SIU Input (IO) Assignments

2-Ch Card	2-Ch Card	2-Ch Card	2-Ch Card	2-Ch Card	2-Ch Card	2-Ch Card	2-Ch Card	2-Ch Card	2-Ch Card	2-Ch Card	2-Ch Card	SIU 10
IO 6	IO 8	IO 10	IO 12	IO 14	IO 16	IO 18	IO 20	IO 22	IO 24	IO 26	IO 28	
IO 7	IO 9	IO 11	IO 13	IO 15	IO 17	IO 19	IO 21	IO 23	IO 25	IO 27	IO 29	
	*IO 6	*IO 8	*IO 10	*IO 12	*IO 14	*IO 16	*IO 18	*IO 20	*IO 22	*IO 24	*IO 26	
	*IO 7	*IO 9	*IO 11	*IO 13	*IO 15	*IO 17	*IO 19	*IO 21	*IO 23	*IO 25	*IO 27	

ATC Cabinet 24-Channel Input Assembly #2

SIU Input (Ch) Assignments

2-Ch Card	2-Ch Card	2-Ch Card	2-Ch Card	2-Ch Card	2-Ch Card	2-Ch Card	2-Ch Card	2-Ch Card	2-Ch Card	2-Ch Card	2-Ch Card	SIU 10
Ch-1	Ch-3	Ch-5	Ch-7	Ch-9	Ch-11	Ch-13	Ch-15	Ch-17	Ch-19	Ch-21	Ch-23	
Ch-2	Ch-4	Ch-6	Ch-8	Ch-10	Ch-12	Ch-14	Ch-16	Ch-18	Ch-20	Ch-22	Ch-24	
	*Ch-1	*Ch-3	*Ch-5	*Ch-7	*Ch-9	*Ch-11	*Ch-13	*Ch-15	*Ch-17	*Ch-19	*Ch-21	
	*Ch-2	*Ch-4	*Ch-6	*Ch-8	*Ch-10	*Ch-12	*Ch-14	*Ch-16	*Ch-18	*Ch-20	*Ch-22	

ATCC-HV Test & Diagnosis (rev 4/10/15)

During normal operation (i.e., Auto Mode) the switches and Components' status should look like the following:

Output Assembly switches: AUTO, Stop Time OFF			
Police Panel switches: AUTO, Signal ON			
Input Assembly (IA)			
SIU: Power	On	Off	
SIU: SB#1 Rx/Tx	Blinking	Off	
AC Devices (i.e., DC Isolator)	On	Off	
DC Devices (i.e., Detector)	On	Off	
Output Assembly (OA)			
HDSP-FU: Power	On	Off	
HDSP-FU: Rx/Tx	Blinking	Off	
HDSP-FU: Inputs	On	Off	
SIU: Power	On	Off	
SIU: SB#1 Rx/Tx	Blinking	Off	
CMU: Power	On	Off	
CMU: SB#1 & #3 Rx	Blinking	Off	
CMU	No Fault *		
Service Assembly (SA)			
HDSP-FU: Power	On	Off	
HDSP-FU: Rx/Tx	Blinking	Off	
SHA1250-ITS	On	Off	
Miscellaneous			
Controller Unit (CU)	On	Off	
CU Stop Time	Off	On	
Cabinet Power Supply	On	Off	
ADU-2220	No Fault		
HDFTR	On	Off	
Signal Indicators	Auto	Dark	Flash

* The "12VDC FAIL" blinking means 12VDC not being monitored.

What should ATC Cabinet Components and Assemblies show under the following condition:

Output Assembly switches: AUTO, Stop Time ON			
Police Panel switches: AUTO, Signal ON			
Input Assembly (IA)			
SIU: Power	On	Off	
SIU: SB#1 Rx/Tx	Blinking	Off	
AC Devices (i.e., DC Isolator)	On	Off	
DC Devices (i.e., Detector)	On	Off	
Output Assembly (OA)			
HDSP-FU: Power	On	Off	
HDSP-FU: Rx/Tx	Blinking	Off	
HDSP-FU: Inputs	On	Off	
SIU: Power	On	Off	
SIU: SB#1 Rx/Tx	Blinking	Off	
CMU: Power	On	Off	
CMU: SB#1 & #3 Rx	Blinking	Off	
CMU	No Fault		
Service Assembly (SA)			
HDSP-FU: Power	On	Off	
HDSP-FU: Rx/Tx	Blinking	Off	
SHA1250-ITS	On	Off	
Miscellaneous			
Controller Unit (CU)	On	Off	
CU Stop Time	Off	On	
Cabinet Power Supply	On	Off	
ADU-2220	No Fault		
HDFTR	On	Off	
Signal Indicators	Auto	Dark	Flash

Output Assembly switches: FLASH, Stop Time OFF			
Police Panel switches: AUTO, Signal ON			
Input Assembly (IA)			
SIU: Power	On		Off
SIU: SB#1 Rx/Tx	Blinking		Off
AC Devices (i.e., DC Isolator)	On		Off
DC Devices (i.e., Detector)	On		Off
Output Assembly (OA)			
HDSP-FU: Power	On		Off
HDSP-FU: Rx/Tx	Blinking		Off
HDSP-FU: Inputs	On		Off *
SIU: Power	On		Off
SIU: SB#1 Rx/Tx	Blinking		Off
CMU: Power	On		Off
CMU: SB#1 & #3 Rx	Blinking		Off
CMU	CU / Local Flash		
Service Assembly (SA)			
HDSP-FU: Power	On		Off
HDSP-FU: Rx/Tx	Blinking		Off
SHA1250-ITS	On		Off
Miscellaneous			
Controller Unit (CU)	On		Off
CU Stop Time	Off		On
Cabinet Power Supply	On		Off
ADU-2220	Local Flash		
HDFTR	On		Off
Signal Indicators	Auto	Dark	Flash

* Activating 24VDC Bypass Switch will turn-on the HDSP-FU inputs

Output Assembly switches: AUTO, Stop Time OFF			
Police Panel switches: FLASH, Signal ON			
Input Assembly (IA)			
SIU: Power	On		Off
SIU: SB#1 Rx/Tx	Blinking		Off
AC Devices (i.e., DC Isolator)	On		Off
DC Devices (i.e., Detector)	On		Off
Output Assembly (OA)			
HDSP-FU: Power	On		Off
HDSP-FU: Rx/Tx	Blinking		Off
HDSP-FU: Inputs	On		Off *
SIU: Power	On		Off
SIU: SB#1 Rx/Tx	Blinking		Off
CMU: Power	On		Off
CMU: SB#1 & #3 Rx	Blinking		Off
CMU	CU / Local Flash		
Service Assembly (SA)			
HDSP-FU: Power	On		Off
HDSP-FU: Rx/Tx	Blinking		Off
SHA1250-ITS	On		Off
Miscellaneous			
Controller Unit (CU)	On		Off
CU Stop Time	Off		On
Cabinet Power Supply	On		Off
ADU-2220	Local Flash		
HDFTR	On		Off
Signal Indicators	Auto	Dark	Flash

* Activating 24VDC Bypass Switch will turn-on the HDSP-FU inputs

Output Assembly switches: AUTO, Stop Time OFF			
Police Panel switches: AUTO, Signal ON			
↓			
Police Panel switch: Signal OFF			
Input Assembly (IA)			
SIU: Power	On		Off
SIU: SB#1 Rx/Tx	Blinking		Off
AC Devices (i.e., DC Isolator)	On		Off
DC Devices (i.e., Detector)	On		Off
Output Assembly (OA)			
HDSP-FU: Power	On		Off
HDSP-FU: Rx/Tx	Blinking		Off
HDSP-FU: Inputs	On		Off
SIU: Power	On		Off
SIU: SB#1 Rx/Tx	Blinking		Off
CMU: Power	On		Off
CMU: SB#1 & #3 Rx	Blinking		Off
CMU	No Fault		
Service Assembly (SA)			
HDSP-FU: Power	On		Off
HDSP-FU: Rx/Tx	Blinking		Off
SHA1250-ITS	On		Off
Miscellaneous			
Controller Unit (CU)	On		Off
CU Stop Time	Off		On
Cabinet Power Supply	On		Off
ADU-2220	No Fault		
HDFTR	On		Off
Signal Indicators	Auto	Dark	Flash

Output Assembly switches: FLASH, Stop Time OFF			
Police Panel switches: AUTO, Signal ON			
↓			
Police Panel: Signal OFF			
Input Assembly (IA)			
SIU: Power	On		Off
SIU: SB#1 Rx/Tx	Blinking		Off
AC Devices (i.e., DC Isolator)	On		Off
DC Devices (i.e., Detector)	On		Off
Output Assembly (OA)			
HDSP-FU: Power	On		Off
HDSP-FU: Rx/Tx	Blinking		Off
HDSP-FU: Inputs	On *		Off
SIU: Power	On		Off
SIU: SB#1 Rx/Tx	Blinking		Off
CMU: Power	On		Off
CMU: SB#1 & #3 Rx	Blinking		Off
CMU	CU / Local Flash		
Service Assembly (SA)			
HDSP-FU: Power	On		Off
HDSP-FU: Rx/Tx	Blinking		Off
SHA1250-ITS	On		Off
Miscellaneous			
Controller Unit (CU)	On		Off
CU Stop Time	Off		On
Cabinet Power Supply	On		Off
ADU-2220	Local Flash		
HDFTR	On		Off
Signal Indicators	Auto	Dark	Flash

* No Red ,Yellow or Green inputs; instead flashing Red.

Cabinet Power Supply (CPS) AC Line Fuse Burned			
Input Assembly (IA)			
SIU: Power	On		Off
SIU: SB#1 Rx/Tx	Blinking		Off
AC Devices (i.e., DC Isolator)	On		Off
DC Devices (i.e., Detector)	On		Off
Output Assembly (OA)			
HDSP-FU: Power	On		Off
HDSP-FU: Rx/Tx	Blinking		Off
HDSP-FU: Inputs	On		Off
SIU: Power	On		Off
SIU: SB#1 Rx/Tx	Blinking		Off
CMU: Power	On		Off
CMU: SB#1 & #3 Rx	Blinking		Off
CMU	CU / Local Flash		
Service Assembly (SA)			
HDSP-FU: Power	On		Off
HDSP-FU: Rx/Tx	Blinking		Off
SHA1250-ITS	On		Off
Miscellaneous			
Controller Unit (CU)	On		Off
CU Stop Time	Off		On
CPS AC LINE Indictor	On		Off
ADU-2220	Dark		
HDFTR	On		Off
Signal Indicators	Auto	Dark	Flash

Cabinet Power Supply (CPS) 24VDC Fuse Burned			
Input Assembly (IA)			
SIU: Power	On		Off
SIU: SB#1 Rx/Tx	Blinking		Off
AC Devices (i.e., DC Isolator)	On		Off
DC Devices (i.e., Detector)	On		Off
Output Assembly (OA)			
HDSP-FU: Power	On		Off
HDSP-FU: Rx/Tx	Blinking		Off
HDSP-FU: Inputs	On		Off
SIU: Power	On		Off
SIU: SB#1 Rx/Tx	Blinking		Off
CMU: Power	On		Off
CMU: SB#1 & #3 Rx	Blinking		Off
CMU	24VDC FAIL		
Service Assembly (SA)			
HDSP-FU: Power	On		Off
HDSP-FU: Rx/Tx	Blinking		Off
SHA1250-ITS	On		Off
Miscellaneous			
Controller Unit (CU)	On		Off
CU Stop Time	Off		On
CPS 24VDC indicator	On		Off
ADU-2220	24VDC FAIL		
HDFTR	On		Off
Signal Indicators	Auto	Dark	Flash

Cabinet Power Supply (CPS) 48VDC Fuse Burned		
Input Assembly (IA)		
SIU: Power	On	Off
SIU: SB#1 Rx/Tx	Blinking	Off
AC Devices (i.e., DC Isolator)	On	Off
DC Devices (i.e., Detector)	On	Off
Output Assembly (OA)		
HDSP-FU: Power	On	Off
HDSP-FU: Rx/Tx	Blinking	Off
HDSP-FU: Inputs	On	Off
SIU: Power	On	Off
SIU: SB#1 Rx/Tx	Blinking	Off
CMU: Power	On	Off
CMU: SB#1 & #3 Rx	Blinking	Off
CMU	CU / Local Flash	
Service Assembly (SA)		
HDSP-FU: Power	On	Off
HDSP-FU: Rx/Tx	Blinking	Off
SHA1250-ITS	On	Off
Miscellaneous		
Controller Unit (CU)	On	Off
CU Stop Time	Off	On
CPS 48VDC indicator	On	Off
ADU-2220	Dark	
HDFTR	On	Off
Signal Indicators	Auto / Dark	Flash

* Activating 24VDC Bypass Switch will turn-on the HDSP-FU inputs

What to expect if the following items removed or turned off:			
Removing DataKey w/front door open			
CMU	Diagnostic blink		
ADU-2220	No Fault		
Signal Indicators	Auto	Dark	Flash

Removing Datakey w/front door closed			
CMU	Diagnostic on		
ADU-2220	Datakey no present		
Signal Indicators	Auto	Dark	Flash

Removing OA SIU			
CMU	CU / Local Flash		
ADU-2220	CU Non-lashed Flash		
Signal Indicators	Auto	Dark	Flash

Removing an HDSP-FU from OA			
CMU	SB#3 Error		
ADU-2220	Serial Bus 3 Fail		
Signal Indicators	Auto	Dark	Flash

Removing HDSP-FU from SA			
CMU			
ADU-2220	Flasher Alarm Active		
Signal Indicators	Auto	Dark	Flash

Removing SA HDSP-FU fuse			
CMU	No Fault		
ADU-2220	Flasher Alarm Active		
Signal Indicators	Auto	Dark	Flash

Removing Flash Program Block (FPB)			
CMU	Lack of Signal		
ADU-2220	Lack of Signal		
Signal Indicators	Auto	Dark	Flash

Removing HDFTR			
CMU	Lack of Signal		
ADU-2220	Lack of Signal		
Signal Indicators	Auto	Dark	Flash

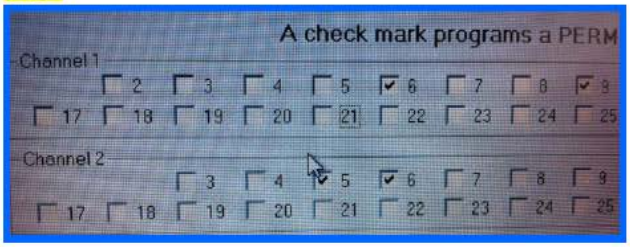
Removing CMU			
ADU-2220	NO SB3 COMM from CMU		
Signal Indicators	Auto	Dark	Flash

Removing SA SHA-1250	
CMU	CU / Local Flash
ADU-2220	Off
Controller Unit	Off
SIUs	Off
Cabinet Power Supply	Off

Removing CU SB1/B2 cable			
CMU	SB #1 Fail		
ADU-2220	Serial Bus 1 Error		
Signal Indicators	Auto	Dark	Flash

What are ATC Cabinet Circuit Breakers controlling:
Service Assembly (SA) MAIN Circuit Breaker (CB) controls power to the entire ATCC
SA CLEAN POWER CB controls power to the clean power bus
SA RAW PWR/GFCI/FAN/LIGHTS CB controls power to outlets, GFCI, fan(s) and light(s)
SA HDFU CB controls power to SA HDSP-FU
SA OUTPUT ASSEMBLY (OA) CB controls power to OA
OA CB1 controls power to HDSP1 & 2
OA CB2 controls power to HDSP3 & 4
OA CB3 controls power to HDSP5 & 6
OA CB4 controls power to HDSP7 & 8
Manual Control Enable (MCE) switch places call into the CU and activates stop time
Advance switch advances the CU when MCE is on

Example of forgetting to select Ch 1 and Ch 5 permissive on "A check mark program PERMISSIVE channel pair" page:



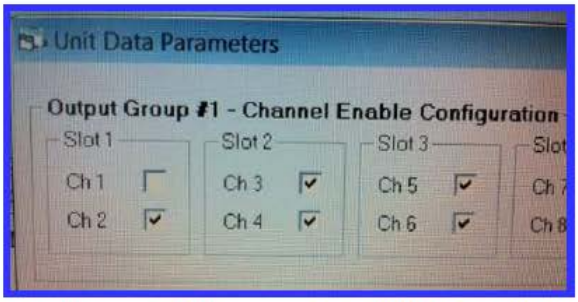
MonitorKey: A check mark program PERMISSIVE channel pair page

Output Assembly: CMU 2212-HV CU/LOCAL FLASH indicator is on

ADU 2220: CU LATCHED FLASH

2070ATC/Omni: CMU: LFSA CU FAULT
CU: PERMESSIVE
MAIN MENU/STATUES/CABINET/ITS STATUE/CMU OPERRATION STATUS/CHANNEL STATUS or 0.7.3.1.1

Example of forgetting to select Ch 1 on the MonitorKey Output Group #1 –Channel Configuration page



MonitorKey Output Group #1 –Channel Configuration

Output Assembly:
CMU 2212-HV Lack ok of Signal indicator is on
HDSP-FU 2202-HV blue indicator at slot #1 CH1 is on

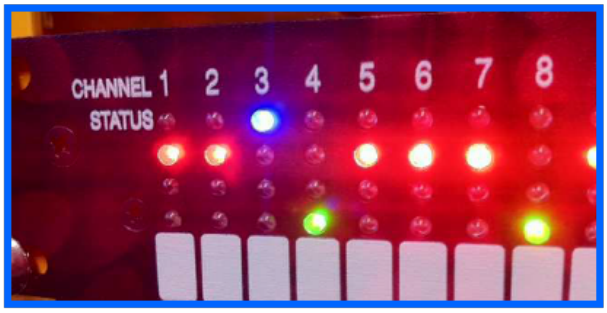
2070ATC/Omni: CMU: LACK OF SIGNAL
CU: NO FAULT
MAIN MENU/STATUES/CABINET/ITS STATUE/CMU OPERRATION STATUS/CHANNEL STATUS or 0.7.3.1.1

ADU 2220: shows LACK OF SIGNAL

ADU 2220: CHANNEL STATUS blue indicator is on

Example of having FPB #3 (flash program block) being absent or defective

Output Assembly:
CMU 2212-HV: LACK OF SIGNAL indicator is on
HDSP-FU 2202-HV blue indicator at slot #2 CH1 is on



ADU 2220: CHANNEL STATUS blue indicator #3 is on

ADU 2220: shows LACK OF SIGNAL

2070ATC/Omni
CMU: LACK OF SIGNAL
CU: NO FAULT
MAIN MENU/STATUES/CABINET/ITS STATUE/CMU OPERRATION STATUS/CHANNEL STATUS or 0.7.3.1.1

Example of FIELD CHECK FAULT

Example of a bad K2 Relay

The ATC cabinet was showing a CMU 24 volt fail.
The cabinet power supply was putting out 24 volts.
The ADU displayed 24 volts.
The OA 24 bypass switch, when pushed, showed the switchpacks had 24 volts.

The fault:
The cabinet had a bad K2 relay.
The K2 relay controls the 24 volts going to the switchpacks.

Analysis:
The CMU monitors the power supply 24 volts not the switchpack 24 volts (24 controlled).
The CMU displayed the power supply 24 volts on the ADU.
Pressing the 24 volt bypass switch allowed the cabinet to run.
The switchpacks did not have 24 volts unless the bypass switch was pressed giving a false lead that the 24 volts was okay.
The switchpacks monitor the 24 volt "controlled". If it is low, bit one of response byte one in message 129 gets set. The CMU monitors this error bit and reports a 24 volt fail even though the power supply is okay.

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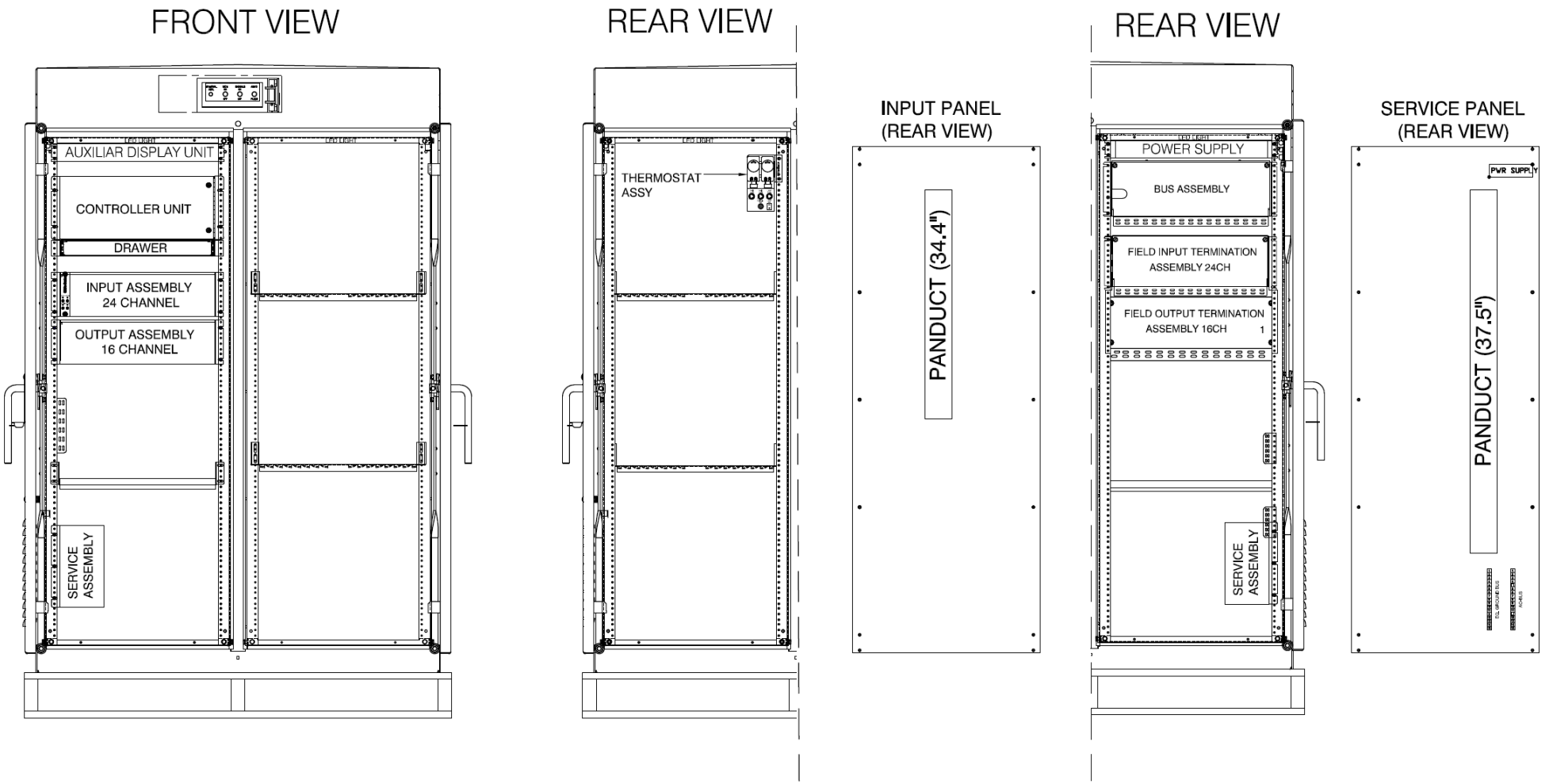

CABINET LAYOUT

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7 GLOSSARY

Wherever the following terms or abbreviations are used, the intent and meaning are as follows:

AC	Alternating Current
AC-	120 Volts AC, 60 Hertz grounded return to the power source
AC+	120 Volts AC, 60 Hertz ungrounded power source
ADC	Address Connector
ADU	Auxiliary Display Unit
ADV	Advance
Amp	Ampere
ASTM	American Society for Testing and Materials
ATC	Advanced Transportation Controller
AWG	American Wire Gage
BBS	Battery Back-up System
C	Celsius
C2	C2 Connector
BLK	Block
Caltrans	California Department of Transportation
CB	Circuit Breaker
CFM	Cubic Feet per Minute
CBL	Cable
CH	Channel
Channel	An information path from a discrete input to a discrete output
CMU	Cabinet Monitor Unit
CR	Controller Receptacles
D	Diode
DAT Program	The AGENCY's Diagnostic and Acceptance Test Program
DC	Direct Current
DCP	Direct Current Power
DIN	Deutsche Industrial Norms
DOT	Department of Transportation
EA	Each piece
EQ	Equipment
EG	Equipment Ground
EIA	Electronic Industries Association
EMI	Electro Magnetic Interference
EN	Enable
ETL	Electrical Testing Laboratories, Inc
EV	Emergency Vehicle
EX	External
F1	Fuse 1
FDS	Front Door Switch
FHWA	Federal Highway Administration
FL	Flasher
FOTA	Field Output Termination Assembly
FT	Field Terminal
FTR	Flash Transfer Relay
FU1-1	Flasher Unit output 1-1
FU2-1	Flasher Unit output 2-1
G	Green
GFCI	Ground Fault Circuit Interrupter
GND	Ground
GRN	Green
HDFTR	High Density Flash Transfer Relay
HDFU	High Density Flasher Unit
HDSP	High Density Switch Pack
HJ	Harness Jack
HZ	Hertz
IA	Input Assembly
IA	Interval Advance
I.D.	Identification
IEEE	Institute of Electrical and Electronics Engineers
ISO	International Standards Organization

K2 Relay	24 VDC Control Relay
L	Lower
LB	Pound Measure Weight Unit
LED	Light Emitting Diode
LF	Local Flash
LFSA	Latched Failed State Action
LOG	Logic
LOGIC	Negative Logic Convention (Ground True) State
OTPT	Output
MC	Main Contactor
MCB	Main Circuit Breaker
MCE	Manual Control Enable
MIL	Military Specifications
MOV	Metal-Oxide Varistor
MS	Military Standards
N.C.	Normally closed contact
N.O.	Normally open contact
NA	Not Assigned.
NC	Not Connected
NEMA	National Electrical Manufacturer's Association
NETA	National Electrical Testing Association, Inc
OA	Output assembly
OL	Overlap
P	Pedestrian
PCB	Printed Circuit Board
PK	Package
PRGM	Program
PS	Power Supply
R	Red
R	Receptacle
RDS	Rear Door Switch
RR	Rail Road
RST	Reset
S1	Switch One
SA	Service Assembly
SB1/SB2	Serial Bus 1/ Serial Bus 2
SCB	Signal circuit breaker
SIU	Serial Interface Unit
SP	Switch Pack
SPA	Service Panel Assembly
SSR	Solid State Relay
SW	Switch
T1	Terminal Block One
TBS	Terminal Block Service
TEES	Transportation Electrical Equipment Specifications
TB	Terminal Block
U	Upper
U	Unit
UL	Underwriters Laboratories, Inc
VAC	Voltage Alternating Current
VDC	Voltage Direct Current
Y	Yellow
YEL	Yellow